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Gerald and Patricia Turpanjian School of Public Health
Avedisian Onanian Center for Health Services Research and Development

Institutional consultancy on Assessing Neonatal Care Services at Maternity and Primary Healthcare Levels in Armenia

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ABBREVAITONS

AANM	- Armenian Association of Neonatal Medicine
AECP	- Armenian Eye Care Project
AUA	- American University of Armenia
CEPCB	- Center of Excellence for the Prevention of Childhood Blindness
CHSR	- Center for Health Services Research and Development
CPAP	- Continuous Positive Airway Pressure
ENAP	- Every Newborn Action Plan
ENM	- Early Neonatal Mortality
EU	- European Union
FCNC	- Family Centered Neonatal Care
FGD	- Focus group discussion
GDP	- Gross Domestic Product
GBD	- Global Barden of Disease
HBB	- Helping Babies Breathe
HHHFNC	- Heated, Humidified High-Flow Nasal Cannula
HICs	- High Income Countries
HiT	- Health Systems in Transition
HIV	- Human Immunodeficiency Virus
IDI	- In-depth interview
IMR	- Infant Mortality Rate
LBW	- Low birth weight
LMICs	- Low and Middle Income Countries
M&CHPC	- Mother and Child Health Protection Center
MC	- Medical Center
MDGs	- Millennium Development Goals
MOH	- Ministry of Health
NHF	- Nasal High Flow
NICU	- Neonatal Intensive Care Unit
NIH	- National Institute of Health

NMR	- Neonatal Mortality Rate
NSS	- National Statistical Service
Ob/gyn	- Obstetrician/gynaecologist
OCSC	- Obstetric Care State Certificate
PHC	- Primary health care
RA	- Republic of Armenia
RHPOGC	- Reproductive Health, Perinatology, Obstetrics and Gynecology Center
ROP	- Retinopathy of Prematurity
SDGs	- Sustainable Development Goals
UN	- United Nations
UNICEF	- United Nations' Children's Fund
USAID	- United States Agency for International Development
WHO	- World Health Organization
WV	- World Vision
YSMU	- Yerevan State Medical University

EXECUTIVE SUMMARY

Since 1990, a considerable decrease in the infant mortality rate (IMR) was observed in Armenia, while the reduction of neonatal mortality rate was disproportionately slower. During the last five years, neonatal deaths constituted almost three fourths of all infant deaths and early neonatal mortality had the biggest share in the structure of neonatal mortality with approximately half of all early neonatal deaths occurring within the first day of life. A recent countrywide assessment of neonatal services demonstrated a wide gap between Yerevan and regional maternity hospitals in terms of the availability and quality of specialized services provided to newborns. Therefore, enhancing neonatal services in regional hospitals and primary health care (PHC) facilities could be an effective intervention to achieve further reduction of IMR in Armenia.

The Zvart Avedisian Onanian Center for Health Cervices Research and Development of the Gerald and Patricia Turpanjian School of Public Health, American University of Armenia conducted this study with support from UNICEF to identify the existing needs in neonatal care services of the country in terms of structural changes, qualified human resources, equipment, supplies, and specialized trainings at maternity and PHC levels.

The research applied a mixed study – a combination of desk review, needs assessment via checklists, and a qualitative study. The desk review included review of the available literature on the most effective strategies and the recommended structural characteristics of neonatal services proved to be effective in decreasing neonatal mortality rates in other countries. The checklists gathered information on the availability of necessary equipment, supplies, laboratory tests, human resources, and clinical protocols in selected regional maternity hospitals, as well as the perceived needs of providers for trainings and/or clinical guidelines on different topics of neonatal medicine. The qualitative study applied in-depth interviews (IDI) and focus group discussions (FGD) with different groups of stakeholders to identify their perspectives in restructuring and reinforcing neonatal care services at different levels.

The qualitative study took place in Yerevan and in two marzes – Syunik and Gegharkunik. Four groups of participants were involved in the study: 1) hospital neonatologists, 2) PHC pediatricians and family physicians, 3) representatives of professional and donor organizations, and 4) policymakers/experts. Overall, 14 IDIs and five FGDs were conducted with involvement of 43 participants from Yerevan (15), Syunik (11) and Gegharkunik (17). Also, 17 neonatologists and 21 pediatricians/family physicians completed the checklist on the knowledge areas and the study expert applied the equipment checklist in six regional maternity hospitals.

According to the study findings, in Armenia, during the last decade, neonatology has become more modern specialty compared to other pediatric specialties and has achieved some reduction of neonatal mortality rates, largely due to various donor projects in the field that had high coverage, substantial impact on improving providers' knowledge, organization of newborn transfers, case management of severely ill neonates in regions, and other. The main concern related to donor projects was their limited sustainability, especially, the further functioning of the Armenian Association of Neonatal Medicine (AANM).

The current structure of neonatal care in Armenia that includes over 50 small neonatal units is viewed as both inefficient and ineffective. It does not ensure equal access to quality services for all newborns, as almost all 3rd level Neonatal Intensive Care Units (NICU) are confined to

Yerevan and are less accessible for newborns from regions. Regional facilities are often lacking high quality specialists, equipment and supplies, and the motivation of specialists to treat complicated cases in regional facilities is low because of low salaries they receive, lack of state funding allocated to regional facilities for neonatal care, and procedural restrictions that require transferring sick neonates to higher-level facilities. Because of this, even the available equipment is often left unused in regional facilities.

In the meantime, some facilities in regions are lacking the most vital equipment necessary to stabilize a newborn before the transfer. The most widespread need is the lack of equipment for providing a neonate with heated and humidified air-oxygen mixture during respiratory support. Also, many disposable supplies are insufficient and half of the essential laboratory and diagnostic tests for newborns are unavailable in regions. The neonatal ambulance service of Muratsan hospital is the only such service in the country with its two suboptimally equipped reanimobiles. Transferring neonates to Yerevan from remote areas via this service takes too much time for severely ill neonates. Although in utero transfer of pregnant women at high risk of having ill neonate is recommended, these risks are not always accurately estimated in regions due to the lack of appropriate equipment and qualified specialists. Moreover, maternities are not interested in in-utero transfers as, under the Obstetric Care State Certificate program, they get paid from the state for each delivery.

No quality of care indicators are monitored in neonatal services of Armenia and there is no reliable data on neonatal services, as maternity hospitals are often reluctant to report their actual data. Parents are not provided with unlimited access to their neonates in NICUs. The units often lack conditions for minimizing stress for neonates, providing beds for mothers to sleep in, or areas where they can express milk, which usually results in shifting to formula feeding.

There are no professional qualification standards either for neonatologists or neonatal nurses. The overall quality of education in nursing schools is inadequate. Also, there is a shortage of both neonatologists and neonatal nurses, with the former being especially pronounced in regional maternities and the latter – in Yerevan NICUs. The existing credit system poses several challenges for physicians and nurses, including difficulties for providers from marzes to attend trainings in Yerevan, to pay the cost for their attendance, and to learn independently as there is no supervision of their participation, no opportunities to practice their skills, and no requirement to pass an exam upon completion.

Neonatologists give the highest priority to receiving trainings on neonatal resuscitation, respiratory support, respiratory distress syndrome, pneumonia, asphyxia, encephalopathy, equipment use, and infusion therapy. They appreciate the new guidelines on neonatology developed by the AANM. The main training areas suggested for nurses include neonatal resuscitation, intensive care, respiratory assistance, infusion therapy, storage and administration of antibiotics, monitoring of infant's vital signs, and newborn's stabilization and transportation. PHC providers consider respiratory distress syndrome, pneumonia, low birth weight newborn care and feeding, neonatal hypoglycemia, convulsions, and neonatal jaundice as priority topics for learning. Pediatricians from regions often do not manage to keep the schedule of home visits to newborns in rural areas because of the lack of transportation means allocated for that.

Based on the study findings and suggestions provided by the study participants, the research team developed a set of recommendations that include organizing regular on-site trainings on

neonatal resuscitation for neonatal care providers and adopting a requirement for them to periodically pass an exam on this subject; creating the needed conditions in all maternity hospitals for application of Continuous Positive Airway Pressure (CPAP) with the use of humidified and heated air-oxygen mixture; ensuring round-the-clock availability of personnel skilled in neonatal resuscitation and application of CPAP; developing and monitoring neonatal care quality indicators for all levels of care; standardizing maternal and newborn care with the use of clear indications for hospitalization of pregnant women in different-level facilities with established territorial referral patterns for each facility; providing regional facilities with the needed diagnostic equipment and specialists for accurate prenatal diagnostics, establishing 3rd level referral centers in remote marzes; enhancing neonatal ambulance system in terms of availability, equipping and staffing; creating possibilities to exclusively finance maternal and newborn health care services from the state budget, ensuring the transparency of financial flows and the accountability of maternal and neonatal care services; increasing providers' salaries, providing them with state health insurance and legal protection against work-related violence; making the trainings required in the scope of the credit system free of charge for providers, better mentored, providing practical skills, and requiring an exam upon completion; creating conditions for providers' learning on-practice; setting professional qualification standards for neonatologists and neonatal nurses; making a shift to a system that requires accreditation of doctors to be allowed to practice medicine; promoting family centered care, exclusive human milk feeding and Kangaroo mother care in NICUs; improving pregnant women's education on newborn care and nutrition and couples' knowledge on the importance of preconception screening; developing guidelines on managing neonatal conditions at PHC level; providing transportation means for pediatricians to make visits to newborns in villages; and conducting research on the major determinants of neonatal survival before designing programs to improve neonatal care.

ԱՄՓՈՓՈՒՄ

1990թ. ի վեր Հայաստանում նկատվել է մանկական մահացության զգալի իջեցում, մինչդեռ նորածնային մահացությունն իջել է անհամեմատ ավելի դանդաղ: Վերջին 10 տարիների ընթացքում նորածնային մահերը կազմել են բոլոր մանկական մահերի գրեթե երեք չորրորդ մասը: Ընդ որում, նորածնային մահերի մեծ մասը կազմել են վաղ նորածնային (առաջին 7-օրյա) մահերը, որոնց ավելի քան կեսը տեղի է ունեցել կյանքի առաջին օրվա ընթացքում: Հանրապետությունում վերջերս անցկացված նորածնային ծառայությունների գնահատումն ի հայտ է բերել հսկայական տարբերություն Երևանի և մարզերի ծննդատների միջև՝ նորածիններին ցուցաբերվող մասնագիտական ծառայությունների որակի և մատչելիության առումով: Ուստի, մարզերի հիվանդանոցային և ամբուլատոր բուժսպասարկման օղակներում նորածնային ծառայությունների բարելավումը կարող է արդյունավետ լինել՝ Հայաստանում մանկական մահացության հետագա իջեցումն ապահովելու համար:

Հայաստանի ամերիկյան համալսարանի Ժիրայր և Փաթրիշա Թրփանճեանի անվան հանրային առողջապահության ֆակուլտետի Զուարթ Աւետիսեան Օնանեանի անվան առողջապահական ծառայությունների հետազոտման և զարգացման կենտրոնը ՄԱԿ-ի Մանկական հիմնադրամի աջակցությամբ իրականացրել է սույն հետազոտությունը՝ երկրի նորածնային ծառայություններում առկա կարիքների գնահատման նպատակով՝ ինչպես ծննդատնային, այնպես էլ՝ամբուլատոր օղակներում:

Հետազոտությունը համադրել է մի քանի մեթոդ, այն է՝ արդի գրականության ուսումնասիրություն, կարիքների գնահատում ստուգաթերթերի միջոցով, և որակական հետազոտություն: Գրականության ուսումնասիրությունը ներառել է այլ երկրներում նորածնային մահացության իջեցմանը նպաստած ռազմավարությունների և նորածնային ծառայությունների կառուցվածքային առանձնահատկությունների ուսումնասիրություն: Ստուգաթերթերի միջոցով տեղեկություններ են հավաքվել ընտրված մարզային ծննդատներում առկա կարիքների վերաբերյալ՝անհրաժեշտ սարքավորումների, մատակարարումների, լաբորատոր հետազոտությունների, մարդկային ռեսուրսների և կլինիկական ուղեցույցների առումով: Պարզաբանվել է նաև, թե նեոնատոլոգներն ու մանկաբույժները ո՞ր թեմաներով վերապատրաստումներն ու կլինիկական ուղեցույցներն են համարում առավել կարևոր իրենց գործունեության համար: Որակական հետազոտությունը ներառել է խորացված հարցազրույցներ (ԽՀ) և խմբային քննարկումներ (ԽՔ) շահագրգիռ անձանց տարբեր խմբերի հետ՝ պարզելու նրանց կարծիքը, թե ինչպես կարելի է վերակառուցել և ուժեղացնել նորածինների բուժսպասարկումը տարբեր մակարդակներում:

Որակական հետազոտությունն իրականացվել է Երևանում և երկու մարզում՝ Սյունիքի և Գեղարքունիքի: Մասնակիցների չորս խումբ են ներգրավվել այս հետազոտության մեջ. 1) հիվանդանոցի նեոնատոլոգներ, 2) առաջնային օղակի մանկաբույժներ և ընտանեկան բժիշկներ, 3) մասնագիտական և դոնոր կազմակերպությունների ներկայացուցիչներ և 4) քաղաքականություն մշակողներ/ փորձագետներ: Ընդամենը, 14 ԽՀ և 5 ԽՔ է անցկացվել 43 մասնագետի մասնակցությամբ, այդ թվում՝ 15-ը՝ Երևանից, 11-ը՝ Սյունիքից և 17-ը՝ Գեղարքունիքից: Նաև, 17 նեոնատոլոգ և 21 մանկաբույժ/ընտանեկան բժիշկ լրացրել են մասնագիտական

մի շարք թեմաներով ուսուցման կարևորության սանդղակը, իսկ ծրագրի խորհրդատուն լրացրել է առկա կարիքների վերաբերյալ ստուգաթերթերը վեց մարզային ծննդատներում:

Հետազոտության արդյունքները ցույց են տվել, որ վերջին 10 տարվա ընթացքում Հայաստանում նեոնատոլոգիան դարձել է ավելի ժամանակակից մասնագիտություն՝ համեմատած այլ մանկաբուժական մասնագիտությունների հետ: Դրա շնորհիվ նկատվել է նորածնային մահացության ցուցանիշի որոշ իջեցում՝ հիմնականում պայմանավորված տարբեր դոնորական ծրագրերի գործունեությամբ, որոնք ունեցել են մեծ ընդգրկում և զգալիորեն նպաստել են բուժաշխատողների գիտելիքների հարստացմանը, նորածինների տեղափոխությունների բարելավմանը, նորածնային ծանր դեպքերի կայունացմանը մարզերում և այլն: Դոնոր ծրագրերի հետ կապված հիմնական մտահոգությունը եղել է դրանց շարունակականության խնդիրը, հատկապես՝ Նորածնային բժշկության հայկական ասոցիացիայի (ՆԲՀԱ) հետագա գործունեության ապահովման անհրաժեշտությունը:

Հայաստանի նորածնային ծառայությունների ներկայիս կառուցվածքը, որը ներառում է ավելի քան 50 փոքր նորածնային բաժանմունք, հետազոտության մասնակիցների կողմից համարվել է և՛ անարդյունավետ, և՛ աննպատակահարմար: Այդպիսի կառուցվածքը չի ապահովում որակյալ ծառայությունների հավասար մատչելիություն բոլոր նորածինների համար, քանի որ գրեթե բոլոր 3-րդ մակարդակի նորածնային ինտենսիվ թերապիայի բաժանմունքները (ՆԻԹԲ) կենտրոնացված են Երևանում և դժվարամատչելի են շրջանների բնակիչների համար: Մարզային ծննդատներում հաճախ չկան բաձրորակ մասնագետներ, անհրաժեշտ սարքավորումներ և պարագաներ, իսկ մասնագետները շահագրգռված չեն բուժել հիվանդ նորածիններին, քանի որ այդ մակարդակի ծննդատները չեն ստանում պետական ֆինանսավորում հիվանդ նորածինների բուժման համար, բուժաշխատողների աշխատավարձը շատ ցածր է, իսկ գործող կանոնակարգերը սահմանափակում են նրանց գործունեության շրջանակը՝ պահանջելով հիվանդ նորածիններին ուղեգրել ավելի բարձր մակարդակի բուժհաստատություններ: Այդ պատճառով, մինչև իսկ այն սարքերը, որոնք առկա են մարզային ծննդատներում, հաճախ այդպես էլ չեն օգտագործվում: Միևնույն ժամանակ, որոշ մարզային ծննդատներ չունեն կենսականորեն անհրաժեշտ այնպիսի սարքավորումներ, որոնք թույլ են տալիս կայունացնել նորածնի վիճակը՝ մինչև նրան տեղափոխելը: Ամենից տարածված կարիքը այն սարքավորումների բացակայությունն է, որոնց համատեղ ներկայությունը կարող է ապահովել նորածնի շնչառական աջակցությունը տաքացված և խոնավացված օդա-թթվածնային խառնուրդով: Նաև, միանգամյա օգտագործման շատ առարկաների քանակն անբավարար է, իսկ անհրաժեշտ լաբորատոր և գործիքային հետազոտությունների միայն կեսն է հնարավոր իրականացնել մարզային ծննդատներում:

«Մուրացան» ԲԿ-ի նորածնային շտապ օգնության ծառայությունը միակն է հանրապետությունում՝ իր երկու ռեանիմոբիլներով, որոնց տեխնիկական հագեցվածությունը օպտիմալից ցածր է: Այս ծառայության միջոցով նորածիններին հեռավոր շրջաններից տեղափոխելու համար պահանջվող ժամանակը չափազանց երկար է ծանր հիվանդ նորածինների համար: Թեև հիվանդ երեխա ծննդաբերելու մեծ

ռիսկ ունեցող հղի կանանց պտղի ներարգանդային տեղափոխությունը ավելի բարձր մակարդակի ծննդատուն մեծապես ցուցված է, այդ ռիսկը ոչ միշտ է ճիշտ գնահատվում մարզերում՝ անհրաժեշտ ախտորոշիչ սարքերի և որակյալ մասնագետների բացակայության պատճառով: Ավելին, ծննդատները շահագրգռված չեն կատարել ներարգանդային տեղափոխություններ, քանի որ Ծննդօգնության պետական հավաստագրի ծրագրով նրանք ստանում են գումար պետությունից՝ իրենց մոտ տեղի ունեցած յուրաքանչյուր ծննդաբերության համար:

Հայաստանի նորածնային բաժանմունքներում որևէ որակի ցուցանիշ չի մշտադիտարկվում, և ծննդատների գործունեության վերաբերյալ առկա տվյալները վստահելի չեն, քանի որ ծննդատները հաճախ չեն ցանկանում զեկուցել իրենց իրական տվյալները: Ծնողները չունեն անսահմանափակ մուտք ՆԻԹԲ-ում բուժվող իրենց նորածինների մոտ: Այդ բաժանմունքները հաճախ չունեն պայմաններ, որպեսզի նվազագույնի հասցնեն նորածինների սթրեսը, մայրերին մահճակալ տրամադրեն քնելու համար կամ տարածք՝ որտեղ նրանք կարող են կթել կրծքի կաթը: Սա սովորաբար հանգեցնում է նորածնի անցմանը արհեստական սնուցման:

Ո՛չ նեոնատոլոգների, ո՛չ էլ նորածնային բուժքույրերի համար մասնագիտական որակավորման ստանդարտներ գոյություն չունեն: Կրթության ընդհանուր որակը բուժքույրական ուսումնարաններում անբավարար է: Բացի այդ, առկա է թե՛ նեոնատոլոգների, թե՛ բուժքույրերի թվաքանակի պակաս: Նեոնատոլոգների պակասը հատկապես զգալի է մարզային ծննդատներում, իսկ նորածնային բուժքույրերինը՝ Երևանի ՆԻԹԲ-ներում: Կրեդիտային համակարգը զգալի դժվարություններ է ստեղծում ինչպես բժիշկների, այնպես էլ՝ բուժքույրերի համար: Այդ դժվարություններից են՝ շրջանի բուժաշխատողներին ներկայացվող պահանջը՝ մասնակցել դասընթացներին Երևանում, ինչպես նաև՝ բուժաշխատողներին պարտադրելը՝ կուրսերի համար վճարել սեփական գրպանից և սովորել անկախ, քանի որ վերապատրաստվողի մասնակցությունը չի վերահսկվում, նրան չի ընձեռվում իր սովորածը գործնականում կիրառելու հնարավորություն, և նրանից չի պահանջվում ավարտական քննություն հանձնել:

Նեոնատոլոգներն ամենից շատ կարևորում են դասընթացները նորածնի վերակենդանացման, շնչառական աջակցության և թթվածնաբուժության, շնչառական խանգարումների և թոքաբորբի, ասֆիքսիայի և էնցեֆալոպաթիայի, սարքերի օգտագործման և ինֆուզիոն թերապիայի թեմաներով: Նրանք բարձր են գնահատում ՆԲՀԱ կողմից մշակված կլինիկական ուղեցույցները: Նորածնային բուժքույրերի համար նրանք կարևորում են ուսուցումը նորածնի վերակենդանացման, ինտենսիվ թերապիայի, շնչառական աջակցության, ինֆուզիոն թերապիայի, հակաբիոտիկների պահպանման և օգտագործման, նորածնի կենսական նշանների վերահսկման, նրա վիճակի կայունացման և տեղափոխման թեմաներով: Առաջնային օղակի բժիշկներն առավել կարևորում են նորածնի շնչառական խանգարումների և թոքաբորբի, ծննդյան ցածր քաշով նորածնի խնամքի և սնուցման, նորածնային հիպոգլիկեմիայի, ցնցումների և նորածնային դեղնուկի թեմաներով դասընթացները: Մարզերի մանկաբույժները հաճախ չեն կարողանում իրականացնել պահանջվող տնային այցելությունները գյուղերում գտնվող նորածիններին, քանի որ դրա համար փոխադրամիջոց չունեն:

Ելնելով հետազոտության արդյունքներից և մասնակիցների առաջարկներից՝ հետազոտող խումբը մշակել է հանձնարարականներ, որոնք ներառում են. նորածիններին բուժօգնություն տրամադրող անձնակազմի համար պարբերաբար տեղերում անցկացնել նորածնի վերակենդանացման թեմայով դասընթաց և ընդունել կարգ, որ նրանք պարբերաբար քննություն հանձնեն այս թեմայով; բոլոր ծննդատներում ստեղծել անհրաժեշտ պայմաններ՝ խոնավացված և տաքացված օդա-թթվածնային խառնուրդով նորածնի շնչուղիների շարունակական դրական ճնշում (ՇՇԴՃ կամ CPAP) կիրառելու համար; ապահովել նորածնի վերակենդանացման և ՇՇԴՃ կիրառության հմտություններին տիրապետող բուժանձնակազմի շուրջօրյա ներկայությունը ծննդատներում; բուժսպասարկման բոլոր մակարդակների համար մշակել և մշտադիտարկել նորածնային բուժօգնության որակի ցուցանիշներ; ստանդարտացնել մոր և մանկան բուժօգնությունը՝ կիրառելով հղի կանանց հիվանդանոց ուղեգրելու հստակ ցուցումներ տարբեր մակարդակի հաստատություններում, և յուրաքանչյուր հաստատության համար մշակելով տարածքային ուղեգրումների հստակ կարգ; շրջանային բուժհաստատություններին տրամադրել անհրաժեշտ ախտորոշիչ սարքեր և մասնագետներ՝ նախածննդյան շրջանում ճիշտ ախտորոշման համար; հիմնել նորածնի ուղեգրման 3-րդ մակարդակի կենտրոններ հեռավոր մարզերում; ուժեղացնել նորածնային շտապ օգնության համակարգը՝ դարձնելով այն ավելի մատչելի և հագեցած սարքավորումներով և բուժանձնակազմով; գտնել միջոցներ՝ մոր և նորածնի բուժսպասարկումը բացառապես պետական միջոցներով իրականացնելու համար՝ ապահովելով ֆինանսական հոսքերի թափանցիկությունը և մոր և մանկան բուժծառայությունների՝ կատարած ծախսերի համար հաշվետու լինելը; բարձացնել բուժաշխատողների աշխատավարձը, տրամադրել նրանց առողջության պետական ապահովագրություն և իրավական պաշտպանություն աշխատանքի հետ առնչվող բռնությունից; կրեդիտային համակարգի շրջանակներում պահանջվող դասընթացները բուժաշխատողների համար դարձնել անվճար, ավելի լավ վերահսկվող, գործնական հմտություններ տվող և ներկայացնել քննության պահանջ՝ դասընթացն ավարտելու համար; ստեղծել պայմաններ՝ բուժաշխատողների աշխատանքից չկտրված ուսուցման համար; սահմանել մասնագիտական որակավորման ստանդարտներ նեոնատոլոգների և նորածնային բուժքույրերի համար; անցում կատարել բժիշկների լիցենզավորում պահանջող համակարգի; ՆԻԹԲ-ներում խրախուսել ընտանիքակենտրոն բուժօգնությունը, բացառապես մարդկային կաթով սնուցումը և Կենգուրու-մայր խնամքը; բարելավել հղի կանանց գիտելիքները նորածնի խնամքի ու կերակրման մասին, և զույգերի տեղեկացվածությունը՝ նախաբեղմնավորման սկրինինգի կարևորության մասին; մշակել նորածնի հիվանդությունների ամբուլատոր վարման ուղեցույցներ; գյուղերում նորածիններին այցելելու համար մանկաբույժներին տրամադրել փոխադրամիջոց; և իրականացնել Հայաստանում նորածնային մահացության հիմնական կանխորոշիչների հետազոտություն՝նախքան նորածնային բուժծառայությունների բարելավման ծրագրեր մշակելը:

1. INTRODUCTION

1.1 Study rationale

Although there was a clear decreasing tendency in the infant mortality rate (IMR) in Armenia during the last several decades, the latest official data indicate no positive trend in IMR during the last three years (8.7 per 1,000 live births in 2014, 8.9 in 2015, and 8.8 in 2016). Increasingly, deaths in neonatal period constitute the main component of infant mortality, currently accounting for over three-forth of deaths during infancy. Perinatal causes (including asphyxia and trauma), congenital abnormalities, respiratory diseases, infections and prematurity are the main causes of neonatal deaths. A recent countrywide assessment of neonatal services demonstrated a wide gap between Yerevan and regional maternity hospitals in terms of availability and quality of specialized services provided to newborns. This gap, along with the lack of appropriate referral system of neonates in the country, seriously decreases the chances of survival of critically ill neonates born in regional hospitals. The differences between the services provided in the capital city and in regional hospitals concern both the availability of qualified medical personnel and the presence of modern equipment and supplies. Inadequate quality of emergency neonatal care services at regional hospitals aggravates this situation further.

Enhancing neonatal services in regional hospitals and primary health care facilities could be an effective intervention for further decreasing the IMR in Armenia. For this purpose, it is very important to identify the existing needs in regional health care facilities in qualified human resources and equipment/supplies, as well as to reveal the areas where some specific actions are needed, such as establishing an effective referral system between primary, secondary and tertiary level health care facilities, making high-quality emergency neonatal care and transfers available in regions, conducting trainings of neonatologists in knowledge and skill areas of perceived high priority, and providing the needed equipment and supplies to the regional hospitals.

The United Nations Children's Fund (UNICEF) Armenia expressed its commitment to collaborate with the Government of Armenia in reinforcing neonatal care services at different levels in the Country Program Document that describes the plans for the next five years (2016-20). In the scope of this commitment, UNICEF supported AUA Zvart Avedisian Onanian Center

for Health Cervices Research and Development (CHSR) to conduct a small-scale formative assessment of neonatal services in Armenia to identify the existing needs in structural changes, qualified human resources, equipment, supplies, and specialized trainings at maternity and primary health care levels. Based on this assessment, a comprehensive and feasible set of interventions for a three-year period will be developed and supported by UNICEF to meet the identified needs of neonatal services in Armenia.

1.2 Study objectives

The objectives of the current study were:

1. To conduct a desk review of available sources and documents to identify the existing problems with neonatal care in middle and high income countries (including the Russian Federation (RF)) and the recommended structural characteristics of neonatal services that are proved to be effective in decreasing neonatal mortality rates;
2. To identify current situation of implementation of programmatic interventions (policy interventions, development of clinical modules and guidelines, capacity building of providers on newborn care and resuscitation) by main donor and partner organizations (USAID, VivaCell-MTS, Armenian Neonatal Association, and others) during the last five years;
3. To assess the availability of required equipment for intensive neonatal care in regional maternities and pediatric hospitals as compared to the Ministry of Health (MOH) approved standards through gathering information from donors on equipment provided during the last years and through a few visits to selected facilities;
4. To assess the human resources of regional maternities in terms of availability of qualified neonatologists and neonatal nurses through a few visits to selected facilities;
5. To identify the knowledge and competency areas concerning basic principles of provision of newborn care and resuscitation where there is perceived need among neonatologists and pediatricians for additional training/competency building and clinical modules/guidelines.
6. To develop recommendations to improve the organization of neonatal services addressing the issues identified during the study and to improve the knowledge of healthcare providers in the identified areas of perceived need for additional trainings and competency building among neonatologists, pediatricians, and family physicians.

2. DESK REVIEW OF AVAILABLE SOURCES

2.1 Neonatal mortality as a global target

The United Nations (UN) Sustainable Development Goals (SDGs) have come into force since January 2016 and set targets by 2030. These goals call for universal action to eliminate poverty, protect the globe, and create preconditions for all people to live in peace and prosperity.[1] SDGs aim to accelerate and expand the progress achieved globally under the Millennium Development Goals. Good health and well-being is the third of the 17 SDGs, and the second target of this goal states: "By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births".[2] During the period of 1990-2015 covered by the Millennium Development Goals (MDGs), under-five mortality declined by 52% from 12.1 million to 5.8 million.[3] However, this reduction was mainly attributable to the decrease (by at least 50%) in post-neonatal (1-11 months old) and childhood (1-4 years old) mortality, while the reduction in neonatal mortality was less pronounced.[4] The global rate of neonatal mortality (during 1-28 days of life) decreased by 42.4%, from 4.6 million in 1990 to 2.6 million in 2015.[3] In 2015, neonatal deaths accounted for 45% of under-five deaths compared to 37.6% in 1990.[3] Among these deaths, the share of early neonatal deaths (occurring during the first 7 days of life) was 73%, and the share of the first 24-hour deaths 36%, indicating that the first week and, in particular, the first day of life is the most vulnerable period for a child.[5] In 2015, the global neonatal mortality rate was 18.6 per 1000 livebirths, which is higher than among all other age groups of children.[3] According to a recent analysis of the causal structure of under-five mortality worldwide, while there are considerable gains in child survival from nutritional deficiencies and infections, no gains are observed for neonatal conditions and congenital anomalies, especially in lower-income countries.[3] Therefore, the success of further reduction of under-five mortality heavily depends on the extent of achieving reduction in neonatal, and particularly, early neonatal mortality. Considering this, in 2014, the World Health Assembly launched Every Newborn Action Plan (ENAP) that set a target to reduce neonatal mortality rates below 10 deaths per 1000 live births in all countries by 2035, mainly focusing on cost-effective interventions during antenatal period, at the time of birth and during the first week of life.[6]

During the period covered by the MDGs, the pace of reduction of child mortality rates varied widely across countries. Large between-country differences were observed for neonatal mortality rates (in 2015, this rate was as low as 0.95 deaths per 1000 livebirths in Iceland and as high as 40.6 deaths per 1000 livebirths in Mali). The following factors were the main contributors of a greater success in reducing child mortality rates: raised per person income levels, increased educational attainment of women, decreased fertility rates; strong public health programs; and improvements in health technologies and systems.[3] National governments' and developmental partners' increased financial commitment to child health issues were prerequisites for the success and the main factors underlying the diverging levels of success between countries included funding levels (absolute and relative), governance styles, health-systems' effectiveness, and implementation of well-targeted health programs and intervention packages.[3]

2.2 Effective strategies to reduce neonatal mortality

With technological advances in the clinical care of sick newborns, the causal structure of neonatal mortality has been changed in High Income Countries (HICs) and non-preventable conditions such as congenital abnormalities have become the primary causes of neonatal deaths. Yet, in Low and Middle Income Countries (LMICs), preventable conditions, such as infections, birth asphyxia, and prematurity, remain the main causes of neonatal deaths.[7,8] Besides between-country differences in neonatal mortality rates (NMRs) and its causal structure, there are differences between different sectors of population in the same countries as well with higher NMRs among deprived segments of population having limited access and utilization of quality hospital-based services for maternal and newborn care.[9,10]

There is substantial evidence on interventions that have been shown to be effective in improving neonatal care outcomes in HICs, while the evidence on this from LMICs is quite limited.[11,12] Nevertheless, in 2005, it was estimated that approximately two-thirds of neonatal deaths can be avoided in LMICs with implementation of several feasible and cost-effective intervention packages to be practiced with high coverage at both community/family (via outreach services) and hospital levels.[13] For intrapartum period, the package of suggested interventions include emergency obstetric and neonatal care with timely management of delivery complications, application of antibiotics for preterm and premature rupture of membranes and prescription of

antenatal corticosteroids in the case of preterm labour. For postnatal period, the suggested interventions include resuscitation of a neonate and emergency neonatal care for infections, asphyxia, prematurity, and jaundice; case management for pneumonia; and special care for low birthweight neonates that should include provision of additional warmth, appropriate hygiene, feeding with breast milk and Kangaroo mother care.[13] The listed interventions are considered especially effective in decreasing neonatal mortality rates (NMRs) in countries with the highest NMRs, while in countries with the rates close to the average worldwide rate of 15 per 1000 livebirths, up to 50% reduction is expected with universal coverage of the population with the full set of these interventions on both the community/family and the clinical care levels.[13] Although interventions at the clinical care level are more costly to implement and more challenging in terms of available human resources, these interventions are also proved to be very cost-effective. In countries with relatively low NMRs, the interventions on clinical care level have no alternatives to achieve further reduction of neonatal mortality.[13]

In low-resource settings, stimulation and ventilation are believed to be the most effective steps of neonatal resuscitation that contribute to NMR reduction, whereas technically sophisticated procedures, e.g. intubation and chest compression add only little benefit in terms of further reduction of neonatal mortality in such settings.[10] A recent review of up-to-date research on newborn resuscitation recommends several evidence-based strategies for successful resuscitation of newborns. These include the use of pulse oximetry or electrocardiogram in the delivery room to monitor the newborn's response to resuscitation, resuscitation beneath a radiant heat source, the initial use of humidified and heated air or low (30%) oxygen concentrations rather than 100% oxygen to avoid hypothermia and hyperoxemia in the infant, the application of positive airway pressure or the combination of this with surfactant administration via brief intubation or less invasive techniques (feeding tube or small catheter) as an alternative to routine intubation for extremely preterm newborns, the use of antenatal magnesium sulfate in the case of very preterm delivery to reduce cerebral palsy in the infant (along with antenatal administration of corticosteroids, antibiotics, and tocolytics), the application of moderate hypothermia for 72 hours after birth as a neural rescue therapy for term infants with moderate-to-severe hypoxic-ischemic encephalopathy, the use of delayed cord clumping and the avoidance from routine suctioning of trachea for those babies born through meconium-stained amniotic fluid.[12]

There are training programs on neonatal resuscitation especially designed for providers in low-resource settings that are shown to be efficient and effective in reducing neonatal mortality. It is estimated that in LMICs, facility-level trainings on neonatal resuscitation may avert up to 30% of neonatal deaths related to intrapartum causes. One of the training programs developed by the American Academy of Pediatrics, Helping Babies Breathe (HBB), includes steps to establish breathing (spontaneously or with ventilation via self-inflating bag and mask), to ensure thermoregulation, hygiene, breastfeeding, premature baby care, and detection of danger signs while omitting chest compression, medications, and other advanced procedures.[10] However, different-intensity post-resuscitation care should be available for neonates after resuscitation, first, in the setting of birth (supportive newborn care and monitoring), next, in the setting of the referral hospital that should be easily accessible from the place of birth and able to provide the needed level of care that includes breathing support (via continuous positive airway pressure (CPAP) or mechanical ventilation as needed), maintenance of adequate oxygenation and thermal, glucose, and fluid balance. Usually, this should be a tertiary-level care setting connected with the local setting via emergency transport system which is equipped accordingly to provide basic supportive care to newborns and maintain their temperature and blood glucose level during transportation.[10]

The use of CPAP is a recent trend in LMICs to support breathing of low birthweight babies at a lower cost than in the case of mechanical ventilation. A randomized controlled trial conducted in Armenia demonstrated that continuous positive airway pressure can be administered to newborns via more simple and less expensive technology – bubble CPAP – with results comparable to the use of flow driver CPAP.[14] A recent review[15] of the effectiveness of the use of nasal CPAP in LMICs identified several concerns. These include the following technical aspects:

- the use of various types of devices for CPAP in the same geographical area (especially if these are brought by different donors) that makes difficult the development of a unified clinical protocol on the application of this method;
- the difficulties of providing air with the needed level of oxygenation because of the lack of piped air and oxygen in low-resource settings, because of which an air-flow driver is used (usually, an air compressor with an air-oxygen blender with the oxygen provided from an oxygen concentrator or, less preferably, oxygen cylinder);

- the technical and financial difficulties of using heated and humidified gases;
- the often unmet need of incorporating a simple oxygen analyzer into the system to measure the oxygen flow rate and fraction, especially when concentrators are used as the sources of gases;
- the need to use special low-resistance nasal prongs that occlude the nasal orifices, which are not always available; and
- the frequent need of re-using circuits because of high cost of obtaining new circuits.[15]

The preparedness of nursing staff to care for and to monitor neonates on CPAP is also often inadequate in low-resource settings.[15] Because of these problems, the complications of CPAP (nasal trauma, pneumothorax, infection, hyperoxaemia and retinopathy of prematurity) are more frequent in these settings. However, with appropriate financing, successful leadership and motivation of the medical staff, this rather complicated method of neonatal respiratory support has the potential to become a useful tool for improving newborn survival in LMICs.[15] Indeed, the recent evidence (although mainly from HICs) indicates that the combination of gentle respiratory support (CPAP, Nasal Intermittent Positive Pressure Ventilation, or Nasal High-Flow Therapy, whenever possible) while targeting oxygen saturation levels less than 90%, provision of intratracheal surfactant via less invasive techniques, and optimal nutrition (first, parenteral nutrition with starter solutions of high nutrient concentrations, then breast milk, often supplemented with micronutrient-containing powders) is the optimal treatment for extremely premature infants, which allows to reduce complications such as bronchopulmonary dysplasia, neurological and developmental abnormalities, retinopathy of prematurity, and necrotizing enterocolitis, and to achieve desirable growth rates in these infants.[16,17]

A number of various innovative interventions to reduce neonatal mortality are currently being implemented and evaluated in different countries to improve the quality of maternal and neonatal healthcare services. These interventions include projects to improve referral systems, to introduce novel methodologies for training of healthcare providers, to develop and promote professional associations, to try new and original approaches of supportive supervision, to improve availability of blood products, and others. The evaluations of these interventions will

create a basis for developing evidence-based effective strategies for enhancing maternal and neonatal services in LMICs.[11]

An overview of the existing systematic reviews on the effectiveness of different approaches to improve the outcomes of care for women and neonates has demonstrated that, at the facility level, strategies for improving professional practice, providers' in-service trainings, and creating specialty teams were all related to improved outcomes of mother and newborn care.[11] However, most of the findings on these were limited to HICs, while the evidence of interventions proved to be effective in reducing neonatal mortality in LMICs is insufficient in order to recommend specific evidence-based strategies for improving neonatal care in these countries.[11]

The analysis of the effectiveness of interventions carried out in different countries to improve neonatal services has demonstrated that the most important aspect of care related to better outcomes was its quality. Measures that focused on increased access to hospital care, improved facility infrastructure, better referral system, or training of providers, often failed to materialize the expected health outcomes for mothers and neonates unless accompanied with improved quality of care.[9] In the discussed overview, the quality of care was judged as sufficient if meeting all the quality requirements including clinical care quality (in terms of safety and effectiveness), interpersonal (patient-centered care) and contextual aspects of care, with the latter covering the timeliness of the care (no waits or delays detrimental for health), its efficiency (no waste of material and human resources) and equity (no variations in care as a result of differences in income levels, socio-demographic characteristics or geographic location of patients).[9]

There are several important principles that should be followed when designing a program for reducing neonatal mortality rate in a country with limited resources.[8] These principles include:

- First of all, satisfying the basic needs of healthy neonates at the primary care level via ensuring that they receive the best care corresponding to up-to-date evidence-based standards. This should include appropriate hygiene, maintenance of warmth, promotion of breastfeeding, timely vaccination, and surveillance for jaundice and infections.

- Ensuring equal access of all neonates to facilities providing high quality primary- and secondary-level care, and only then, as the resources permit, to those facilities providing tertiary-level care.
- Not only providing optimal resources to neonatal units according to the existing recommendations, but ensuring their optimal use via creating easy access to each level of care. For this purpose, the factors that deter the optimal use of services should be identified in each community and eliminated with the support of appropriate government agencies.
- Before investment in advanced neonatal technology, the proved cost-effective means for optimal newborn care must be given priority, including neonatal resuscitation.
- The major determinants of neonatal survival in the community should be identified via research and considered when designing the program. High priority should be given to research activities that support informed decisions.
- When advanced neonatal care is possible, its optimal use should be the goal via proper organization of services including the system of transportation and referrals.
- An auditing system should be incorporated at all levels of care to monitor all aspects of its quality, including acceptability, utilization, cost, and effectiveness in terms of newborn survival and other health outcomes.[8]

2.3 Current situation with neonatal mortality and neonatal services in Armenia

According to National Statistical Service (NSS) data, since 1990, a considerable decrease in the infant mortality rate (IMR) was observed in Armenia. However, the reduction of neonatal mortality rate (NMR) over the same period was disproportionately slower, leading to gradual increase in the proportion of deaths occurring during the first 28 days of life in the age structure of infant mortality. During the last five years, neonatal deaths constituted almost three fourths of all infant deaths (Table 1). Meanwhile, early neonatal mortality (ENM) had the biggest share in the structure of neonatal mortality; e.g., in 2015, seventy-three percent of all neonatal deaths occurred during the first seven days of life.

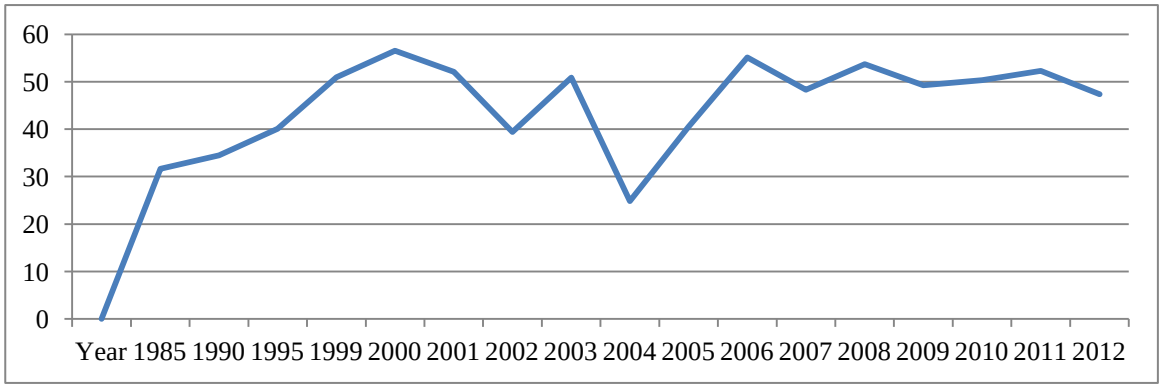
Table 1. Infant (under 1 year) and neonatal (under 28 days) mortality rates in Armenia since 1990*

Year	1990	1995	2000	2005	2010	2011	2012	2013	2014	2015
IMR	18.3	14.2	15.8	12.3	11.4	11.7	10.8	9.7	8.7	8.9
NMR	8.9	7.5	9.5	8.5	7.8	8.6	8.0	7.3	6.7	6.3
% of NMR	48.6	52.8	60.1	69.1	68.4	73.5	74.1	75.3	77.0	70.8

* Number of deaths per 1000 live births, NSS data

According to the available data from the National Institute of Health (NIH) of the Republic of Armenia (RA), approximately half of all early neonatal deaths in Armenia occur within the first day of life, which makes critical early efforts by perinatal services to prevent those deaths. Indeed, over the last decades, there was no decreasing trend in the proportion of first 24-hour deaths in the structure of ENM in Armenia (Figure 1).

Figure 1. Percentage of first 24-hour deaths in the structure of early neonatal mortality in RA, NIH



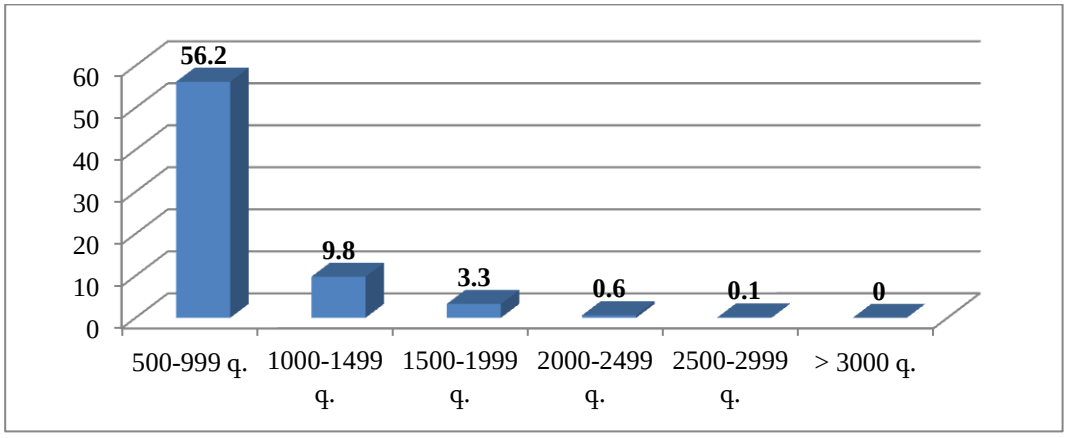
The real situation with early neonatal mortality rates and, especially, first 24-hour deaths could be more serious than the official numbers indicate, as an analysis of the available data demonstrated a possible tendency of reporting a portion of early neonatal deaths as stillbirths in some maternity hospitals, thus hiding the real burden of early neonatal mortality in Armenia.[18]

According to annual reports to NIH from the hospital neonatal departments that serve as referral centers for newborns, among the diseases causing early neonatal deaths, the most frequent ones are respiratory distress syndrome and inborn pneumonia, followed by congenital defects and asphyxia/ intrauterine hypoxia (e.g., in 2014, these conditions caused, respectively, 29.3%; 28.0%; 20.0%, and 17.3% of the early neonatal deaths in these departments).

In total, there are 62 hospitals in Armenia that provide different level maternal and neonatal care[19] and three referral hospitals for neonates, of which two (Muratsan University Hospital and "Surb Astvatsamayr" MC) are located in Yerevan and one (Austrian Hospital) in Gyumri. Based on the official data from the NIH, in 2014, approximately two thirds (142 or 65.4%) of the registered cases of early neonatal deaths (n=217) occurred in maternity hospitals and one third (75 or 34.6%) in neonatal departments of referral hospitals. This ratio slightly improved in 2015: of the registered 191 early neonatal deaths, 109 (57.1%) took place in maternities and 82 (42.9%) in referral hospitals. Still, these numbers might indicate some problems in maternities with stabilization and timely transportation of critically ill neonates to referral hospitals.

The share of deaths among low birth weight (LBW) babies is substantial in the structure of ENM. The NIH data for 2014 indicates that 87.4% of all early neonatal deaths in Armenia occurred among LBW newborns. To the highest extent, this refers to the category of extremely LBW babies (under 1000g). According to the NIH data, in 2014, of the 552 births in this weight category, only 89 (16%) were registered as livebirths, of whom 57 (64%) died during the first seven days of life, with the vast majority (50 children or 88%) dying in maternity hospitals and only 7 (12%) in referral hospitals.

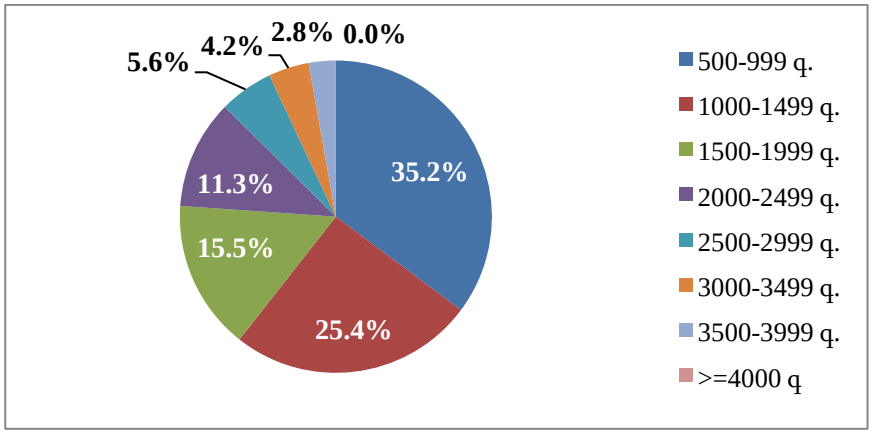
Figure 2. Percentages of early neonatal deaths in each weight category, 2014, NIH maternity data



A clear inverse relation was observed between birthweight and frequency of dying during early neonatal period, especially in maternity hospitals. Figure 2 depicts the percentages of those livebirths in each weight category who died during the first 7 days of life in maternity hospitals according to NIH data for 2014. These proportions range from as high as 56.2% for those born

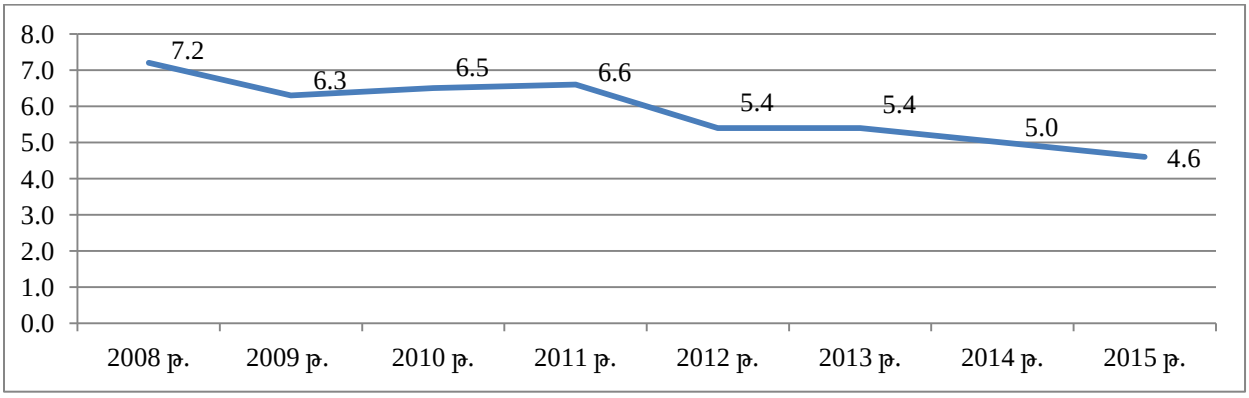
with extremely low birthweight to practically 0% for those born with a birthweight of ≥3000 or more. Accordingly, in the structure of ENM in maternity hospitals, mortality among extremely premature babies constitutes the highest proportion (35.2%), and a substantial portion (70%) of ENM in maternity hospitals is attributable to deaths among LBW (< 2500g) neonates (Figure 3). The provided data indicate the importance of targeted interventions to improve the care of LBW neonates in maternity hospitals, as these have the highest potential of achieving a sizable reduction in neonatal mortality in the country.

Figure 3. Structure ENM in maternity hospitals by birthweight category in Armenia, 2014, NIH



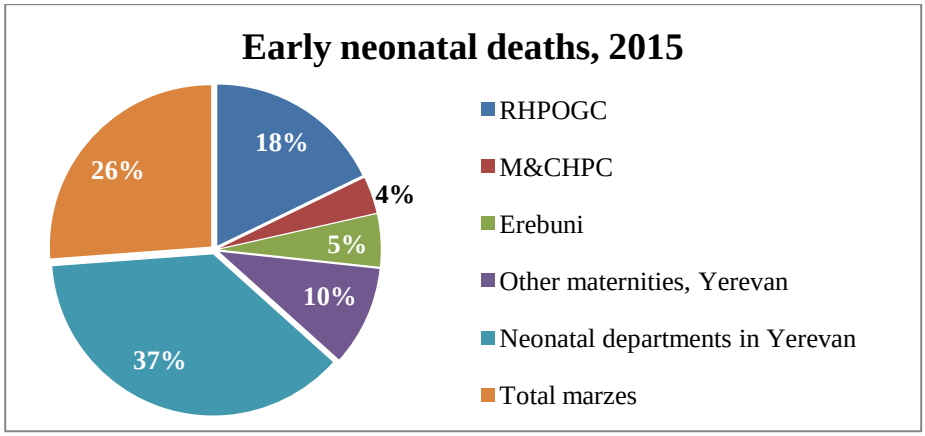
During the recent years, donor and professional organizations were engaged in a number of activities to strengthen neonatal services in Armenia. These activities are described in the next chapter. Due to these, a positive dynamics in the rates of ENM was observed (Figure 4). However, there is still a considerable room for improvement. A recent countrywide assessment of neonatal services in Armenia carried out by the Armenian Association of Neonatal Medicine (AANM) in the scope of the USAID-funded project[19] demonstrated a wide gap between Yerevan and regional maternity hospitals in terms of the availability and quality of specialized services provided to newborns. This, along with the lack of appropriate referral system in the country for neonates seriously decrease the chances of survival of critically ill neonates born in regional hospitals. The differences between the services provided in the capital city and in regional hospitals concern both the availability of qualified medical personnel and the presence of modern equipment and supplies.[19] Inadequate quality of emergency neonatal care services at regional hospitals aggravates this situation further.

Figure 4. Early neonatal mortality rates in Armenia, 2008-2015, NIH



The quality of neonatal care provided in some second and third level maternity hospitals is a matter of concern in the marz centers and Yerevan. The above-mentioned assessment identified serious shortcomings in a number of these hospitals in terms of overreliance on Cesarean sections, unavailability of some important laboratory tests, lack of any equipment for respiratory support in many second level maternity hospitals and inadequate quantity of some critical equipment in a number of third level hospitals, inadequate quantity of qualified medical and nursing staff in many of these settings, etc.[19] The use of diverse equipment and reporting forms in different Yerevan hospitals was also highlighted as being an obstacle in following uniform protocols, performance indicators and quality standards.[19] Given that hospitals in Yerevan are referral centers for complicated births from the regions and that currently about three fourths of all early neonatal deaths in Armenia occur in Yerevan (Figure 5),[18] improving the quality of care in Yerevan hospitals is also vitally important for further reducing neonatal mortality in the country.

Figure 5. Early neonatal deaths in Armenia by place of occurrence, 2015



2.4 Recent initiatives in the field of neonatal care in Armenia

Over the last several years, a number of initiatives were undertaken in Armenia by donor and professional organizations to strengthen neonatal services. Among these, VivaCell MTS initiated and supported a multi-faceted project – BirthLink – during 2009-2016. The project had wide coverage of neonatal services both in Yerevan and in the marzes and included provision of equipment, improvement of neonatal facilities, and education of medical staff.[20] BirthLink provided neonatal intensive care cots and equipment for maintaining warmth, non-invasive respiratory support, oxygen monitoring, phototherapy, and devices to deliver small volumes of intravenous fluids to the units providing basic level neonatal care and more sophisticated equipment for tertiary level care units including mechanical ventilators, non-invasive respiratory support systems, and blood analyzers. Overall, thirteen neonatal units in Yerevan (11 maternity and two children hospitals) and thirty-one neonatal departments in the ten marzes of Armenia received support from the project. VivaCell and BirtLink partnership was the first project that made available the equipment for continuous positive airway pressure (CPAP) and nasal high flow (NHF) in the neonatal units of the country. It delivered also a portable cranial ultrasound imaging machine for neonates. Provision of equipment was accompanied with on-site support and trainings of the medical staff of the recipient neonatal units. Workshops and annual conferences were also held for neonatologists and neonatal nurses in collaboration with Imperial College of London and Yerevan Medical University.[20]

In 2011, a department of neonatology was established in the Yerevan State Medical University (YSMU), which provides up-to-date postgraduate and continuing medical education to neonatologists. The department developed a new curriculum for postgraduate education in accordance to the modern standards of specialization in neonatology. The refreshment course for continuing medical education is a seven-week course delivered to practicing neonatologists once in each five years. In addition, within the scope of the BirthLink project, since 2012, this department has conducted courses for neonatologists and nurses on respiratory therapy of newborns, the use and maintenance of equipment in neonatal practice, and a 5 week course on neonatal nursing care.[20]

The AANM has also been actively involved in projects to strengthen neonatal services in Armenia. AANM, in cooperation with Armenian Eye Care Project (AECP), is the primary

implementing agency of the USAID-funded 2-year project on "Improving Quality of Neonatal Services in Armenia" launched since 2015. In the scope of this project, 24 protocols and clinical guidelines on different aspects of neonatal care were developed and 27 more protocols are in the process of development. The developed protocols were distributed countrywide among providers who were trained to use these protocols. The trainings were supported by USAID and World Vision (WV) Armenia. Overall, 700 providers (neonatologists, neonatal nurses, ob/gyns, pediatricians and anesthesiologist-reanimatologists) from 63 healthcare institutions were reached with these activities. Within the scope of this USAID-funded project, a telemedicine service was established in the Neonatal Intensive Care Unit (NICU) of the "Muratsan" Medical Center (MC) that is available for all neonatal care providers in Armenia to deliver twenty-four-hour medical consultations. Also, AANM is working on developing the list of essential medications for neonatal care, defining the four levels of neonatal care, developing standard requirements for qualification of personnel of neonatal services, developing standards for equipment and supplies of different level neonatal services, as well as standards for recording of medical information, screenings of newborns, referrals, transfers, hospital admission and discharge of sick and/or preterm neonates, and ethical nursing in neonatology.

In 2010, AECP initiated a national program on "Prevention and Treatment of Retinopathy of Prematurity". As a continuation of this program, in 2012, AECP launched a three year program "Center of Excellence for the Prevention of Childhood Blindness" (CEPCB) in cooperation with the USAID and the Ministry of Health. The program seeks to eliminate childhood blindness from retinopathy of prematurity (ROP). The CEPCB was established in the Reproductive Health, Perinatology, Obstetrics and Gynecology Center (RHPOGC) in Yerevan and was equipped with modern equipment enabling to conduct effective surgeries for retinopathy of prematurity while receiving direct real time mentoring from specialists in USA and UK via tele-surgery. Two surgeons from Armenia underwent a fellowship on ROP surgery at the Retina Center at the Children's Hospital Los Angeles. On-site trainings of the CEPCB local staff by foreign renowned specialists also took place. The project obtained a number of portable retinal cameras, a necessary piece of equipment for timely identification of retinopathy of prematurity, and equipped with it the centers in Yerevan, Gyumri, and three portable centers for ROP screening to cover entire Armenia with this screening. Also, AECP, with support from a Swiss charity foundation and USAID, provided the needed equipment (air compressors, blenders and pulse-

oximeters) to seven NICUs (six in Yerevan and one in Gyumri) to enable them using proper concentrations of oxygen for supported ventilation. In addition, in collaboration with Children's Hospital Los Angeles, AECP organized trainings for Armenian NICU nurses on intensive care unit nursing. In total, 141 nurses from Yerevan and the regions were trained on eight different topics of NICU nursing. In the last year of its functioning, AECP worked on enhancing the organizational capacities of the Armenian Association of Neonatal Medicine. The AECP ended in 2015.

World Bank was also engaged in some activities aimed at strengthening neonatal services in the country in the scope of its loan programs. Since 2011, World Bank provided the regional neonatal departments in Aparan, Gavar, Alaverdi, Berd, Kapan, and Meghri MCs with some furniture and equipment, including neonatal scales, an incubator, resuscitation tables with warmers, ventilators, neonatal beds, and swaddling tables. World Bank plans to cover three other regional neonatal departments (in Artashat, Vanadzor, and Sevan MCs) with this support in 2018. Also, in collaboration with MOH, WB carried out renovation of neonatal units in a number of maternity hospitals in different regions of Armenia.

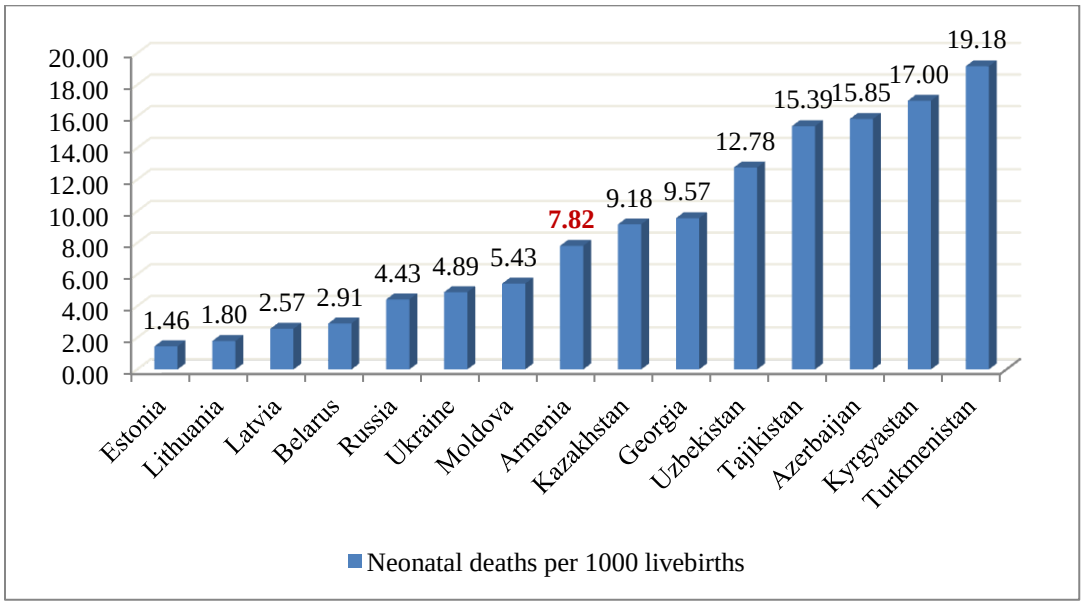
Within the last five years, WV Armenia provided neonatal departments of 10 regional maternity hospitals with equipment for newborn hearing screening. In 2017, several regional maternity hospitals received electric suction machine, pulsoximeter and infusion pump from WV, and two regional maternities – a glucometer with strips.

2.5 Neonatal care in selected countries that achieved notable reduction of neonatal mortality

According to the Global Barden of Disease (GBD) 2015 study,[21] since 1990, the decrease in deaths due to neonatal conditions including complications of prematurity and congenital anomalies accounted for the major portion of the gains achieved in the reduction of under-5 mortality rates in higher-income countries, where these rates were already very low. The underlying factors for these gains included advances in medical technologies and improved access to intensive neonatal care. Unlike HICs, in many low- and low-middle-income countries,

the common problems with equipment, staffing, accessibility and affordability of neonatal intensive care services have lead to stagnation in neonatal mortality rates.[21] The GBD 2015 study data indicate that Armenia was among those countries that achieved the 4th target of the Millennium Development Goals – reducing under-5 mortality rate by two thirds since 1990. Of the remaining 14 countries of the former Soviet Union, only the three Baltic countries and Belarus achieved this goal.[21] According to GBD 2015 study, Armenia ranked eighth among the former Soviet Union countries in terms of neonatal mortality rate, leaving behind the two Transcaucasian and the five Central Asian countries (Figure 6). However, the rates provided in this study do not match with the rates from the country statistics (e.g., for Armenia, 7.8 instead of 6.3 per 1000 livebirth according to the country statistics for 2015).

Figure 6. Neonatal death rates in the former Soviet Union countries, GBD 2015 study[21]



Of the Former Soviet Union countries with lower neonatal mortality rates than in Armenia, our literature search resulted in publications referring to neonatal mortality and/or neonatal services structure only in Russia. In a review paper on maternity care in Russia,[22] authors stated that in 2014, the neonatal mortality rate in the country was 7.4 per 1000 live births, with substantial variations across different regions. The most frequent causes of neonatal deaths included respiratory problems (intrauterine hypoxia, respiratory distress syndrome, and birth asphyxia) accounting for 53% of the deaths, and congenital malformations accounting for another 22% of

the deaths that occurred during the neonatal period. In the same year, early neonatal mortality rate was 2.8 per 1000 live births and stillbirth rate 6.0 per 1000 births in Russia (these rates were 5.4 and 16.5, respectively, in Armenia in 2014).

Stillbirths in Russia were commonly (in 85.9%) caused by intrauterine hypoxia and asphyxia and, as in Armenia, occurred mainly antenatally (in 87% of cases in Russia and in 88.6% of cases in Armenia[18]), while early neonatal deaths in Russia were often caused by respiratory disorders (46.9%), congenital malformations (16.2%), and hemorrhagic/hematological conditions (14.3%) and occurred mainly (in 50%) in the first two days of life. Hence, asphyxia was not among the common causes of early neonatal deaths in Russia, while in Armenia, as mentioned above, it caused 17.3% of all early neonatal deaths in the referral hospitals.

Among other indicators of perinatal health, the steady decline in neonatal mortality rates in all regions of Russia is believed to be due to optimizing the maternity care system in terms of its accessibility and quality.[22] This was achieved via personnel trainings to improve prenatal diagnosis and neonatal intensive care, increased use of advanced technologies and medical-genetic services, implementing counseling services via telecommunication and establishing remote counseling centers that have mobile (both ground and air) teams of specialists equipped with diagnostic and resuscitation equipment and portable incubators. Interestingly, the statistics of these mobile teams in Russia indicated that urgent intervention was required for one in each 60 births.[22,i] Standardization of maternal and newborn care with improved data collection and analysis, application of clear indications for hospitalization of pregnant women in different-level facilities with established territorial referral patterns for each facility were among the factors contributing to the success. In 2014, half of under 28-week deliveries took place in level III hospitals in Russia and the mortality rate of extremely LBW neonates was 27%.[22,ii] In the same year, Russia made a shift to a system that requires licansing of doctors to be allowed to practice medicine.[22]

[i] When applying this rate to Armenia which has around 42,000 annual births, the demand in services by such mobile teams constitutes approximately two calls per day.

[ii] For comparison, in Armenia, only 16% of extremely LBW neonates were registered as live births in 2014. Of these, 64% died during the early neonatal period with 88% of these deaths occurring in maternity hospitals (NIH data).

In Russia, the state guarantees exclusive financing of maternal and newborn health care from compulsory health insurance funds. Given this and the fact that, based on its per capita gross national income level ($26,500 PPP (2016 est.)), Russia is classified as an upper middle income country (Armenia's per capita national income was $8,600 PPP (2016 est.)), and that the total government expenditures on health in 2014 constituted 3.7% of the Gross Domestic Product (GDP) in Russia (in Armenia, this percentage was 1.94% in 2014), the state has both the finances and commitment to enhance maternity and newborn healthcare services, which is an important prerequisite for the observed achievements in this field.[22]

Along with primary ante- and post-natal care provided to pregnant women and mother-newborn pairs by providers in primary healthcare settings, a three-level specialized medical care is available for maternity and newborn care in Russia. Basic low-capacity (<30 beds) obstetric hospitals provide I level care to women living in remote and rural areas. These facilities have no round-the-clock availability of neonatologists and other medical specialists on-site, but they are available on-call. Facilities providing II level care have intensive care and resuscitation units in their structure to provide care to women and newborns with some complications, including premature births at 33-36 weeks of gestation. The hospitals and perinatal centers providing III level obstetric and neonatal care are equipped with advanced equipment and highly qualified personnel and besides intensive care and resuscitation units, have special units to care for extremely premature neonates. In 2015, only nineteen percent of obstetric beds were concentrated in the I level facilities in Russia, while 60% in the II level, and 21% in the III level facilities.[22] Notably, there is a tendency of increasing the number of facilities providing higher-level care and establishing more perinatal centers in Russia, because these centers are believed to address best the needs of extremely premature and critically ill neonates.[23] A recent study that evaluated the impact of introducing technologically advanced perinatal centers in 24 regions of Russia have demonstrated that the establishment of a perinatal center in a region results in reduction of infant mortality by 3.8%, neonatal mortality by 7.0%, and ENM by 7.3% in that region, and that the life-saving potential of such centers largely overweight the expenses of establishing and running those.[24]

The positive changes in maternal and infant mortality rates in Russia have started since1994, as the ordinary maternity facilities started getting better equipment, especially for caring for low-

birth-weight infants. The later impressive achievements in decreasing these rates were linked to the targeted interventions such as antenatal care programs and development of perinatal centers.[25]

Nevertheless, some statisticians question the high pace of reduction of infant mortality rates in Russia during the post-Soviet period, as, unlike the observed dynamics in other countries, these rates decreased mainly due to reduction in the early neonatal mortality, while post-neonatal mortality remained relatively stable. Therefore, they attribute some part of the observed reduction of infant mortality rates to misclassification of a portion of early neonatal deaths as stillbirths.[26] The same tendency of registration of some early neonatal deaths as stillbirths is suspected in Armenia as well.[18]

As shown in Figure 6, Ukraine is also among the post-Soviet countries that reached lower neonatal mortality rates than in Armenia. The recent rapid reduction of infant mortality rates in Ukraine were mainly attributed to the improvements in perinatal health care services, including wider access to advanced perinatal technologies.[27] In 2011, a public-private partnership was launched in the country seeking to establish a network of regional perinatal centers equipped with the latest technology. In the scope of this initiative, for the commissioning phase of 10 and investment phase of 17 perinatal centers, the state of Ukraine provided the main portion of the needed funds (US$ 94.3 million), with the rest (US$ 12.5 million) covered by private investors. At the primary care level, a number of screening programs for pregnant women were introduced in the country including early detection of congenital defects in fetuses, tests for syphilis and human immunodeficiency virus (HIV). Due to the HIV screening and antiretroviral treatment provided to 95.5% of HIV-infected pregnant women, the rate of vertical transmission of HIV has decreased 14 times during a 10-year period in Ukraine (from 27.8% in 2001 to 2% in 2011).[27] An effective referral system is practiced in the country's maternity services with referrals of women to the appropriate level of care corresponding to the degree of perinatal risks they face. Due to this, correct allocation of births is practiced, when low-risk births mainly take place in second level care facilities and high-risk births in highly specialized perinatal centers.[27] An evaluation of a "Mother and Infant Health Program" implemented in the country have demonstrated that the program resulted in reduction of infant mortality caused by perinatal conditions. The effect of the program was attributed to the increased rate of early attendance of

antenatal clinics and decreased rate of Cesarean sections, due to which the share of normal deliveries has increased.[28]

Belarus has also reached impressive reduction in infant, neonatal and perinatal mortality rates (according to country's official statistics, perinatal mortality has decreased from 12.2 per 1000 births in 1995 to 3.7 per 1000 births in 2009). As in the case of Ukraine and Russia, this success was largely attributed to the intensive efforts undertaken in the country since 1994 to upgrade maternity hospitals and re-equip those with advanced technology for neonatal intensive care.[29]

In Lithuania, infant mortality rate in 2010 was 4.3 and neonatal mortality rate 2.3 per 1000 live births. The latter is below the European Union (EU) average rate of 2.7 per 1000 live births. Introduction of better standards of maternity and newborn care in the country's healthcare system and a cooperative program between Lithuania and Switzerland seeking to improve perinatal services are listed as the main contributors of the success in achieving exceptionally low infant and neonatal mortality rates.[30]

2.6 The recommended structural features of neonatal services proved to be effective in reducing neonatal mortality

Scientific publications on the influence of structural features of neonatal services on the treatment outcomes are scarce and generally reflect the situation in developed countries.[31] The available studies seek to identify associations between the volume of care, its level, the staffing and neonatal outcomes, mainly – survival at discharge. As deaths among extremely LBW neonates constitute a significant portion of all neonatal deaths, most of these studies focus on the outcomes among this group of births in relation to neonatal services structure and characteristics.

Research demonstrates a strong positive relation between the survival of LBW neonates and the volume of the neonatal units where they receive treatment. The likelihood of survival of these newborns is higher in bigger units that treat more patients.[32-36] A cutoff value for the volume of patients served by a neonatal unit was also suggested: around 50 admissions of very LBW neonates per year. It was shown that in the units providing care to fewer neonates of this category, the treatment outcomes were below the optimal levels.[32] The same was true for the

volume of delivery units – there was a linear relation between birthweight-specific mortality rates of neonates and the size of the delivery unit they were born in: the bigger was the unit, the lower were the mortality rates.[34] Therefore, centralized provision of care to pregnant women of high risk and to newborns in need of intensive care in big regional centers was recommended rather than in district or local level hospitals.[31]

Besides the volume of care, the level of it is also important. Mortality among very LBW neonates is the lowest when they are born in hospitals with NICUs that are large enough and provide high level of care.[33,35] In a study conducted in Germany,[35] infants born in large maternity hospitals (with 1000 annual births) and treated in large NICUs had almost two times higher chance to survive during the neonatal period than those born in small delivery hospitals and cared in small NICUs. The association between neonatal mortality rates and unit volume was stronger for NICUs than for obstetric services. In this study, the influence of the unit volume on neonatal mortality was the greatest for those neonates born before 29th week of gestation. The study concluded that perinatal healthcare can be improved further if establishing larger perinatal centers.[35] Another study conducted in California found that for infants weighting <2000 g, the likelihood of dying was 2.4 times higher if they were born in a hospital with no NICU, 1.9 times higher if born in a hospitals with an intermediate NICU, and 1.4 times higher if born in a hospital with small community NICU, as compared to being born in a hospital with large NICU providing tertiary level care.[37] The authors concluded that women with expected preterm delivery when the fetal weight is suspected to be less than 2000 g should be transferred from hospitals with no or small NICU to a perinatal center, preferably, before giving birth (*in-utero*).[37]

A review paper found that in the vast majority of relevant studies (in 20 of 21), being born in smaller hospitals was associated with higher rates of death and intraventricular hemorrhage among very LBW neonates, regardless of meeting formal structural requirements for neonatal units. This review suggested a threshold of 500-1000 deliveries per year for obstetrical departments and 35-50 admissions of very LBW newborns per year for neonatal units. There was no significant relation between the unit volume and care outcome in the units admitting more than 50 very LBW infants per year.[36]

However, improved outcomes cannot be expected solely from centralization of neonatal care. For instance, a study investigating the relation between risk-adjusted outcomes of neonatal care and units' staffing, workload, and patient volume found that in Australia, reduced neonatal mortality was not only due to centralization but also due to increased specialization of the staff and applying national recommendations for higher degree of specialization and training of clinical and nursing staff.[38] This study revealed also a positive relation between higher workload of the staff and increased neonatal mortality in all types of neonatal intensive care units. The authors concluded that transfers and centralization of only very sick neonates can improve the care efficiency, provided that this does not excessively increase the staff workload in the recipient unit.[38]

Given the above-mentioned, *in utero* or *ex utero* transfers of critically ill neonates from less specialized units providing lower-level care to more specialized units providing higher level care are advisable. However, transfers between specialized units providing the same level of care cannot be regarded as acceptable practice.[39] The Ministry of Health of Singapore guidelines for the hospitals having neonatal services details the terms and conditions for neonatal transfers. According to this guideline, the appropriate transport for a neonate should provide at least transport incubator, equipment for emergency resuscitation, means for administration of medications, oxygen supply, ventilator, and equipment for vital functions monitoring during the transfer.[40]

Concerning the optimal staffing levels of NICUs, the UK Staffing Study showed that increasing qualified neonatal nurse-to-infant ratio to 1:1 for those infants demanding intensive or high dependency care was associated with 48% reduction of risk-adjusted neonatal mortality in those units.[41] A study looking at the relation between nurse staffing levels and infection rates in 67 USA NICUs found that nurse understaffing was associated with significant increase of nosocomial infections among very LBW neonates.[42] A brief systematic review of the relevant literature conducted in 2013 also concluded that higher nurse-to-patient ratios appear to be related to better outcomes of care in NICUs.[43]

The American Academy of Pediatrics guidelines states the required level of education and experience of nurses and nurse-to-infant ratios across neonate acuity levels. Five levels of acuity are specified for neonates ranging from 1 (the least acute) to 5 (the most acute). The guidelines recommend nurse-to-patient ratios of one-to-four or one-to-three for the lowest acuity levels, while one or more nurse per patient ratios for the highest acuity levels.[44] The guidelines require also that NICU nurses are both certified in the specialty and specialized in the care technology and have advanced training. The guideline of the Ministry of Health of Singapore states a nurse-to-neonate ratio of 1-to-0.5 for NICUs providing III level care and a ratio of 1-to-1.1 for NICUs providing II level care.[40]

The British Association of Perinatal Medicine, in its Service Standards for Hospitals Providing Neonatal Care,[45] recommends organizing neonatal care via establishing so-called *managed clinical networks*. Each such network consists of several facilities providing different types and levels of neonatal care, located in reasonable distance from each other, and an ambulance service for transferring neonates from the network's local neonatal units delivering lower level care to the lead NICU providing tertiary level care or to special care units within the network as indicated. Each managed clinical network has a network board, applies a centralized system of education for its providers and common clinical practices. The aim of such a network is to deliver timely and quality neonatal care in the most appropriate setting at the least distance from home, while keeping the care responsive to the needs of both newborns and parents. The Standards specify also the staffing requirements for each level of care, the requirements concerning the competence, education and training of providers, the standards for clinical governance and quality assurance, indications for *in-utero* and *ex-utero* referrals within the network and the required conditions during neonatal transfers, the requirements for environment to ensure family-centered, breast milk-feeding friendly care with parent's unrestricted access to their baby in the atmosphere of privacy and least stress via minimizing the levels of pain, noise, light, and other stressors, and conserving baby's energy.[45]

3. METHODS

3.1 Study design

The study sought to make an understanding of the existing needs in the country's neonatal healthcare services in terms of structural changes, qualified human resources, equipment, supplies, and specialized trainings at secondary and primary health care levels. For this purpose, the study team designed and implemented a mixed study – a combination of desk review, needs assessment via checklists, and a qualitative study. The desk review included review of the available literature and documents on current standards of quality neonatal services, evidence-based strategies proved to be effective in reducing neonatal mortality, and organization of neonatal services in selected countries and its relation to improved neonatal mortality rates in those countries. Checklists developed based on standard lists of material and human resources for neonatal departments approved by the Ministry of Health of Armenia were used to gather information on the availability of needed equipment, supplies, laboratory tests, qualified human resources, and clinical protocols in selected regional maternity hospitals. The qualitative study applied in-depth interviews (IDI) and focus group discussions (FGD) with different groups of stakeholders to gather information from neonatologists, primary health care (PHC) pediatricians and family physicians, representatives of donor organizations and experts/policy makers concerning their perspectives in restructuring and reinforcing neonatal care services at different levels. The study team identified an expert in the field of neonatology who closely collaborated with the research team and provided continuous technical support during the entire research. With the help of the study expert, the study team developed checklists for neonatologists and PHC pediatricians to identify the topics of neonatal medicine where these specialists perceived a need for trainings and/or clinical guidelines.

3.2 Study setting

The qualitative study took place in Yerevan city and two marzes – Syunik and Gegharkunik, to identify the existing situation with neonatal care services at the national and regional levels and to enable the study to make comparisons between the marzes. Syunik was selected as one of the most distant marzes from the capital city and Gegharkunik was chosen because of having many remote and difficult-to-reach communities. The checklists on the availability of human

resources, equipment, supplies, laboratory tests and clinical protocols were completed in selected hospitals of these marzes. In Syunik marz, the maternity hospitals within the structure of Sisian, Goris, and Kapan MCs, and in Gegharkunik marz, the maternity hospitals within Gavar, Martuni, and Vardenis MCs were included.

3.3 Study participants

The research team identified the study participants using purposive sampling methods with the aim to identify and involve participants possessing the needed dept and volume of experience-based information and to cover the full range of diversity of opinions on the study subject.[46] Also, the study applied sequential approach that includes representativeness and comparability. The research team continued the sampling process until a saturation was reached and no more new information emerged with the involvement of new participants.[46]

Four groups of participants took part in the study: 1) hospital neonatologists, 2) PHC pediatricians and family physicians, 3) representatives of professional or donor organizations, and 4) policymakers/experts.

For constant comparative and contrast study coverage, these four groups of participants were targeted for recruitment from Yerevan and the two selected marzes – Syunik and Gegharkunik. The group of neonatologists included specialists from secondary and tertiary-level healthcare institutions (maternity and pediatric hospitals). The group of pediatricians and family physicians included those practicing pediatrics in outpatient settings. The group representing professional or donor organizations included those involved in projects carried out by their respective organizations that supported neonatal services in Armenia during the last five years. The group of policy makers and experts included mainly neonatologists with wider expertise and/or involved in decision making concerning organization and provision of neonatal care in Armenia.

3.4 Research instruments

The CHSR research team developed semi-structured guides for in-depth interviews and focus group discussions with different groups of participants. The guide for each group was adapted to specific areas of expertise and responsibilities of that group to optimize and maximize the value

of the data collected to meet the objectives of the study. The study team shared the guides with UNICEF Armenia staff, modified those according to their suggestions, and applied the guides after receiving UNICEF's approval. All the guides were developed in Armenian and then translated into English. English and Armenian versions of the focus group discussion and in-depth interview guides are provided in Appendices 1 and 2 (respectively).

The research team developed a short demographic information form to be completed by the study participants. With the help of the study expert, a checklist of knowledge/competency areas on neonatal care for hospital neonatologists (containing 17 topics and an "other" option) was developed and included in the demographic information form to be completed by the participating neonatologists prior to the interview or discussion. Similarly, another checklist of knowledge/competency areas on neonatal care for PHC pediatricians (containing 15 topics and an "other" option) was developed and included in the demographic information form to be completed by PHC pediatricians prior to the FGD. The checklists asked the participants, using a three-point response scale, to prioritize the topics on which they would like to receive additional trainings and/or new clinical protocols/guidelines. Appendix 3 provides the English and Armenian versions of these forms.

With the help of the study expert, the research team identified existing policy documents, guidelines, protocols, and MOH-approved standards for structure, equipment and human resources of neonatal services in Armenia. Based on these materials, the research team developed a checklist to assess the situation with the availability of required equipment, supplies, laboratory tests, qualified human resources, and clinical protocols in the selected regional maternity hospitals. The checklists included also a brief section to gather information on the number of patients served by the given facility during 2016. Appendix 4 provides the English and Armenian versions of this checklist.

3.5 Data collection and analysis

The desk review of the available literature and documentation was conducted in June-July 2017. The project expert visited neonatal units of the selected regional hospitals to assess the existing situation and to complete the needs assessment checklists. The three hospitals in Syunik marz

(Sisian, Goris and Kapan MCs) and the three hospitals in Gegharkunik marz (Gavar, Martuni, Vardenis MCs) were visited in July, 2017. The data collection for the qualitative study took place in July - August, 2017. The CHSR/AUA research team conducted all the in-depth interviews and focus group discussions. Each FGD had a trained moderator and a note-taker. With few exceptions, the IDIs and FGDs were audio recorded (with permission of all study participants). The research team took detailed notes in the few instances when the audio recording was not allowed. All FGDs and IDIs were transcribed. Conventional content analysis technique was utilized to analyze IDI and FGD transcripts.[47] The themes identified during the analysis generally repeated the sequence of the main themes included in the field guides. The research team organized the results section based on the identified main themes.

Overall, 43 study participants (33 female and 10 male participants) were recruited from Yerevan (15 participants), Syunik (11 participants) and Gegharkunik (17 participants) marzes (Table 2).

Table 2. Number of IDI and FGD participants by specialty/type and study site

	Yerevan	Syunik	Gegharkunik	Total
IDIs				
Neonatologists	-	5	-	5
Donor organization representatives	4	-	-	4
Policy makers/experts	5	-	-	5
FGDs				
Neonatologists	3	-	5	8
PHC pediatricians/family physicians	3	6	12	21
Total	**15**	**11**	**17**	**43**

Of the 14 IDIs with the key informants, nine were conducted in Yerevan and five in Syunik marz. The groups involved in IDIs in Yerevan included representatives of donor organizations (USAID, AANM, VivaCell-MTS/ BirthLink, and AECP), neonatologist-experts and policy maker. In Syunik marz, the key informants were practicing neonatologists in different neonatal units within the marz, who were involved in IDIs instead of an initially planned FGD, as the marz health department refused inviting them to a single place to avoid their absence from their respective cities in the case of an emergency (Table 2). The interviews with the key informants lasted 47 minutes in average (ranging from 21 to 90 minutes).

Overall, 29 providers participated in five focus group discussions in Yerevan, Syunik and Gegharkunik marzes (Table 2). Of the two FGDs conducted in Yerevan, one involved neonatologists, and one – PHC pediatricians. In Syunik marz, one FGD with PHC pediatricians and family physicians (from either urban or rural outpatient facilities) was conducted, and in Gegharkunik marz, two FGDs were conducted – one with neonatologists from different neonatal units within the marz and the second with PHC pediatricians and family physicians practicing in regional centers or rural ambulatories.

The mean duration of FGDs was 73 minutes, ranging from 61 to 100 minutes. On average, the discussions took longer in Yerevan than in the marzes (90 minutes versus 62 minutes) and with neonatologists than with PHC pediatricians and family physicians (88 minutes versus 68 minutes).

The mean age of providers who participated in FGDs and IDIs was 50 years (49 years for neonatologists and 51 years for PHC pediatricians and family physicians). The mean duration of professional experience of providers was 25 years (26 years for neonatologists and 25 years for PHC pediatricians and family physicians). Sixty-three percent of the providers who participated in the study mentioned that they have received some training on neonatal care after 2010. There was a big difference in this respect between the specialty groups: 94% (16 of 17) of the neonatologists participated in training(s) on neonatal care after 2010, while only 52% (11 of 21) of the PHC pediatricians and family physicians. The most frequently mentioned training topic by neonatologists was newborn resuscitation (7 participants), followed by neonatal intensive therapy (3 participants), perinatal infections (2 participants), general neonatology (2 participants), LBW newborn care (1 participant), asphyxia (1 participant), and infusion therapy (1 participant). Three neonatologists did not mention specific topics telling that there were too many. The PHC pediatricians mentioned only two topics: newborn resuscitation (3 participants) and healthy newborn feeding (2 participants). Five PHC pediatricians/family physicians, who mentioned attending training(s) on neonatology after 2010, did not mention the topic of their training, and the handwriting of one person was ineligible.

3.6 Categorization of study participants

The direct quotes provided in the boxes in the Results section were abstracted from both in-depth interviews and focus group discussions. The FGD participants were categorized into two groups: 1) neonatologist and 2) PHC physician, with the latter category including PHC pediatricians and family physicians. The IDI participants were categorized into three groups: 1) policy maker/expert, 2) neonatologist and 3) donor. The category of policy maker/expert included neonatologist-experts and policy makers from MOH. The category of IDI neonatologist included neonatologists from Syunik marz. The donor category included representatives of donor organizations.

The individual informant identifiers (e.g., Neonatologist, 4.3.1.1.1.) specify the category of participants who provided the quote (e.g., Neonatologist), the subtitle of the report (e.g., 4.3.1.1.) and the sequential number of participant who provided the quote for the given subtitle of the report (e.g., 1). If the same participant provided more than one quote for a given subtitle, these quotes are provided under the same identifier. A single informant who provided quotes for more than one subtitle has different identifiers under each subtitle. After each identifier, the type of qualitative study method applied (FGD or IDI) and the residency area of the participant (Yerevan, Syunik or Gegharkunik) are provided. Here is an example of a complete identifier for a neonatologist, FGD participant from Yerevan, who provided the first quote under the Results section's subtitle 4.3.1: (Neonatologist, 4.3.1.1.1, FGD, Yerevan).

3.7 Ethical considerations

The AUA Institutional Review Board approved the study protocol as complying with locally and internationally accepted ethical standards for qualitative and mixed studies. All participants were informed about their rights (anonymity and confidentiality of provided information, voluntary participation, and the right to refuse answering any question they chose and discontinue interview or discussion at any time). Audio-recording was conducted only with permission of all participants. If a participant did not want to be audio-recorded, only written notes were taken. The final report does not contain any identifiable information such as respondents' names, positions, or institutions.

4. RESULTS

During the data collection process, an observation relevant to the study was made by the study team. A few key informers expressed suspicion and an overall negative attitude towards the study itself. This was related to the continuous assessments being conducted in the sphere, when "everybody already knows what the issues are". Thus, the team was met with comments, such as "what is the purpose of this study?", "this is a pointless study", etc. Unfortunately, these were made during the initial phase of the meetings, when the consent form was being presented and permission for recording was not yet obtained, which is why corresponding quotes cannot be provided.

4.1 Needs in trainings and clinical guidelines

Prior to the FGDs and IDIs, the neonatologist participants were asked to complete a checklist to express their perceived need in receiving trainings and clinical guidelines on several topics of secondary and tertiary neonatal care. Similarly, PHC pediatricians and family physicians were asked to complete a checklist to express their need to receive trainings and clinical guidelines on a number of primary neonatal care areas. Overall, 17 neonatologists and 21 pediatricians/family physicians completed the checklists. Table 3 depicts the ranked-by-priority results for neonatologists and Table 4 the ranked results for PHC pediatricians and family physicians.

Table 3. Neonatologists' perceived needs in trainings and clinical guidelines on newborn care topics

	Training			**Clinical guideline**		
	1* # (%)	**2**** # (%)	**3***** # (%)	**1*** # (%)	**2**** # (%)	**3***** # (%)
1. Neonatal resuscitation in delivery room	14 (82.4)	3 (17.6)	0 -	12 (80.0)	3 (20.0)	0 -
2. Respiratory support. Oxygen therapy	14 (82.4)	3 (17.6)	0 -	12 (80.0)	3 (20.0)	0 -
3. Respiratory distress syndrome and pneumonia	12 (70.6)	5 (29.4)	0 -	11 (78.6)	3 (21.4)	0 -
4. Asphyxia and encephalopathy	12 (70.6)	5 (29.4)	0 -	11 (73.3)	4 (26.7)	0 -
5. Infusion therapy. Acid-base balance	11 (64.7)	6 (35.3)	0 -	12 (80.0)	3 (20.0)	0 -
6. Neonatal convulsions	11	6	0	11	4	0

	Training			Clinical guideline		
	1* # (%)	**2**** # (%)	**3***** # (%)	**1*** # (%)	**2**** # (%)	**3***** # (%)
	(64.7)	(35.3)	-	(73.3)	(26.7)	-
7. Shock	11 (68.8)	5 (31.3)	0 -	9 (64.3)	5 (35.7)	0 -
8. Extremely LBW neonates	10 (58.8)	7 (41.2)	0 -	9 (60.0)	6 (40.0)	0 -
9. Neonatal jaundice	9 (52.9)	8 (74.1)	0 -	9 (60.0)	6 (40.0)	0 -
10. Heart and other common congenital defects	9 (52.9)	8 (47.1)	0 -	8 (53.3)	7 (46.7)	0 -
11. Newborn transfer	8 (47.1)	7 (41.2)	2 (11.8)	10 (66.7)	4 (26.7)	1 (6.7)
12. Enteric feeding and feeding difficulties	8 (47.1)	8 (47.1)	1 (5.9)	7 (46.7)	7 (46.7)	1 (6.7)
13. Prevention of nosocomial infections	7 (43.8)	9 (56.3)	0 -	7 (50.0)	7 (50.0)	0 -
14. Sepsis and antibacterial treatment	7 (41.2)	10 (58.8)	0 -	9 (60.0)	6 (40.0)	0 -
15. Hemorrhages. Blood components transfusion	7 (41.2)	9 (52.9)	1 (5.9)	8 (53.3)	6 (40.0)	1 (6.7)
16. Catheterization of umbilical vein	7 (41.2)	5 (29.4)	5 (29.4)	7 (46.7)	4 (26.7)	4 (26.7)
17. Neonates of diabetic mothers	4 (23.5)	11 (64.7)	2 (11.8)	4 (26.7)	10 (66.7)	1 (6.7)
18. *Other suggested topic:* Thermoregulation	1					

*1=Very important;
** 2=Important;
***3=Unimportant.

As it is evident from Table 3, neonatologists gave the highest priority to receiving trainings on neonatal resuscitation in delivery room and respiratory support including oxygen therapy. Trainings on respiratory distress syndrome and pneumonia, as well as asphyxia and encephalopathy were also perceived as highly important, followed by trainings on infusion therapy, acid-base balance, neonatal convulsions and shock. The themes on care for extremely LBW neonates, neonatal jaundice, and heart and other common congenital defects were also perceived as important by all the respondents and very important by the majority of them. The topics on newborn transfer, enteric feeding and feeding difficulties, prevention of nosocomial infections, sepsis and antibacterial treatment, and hemorrhages and blood components transfusion were perceived as somewhat less important, and the trainings on catheterization of umbilical vein and neonates of diabetic mothers – as the least important. One neonatologist

suggested an additional topic for training – thermoregulation. The prioritization of topics for clinical guidelines mainly repeated the same sequence as for the trainings with some mild differences. Particularly, clinical guidelines on infusion therapy and acid-base balance, newborn transfer, and sepsis and antibacterial treatment were prioritized more than trainings on these topics.

PHC pediatricians and family physicians prioritized the most both the training and the clinical guideline on neonatal respiratory distress and pneumonia. LBW newborn care and feeding was the next highly prioritized topic followed by neonatal hypoglycemia, muscular tonus and convulsions, and neonatal jaundice. Again, this was the case for both trainings and clinical guidelines. Around two-thirds of the respondents perceived trainings on the topics of neonatal hypothermia, neonatal infections and sepsis, more common congenital abnormalities, neonatal sense organs and development, neonatal resuscitation, and healthy newborn care and feeding as very important. The topics on breastfeeding problems and neonatal growth monitoring received slightly fewer "very important" ratings, while the neonatal growth monitoring received the highest proportion (15%) of "unimportant" ratings.

Table 4. PHC pediatricians' and family physicians' perceived needs in trainings and clinical guidelines on newborn care topics

	Training			**Clinical guideline**		
	1* # (%)	**2**** # (%)	**3***** # (%)	**1*** # (%)	**2**** # (%)	**3***** # (%)
1. Neonatal respiratory distress and pneumonia	18 (94.7)	0 -	1 (5.3)	17 (89.5)	1 (5.3)	1 (5.3)
2. LBW newborn care and feeding	16 (80.0)	2 (10.0)	2 (10.0)	16 (84.2)	1 (5.3)	2 (10.5)
3. Neonatal hypoglycemia	16 (80.0)	4 (20.0)	0 -	15 (75.0)	5 (15)	0 -
4. Muscular tonus and convulsions	15 (75.0)	3 (15.0)	2 (10.0)	15 (78.9)	2 (10.5)	2 (10.5)
5. Neonatal jaundice	15 (75.0)	3 (15.0)	2 (10.0)	14 (70.0)	4 (20.0)	2 (10.0)
6. Neonatal hypothermia	13 (68.4)	6 (31.6)	0 -	13 (65.0)	7 (35.0)	0 -
7. Neonatal infections and sepsis	14 (66.7)	6 (28.6)	1 (4.8)	13 (61.9)	7 (33.3)	1 (4.8)
8. More common congenital abnormalities	13 (65.0)	7 (35.0)	0 -	13 (72.2)	5 (27.8)	0 -

	Training			Clinical guideline		
	1* # (%)	**2**** # (%)	**3***** # (%)	**1*** # (%)	**2**** # (%)	**3***** # (%)
9. Neonatal sense organs and development	13 (65.0)	6 (30.0)	1 (5.0)	12 (60.0)	7 (35.0)	1 (5.0)
10. Neonatal resuscitation	12 (70.6)	3 (17.6)	2 (11.8)	13 (72.2)	3 (16.7)	2 (11.1)
11. Healthy newborn care and feeding	12 (66.7)	4 (22.2)	2 (11.1)	12 (70.6)	3 (17.6)	2 (11.8)
12. Breastfeeding problems	11 (57.9)	6 (31.6)	2 (10.5)	12 (66.7)	4 (22.2)	2 (11.1)
13. Neonatal growth monitoring	11 (55.0)	6 (30.0)	3 (15.0)	11 (55.0)	6 (30.0)	3 (15.0)
14. Neonatal conjunctivitis	9 (47.4)	10 (52.6)	0 -	9 (50.0)	9 (50.0)	0 -
15. Safety of a neonate	9 (50.0)	8 (44.4)	1 (5.6)	9 (50.0)	9 (50.0)	0 -
16. *Other suggested topics:* General pediatrics	1					
Monitoring of preterm newborns	1					
Preterm newborn's growth monitoring	1					
Urgent medical care of a newborn	1					

*1=Very important;
** 2=Important;
***3=Unimportant.

Both trainings and clinical guidelines on neonatal conjunctivitis and safety of a neonate were perceived as the least important by the respondents. The perceived importance of clinical guidelines on the listed topics generally repeated the same sequence as for the trainings. The respondents suggested four other topics for training, including preterm newborn's monitoring, preterm newborn's growth monitoring, newborn's urgent medical care, and general pediatrics.

4.2 Needs in material and human resources in selected regional neonatal units

Two of the selected regional maternity hospitals were assigned as providing II level care and the rest – IB level care. None of the hospitals had a neonatal pathology department. NICU was present in all of them, with the number of NICU beds ranging from 1 to 4. None of the visited hospitals had neonatal ambulance brigade. The number of livebirths in 2016 in these hospitals ranged from 225 to 1193, and those born with LBW constituted 6.8% of all livebirths in average (ranging from 4.3% to 9.8% in different hospitals) (Table 5).

Table 5. Structure, work volume and staff of neonatal units of the visited regional hospitals

	Hosp.1	Hosp.2	Hosp.3	Hosp.4	Hosp.5	Hosp.6
Structure and work volume						
Neonatal pathology department	no	no	no	no	no	no
NICU	yes	yes	yes	yes	yes	yes
Number of NICU beds	1	3	4	3	4	?
Neonatal ambulance brigade	no	no	no	no	no	no
Number of livebirths in 2016	225	554	453	502	1193	327
Number of LBW newborns	22 (9.8%)	36 (6.5%)	23 (5.1%)	31 (6.2%)	51 (4.3%)	29 (8.9%)
Staff						
Number of neonatologists	1	3	1	1	2	1
Neonatologists at shift after 15:30	0	0	0	0	1	0
Number of neonatal nurses (total)	4	5	5	4	8	4
of which, NICU nurses	0	0	0	0	1	0
Neonatal nurses at shift before 15:30	1	1	1	1	2	1
Neonatal nurses at shift after 15:30	1	1	1	1	2	1
Neonate-to-nurse ratio	3:1	6:1	4:1	4:1	5:1	3:1

The majority of the visited regional maternity hospitals (four of six) had only one neonatologist (Table 5). In all maternities except one, after 15:30 p.m., a neonatologist was available only on-call. The number of neonatal nurses in these hospitals was mainly 4-5, with each of them having a 24-hour shift each third day. Therefore, regardless of the time (before or after 15:30 p.m.), only one neonatal nurse was present at these hospitals. Indeed, none of these nurses were qualified as NICU nurse. Only one hospital with the highest annual number of births ensured a 24-hour presence of at least one neonatologist and two nurses, with one of them being a qualified NICU nurse. The weighted average neonate-to-nurse ratio in the visited hospitals was 4.5:1, ranging from 2.7:1 to 6:1 in different settings (Table 5). It should be noted that these ratios were calculated for all neonates regardless of their health status and the level of care they require.

Equipment of the neonatal services in the selected regional hospitals was assessed by comparing the equipment that was present in the maternities and was in proper working condition at the time of the assessment with the standard list of equipment for delivery rooms and neonatal departments approved by the MOH. In addition, data was gathered on some important pieces of equipment that were not yet included in the list of standard equipment for NICUs in Armenia. Table 6 presents the results of this assessment. The main need that was not addressed in the

majority of the visited hospitals was the lack of equipment for providing a neonate with appropriate, heated and humidified air-oxygen mixture during respiratory support. None of the visited hospitals except one had an air compressor in the delivery room and three of the six had none in the neonatal unit either. None of the hospitals had respiratory circuit with heated humidifier in the delivery room, and one had neither in the neonatal unit. Three of the six hospitals had no oxygen concentrator. Air-oxygen blender was available in only one of the six hospitals. Two hospitals had no pulse oxymeters in the delivery room and one had none in the neonatal unit. The rest typically had per one pulse oxymeter in the delivery room and in the neonatal unit. Oxygen tent was present in only two hospitals. Neonatal thermometers (up to 25˚C) were not available in the delivery rooms of three hospitals, and in the NICU of one hospital. Only mechanical neonatal scales were available in the delivery rooms of three hospitals and in the neonatal departments of two hospitals, while the neonatal unit of one hospital had no neonatal scale at all. There was no disinfection device in the majority of the neonatal units of the visited hospitals as they were using centralized disinfection system in the hospital. Four of the six assessed hospitals had only one incubator in the neonatal unit, and there was no electric suction machine in two of the neonatal units. Laryngoscope was also unavailable in two neonatal units. One neonatal unit had no bactericide lamp.

Table 6. Available equipment for neonatal services in the visited regional hospitals

	Hosp.1	Hosp.2	Hosp.3	Hosp.4	Hosp.5	Hosp.6
Equipment, delivery room						
1. Resuscitation table with radiant heating lamp	1	1	1	3	1	1
2. AMBU bags with different size masks	2	3	3	3	2	2
3. Pulse oxymeter	1	0	0	1	1	1
4. Electric suction machine	1	2	2	2	1	1
5. Oxygen source	1	1	1	4	3	1
6. Flow meter	1	1	1	2	2	1
7. Air compressor	0	0	0	2	0	0
8. Respiratory circuit with heated humidifier	0	0	0	0	0	0
9. Laryngoscope with blades of different size	1	1	1	2	1	2
10. Laryngeal mask	0	1	1	2	0	0
11. T-shaped resuscitator (Neopuff)	0	0	0	0	1	0
12. Neonatal scale	1	1	1	2	1	1
13. Disinfection device	1	0	0	1	1	1
14. Neonatal thermometer (up to 25˚C)	1	0	0	2	1	0

	Hosp.1	Hosp.2	Hosp.3	Hosp.4	Hosp.5	Hosp.6
15. Wall/room thermometer	1	1	1	2	1	1
16. Sterile kit for cord cut and clamping	4	6	6	2	22	2
17. Heater for maternity unit	1	1	1	2	1	2
18. Stethoscope	1	1	1	2	1	1
19. Clock with timer	1	1	1	2	1	1
20. Heating pad for a newborn	0	1	1	1	0	1
21. Syringe pump	2	5	5	2	3	3
Equipment, NICU						
1. Incubator	1	1	1	2	2	1
2. Resuscitation table with radiant heating lamp	1	2	2	1	2	1
3. AMBU bags with different sizes of masks	2	3	3	2	1	1
4. Electric suction machine	0	1	1	2	1	0
5. T-shaped resuscitator	0	0	0	0	0	0
6. Centralized oxygen supply system	1	2	2	2	3	0
7. Oxygen cylinder	0	0	0	2	1	0
8. Oxygen concentrator	0	0	0	1	1	1
9. Air compressor	0	2	2	2	0	0
10. Air-oxygen blender	0	0	0	2	0	0
11. Respiratory circuit with heated humidifier	1	1	1	2	1	0
12. Infusion pump	1	2	2	2	2	1
13. Flow meter	1	2	2	2	2	1
14. Oxygen tent	1	0	0	0	2	0
15. Phototherapy lamp	1	1	1	2	2	1
16. Laryngoscope with blades of different size	1	0	0	2	1	1
17. Nasal CPAP	0	1	1	1	1	0
18. Heated, humidified high-flow nasal cannula	1	0	0	0	0	0
19. Artificial respiration equipment	0	0	0	0	0	0
20. Pulse oxymeter	1	1	1	1	2	0
21. Bactericide lamp	1	1	1	1	1	0
22. Neonatal scale	1	1	1	2	2	0
23. Disinfection device	0	0	0	1	0	0
24. Drum	2	1	1	2	5	8
25. Anatomical tweezers	0	2	2	4	9	4
26. Scissor	1	2	2	3	2	4
27. Surgical forceps	4	0	0	2	5	4
28. Neonatal thermometer (up to 25˚C)	1	2	2	2	1	0
29. Wall/room thermometer	1	1	1	1	1	1
30. Electric heating mattress	1	1	1	1	1	1
31. Stethoscope	5	2	2	1	2	1
32. Clock with timer	1	1	1	1	1	0
33. Additional electric power source	0	1	1	1	0	1

	Hosp.1	Hosp.2	Hosp.3	Hosp.4	Hosp.5	Hosp.6
34. Full day water supply	1	1	1	1	1	1
35. Neonatal tonometer	0	0	0	1	0	0
36. Bilirubinometer	0	0	0	1	0	0
37. Glucometer	1	1	1	1	1	1
38. Refrigerator for medications	1	0	0	0	0	0
Equipment diversity score (of 59 items in total)	*42*	*41*	*41*	*52*	*46*	*34*
(Percent score)	*(71.2%)*	*(69.5%)*	*(69.5%)*	*(88.1%)*	*(78.0%)*	*(57.6%)*

Of the equipment not yet included in the standard list approved by the MOH, T-shaped resuscitator was available in the delivery room of only one hospital. None of the units had artificial respiration equipment. Per one nasal CPAP was available in four of the six hospitals, and only one hospital had heated, humidified high-flow nasal cannula (HFNC). The neonatal units of two hospitals had no additional electric power source. Of the six NICUs visited, only one had neonatal tonometer and bilirubinometer and another one – refrigerator for medications.

Based on the assessment results, a score was calculated for each hospital reflecting the diversity of the available equipment in that hospital out of the inquired 59 items (21 items for delivery room and 38 for NICU). The mean equipment diversity score across the hospitals was 42.7 (of 59) or 72.4%. The score ranged from 34 (57.6%) to 52 (88.1%). Three of the assessed hospitals had almost similar scores – 41 to 42 or ~70% (Table 6). There was no clear relation between the level (IB or II) assigned to a maternity hospital and its equipment diversity score.

The checklist asked also about the availability of medical and disposable supplies in sufficient quantities for newborn care (Table 7). The supplies frequently reported as insufficient by the neonatologists included intubation tubes and air tubes (in three of the six hospitals), followed by umbilical and venous catheters, nasal cannulas of different sizes, aspiration catheters, and blankets for mother and baby, each mentioned as insufficient in two of the six hospitals. One of the hospitals reported the highest number of items (10 out of the inquired 18) that were in a short supply. These, in addition to the above listed, included sterile gloves, tweezers, scissors, surgical forceps, "Butterfly" needles, and gastric probes of various sizes. The remaining five hospitals reported only 0 to 3 items (of the 18) as insufficient.

Table 7. Supplies available in sufficient quantities for neonatal services in the regional hospitals

Supplies	**Hosp.1**	**Hosp.2**	**Hosp.3**	**Hosp.4**	**Hosp.5**	**Hosp.6**
1. Sterile gloves	0	1	1	1	1	1
2. Sterile diapers	1	1	1	1	1	1
3. Oxygen tubes	1	1	1	1	1	1
4. Medical vials	1	1	1	1	1	1
5. Tweezers	0	1	1	1	1	1
6. Scissors	0	1	1	1	1	1
7. Surgical forceps	0	1	1	1	1	1
8. Medical tape	1	1	1	1	1	1
9. Blankets for mother and baby	0	1	1	1	0	1
10. Drip injection systems	1	1	1	1	1	1
11. Syringes with different volumes	1	1	1	1	1	1
12. "Butterfly" needles (various sizes)	0	1	1	1	1	1
13. Gastric probes (different sizes)	0	1	1	1	1	1
14. Umbilical and venous catheters	1	1	1	1	0	0
15. Nasal cannulas (different sizes)	0	1	1	1	1	0
16. Intubation tubes	0	0	0	1	1	1
17. Aspiration catheters ` 10, 12, 14 F	0	1	1	1	0	1
18. Air tubes	1	0	0	1	1	0
Supply score (of 18 items in total)	*8*	*16*	*16*	*18*	*15*	*15*
(Percent score)	*(44.4%)*	*(88.9%)*	*(88.9%)*	*(100%)*	*(83.3%)*	*(83.3%)*

The universal lack of nasal prongs of neonatal or premature size was of a particular concern, because the use of infant-size prongs instead of these for HFNC was traumatic for neonates. As in the case of the equipment score, there was no clear relation between the supply score and the level (IB or II) assigned to a maternity hospital.

The availability of the inquired essential laboratory and diagnostic tests for newborns was rather limited in the assessed regional hospitals (Table 8).

Table 8. Availability of essential laboratory and diagnostic tests for neonates in the visited hospitals

Test of:	**Hosp.1**	**Hosp.2**	**Hosp.3**	**Hosp.4**	**Hosp.5**	**Hosp.6**
1. Hemoglobin	1	1	1	1	1	1
2. Hematocrit	1	0	0	1	1	1
3. Blood group and rhesus factor	1	1	1	1	1	1
4. Blood glucose (biochemical test)	1	1	1	1	1	1
5. Complete blood count	1	1	1	1	1	1
6. Leykoformula	1	1	1	1	1	1

Test of:	**Hosp.1**	**Hosp.2**	**Hosp.3**	**Hosp.4**	**Hosp.5**	**Hosp.6**
7. C-reactive protein	1	1	1	1	1	1
8. Bacteriology (hemoculture)	0	0	0	0	0	0
9. Sensitivity to antibiotics	0	0	0	0	0	0
10. Blood electrolytes	0	0	0	0	1	0
11. Coagulogram	1	1	1	1	0	1
12. Acid-base balance	0	0	0	0	0	0
13. Proteins in blood	0	1	1	1	1	1
14. Urea, creatinine	1	1	1	1	1	1
15. Direct and indirect Coombs reaction	0	0	0	0	0	0
16. Serological blood tests	0	0	0	0	0	0
17. Blood compatibility	1	1	1	0	0	1
18. Liver function tests	1	1	1	1	1	0
19. Brain ultrasound	0	0	0	0	0	0
20. X-ray examination	0	1	1	1	0	1
21. Echocardiography	0	0	0	0	0	0
22. Electrocardiography	1	0	0	1	0	1
Laboratory & diagnostic test score (of 22)	*12*	*12*	*12*	*14*	*11*	*13*
(Percent score)	*(54.5%)*	*(54.5%)*	*(54.5%)*	*(63.6%)*	*(50.0%)*	*(59.1%)*

The tests for bacteriology (hemoculture), sensitivity to antibiotics, acid-base balance (blood gases), direct and indirect Coombs reaction and serological blood tests were unavailable in all the assessed hospitals. Of the instrumental examinations, brain ultrasound and neonatal echocardiography were also unavailable in all six hospitals. The test for blood electrolytes was available in only one hospital of the six assessed. Electrocardiography was not available in three hospitals and X-ray examination in two hospitals. Tests for blood compatibility and hematocrit were also unavailable in two hospitals. One hospital reported unavailability of coagulogram, another – of liver function tests, and a third one – on proteins in blood. In three hospitals, all the tests were available only during the daytime working hours. The test score for the assessed hospitals ranged from 11 to 14 (of the 22) or 50.0-63.6%. Again, the hospitals with higher laboratory & diagnostic test scores were not those with higher assigned level of services.

The checklist asked also about the availability of 20 clinical guidelines on different topics of neonatal care in the selected regional hospitals (Appendix 4). All 20 guidelines were available in all six hospitals. In five of them, these guidelines were those recently developed by AANM in the scope of the USAID-funded project "Improving Quality of Neonatal Services in Armenia"

launched in 2015. In the sixth hospital, these new guidelines were not yet received and instead the older ones developed with UNICEF support in 2009 were in use.

Additionally, the equipping of the two neonatal ambulance cars of the "Muratsan" hospital was assessed by the study expert. The neonatal ambulance service in "Muratsan" hospital is the only such service in Armenia and serves the whole country. Ideally, each of the neonatal ambulance cars should be equipped with a portable incubator, a portable mechanical ventilator, a cardiomonitor (heart rate, SpO2, blood pressure, respiratory rate, and temperature), an oxygen transport cylinder, an air compressor (small size), a T-piece resuscitator, an air humidifier, a transilluminator (to check for pneumothorax), an infusion pump, a microlaboratory, a bilicheck and a phototherapy lamp. Each of the two neonatal ambulance cars of the "Muratsan" hospital is currently equipped with an oxygen cylinder, a suction machine, a mechanical ventilator and a T-piece resuscitator. However, the mechanical ventilator and T-piece resuscitator are actually useless because of the lack of a compressed air source (air compressor) in these cars. Initially, there was also an incubator in each care, but the staff preferred to remove those because of the limited space in the car that made the presence of those impractical. In fact, these cars are too small to be equipped in accordance to the international standards. According to the study expert opinion, although obtaining bigger ambulance cars can serve the problem of the space and bigger cars are generally more comfortable, they might be not suitable for the roads of Armenia.

4.3 Qualitative study results

4.3.1 Organization and adequacy of neonatal services

4.3.1.1 Equity of access to quality maternity and neonatal services in Armenia

Although a couple of neonatologists from the marzes and some pediatricians thought that the present structure of neonatal care services in Armenia ensures equal access to quality services to all newborns regardless of their birthplace, the prevailing opinion of the participants was that it does not. They explained that various factors make equal access impossible. Firstly, all 3rd level maternities, which are the most saturated with equipment and supplies, are confined to Yerevan, while the marzes are left with less-equipped and smaller-scale 1st and 2nd level facilities. Further,

some participants emphasized that the numbers and qualification levels of medical personnel are an issue especially for the facilities in the marzes. Donor organization representatives also mentioned lack of specialists, equipment and supplies in regional facilities that diminish the quality of the services they provide. Additionally, they mentioned the lower financial affordability of quality services for families from regions and lower geographical accessibility of these services for them, as well as low salary for neonatologists, which decreases their motivation to work properly. As a result, whenever difficulties arise, the regional hospitals prefer to transfer newborns or pregnant women to more specialized medical centers in Yerevan. The donor agency representatives noted that one of the side-effects of this is that the small number of serious cases treated in marz hospitals leaves the specialists there with a lack in work experience. A key informant felt that the whole system of neonatal care in Armenia needs restructuring, because the system consisting of over 50 small neonatal units spends a lot of resources but is not able to provide satisfactory care. This participant suggested decreasing sharply the number of neonatal care units in Armenia, while making sure that the remaining units are accessible and able to provide high quality care.

A group of pediatricians claimed that the level of access to quality neonatal services is limited for those born in the regions because often the babies who are transferred to Yerevan come in a very bad condition and it is obvious that in the regional medical facility no one took adequate care of them. According to them, the babies born in the remote areas are often "neglected" and they frequently do not pass all the necessary screenings. Again, the above mentioned problems are related to the absence or lack of narrow specialist services and physicians in the regions.

The neonatologist participants from the FGD conducted in Yerevan unanimously reported that there is an issue with physical accessibility of quality neonatal services, but then quickly clarified that this was true "only in remote areas which have problems with roads". For these areas, they suggested to have regional referral centers providing third level care that will considerably shorten the time spent on transferring neonates and thus will contribute to better health outcomes. Also, there is a considerable demand among population from remote regions to be referred to a close-by (regional) referral center, rather than to go to Yerevan, which is not always affordable or feasible for them.

At first sight I would say no [the structure of neonatal care services in Armenia does not ensure equal access to quality services for all newborns, regardless of their birthplace], *because, the preparedness, the infrastructure, the quantity of physicians is not ensured* [in regional facilities]. *The only thing that saves the situations is that Muratsan* [hospital] *responds very quickly and effectively whenever there are problems*. (Donor, 4.3.1.1.1, IDI, Yerevan)

There are problems with regards to quality and accessibility of neonatal services. I think it is not the same for villages and cities. There are medical conditions that we are not able to manage here [in the marz]; *therefore, we refer those to the capital city. Our problems concern both the specialists' qualifications and the equipment. Healthcare services are accessible but the question is the quality of those services. That is the problem… There are certain conditions that we don't have capacities* [specialists and equipment] *to diagnose or to treat, for instance complications during pregnancy. We work in a remote marz and refer complicated cases to Yerevan. The transportation is also a problem for us. Such cases as infertility, a child with complications or a complicated pregnancy are very difficult to manage and to organize the transfer.* (Pediatrician, 4.3.1.1.2, FGD, marz)

Yes, the structure of neonatal care services in Armenia ensures equal access to quality services for all newborns, regardless of their birthplace [a few participants agreed]. (Pediatrician, 4.3.1.1.3, FGD, marz)

Yes [equal access is ensured], *but with exceptions. It is not possible to ensure equal conditions in marzes and in the city* [Yerevan]. (Neonatologist, 4.3.1.1.4, FGD, marz)

When we talk about equal access, we must differentiate two types of access: access to services from a financial point of view and in terms of geographical location. When we talk about the geographical access, we mean that not all marzes or regions have neonatal resuscitation units, but the MOH is trying to regulate that with the help of the referral system... All regional maternities have NICU rooms, where they stabilize newborns and then transfer them to Yerevan... I have to say that we also have a problem with human resources, which creates challenges related to access. We have regional maternities where there is no neonatologist and the delivery is performed by a midwife and probably by the pediatrician who is on duty. These are the main things related to access... (Policy maker/expert, 4.3.1.1.5, IDI, Yerevan)

Probably. It is a problem if you are a very poor family from a region coming to Yerevan to deliver. There are a lot of financial issues there. And then you are leaving your family behind, so that is probably an issue. I think it's equal in respect that the facility is here in Yerevan if you need it. And I think it is available to anyone. … I think there is an issue with money on this. You know, if you pay somebody you will go somewhere. You may not get an opportunity if you have no money... (Donor, 4.3.1.1.6, IDI, Yerevan)

Poor countries must spend their resources correctly… we waste our resources. They are incorrectly distributed, the overall structure is wrong and instead of going in the direction of enlargement where we would have 20 working maternities instead of 60, various donor organizations try to revive those small ones which are dying out or are already dead, without taking prospects into consideration. (Policy maker/expert, 4.3.1.1.7, IDI, Yerevan)

Now let's imagine for a moment if 3 maternities, Martuni, Gavar and Vardenis, were to be merged together, there would be 4 doctors there and no issues with equipment at all. And if together with this enlargement they were also financed for treating patients, this would resolve their issue with staff members, equipment, and they would not be idle anymore. (Policy maker/expert, 4.3.1.1.7, IDI, Yerevan)

…they bring awfully neglected babies from the regions. …it is highly improbable to have a child in the capital so badly neglected. (Pediatrician, 4.3.1.1.8, FGD, Yerevan)

Birthplace has a big significance… the conditions are sufficient to provide necessary care in the tertiary maternities [in Yerevan]. *With regards to the marzes – I can only speak of our marz – the services are at a very low level. I do not mean the preparedness of the specialists, but the technical saturation, the laboratory conditions, everything…* (Neonatologist, 4.3.1.1.9, IDI, marz)

As relates to the screenings, there is a very big difference between the service levels of the city and the regions. Narrow specialist services are mainly absent in the regions, so the children are left practically without a doctor… None of the [needed] *screenings are conducted among those children from regions who apply to our center. The provided services are very different, very incomplete* [in the regions]. (Pediatrician, 4.3.1.1.10, FGD, Yerevan)

[Physical accessibility is a problem] *only in remote areas which have problems with roads.* (Neonatologist, 4.3.1.1.11, FGD, Yerevan)

It is very desirable to establish regional neonatal centers because our region is far away from Yerevan. Of course, transferring services are available and we are very pleased with these services… But the presence of a neonatal center in the region where sick newborns could be transported in 1-2 hours and treated (instead of the 5-6 hours to reach Yerevan) would be more effective and improve the outcomes. (Neonatologist, 4.3.1.1.12, IDI, marz)

The complicated cases from Sisian and Kashatagh also come to us. We have many cases when people decided on their own to come to our center, even if they have already been referred to Yerevan by their doctor. …Thus, we end up having to refer these cases back to Yerevan; we try

to explain that instead of coming towards us, they should not waste time and should go directly to Yerevan. (Neonatologist, 4.3.1.1.13, IDI, marz)

In general medical care services should be organized closer to the public and not the opposite when the mother and her baby have to go and seek care in Yerevan... Not all can afford going to Yerevan. (Pediatrician, 4.3.1.1.14, FGD, marz)

4.3.1.2 Selection of a delivery hospital

According to various FGD participants, most pregnant women prefer to give birth in nearby maternity, while, according to different estimations, 10-25 % of women from regions prefer to give birth in other maternity hospitals, especially in Yerevan. From their words it became clear that there are a number of reasons explaining the intentions of pregnant women to give birth in Yerevan or in other cities: those include distrust towards local specialists, medical indications such as complications during pregnancy, being treated in Yerevan during pregnancy or before (e.g., for infertility), preferring to give birth in the city where the pregnant woman was born or where her relatives live, and the financial affordability of giving birth outside the own marz. Some participants claimed that people in regions cannot freely choose the maternity outside of their marzes. They stated that women can deliver with the state funding (provided by Obstetric Care State Certificate (OCSC)) within the boundaries of their marz and when they come to deliver for example, in Yerevan, the maternities ask them to pay lots of money, as their OCSC does not work outside their region, unless they are referred to Yerevan by their doctors because of having medical indications. While some of the participants believed that financial accessibility plays an important role in the choice of another maternity hospital for delivery, most argued that the financial aspect plays no role, and if the family wants to choose another maternity, the poor financial situation will not stop them, as they take a loan to be able to go to a different maternity. The lack of doctors in some regional maternities was mentioned as an important factor that forces women to seek care in other hospitals. Another fact related to trust towards providers was noted by one of the regional specialists who mentioned that the number of pregnant women who prefer to give birth in the city where they live dramatically declines during a certain period if undesirable outcomes such as cases of newborn or maternal deaths happen in

the local maternity. From the words of this participant, during that time the local pregnant women prefer going to Yerevan and giving birth there.

One of the marz neonatologists spoke of some difficulties which they face when a woman who is not from their region accidentally comes to deliver at their unit. Mainly, these are connected with the lack of essential medical information on that woman and difficulties with collecting the needed information urgently because of unavailability of round-the-clock laboratory services.

90% prefer to deliver their babies in our MC, the remaining 10% of women who have complications, only they prefer moving to other places [P 5, P6, P7, P3 agreed]. (Pediatrician, 4.3.1.2.1, FGD, marz)

Approximately 20% or more [deliver in other places]. *In my case 13 out of 53 births took place in other maternities, not in our local maternity unit. It is a big number.* (Pediatrician, 4.3.1.2.2, FGD, marz)

The 10-20% of the transferred cases that you mentioned included mothers who decided to move to Yerevan on their own, without clinical indications [all agreed]. (Pediatrician, 4.3.1.2.3, FGD, marz)

Those pregnant women who have complications are usually transferred immediately from the maternity unit. Women that need consultation and high quality specialized hospital care are also transferred. Anyway, it [the choice of delivery place] *also depends on women's preference to deliver in regions where their relatives reside. But, in general, majority of women prefer giving birth in the nearest maternity unit…Mothers that got pregnant after treating infertility and were under Yerevan specialists' control stay there and deliver their babies in Yerevan.* (Pediatrician, 4.3.1.2.4, FGD, marz)

The birthplace of a pregnant woman it is very important. If the pregnant woman has been born in city X, they go there. It is important for post birth care, sometimes they go to X, stay there and later only return back to us. (Pediatrician, 4.3.1.2.5, FGD, marz)

Pregnant women are scared, they are terrified... they have cases when the ob/gyn is not present at the delivery (or they don't have one at all), and out of fright the person tries going to another region or if they manage they come to Yerevan [P2 agreed]. *There are some regions, where pregnant women just do not know where to go to. There are such cases and I know gynecologists from Yerevan who travel to the regions, just work on duty throughout Saturday and Sunday and then return.* (Pediatrician, 4.3.1.2.6, FGD, Yerevan)

If they trust their doctors, they would hardly come here [to Yerevan]. *They would just stay and deliver there.* (Pediatrician, 4.3.1.2.7, FGD, Yerevan)

Pregnant women are provided with a certificate, which allows them to apply to any maternity hospital within the territory of their marz and deliver with state funding. But if they want to deliver in Yerevan, then it is a different matter. …They come from the regions with their certificates and we hear sooooo many things. About how they [maternity hospitals] *admit them but with such prices or the conditions they propose. …They* [regional residents] *are free within the boundaries of their region. If there are any indications to come to a higher level, then they have to be referred by their maternity. This reference is again on the state funding, but if they want to come to a specific maternity hospital at their own free will, then that is a different matter* [they need to pay]. (Pediatrician, 4.3.1.2.8, FGD, Yerevan)

Approximately 2-3% of pregnant women afford moving to Yerevan on their own, getting registered and delivering babies there. There are people who want to go to Yerevan. Mostly those who are from Yerevan, who have been born in Yerevan move back to deliver their babies there. There are also wealthy families that find it better to deliver babies in the capital city and stay under their [specialists from Yerevan] *control compared with staying here. This is related to trust …* [towards specialists]. (Pediatrician, 4.3.1.2.9, FGD, marz)

In general I find that in any situation financial factor is the primary factor. One should have enough financial resources to afford the transfer [P 4 disagreed]. *I think if people do not have enough financial resources how can they manage to go to other place to deliver their baby there?* (Pediatrician, 4.3.1.2.10, FGD, marz)

Even if they [families] *don't have enough money, they will try to do something. Sometimes you see that a family does not have financial resources to move to other place, but they somehow manage to go. Because of those stressful situations when they feel distrust towards local specialists. I have met such people, while looking at them I would never believe they could afford transfer to Yerevan. Still they managed to go. Financial status is not really related. Those who have enough financial resources move and get registered in Yerevan from very beginning without even coming to us. They take loans and go, I know that very well.* (Pediatrician, 4.3.1.2.5, FGD, marz)

I would not say that the financial issues force mothers to stay and deliver in local maternity unit [P3 agreed]. (Pediatrician, 4.3.1.2.1, FGD, marz)

When an incident occur with a bad outcome [in the local maternity] *such as an infant death, maternal death, or other situations that receive public attention, the flow of our mothers to Yerevan during that certain period increases. It is they who* [pregnant women] *decide to go to*

Yerevan…Two months later we feel that our pregnant women return to our hospital and the number of births restores. I have observed this tendency… [P 5 and P 2 confirmed they also noticed this tendency]. *Is it more of carefulness…* (Pediatrician, 4.3.1.2.5, FGD, marz)

You know, they do not bring the exchange card with them [referring to women who come from other areas], *which means that we do not have any information about them. We have a lack of information for these cases. The pregnant women from our city are included in the women's consultation registers and our physicians know about them. Plus, they* [mothers] *also have their exchange cards. But if someone goes to the army* [for a visit] *and on the road she... sometimes they do not even know their blood group, rhesus… and the laboratory does not work for 24 hours...we have one physician there and we call him/her... if necessary, we call everyone: the ultrasound examination physician, the laboratory physician etc.* (Neonatologist, 4.3.1.2.11, IDI, marz)

When asked about home deliveries, all FGD participants unanimously assured that there have been no home births for more than 20 years. All the deliveries take place in hospitals. In the rare cases of home births the couples are immediately hospitalized. A participant argued that although in his/her region the home births are no longer a problem, he/she assumed that this problem could still exist elsewhere during the harsh weather.

It has been almost 20 years since we do not have home births. (Pediatrician, 4.3.1.2.1, FGD, marz)

We also serve the villages, all regional villages near our regional center… even in the villages we do not have home births. (Pediatrician, 4.3.1.2.5, FGD, marz)

But why are you telling that home births are not problem for us? In the winters the roads can be closed… I mean you say that there are no problems but in fact there are. (Pediatrician, 4.3.1.2.12, FGD, marz)

"It has reduced a lot even in the regions. Very much. It is not how it used to be in the past. People really avoid delivering at home. There are almost no cases of deliveries at home now. People are more informed I guess… We have not had home birth case, but if there is a case, we would send them to maternity hospital for sure." (Pediatrician, 4.3.1.2.6, FGD, Yerevan)

4.3.1.3 Availability of equipment at neonatal units of Armenia

The question related to availability of the necessary equipment in the neonatal units of Armenia was met with an almost unanimous "no" from all neonatologists participating in the study. They

reported that although the situation is much better than before, none of the neonatal units in Armenia are saturated, as the equipment they have is not enough. A few participants went on to explain that the level of saturation varies from one unit to the other, with Yerevan being in much better shape compared to the marzes. Some participants indicated that as the needs are different across the hospitals, it is impossible to suggest a solution which will be applicable to all the settings. Also, some of the donors expressed their opinion, that simply providing equipment to facilities or renovating the maternities does not guarantee high quality of care. This group also reported that not all the facilities are adequately equipped with proper equipment and even with the existing equipment there are still many problems. Firstly, some maternities received equipment, and although employees assure that they use them, the donors' observations have shown the opposite thing. Moreover, they have seen that some part of the equipment is in their boxes, covered in dust. A similar situation was also reported by one of the neonatologists from Yerevan, who noted that in these cases the equipment serves more as furniture than as medical devices. According to a few respondents the issue is that the donor organizations provided equipment to different facilities without conducting an accurate needs assessment. As a result, some maternities have equipment which they don't use simply because they do not perform the procedures the equipment is intended for (as the level of their maternity does not allow that). In the same time, they lack some other more basic equipment that they actually need. Moreover, one neonatologist explained that this process was further affected by the department heads that have a major role in evaluating the situation in their own units and procuring the required equipment in any way possible. A key informant suggested relocating the unused pieces of equipment from one facility to another, so that these are used in the recipient facility. It was suggested that the MOH regulate this process.

Besides, another interesting opinion was expressed by one of the donors, who stated that not only the facilities need new equipment to replace the old ones, but also they do not have enough financial resources to find a specialist and repair the available equipment when it gets out-of-order. The engineering service of the USAID/AANM that visited the facilities and repaired their old equipment was perceived by a donor agency representative as very important one.

Regarding saturation [with the needed equipment]*... that which is required by international standards from neonatal services... in my opinion Armenia is only half saturated, 60% at the*

most. Even those maternity hospitals which are the most saturated have a deficit of a huge number of equipment, which does not allow them to provide sufficient services and at full capacity. (Policy maker/expert, 4.3.1.3.1, IDI, Yerevan)

Of course these [equipment] *are not enough. If we compare ourselves to European and American NICUs, our departments have many problems with saturation with contemporary equipment… Every department has its unique requirements depending on the level of care it provides. I cannot say exactly which equipment is necessary for all.* (Policy maker/expert, 4.3.1.3.2, IDI, Yerevan)

Without a doubt, they [neonatal services of Armenia] *are not* [saturated with necessary equipment for intensive care and newborn resuscitation]. *I can list 10 types of equipment, that if you were to enter even the best department - the most saturated one - you would find missing. And these are equipment that they should have, but they don't. I'm not even talking about the poorest departments.* (Policy maker/expert, 4.3.1.3.1, IDI, Yerevan)

All clinics in Yerevan are mainly private and they are quite well equipped. They do not depend on anyone or anything. However, the situation is different in marzes, which are poor and inadequately equipped. (Neonatologist, 4.3.1.3.3, FGD, marz)

The adequacy of equipment is very low in our facility. (Neonatologist, 4.3.1.3.4, FGD, marz)

…The availability of equipment is something relative. For example, through programs, some regional hospitals have been provided with certain types of equipment which they do not need and they would not use them ever. (Policy maker/expert, 4.3.1.3.5, IDI, Yerevan)

…Even large neonatal units of Yerevan providing third level of care services as well as delivery rooms in two hospitals are not sufficiently equipped to adequately address the needs relevant to the volumes they have, compared to the same units abroad. This is about equipment. With respect to the regions, levels of care are different… There are regions that are more equipped compared to others. This also refers to the staffing levels of specialists. (Neonatologist, 4.3.1.3.6, FGD, Yerevan)

It's not like we don't have anything here in Armenia... I just passed the halfway, and we still have many-many things that must be obtained. As for the regional maternity hospitals... these are in far poor shape. Various organizations have given different things without an accurate assessment of the needs of these people, so they lack equipment which they need to use prior to using this advanced equipment. As a result we have an area, where we are completely uncovered, and then we have equipment which we can never use. (Policy maker/expert, 4.3.1.3.1, IDI, Yerevan)

The pressing needs in this area are different in various places... in one place it is the lack of oxygen cylinders or the cylinders do not work, in other places there are no nasal prongs [for HHHFNC], *bilirubinometer… there are thousand questions which are specific for each facility... I cannot say one thing that every facility has... it is very individual and of course, those are pressing needs which should be clearly estimated.* (Donor, 4.3.1.3.7, IDI, Yerevan)

There is a serious problem related to the neonatal equipment... many organizations donate equipment to the medical settings, but nobody studied whether they are required in that region or not. For example, you could see equipment in the settings of A or B [names of two maternities] *which is not used because they do not treat newborns with complications while the same equipment that is necessary in Yerevan is absent…The WB renovated many hospitals that have excessive areas, they are well equipped and repaired, but not all of them work fully***.** (Donor, 4.3.1.3.8, IDI, Yerevan)

I was recently at the "X" maternity ward where they have an artificial respiration device, which is impossible to use, as it has many missing accessories. There is only one doctor there, who has not undergone any training on operating this equipment. In addition, there are other less aggressive devices, which must be used first and if the infant doesn't respond well, then he/she is transferred to this artificial respiration device. However, they lack this equipment. So if the provision had been organized correctly, then instead of this artificial respiration device - which is a rather expensive piece of equipment - they could have been provided with other more basic and mild, yet more vital equipment. This maternity hospital is not unique in this sense... this situation is present at almost all the maternity hospitals, because a systematic provision of equipment has never been organized in Armenia. Everything has depended on how the head of that specific maternity hospital has managed to procure these devices, and whether or not they have been able to evaluate their needs on the spot. (Policy maker/expert, 4.3.1.3.1, IDI, Yerevan)

Another problem is that if the equipment is placed in the setting without using it, then keeping it there is wrong… The equipment could be relocated to another hospital where there is more need. They should work with people and explain that it is meaningless to keep the equipment when it could save the life of a newborn at another hospital...The MOH [can supervise this], *along with regional health departments.* (Donor, 4.3.1.3.8, IDI, Yerevan)

We conducted such assessment [to identify the needed equipment] *and applied to USAID, and it is on the stage of buying that equipment. In your report, you can note that we conducted assessment and we asked the donor to buy these/those equipment for these/those facilities. Of course, only this is not enough. There is always a need...* (Donor, 4.3.1.3.7, IDI, Yerevan)

…Within the USAID project, certain problems have been resolved and they [the AANM]

demonstrated very reasonable approach as they managed to repair the equipment that had not been used for years because some mechanical details should have been replaced. I think that the AANM is capable of assessing what devices and equipment are necessary to repair. Because, it happened that the equipment was present but the usage options were few. (Donor, 4.3.1.3.9, IDI, Yerevan)

Throughout discussions, some neonatologists readily listed a few of their most appreciated and new equipment and explained how some of these are essential for saving the lives of newborns, and how some others facilitate their work. On the other hand, other neonatologists (mainly from lower-level hospitals in marzes) reported not having some of the essential equipments and facing various difficulties because of that. The most frequently needed equipment types were those for non-invasive respiratory support (often unusable because of the lack of compressed air and oxygen supply systems), bilirubinometer (in the lack of which the old equipment requires unfeasibly large quantities of blood to be taken each time to detect the bilirubin level), and infusion pump (for automatic regulation of medication dosage administered to a newborn, in the absence of which the possibility of human errors in the administered dosages seriously increases). The need for cranial ultrasound and cardiac ultrasound machines, and equipment for measuring blood gas levels also was acknowledged.

Another issue raised by the participants was the presence of equipment, supplies (e.g., suction catheters, tubes, PP3 catheters, extenders for intravenous injections), and essential medication in insufficient quantities. Several participants brought examples of cases when their work had been hindered and a simple procedure had become difficult because they had too many sick babies and not enough equipment. Another issue related to insufficient quantities of some disposable items (catheters, tubes) was the danger of nosocomial infections because of re-using those items. Outdated equipment was another issue raised both during FGDs and IDIs with neonatologists from Yerevan. These participants explained that it is possible even for a newly acquired equipment to be outdated, the use of which reduces the quality of their work. However, they agreed that it is really hard to keep up with the constant modernization.

...The pressing needs in this area are different in various places... in one place it is the lack of oxygen cylinders or the cylinders do not work, in other places there is no nasal cannula [HHHFNC], *bilirubinometer... or for example, essential medications which might be missing from the facility... Currently, our staff is working on the essential medications' list, and we hope*

*that when the list is ready the facilities will be obliged to ensure the presence of those medications***...** (Donor, 4.3.1.3.7, IDI, Yerevan)

Respiration equipment is also needed, because the newborn may get harmed during waiting for the reanimobile to arrive. (Neonatologist, 4.3.1.3.9, FGD, marz)

We do not have a compressed air supply (Muratsan has this and it is very good) and we also have nobody who can handle that equipment…We are in urgent need of high-flow [HHHFNC]. (Neonatologist, 4.3.1.3.10, IDI, marz)

We have a problem with oxygen supply. This is a problem everywhere, I asked around. In the 1st level facilities the oxygen is very problematic... (Neonatologist, 4.3.1.3.11, IDI, marz)

...There are many-many tests, examinations, which must necessarily be performed on a newborn. Very few maternity hospitals have these equipments. For example, cranial ultrasound, cardiac ultrasound, blood gas level tests which are mandatory for infants with respiratory problems - I don't think there is any hospital which has this equipment. But even if they do, these are very old equipment left from the soviet era which have nothing to do with current reality. (Policy maker/expert, 4.3.1.3.1, IDI, Yerevan)

For example for identifying jaundice we do not have a bilirubinometer. I estimate it [severity of the jaundice] *approximately by my eye. I would like to have a bilirubinometer… I would also like to have a laryngeal mask for cases when I cannot perform an intubation. I would also like to have high-flow equipment.* (Neonatologist, 4.3.1.3.12, FGD, marz)

In tertiary maternity hospitals they have a simple bilirubinometer and they are able to take a drop of blood [to determine the level of bilirubin], *but for example in marzes we have to take blood from vein in order to perform such a test... It* [bilirubin] *has an hourly increase, and we need to determine it a few times a day. So whenever this problem* [the need to measure bilirubin several times a day] *arises, the newborn is transferred to a tertiary level hospital*. (Neonatologist, 4.3.1.3.13, IDI, marz)

Disposable supplies including suction catheters, tubes, PP3 catheters, etc, should be provided in larger quantities. They seem to be sufficient in our hospital but there are settings that do not have them in adequate quantities. This is very important to prevent nosocomial infections [because of re-using these items]. (Neonatologist, 4.3.1.3.14, FGD, marz)

You know, there are things that are lacking... I wrote a claim but still have no answer: for example, probes, extender for intravenous injections... I mean, for the newborns we have special extenders that are connected to a pump and when their quantity decreases I have a panic attack

and knock on all doors, but still we do not have enough of them... Sometimes when the reanimobile comes, the staff gives these things to us as gifts. (Neonatologist, 4.3.1.3.11, IDI, marz)

…They had an infusion pump issue over there [in a regional unit], *which* [the pump] *is necessary to be able to provide the infant with correctly dosed liquids at a specific speed/hourly rate. So they don't have that. And even though it is possible to work without this specific piece of equipment, it is quite dangerous. Because they have to sit and count the drops to make sure that they don't flow too fast or too slow. And this is a very complicated thing to do when you are working alone.* (Policy maker/expert, 4.3.1.3.1, IDI, Yerevan)

Units have equipment but the volume is not sufficient to provide adequate services. There aren't as many equipment by each bed, as there are abroad. If there are 10 pieces of equipment attached to a monitor per bed abroad, we have far less. So we sometimes end up moving them from one ICU patient to the other. This problem exists. (Neonatologist, 4.3.1.3.15, FGD, Yerevan)

I received a call that a woman form Sisian pregnant with twins was delivering early. At the same time I already had an ill infant born from a mother through her second C-section... I ended up putting one baby on CPAP and providing manual oxygen to the other. What could I do, we only have one CPAP machine. Once the reanimobile arrived, they transported all 3 infants to Yerevan. (Neonatologist, 4.3.1.3.10, IDI, marz)

As far as I know, there is only one high flow machine [HHHFNC at Muratsan hospital], *but there are cases when 1-2 newborns need this equipment. However, they do manage to work with all cases.* (Policy maker/expert, 4.3.1.3.16, IDI, Yerevan)

For example, we have one infusion set which we use to work with. The presence of a second infusion set will be beneficial because there are issues related to the deterioration of a device. (Neonatologist, 4.3.1.3.17, IDI, marz)

I also avoid performing infusion therapy, because identifying PH…identifying the electrolytes is problematic. I would like the hospital to be able to determine that as well… We had an infusion pump which got damaged and it was taken to England for repair, but up to day they have not received it. It was provided by VivaCell. We would like to have that pump again… In case of asphyxia I cannot determine the PH level…I can only describe it. (Neonatologist, 4.3.1.3.18, FGD, marz)

There are different equipment series such as artificial ventilation equipment, which are updated rapidly. So, a six-year-old equipment may still be quite new, but from an older series. The new

equipment that is 4 to 5 years old could be older in series. I mean the equipment doesn't necessarily have to be deteriorated to be considered old. There are more modern series of equipment produced currently, but we could not afford changing them periodically… we use older types of equipment for patients with milder conditions. They are functioning but we could not provide adequate treatment services to the sick patients to get the desired outcomes. (Neonatologist, 4.3.1.3.15, FGD, Yerevan)

…You know, the demand always exceeds the supply... Technologies are developing and new equipment are being produced... if we try to assess the situation related to equipment, I would say that it is not bad but we still need to develop it even more... (Policy maker/expert, 4.3.1.3.19, IDI, Yerevan)

4.3.1.4 Issues with operating the available equipment

While discussing the staff's ability to operate the existing equipment correctly, some neonatologists expressed their satisfaction stating that their staff can operate the devices. One neonatologist also explained that all staff members don't necessarily know how to operate all the different devices, but working as a team they do not face any trouble. However, a number of participants expressed some concerns related to operating the equipment. Although the majority of neonatologists reported that special training sessions were routinely organized together with the provision of equipment to ensure its correct use, some mentioned the difficulties for the specialists from regions to participate in such trainings when they are organized in the capital. One neonatologist reported organizing refresher trainings at their facility, as their own initiative. However, some participants reported having issues with calculations and operation of devices. Only one of the donors thought that employees of different facilities are able to use the existing equipment, because those specialists who went to train them on the use of new equipment, most likely transferred these skills to them.

Another issue the participants raised was forgetting the details concerning the operation of the devices, as in small departments that treat very small number of severely sick newborns annually, the staff don't have the chance to use some devices frequently enough. This results in a natural recall bias and difficulty in operating the devices after a certain amount of time has passed. Therefore, even though providers working in small units have the needed equipment, they prefer referring the severe cases to larger units rather than trying to provide services using

the equipment they are not proficient with. One member of the donors' group believed that the staff members of the NICUs providing 3rd level care know how to use the available equipment because they manage many cases, including complex ones, so they have a lot of practice.

In some cases even though the equipment exist, operation is either difficult, or altogether impossible due to certain facility conditions where the infrastructure is absent and work becomes more complicated. One neonatologist reported having the oxygen system outdoors, which causes it to be very cold during winter. So the staff pours hot water into the system regularly to avoid any further damage to the newborns' airways.

An interesting phenomenon was reported by one of the marz neonatologists, who explained facing a sarcastic attitude from their colleagues when it comes to using the equipment. According to him, this attitude, which was related to lack of knowledge and avoidance from unusual equipment, sometimes resulted in reluctance to use it.

They [providers] *are operating the available equipment well. There is no problem with operating our equipment, because we are doing continuous trainings… to be more exact, the YSMU neonatology department, the neonatal association are always conducting continuous trainings.* (Policy maker/expert, 4.3.1.4.1, IDI, Yerevan)

Yes, they [maternity staff] *are prepared to use the available equipment correctly.* (Neonatologist, 4.3.1.4.2, FGD, marz)

We have an infusion pump, but I cannot use it, as I don't know how to do the calculations. (Neonatologist, 4.3.1.4.3, FGD, marz)

I do not think that the specialists do not teach others how to use the equipment... I think the AANM performs that and its staff visits marzes…but I do not rule out that there might be cases when certain equipment is not used... such cases happened... (Policy maker/expert, 4.3.1.4.4, IDI, Yerevan)

That is a very painful question, because you know in the beginning it seems that when you give the equipment to marzes… the neonatal services will improve. Unfortunately, it is not like that... our specialists went to many facilities and saw that the equipment are in the boxes and covered in dust or they opened it but… and when you ask them "have you used it?" they say "yes, yes", not knowing that in the back [of the device] *there is a measurement section which shows how many times you have used it and you see that it shows that they have not used it at all* [the participant started to laugh]. *It means that only giving the equipment is the first step but after that*

*they should be trained to use it... Of course.... it is not everywhere, but in many places this problem exists***.** (Donor, 4.3.1.4.5, IDI, Yerevan)

There is a huge project with the Ministry of Health and the World Bank. They have reinforced most of the hospitals now in Armenia, but it doesn't necessarily make them good. We've visited every hospital and I've seen the changes over the last 10 years. And you can go into one where they have new brand equipment which isn't being used. So they don't know how to use it, it's not maintained, they break it because they have no respect for their equipment. (Donor, 4.3.1.4.6, IDI, Yerevan)

Of course, there are some departments which have undergone respective training and the staff is better prepared. However, in some hospitals they've just brought the equipment, placed it there and said goodbye. Thus, instead of serving as operating equipment, these have more of a furniture status. So, there is a need to check these periodically, work in cooperation and train people. (Policy maker/expert, 4.3.1.4.7, IDI, Yerevan)

It [the equipment] *is covered in dust from standing there. And also because maybe some small detail is missing, and they don't know what that detail is...* (Donor, 4.3.1.4.8, IDI, Yerevan)

There might be places where the medical staff is not prepared to use the equipment, therefore the trainers need to come from Yerevan and train them on the spot instead of taking the staff to Yerevan. (Neonatologist, 4.3.1.4.9, FGD, marz)

Thankfully we have not had newborns with very LBW requiring incubators. We have an incubator, but we almost do not use it throughout the year. Once or twice in a year… Particularly, the new incubator that we have had for several years since 2013, we did not use it. (Neonatologist, 4.3.1.4.10, IDI, marz)

…they [maternity staff] *use those types of equipment rarely; this reduces their efficiency as a physician and their level of knowledge…* (Policy maker/expert, 4.3.1.4.11, IDI, Yerevan)

I know how to use them but, you know, currently we are not having many newborns and sometimes it happens when the girls [nurses] *forget something, but I control that all the time... Sometimes we gather and organize self-training... We ourselves organize that.* (Neonatologist, 4.3.1.4.12, IDI, marz

If the hospital is small (which most of them are), it means that they have less newborns with severe problems who need neonatological care. So imagine the CPAP or any other equipment, or procedure that you only use 6 times a year, it's impossible to perform it with high quality… That is why whenever they have a [severe] *case they get scared and transfer the baby to Yerevan,*

even if working with these cases falls within the frame of their maternity level. (Donor, 4.3.1.4.5, IDI, Yerevan)

I went to Yerevan and I was trained how to use a high-flow equipment. However now I do not remember that, because I do not have this equipment here and I forgot everything I leaned about its usage. (Neonatologist, 4.3.1.4.13, FGD, marz)

Yes, I think all new specialists are prepared and they would have the knowledge [on equipment use], *but middle aged and older* [specialists]*…* (Neonatologist, 4.3.1.4.14, IDI, marz)

We have the CPAP machine and a generalized oxygen supply, however, the issue with our oxygen system is that the tanks are located outside the building and during winter the oxygen becomes cold. Thus we need to pour hot water to heat the system every 15 minutes, otherwise it is more dangerous than helpful. (Neonatologist, 4.3.1.4.15, IDI, marz)

We are a 1st level facility but we are using an oxygen cylinder and because of that I am scared when the oxygen will expire. There is no systematic oxygen supply system… The oxygen therapy must be performed…it is a mixture of oxygen and air… Giving pure oxygen to a newborn is wrong as well… (Neonatologist, 4.3.1.4.13, FGD, marz)

Both the CPAP and pulsoximeter are very good machines, but the other doctors avoid using them. They make fun of me for switching them on, but I try to explain that it is for their own benefit. Even I was avoiding the pulsoximeter in the beginning, as it was unusual and I didn't understand its benefits. (Neonatologist, 4.3.1.4.15, IDI, marz)

4.3.1.5 Referrals between different level neonatal units

Even though the neonatologists reported that there are set standards and guidelines approved by the MOH regarding referrals between different level maternities in Armenia, and the referral system which is now in place works, they also mentioned that certain problems (limited number of vehicles, bad roads, uncertainties with referral forms, difficulties to stabilize the newborn before the transfer, etc.) still exist. The development of new guidelines for referrals is currently underway, which are meant to take into account these problems and provide solutions to them.

The system is established in a way that the lowest level hospitals (1st) in the marzes refer any case which they are not equipped to handle, to the higher levels. The level to which a pregnant woman/ baby is referred, depends on the complexity of the case and requirements. However, one

neonatologist from Yerevan reported that there is no transportation between various hospitals, and the only place they refer to is Muratsan hospital, which owns two neonatal reanimobiles that are the only vehicles for transportation of newborns in Armenia. Another participant mentioned that Muratsan and Arabkir hospitals are the main referral centers for all maternity neonatal units throughout Armenia, and when these two are full, then the RHPOGC is also allowed to admit neonates referred from other maternity hospitals, but this does not really addresses the issue of the scarcity of referral centers, as the NICU of the RHPOGC is usually overloaded with their own neonates. One participant suggested opening another referral NICU in Armenia.

During one of the marz FGDs, when a neonatologists in the group reported that they must prepare a referral form for the next hospital, their comment was widely debated within the group, as a few argued that the reanimobile staff do not take a referral form, while a couple of others named hospitals which require these.

Although some participants thought that the existing structure and system of referrals is good, some others felt like it limits motivation among neonatologists, as there is nothing left for them to do but to refer severe cases to higher-level facilities. Moreover, even a number of third-level maternities in Yerevan refer all their severe cases to Muratsan, although there is no justification for this as the third level facilities should refer only those neonates requiring highly specialized care.

We have a transfer system, which works successfully. In the marz centers we have slightly more enhanced neonatal services, but not in all marzes... In Gyumri we have a neonatal reanimation unit… We have tried to do that in Vanadzor as well, but it did not work… Finally, we have third level facilities... It seems that this system is understandable and works well... Probably it works well in one marz and a little bit worse in another marz… (Policy maker/expert, 4.3.1.5.1, IDI, Yerevan)

We have our standards [for neonatal referrals], *approved by the Ministry of Health. Of course, there are guidelines, there are standards, but the time has come to review some problems. We are now dealing with these problems, and during the recent months we have been working on new guidelines –updating the guidelines – with the neonatal association.* (Policy maker/expert, 4.3.1.5.2, IDI, Yerevan)

The referral system is currently being developed. (Neonatologist, 4.3.1.5.3, FGD, Yerevan)

We provide 1st level services, therefore we transfer [newborns] *to the higher levels of care, when necessary… The roads to the maternity in the marz center are also not good for transferring, but the distance and the time are shorter* [compared to Yerevan]. (Neonatologist, 4.3.1.5.4, IDI, marz)

In general the referral system works. If there is an issue of doing a tomography or MRT – we don't have such equipment and can't do these – so, the patient is referred...We refer for anything that we are unable to carry out. For anything that we can do here, we don't refer. (Neonatologist, 4.3.1.5.5, IDI, marz)

We had 2 to 3 cases when infants were already born with complications, it was not possible even to transfer [them] *from the delivery room* [to perform necessary procedures]. (Neonatologist, 4.3.1.5.4, IDI, marz)

As we refer the complicated cases, we do not need much of this equipment. We do not have permission to keep complicated cases at our center, as if anything goes wrong, then it becomes our responsibility. (Neonatologist, 4.3.1.5.6, IDI, marz)

We generally seek to provide services with the use of consultation and advice from the chief neonatologist or chief anesthesiologist-reanimatologist when it is not possible to transfer or when it is possible to treat newborns here without referral. But we provide services to those newborns that are not too premature or born with very LBW. Otherwise, we organize the immediate transfer due to the potential high risks. (Neonatologist, 4.3.1.5.4, IDI, marz)

The referral is not performed from one hospital to another… The option is to transfer the cases to the intensive therapy department of Muratsan hospital which is very well equipped. Here, there are equipment that none of the other maternities have, therefore, if there is a need, those babies are transferred to Muratsan...There are no problems in the referral system, because it [Muratsan] *is considered a third level facility with qualified staff and they care about the newborns. Therefore if there is a need to continue the treatment, then the transfer is organized.* (Policy maker/expert, 4.3.1.5.7, IDI, Yerevan)

When the units of Arabkir and Muratsan became overloaded, an order was given which indicated that the RHPOGC could admit neonates from other neonatal units. But the situation there is also critical as their unit contains over 30-40 newborn patients. (Neonatologist, 4.3.1.5.8, FGD, Yerevan)

It would be better to have more reanimobiles and another referral NICU in Armenia, because they hardly manage all cases in Armenia. (Neonatologist, 4.3.1.5.9, FGD, marz)

There is a referral system and referral forms also exist. (Neonatologist, 4.3.1.5.9, FGD, marz)

There is such a system [of effective referrals]. *They know whom to apply and what to do. After a call, the form is completed indicating* [newborn's] *health conditions during the transfer (similar to the clinical record* [epicrisis]). (Neonatologist, 4.3.1.5.8, FGD, Yerevan)

The reanimobile refused to take referral forms. I offered them but they refused to take them. (Neonatologist, 4.3.1.5.10, FGD, marz)

In truth the level depends on things that cannot be understood, because there are maternities which transfer all their severe cases and are considered 3rd level. And then there are 2nd level maternities which have the lowest transfer rates in all of Armenia… But if you are a 3rd level maternity, then you should only transfer those patients which require very narrow-specialized care, such as: cardiological, neurological, and surgical care... Unfortunately, this isn't how things are. (Policy maker/expert, 4.3.1.5.11, IDI, Yerevan)

4.3.1.6 Need in neonatal services restructuring

A number of donor organizations' representatives stated that to improve the access to quality services, it is eminent to merge the maternities that are located very close to each other, meaning that if two or three maternities are 20 minutes apart from each other and separately have a very small number of births, then they must be closed so that only one hospital remains there. There was triangulation between groups, as a few neonatologists also saw this process of enlargement as a necessary and effective way of restructuring. According to the respondents, merging a few small facilities will increase the number of deliveries in one facility and the financial resources will be spent adequately to enhance that one facility. The number of medical personnel, hence, their round-the-clock availability at the hospital will also increase. Moreover, an increase in the number of deliveries would also mean that medical personnel will have more chances to practice their skills for diagnosing and managing problematic and high-risk cases. Consequently, the quality of provided services and care will improve. However, the participants highlighted the importance of ensuring that physicians working at the enlarged maternities receive adequate salary so that they have motivation to work there. Although the issue of salaries was raised by neonatologists also, not all of them agreed with the idea of enlargement. They explained that even though this seems like a logical solution, it will bring more difficulties in its wake, since the

geography and nature of Armenia makes some areas inaccessible for months, especially in winter, which makes these very small regional units necessary.

All participants who supported the idea of enlargement stated that in order to bring this project to life lots of problems should be solved. Besides, two of the donors believed that the enlargement might be difficult because it will raise dissatisfaction of maternities' owners. As one of the respondents stated, everyone in Armenia can open a maternity if he/she has money, without taking into consideration the availability of adequate equipment and staff in that facility and as this participant noted, this is not monitored by higher instances.

At this moment I cannot suggest any new structure, but of course there are some ideas to improve our current structure. This requires a lot of work, and this is not for one person to handle... a serious team of the country's best experts should work in this direction for a long time. Of course our system is working, I can't say that it isn't, but there are some ideas, of course, to improve it… For example I am thinking that small departments, small hospitals, which have a small number of patients have to be closed. There is a tendency in the entire world called regionalization, where the best workforce is gathered at a university hospital... It doesn't necessarily have to be a university hospital. And you know very well that if providers serve large number of patients every day, they become more experienced and have more practice. Studies conducted in the USA have shown the same results – that a large number of small hospitals do not operate effectively. And we in Armenia have many problems, many.... Small maternities are very widespread… For example there are small hospitals that have 300 or 400 deliveries annually. That, according to the current approaches, is not so effective. (Policy maker/expert, 4.3.1.6.1, IDI, Yerevan)

Ideally you'd probably close the maternities with 100-150 deliveries. For example... you've got maternities that are all relatively close… At least you could possibly close one and move everything to the other, which is about a 20 minute drive away. But, you know, it is about patients and access to facilities as well. So... how we practice in our country... you would have just a clinic [instead of a hospital], *where you would have a midwife and a doctor doing assessments, monitoring during pregnancy, and then referring the woman to the hospital. And if you closed one, you would then increase your deliveries in another one. And that would give them* [providers] *more practice...* (Donor, 4.3.1.6.2, IDI, Yerevan)

We have some ideas [related to restructuring of neonatal care services] *but realizing them is a huge work. This is about creating centers... The centers should be in marzes, instead of having 63 facilities providing neonatal services… maintaining a huge staff for that… I mean to make them bigger … It is preferable to have a center in marzes in one or two places, or three maternities in south and three in north parts of the country, where the newborns will be*

transferred if they have any health related issues… Here, in Yerevan, there is a terrible overload... If we plan to make them [maternity hospitals] *bigger, then a financial assessment is needed to understand what is going on... and there will be neonatologists who… should receive a competitive salary and everything should be centralized, ensure transportation... I am saying things that everyone thinks, but everyone understands that this is a very complicated issue… Currently the structure is very bad: there are places where there are not many births and there is one neonatologist and one nurse... Then a question arises: will that neonatologist stay there for 24 hours? Right? So in each spot, 3 neonatologists are needed to work for 8 hours each... so that they replace each other... the same refers to nurses*. (Donor, 4.3.1.6.3, IDI, Yerevan)

…Optimization [is meaningful] *in cases when the accessibility of services does not suffer… I think in situations when medical centers are located close – in 20 minutes distance – to each other, the presence of one maternity center is sufficient... I remember a maternity that had only 4 deliveries and then they decided to repair the department and now it provides services for 30 deliveries. But, this is also irrelevant… I have not been in that region yet but it is characterized by lowlands unlike Kapan and Meghri where roads are in poor conditions and they might be closed not allowing people to receive services. Spending financial resources should be done efficiently because if the hospital is accessible physically but you do not have specialists with specific competencies and infrastructure like equipment and medicines, then this situation reduces the quality of accessible services.* (Neonatologist, 4.3.1.6.4, IDI, Yerevan)

Firstly, our country needs to develop a doctrine about what to expect from neonatal services. Do we need to have 60 maternity hospitals for 30-35 thousand annual births? And whether all of these 60 hospitals are saturated with the minimal requirements for providing neonatal services? Some efforts are being made to regulate these, but the longer this takes, the more it is delayed, the more our neonatal services suffer. It's not that these issues are neglected, rather that the intensity of the steps taken, their consistency and expected results - in my opinion - are not satisfactory. I often travel to the regions, and... People are dissatisfied. They feel like they have been abandoned, together with their problems, and everybody is trying to solve them as much as they can - in some cases they are no longer trying to solve these... (Policy maker/expert, 4.3.1.6.5, IDI, Yerevan)

In a lot of these hospitals in the regions - and I understand why they're there, because you need maternities - their number of deliveries is very small, so it is impossible to keep your skills, your practice up with that sort of experience. So it's not centralized... for example in one region you have a hospital serving 150 deliveries a year. You know, it's impossible to keep your skills up when you have complications with the mother in labour, or identifying high-risk mothers... I know more than 50% of women deliver in Yerevan, because a lot of them know the problems already in the regions. But the people who don't have that option... you're putting them at risk… (Donor, 4.3.1.6.2, IDI, Yerevan)

The golden standard is the shortage of medical centers delivering neonatal care services. But this process is challenging in Armenia not only in terms of social perspective but also the way of thinking and complicated geography. For example, if 60 to 100 deliveries occur in Meghri and 200 deliveries in Kapan, these numbers are generally small. But merging these centers together is impossible because Meghri could be inaccessible for two months in a year. This is why we have what we have in Armenia. On the other hand, the presence of high quality specialists in regions where the number of deliveries is small [is questionable]... (Policy maker/expert, 4.3.1.6.6, IDI, Yerevan)

I think the services need reorganizing. For example, it seems to be possible here for anyone to open a maternity hospital. If you've got money, you open it. And it doesn't seem to matter whether you have the abilities, the knowledge, the equipment... you know, if you got the money to open that building, these directors can open them and really not have a terrible interest in what happens after that. So I think that is a big problem. It doesn't seem to be monitored centrally… And if the facility is good, it's fine, but if it's not... (Donor, 4.3.1.6.2, IDI, Yerevan)

4.3.2 Medical staff of neonatal services

4.3.2.1 Qualification standards for neonatal nurses and neonatologists in Armenia

At present there are no professional qualification standards either for neonatologists or for neonatal nurses working at different level neonatal care services in Armenia. However, the neonatologists recognized the necessity of these qualification standards. As one neonatologist stated, *"We must meet the worldwide requirements and move closer to international standards"*. Therefore, according to this and some other participants, a systematic approach should be developed to evaluate the knowledge level of both physicians and nurses working in the sphere of neonatology. A key informant stated that the responsibilities of neonatologists are clearly written in the ministry documents but these need serious upgrading as they do not contain the competency and knowledge areas of neonatologists. Regular tests were reported as being the best means for assessing the qualification of neonatologists and neonatal nurses. A couple of participants noted that this method was used in the past in some settings, particularly for nurses, but has now been replaced by a new credit system (discussed in detail in the "Current system of specialty trainings for neonatologists and neonatal nurses" section).

A key informant mentioned that the AANM currently works on developing professional qualification standards for nurses. She explained that currently the specialty categories of "neonatal nurse" or "intensive care nurse" do not exist in Armenia and it seems that there is no demand for these specialties. Therefore, the developed standards cannot be called "professional qualification standards". Rather, these will be called "job description" and included in the employment contract, so that nurses know their responsibilities whenever they are hired by a certain facility, because the employment contract that they currently sign contains a very superficial description of their duties at work.

Of course our neonatal system does not meet the current European requirements. There are no criteria [qualification standards] *either for physicians or for nurses yet.* (Policy maker/expert, 4.3.2.1.1, IDI, Yerevan)

Absolutely not [professional qualification standards for nurses working at different level neonatal care services in Armenia do not exist]. *Each department has its own internal rules, and God knows whether or not these contribute to the improvement of their* [nurses] *professional qualities. In any case there is no system that coordinates and controls the process of continuous education of nurses.* (Policy maker/expert, 4.3.2.1.2, IDI, Yerevan)

So far we do not have those qualification standards… To take an exam, then work in the department. (Neonatologist, 4.3.2.1.3, FGD, marz)

The responsibilities of neonatologists are clearly written in the ministry standards. For example, it's written that a neonatologist must be present at all births. This is required by law and is written… However, these definitely need to be updated... what must a neonatologist know? What must they master? (Policy maker/expert, 4.3.2.1.2, IDI, Yerevan)

No, there are no [qualification] *standards* [for nurses], *but I believe they are very important. Each medical setting prepares its staff members starting with the basics…* (Policy maker/expert, 4.3.2.1.4, IDI, Yerevan)

The nurses must undergo trainings. In case of neonatologists, they come straight from residency and are therefore already prepared. (Neonatologist, 4.3.2.1.5, IDI, marz)

Nurses must take regular tests - exams - in order for their qualification to meet international standards. I don't know whether or not there are any departments where all of this takes place. I worked at "X" maternity hospital for years and only recall something like a test for the nurses happening only once or twice. However… this was just an additional stress for the nurses.

(Policy maker/expert, 4.3.2.1.2, IDI, Yerevan)

…We do not have "neonatal nurse" or "intensive care nurse" [specialties] *differentiated… it seems that in the field we do not have that demand. On the other hand, we clearly know that the work performed by a neonatal nurse is special and therefore, the AANM has developed those regulations* [professional qualifications of neonatal nurses] *and we will probably name it job description rather than professional qualifications. Those are still in a draft form, but we should finish it so that each nurse has a job description stated…* [Currently,] *the work duties are written [in the employment contract], but they are stated in very general terms.* (Policy maker/expert, 4.3.2.1.6, IDI, Yerevan)

4.3.2.2 Issues with current qualification of neonatologists and neonatal nurses in Armenia

When speaking of qualification of neonatologists and neonatal nurses, most participants reported that the quality of newly graduated neonatologists is quite high and one participant even noted that the graduates from the Yerevan State Medical University of Armenia are highly demanded in other countries as well (e.g., in Russia). Meanwhile, it was unanimously agreed that the same cannot be said about the newly graduated nurses, who might have good theoretical knowledge, but lag-behind immensely in their skills and in some cases don't have any skills at all.

There is no specialization in nursing practice and all graduates from nursing schools are just general nurses. However, the work of a neonatal nurse is very specific and requires special skills. As a result, each neonatal department uses its own approach to internally improve the quality of nurses whom they employ. Although there are no selection criteria for new nurses, they all undergo a probation period at their respective departments, which usually lasts a few months (reported by various respondents as mainly having 1-3 months duration). During this probation period, the newcomer works under the strict supervision of an experienced staff, until the staff decides if the new nurse can be hired. Compared to lower-level units, the requirements are much higher at the 3rd level NICUs in Yerevan. Further, at some units, nurses also take special tests on a regular basis to assess their knowledge level. Again, there are no set procedures for this and each department has its own approach in how to organize these, what to include and how to carry out. At one of the units in Yerevan, the nurses undergo through a 2-week training session on basic nursing topics (NRP, STABLE and breastfeeding), which is provided by the neonatologists of that same unit. This is then followed with an exam. Each nurse is then provided with her

grades and information on her weak areas, which allows her to further develop these areas. In an effort to acknowledge nurses' efforts and to increase their motivation, the hospital management provides a "best nurse" award.

The preparation of middle level personnel is one of the challenges we face in Armenia in general. If our medical university is competent with providing its many specializations... In Russia, any of our specialists [physicians] *are highly appreciated and are employed... They are always welcome there… this* [quality at graduation] *is different with our nurses. At best, they come with a strong theoretical background, but with zero experience and competencies.* (Policy maker/expert, 4.3.2.2.1, IDI, Yerevan)

All new nurses undergo a 1-month trial period. During this they are not paid, but they participate in the doctors' rounds and manipulations. After this period the decision is made whether to keep them or not (Neonatologist, 4.3.2.2.2, IDI, marz)

Those nurses [new recruits] *participate in training sessions for months at our clinic; other facilities also have similar experiences. At our unit, after this phase these nurses take an unofficial exam, which is also something not regulated in our country. As there are no official approaches for assessment, many could simply say that a girl was admitted because of her beautiful eyes. But fortunately this is not the case, because the work is not an easy one. Over 70% of newcomers usually refuse to continue training sessions after some weeks and we work with the remaining 30%. Not only do we select based on intelligence, but we also consider other factors, such as physical capability and psychological stability, as they are going to deal with mortality cases almost every day.* (Policy maker/expert, 4.3.2.2.1, IDI, Yerevan)

Anybody who graduated a nursing college cannot enter and work in the neonatal department without additional training and a probation period. I am speaking about the 3rd level. The admission process is much easier at the 1st level. (Neonatologist, 4.3.2.2.3, FGD, marz)

Any given nurse who is accepted to work here goes through a trial period. A newly graduated nurse has to have a specific set of specialization skills. Most of the time they are graduates of our college. They are not bad, because we also teach them, train them, they carry out their practical work here. …We give them a trial period of 3 months. If they have graduated as a general nurse …they have to undergo additional training to be able to work in the neonatal, intensive therapy or intensive care departments. …She has to be on duty with experienced doctors and nurses, and when she gets permission to do things by herself, only then will she get hired. It's not like they immediately get a job. (Neonatologist, 4.3.2.2.4, IDI, marz)

It might take 1-2 months of working together, and after this if our staff members see that the new nurse can already be trusted to perform certain procedures, the responsibilities are fully

transferred to her. …Our observations show that regardless of how much you know, you must gain practical skills. Then, when they [the new nurses] *have specific questions, they contact one of the old nurses whose house is close; the old nurse quickly comes when there are issues…* (Neonatologist, 4.3.2.2.5, IDI, marz)

It [probation] *is definitely necessary, because it* [neonatology] *is a different world.* (Neonatologist, 4.3.2.2.3, FGD, marz)

Here we conduct tests every year [as the unit's own initiative]. *I have neither been criticized, nor awarded for this by anyone. We then prepare the results and all of the nurses receive these (their name and their grade). In order to motivate them to know more and work harder, the hospital management has promised an award for the best nurse. We organized a 2 week cycle on basic nursing topics (NRP, STABLE and breastfeeding) for the nurses, which they practiced through our doctors before taking the tests. So we don't just grab them from the street and demand them to take the tests…* (Policy maker/expert, 4.3.2.2.6, IDI, Yerevan)

…We organize a committee of physicians and chief nurse in our unit once a year completely based on our internal initiative. Nurses take an oral exam. But, we do not have a systematic approach for compulsory engaging nurses. (Neonatologist, 4.3.2.2.7, FGD, Yerevan)

When speaking about the qualification level of neonatologists in Armenia, the participants were quite positive. They thought that in general, neonatologists meet the current requirements from their specialty. Unlike when discussing nurses, a majority of the participants agreed that there are currently good quality young specialists and residents. However, some of the participants disagreed with the quality of all neonatologists being good. They argued that some of these specialists have difficulty understanding even basic things, and it is thus impossible to ask them to learn about modern techniques and equipment.

A majority of the neonatologists believed that neonatology is a more modern specialty compared to others and there have been continuous developments in the field – both due to the specialists' self-education and various training sessions, including those organized by AANM and the visits of specialists from abroad. A number of neonatologists mentioned that the outcomes of neonatal care in Armenia are now much better as compared to the past thanks to the recent advancements in the field. However, a few participants reported that the situation is different in marzes when compared to Yerevan, as not all marz neonatologists meet the current requirements. To address

this issue, either specialists from Yerevan travel to marzes to provide training sessions to the marz neonatologists, or the latter are invited to Yerevan for trainings.

We have very skilled specialists among younger and older staff members with experience. Recently the first obstetric department conducted seminars and I participated. The younger specialists left a good impression on me. They work very well and have good knowledge and experience… I mean the residents are good young professionals that could work further. (Neonatologist, 4.3.2.2.5, IDI, marz)

Neonatology seems to be more modern than other specializations. We are always working on improving [our] *invasive care skills as well, while general pediatrics appears to be less advanced…* [This is achieved] *both through self-studies and training sessions conducted by the association* [AANM], *allowing to discuss new topics or analyze specific cases or develop clinical protocols.* (Neonatologist, 4.3.2.2.7, FGD, Yerevan)

And also [neonatologists are more advanced because] *specialists from abroad attend to us.* (Neonatologist, 4.3.2.2.8, FGD, Yerevan)

When I was in Russia for a training session, we had our specialists from Muratsan and also Tajiks there, and when comparing them to each other I could see that our quality was much higher than that of [neonatologists from] *other countries.* (Neonatologist, 4.3.2.2.2, IDI, marz)

We indicated several times that there are many advancements in the field compared to the previous years. Those newborns that had lower risks for survival in the past, they now have higher chances to survive. Now when newborns are transferred to Yerevan, we rarely have bad outcomes. All of them get well and discharged. (Neonatologist, 4.3.2.2.5, IDI, marz)

…If that person [a neonatologist] *masters basic things with difficulty, how can we expect them to master more up-to-date and modern equipment? Like, "why do you don't know how a high-intensity artificial respiration device works?" This person doesn't even know yet how CPAP works, so how can you expect from him knowing issues that are modern in the nowadays world? If you don't know that, then you are a bad neonatologist. You know?* (Policy maker/expert, 4.3.2.2.6, IDI, Yerevan)

Not all of them [marz neonatologists] *meet the requirements, but specialists from Yerevan go to these places and deliver training sessions.* (Neonatologist, 4.3.2.2.7, FGD, Yerevan)

4.3.2.3 Staff-per-patient rate in different-level neonatal units

It was unanimously agreed that the number of neonates served by nurses and physicians at different levels of neonatal care are not optimal in Armenia. There is a shortage of both neonatologists and nurses in various places (information about the neonatologists is presented in the following section of "Round the clock availability of specialists in maternity hospitals").

Insufficient nurse-to-patient rate in NICUs was reported by a majority of participants. Several participants from the smaller units or marzes, though, believed that mainly larger units face this issue and it does not affect the smaller units. The participants from marzes reported that this question is not relevant to them, as they do not have an intensive therapy department; they transfer severely ill babies to the 3rd level units. However, they still have a shortage of staff in the unit. Many of these units have very few babies in general and severe cases are quite unusual. However, one of the issues here is that the same nurse has to work with both healthy babies and those in the ICU. Two participants from marzes reported that it may even happen that they don't have any babies for few days, but then suddenly have a lot. Additionally, it was reported that at some units the midwives are also integrated into the process of caring for newborns when needed.

The participants suggested neonatologist-to-patient ratio of 1:6 and nurse-to-patient ratio of 1:1 to 1:4 as optimal for NICUs. The prevailing opinion for the nurse-to-patient ratio, though, was 1:1 or 1:2. This means having one nurse for every critically ill newborn, or at maximum for two such newborns. However, in the 3rd level intensive therapy departments in Armenia there may be 4-6 newborns with severe health problems per a nurse. One participant reported that at the moment of the interview, his NICU is short of having an optimal number of nurses (there were 33 babies and 8 nurses at the department, while the respondent felt that at least 11 or 12 nurses were needed). Another participant reported that instead of the 1:1 nurse-to-patient ratio required for NICUs, there has even been a case of 1:10 ratio at one of the units. This creates very stressful conditions for the nurses, who may rush through their work by skipping some things such as proper hand sanitation, or timely administration of antibiotics. Such conditions also increase the probability of human-errors. One of the FGD participants explained that the on-duty doctor assesses the situation in the department to see whether or not the nurses can handle serving all the babies and, if needed, re-allocates the babies between the nurses so that each serves equal

number of severe and milder cases. All the participants agreed that the quality of the provided care suffers when too many patients are served by a provider.

As the babies at the neonatal pathology departments aren't in very severe condition [unlike NICUS), neonatologists suggested a 1:6, 1:8 or 1:10 ratio as being an optimal nurse-baby ratio in these departments. As to serving healthy neonates in maternities, a 1:10 ratio for a nurse was mentioned as normal. One of the key informants reported that currently Armenia has optimal provider-to-patient ratios for neonatologists but not for the nurses. Moreover, no standards for nurse-to-patient ratios in different units are specified in Armenia, even though it is generally believed that the care is effective if nurses are able to "manage the work volume". The respondent believed that currently the nurse-to-newborn ratio varies across different facilities, because the managers of these facilities set the staff numbers based on available resources. Therefore, it is important to develop requirements that will be ubiquitous for all facilities.

I think that neonatologist:patient ratio is optimal, but this is not the case for the nurse-patient ratio. (Policy maker/expert, 4.3.2.3.1, IDI, Yerevan)

This issue [a nurse serving too many neonates] *is more relevant to larger neonatal units than smaller ones.* (Neonatologist, 4.3.2.3.2, FGD, Yerevan)

In the regions we do not have much contact with pathology, because if there is a problem that we cannot manage locally, we transfer the baby… (Neonatologist, 4.3.2.3.3, IDI, marz)

According to contemporary [standards of] *neonatal intensive care, the optimal* [nurse to patient] *ratio is considered to be 1:1 or 1:2. This means that in order to provide good quality care, one nurse is taking care of one newborn with severe health problems or, at maximum, one nurse is taking care of two newborns with serious health problems. In our departments, one nurse is taking care of four or six newborns. This is regarding intensive therapy, not pathology, regarding patients in critical condition, the most severe patients…* [In] *neonatal pathology department… there is* [no need] *for a big number of nurses, of course there is a need for good nurses, but the* [nurse to neonate] *ratio can be 1:6 or 1:8.* (Policy maker/expert, 4.3.2.3.4, IDI, Yerevan)

Our setting [a neonatal pathology department] *is different, but there are other large neonatal units where one nurse cares for many more neonates than they should do. I mean when they are overloaded, it is difficult or even impossible to maintain the delivery of high quality services... I think the ratio of 1:3 is optimal* [for NICUs]*… They* [NICU nurses] *hardly manage when the ratio is 1:4.* (Neonatologist, 4.3.2.3.2, FGD, Yerevan)

The optimal ratio is definitely 1:1 for babies in critical condition, 1:2 for moderately severe babies and 1:3 is optimal in the entire world for milder cases. I read an article, according to which in the UK, they decided to save some money and moved from a 1:1 ration to 1:2, where one nurse would care for 2 critically ill newborns. Their neonatal statistics showed very soon that the neonatal mortality rate increased and they realized that they mustn't try saving on this. So if it is about a newborn in critical condition, then it must be one nurse per infant. (Policy maker/expert, 4.3.2.3.6, IDI, Yerevan)

There are international standards [for provider-to-patient ratio in NICUs]*; the* [optimal] *physician-to-patient ratio is 1:6 and the nurse-to-patient ratio is 1:1*. (Neonatologist, 4.3.2.3.7, FGD, Yerevan)

[The nurse to patient ratio should be] *1:3 for intensive therapy department… Problems occur when a newborn needs intensive therapy… In an ordinary department a 1:10 ratio is enough.* (Neonatologist, 4.3.2.3.8, FGD, marz)

Let me put it this way without mentioning names... there are some maternity hospitals, where there are 25-30 infants in the intensive care department, and 3 nurses. We have such departments, where the ratio reached 1:10. In these places you can't even think about quality, even if the nurses were the best nurses in the world. Eventually this department will explode. (Policy maker/expert, 4.3.2.3.6, IDI, Yerevan)

No. I guess there is a need to increase the number of nurses... Two nurses who are on duty work with 20 newborns. I consider this unfair, and I think that 3-4 newborns that are in the intensive care unit must be treated by one nurse. This is the most painful problem... It comes with an optimization program, where they reduce the number of nurses so that they do not pay more new nurses. (Policy maker/expert, 4.3.2.3.9, IDI, Yerevan)

The [neonatal] *pathology department is not overloaded and the nurse-to-patient ratio of 1:10 is optimal there. In the NICU* [i.e., neonatal resuscitation department] *the nurse-to-patient ratio of 1:2 is optimal. ... We* [at NICU] *currently have 33 patients and 8 nurses. This is not optimal. We should have at least 11 or 12 nurses. At least 11*... (Policy maker/expert, 4.3.2.3.1, IDI, Yerevan)

It [optimal nurse-to-patient ratio at the NICU] *is the accepted norm for delivering quality services. The nurses cannot do all procedures including feeding, changing pampers, etc. These activities for neonates are performed by nurses and not by the sanitation team. So it is difficult to ensure correct mechanical ventilation and treatments, when nurses care for more than 3 babies.* (Neonatologist, 4.3.2.3.10, FGD, Yerevan)

…There are seven nurses for 30 patients. But you [the physician on the shift] *distribute one patient with milder condition and another one with more complicated condition to make some adjustments while assigning them to nurses. In general, the physician-to-patient ratio is 1:6.* (Neonatologist, 4.3.2.3.10, FGD, Yerevan)

…At least for the neonatal services, we have those standards [for provider-to-patient ratio]*: unfortunately, those norms are only for physicians and we do not have these standards for nurses. …There is recognition that the care is better when the nurse is skilled and can manage the work volume... If one nurse works with 5 severe newborns, for sure she cannot do her job with high quality. In the overseas …there might be units where a nurse would work with 1-2 neonates. Unfortunately, this is not easy to implement in our reality and it* [the ratio] *varies between different facilities. Unfortunately, each medical facility allocates its resources based on its financial situation… Here, I think we also need general regulation, instead of leaving the hospitals' managers to decide it.* (Policy maker/expert, 4.3.2.3.11, IDI, Yerevan)

4.3.2.4 Around-the-clock availability of specialists in maternity hospitals

Availability of neonatologists: The issue of having insufficient number of neonatologists was one raised by various specialists throughout discussions and interviews. The main shortage in specialists falls to the marzes, with some places having only one specialist per region. According to RA law, it is legally required for a neonatologist to be present at every single birth in cities, regardless of there being complications or not. This is not similar to the international practice, where neonatologists are present only during high risk deliveries. While some participants were for the current regulation requiring the presence of a neonatologist at every delivery, because "you never know when complications might occur", others were against it thinking that the international practice is justified, but they confessed that the level of knowledge and skills that nurses currently have aren't sufficient for this approach. However, as some participants reported, it is physically impossible for a neonatologist to be present during all deliveries, when he/she is the only neonatologist in the hospital. Replacing the neonatologist with a general pediatrician on-duty to attend the deliveries was not perceived as a correct alternative. Rather, some participants thought that gynecologists can better replace a neonatologist than pediatricians. Also, some participants noted that in the 1st and 2nd level hospitals (unlike the 3rd level – referral hospitals), the presence of a neonatologist at each delivery is not obligatory.

Neonatologists believed that the law itself is flawed because it violates their human rights of going home after an 8-hour work day or taking vacation, if they are the only specialists in the hospital. Moreover, the physicians need to participate in training session, seminars and conferences – some organized by the ministry itself – which again means that they will be unable to attend births during that period of time and may not even be in an accessible distance. Participants reported that they still do their best to cover all the deliveries, especially those considered high-risk. In some cases, the ob/gyns cover for periods when they are not available – especially since these specialists have also been trained in newborn resuscitation.

The round-the-clock availability of a neonatologist in the regional neonatal unit was also a serious problem. A FGD participants from a marz mentioned that even though they have equipment for resuscitation and intensive care, there are no specialists to stay with the baby for 24 hours. An IDI participant mentioned that there are places where after the daytime no neonatologist or nurse are present in the unit, and neonates are left without medical attendance.

There are no official qualification requirements for practicing neonatologists in Armenia, and some of them are just pediatricians who have not even completed a residency in neonatology, and became specialists via gaining their experience at the workplace. However, making the residency in neonatology as a mandatory requirement would cause an even worse shortage of specialists, as a portion of those already working in the field would be removed.

Some suggestions were made to address the issue of shortage of specialists, including sending experienced neonatologists or new graduates, especially those originating from the given region, to work in the regions, as it was done during Soviet times. Not only will this serve as experience for the specialists, but it will also help to address the issue of shortage of specialists in the regions. However, lately, a project was initiated in Armenia to temporarily send a few highly skilled neonatologists from Yerevan to the marzes to help the local staff there. Although there was improvement in the outcomes of care in the target regions, it turned out that even Yerevan had a shortage of skilled neonatologists and could not manage to have them away.

According to international standards, neonatologists have to be present during deliveries in high risk group, when there is premature delivery, or a newborn with any disease is expected. In Europe and in the US, the neonatologist is not present during normal deliveries. According to our standards, our rules, still, it is required… that doctor-neonatologist must be present at every delivery. (Policy maker/expert, 4.3.2.4.1, IDI, Yerevan)

It's written [in the MOH requirements] that a neonatologist must be present at all births. …So the question here is, "respected sir/madam, if you have [only] *one neonatologist and that person has the right for a 24-day vacation, then how do you imagine he/she could be present always? Or, say that person works for 8 hours and goes home. What right do you have to call him back if there is a birth, let's say, at 3:00 in the morning? And are you going to pay him for this call?" Of course, not.* (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

No, I do not think so [that a neonatologist should be present at all deliveries]. *For instance, when …everything is well and there is no respiratory failure and amniotic fluids are not contaminated and the* [obstetrician-gynecologist] *is skilled in performing* [newborn] *resuscitation procedures. I mean when we do not think that any emergency will happen.* (Neonatologist, 4.3.2.4.3, IDI, marz)

I think it is mandatory [to have round the clock neonatologists], *because delivery is an unpredictable process: you think everything is ok and there should not be problems, but the baby is born with a problem. Of course, the assistance that a neonatologist provides… neither a gynecologist nor a pediatrician can provide that.* (Policy maker/expert, 4.3.2.4.4, IDI, Yerevan)

You will only see one or, maximum, two neonatologists in each of the regional maternity hospitals. …Moreover, the majority of these are not just neonatologists; but they do everything. They are also pediatricians, maybe even PHC doctors... If that person goes on vacation, then neonatology as such completely disappears. (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

Mostly it [around the clock availability of neonatologists] *is ensured, but there are regions where neonatologists are not receiving salary for night duties. They don't have night shifts. This issue exists in the marzes.* (Policy maker/expert, 4.3.2.4.1, IDI, Yerevan)

In the [units providing] *2nd and 3rd level* [care] *there are at least two neonatologists. The presence of the neonatologist* [during the delivery] *is not mandatory in the 1st and 2nd level maternities. Only the nurse might be present there. The situation is different from the 3rd level, where the presence of the neonatologist is a must, because it* [the 3rd level maternity] *accepts severe cases from the 1st and 2nd levels…* (Neonatologist, 4.3.2.4.5, FGD, marz)

The problem is the number of physicians. There are regional hospitals that have one pediatrician [P3 agrees: Not even a neonatologist but a pediatrician]. (Neonatologist, 4.3.2.4.6, FGD, Yerevan)

…If we were to look at the documents of all the 180 neonatologists in Armenia today, hardly half of them will have done this clinical residency [in neonatology]. *The only thing that will happen*

[if completing residency is enforced] *is that this will remove those people who are not neonatologists and somehow manage to work, leaving us with an even larger problem.* (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

A human being cannot be present for 24 hours and to be on duty for 365 days. (Neonatologist, 4.3.2.4.7, FGD, marz)

We have to prepare high level midwifes and nurses, who can substitute the neonatologist. There is no such impression yet, that they can substitute a doctor. When we have that, then of course, this can definitely be done. (Policy maker/expert, 4.3.2.4.1, IDI, Yerevan)

I am very far from the idea of having neonatologists available for 24-hour at all of our maternity hospitals and wards. But we can have high quality nurses available for 24 hours at all maternity hospitals, who can take care of everything until the physician arrives. (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

There are some places where they don't have nurses at all. The nurses come in the morning and stay until 3:00 pm, so the neonatal services are left without doctors and nurses, relying on the mother and the power of God… (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

On my wedding day - because the next doctor was on holiday -, I had to leave [the wedding] *mid-way. I am telling you the truth* {laughing}*, because there was a delivery, which could have complications. So I went… and it became necessary to resuscitate* [the newborn]. (Neonatologist, 4.3.2.4.8, IDI, marz)

It's me [the round the clock available neonatologist]. Whenever they call me I'm here. There isn't a birth, a surgery, or a critical child at all times. At the moment we have 2 children in our department. Whenever they call me, I come. (Neonatologist, 4.3.2.4.9, IDI, marz)

*In the past when we graduated, all of us had to go to the regions and work there. This was mandatory. But now everybody graduates and only works in Yerevan… So many residents become neonatologists, neurologists, right? ...They should send people with such specializations to marzes, to at least provide some support. Because by working in the marzes, they will firstly gain experience***.** (Pediatrician, 4.3.2.4.10, FGD, Yerevan)

Maybe the doctors who are originally from a region should return to work in their regions. Maybe they can accept them at the [medical] *university with such conditions?* (Pediatrician, 4.3.2.4.11, FGD, Yerevan)

…A group of professionals from different neonatal units in Yerevan went to marzes for a month.

These marzes did not have mortality cases within two months neither in the neonatal units, nor during neonatal transfers. But we faced a challenge, as it turned out that even Yerevan does not have the capacity for keeping away three professionals in regions. (Policy maker/expert, 4.3.2.4.12, IDI, Yerevan)

Availability of advanced newborn airways skills professional: When discussing the issues related to providing emergency assistance to newborn breathing, a neonatologist from Yerevan explained that in developed countries, there are distinct specialists, so called – respiration therapists, who perform the required activities, and neonatologists have nothing to do with this. Moreover, in the USA, this is a nursing specialty. Armenia lacks such narrow specialists, so the departments usually have one of their doctors (usually, a neonatologist or an anesthesiologist) to take care of this. One participant reported that they attended a special "advanced newborn airway skills" training course and it is their responsibility to conduct this at their maternity unit whenever the need arises. In some cases, when a respiration specialist is urgently needed, the neonatologist on duty might call the anesthesiologist or the head of department who are skilled in newborn respiration support to resolve the situation. Participants from one of the FGDs with neonatologists reported that they know how to intubate and they manually initiate breathing by using self-inflating bags. All this is done until the newborn is quickly transferred. Meanwhile a neonatologist from the marz responded that it is not possible to ensure the presence of a skilled airway specialist in regions, as these specialists can only be in Yerevan, which is too far from them.

No, not at all [the maternity institutions are not able to immediately ensure the presence of a professional who is competent in advanced newborn airway skills]. *Maybe half can and half cannot.* (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

We do not have a respiratory specialist, and we [neonatologists] *manage these cases.* (Neonatologist, 4.3.2.4.13, IDI, Yerevan)

It is important to note that there are now specialized respiration-therapists overseas, specifically in the US… this does not the case in Armenia and other post-Soviet countries… Respiratory therapists represent a separate occupation… In our practice the doctor should know everything... (Policy maker/expert, 4.3.2.4.12, IDI, Yerevan)

Every department has at least one person who is capable of this [advanced newborn airway

skills]. *Besides that, there is always an anesthesiologist on duty who also comes to assist. Of course, there are difficult situations when the doctor on duty calls the senior specialist or the chief of the department for help... of course there is always an available person, who can help.* (Policy maker/expert, 4.3.2.4.1, IDI, Yerevan)

In general no [the respiration therapist is not the same as the neonatologist], *but in Armenia yes, because we do not have that specialist.* [In the USA] *…nurses have more in-depth knowledge in this area* [respiration therapy] *than the physicians... Physicians should not necessarily know all the details because respiratory therapy appeared to be a nurse occupation in the US.* (Policy maker/expert, 4.3.2.4.12, IDI, Yerevan)

We have an anesthesiologist, by the way I'm also an anesthesiologist, who is capable of this [newborn respiration support]. *If I'm not here, he organizes it.* (Neonatologist, 4.3.2.4.9, IDI, marz)

I forgot to mention that I and one other person received trainings on resuscitation. We taught the nurses, and if we need support, they help us. Whenever we suspect having a birth with such complications, we generally try to perform the resuscitation together. Whenever we have unexpected cases, our physician performs [resuscitation] *with the help of nurses.* (Neonatologist, 4.3.2.4.3, IDI, marz)

In terms of distances, they cannot [immediately ensure the presence of a professional who is competent in advanced newborn airway skills]. *It is possible in Yerevan, but not in the marzes.* (Neonatologist, 4.3.2.4.8, IDI, marz)

The neonatologists perform first aid services… If necessary, we keep the babies and perform intubation...until they arrive and transport them; this is done quickly. (Neonatologist, 4.3.2.4.14, FGD, Yerevan)

Availability of intensive care consultant: Intensive care consultation for neonatologists is available 24 hours a day. The list of contacts, which includes some leading specialists in the country, has been provided to the regional services by the MOH. The consultations are mainly made through direct telephone calls or the tele-communication system through wireless tablets, provided in the scope of the AANN/USAID project. The service is praised, especially by the participants from the marzes, who regularly contact the specialists in Yerevan for consultations. The tablets make possible to have video calls, enabling the consultants to see the patient and to observe whether the local doctors are following their directions correctly with the technology-

related interventions. Also, consultants make regular visits to regional hospitals to provide support on spot. However, no "rapid response" team of consultants is established specifically for the telemedicine service. Instead, this function is assigned to the on-duty specialists at Muratsan University Hospital. Therefore, if a particular specialist is needed, the neonatologists in regions make a phone call directly to this specialist, who is not formally obligated to help them, but usually does it informally.

I, myself, am a chief specialist. People can contact me 24 hours a day without any problem. In Muratsan University Hospital there is a 24 hour service - there are always doctors, who assist the marz doctors with any problems. (Policy maker/expert, 4.3.2.4.1, IDI, Yerevan)

Allow me to explain. The MOH has distributed contact forms to all regional hospitals describing who they can contact and in what cases. All of them have our [the consultants'] *contact numbers. They call us regardless of the time and we decide who is going to admit a neonate or provide consultation, etc.* (Neonatologist, 4.3.2.4.15, FGD, Yerevan)

Consultation is available 24/7 at Muratsan Hospital. Even if the head specialist is not there, the on-call specialists are available in 100% of cases. This consultation is very important for us, as it is not always necessary to transport an infant with a complication. (Neonatologist, 4.3.2.4.13, IDI, Yerevan)

We ensure constant connection with neonatal units through periodical visits, especially in regions, as it is relatively easier in Yerevan where we are connected on a daily basis. We also ensure constant connection through a phone line with our colleagues, as well as partially through the wireless tablets, which provide free of charge connection with 37 settings delivering neonatal care services... (Policy maker/expert, 4.3.2.4.12, IDI, Yerevan)

The consultations are very effective. In case of specific health conditions, we always keep in touch with Muratsan. (Neonatologist, 4.3.2.4.5, FGD, marz)

In case of necessity we contact Yerevan via telephone or the tablets. These have been provided by the neonatal association and they give us the opportunity to Skype with Muratsan hospital for consultation in case of complications. Since it is a video-call, they can see the infant as well. (Neonatologist, 4.3.2.4.14, IDI, Yerevan)

…We stayed in contact [via tablets] *for an hour and a half, until the end of the procedure... This has become very effective as you can show what not to do and what to do. The explanation was very difficult previously, as you did not know whether or not your instructions were being followed correctly.* (Policy maker/expert, 4.3.2.4.12, IDI, Yerevan)

They [the tablets] *are perfect. I can find all the information I need. Of course, when problems occur with the newborn that must be transferred, we also have Skype and if they* [the Muratsan staff] *ask me to turn on the Skype and show them the newborn, then I can do that too…* (Neonatologist, 4.3.2.4.14, IDI, marz)

…within the frameworks of the Armenian Neonatal Medicine Association and USAID project... Around 40 or 50 tablets were purchased - with internet connection and video connection - and provided mainly to remote regions, so that if the need for immediate consultation arose, they could contact and the doctor in Yerevan would be able to see the newborn and assist the physician in deciding the correct course of treatment. I am not sure how much they use this system… Maybe… it was necessary to also establish a special headquarters with an on-duty rapid response team, which would always be available to respond to the questions of these people. The function was added to the responsibilities of the Muratsan University Hospital. The main tablet is located with them, so in case of calls the on-duty doctor at the center must try to assist. (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

I can share my experience. For example, I contact the NICU [at Muratsan] *to talk to a specialist who could be busy, as they do not sit in the unit waiting for our calls. If they are unable to reply, then others might respond. But when there are questions that should be asked to a specific specialist, then we have to wait as we do not call other units. …We have been provided with the phone numbers of specialists, such as a neurologist in case we have questions. In some cases we call them…* (Neonatologist, 4.3.2.4.3, IDI, marz)

I am not aware of how well this very good idea [telemedicine consultations via tablets] *is functioning. More often I just receive telephone calls on a so called "friendly" level from almost all the maternity hospitals, asking, "we have such a baby, what would you advise? What should we do?" or, "this is what we have done. Is it correct?" So I think my telephone serves this purpose more than the tablets…* (Policy maker/expert, 4.3.2.4.2, IDI, Yerevan)

4.3.3 Providers' knowledge, educational needs and quality of inpatient neonatal care

4.3.3.1 Current system of continuous trainings for neonatologists and neonatal nurses

During the interviews and discussions, various neonatologists explained that according to the RA law, all medical specialists in Armenia, including neonatologists, must undergo specialty trainings every 5 years to gain the number of credits that allows them to continue practicing medicine. In order for neonatologists to complete this requirement, they must gain a total of 220 credits during a five-year period either at once – via a specialty training of seven-week duration,

or gradually – via several shorter training sessions, each providing some number of credits (so that these credits add up and amount to the required number credits that they need).

According to the participants, there is no formal specialty training in neonatal nursing in Armenia. Still, every five years, nurses should also gain particular number of credits to be allowed to continue their nursing practice. From the words of the respondents, the required duration of the training for nurses for a five-year period is five weeks refreshment training in general nursing.

In addition to these required specialty trainings, participants also reported having the opportunity to attend training sessions, seminars and conferences throughout the year which focus on various topics. These are available both for neonatologists and neonatal nurses and are provided by different organizations at least 2-3 times a year. Such trainings are organized both in the capital and in marzes. These are usually free of charge and in some cases participants even receive some remuneration, and their accommodation is covered. Several neonatologists reported that they were very pleased with the quality of recent training sessions organized by the MOH and AANM, where they had opportunity to discuss various cases and to get familiar with the new guidelines on various topics of neonatology, which were subsequently distributed among them.

During a FGD, neonatologists reported that the physicians have more opportunities for trainings compared to nurses. Some participants also reported having the opportunity to travel abroad to participate in various conferences or training sessions. Those who have attended were very pleased with their experience. However, these sessions abroad are not for free and thus many specialists do not get a chance to participate in them. Some of the latter reported that the information gained during such sessions from abroad are shared with them during sessions conducted in Armenia by those leading specialists who had attended; and these are very informative.

Every five years each medical worker has to pass a training session, this is mandatory. (Policy maker/expert, 4.3.3.1.1, IDI, Yerevan)

The MOH provides us with a booklet that has all the information on the available training courses for us. You can pay and take a course, for which you earn credits. One week of such a course costs 15.000 AMD. (Neonatologist, 4.3.3.1.2, IDI, marz)

...from 2016 to 2021 ... we all have to go through training and receive credits so that we can work until 2025. ...I secure those 220 credits within 5 years… for nurses it's 5 weeks, ours, the doctors' is 7 weeks. (Neonatologist, 4.3.3.1.3, IDI, marz)

... They [nurses] *attend general training sessions, but these are not specially intended for neonatal nurses. In general, nurses participate in training sessions once in five years.* (Neonatologist, 4.3.3.1.4, FGD, Yerevan)

They [nurses] *have not gone anywhere* [for training]*... whatever they know either I taught them or they participated in seminars which were organized here, at our facility.* (Neonatologist, 4.3.3.1.5, IDI, marz)

I have already indicated that large scale training sessions are conducted once in five years. But they [staff] can also participate in conferences and seminars on different topics several times a year. (Neonatologist, 4.3.3.1.4, FGD, Yerevan)

[Seminars and other trainings] *are organized twice or three times a year, if not more.* (Policy maker/expert, 4.3.3.1.1, IDI, Yerevan)

Physicians have more options [than nurses do] *to be educated both in the country and outside.* (Neonatologist, 4.3.3.1.4, FGD, Yerevan)

Most of them [trainings] *are organized here* [in the region]*... they gave us dummies and gave laryngoscopes... they have shown us everything and the nurses performed artificial breathing via AMBU bags... but the dummy is one thing and the newborn is another thing.* (Neonatologist, 4.3.3.1.5, IDI, marz)

Three neonatologists provided recent approaches during the courses [organized by the AANM]. *We introduced different cases and we had good discussions.* (Neonatologist, 4.3.3.1.4, FGD, Yerevan)

The trainings were organized for 5 days and were very interesting. They [the AANM trainers] *prepared guidelines and introduced them to us in forms of slides and lectures... after the training, they gave us those guidelines that are up-to-date.* (Policy maker/expert, 4.3.3.1.6, IDI, Yerevan)

The Neonatal Association organizes very interesting trainings on different topics. In the course of these trainings, experts from foreign countries are invited ...The recent training was devoted to the care and nutrition of the premature newborns, kangaroo method... The lecturer was from

Italy... I am very pleased with those trainings... (Policy maker/expert, 4.3.3.1.6, IDI, Yerevan)

We also attend and deliver training courses [in marzes]. *I know for sure that neonatologists attend these. For example, I myself have recently traveled to "X" with one of our nurses to deliver courses on resuscitation.* (Neonatologist, 4.3.3.1.4, FGD, Yerevan)

In most cases when I participated, they [trainings] *were free… I mean the financial issues, transportation, accommodation, … etc. But I did not participate in any trainings or seminars with payment. Outside of Armenia, yes, I paid to participate, but not in Armenia.* (Neonatologist, 4.3.3.1.7, IDI, marz)

*… FAR has similar trainings… The trainings are for doctors and nurses, they are free of charge and you are even paid 60,000 AMD as per-diem. Moreover, we are provided with a place to stay and our transportation fees are also paid… I also participated in a 2-week training at the Margarian hospital***.** (Neonatologist, 4.3.3.1.2, IDI, marz)

...this year we have had 2-3 trainings in which all members of our middle-level medical personnel took part. (Neonatologist, 4.3.3.1.3, IDI, marz)

Why is there progress [in the field of neonatology in Armenia]*? Because our experts, our leading experts - at this moments we have many leading experts in Armenia - go abroad, learn what's new, take courses, return and carry out courses for neonatologists and pediatricians of Yerevan and even the regions…* (Neonatologist, 4.3.3.1.3, IDI, marz)

4.3.3.2 Some issues related to the current system of specialty trainings in neonatology

There were mixed feelings among neonatologists about the effectiveness of the credit system. Although some said that this system is effective and that they were pleased with it, others were a bit more hesitant and expressed uncertainty, while a third group expressed outright displeasure. The negative opinions were either related to certain challenges that the system poses for them and their nurses, or to the perceived incompleteness of the system.

One of the main issues for the marz neonatologists and neonatal nurses was that the refreshment trainings are organized in Yerevan and require that the medical personnel travel and stay in the capital. Not only does this create difficulties with traveling, being away from home and finding accommodation, but as there is a shortage of specialists in the regions, this system also creates

the additional problem of having some regions left without their single specialist for quite a long period of time.

Another major shortcoming related to the current system of specialty training reported by neonatologists was one which applies to the entire sphere of medicine and not just neonatology. Physicians and nurses do not receive funding from their respective healthcare facilities to attend these trainings; each individual must pay him/herself for this mandatory training. Thus, expenses related to the training itself (140,000 AMD for a 7-week course), as well as traveling to Yerevan and accommodation during this period fall entirely on the shoulders of each individual. At the same time, the benefit related to going to Yerevan was also reported. It provides specialists with the ability to see and work with many cases in advanced settings.

As to the effectiveness of the trainings, the respondents were uniform in their opinion that it largely depends on a trainee's desire to learn, as there is no system in place allowing to supervise their participation and learning. Moreover, the fact that it is paid for by the individual doctor makes matters even worse, as basically anybody who pays, almost automatically receives the needed credits to work for an additional 5 years, regardless of the actual attendance and learning. According to some neonatologists, the effectiveness of trainings suffers also because of those being mainly theoretical and providing no opportunity for the trainees to obtain skills via practicing. An important issue raised was that there is no law in Armenia that requires neonatal care providers to annually or biannually pass an exam on newborn resuscitation to make sure that they are competent in this, a regulation that is a standard abroad. Some participants stressed the importance of adopting a regulation to pass an exam after the trainings and only then to get a license for providing neonatal care. Some participants stressed the importance of finding incentives to increase the motivation of providers in learning, so that it would become a continuous, never ending process. Creating more opportunities for neonatologists and nurses to attend training sessions abroad or to participate in sessions lead by foreign specialists was also suggested as a mean that can boost their motivation and improve the overall quality of the services.

Some of the marz participants expressed their desire to come to Yerevan and have a practice at one of the 3rd level units there (Muratsan). This idea was also shared by neonatologists from Yerevan who noted that the neonatologists from the marzes have many questions which would

be resolved by either having them come to Yerevan, or sending good specialists to the marzes for some time and having them work alongside the staff there. The latter has additional benefits, as all the personnel of the regional facility can benefit from it and gain both knowledge and practical skills from working side-by-side with this specialist. As another possible solution for this, a suggestion was made to organize a mobile practice (simulation) unit which would move throughout Armenia and provide hands-on simulation on site, – allowing for all personnel from the unit to take part in it as a team and then take an exam.

I could not say [if the accreditation system is effective]. *It provides us with some knowledge and updates... but the distance and staying in another place are issues for regional providers.* (Neonatologist, 4.3.3.2.1, IDI, marz)

Only one neonatologist works in the facility and being absent from the hospital is a huge problem, therefore, the trainings must be organized on the spot so that we do not leave the hospital. (Neonatologist, 4.3.3.2.2, FGD, marz)

There are [difficulties attending trainings in Yerevan]*: marz distance, weather conditions, family... They* [family members] *will allow one* [to go for the trainings], *but they will not allow another.* (Neonatologist, 4.3.3.2.3, IDI, marz)

As for the training sessions [for accreditation]*... these are only formalities. Every 5 years people's licenses expire, so some of them actually come and are present at these six-seven-week-long sessions. Others - taking into account how busy they are... if they are the only neonatologist in their region, or area, then they cannot take a 6-7 week break to attend these classes in Yerevan...* [So, they actually don't participate]. (Policy maker/expert, 4.3.3.2.4, IDI, Yerevan)

They [specialized training session] *seem less effective to me. I do not mean that they are absolutely ineffective; if there are updates within five years, trainers provide them with the relevant materials. But in terms of receiving practical skills, sessions are completely ineffective. For instance, I would not allow nurses from outside to learn via delivering care on my patients. ...I have to allow this only to my nurses.* (Policy maker/expert, 4.3.3.2.5, IDI, Yerevan)

And unfortunately it's not like when they come [to the trainings], *somebody grabs them and tells them that they have to learn this, this and that... Unfortunately that's not how it is. They show you, but whether you learn or not is up to you. I mean, there is no supervision in place for all of this; to ensure that you do all of this.* (Policy maker/expert, 4.3.3.2.4, IDI, Yerevan)

... The problem [with the accreditation system] *is that medical institution does not pay the doctor any money (as it is done abroad) for that doctor to attend the training. Doctors have to rely on*

their own money, their salary. Of course [the same is the case for nurses]. (Policy maker/expert, 4.3.3.2.6, IDI, Yerevan)

As of today I have not collected all my credits. What can I do? I can resign from my work at any time. … Every single moment we can fall into the court. There is no incentive there... The interest is so low that it is meaningless… I receive 80.000 – 90.000 AMD salary… Based on that tell me how many times I can afford to go to Yerevan, pay utility bills and keep my family at the same time? (Neonatologist, 4.3.3.2.2, FGD, marz)

The main problem is that both the neonatologists and the nurses pay for these trainings. For collecting credits it is mandatory. This is also a political thing, but this barrier should not be present when we talk about trainings... Trainings should be free of charge. (Policy maker/expert, 4.3.3.2.7, IDI, Yerevan)

Traveling is a bit difficult for us. ...The nurses have financial issues, travel costs, accommodation issues. The correct way is for them to organize trainings here. …Today our salaries are nothing - the nurses I mean -, so to live in Yerevan, while the family is here, being absent from work for a month...I can't say...it is a difficult issue; but organizing it here is correct. (Neonatologist, 4.3.3.2.8, IDI, marz)

…It will be better to organize [trainings] locally, so that problems like that [traveling, leaving family, etc.] do not occur. (Neonatologist, 4.3.3.2.3, IDI, marz)

If we were to look at the experience of other, "normal" countries, they [medical staff] *have to take an exam for their license. This is done to check both theoretical and practical knowledge. Over here, the most important thing is that they pay that 140,000 AMD to the university... and if they have paid, then they will definitely receive their license, regardless of what knowledge they received during that 7-week period.* (Policy maker/expert, 4.3.3.2.4, IDI, Yerevan)

We do not have an examination system after the training. They have examination systems abroad. (Neonatologist, 4.3.3.2.9, FGD, marz)

We need a system to evaluate the physicians' knowledge, like in the past. They used to pass an exam in the past, but there is nothing like that now. It is a credit's system now, where a person [both doctors and nurses] *gains credits based on their participation at conferences and trainings, but they do not have to take a qualification exam.* (Policy maker/expert, 4.3.3.2.6, IDI, Yerevan)

…Maybe they [neonatologists in regions] *could come here to receive training at a good department, or maybe to have a good specialist go to them and work alongside them for like a 1-2 or maybe 3 month-period and help resolve their issues.* (Policy maker/expert, 4.3.3.2.4, IDI,

Yerevan)

During the recent years, many trainings were organized, including on neonate care, but they have to be continuous. (Neonatologist, 4.3.3.2.2, FGD, marz)

The physician and nurse must be motivated, a mechanism must be developed which will motivate them to educate themselves and participate in all of these educational procedures. Of course, these are very few in Armenia, but there must be mechanisms in place which will allow a person to go abroad. (Policy maker/expert, 4.3.3.2.4, IDI, Yerevan)

We are motivated through financial incentives. Good financial incentives, credits and exams after the course will be more motivational to participate [in the 5-year specialty training cycle]. (Neonatologist, 4.3.3.2.9, FGD, marz)

I see more need for nurses [training] *than for physicians because they* [physicians] *visit different places and participate in training sessions unlike nurses.* (Neonatologist, 4.3.3.2.2, FGD, marz)

The most important thing is having practice at your workplace. You can read a lot, or talk, or even watch something with the tablets... but even after that we are like a passive audience, because here you need your hands. (Neonatologist, 4.3.3.2.10, IDI, marz)

In Armenia… People do not see any room for advancements. …for example if the physician in Noyemberian were to read this book, or take this exam would anything change in his life? Of course it won't... This is the first thing that people have to understand, that there has to be continuous education, and this has to be always, without any breaks. If you have not received new knowledge, participated in new seminars, understood new things for 1-2 years, you will become stagnated. (Policy maker/expert, 4.3.3.2.4, IDI, Yerevan)

There are small neonatal units everywhere, but there are also simulation centers that have compulsory programs like on newborn resuscitation. The most powerful hospitals with all staff members attend simulations centers every six months, enter training areas where they are provided with tasks and perform work activities within their teams… They are asked to retake the exams. …In Armenia, if you cannot perform a task, there are other specialists that can replace you. But, it is realistic to have a moveable simulation center. If this is unrealistic to perform in every six months, then it should be performed at least each year and an exam taken. (Policy maker/expert, 4.3.3.2.5, IDI, Yerevan)

4.3.3.3 Providers' knowledge and skills on neonatal resuscitation

Some neonatologists reported that in their opinion all staff members of neonatal units are skilled in neonatal resuscitation. However, a majority of participants did not agree. In general, it was thought that the neonatologists are skilled and the nurses are not. Several neonatologists stressed that this is particularly true for the nurses working in the marz maternity units and that the quality of nurses at the 3rd level maternities in Yerevan completely differ from that of nurses at other levels. One of the marz neonatologists even noted that the nurses at Muratsan hospital are at the same level as her in terms of knowledge and skills. Marz neonatologists reported that they cannot trust their nurses when it comes to complicated newborns, thus whenever there are any such cases at the department, they visit the unit multiple times after work and even return at night to ensure that things are right. This is further complicated by the limited number of specialists in the marzes, as some have no replacement and are worried of what might happen if there is ever a reason that they cannot attend. However, some participants were against of nurses routinely performing resuscitation, although they also agreed that nurses must have these skills.

Participants felt that trainings on neonatal resuscitation must be organized locally in all regional facilities with involvement of all staff members. One of the participants underscored the good quality of such a training she underwent while being a resident. Another neonatologist felt that to maintain good skills in neonatal resuscitation, staff members should periodically (at least two times per year) pass trainings, as in small units they lose their skills due to lack of practice. Participants from marzes reported that their ob/gyns have participated in special trainings on neonatal resuscitation and support neonatologists a lot in resuscitating a neonate.

Yes, generally, [all staff members of neonatal units are skilled] *in terms of resuscitation procedure. We are always working on it.* (Neonatologist, 4.3.3.3.1, FGD, Yerevan)

You know you cannot equalize everyone, but physicians with extensive work experience are admitted to the intensive care unit already having all the necessary skills in that [in neonatal resuscitation]... *For young neonatologists, I know that there is a residency program where they work with experienced physicians and during the years they get all the necessary skills... Young professionals never work alone, especially if the case [a newborn] is problematic… The same goes for nurses. If a nurse is admitted to the intensive therapy department, they do not take responsibility on their own immediately. They work with senior nurses and during the time they learn all the things* [on neonatal resuscitation] *from them.* (Policy maker/expert, 4.3.3.3.2,

IDI, Yerevan)

No [all staff members of neonatal units are not skilled in neonatal resuscitation]. *Trainings must be organized locally, and not just oral. For example I passed this program. To be honest with you, I don't recall the name of the international organization that conducted this program. …they did the training on pads, on everything. It was done so detailed and so many times, that it is impossible not to have learned it or to do anything wrong.* (Neonatologist, 4.3.3.3.3, IDI, marz)

It [skills in neonatal resuscitation] *depends on the number of cases. There might be situations when a unit does not have any case in a year. Therefore, there should be continuous education.* (Neonatologist, 4.3.3.3.4, FGD, marz)

[Training sessions on neonatal resuscitation need to be organized for nurses] *at least twice a year. If they pass* [a training] *once a year they already forget.* (Neonatologist, 4.3.3.3.3, IDI, marz)

In marzes, the nurse only monitors, changes diapers [laughing]. *For example, say on a certain day the nurse is on duty, I am at home and I have a newborn with some complications, well… I do not trust her with that, so I call very often and go in* [to the unit] *very often. However, it is possible that at some point my presence will be impossible…* (Neonatologist, 4.3.3.3.3, IDI, marz)

Such trainings [on neonatal resuscitation] *have been organized many times, but I am far from the thought that you can send a nurse to the delivery room today without worries that she will carry out her responsibilities there. We are far from this point at the moment.* (Policy maker/expert, 4.3.3.3.5, IDI, Yerevan)

Well... I have been in Muratsan and there the nurses are at my level... they know how to do everything... absolutely everything... but to be honest with you, I am afraid to teach them [our nurses] *how to put a probe, because in case of my absence I do not know what will happen. That is why all...Most of the nurse manipulations I have to do on my own...* (Neonatologist, 4.3.3.3.6, IDI, marz)

…Performing resuscitation on a dummy and on a newborn are two completely different things. The dummy is good for education but not for practicing skills. (Neonatologist, 4.3.3.3.7, IDI, marz)

They [nurses] *might learn these skills* [performing resuscitation], *but I do not think that the need would arise to perform the procedure by nurses…* (Neonatologist, 4.3.3.3.1, FGD, Yerevan)

The gynecologists are [skilled in resuscitation]. *They too have undergone special trainings and are qualified… There are no problems* [with reanimation], *as our specialists are skilled.* (Neonatologist, 4.3.3.3.8, IDI, marz)

We gained qualifications on resuscitation management through training courses so that when it is necessary both a gynecologist and me [the neonatologist] *work together. There have been many cases when we have successfully provided these services and saved the lives of newborns.* (Neonatologist, 4.3.3.3.9, IDI, marz)

4.3.3.4 Areas for continuing education of neonatal nurses

Participants were dissatisfied with the overall quality of education in nursing schools. They mentioned that the new graduates of nursing schools learn everything at the workplace, while working under the supervision of senior nurses.

Several suggestions were made concerning areas where there is a necessity for continuing education of nurses. The main areas suggested were: neonatal resuscitation, intensive care, respiratory assistance, infusion therapy, antibacterial treatment, how antibiotics must be stored, how they must be diluted, what mustn't be mixed with what, how to monitor the vital signs of a baby, and how to stabilize and transfer a newborn. A few believed that trainings are required in all areas to cover all guidelines and every topic, as skills of nurses reveal all of these as being problematic. Participants did not see any necessity for training sessions on breast feeding, as they think that this topic has been covered multiple times.

A couple of neonatologists noted that in order to improve neonatal services in Armenia, departments must concentrate on increasing the number of good quality and very skilled nurses, instead of doctors. A key informant backed up this idea telling that in the developed world nurses often carry out many of the responsibilities originally performed by neonatologists. This means that the neonatologist is only called upon when there are complications, while the rest of the time the staff handles everything on their own.

I am sure that after graduation, none of the nurses know how to perform manipulation procedures. They learn them during their work experience. Those narratives must be introduced into the system. (Neonatologist, 4.3.3.4.1, FGD, marz)

They [nurses] *should know all of them* [the topics that the existing guidelines cover] *and not just one or two of them. Each nurse should know all these topics.* (Neonatologist, 4.3.3.4.2, FGD, Yerevan)

Neonatal Resuscitation Procedure is the foundation of maternity services, so we have to start [educating nurses] *from here. In any case this must be the first step… After this question is resolved... there is respiratory assistance, infusion therapy, antibacterial treatment, how antibiotics must be stored, how they must be diluted, what mustn't be mixed with what, how to monitor the vital signs of a baby.* (Policy maker/expert, 4.3.3.4.3, IDI, Yerevan)

Additional trainings are always necessary and it is desirable that nurses undergo training in asphyxia and respiratory disorders. In one word, resuscitation and intensive therapy. (Neonatologist, 4.3.3.4.4, IDI, marz)

Intensive [care] *is necessary of course. There is a need for that, it is preferable… It wouldn't be bad to have stabilization and transfer. But it is more vital to be aware of the resuscitation events.* (Neonatologist, 4.3.3.4.5, IDI, marz)

There were training sessions on breastfeeding and there are still trainings on this topic... so nurses are informed about breastfeeding as well. (Policy maker/expert, 4.3.3.4.6, IDI, Yerevan)

Regarding breast feeding, I think, that it was done so many times, that it is already at the highest level - to put it roughly [participant laughs]. (Neonatologist, 4.3.3.4.5, IDI, marz)

…Trainings are necessary on the rest of the topics [other than breastfeeding] *you have mentioned* [intensive, special, or post-surgery newborn care, stabilization and transfer of a neonate (STABLE), resuscitation (NRP)]. (Neonatologist, 4.3.3.4.7, FGD, marz)

I think [education on] *post-surgical care is meaningless for the marzes. I don't mean it is just meaningless… of course acquiring any knowledge has meaning, but a primary necessity does not exist. I am speaking concretely for our service.* (Neonatologist, 4.3.3.4.5, IDI, marz)

Our unit is small, I am saying it again. I could indicate about resuscitation and follow-up care, but surgeries are performed at higher levels. (Neonatologist, 4.3.3.4.8, IDI, marz)

One day I asked her [a nurse from another country]… *"Do doctors go to the delivery room for all births in your country – I have neonatologists in mind". She said, "We do not have a stationary doctor at our department, everything is done by the nurses". …So I asked, "what if a baby is born with complications? What do you do then?" She said, "The doctor lives around 40*

km away, so we do everything and then call him. He comes and makes adjustments if there is a need for it". …We are km-s away from this thing, but we have to go in this direction. (Policy maker/expert, 4.3.3.4.9, IDI, Yerevan)

4.3.3.5 Areas for continuous education and information sources for neonatologists

There were fewer areas suggested by neonatologists for themselves when speaking of continuous education. Again, a couple of participants thought that all areas related to neonatal care must be covered through continuous education for neonatologists. Some particular topics suggested were the use of equipment and infusion therapy.

The guidelines which were developed by the AANM and distributed throughout the country following training sessions on each of them are one of the main sources of information for neonatologists. The internet is also used as a source of information; some participants even noted that they sometimes use the telemedicine tablets for this purpose. Other reported information sources include: literature, seminars, conferences, discussions with peers and exchanging experience with them. The chief neonatologist was also mentioned as an important source of information and support for practicing neonatologists.

However, one neonatologist expressed concern on the low motivation of specialists to improve their knowledge and share what they learn with other specialists. Those who manage to go abroad and obtain some information are either not interested to learn themselves or to share the information with colleagues upon their return.

It was suggested that as done abroad, the best source would be for neonatologists to have regular meetings to discuss and share their experiences, as well as the availability of printed cases providing information on international developments in the field. Connections with acknowledged neonatologists from abroad, their regular visits to Armenia and training sessions that they lead were also mentioned as important source of information for neonatologists. Another suggestion made by a key informant was connecting the medical personnel of the lower-level maternities to one of the 3rd level maternities so that they have regular consultations with them concerning any cases, because the currently existing system of consultations with Muratsan Hospital specialists via tablets is only for emergency situations.

It would be good to have seminars on the list of topics that you had in your checklist. (Neonatologist, 4.3.3.5.1, IDI, marz)

Specifically all the topics in our guidelines that have to do with newborns: premature babies, their treatment, their nutrition, operating the equipment, infections, for example in utero infections, the septic condition of the newborn. …all new information regarding these we welcome and are willing to learn and implement. (Neonatologist, 4.3.3.5.2, IDI, marz)

Priority [areas where neonatologists need continuing education]*… Well, I can't say anything like that, because they more or less pass everything. We have the faculty of continuous education at the Medical University and the department of neonatology, which has training programs. So it is difficult for me to isolate a topic.* (Policy maker/expert, 4.3.3.5.3, IDI, Yerevan)

However, trainings on any topic related to neonates would be very helpful. (Neonatologist, 4.3.3.5.1, IDI, marz)

… As I said, receiving new equipment is an ongoing process; … A specialist must have skills to work with that equipment [referring to continuous trainings related to equipment use]. (Policy maker/expert, 4.3.3.5.4, IDI, Yerevan)

… I would like to have a training on infusion therapy... I received training in infusion therapy, but I am not satisfied with it, therefore I cannot completely perform it. (Neonatologist, 4.3.3.5.5, FGD, marz)

I often search for protocols on neonatology [on the internet] *and then download them so that receiving information is faster for me. But of course I compare it with our literature, because there might be differences... I compare them and then based on this information I continue working.* (Neonatologist, 4.3.3.5.6, IDI, marz)

…We learn from the internet, but real life connections, gatherings, discussions, explaining, consulting exists...I try to always participate in various conferences... We are always thirsty for knowledge. The more we live the more we learn. We use neonatology websites, Face book pages, we keep contact with the AANM, and of course our guidelines, which specifically tell us what to do in a given situation, this is both assistance and salvation. (Neonatologist, 4.3.3.5.2, IDI, marz)

We have printed, approved guidelines, and all Armenian neonatologists use that. We have guidelines, which are provided for second, third levels, adapted from the Medical Association of Neonatology.... huge amounts of work has been conducted in the recent two years, and thanks God we now have all the guidelines for the treatment and management of diseases. (Policy

maker/expert, 4.3.3.5.3, IDI, Yerevan)

I use the tablet very often [for Internet search]*… a couple of days ago, I searched for the most frequent mistakes during resuscitation.* (Neonatologist, 4.3.3.5.6, IDI, marz)

To tell you the truth, mostly our chief neonatologist [is our source of information]. *We simply learn a lot from him. It is mostly through him and seminars. We do not stay behind on any news. Such a problem does not exist. Not even anything which arises during work... he answers all the questions regardless of the time and place.* (Neonatologist, 4.3.3.5.7, IDI, marz)

Usually, if the knife has not yet reached their bone, they don't use anything [to learn] *at all. Or if somebody goes to another country and sees a book, then they will buy that (if it isn't too expensive), bring it with them and keep it to themselves without sharing with anybody. They will read it if they have the time, but in all probability they won't even read it. It is generally limited to this. Those department heads who are somewhat more active in going abroad, see a few things, which they might either share with the colleagues upon returning, or not share.* (Policy maker/expert, 4.3.3.5.8, IDI, Yerevan)

I read literature. I buy new books written by international authors in Russian, …materials given by the UNICEF and training courses. (Neonatologist, 4.3.3.5.9, IDI, marz)

There is professional literature and the Internet, which everybody uses. The practice of having textbooks on the table appears to have disappeared, but, for example, I love textbooks. The presence of clinical protocols is very important around the world. Fortunately, we had the opportunity to establish them… We also have connections with well-respected neonatologists from abroad who periodically provide consulting services and training sessions in Armenia. The presence of these connections is adequately efficient and provides very good results. (Policy maker/expert, 4.3.3.5.10, IDI, Yerevan)

…The main source of information should either be frequent meetings - it has to be routine, so that everybody is aware that the neonatologists meet and discuss something interesting on the 1st day of each month. …Or maybe we could have a journal, which doesn't necessarily have to be neonatal... it can be a pediatric journal, which can include 1-2 articles on newborns in each publication, either translated from international practice, or one from Armenia - if anybody has had the courage to conduct a study. (Policy maker/expert, 4.3.3.5.8, IDI, Yerevan)

Maybe it would be good if the medical workers were connected to one 3rd level maternity for ongoing consultations or for discussing issues. Although, I am saying that we have this hot line [24/7] *but it is only for the extreme cases, when there is a need for resuscitation, but for the ongoing one…* (Donor, 4.3.3.5.11, IDI, Yerevan)

4.3.3.6 Need in clinical guidelines in neonatology

Neonatologists reported that through the efforts of the Armenian Neonatal Association/USAID 25 new guidelines were provided to the 1st and 2nd level hospitals. These are approved by the Ministry of Health. An additional 25 guidelines prepared for the 3rd level hospitals have not been approved by the ministry, but training sessions have been organized based on these. According to a few neonatologists, the most important effect of this had been that now they all do everything the same way, as opposed to the past when everybody could do things how they wanted. There are concrete protocols in place now which have to be followed by all the neonatologists. These are updated every five years, and the latest ones will be effective until the year 2021.

When asked if there were any additional guidelines which are not present now and they would like to have, the majority noted that in their opinion these guidelines are complete and include all topics necessary for them. In cases where they have any additional questions, they consult with head specialists. A benefit reported by some neonatologists was that the guidelines provide them with certain support and assistance, as there are specific steps to take during any situation. One participant reported that the new guidelines also provide some support to the neonatologists against ob/gyns. They explained that there has always been a certain amount of conflict between specialists from these two backgrounds, but they now have some protection because they have the guidelines to follow and refer to. Moreover, these guidelines also back them up with their management when they make certain decisions concerning the transfer of babies.

One participant reported that in some cases guidelines exist, but issues such as absence of the necessary equipment make them difficult to follow. This triangulated with another neonatologist reporting that one of the most basic requirements in the neonatal services is measuring the systolic pressure of babies, yet a majority of the units do not have the instruments to do this.

The protocols that we have today - 25 already approved ones for the second level, and 25 for the 3-rd level, which aren't yet approved by the ministry, are a very serious base to continue working on. (Policy maker/expert, 4.3.3.6.1, IDI, Yerevan)

They [the guidelines] *do not cover all the things* [yet]. *The guidelines for 1st and 2nd levels are ready and they* [the AANM] *are working on the guidelines for the 3rd level.* (Neonatologist,

4.3.3.6.2, FGD, marz)

All the topics are included in these guidelines. Every 3 or 5 years the guidelines are updated. This last guideline that was created and developed by all – the Association, the Ministry, American organizations – is foreseen for the next 5 years; from 2016 to 2021. During this period all of us will be operating according to these guidelines. Of course if there are questions that are not included in the guideline we consult, propose... (Neonatologist, 4.3.3.6.3, IDI, marz)

Our neonatologists currently work even better…we have guidelines…We only need to read them and work on ourselves. (Neonatologist, 4.3.3.6.4, FGD, marz)

The guidelines make us feel more confident. (Neonatologist, 4.3.3.6.4, FGD, marz)

Now, there is one [unified] *approach. Previously, each specialist told different things and you could not understand.* (Neonatologist, 4.3.3.6.5, FGD, Yerevan)

The guidelines protect the physicians. (Neonatologist, 4.3.3.6.2, FGD, marz)

It guides neonatologists and this eliminates any arguments between us and the gynecologists. In the past when we used to ask the pregnant women any questions, the gynecologists would immediately challenge us, demanding to know why we were asking. They would even mockingly – in some cases – tell us that we would know the weight of the baby when it was born, etc. However, the guides clearly state that we have the right to ask all these questions, so they can no longer behave in this way. (Neonatologist, 4.3.3.6.6, IDI, marz)

Our previous head doctor wouldn't approve of transporting babies; he would say that if we refer the baby to Yerevan, then the residents of Sisian would be unwilling to come to us. But now I have guidelines and I show them to our current director who says that I can do what I find suitable. (Neonatologist, 4.3.3.6.6, IDI, marz)

Yes, clinical guidelines have been published on neonatal care and we work in accordance with them. …There are areas that remain open [not improved]*... for example, we might not have certain equipment to perform specific procedures...* (Neonatologist, 4.3.3.6.7, IDI, marz)

The systolic pressure of a newborn is one of the most important factors, yet around 95% of the departments don't have the means to check this. The absence of this means that it becomes pointless to continue speaking about various other things. (Policy maker/expert, 4.3.3.6.1, IDI, Yerevan)

4.3.3.7 Quality of care indicators and work organization in neonatal units of Armenia

When asked about the presence of quality of care indicators, a majority of neonatologists were uncertain at first and the question had to be explained to them. Some reported that there is no such practice and monitoring at their unit, while some others were still unsure; a suggestion was made that the team ask "them" – referring to the management. In general, while responding, they seemed a little uncertain about what such indicators entail and how they are used.

A few neonatologists from Yerevan, who were more aware of the neonatal services in the country, reported that there aren't any programs currently concerning quality of care and data management. Although each unit records medical data in patient cards, some data is regularly provided to the government, these are only summarized to show numbers and are not used to understand cause-effect relationships, or to follow-up and intervene to improve the quality of care. A neonatologist from Yerevan reported that he has developed a large statistical database in his unit and he enters the data from medical records into this database, but he does this to satisfy his own interest, and he is not sure whether others could be interested in such a voluminous work.

One participant reported that such a monitoring program had existed during their residency. The participant was unsure of the details, but believed that all data on ICU patients were collected and summarized. The participant was unaware whether or not this project was still continuing. Another neonatologist also reported the same thing, saying that the monitoring was done for a scientific study and there is probably no follow up on this. A FGD participant reported having some indicators at maternities, such as the percentage of breastfed neonates, but another member from the same group responded that they do not have such data at their unit.

As to the long-term outcomes of neonatal care, a participant from the marz explained that although they are unaware of any quality of care indicators at their facility, however, as their facility includes both inpatient and outpatient services, they are in constant contact with the pediatricians and know of the condition of all children. The same thing was reported during a FGD in Yerevan, where participants did not see any need for long-term outcome indicators, as they believed that polyclinics monitor babies after they leave the maternities and they can then

be informed about this from the pediatricians. Others reported that they do not have such monitoring at their center, because the ill neonates are transferred to another level.

The issue of lack of reliable data was also raised by a representative from one of the donor organizations who reported that they had tried to create a centralized database where all maternities would submit their data. However, during implementation they realized that not all maternities are ready to share their statistics because they thought it is a risk, so they claimed that they needed approval from the MOH. But even after this approval, when the maternities where sharing their data, it seemed like they were hiding the real data and only showing statistics that others would like to see. The same was also noted by a neonatologist from Yerevan, who expressed concern that statistics were being tampered with and not showing the true situation of neonatal services in the country. They expressed their frustration that the data is not being collected and summarized, and none of the specialists knows what's going on in the country as a whole. They have tried to raise this issue on occasion, but have not received a positive response from the MOH and, as they put it, *"statistics is something which catches you if you lie".*

Although some participants did not see a need to have quality of care indicators and monitor the outcomes, a few others believed that these are necessary and having such a system in place will allow them to see the overall situation of the neonatal services. A key informant raised an important issue on the importance of having countrywide data on long-term morbidity of children treated in NICUs, because focusing on neonatal mortality alone may hide the real situation with the quality of neonatal care, the aim of which is not only saving the child's life but insuring his/her normal development later-on.

No [maternity hospitals and neonatal units do not have quality of care indicators that they monitor, including long-term treatment outcomes]. (Neonatologist, 4.3.3.7.1, FGD, Yerevan)

None is conducted [referring to monitoring]. *We record the information in our patient cards and store them. But none of this is later used for monitoring purposes.* (Neonatologist, 4.3.3.7.2, IDI, marz)

Unfortunately we don't have them [quality of care indicators]. *If I am not mistaken, only one department - Margaryan hospital - had this, with the purpose of conducting scientific studies. A group of babies were controlled for a certain period of time through cerebral ultrasound. I think the study ended and they probably don't call them anymore to monitor the long term outcomes.*

So such a thing was done, but it was done for a specific purpose and not as a coordinated thing. (Policy maker/expert, 4.3.3.7.3, IDI, Yerevan)

Yes, we had such a program when we admitted the patient and filled in forms. Everything was controlled after that and the information was collected from the maternity hospitals. Such a program existed… I think it was in 2015. I was doing my residency. For every patient entering the NICU everything had to be recorded. It was for future studies or something. (Neonatologist, 4.3.3.7.4, IDI, marz)

I cannot say. It's possible that there is monitoring, but for that you should ask them [management], *I am not aware.* (Neonatologist, 4.3.3.7.5, IDI, marz)

For example, I developed a large statistical database with approximately 300 parameters on neonatal services, which we have been controlling for ever since our maternity hospital was opened. Here we also have breastfeeding to see how many of the babies are being are exclusively breastfed when discharged, how many children have received artificial milk at least once, etc. This is difficult, time-consuming work, as entering the information from each medical card into the database takes around 10-15 minutes. This is interesting to me, so I do it, but maybe it does not really interest others and they don't care to have such statistics. (Policy maker/expert, 4.3.3.7.3, IDI, Yerevan)

You are referring to follow-up monitoring of newborns … which is a governmental program [in other countries]. *In our country this governmental program is absent. …Diseases of newborns can cause high percentages of disability and complications in the future. That is the quality of treatment… Such data aren't collected yet. …We do not have any analytical centers; there is a mandatory need for this in Armenia. It is necessary everywhere. This is called a register, a newborn diseases register, which follows up, investigates and can provide such information. In our country we can find very scarce information on newborn patients.* (Policy maker/expert, 4.3.3.7.6, IDI, Yerevan)

Such a system [monitoring of long-term outcomes] *does not exist... However, I do know what happens with our newborns 2 years later, because our territory is very small.* (Neonatologist, 4.3.3.7.7, FGD, marz)

As the polyclinic is here and they [children] *come to see local pediatricians... Having a small unit is sometimes convenient, as we see those newborns later. We keep connections with pediatricians and discuss newborns with problems, so we are aware.* (Neonatologist, 4.3.3.7.8, IDI, marz)

…That is the cornerstone of neonatal services; you have to know what happens to your patients

later. If this monitoring is absent then the quality of your treatment cannot be considered high. This is a shortcoming we have… (Policy maker/expert, 4.3.3.7.3, IDI, Yerevan)

We do not have such monitoring as we transport critically ill neonates. (Neonatologist, 4.3.3.7.8, FGD, Yerevan)

One of our biggest problems has been collecting data... reliable data. And I don't actually trust the data people give me. They give you what they think you want to hear. So what we did a few years ago, is set up a database. The intention was that everyone - each hospital - would put in their data for their newborns. …There was a problem... some hospitals wouldn't do it, because they said it wasn't an order from the MOH. In 2015 it became an order... So it was then being collected, but I still don't think it was reliable even then. … There are still some hospitals that won't do it, and one of them has the highest number of births - high risk births in Yerevan. And they weren't prepared to actually submit that data, because they all see this as a threat. So they don't understand audit and data, and they don't see the need. Because it might just pick out the bad things that are happening in Armenia. … I think the MOH wanted to take over that database and I don't know what happened. So this was supposed to be a centralized data collection system for the whole of Armenia. (Donor, 4.3.3.7.9, IDI, Yerevan)

The question is in the following: when everything is summarized, when at the end of the year all of the maternity hospitals send in their reports, are these analyzed or not? I don't think that they are. They are probably just compared to see if there is more here and less there. This report must be published each year and all the neonatologists must read it to see what the achievements, etc of this service in their country is, compared to previous years. This isn't done. …The data just sits at the ministry… (Policy maker/expert, 4.3.3.7.3, IDI, Yerevan)

A report which raised the main issues [with neonatal services] *was presented in front of the deputy minster a year ago, but I understood that these people were very displeased with us for raising these issues. …In their perception everything is alright, because according to statistical data newborn mortality rates have decreased from 15 to 7. I am scared that they will decrease this number so much that we will pass Japan and Sweden… At least somebody should tell them that it's enough. …The real situation is that our newborn mortality isn't 7, but it maybe 17, and those babies that die become stillborn… People have just superficially arranged the numbers which they need...* (Policy maker/expert, 4.3.3.7.3, IDI, Yerevan)

No monitoring is not performed… It would be good to have such a system. (Neonatologist, 4.3.3.7.10, FGD, marz)

No, in all probability there is no need at all [for quality of care indicators]. (Neonatologist, 4.3.3.7.1, FGD, Yerevan)

We are more concentrated on the mortality rate to save children, but morbidity rate is a huge problem. We reached the millennium goal and it seems the mortality rate is ok… I guess it is 7 out of 1000 livebirths]. *We should continue and there are still problems, but we have to think about the morbidity rate as well. You can save the life of this baby, but he/she may later have many health problems… For example, It's possible that you saved the baby's life, but provided oxygen a little bit later that you were supposed to, resulting in changes in baby's brain… This is a huge problem and we must pay attention to this.* (Donor, 4.3.3.7.11, IDI, Yerevan)

A number of the neonatologists reported that the staff of their neonatal units gathers regularly to discuss some issues, shortcomings, future activities and success stories. However, some neonatologists reported that such gatherings happen only in case of issues, but not for work organization on a regular basis, while one reported that they do not have these at all. Also, a couple of Yerevan FGD participants noted that when they get together, the nurses do not participate. A neonatologist from the marz reported that they have two sets of gatherings; one of them is only for the head of the facility and doctors, while the other one includes both doctors and nurses. Another participant from the marz shared that during their gatherings they also go through cases provided to them during seminars and try to solve the issue as a team. One of the neonatologists shared his/her experience of participating at such discussions both in Armenia and abroad. The participant noted that in the foreign country the discussions were very constructive and directed towards avoiding future mistakes and sharing correct approaches, while in Armenia, when discussing a failure, neonatologists and pediatricians were just trying to place the blame on one another. The neonatologists from smaller units valued work-related discussions, but felt that they are pointless in their units, which do not have as many cases to concentrate on.

Definitely... at my department we have meetings at least once a week and discuss the quality of work, errors and successful cases. (Policy maker/expert, 4.3.3.7.6, IDI, Yerevan)

The head of the department organizes regular meetings among staff. (Neonatologist, 4.3.3.7.2, IDI, marz)

If the problem occurs, then this is definitely done [discussing issues with staff]. *But to say that we sit down on a certain day and discuss things that must be done… No.* (Neonatologist, 4.3.3.7.4, IDI, marz)

When there is a problem, we conduct this [gatherings with staff members]. (Neonatologist, 4.3.3.7.12, FGD, Yerevan)

We do not have such practice [of the staff gathering on a regular basis to discuss organizational issues]. (Neonatologist, 4.3.3.7.10, FGD, marz)

We have this practice, but the nurses do not participate in those discussions. (Neonatologist, 4.3.3.7.13, FGD, marz)

[At our unit] *The nurses and the physicians discuss the same things separately.* (Neonatologist, 4.3.3.7.14, FGD, marz)

[Yes we gather together and speak of] *the consultations, the Doctors' Rounds, analytical work which we do, what's happening in various departments, etc. We report, present to our administration, if necessary we analyze it and discuss it... If* [it is something] *specific then yes* [only doctors take part]. *In the departments the entire staff, together with the nurses - doctors and nurses-, but with the management its only doctors. .* (Neonatologist, 4.3.3.7.15, IDI, marz)

During the first years [of my practice] *we used to have something called "mortality meetings" at "X" maternity, where we would summarize 2-3 cases. However, the purpose of this wasn't to identify the cause of death and come to a correct conclusion on its basis, but rather it turned out to be a boxing field for the neonatologists and pediatricians. …We tried to organize that same thing here* [at my current unit] *as well, at least for cases of stillbirth. …So if there are any important events, then we gather. It's just that our maternity isn't that large for us to be able to have such events more frequently, which is why this activity isn't as valuable. …There [abroad] the neonatologists and pediatricians would gather once a month and discuss the most serious case of either death or where there could have been a medical mistake. The meeting was closed - nobody would come to take footage -, they would decide on the steps to take to avoid such a mistake in the future.* (Policy maker/expert, 4.3.3.7.3, IDI, Yerevan)

4.3.3.8 Fetal antenatal diagnosis and ways for its improvement

The participants were uniform that pregnant women at high risk of very preterm delivery or diagnosed with severely ill fetus should be referred *in utero* to perinatal centers providing 3rd level care, where there are all conditions to provide the neonate with the best possible care. However, the risk of preterm delivery is not always accurately estimated and the in-utero diagnosis of congenital conditions and malformations is not always successfully made, which results in babies being born in regional maternities and only then being transferred to the

Muratsan NICU. In some cases providers might identify the pathology in-utero and refer the pregnant woman, but she may not comply and then they will have to transfer the baby after delivery. However, not only is post-delivery transfer dangerous due to the vulnerability of these newborns, but it also brings about additional financial issues related to transferring.

When discussing the reasons for misdiagnosis, both lack of modern equipment and human error were reported. Some neonatologists were satisfied with the quality of antenatal diagnosis, while others reported having some issues. One participant raised the issue of the lack of practice again. According to the neonatologists, the quality of fetal antenatal diagnosis is higher at the facilities providing 3rd level care, and this is directly connected to the availability of up-to-date equipment. They emphasized again that not having the needed equipment, or the possibility to practice it is the root cause of the low quality of antenatal diagnosis, rather than the inadequate knowledge of specialists. A neonatologist from the marz reported that because of the poor condition of their equipment, they often have to refer women to Yerevan. Naturally this places additional burden on the services in Yerevan, as well as brings about issues with transportation.

Participants from a FGD conducted in Yerevan also reported issues with ultrasound scanning, but they could not suggest any solutions as they weren't sure if the problem was from the equipment, or the specialists. However, another marz neonatologist clearly noted that their issues were related to the qualities of the ultrasound and x-ray technicians who would sometimes misdiagnose, causing them to have the baby transferred to Yerevan, where the results of additional examinations would contradict the initial diagnosis. This participant also reported having trouble with the accuracy of laboratory analysis.

Many neonatologists specifically pointed out the difficulties connected to the antenatal diagnosis of congenital heart defects. It was explained that the Nork Marash MC is the only facility which performs surgery on these babies and they have developed special guidelines for such cases, which are the only guidelines available. As Muratsan hospital is the facility that maintains connections with such specialized centers, and the final decision of where the specific newborn must be transferred is made by them, these newborns are first taken to Muratsan, where they are kept stable and only then transported to Nork Marash for the surgery.

Although special attention is being paid to antenatal diagnosis of fetal heart defects, there are still cases of misdiagnosis of these conditions in the country. On the other hand, a couple of participants were pleased with the effectiveness of the system in diagnosing Down's syndrome during a routine ultrasound conducted in the third month of pregnancy.

Thus the main issue in this sector was again mainly related to insufficient or outdated equipment and the same suggestion was made that these be replaced. An additional problem reported by a few participants was related to the insufficient quality and/or numbers of radiologists, which either result in misdiagnosis, or long queues. As one participant explained, it is impossible to expect somebody to perform this duty well after a short training, and the solution to this is having specialists with many years of experience.

If the labor has already started, then no [the woman should not be transported]. *It should be done in advance. The gynecologists know in advance what the chances* [of preterm delivery] are, *whether they are low or high. If the woman is hospitalized at their facility and there is a risk of early delivery, then they have to transfer her to the corresponding center before the storm sets in. Or if you know for sure that she have to undergo C-section, and that the baby will be born prematurely and possibly with complications, then you must not leave them somewhere that is going to cost tens or even hundreds of thousands of drams for transportation once the baby is born.* (Policy maker/expert, 4.3.3.8.1, IDI, Yerevan)

In case of discovery of [fetal] *pathology, the woman must receive high quality perinatal care at the highest level, which is the 3rd level. …For example if a congenital heart disease is revealed during intra uterine examination, we prepare for that and coordinate with the Nork-Marash cardiology center. …If we are expecting a surgical pathology, then we are already in cooperation with surgeons and decide on the management tactics. This* [birth] *mustn't take place at the 1st or 2nd levels where there will be a problem of transferring from the region. Because transferring has a very bad impact on the newborns' health.* (Policy maker/expert, 4.3.3.8.2, IDI, Yerevan)

[Fetal antenatal diagnosis] *depends on the level of the maternity hospital. It is obvious, that in 3rd level hospitals the quality will be high, because they are saturated with everything. But in lower level maternity hospitals they don't have the means. This is not due to doctors having insufficient knowledge or their quality. …No matter how much you try, read, search in different places, if you are not using something, not practicing it, then there is no point.* (Neonatologist, 4.3.3.8.3, IDI, marz)

When we have suspicions, we try initially to plan and refer newborns in-utero. We perform

antenatal diagnosis and find that the fetus belongs to the high risk group, so the woman is referred to Yerevan to be served by all the necessary and correct specialists. There are mothers who understand and do that, there are others who sit at home carelessly without thinking that their decision affects all our medical personnel and the setting. Her newborn could just immediately receive necessary care in Yerevan, but in this case we just lose time and then refer them in critical conditions. This multiplies our problems. (Neonatologist, 4.3.3.8.4, IDI, marz)

Ultrasound is performed very well at our facility. We identify the defects and refer them to Yerevan. (Neonatologist, 4.3.3.8.5, FGD, marz)

New series of high quality equipment are necessary [to improve in antenatal diagnostics]. (Neonatologist, 4.3.3.8.6, FGD, Yerevan)

In case of antenatal care, there is a problem with ultrasound specialists and the number of specialists. The waiting time is too long (there are queues) when approaching a physician for a check-up; you may end up getting one 2 days later. (Neonatologist, 4.3.3.8.7, FGD, marz)

…Other than the equipment you also need specialists, high quality specialists. It is impossible to teach somebody for a week and turn them into a fetal ultrasound technician. You need years for this, you need experience for this. And this necessity is unmet in many-many places in Armenia. (Policy maker/expert, 4.3.3.8.1, IDI, Yerevan)

...Our gynecologists and I are not satisfied with this [their ultrasound examination]. *Moreover, we do not have an X-ray specialist. We had a temporary specialist, but not a permanent one; whenever I had cases with pneumonia, the X-ray results would read "absence of the left lung". I would then transfer this baby by reanimobile, and it would turn out that it was just pneumonia. There was a case when the result said there was hydrocephaly, and again we transferred the baby, but in Yerevan they said that there was no hydrocephaly… Well, we do not have a Doppler. But it seems that the equipment is normal and it is probably a specialist-related problem.* (Neonatologist, 4.3.3.8.9, IDI, marz)

The problem [with antenatal diagnosis] *is related to the ultrasound scanning… We do not know* [whether these are equipment issues, or a specialist issues]… *there might be equipment related issues too.* (Neonatologist, 4.3.3.8.10, FGD, Yerevan)

There are 2-3 heart defect specialists in Yerevan... Intrauterine heart defects are often missed. Nork Marash developed a specific guideline for critical heart defects. There are no other guidelines for such cases, so the gynecologists transfer such cases to a higher level facility. (Neonatologist, 4.3.3.8.7, FGD, marz)

…There have been many cases when we have detected new malformations, which nobody knew about. In such cases either our cardiologist becomes engaged with treatment, or we contact Nork Marash. So we work together in this way. (Neonatologist, 4.3.3.8.10, FGD, Yerevan)

Cases of Down's syndrome are quickly detected. Heart defect cases are often missed... (Neonatologist, 4.3.3.8.5, FGD, marz)

…a couple of years ago… pregnant women were delivering without these types of examinations [for the detection of birth defects], *and we were having so-called "surprises"; newborns with spine hernias, absence of the abdominal wall, heart defects, etc. Those cases were unexpected for the neonatologist... Currently, Down's syndrome is diagnosed during the 3rd month of pregnancy.* (Policy maker/expert, 4.3.3.8.11, IDI, Yerevan)

There are cases when the laboratory gives wrong results and we send the case to Yerevan, but it turns out that there is no problem. … We do not rely on the results of the laboratory alone... during work you have to use your brain as well. (Neonatologist, 4.3.3.8.9, IDI, marz)

4.3.3.9 Financial issues, motivation of providers and quality of care

Participants from various groups reported several financial issues in the field that directly or indirectly affect the quality of the provided care. The first is the low salaries of both physicians and nurses, which does not motivate them to work in such a risky field. A key informant reported staff members receiving 300-350 AMD for each delivery, which is "shameful", as it is equal to the amount of money people spend on public transportation. Neonatologists also raised the issue of very low salaries, mentioning that even though they receive 3,100 AMD for each healthy newborn (in a 3rd level maternity), they are not paid for the sick babies in the NICU. While the 1st and 2nd level units do not receive any funding to treat sick babies, the state funding for treating severely ill children in third level NICUs is very low, even compared to that in Georgia, and this seriously limits the possibility of reaching treatment outcomes of these neonates comparable to that in developed countries.

The lack of funding of lower level maternities for treatment of a sick child, combined with the low motivation of specialists due to their low salaries and possible adverse consequences for them in case of deterioration of a sick newborn's health status, results in transferring to higher level units even those babies with mild conditions who could receive the healthcare they need on

the spot, at their local unit. Not only does this cost the government a large sum of money, but it also puts added pressure on the 3rd level facilities in Yerevan by overloading them, and creates a difficult situation for parents, as they now have to leave everything and travel to Yerevan to be close to their baby. Such a move affects them financially, causes temporary absence from work and separation from other family members. At the same time, the lower level maternities receive funding for each delivery, which of course affects their desire to refer complicated cases in-utero. So again, women deliver locally, and the same issue with transferring a severely ill newborn with its high costs arises. A reverse phenomenon was also reported by one of the key informants, who stated that some higher level NICUs in Yerevan may purposefully keep the babies for longer periods, as they receive daily funding for them.

The lack of funds also affects other areas, such as facility conditions and equipment. Funding is not allocated for equipment repair and maintenance (which is currently being addressed to some extent by one of the projects).

The lack of motivation among regional neonatologists to treat sick neonates, as they cannot receive state funding for it, combined with the restriction of their functions by the existing guidelines that require transferring sick children from lower-level units to higher-level ones, forbids the usage of available equipment in lower-level units. A couple of neonatologists from the marzes expressed frustration over having to refer babies even if they have the equipment and expertise to care for them, only because the guidelines require that they do so. Because of this they no longer feel like doctors, but rather like "dispatchers", and the lack of practice also erodes their skills. According to one key informant, not using equipment is also connected to the quality of the facility management and how they organize work. A neonatologist expressed frustration on how some facility heads make a lot of money from private patient rooms, but do not invest these in improving the conditions of the departments, or paying the specialists who have done all the work. Other than adequate funding and salaries, reorganization of services, increased accountability and centralized monitoring were suggested to improve the quality of care in the regions. One neonatologist expressed his vision of how the regional neonatal services can be improved via combined implementation of four activities: increasing the financing of these services, ensuring appropriate utilization of the equipment, improving the knowledge and increasing the role of nurses.

An important point was raised in a marz FGD, where participants stated that medical workers have no legal protection from violence at the workplace, and they are not included in the categories that receive state health insurance. These are also among important factors that decrease providers' work motivation.

If our country allocates for the provided neonatal intensive care services 51,000 or 52,000 drams per day within a seven-day period... For not going far away let's have a look at Georgia that allocates 500 laris [100,000 drams] *per day within the first 14 days and then 300 laris* [60,000 drams] *within the next 14 days. So, we could stop talking about anything else…* (Policy maker/expert, 4.3.3.9.1, IDI, Yerevan)

It appears the staff receives 300 or 500 drams per delivery. Different places have different rates... This is because they are considered hospitals delivering 1st or 2nd levels of neonatal care… So, there are absurd mechanisms of financing. I think it is shameful to provide neonatologists 300 drams per delivery, including for healthy newborns. In any moment, unexpected things could happen and they bear the entire responsibility. …It is really shame that they receive the same amount that is equal to the fee for public transport or a taxi bill. (Neonatologist, 4.3.3.9.2, IDI, Yerevan)

Neonatologist must be paid as much as gynecologist… Neonatology is a more complicated profession compared to pediatrics, but both the pediatricians and the gynecologists are paid more than neonatologists. (Neonatologist, 4.3.3.9.3, FGD, marz)

When a neonatologist works for 24 hours and is paid 3100 drams for one healthy newborn, but doesn't receive any payment for 20-30 newborns in the intensive therapy department… What is your opinion on this? This is very responsible work, yet the payment for it is very low... (Policy maker/expert, 4.3.3.9.4, IDI, Yerevan)

… I think there is very low moral generally in the regions because of [low] *salary.* (Donor, 4.3.3.9.5, IDI, Yerevan)

…Since the 1st and 2nd levels do not receive funding for neonatal care, neither the neonatologist, nor the head of that medical institution have any interest in caring for newborns. So any child with a bit of a problem is directly referred to Yerevan. ...The cost of transportation alone is huge. They are taken to the intensive care unit, which puts an extra load on the government, as keeping a baby here for 7 days costs 350,000 AMD. Moreover, the child has a risk of contracting in-hospital infections here, because if they were the only child at their hospital - or maybe one of two -, then here they are among say 40 babies. The parents are forced to move to Yerevan from their region, thus they cannot go to work. (Policy maker/expert, 4.3.3.9.6, IDI, Yerevan)

Only the 3rd level facilities receive financing. It would be desirable having a system for 2nd level facilities to also be remunerated. I had two newborns with 1 kg and 700 g weigh and I could keep them in our facility, but I had to refer them, because I knew that I would have to keep those babies in the facility for a month and have lots of expenses... (Neonatologist, 4.3.3.9.7, FGD, marz)

Another problem is that we've seen some hospitals where babies are kept in intensive care unnecessarily, because it's about money, payment... and if you keep them there for several days, you get money from the government. This is a big problem and it is in Yerevan, and it is very bad practice. Because you're actually putting that and every other baby at risk... (Donor, 4.3.3.9.5, IDI, Yerevan)

If any equipment malfunctions and requires maintenance, they [facilities] might not be able to bring the appropriate specialists, especially in regional settings. On the other hand, they do not have financial resources to buy equipment. Furthermore, some equipment parts should be purchased regularly, but the current budget allocations of the MOH are insufficient… (Neonatologist, 4.3.3.9.2, IDI, Yerevan)

… We [neonatologists from various settings] *communicate with each other and I am ashamed of some of the head doctors, who earn millions from the private rooms, but the NICU is in a poor condition and that department survives thanks to the work of its neonatologists... that are paid a very low salary.* (Policy maker/expert, 4.3.3.9.4, IDI, Yerevan)

Adequate financial allocations will fill in all the gaps... This is the first challenge we have. Secondly …the role of nurses should be increased through enhancing their knowledge, competencies and documenting about their role in orders... Then, the presence of the equipment is meaningless… if you don't use them. These four components, which include improvements in knowledge levels, use of equipment, allocation of financing, and the role of nurses, must be performed together. (Policy maker/expert, 4.3.3.9.1, IDI, Yerevan)

If they [the state] *address financial issues, then it would be possible to offer various solutions* [for quality improvement] *like training the staff regularly,* [providers] *working both in Yerevan and regions based on the job rotation approach so that regional staff could develop competencies in managing complicated cases, provision of rewards…* (Neonatologist, 4.3.3.9.2, IDI, Yerevan)

Motivation is what is absent [among neonatologists in regions]. *People just don't want to do these things* [keeping and treating sick babies] *because there is absolutely no money in it all. There are only difficulties, work, and expenses for the hospital.* (Policy maker/expert, 4.3.3.9.6,

IDI, Yerevan)

…You go around into a maternity and they [providers] *are sitting there all day, eating food. You know you wouldn't get away with that in our country. So it's not being centrally monitored. So I think it is about reorganization of services, and accountability.* (Donor, 4.3.3.9.5, IDI, Yerevan)

…[We do not have a right] *…to keep newborns with < 1500 g birth weight. I transfer them and it is the correct approach, since none of us wants to have emergencies. But because of this, I feel that everything goes to the center* [Yerevan]*…. like I am a dispatcher, but in the end we are physicians… In the past we were able to manage everything...* (Neonatologist, 4.3.3.9.8, IDI, marz)

Healthcare professionals perform very insecure work, either at the districts, the inpatient units, emergency care points, or during ordinary calls. Anyone… can enter the room, offend the physician and walk out. … Another thing is that we should have health insurance. …It would be very good to have health insurance for healthcare professionals. (Pediatrician, 4.3.3.9.9, FGD, marz)

4.3.4 Family involvement in neonatal care

4.3.4.1 Family members' access to their newborn baby in maternity hospitals of Armenia

All participants unanimously reported that once the baby is delivered, those that are healthy stay in the same room with their mothers. Some neonatologists reported that their maternities have certain administrative restrictions in place related to the access of fathers and relatives, while a few claimed that theirs don't have such restrictions. The mentioned restrictions included either having set visiting hours, regulating entry to the department under specific circumstances (for example when the mother is breastfeeding), or forbidding entry completely. A few neonatologists from the marzes believed that Yerevan maternities allow more access to relatives, while neonatal units in the marzes have more restrictions in place.

The restrictions were mainly thought as being a result of facility conditions at certain hospitals, such as limited space, overcrowding, lack of sitting areas for parents, etc. Several doctors explained that you may have a room where a few mothers are staying together with their babies (3-4 mothers). In such cases allowing even the husband of one of these women in, creates discomfort for the rest. They specifically brought the example of the inconvenience when one

woman is breastfeeding and another woman's husband walks in. In addition, the rooms are already quite crowded and having additional family members there creates chaos. Thus at one unit they only allow them to stay for 10-15 minutes, although they feel that this still causes discomfort. The issue of hygiene was also raised, as the doctors were concerned that some people do not follow the basic rules of personal hygiene and the newborns are then subjected to contact with them, which creates optimal conditions for infection; there was worry that if an infection were to spread in such conditions, it would be impossible to control it. Another marz participant brought examples of how they have had cases of drunken fathers coming to the ward following celebration for the birth of their babies.

In the marzes we have rooming-in [for mothers and their babies]. (Pediatrician, 4.3.4.1.1, FGD, marz)

If [the newborn] *is not in the NICU, staying with the mother is mandatory. This is not subject to discussion.* [The mother] *is moved from the delivery room to the ward 30 minutes post-delivery, and if everything is normal then the newborn is also taken to the same room.* (Neonatologist, 4.3.4.1.2, IDI, marz)

We do not allow family members to visit the baby. (Neonatologist, 4.3.4.1.3, FGD, marz)

If there are 2-3 newborns in one room we do allow the relatives to visit for 10-15 minutes, but in any case that is an unpleasant situation. (Neonatologist, 4.3.4.1.4, FGD, marz)

The maternity hospitals have restrictions because of sanitary - hygienic conditions. The relatives can visit [the mother and the newborn] *for one hour only. This is done for all mothers who are in one room, because if 4 women breastfeed their children in one room, naturally, the presence of their husbands is not desirable. Regarding the private rooms, which are not free of charge, it is allowed to have a guardian, a husband there. And if the baby is born healthy, then the mother is always with the newborn.* (Policy maker/expert, 4.3.4.1.5, IDI, Yerevan)

Here [at our maternity*], there is no access* [for family members]. *...This is also due to our conditions. For example if 2 or 3 mothers are staying in a single room together with their babies, and the husband of one comes, would that be correct? If it were possible to have one mother with her child in one room then... let the husband come...* (Neonatologist, 4.3.4.1.6, IDI, marz)

Maintaining sanitary-hygienic conditions and feeding the babies would be difficult in those cases [presence of fathers]. *We do that* [deny access] *to prevent the spread of infections.* (Neonatologist, 4.3.4.1.7, FGD, marz)

We have had 1-2 cases when the fathers/relatives came drunk. Also, you may have 3 people [women] *in the same room, and one of them might not be comfortable with the presence of other people. It is not acceptable having 4 mothers and 4 fathers in one room. There is no space for that. Therefore, we decided to forbid or limit those visits. There is only one mother per room in other countries, but we do not have that possibility here.* (Neonatologist, 4.3.4.1.8, FGD, marz)

…Our unit is small and we do not have much room for them to sit. Plus, if something happens [referring to infection] *then it will go through the entire department without us being able to stop it. That's why we do not implement that practice* [of fathers' free access]. *I think that free access is not allowed in a majority of our marz hospitals. This is mainly available at the 3rd level hospitals in Yerevan – as a paid service of course.* (Neonatologist, 4.3.4.1.9, IDI, marz)

4.3.4.2 Care environment and family centered care in the NICUs of Armenia

Two Yerevan neonatologists reported that the concept of Family-Centered Care is very important and is the direction in which medicine is moving on at an international level. It is also currently being introduced in Armenia through the effort of the AANM. One of them explained how a piloting period was organized in a few maternities, and now 6-7 are considered to have introduced this type of care, although various issues make it difficult to implement the concept fully. It was reported that due to the shift to Family Centered Care, parents' access to NICUs is slowly increasing, as the restrictions decrease. In general, mothers are allowed to visit their babies in the NICUs at any time. A few participants reported that if the baby is in the NICU then the mother can have full access unless the staff is working there at that time and her presence could interfere with their work. Another participant reported having certain restrictions, such as not allowing fathers to enter when there is a breastfeeding woman in the room, or parents having to take turns when there are too many babies in the NICU. During one of the marz FGDs, a participant reported a phenomenon that sometimes, mothers of severely ill newborns prefer not visiting, and instead the mothers-in-law come to visit the newborn.

A neonatologist from Yerevan reported that their nurses and doctors were recently trained on skin-to-skin contact and kangaroo care and received certificates. Since newborns requiring intensive care are transferred to Yerevan, the marz specialists were not included in these sessions. The NICUs in Yerevan try to ensure skin-to-skin contact and kangaroo care as much as possible. However, there are multiple issues which cause difficulties with the implementation of

such care and organization of work, including limited space and equipment and staff overload. Having too many babies in the unit creates a situation where constant free access would mean having too many people in the NICU, which would interfere with work, while insufficient numbers of equipment and nurses create an overall hectic environment. Therefore some units have time limitations, where parents can care for their baby, touch them, feed them, but must leave once the baby falls asleep. Again the issue with personal hygiene was reported, *"You should educate parents to wash and disinfect their hands, take a shower, change their clothes and only then attend the unit".*

There may be places, where there are some administrative restrictions [at NICUs], *but at our unit specifically, the mother is with her baby for all the 24 hours. The mother is with the sick baby, the family has free entry to them… I do not see any problems, and we are completely open and transparent.* (Policy maker/expert, 4.3.4.2.1, IDI, Yerevan)

The "family centered care" project was introduced within the frameworks of the AANM project. A few maternities were selected as so-called pilots. Now around 6-7 maternity hospitals are considered to have family centered care. They are only considered; this [family centered care] *does not work there. But at least the idea has reached Armenia and hopefully there will be some outcome.* (Policy maker/expert, 4.3.4.2.2, IDI, Yerevan)

…Our specialists: nurses and doctors passed trainings [a week ago], *received certificates on skin to skin contact, kangaroo care, and they all already know how to work. All this is done to ensure the correspondence to the worldwide standards. We have also introduced "Family centered care" within the scope of our association* [AANM]. *We have psychologists who provide support. They visit* [the unit], *communicate with parents, meet with the families... This program is still continuous.* [Providers from marzes were not invited to attend these trainings, as] *There aren't any severely ill newborns in the marzes, they aren't treated* [there], *but are transferred to Yerevan.* (Policy maker/expert, 4.3.4.2.1, IDI, Yerevan)

Previously, during Soviet time, access [of parents] *to the NICUs was restricted; in Russia as well. This approach of allowing broader access to the NICUs for parents is becoming widely acknowledged abroad. In Strasburg they indicated many times that the parents should also be present during the resuscitation process. Many controversial opinions were expressed on this matter, but parents are gaining more access.* (Neonatologist, 4.3.4.2.3, FGD, Yerevan)

… [When the baby is in the NICU], *the mother can visit her newborn at any time.* (Policy maker/expert, 4.3.4.2.4, IDI, Yerevan)

Mothers can also freely go to their baby in the NICU at any time. (Neonatologist, 4.3.4.2.5, IDI, marz)

No… In our unit, they [parents] *cannot always be present* [in the NICU]. (Neonatologist, 4.3.4.2.3, FGD, Yerevan)

We allow parents to enter the unit [NICU], *but the care and related work activities are performed by nurses and not the mothers. If the baby's condition allows this, then their mother feeds and or hugs them. The rest of the care is performed by staff members, but in the neonatal ward, the mothers care for their own newborns.* (Neonatologist, 4.3.4.2.3, FGD, Yerevan)

The mom can feed her baby, have kangaroo contact, but she cannot sleep in this room [NICU]. *We try to limit the noise, but as the intensive care is located next to the corridor and separated by a door, naturally there is some noise. If we have a sick child, then we go out and warn people standing there to be quite, so that the baby isn't bothered.* (Neonatologist, 4.3.4.2.5, IDI, marz)

If [the newborn] *is in the NICU, and the mother won't be disturbing the work there, then her presence is definitely mandatory. If the newborn's condition allows, then she can hold her baby whenever she wants. This allows them to emotionally bond with their baby, but only if they are not disturbing the work.* (Neonatologist, 4.3.4.2.6, IDI, Yerevan)

If the baby's condition is serious, then the mothers-in-law come to the hospital. The mothers of the babies prefer not to come to the hospital. In Yerevan this practice is different. (Neonatologist, 4.3.4.2.7, FGD, marz)

At our department specifically, parents enter and leave without barriers at any given time during the day. They do not feel like they are in a prison or something like that. Of course, we do have certain regulations in place, which inform them when they shouldn't enter. If there is a mother with a baby then a father should not enter, because the mother is breastfeeding. Or if there are too many babies in the department, then they should take turns entering instead of all the mothers or fathers going in at the same time. (Policy maker/expert, 4.3.4.2.2, IDI, Yerevan)

No [parents cannot access the NICU at all times]. *We set a time when they can attend, care and feed. They should leave the room when the babies sleep… In other countries two patients might be present in the room and two mothers can sit and care for their babies. In our unit, if there are ten patients with ten mothers, then what would this unit look like?* (Neonatologist, 4.3.4.2.3, FGD, Yerevan)

In the beginning our nurses were also like, "what? Work in the presence of the mothers? They see things differently", but that initial worry has passed now and they enter and exit with ease.

They just have to maintain civilized norms: enter after knocking on the door, hello, thank you, etc. That is how medicine must be... the mother must be a part of the department, let's say the "nurse" of her own child who can and must carry out certain procedures. (Policy maker/expert, 4.3.4.2.2, IDI, Yerevan)

The main issues with ensuring minimum environmental stress (light and noise) for NICU babies were related to facility conditions: some units are overloaded with babies, while others may be located near a corridor, requiring that staff step out and warn people to keep it down; yet, everybody reported that they try to limit these stressors as much as possible.

Interestingly, while visiting a healthcare facility to conduct an IDI, the study team observed a situation which did not correspond with the information provided by the participant concerning "minimizing the noise" at the NICU. At the time of the visit, the department had received new supplies in a large quantity of packages. The door of the main entrance to the NICU was left open, while the janitor threw the boxes in from the elevator. This loud noise of boxes being thrown was then increased, as the staff members began helping by calling each other and speaking very loudly through the corridors, carrying a few boxes and kicking the smaller lighter ones. The team observed how this commotion continued for several minutes, until the head of the department returned and the loud noises stopped immediately. The rest of the work was carried out much quietly, and the entrance door was immediately shut.

An interesting phenomenon was revealed when discussing whether soothing touch of a parent is insured during painful procedures in the NICUs. Several participants both from Yerevan and the marzes mentioned that they and the nurses feel uncomfortable when performing procedures and manipulations in the presence of parents who *"see the things differently*". Thus, many of them ask parents to leave the room during such procedures. As one doctor put it, "*If we fail while performing complicated procedures in front of the relatives, what will we do then?"* Also, working with too many babies under the circumstances when there is a lack of equipment and supplies creates a stressful atmosphere for the personnel, under which the "beautiful whishes" of ensuring continuous skin-to-skin contact and soothing touch are hardly imaginable for them.

We definitely exclude noise, light which has an irritating effect on the baby; it's a calmer environment. (Neonatologist, 4.3.4.2.6, IDI, Yerevan)

Every department tries to keep the noise and light at a minimum level. (Neonatologist, 4.3.4.2.7, FGD, marz)

We try to keep that [sound and light exposure] *to a minimum level. You probably know that the incubators have special tents that ensure those things. For premature babies, we try to keep the temperature and darkness close to the temperature and the level of darkness inside the uterus of the mother.* (Policy maker/expert, 4.3.4.2.4, IDI, Yerevan)

It seems that in the NICUs no [skin-to-skin contact, soothing touch are not ensured]. (Neonatologist, 4.3.4.2.8, FGD, Yerevan)

[Not ensuring soothing during painful procedures] *is related to* [our] *mentality. Sometimes neonatologists are afraid of a conflict, which can arise because of a manipulation failure while working with the baby in front of the relatives. The relatives might question why the physician could not manage the procedure from the first attempt and in case of repeating the failure, the relatives can request another physician.* (Neonatologist, 4.3.4.2.7, FGD, marz)

I would say that soothing touch during painful procedures is not ensured. I know that this practice is acceptable in foreign countries, but in our country there is a difference in culture. It is better not to allow mothers to be present during the procedures, because putting an intravenous catheter or feeding the baby with a probe might be shocking for mothers. In the case of probe feeding, they are allowed to be with the baby; however, for all other procedures, their presence is undesirable, since they do not approach the situation adequately. Regarding the skin to skin contact, yes, we ensure that and it is very desirable. (Policy maker/expert, 4.3.4.2.4, IDI, Yerevan)

I ask the parent to leave the room when performing a manipulation. (Neonatologist, 4.3.4.2.9, FGD, marz)

When the mother does not look, performing manipulation becomes easier. (Neonatologist, 4.3.4.2.10, FGD, marz)

Those [skin to skin contact, soothing touch, etc] *are just beautiful wishes, the introduction of which in the departments is very difficult, as everything is carried out very aggressively. There is a lack of sufficient number of nurses to care for the large number of babies, there aren't enough equipment - the ones they have are already overworked... all that's missing under these circumstances is to bring the mother in, put the baby on her breast and try to take a test sample…* (Policy maker/expert, 4.3.4.2.2, IDI, Yerevan)

4.3.4.3 Conditions for breast milk pumping, storing and feeding at neonatal units

The response to the use of donor milk in Armenia was a unanimous *"no"* from all participating neonatologists. The use of donor milk is currently prohibited, as there aren't any milk banks and large storage areas. A neonatologist from Yerevan stated, *"Of course, if we had at least one breast milk bank for the entire country that would be a big thing, a big deal. But it is an expensive pleasure... we need about one million dollars to organize such a thing".* Several participants explained that they deal with premature and or ill newborns at the NICUs and it would be dangerous to take milk from other people who may be ill themselves; thus, they only use the mother's milk, or resort to the use of formula in case of difficulties. The mother is asked to pump her milk and bring it for her baby every few hours. They either do so at home, or while at the hospital. However, it was reported that a major issue here is that units do not have beds for mothers to sleep in, or a sitting areas where they can stay. This creates difficulties for the mothers to supply the required milk, which can directly result in the baby being fed formula. Naturally this situation has both a financial and psychological impact on the mother and the family. The neonatologists from regions mentioned that whenever a child is transferred to a referral hospital and the mother stays in the maternity for few more days due to her health condition, there is no other option but feeding the child in the NICU with formula.

The responses provided by the neonatologists in relation to facilities for mothers to pump and store their milk were diverse. A neonatologist from Yerevan reported that pumping and storing milk is not an issue, as all maternities have the necessary conditions to do this. Another neonatologist from Yerevan also agreed to storage not being an issue; there are refrigerators in all of the rooms, as this is a minimum requirement allowing mothers to store their own food, however, they do not provide milk pumps and mothers bring their own. Yet a third neonatologist from Yerevan reported the opposite, stating that *"Options for breast milk pumping are present* [at maternities]*, but not for storage"*. The majority of the respondents did not see the need for storing expressed milk for a period longer than a few hours and, therefore, did not view the lack of milk storage facilities as a problem. One neonatologist seemed to be slightly confused as to what breast milk storage entails. Their response to this question was, *"No, we do not store* [milk]*. We keep it for several hours".*

The marz specialists reported that they do not have conditions for pumping and storing milk in refrigerators; one neonatologist even explained that these conditions are not required at their maternity, since pumping is necessary for those newborns who are sick, and they transfer all such babies.

When speaking about the availability of pumps in general, some participants reported that pumps are available at their units; some others reported that even though they do not have pumps at their units, all mothers have their own and even receive guidance on the correct pump to buy. One neonatologist from the FGD conducted in Yerevan disagreed with another member from their group who had also stated that they have pumps at their unit, by saying, *"No, I prohibit using a common pump"*. Another participant from Yerevan also stated that it is good that everyone has their own pump. The reasoning for this was that if the maternity provided pumps, then they would also have to provide a breastfeeding room and additional conditions for equipment sterilization, so it is better that people bring their own pumps. However, a neonatologist from marz thought that pumps can be not affordable for some mothers to buy and therefore it would be correct to provide them with hospital pumps.

Donor milk is absent, prohibited in Armenia. There aren't any milk banks or storage areas, which is why the use of donor milk is prohibited. Every mother feeds her own baby. (Policy maker/expert, 4.3.4.3.1, IDI, Yerevan)

We do not use donor milk because all the infants at our unit are ill… There are [fridges], *but we deal with sick infants, and you cannot know what infections the mothers have. It is a risky issue.* (Neonatologist, 4.3.4.3.2, FGD, Yerevan)

… None of the 3-rd level hospitals in our country have the ability to provide this - for the mother to come and stay next to their child at the hospital. There are issues with hospital beds. As a result, the mother is separated from her baby. They must provide milk, which is quite difficult, so the child is fed with formula, which in turn can lead to additional problems. In one word, a single issue leads to several, more complicated problems, both financial and moral-psychological. (Policy maker/expert, 4.3.4.3.3, IDI, Yerevan)

If anything happens, we have formula, because we don't have the necessary means to store and collect donor milk. Also this isn't very accepted. In all the NICU's where… let's say we send the child from here to Muratsan Medical Center, and the mother stays here for a few days post-delivery, they feed the child with formula so that the infant doesn't stay hungry... (Neonatologist,

4.3.4.3.4, IDI, marz)

We do not have donor milk, or necessary conditions to pump and store the mother's milk. If we need any milk, we ask the mother to pump her breasts every three hours and bring it to us. I do not think there is a necessity to change things here, as we do not have reanimation and the mother solves the milk issue. In cases when the mother does not have sufficient milk, we feed formula. But if they have some, then we give that first and follow with formula. (Neonatologist, 4.3.4.3.5, IDI, marz)

If the baby is a breastfeeding newborn in the intensive therapy room, then the mother brings milk for them once every 2-3 hours. (Policy maker/expert, 4.3.4.3.6, IDI, Yerevan)

Who stores breast milk? We do not have that practice. The mothers always breastfeed and if the baby needs… If they have restrictions to being breastfed, the mother uses special equipment to pump their milk. We feed the child in this way [with pumped fresh milk], *and once the baby feels better we go back to breastfeeding.* (Neonatologist, 4.3.4.3.7, IDI, marz)

If there are neonatal complications, mothers are provided with rooms where they breastfeed or pump the milk until the baby gets better. (Pediatrician, 4.3.4.3.8, FGD, marz)

We have very few deliveries and we transfer in case of complications, and usually milk is expressed if there is a sick baby. So we do not have such conditions [for milk storage]. *What concerns other maternities, I cannot speak of donor milk, but in the 3rd level maternities there are separate rooms to pump milk... I have seen all of this.* (Neonatologist, 4.3.4.3.9, IDI, marz)

[Pumping milk] *is a very simple thing. There are pumps in all places, and you need a refrigerator for storage, nothing else. That* [the process of milk expression and storing in refrigerators] *is normal in all places and there aren't any problems.* (Policy maker/expert, 4.3.4.3.1, IDI, Yerevan)

We have [pumps] *at our unit.* (Neonatologist, 4.3.4.3.10, IDI, Yerevan)

There are refrigerators in the rooms. I guess every maternity hospital has a refrigerator where breast milk can be stored. This is the minimum requirement that the maternity must ensure; at least for young mothers to be able to store their food. We do not have any equipment to pump milk, and mothers bring their own pumps. But we advise them on which model to buy, taking the socioeconomic condition of each family into account. (Policy maker/expert, 4.3.4.3.6, IDI, Yerevan)

I guess this is a better method [that everybody has her own pump], *because if the facility had its*

own equipment, then they would also have to have a separate room for breastfeeding, as well as conditions to sterilize the equipment to prevent the transmission of infections. (Policy maker/expert, 4.3.4.3.6, IDI, Yerevan)

No [we do not have pumps]. *Mothers bring these. …Even if these are used only once a month, there is still a need* [that the hospital provides these], *because there will be a baby who will need this breast milk, but whose mother will not have the* [financial] *means* [to buy a pump]. (Neonatologist, 4.3.4.3.9, IDI, marz)

Suggestions for improvements in this area included: creating the necessary conditions (room, bed) next to NICUs enabling mothers to stay in the hospital with their neonates and have unlimited access to them; supporting mothers with breastfeeding by providing them a room with necessary conditions (pumps, other supplies) where they can pump and store their milk; and creating conditions for using donor's milk by screening the potential donors for any infections they may have. It was also suggested to collect data on newborn feeding indicators, where each hospital will share its statistics on the number of newborns fed with formula, so that the motivation of the maternity staff to support exclusive breastfeeding would increase.

The most basic thing... at least if we could have the ability to provide conditions to use breast milk. For the mother to be able to go and pump their breast, leave the milk, have a room in case of necessity for them to stay for a few hours. Unfortunately none of these exist. Everybody understands that these are necessary, but at the moment no practical step is being taken towards this. (Policy maker/expert, 4.3.4.3.3, IDI, Yerevan)

[In order to have donor's milk], *it is necessary to start from the beginning; all mothers should undergo examinations to detect possible infections. We should have the medical history of mothers to decide whether or not we could use their milk to feed other newborns. If we do not examine mothers for all infections and we do not have their medical history, then how could we allow ourselves to use their milk?* (Neonatologist, 4.3.4.3.10, IDI, Yerevan)

The discharge of every single newborn being fed with formula must be viewed as a negative point for the maternity hospital. And this must be controlled in some way. At present it is completely uncontrolled... we don't know how many babies are discharged already being fed artificial milk, we don't know how many babies receive these on the first day of their life - with or without the doctor's knowledge. There must be some statistics to know in what percentage of cases you are able to ensure exclusive breastfeeding… We have to develop and set such mechanisms in place, which will make it difficult to tamper with the data. (Policy maker/expert, 4.3.4.3.3, IDI, Yerevan)

4.3.4.4 Availability of information for parents whose neonates are placed in NICUs

A couple of neonatologists reported that maternities have information on their regulations and newborn care on the walls of their departments. Also, at discharge, parents are provided with a piece of paper containing basic information on the "signs of danger", which is a warning on when they should take their baby to the hospital. One participant from a 3rd level maternity hospital in Yerevan stated that many written materials were developed for parents containing information on neonatal diseases, sick newborns, what is going on in the department of intensive therapy, etc. However, the majority of neonatologists stated that there is no any practice of providing parents with written information on their child's disease, treatment process and the regulations of the neonatal department. Moreover, none of them saw the need for adopting such practice. Instead, they stated that they respond to questions and give oral direction to the parents. One of the marz neonatologists noted that there aren't any issues when it comes to mothers being able to communicate with specialists as their contact information is available for mothers. As to the written information, a few participants mentioned that they have not yet been asked by any parent for this. Two neonatologists believed that this can be due to national specificities, as people view asking for written information as a negative thing. The only written papers given to parents are the epicrisis and the exchange card, which must be taken to the polyclinic. Parents have to sign in the patient cards when they received these documents.

During one of the FGDs participants reported of another document that requires the signature of parents. In cases when the baby is subject to surgery or blood transfusion, all the details are explained to the parent and then they have to sign a consent form, which states that they have been informed of the situation, and the procedure with it's possible outcomes.

As for informational brochures, several participants reported that they used to have these, which would provide all details on neonatal care, but they weren't sure whether or not these are available nowadays or not. On a whole, there is a shortage of informational brochures which can be provided to parents and although a couple of neonatologists reported that compared to the past mothers are more aware nowadays, a few others thought the opposite.

The department regulations are posted on the walls. ...We also have posters in the rooms with information on how to care for a newborn. (Neonatologist, 4.3.4.4.1, IDI, marz)

At discharge I give them a paper on "signs of danger", so they know when to apply to physicians. The women's consultation services provide lots of brochures. Nowadays, the mothers are not illiterate like they were in the past. They know everything. (Neonatologist, 4.3.4.4.2, IDI, marz)

Many brochures have been developed, papers are printed and there are posters hanging on the department walls. These contain: information on diseases, information on sick newborns, what is going on in the department of intensive therapy, information for parents, etc. (Policy maker/expert, 4.3.4.4.3, IDI, Yerevan)

Written? I have never witnessed the need for such a thing. That mothers, and not just mothers, but parents in general request written information. This may be due to the awareness level of people, not in terms of knowledge though… I don't know. I guess it's just not accepted among us to say, "could you please provide this to me in written form?" Maybe these are national specificities! (Neonatologist, 4.3.4.4.4, IDI, marz)

We have not had a demand for providing written information, but we state these treatments in the patient's medical record, as well as in the Exchange Card which is sent to the polyclinic where the child's card is opened. In the Exchange Card we describe what we have done here, how the child was born, what kind of pregnancy it was, what treatments they have received, what vaccinations, what examinations they have undergone, etc. The diagnosis is also mentioned... No parent has asked for written information. (Neonatologist, 4.3.4.4.1, IDI, marz)

No [I do not provide written information], *I only explain orally. When they are discharged, it is also noted that the mother received the exchange card. We then answer their questions, explain how they should feed the baby, what she* [the mother] *can eat, etc.* (Neonatologist, 4.3.4.4.2, IDI, marz)

No, we do not provide written information. We provide them with some leaflets, record the information in the newborn cards and give the parents oral instructions so that they will know what treatment we are doing. Written information isn't necessary, as they are there and can see what we are doing. (Neonatologist, 4.3.4.4.5, IDI, marz)

Providing relevant information on the course of treatment is the doctor's responsibility. They meet with parents every day and provide the information… It isn't possible to have everything in written form, you know. Every patient is different. There are situations, when it isn't possible to write everything on paper, because… the condition of the patient is constantly changing. Of

course it is possible, but it is quite difficult to prepare everything in written form. (Policy maker/expert, 4.3.4.4.3, IDI, Yerevan)

No, we do not [provide written information to parents]. *It's generally taken very negatively in our country when a parent approaches asking for a report on their child's health. …But in the civilized countries parents have the right to say, "please provide me with a short epicrisis. I want to be updated". Or this doesn't necessarily have to be written, it can be orally communicated… But this must be done. The parent may ask stupid questions, but should receive intelligent responses to these from the nurses – at their level, and from the doctors – at their.* (Policy maker/expert, 4.3.4.4.6, IDI, Yerevan)

You know that there is a medical card for newborns, where their diseases, daily procedures, and prescriptions are written. After they are discharged, the epicrisis and the exchange card are given to a parent, which contain the details about the newborn, including their treatment, interventions, and future consultations. (Policy maker/expert, 4.3.4.4.7, IDI, Yerevan)

There are posters in the patients' rooms, where mothers can find guidelines. My phone number is given underneath the poster. They can call me… (Neonatologist, 4.3.4.4.1, IDI, marz)

Previously, for some time, maternities would provide mothers with brochures on neonatal care. This was helpful, as all mothers read the brochures. I remember the mothers in our unit read with pleasure. I remember that when I gave birth, I too was provided with a brochure at the Margarian hospital. (Neonatologist, 4.3.4.4.8, FGD, Yerevan)

[The information available for parent's is not] *enough. There is always a need for improvement. We only have the minimum now.* (Policy maker/expert, 4.3.4.4.3, IDI, Yerevan)

4.3.5 Organizing the transfer of sick newborns

4.3.5.1 The need in ex utero and in utero transfer guidelines

The participants were uniform in claiming that in Armenia there are ex utero and in utero transfer guidelines, which include the indications and contraindications for transfers, as well as how to transfer and how to prepare the patient for transfer. Moreover, recently a new document regarding transferring cases was developed and currently it is waiting for the approval from the MOH. The responses mainly referred to ex utero transfers, as the participants stated that in utero transfers are the responsibility of gynecologists. Still, the respondents agreed that in utero

transfers are the most recommended practice if very preterm delivery or complications during delivery are anticipated. However, one of the participants raised a very important issue regarding the in utero transfers. He claimed that to receive the money allocated by the state for each delivery, maternities often don't transfer the cases qualified for in utero transfer until the delivery occurs in their facility. Only then they quickly transfer the baby and/or the mother to a higher level hospital, thus putting the health of both the baby and the mother at a risk.

A representative from one of the donor organizations noted that their employees have noticed that sometimes risk assessment was not performed before transferring a neonate. As he/she claimed there is a scoring scale for risk assessment, but it is developed for older children, not for newborns, and currently they are working on developing such a scoring scale for newborns. However, a neonatologist participant claimed that before transferring, they evaluate the newborn's health condition via a scoring scale included in the guidelines which they had received from the MOH, meaning that currently there is such assessment tool. Another participant mentioned the AANM provided them the guidelines for neonatal transfers that include everything. A participant from a referral hospital in Yerevan also described a scoring tool developed by AANM that allows estimating the risk associated with the given case of neonatal transfer.

In maternity hospitals, gynecologists are mainly engaged in in-utero transfers… this is their [gynecologists] *responsibility. … There are such guidelines* [ex utero and in utero transfer guidelines]. *We have gynecologists, who use them. I cannot say whether all of them do, but there are gynecologists who use* [the guidelines]. (Neonatologist, 4.3.5.1.1, IDI, marz)

Last year we had two cases of in utero transfer, issues with 32-33 up to 34 week fetuses, also the woman had blood pressure problems. If the woman's condition permits it, we transfer her. (Neonatologist, 4.3.5.1.2, IDI, marz)

…In utero transfers are the recommended practice [in the literature]. *I mean when there are suspicions that the pregnancy should be interrupted earlier or fetal deviations are detected with or without confirmed diagnosis, it is highly desirable that these mothers give birth in a third level hospitals so that after the delivery there is NICU option. But this is not always the case in Armenia due to social issues, people's mentality and geographical proximity as well as the situations when these cases are not detected in time. Therefore,* [severely ill] *infants are being born and will be born outside tertiary hospitals.* (Policy maker/expert, 4.3.5.1.3, IDI, Yerevan)

Such guidelines exist [ex utero and in utero transfer guidelines]. *Moreover, in utero transfer must always be privileged, but our current system of healthcare financing does not encourage this. It is more beneficial for the maternity hospital that the baby is born there so that it is registered as a delivery and they get paid for it. … This is how it is usually done. People do not really want to refuse these dangerous payments... What happens later is that they just quickly transfer the baby.* (Policy maker/expert, 4.3.5.1.4, IDI, Yerevan)

Yes, there are guidelines on how to transfer [a newborn] *and how to prepare for the transfer. There are books written for the transfer because this is one part of delivering neonatal care services and it is not only about moving babies from the A destination to the B. The transfer is a period of time when medical procedures are performed with all nuances and difficulties and it is considered one of the challenging parts of these services. Only from regions, we perform more than 460 transfers in a year.* (Policy maker/expert, 4.3.5.1.3, IDI, Yerevan)

There are some guidelines which state when and in case of which conditions it is forbidden for the second level [maternities] *to keep the* [ill] *newborns. …The guidelines have been provided by the neonatal association.* (Neonatologist, 4.3.5.1.5, IDI, marz)

Yes [there are ex utero and in utero transfer guidelines], *in recent months a big document has been prepared, which regulates all transfers... this is a standard, which is developed and in the near future it should be approved by the MOH. It includes everything* [what should be done before and after the transfer]. *It was developed a month ago.* (Policy maker/expert, 4.3.5.1.6, IDI, Yerevan)

Yes, there are guidelines on that [ex utero and in utero transfer]. *The "Neonatal Association" works on these guidelines, especially we put an emphasis on the risk assessment before transferring the baby. For example, we already have a scale for the transfer of infants approved by the Minister, and before transferring the child that assessment must be conducted. ... This system exists for children, but not for newborns. Now we are working on developing it, I mean the "scoring scale for a newborn…"* (Policy maker/expert, 4.3.5.1.7, IDI, Yerevan)

We have guidelines [for ex utero and in utero transfers]. …In 2016 there was a new publication [of these guidelines]... We score the baby by points and decide whether or not there is a need for transfer... i.e. it makes no sense traveling 300 km when the child might not survive... we have such guidelines, with which we organize our work. The MOH provided those to us… (Neonatologist, 4.3.5.1.2, IDI, marz)

We have developed an assessment form of health conditions of newborns [with AANM] *that is completed when the referral hospital receives a call for transportation. I do not know whether or not all settings perform this procedure but it includes items like the presence of consciousness,*

the color of skin, heart rate, respiratory rate, etc... We give them questions and they answer so that we complete the form. Subsequently, we get a result based on scores allowing us to assess the risks of transportation. (Neonatologist, 4.3.5.1.8, FGD, Yerevan)

4.3.5.2 Vehicles for newborns' transfer: equipment, staff, and existing problems

According to the participants, all neonatal transfers from the regions and the majority of those from Yerevan maternities are organized by Muratsan hospital via its reanimobiles. Also, Arabkir and Surb Astvatsamayr hospitals perform some neonatal transfers using their vehicles, although these vehicles are not specially intended for newborn transfers. Almost all participants from different groups (donor organization members, neonatologists, pediatricians) felt that the transfer of sick newborns is performed safe and effective. From their words, the two neonatal reanimobiles belonging to Muratsan University Hospital are well equipped and have qualified crews. However, according to some participants, the vehicles are small and there is no much room for a variety of equipment and currently only few devices are left in the vehicles. While, by the words of some IDI participants, this has its advantages – small vehicles with a few equipment are more speedy and comfortable, still, the ambulance service would benefit from more small-size portable equipment in the vehicles, including transport incubator, cardio-monitor, air compressor, oxygen cylinder, humidifier, mechanical ventilator, T-piece resuscitator, infusion pump, micro-laboratory, bilicheck, phototherapy lamp, and trans-illuminator. Also, it is advisable to have crews for these ambulances solely involved in neonatal transfers and having no other responsibilities. Some participants claimed that the tablets for 7/24 telemedicine consultations play a vital role in organizing effective transfers of sick newborns, because due to these consultations maternity neonatologists successfully stabilize the newborn before the reanimobile arrives. According to a donor agency representative, providing support to medical personnel in stabilizing newborn's condition before transferring him/her to a higher-level hospital is one of the main aims of the 7/24 telemedicine service. However, the participants from regions claimed that in severe cases when invasive interventions are needed, the local providers have no adequate competencies and equipment to stabilize the neonate until the reanimobile arrives, and there is a lot to do here. Another issue raised during a FGD was that severely ill

neonates cannot be kept in regional hospitals because of shortage of the specialized staff, which does not allow their round the clock presence in NICU.

The factors that make neonatal transfers challenging include the long distances between Yerevan and some of the regions (e.g., a transfer from Kapan to Yerevan takes 5-6 hours), because of which both the waiting time for the vehicle to arrive and the transfer duration are getting too long; poor geographical and weather conditions that sometimes make roads impassible; as well as shortage of vehicles and crews. Although there were some participants who thought that in Armenia there is no shortage of neonatal reanimobiles, still there were respondents who claimed that the number of neonatal reanimobiles should be increased, because when a neonate is referred to a hospital other than Muratsan, the former have to ask Muratsan hospital to send its reanimobile with the medical staff for transferring the newborn. Because of the crew and vehicle shortage, sometimes, when 2-3 simultaneous calls happen, the reanimobile transfers the severe case first and then the other case(s) or when the calls are from the same marz, the reanimobile may transfer 2-3 cases at once. Also, a suggestion was made to provide neonatal ambulance vehicles to remote marzes to shorten the waiting time for neonates who are transferred. Another suggestion was using air transfer service via helicopter to address this issue.

The lack of financing of the vehicle crews was also mentioned as a problem. From the words of an IDI participant, only one reanimobile crew has allocated funding. Therefore, when a need for the second reanimobile emerges, the transfer is conducted without predetermined financing, meaning that the hospital has to ask its staff members to urgently compose a transfer team and then it should re-allocate some funds from other services to pay the members of that team. Also, the vehicle crew not always consists of a neonatologist and a nurse. When the newborn condition is estimated as not very severe, only a neonatal nurse is sent to transfer the newborn.

> *…We* [a hospital in Yerevan] *have one vehicle and Muratsan has two vehicles. One vehicle belongs to Arabkir hospital. The vehicles of Muratsan are intended for neonates while our vehicle is a larger reanimobile intended for older children... Staff members of our units are involved in the transfer teams. Both physician and nurse. For Muratsan, the nurses and physicians from the NICU are involved in the transfer team. …Muratsan could organize the transportation of infants with its team, but transfer them to Arabkir.* (Neonatologist, 4.3.5.2.1, FGD, Yerevan)

These [neonatal transfers] *are covered by Muratsan basically, and they have been building up their services over the years, and I think they have got a good service now. I have not seen it in the last couple of years, but I know they have their dedicated ambulances, they have a crew, and they have equipment. They are very keen to develop this more, and they probably would benefit from more equipment in the ambulance, because there is now very much dedicated equipment for transport. And most countries in the west have dedicated transport teams, who are not doing any of the work... They are purely there. It is much harder in Armenia, because of the region you are covering, the roads…* (Donor, 4.3.5.2.2, IDI, Yerevan)

Newborns are transferred in special reanimobiles, which have qualified nurses and physicians as well as equipment... Mostly they are transferred to Muratsan and sometimes to Arabkir. Maybe they are transferred to other facilities as well, but those two are the main ones... There were one or two [old] *reanimobiles in Muratsan but happily they obtained two new reanimobiles as well and …this quantity is enough for us... They respond …immediately... the 7/24* [service] *also fosters to that... The question here is more related to a huge distance… For example, reaching Kapan takes 5-6 hours... Probably, providing cars to marzes will shorten the time...* (Donor, 4.3.5.2.3, IDI, Yerevan)

Waiting [for reanimobile to arrive] *would not be dangerous if low level facilities had necessary equipment for keeping the newborns until the reanimobile arrives.* (Neonatologist, 4.3.5.2.4, FGD, marz)

The equipment is there [in the regional NICU] *and if you turn it on there are no specialists to observe the baby for 24 hours. Is one pediatrician able to control baby for 24 hours? This is the cause of transfers; the shortage of specialists* [other participants agreed]. (Pediatrician, 4.3.5.2.5, FGD, marz)

As far as I know, reanimobiles are equipped with all necessary items… But, they [AANM members] *indicated that reanimobiles could be equipped better.* (Neonatologist, 4.3.5.2.6, IDI, Yerevan)

A vehicle transferring a newborn has to include artificial respiration equipment and transportation incubators. As far as I know, none of these are available in our vehicles. The baby is transferred in the arms of the nurse, in the best case scenario there might be heating mattresses, ect, and breathing is facilitated manually through AMBU bag. This is very dangerous for long distances. Babies, whose respiration has been facilitated in this way, reach the department already with pneumothorax, because the nurse cannot manually pump with the same intensity for 4 hours straight. (Policy maker/expert, 4.3.5.2.7, IDI, Yerevan)

The conditions of reanimobiles are satisfactory as demonstrated by the fact that none of the 470 neonates transferred from regions in the last year have died during the transfer. …I mean there is no issue related to the quality of transfers. …We have also significantly revised the principles of transfer services considering the conditions of the roads in Armenia and the difficult geography. We do not use large transport vehicles equipped with heavy equipment …which quickly gets damaged on our [uneven] *roads. According to some recent publications … the use of large vehicles and respective equipment is not always justified... It is more justified the use of so called "vehicle-incubators" – smaller, speedy transport vehicles with favorable environment inside and the most necessary equipment...* (Policy maker/expert, 4.3.5.2.8, IDI, Yerevan)

…on my opinion the cars are too small to be equipped by international standards. That's why the incubator was removed from there and even the staff finds it not necessary. Anyway, inside the car there are few equipment only: oxygen cylinder, suction machine. They have one mechanical ventilator and one T-piece resuscitator, which are useless because of absence of compressed air source. So …the needed devices for the two ambulances are: transport incubator, cardio-monitor, air compressor, small transport oxygen cylinder, humidifier, transport mechanical ventilator, T-piece resuscitator, infusion pump, micro-laboratory, bilicheck, phototherapy lamp, and trans-illuminator. (Policy maker/expert, 4.3.5.2.7, IDI, Yerevan)

In severe cases, we perform oxygenotherapy, stabilize the newborn and then transfer him/her on reanimobile. It may take 8 hours for the reanimobile to reach us... Their work is 100% effective, and if they weren't available then we would have deaths. …We are very pleased with the equipment and the team of the reanimobile. In case of necessity we contact Yerevan via telephone or the tablets….Since it is a video-call, they can see the newborn as well. (Neonatologist, 4.3.5.2.9, IDI, marz)

…The distance and the condition of the newborn are taken into account. If they [consultants at Muratsan] *evaluate the newborn's situation as very severe… they may not transfer the baby because of this long distance. …We contact them and within 5 hours they reach us... By their arrival I do whatever our facility level allows me to do... There were no problems so far... the vehicles are new and they reach faster than in the past...* (Neonatologist, 4.3.5.2.10, IDI, marz)

We haven't had problems with transfers during these last 10 years… if in the past we used to organize transfers by means of our doctors and nurses, now there is a brigade that comes and organizes the transfer with equipped vehicles. …Recently two equipped vehicles were donated to the Muratsan University Hospital, about 6 months ago. They carry out their task without any obstacles. The staff is NICU staff. The nurses, the doctors, plus the drivers, auxiliaries, they all know the equipment in the vehicle, what to switch on… they master their job fully. (Neonatologist, 4.3.5.2.11, IDI, marz)

Only land transportation is available in our country through reanimobiles and ambulance vehicles. We do not have an option for air transfer but the presence of it would be better for emergency situations. (Neonatologist, 4.3.5.2.6, IDI, Yerevan)

This [the transfer service] *is organized overseas very well as they also use helicopters. In that case, infants would be transferred within 45 minutes from Goris to Yerevan, but with our current capacity we do that within 4.5 hours (one direction).* (Policy maker/expert, 4.3.5.2.8, IDI, Yerevan)

The team consisting of highly qualified medical personnel and driver costs a lot; we spend 8-12 hours on one patient. The country does not have another team. …There are no adequate financial allocations for keeping two teams working simultaneously. The second team works exclusively on enthusiasm… Because of shortage of financing, we re-allocate some funds from other neonatal services to be able to pay the second team when there is a second case simultaneously. (Policy maker/expert, 4.3.5.2.8, IDI, Yerevan)

It would be better to have more reanimobiles… If simultaneously there are two calls, the one in worse condition is transferred first. Two cars work in the mornings and one car works at night... Sometimes we have to wait for 5-6 hours [for reanimobile to arrive]. (Neonatologist, 4.3.5.2.4, FGD, marz)

We contact to the transferring hospital to receive consulting services and they decide the composition of the transporting team. We provide information on the health status of a newborn, whether it is stable or not, they decide a neonatologist or a neonatal nurse would be part of a transporting team. (Neonatologist, 4.3.5.2.12, IDI, marz)

…The snow was too high and it was impossible for the reanimobile to reach us. We have had cases when the reanimobile was already in the nearby city *and they transported both the patient from there and from our center at once. In one case we had three babies… all three were taken.* (Neonatologist, 4.3.5.2.9, IDI, marz)

Weather conditions sometimes create challenges for the transfer... For example, it happens that roads are closed due to the harsh weather conditions… it also happened that transfer at the particular time was not possible as other transfers were performed simultaneously. (Neonatologist, 4.3.5.2.12, IDI, marz)

4.3.6 Donor projects on neonatal care in Armenia since 2010

4.3.6.1 Content and coverage of the projects

The study team conducted IDIs with representatives of donor agencies involved in projects aimed at strengthening neonatal services in Armenia during the last five years. Particularly, representatives from USAID, AANM, VivaCell-MTS, BirthLink and AECP were interviewed and provided written information on their activities whenever available. Also, the needed information was gathered from WV Armenia and World Bank via written communication. All the participants reported that their organizations conducted some kind of needs assessment (on national or local level) before undertaking particular initiatives to strengthen neonatal services in Armenia. As detailed in chapter 2.4 of this report, the projects curried out by the listed agencies included wide range of activities. These included developing quality standards and guidelines for neonatal care (AANM, USAID, AECP), including standards for ensuring the continuity of care and implementing family centered neonatal care with psychological support to parents (USAID/ AANM), conducting provider trainings locally (AANM, USAID, UNICEF, VivaCell/BirthLink, AECP, WV Armenia) and abroad (AECP), establishing a telemedicine service in "Muratsan" hospital to provide 7/24 consulting services to neonatologists countrywide and ensuring the technical support for the system (USAID/AANM), establishing neonatal retinopathy screening centers (AECP) and a center for prevention of childhood blindness (AECP, USAID), introducing non-invasive respiratory support and high flow therapy in Armenia and supporting neonatal research (VivaCell/BirthLink), provision, installation and repair of equipment for neonatal care (VivaCell/BirthLink, AECP, USAID, WV, WB), and renovation of neonatal units in some hospitals (WB). The projects conducted by some of these organizations (VivaCell/BirthLink, AANM/USAID) have achieved an impressive coverage of neonatal services throughout Armenia and, according to both donor agency representatives and participating neonatologists, contributed a lot to the recent achievements in the field. When asked about projects carried out since 2010 by donor organizations in the field of neonatal care in Armenia, the responses of neonatologists were quite similar. The above-mentioned donor organizations along with the MOH and the Department of Neonatology of the YSMU were repeatedly mentioned by almost all neonatologists as having the major impact in the field. The impact of the AANM in the field was particularly appreciated by the participants as a successful replication of a western-type model

for achieving advances in a particular field of medicine. Some of the participating physicians mentioned other organizations as well that carried out some smaller-scale projects. These included Church of Jesus Christ of Latter-day Saints, SlavMed, Grand Holding, and the Armenian Software organization.

...In the last almost 20 years the government has not provided our maternity units with anything. This was done within the framework of various charity programs. You may be aware of the VivaCell program, which was done together with BirthLink. This program allowed saturating many [neonatal] *departments,* [including] *the regional departments with good equipment.* (Policy maker/expert, 4.3.6.1.1, IDI, Yerevan)

…We conducted several projects with UNICEF, Latter-day Saints program which were training and guidelines development projects, but of course they were small-scale programs not like the one we started in 2015. …The [current] *project has different components: structural or procedural changes in facilities are also included in this project. …The ongoing projects are the development of standards, FCNC* [family centered newborn care], *engineering services* [repairing out-of-order equipment in neonatal units] *and 7/24 format* [for telemedicine]*... One more thing is on the process... ensuring care effectiveness and continuity between the gynecologists, neonatologists and pediatricians...* (Donor, 4.3.6.1.2, IDI, Yerevan)

We did actually include all neonatal maternity departments in Yerevan and most of the regions - we just did not quite finish, but basically over 8 years we went through all. …We started with the level 3 units in Yerevan, and then we went over to the level 2 units. We did Yerevan over the first couple of years, and then we extended out into the provinces. And we covered about all regions. (Donor, 4.3.6.1.3, IDI, Yerevan)

…We implemented 7/24 hot line which is for all of Armenia and is provided to all facilities that offer neonatal services... 36 of them received free of charge Internet and telephone connections. We distributed them [neonatologists] *tablets so that they could contact, show a newborn and receive all the necessary consultation whenever needed. …They contact Muratsan and there are four physicians, who are responsible for the hot line and they are available for 24 hours.* (Donor, 4.3.6.1.2, IDI, Yerevan)

The main components of the program include the improvement of the quality of neonatal services, the development of competencies among the neonatal staff and the promotion of the AANM and other organizations focused on the field of newborn and mother care provision. This approach as an international model is accepted overseas where specialized associations with licenses perform similar tasks, unlike in our country where everything is performed at the level of the government. (Neonatologist, 4.3.6.1.4, IDI, Yerevan)

The guidelines were developed for 1st, 2nd, and 3rd level maternities... We have 24 protocols which were approved by the Government and currently they are official guidelines... After that separately for the 3rd level, 27 guidelines were developed. …The project also developed neonatal care standards collaboratively with the MOH... About 96 standards were developed… (Donor, 4.3.6.1.2, IDI, Yerevan)

Based on the [developed] *protocols, trainings were conducted in all 1st and 2nd level maternities of Armenia. …Those trainings were for* [providers from] *53 maternities in all the marzes and almost 700 providers were trained including neonatologists, anesthesiologists, gynecologists, nurses, etc... Those were trainings with credits. We also conducted trainings for the 3rd level facilities based on the protocols that were not officially approved, but the trainings were approved and performed in Yerevan for ~125 specialists from all 3rd level maternities.* (Donor, 4.3.6.1.2, IDI, Yerevan)

We implemented the project from 2012 until 15 August 2015 and perhaps we started since 2010. So, since 2010 the Armenian Eye Care Project within the USAID project has carried out the retinopathy screening for premature infants. It was implemented in all health care facilities of Yerevan that had NICUs. After that, we had implemented a new program since 2012 as a continuation of the former project with the USAID support for creating the Center of Excellence for Prevention of Childhood Blindness and conducting training courses. …For this purpose, it was necessary to establish a center that we did in the Republic Institute of Reproductive Health, Perinatology, Obstetrics and Gynecology. One floor was devoted to the AECP implementation where the department was equipped with modern devices. We then started the training courses for our surgeons because in this context the level was different. (Donor, 4.3.6.1.5, IDI, Yerevan)

We have psychological consultations for parents which are also very effective and almost 400 parents passed there trainings... also the nurses and physicians pass those trainings, because they are under stressful conditions and they need relaxation too... (Donor, 4.3.6.1.2, IDI, Yerevan)

Also, we provide services that generally improve the delivered neonatal care including the training courses [for providers] *as well as the replacement of air and oxygen supply systems* [in two NICUs – RHPOGC and "Muratsan"] *and the provision of devices and equipment to NICUs.* (Donor, 4.3.6.1.5, IDI, Yerevan)

Training courses on resuscitation were organized by the Church of Jesus Christ of Latter-day Saints. They organized courses very well and provided us with three resuscitation bags which are very good and we use them until now, they help us very much to organize our work activities. Other organizations provided equipment to our hospital. Training courses were conducted by the MOH, UN and UNICEF. Several times the Association of Neonatal Medicine conducted training

courses with nurses. (Neonatologist, 4.3.6.1.6, IDI, marz)

The largest investment was made by VivaCell MTC… Besides that, smaller investments over the years have been made by the "Armenian Software" organization… Also, Grand Holding has made huge investments during this year… Different hospitals invested in the units through their own financial resources. Significant financial investment was made by SlavMed, which is private, but has an important role in the improvement of the neonatal services. (Policy maker/expert, 4.3.6.1.7, IDI, Yerevan)

4.3.6.2 Monitoring and effectiveness of the projects

All donor organizations conducted some monitoring activities to assess the effectiveness of their projects and generally they were satisfied with the results. The monitoring carried out by some donor organizations was in a form of supervisory visits to check if the medical personnel received the necessary training materials, if they were satisfied with the training courses and more importantly if they used the newly obtained knowledge and skills in their practice. Some organizations made visits to facilities to see if the personnel used the equipment they have received from that organization. One of the donors applied different monitoring approach – they generated monthly reports with relevant statistics from the participating doctors and then they developed specific software and entered the entire medical information on their newborn beneficiaries into this software accessible for both providers and patients, and conducted patient satisfaction surveys.

The program made supervisory visits… we were checking the way the physicians were using the knowledge they received during the training courses... There were almost 50 supervision visits...We did that with the help of tests... So far we do not have the summary of their results... (Donor, 4.3.6.2.1, IDI, Yerevan)

The program supervisor also conducts monitoring measures and I attend by myself… I see doctors and try to understand the impact of the program on them, whether they participated in training courses or not, or received the materials, and in general, their opinion about the program. (Neonatologist, 4.3.6.2.2, IDI, Yerevan)

We have a database, software on children with retinal atrophy that we have developed by ourselves. …This software allows collecting the entire information regarding the children with [retinal] *atrophy in one place with their pictures, RetCam images, all recordings about children.*

The software is cloud based so that we and our physicians could access it from anywhere. The data could also be accessible for patients. We also used reporting forms as part of the monitoring activities. Before developing the software, we had monthly reports sent by our retinal specialists. …We also have patient satisfaction surveys that were used to assess performed work activities… (Donor, 4.3.6.2.3, IDI, Yerevan)

The study participants were uniform in their opinion that the various donor projects in the field of neonatology were effective and very helpful in developing the field. As one neonatologist from the marz put it, they were "a salvation". The monitoring activities revealed a number of positive changes, such as improved knowledge and better communication between providers as they "started to speak in the same language", hence better collaboration between different hospitals, which in its turn contributed to better organization of newborns' transfers. Also, the case management of critically ill neonates considerably improved in regional facilities due to on-site trainings and 7/24 telemedicine service. The main concern expressed by several participants was the limited sustainability of the projects, as they afraid that with the completion of these projects their impact will gradually diminish and the unaddressed needs in the neonatal services will emerge again. There were some lessons learned from the monitoring. For example, that provider trainings organized in clinical settings are more effective than theoretical trainings conducted outside of the working atmosphere; that hospitals receiving the same aid differ in the pace of advancement, with some developing faster than others due to reasons that the donor organization preferred not to share because of confidentiality considerations; that to be effective and efficient in one's undertakings, one should have a clear picture of the baseline situation in the field, so that most crucial needs in each setting in terms of both equipment and provider knowledge/skills are figured out from the beginning to avoid repetitions and duplication of efforts. Importantly, almost all organizations implementing donor projects in the field of neonatology started their activities from needs assessment to make a better understanding of the existing needs in the field.

I should say that the general opinion [on trainings] *is positive because they receive necessary knowledge they need… They also indicated that doctors from Yerevan and regional hospitals are now speaking in the same language. For example, one of them said that when previously they called regarding an ill infant to ask something, they could not tell anything because they did not use certain terms or forgot those, but now the communication is more effective. Another*

important thing the neonatal staff indicated is the improved collaboration between them. …Moreover, the process of newborn referrals is easier to organize… Also, thanks to the 24/7 telemedicine service, the lives of many newborn infants were saved… (Neonatologist, 4.3.6.2.2, IDI, Yerevan)

...The newborns change their environment [after birth]. *They have to adapt to the outside world… These machines have helped us immensely. I do not know what they* [donor organizations] *have given to other regions, but to our region they have given...as far as I know Goris also has a CPAP and a High Frequency Ventilator. This is a salvation. It helps us a lot.* (Neonatologist, 4.3.6.2.4, IDI, marz)

We really saw a huge change [from providing equipment that enables delivering a neonate on respiratory support with the needed mixture of oxygen and air]*…So that was probably the biggest impact*. (Donor, 4.3.6.2.5, IDI, Yerevan)

Our training courses are practical so that [the knowledge that providers gain] *they can utilize in their practice. I mean we do not go to the 2nd level hospitals to teach the medical personnel to work with such equipment that they would not use in their practice. Rather we provide training courses that are relevant to the equipment and the volume of work they should perform…* (Neonatologist, 4.3.6.2.2, IDI, Yerevan)

…I can say – it [the USAID/AANM project] *was very successful – it should be considered more successful than any of the previous projects, because it lasted for 2-3 years and selected very serious targets. It tried to include as many people as possible, both doctors and nurses, and provided the opportunity to strengthen the association* [of neonatal medicine]. *A strong association is a good thing, because in normal countries associations are trusted more than official ministries…* (Policy maker/expert, 4.3.6.2.6, IDI, Yerevan)

For the training classes that we organized we were going there [to the facilities]... *So we were doing* [the trainings] *on the spot and it was very effective, because they were seeing the work they have done as well...* (Donor, 4.3.6.2.1, IDI, Yerevan)

We did the final monitoring in 2015 to assess what was being used and what was being used safely, etc. …Of course we are pleased with the results of the monitoring. But... ummm... some hospitals developed much faster than the rest. I mean it was down to individuals… (Donor, 4.3.6.2.5, IDI, Yerevan)

It [the USAID/AANM project] *is a very good project. We worked for two years, it was quite effective. They have had a great impact. I cannot imagine what will happen when these no longer exist. We will be in a very dire situation.* (Policy maker/expert, 4.3.6.2.7, IDI, Yerevan)

I think every program, which is working, is effective, sustainability is the only thing that remains. The programs should be continuous, for everything to be further developed and used. (Neonatologist, 4.3.6.2.8, IDI, marz)

We were very happy to meet with BirthLink, which first of all conducted research in Armenia to understand the problems at the local hospitals and identify means to show a holistic approach. BirthLinks's greatest investment at this point was that they conducted research, identified the issues and started training sessions, and conducted monitoring… (Donor, 4.3.6.2.9, IDI, Yerevan)

We started this project with assessment which was like a tool for us to receive information so that we know how we could adapt and give more benefit [to the facilities] *and the assessment was conducted with them* [with the facilities]. *The assessment included different aspects of neonatal services and various organizational issues... how the neonatal services are organized in those maternities etc...Also we conducted an assessment on available equipment…* (Donor, 4.3.6.2.1, IDI, Yerevan)

So we were addressing the equipment by looking at what every hospital needed to deliver essential care, in particular – in the regions – immediate care after birth, when there are complications and premature birth. So equipment that would actually allow stabilizing babies before transferring to Yerevan, or to another level 3 unit. (Donor, 4.3.6.2.5, IDI, Yerevan)

This process has been successful, because when VivaCell MTC started to make large investments, I mean the process was conducted in an organized way and I knew exactly what the facilities received from different programs, like in case of the World Bank. This is why facilities did not receive the same thing twice. Also the current chief neonatologist is also the vice president of the AANM, and we already know what to ask for the facilities to avoid receiving things twice, starting from training session, to equipment. (Policy maker/expert, 4.3.6.2.10, IDI, Yerevan)

The majority of neonatologists greatly appreciated the activities undertaken by donor and professional organizations. Generally, they demonstrated positive attitude towards the changes that occurred in the field of neonatology in Armenia during the past decade. They attributed these changes to the various activities conducted in the field: provision of new equipment, organization of trainings, establishing new communication systems, etc. One participant explained further that these advancements have helped to decrease neonatal mortality, which was a problem in the past.

In the last 10-15 years there is enormous progress within the country in organizing the treatment and intensive care efforts for newborns… It is because of bringing new equipment, new projects that are related to the rooming-in of the newborn and the mother, breastfeeding, immediate attachment to the breast after birth... I think all of this took place in all the regions. (Neonatologist, 4.3.6.2.4, IDI, marz)

If I compare my whole work starting from the Soviet Union until today, I can say that I work in Paradise… those [new equipment, consultations with specialists, etc] are excellent things for us. That is why I am saying that we are in Paradise. (Neonatologist, 4.3.6.2.11, IDI, marz)

The situation has been amply improved in comparison to the past. I could not complain. At least, previously we had several cases of deaths annually and sometimes we could not even identify the causes of deaths, but now it happens that we do not have any cases of deaths at all in a year... We appreciate the performed initiatives as we witness sufficient advancements in the field… Over time, as more attention has been paid to the provision of neonatal services, we have witnessed satisfactory advances in the field. (Neonatologist, 4.3.6.2.12, IDI, marz)

…When we participate in training courses, attendees from all hospitals indicate about the support provided to them. We feel the support of the MOH and the Armenian Association of Neonatal Medicine who seem to work well. More attention is being paid to the management of newborn diseases, utilization of equipment, improvement of staff qualification levels, and so on. When I started my career here, I remember that the setting did not have appropriate equipment... at least currently I see substantial [positive] *changes compared with the past years.* (Neonatologist, 4.3.6.2.12, IDI, marz)

4.3.6.3 Problems and barriers encountered during the projects

One of the concerns shared by a representative of a donor organization was connected with the sustainability of their activities after completion of the project. They currently provide financial and managerial support to AANM to implement a wide range of very important activities. After the completion of the project, AANM might be unable to sustain its activities because of discontinuation of the support they receive. To be able to function independently, the association decided to prepare some of its members for managerial work via trainings in financial management, program supervision, and human relations. However, the financial support of the Association after the end of the donor program remains a major issue. Another issue raised by this IDI participant was the lack of strong civil society organizations in the health care sector.

Some organizational barriers for a donor project implementation were also pointed out. For example, a representative of the AECP noted that they face some delays in training of doctors from two cities to establish ROP screening centers in those cities, as the local health authorities have not yet identified the doctors to be trained. The implementation of family centered care in maternities and NICUs was also problematic because of some organizational, structural and cultural barriers. In particular, an IDI participant noted that the medical personnel were reluctant to allow fathers to be alongside with their newborns even when the newborns were healthy. For mothers such limitations exist if the newborn is in NICU. The justification for these restrictions by medical personnel include the limited space in NICUs because of the structural specifics of the setting and/or over-crowding, the avoidance of performing medical procedures in the presence of mothers, the reluctance of allowing mothers to be present near a dying newborn, the considerations of hygiene, etc.

Another issue raised by an IDI participant was the difference in competencies of nurses working in NICUs versus those working in other neonatal departments. She also noted that nurses in Armenia have no sufficient background knowledge to be able to obtain from the trainings the whole dept of the knowledge and skills that are standard requirements for their counterparts in the USA. Two participants raised a concern related to difficulties the older generation of doctors faced in using new electronic devices. For this reason, the telemedicine service was not used in its full potential in some settings, where doctors either were not fluent in using those devices or they were reluctant in "bothering" the consultants with their questions.

…When the [USIAD] *program ends up, they* [AANM] *will remain without financial support and a problem arises who should perform their activities later-on. The Association decided to involve some neonatologists in the program management... Some of them took courses on financial management, program supervision, human relations in order to be able to cope with situations by their own… I agree that in some fields of Armenia we have sufficiently strong civil society but this movement is very weak in the health care sector. There are many registered associations but few of them did continuous work and few could manage provided financial resources effectively.* (Neonatologist, 4.3.6.3.1, IDI, Yerevan)

Our pediatric surgeons that have already become retinal surgeons trained specialists from Gyumri and Goris. …The initial idea was that such services [ROP screening centers] *should be available not only in Yerevan but also in Kapan, Lori and Gyumri. We do not have any issues in Gyumri as they have worked for two years very well. Regarding Kapan and Lori, …we are ready*

to train the specialists, but regional health departments should select them so that we could train them. (Donor, 4.3.6.3.2, IDI, Yerevan)

In the hospitals it is easier when the mother approaches the baby but for a father there might be many obstacles in different facilities... This refers all the newborns including those in the intensive care units and healthy ones… After having a discussion with a physician it became clear that this is a blank space always... especially in NICUs… where the newborns are severely ill, it is impossible to assure mothers' presence for 24 hours, because when there are many newborns in one room, there are procedures that mothers cannot gather there, stay or when something happens to a baby... of course, the mother can approach but often the physicians feel better when they are alone [laughing], *although this is a questionable approach and the parent must always be able to see the newborn.* (Donor, 4.3.6.3.3, IDI, Yerevan)

You should also take into account the difference between neonatal nurses who work outside or inside the NICU. Along with this, there are also other problems. If we take all courses for the nurses in the USA, there are topics for our nurses that are still difficult for them to understand depending on what quality education they received in their [local] *education settings…* (Donor, 4.3.6.3.2, IDI, Yerevan)

However, my personal observations indicate that not every physician is ready to utilize this practice with tablets [telemedicine]. Even they could do this procedure with their mobile phones but it will be costly unlike the wireless tablets that are free of charge… (Neonatologist, 4.3.6.3.1, IDI, Yerevan)

Regarding the tablets, 7/24 format…you know it is very interesting. When we invested that system we saw that there are active and passive places. When we ask the passive ones "why you are so passive?" they say, "We feel uncomfortable to bother them"... we say "do not feel uncomfortable, they are the project participants and that is their work and they must do that"... That cultural change also must be done so that they understand that it is implemented like that, and it is their responsibility to contact… (Donor, 4.3.6.3.3, IDI, Yerevan)

4.3.6.4 Future projects by the donors

Two donor agency representatives mentioned that most probably they are not going to have future projects in the field of neonatal care in Armenia because of the lack of financial means. One of them claimed that the previous projects were more expensive than planned initially. The other one stated that their budget has been shortened. One of the donors stated that they are thinking about starting new projects in the field but nothing specific could be formulated so far

on these plans. Another donor stated that they will continue their projects in this field concentrating on physicians' trainings and introduction of advanced robotics. A key informant raised an issue concerning the sustainability of the successful projects, like the USAID/AANM project, which should not discontinue as its completion will leave a big gap in the field.

Probably not [whether they will have future projects in the field of neonatal care in Armenia]. *A huge amount of money went into this program* [P1 agrees]. *Nearly a million pounds. So it is difficult finding funding at the moment… I mean we were so lucky to have VivaCell support this. And I think it's actually had a big impact… I have no doubt. We weren't planning on having such a big project here… It wasn't in the plans at the beginning* [P1 agrees]. (Donor, 4.3.6.4.1, IDI, Yerevan)

I do not think so [implementing future projects in the field of neonatal care], *because we will distribute the equipment and our funds have been shortened, excluding the health sector at all. If we look at the programs at Europe-Asia continent, Armenia and Ukraine are the only ones that implement health programs. One year later, we might not have health component at all because we do not have new financing yet.* (Donor, 4.3.6.3.2, IDI, Yerevan)

You know we just started working on them [future projects] *but they are so raw that I cannot even say that...* (Donor, 4.3.6.3.3, IDI, Yerevan)

We will continue our work activities with neonatologists and neonatal nurses with respect to finalizing the component of training courses. We also would ensure the availability of some robotics in Armenia as well as the related training courses because we are talking about advanced robotics that could be supervised from the Children's Hospital Los Angeles. I mean here a virtual training would take place for our physicians as a part of our project activities... (Donor, 4.3.6.3.4, IDI, Yerevan)

It would be better if the AANM [project] *lasted longer, as they will finish soon and not continue. It should be continuous… that is the problem.* (Policy maker/expert, 4.3.6.3.5, IDI, Yerevan)

4.3.7 Outpatient neonatal care

4.3.7.1 Ensuring continuity of newborns' care

<u>*Getting notified:*</u> According to the respondents, babies are usually discharged from the maternity within 1-5 days (mainly on the 3rd day) of life if the baby does not have any health issues requiring a longer stay in the hospital. As pediatricians noted, once a baby is born, they

immediately receive a notification about it through the reverse paper which parents or grandparents bring from the maternity (one part of this document remains at the polyclinic and the other is sent back to the maternity). Moreover, a respondent stated that there is a pregnancy visit before the child's birth through which they are informed about the expected birth, and another participant stated that they know very well the population they serve and who, when and where is going to give birth. All the respondents mentioned that they get aware about the birth of a newborn with no delays. A physician mentioned that the newborn will not be discharged from the maternity hospital until the staff receives the part of the reverse paper to make sure that the pediatrician is informed about the infant, so that the latter will be under medical attention after the discharge. The participants told that in some rare cases they might be notified about the baby's birth later than usual. This happens, for instance, when the mother gives birth in another maternity hospital and, after discharge, stays for 1-2 months in the residency place of her parents in another area.

On the 3rd-4th day [a healthy newborn is discharged from the maternity hospital]. (Pediatrician, 4.3.7.1.1, FGD, marz)

During 3-5th days... It depends on the baby. If the bilirubin levels are high, they [the maternity staff] *won't discharge them very soon.* (Pediatrician, 4.3.7.1.2, FGD, marz)

During days 1st to 3rd. It is usually the third day and staying longer than that is very rare. The baby may be discharged later, let's say in the case of C-section deliveries, when there is a problem with the mother. But we have a special reporting system for those babies that are discharged late. [Turns to colleagues] *Remember? Why they are discharged at a later date...* (Pediatrician, 4.3.7.1.3, FGD, Yerevan)

No I have not had such cases [cases of late notification about the baby's birth] *I do not know about the regions, but in the capital we are informed on time. And also, in my case for example, I live in the same district, and so does my nurse. So we all know who is going to give birth, where, when and also when they will return.* (Pediatrician, 4.3.7.1.2, FGD, marz)

Before the first home visit, there is a pregnancy visit through which we are informed of an expected newborn and the approximate time of delivery. But final information on child birth is acquired from the reverse paper. If the newborn has had health complications and has been referred to Yerevan from the local maternity unit and stayed there for 1-2 months, obviously we will not see that baby for several months. (Pediatrician, 4.3.7.1.4, FGD, marz)

There is a special information form [reversed paper] *on a newborn. The parents – the mother, father or grandmother – bring these to the local polyclinic from the maternity hospital. The doctor gets informed, makes a note that he/she is aware of the birth of the newborn and has included the baby in the list of the children he/she serves and sends the reverse paper to the maternity hospital**.** It is possible that they* [parents] *do not bring the form to register the newborn. They wait and say, "We knew that you would come".* (Pediatrician, 4.3.7.1.3, FGD, Yerevan)

…If parents do not return the second part of the reverse paper that we provide to them, the discharge from the maternity unit will not be organized. When after the delivery the mother and the baby do not immediately return to their place of residence, the notification that the baby is born might reach us a little bit late. As I already mentioned, in some cases mothers prefer to live at their own birthplace [parental house] post-delivery, until the baby is around 40 days – two months old. (Pediatrician, 4.3.7.1.5, FGD, marz)

*Immediately after delivery we are notified that a baby has been born. On the same day. We are notified immediately without any delays**.** I am the person who registers the information on newborns. Parents come with a reverse paper. We send one part of this paper back.* (Pediatrician, 4.3.7.1.6, FGD, marz)

Exchange cards: The majority of pediatricians were satisfied with the quality of completion of newborn's exchange cards that they receive from maternity hospitals. They stated that the cards contain all the necessary information on newborn's health parameters, vaccination, and other performed manipulations. However, a few participants stated that the cards are completed very poorly. Sometimes the maternity personnel even misreport the gender or the weight of newborns.

*All screening information is written down, the baby's weight, the procedures performed during the delivery process, etc**.** The exchange cards are appropriately being filled. Information on vaccinations is completely and fully available.* (Pediatrician, 4.3.7.1.6, FGD, marz)

The exchange cards are filled in normally… (Pediatrician, 4.3.7.1.7, FGD, marz)

I have had very rare cases [of incomplete exchange cards]. *For example, they had forgotten to fill in the BCG vaccine series. Such omissions happen, but in general they fill it up as it should be done.* (Pediatrician, 4.3.7.1.8, FGD, Yerevan)

No, it is not complete [the information written in exchange cards]. *A few days ago I had a case, where they had filled the form up for a baby boy and had written girl. Or the other way around. They come to the polyclinic and then we find out this person has had a boy and not a girl**.** It*

happens very often. It happens a lot that while weighting the baby, the parent looks at the newborn's exchange card with surprise and says, "My baby's weight has been incorrectly recorded here". So yes, such things do happen. (Pediatrician, 4.3.7.1.3, FGD, Yerevan)

First home visits: It is well-known that the first home visits made by pediatricians are very important to ensure the continuity of newborn's care. However, the answers to the question on when the first and subsequent home visits for newborns are conducted were somewhat inconsistent. Some of the pediatricians stated that the first visit is on the 3rd day of life, while others – at the end of the first week. Concerning the second visit, again, the majority stated that it is conducted on the 15th day of life, while one participant stated that it is conducted on the 7th day. There was no uniformity concerning the number of home visits to be made to a healthy newborn either. Some participants stated that the current standard requires two home visits, while one doctor stated that a third visit is also made at one month of age. Thereafter, starting from 1.5 months, mothers bring their babies to the primary healthcare facilities for vaccinations. Participants also noted that the above-mentioned schedule refers to the visits to a healthy newborn, but when a child has health problems then doctor (in some cases together with the nurse) visits the child more frequently, even though no state funding is allocated for these additional visits.

Pediatricians from marzes confessed than often they do not manage to keep the schedule of home visits to newborns in rural areas because of the lack of transportation allocated for that. Therefore, often the village nurse makes the first visit without the doctor and asks the physician to come and check the baby if there are some problems. Or the pediatrician asks the parents to come and take him/her to the newborn. One physician even stated that they ask parents to bring the child to the ambulatory right after the discharge from the maternity, before getting home. In general, lack of transportation for home visits is a painful issue, especially in rural areas. Because of this, both the pediatricians and the nurses often have to visit the baby through their own means. Also, they try to visit several newborns from the same village when they go there, which is not always in line with the required timeline for making visits to newborns. Or, simply, nurses go instead of them.

The physician and the nurse visit the baby on the 3rd and 7th days. (Pediatrician, 4.3.7.1.9, FGD, marz)

The first visit is performed together with the nurse. This has to be done within the first 3 days of life [discharge from maternity?]. *If it is later, an explanatory form must be written. The next home visit is conducted on the 15th day and then at one month old. Starting from 1.5 months they bring them in* [to the primary healthcare facility] *for vaccinations.* (Pediatrician, 4.3.7.1.10, FGD, Yerevan)

We visit two times. Based on the [current] *standard, we conduct the first visit at the end of the first week, and go for the second visit within the first 15 days of life. There is also another thing which is probably a fault on our side; we do not manage to visit the babies registered at rural medical points with this frequency. We* [physicians] *do not manage to visit the baby within the first 7 days (there is a permissible range for physicians to visit lately), thus the* [rural] *nurses initially go for the first visits (the one that should be conducted together with the physicians). In case of the need, additional visits are assigned for the physicians. Thus there are no problems in this aspect.* (Pediatrician, 4.3.7.1.5, FGD, marz)

The first home visit is conducted during the first three days. Physicians call and make an appointment for the visit. Honestly speaking we have transportation issues related to conducting these home visits, because in most cases we don't have cars provided for this purpose. We try to arrange with parents, ask them to come and take us by taxi. There is no formal means of transportation allocated for the home visits. Parents residing in villages organize our transportation by coming and taking us to their homes. We try to adjust our several visits in the same villages. (Pediatrician, 4.3.7.1.6, FGD, marz)

In case of necessity [when parents call], *we make home visits even more frequently. It's not like if two visits are allocated, then we go only twice.* (Pediatrician, 4.3.7.1.11, FGD, marz)

We never close our doors to anybody. The government pays us for [healthy child] *checkups at 1.5, 3, 6, 9 and 12 months, but if a mother has issues when her baby is 2 months old, of course we are not going to ignore them. They bring them... We go to them... whatever is necessary. Well, issues are different…. We are talking about home-visits for healthy babies. Of course, when there are any problems, they* [parents] *place calls and you cannot say, "the government only requires that I visit once".* (Pediatrician, 4.3.7.1.8, FGD, Yerevan)

There is another method we have developed to organize the first visits of babies residing in villages. When parents first show up at the policlinic to bring us the reverse paper, we check whether or not they can bring their babies to the policlinic for this first checkup, before going home. Some parents reply that they will organize our transportation to the village. The only problem is related to the organizational difficulty associated with that first visit. Nurses organize

the second visits on their own, as again there is no car provided for them. Nurses have special measurement scales provided by UNICEF, and during the visits within the first 15 days they use these. Weighting the babies is mandatory, as we must understand whether or not the baby has gained any weight. (Pediatrician, 4.3.7.1.6, FGD, marz)

According to pediatricians from various FGDs, when visiting a newborn for the first time, they check both the health of the baby and the socioeconomic conditions of the family. Most of the participants noted that during the first visit they perform the required screenings, check to see if breastfeeding is conducted correctly, what the mother's attitude is towards the baby, whether there are danger signs in baby. They also check the presence of jaundice, measure baby's weight, height, and head circumference, check fontanels, umbilical cord stump, and observe the skin.

Physicians observe whether the breastfeeding is performed correctly, check the condition of the umbilical cord, the newborns general development, the weight, etc. They also observe the color [check for jaundice] *and conduct all other screenings that should be performed… When visiting a newborn for the first time we check for danger signs as well.* (Pediatrician, 4.3.7.1.2, FGD, marz)

In short, during the first visit physicians should observe both health and socioeconomic conditions. (Pediatrician, 4.3.7.1.5, FGD, marz)

When visiting a newborn for the first time we measure the weight, height and head circumference. We also assess the process of breastfeeding and the general environment [in the baby's room]. (Pediatrician, 4.3.7.1.9, FGD, marz)

Firstly, we assess the general atmosphere related to the baby, whether or not the family was ready to have a baby, if the baby was wanted and is loved, etc. We have a special section in the medical card where we have to fill in information on how the family behaves with the baby during our home visit. During this visit we also pay close attention to the relationship between the mother and her baby, maternal skills… (Pediatrician, 4.3.7.1.1, FGD, marz)

<u>*Newborn vaccinations:*</u> Pediatricians were asked whether there are issues with vaccinations (BCG and Hepatitis B vaccine) that the neonates should receive in maternity hospitals. A few of them stated that there are parents who do not allow vaccinating their babies against Hepatitis B either because they afraid complications or because maternity hospital physicians themselves advise parents to refuse this vaccination, while asking them to keep this in secret. Some of the physicians claimed that even when they persuade such parents to allow vaccinating their children

against Hepatitis B later-on (as if the first dose of the Hepatitis B vaccine is not provided during the first 24 hours of life, it can be still administered within the first 15 days of life), they live in stress for several days, as parents will blame them if any complication occurs. On the other hand, even if parents have refused the vaccination themselves, this does not guarantee that the physician will not be brought to trial if the child gets infected with the vaccine-preventable disease. A respondent also claimed that when parents refuse Hepatitis B vaccination, they do not try to convince them a lot, because in any case, starting from 1.5 months, the baby will receive the three sequent doses of multi-vaccine which also contain the Hepatitis B vaccine.

*Usually if the newborns do not have contraindications, parents do not refuse to vaccinate neonates. In very rare cases parents refuse to vaccinate against Hepatitis B***.** *In any case, in the future the baby will receive their 3 doses of vaccination, which also includes the Hepatitis B vaccine. One of the doses is provided at 1.5 months old, which is why we do not insist a lot. On the 19th* [of this month] *we participated in an immunization program, where we learned that if for some reasons that vaccination* [the Hepatitis B vaccination] *is not performed during the first 24 hours (because of contraindications, etc.), the baby can still be vaccinated before the first 15 days of life. If not, anyway starting from 1.5 months the baby will be receiving its Hepatitis B doses.* (Pediatrician, 4.3.7.1.5, FGD, marz)

There are some doctors, who advise parents not to vaccinate right from the maternity hospital. They tell the mothers: "do not tell anybody that we told you, but it is better if you do not let them do the Hepatitis vaccination". The baby comes from them to us [to PHC providers], *right? I ask the parents to please tell me which doctor has said such a thing to them, but naturally they never give out any names.* (Pediatrician, 4.3.7.1.3, FGD, Yerevan)

When they [parents] *refuse* [to vaccinate the baby] *they say it is the parents' right, but that does not save a doctor in court*. (Pediatrician, 4.3.7.1.8, FGD, Yerevan)

There are many people who refuse. Those refusing are mainly from religion sects - that is for sure -, and also if they have heard things. …If you only knew how much we suffer - trying to explain to the parents at the cost of our health how bad the outcome of not being vaccinated can be. But even if they vaccinate, they turn to the doctor and say, "you have convinced me, so you are responsible for everything". So this doctor is then in a state of stress for the next 3 days because of this. (Pediatrician, 4.3.7.1.3, FGD, Yerevan)

There are also many doctors, who refuse to vaccinate [their own children with Hepatitis B vaccine]*… The doctors themselves*. (Pediatrician, 4.3.7.1.10, FGD, Yerevan)

4.3.7.2 Maternal knowledge on newborn care and feeding

The participants from the regions stated that they have schools for mothers, where pregnant women learn about child care before giving birth. Overall, they appreciated the role of these schools in educating future mothers and thus contributing to the health of future babies. However, a key informant stated that these schools are "semi-functional", as they don't provide the whole dept of the knowledge the future mothers need to possess. A few neonatologists suggested that women consultations distribute brochures among pregnant women on child care and feeding, so that they come to maternity hospitals already aware of these issues. Another issue raised by a key informant was that couples should be educated on the importance of passing preconception screening before getting pregnant, as this may have a great impact on the health of their future baby. A few participants mentioned that there is a positive relation between mothers' awareness on child care and their children's health. However, they mentioned that women usually learn nothing on child care and feeding during their short stay at maternity hospital, though at discharge they receive child's health passport that contains some important information on infant health and care. This contradicted with the opinion of neonatologists from regions, who mentioned that they discharge women from the maternity after teaching them how to feed and take care of their child and making sure that they learned these issues. Nevertheless, according to several PHC providers, most mothers are very ignorant, and even when physicians explain to them how to take care of the babies or give that information in a written form, still they do not understand how to do that and eventually end up with coming to the polyclinic or calling and asking again and again. From the words of a few pediatricians, mothers often use the Internet or TV as a source of information on child care. However, even in this era of "technical progress", when the Internet and TV are available, many mothers still have poor knowledge of childcare. Moreover, during one of the FGDs, all participants unanimously agreed that, in fact, it is more problematic when you have an ignorant woman reading things on the Internet, because they then no longer listen to anything the doctor says. This same issue was also raised by pediatricians in other FGDs. Yet, they enjoy the occasional wise and aware women who quickly grasp the information they receive, have a good knowledge on the issue and are prepared for the arrival of their baby beforehand. Some of the participants noted that the current requirement of serving too many children leaves no time for a pediatrician for educating mothers and providing services of a needed quality.

*During the regular pregnancy check-ups when mothers visit gynecologists, they also participate in the training programs held at the mothers' schools; here they are provided with educational materials. So, even before the delivery mothers are completely educated on all the relevant topics***.** (Pediatrician, 4.3.7.2.1, FGD, marz)

There are mothers' schools, where pregnant women receive training and become aware on child care prior to having their baby. In general, women try to get informed through the Internet rather than their physicians… (Pediatrician, 4.3.7.2.2, FGD, marz)

We need large-scale awareness campaigns for the parents. Starting from women's consultation... We have something called "mothers' school", which are semi-functional structures. Supposedly pregnant women must be educated in these schools so that they know what to do after their baby is born. Unfortunately, even though this is a very good idea and these schools already exist, they either function very poorly, or almost don't function at all. (Policy maker/expert, 4.3.7.2.3, IDI, Yerevan)

The maternity units provide health passports where all the information on child care is filled in. (Pediatrician, 4.3.7.2.4, FGD, marz)

...The mother takes care of the child in our presence – puts on his clothes, changes diapers, puts the baby on the tummy, etc,- we teach all this, then we discharge them. It's not like "take your child and go"...we do not discharge until we teach them. We never get tired of teaching. (Neonatologist, 4.3.7.2.5, IDI, marz)

Brochures on infant care and hygienic requirements [are necessary]. (Pediatrician, 4.3.7.2.6, FGD, Yerevan)

Pregnant women should have brochures to be prepared [for the arrival of the baby]. *They should be provided with brochures and then be referred to the maternities.* (Pediatrician, 4.3.7.2.7, FGD, Yerevan)

The awareness of the population is also important because there are many issues that should be considered before giving birth. It would be correct for parents to be subjected to certain medical analyses to identify any infections or health problems when the family is planning on having a baby; only after that should they prepare to become [parents]. *…Some preventive measures might be initiated, which could take a month … This approach is not applied in our country, resulting in the manifestation of infections during pregnancy which affect the health of the fetus.* (Donor, 4.3.7.2.8, IDI, Yerevan)

The percentage of mothers with poor knowledge is quite large. (Pediatrician, 4.3.7.2.9, FGD,

marz)

We encounter both good and bad cases but in general the awareness [of mothers] *is satisfactory …We have observed that the mothers' awareness influences their babies' health***.** *I can say one thing … despite the technological progress and the abundance of information sources through TV and the Internet, the majority of mothers are ignorant and aren't appropriately aware of their child's health. They understand with difficulty. Moreover, when an ignorant mother reads something on the Internet, this causes problems. Whenever we prescribe medication, we explain in detail the mode of its administration. But there are still some mothers who even after long explanations bring the bottle of medicine with them, put it on the table, and ask us to explain how to give it to the baby. We write it all down and give them written information, but they still call and ask us***.** (Pediatrician, 4.3.7.2.10, FGD, marz)

Oh dear, that is a painful area for us [mothers' awareness on child care]. *We teach them how to breastfeed, we give out brochures, explain correct nutrition to pregnant women... Absolutely nothing is done at the maternity hospital during the 1-2 days of mothers' stay there. Everything concerning the child's care falls on the shoulders of PHC providers... In some cases the woman comes from the maternity hospital without even knowing how to feed their baby and what food they must use. It may seem funny, but there are mothers who do not know how to use a thermometer. …But nowadays the Internet is available …it would be better if they looked up some information before having a baby. We get very happy when already prepared mothers visit us, when they already know everything... It amazes me. But unfortunately such mothers who do not need us to teach them something are very rare***.** (Pediatrician, 4.3.7.2.11, FGD, Yerevan)

We provide them with a significant amount of information: what they must do post-partum, how they must swaddle the baby, how they must feed... There are some mothers who have absolutely no maternal instinct... And then, if they actually do read a sentence, you end up in trouble there too. They no longer pay attention to anything you tell them. …It depends on mother's social level, her intellectual abilities. You might tell half of it [referring to the same information] *to somebody and she will immediately understand, while it may not help even if you explain to somebody else* [the same thing] *10 times.* (Pediatrician, 4.3.7.2.12, FGD, Yerevan)

*Mothers who are better informed rarely have problems. Moreover they are also aware of situations when they need to seek help from a physician***.** (Pediatrician, 4.3.7.2.13, FGD, marz)

You know, in the past they reduced the number of children served by pediatricians to about 400-500, so that the doctors could provide quality services to them. But now they say that if you do not have this many children, then you would not have a job, but in my opinion if you have that many, then the quality of your work suffers. (Pediatrician, 4.3.7.2.12, FGD, Yerevan)

4.3.7.3 Newborns' primary healthcare after discharge from maternity hospital

Care of umbilical cord stump at home: Most participants from different FGDs stated that at present the umbilical cord does not present the same problems compared to the past, as now they have very few cases of inflamed umbilical cords. Despite this, some participants still noted that currently the maternities discharge mothers and their babies very early, while in the past they would remain in the hospitals for 7 days. Because of this short stay, the umbilical cord stump does not dry and fall off before the child leaves the maternity, and therefore they often see babies with wet umbilical stumps. However, they considered the wet umbilical stump at 3-4 days of life natural thing, which does not lead to infections if appropriately managed.

For umbilical stump care, various physicians claimed using 70˚ alcohol solution, 0.9% salt-water ("physio-dose"), and/or hydrogen peroxide. Regarding the latter, a couple of participants were against using it, claiming that in case of using the hydrogen peroxide during bloody excretions from the umbilical stump, the hemorrhage will increase. Moreover, one of the pediatricians stated that spirit/alcohol, hydrogen peroxide, physio-dose are good for taking care of the umbilical stump as they completely help the stump to dry and fall. They went on to explain that in the past they would use streptocide, various ointments, furaciline, etc., which would create a layer over the actual wound, blocking off the air and not allowing it to dry and heal.

We do not have problems with umbilical cord stump. It was a long time ago when we were having inflamed umbilical stump cases that required specific care. (Pediatrician, 4.3.7.3.1, FGD, marz)

We do not have problems related to umbilical cord stump infections. (Pediatrician, 4.3.7.3.2, FGD, marz)

Well, the umbilical stump isn't that much of an issue... if it is dry and everything is normal, then it's not an issue for us. (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

Quite often they [newborns] *come* [home] *with wet umbilical cord stumps***.** (Pediatrician, 4.3.7.3.4, FGD, Yerevan)

The umbilical cord stump needs time to fall off…it dries in 7 days, but now the babies are discharged early and obviously during the 3-4 day hospital stay the umbilical cord stump does not dry up. (Pediatrician, 4.3.7.3.5, FGD, marz)

At present they treat it with 70% medical spirit. We also have a so called "physio-dose", which is 0.9% salt-water, and this is what they use at the maternities before discharging them. We continue treating it, but that differs according to the baby and the condition of the umbilical cord stump - there may be omphalitis, inflamed... so it depends on the diagnosis… When I was a new doctor, my nurse was an old nurse and they used to apply streptocide, various ointments, furaciline, etc. Then they realized that this creates a false layer and the stump underneath stays wet. So we only use liquids nowadays for stump treatment. The medical spirit, hydrogen peroxide, physio-dose are all liquids, which ensure that the bottom of the umbilical cord stump stays open and you can see what's happening and proceed accordingly. (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

When the babies are discharged from the maternity, their umbilical cord stump is dry. There might be 1-2 cases of blood excretion but it is only a matter of treatment with peroxide… I mean, to use peroxide to check if the baby feels pain in the umbilicus. (Pediatrician, 4.3.7.3.6, FGD, marz)

If you apply peroxide during bloody excretion the hemorrhage will increase. (Pediatrician, 4.3.7.3.1, FGD, marz)

We advise mothers to take care of the wound [umbilical cord stump] *and treat it with medical spirit. They* [physicians in the maternity unit] *tell that nothing needs to be done. Eventually the umbilical cord stump begins to smell bad, that is why it should be treated with spirit to prevent umbilical infections. However, even though the babies are discharged with their umbilical cord stump, there aren't any developed umbilical infections.* (Pediatrician, 4.3.7.3.5, FGD, marz)

<u>*Healthy newborn care (hygiene, skin care, open air):*</u> The participants from the FGD in Yerevan claimed that they recommend mothers to be outdoors with their babies as often as they can, bathe the baby every day, especially in the summer to prevent the development of infections. Although some respondents reported advising mothers to use soap and sometimes a solution of permanganate to prevent the development of microorganisms on the skin, there was one participant, who disagreed with the latter claiming that current literature does not suggest using these two. Two respondents also explained that Russian mothers bathe their babies before the doctor visits them first time unlike Armenian mothers and grandmothers who believe that the caseose layer protects the baby and it should not be washed off. A pediatrician from marz also stated that they advise to bathe babies, but overall, the FGD participants from marzes were reluctant in expressing their ideas on this matter… Regarding skin care, one participant noted

that they advise mothers not to use creams or powder when taking care of their babies. As for air bathing, one of the respondents mentioned that during summer they advise parents to take the baby out for 15 minutes at first and slowly increase this duration; in the winter they suggest taking the baby outdoors for 3-4 minutes at first and again gradually increase it.

We advise taking baths… (Pediatrician, 4.3.7.3.7, FGD, marz)

As soon as they come from the maternity hospital, I tell them that they must bath and wash the baby this week with soap, or permanganate to get the caseose layer off their body. After that [they need to] *bath them one day with soap, and the next day with plain water, because too much soap also cracks the skin and cracked skin creates optimal conditions for microorganisms to grow in. Without soap the mother just wets them and takes them out…We suggest a very mild solution of permanganate as well. I am not saying turn it into ink and place the baby in it. Just to disinfect the tub as well. After that they can rinse the tub out and then bathe the baby. If the skin does not have any problems, there aren't any pimples, or allergic reaction, etc., then they can just give them a regular bath***.** (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

*Soap is mainly not advised to newborns***.** *Both soap and permanganate are now removed from literature… Right now the weather outside is 40 degrees and you have a newborn. If this baby does not bathe every day... the skin also breaths and the skin pores must open up... this baby will just become covered in wounds.* (Pediatrician, 4.3.7.3.4, FGD, Yerevan)

When you go to a Russian [mother] *for the first home visit, they will already have bathed their baby after returning from the maternity hospital, had a shower themselves, and sat down for a meal. And they have no problems... I am saying this to address the bathing question that you had. Our mothers... the grandmothers say it is a protective layer and must not be touched…The maternities just put them in the water, make them wet and take them out.* (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

We advise not to use creams and powder [for skin care]. (Pediatrician, 4.3.7.3.8, FGD, marz)

The baby must be bathed and be taken outdoors every morning… from 10:00-12:00 in the morning. If they want the body to synthesize vitamin D, they have to take them outdoors every single day for 2 hours. I do not agree with completely opening them up, because they are still feeding on milk. If their tummy gets cold, diarrhea is instantly ready. I always like to have everything in proportion. In any case, my experience shows that the skin must be clean and the baby must be taken outdoors every day. I tell them to start with 3-4 minutes in winter and slowly increase the time. It is not necessary to do it this way in summer; they can just start with 15 minutes… (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

Support for breastfeeding: Most of the pediatricians from different FGDs mentioned that they always support breastfeeding rather than artificial feeding (using formula), advise mothers to feed the baby as many times as the baby demands. Yet, one of the participants from marzes stated that they recommend breastfeeding with overnight breaks. The participants reported observing mothers during breastfeeding to see if they are doing it correctly or not. From their words, if mothers breastfeed their babies in an incorrect position, they teach them how to do that correctly to avoid future problems with nipples. However, from the words of the participants it became evident that mothers with breastfeeding difficulties (cracked nipples, painful feedings, low milk production, first delivery, delivery via C-section, weak/sick neonate, etc.) have no mean to receive professional lactation support neither in maternity hospitals, nor at home. Moreover, the majority of the pediatricians from various FGDs claimed that often mothers come from maternities already feeding with formula because they were advised to do so, especially if the mother had a C-section. In the vast majority of cases, though, this advice is not medically justified. It is interesting that this phenomenon was mainly attributed to the maternities in Yerevan. Several pediatricians believed that the maternity staff is not motivated to spend time and efforts to work with mothers so that they breastfeed their baby and that is the reason they choose the easiest way and advise using formula. This opinion was supported by an IDI participant, who claimed that almost 40% of newborns are given formula in maternity hospitals and the reason for this is the reluctance of medical workers to make efforts to help mothers with breastfeeding. Both providers in maternities and some mothers or their relatives (often grandmothers) prefer choosing the easiest way and feed the baby with formula to avoid the first day difficulties with breastfeeding when it just gets established. Thus, because of physicians' negligence, when mothers go home, they continue feeding with formula and the baby starts having health problems such as diarrhea and a poor immune response. As a result mothers suffer financially, as infant formulas are not cheap, and the baby's health suffers too. An interesting opinion was raised by a couple of pediatricians who believed that maternities in Yerevan work with infant formula companies, and that is the reason that those who delivered in Yerevan almost always use formula. Numerous pediatricians from marzes claimed that compared to Yerevan, they rarely prescribe a formula to babies and that they advise it only when there are medical indications for that, because financially it is not affordable for mothers who live in marzes to use formula. Marz neonatologists also stated that they always support breastfeeding as they realize

its health benefits. Interestingly, they emphasized that they have no any connections with formula producing companies. Many pediatricians stated that even if mothers have already started using formula, they always work with them to return to breastfeeding and often this works.

*Physicians advise breastfeeding and on-demand feeding regimen***.** (Pediatrician, 4.3.7.3.1, FGD, marz)

*We recommend breastfeeding with overnight breaks and exclusive breastfeeding until 6 months***.** *We observe if the baby's position during breastfeeding is correct, and teach mothers if they breastfeed incorrectly***.** (Pediatrician, 4.3.7.3.9, FGD, marz)

At our maternity unit mothers mainly breastfeed. But whenever mothers comes from Yerevan [maternity]*, they feed their babies with formula… Hipp. Around 3% of mothers* [no more] *can have problems and not be able to breastfeed.* (Pediatrician, 4.3.7.3.2, FGD, marz)

…We do not have any connections with any formula advertising companies and we do not support the idea of feeding newborns with baby food. Even when mothers think that their babies remain hungry, we avoid using baby food. (Neonatologist, 4.3.7.3.10, IDI, marz)

Yes, very frequently [we see newborns who are given infant formula], *especially among those newborns delivered in Yerevan. From Yerevan, they* [newborns] *return already on formula***.** *We tell mothers to eliminate formula and breastfeed instead and we* [pediatricians] *observe the process. Maternity specialists do not want to work with the mother...* (Pediatrician, 4.3.7.3.11, FGD, marz)

…Sometimes they give newborns formula without reason and without indication…You know? ...Especially in case of people who have undergone C-section… (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

Personally I have witnessed a case when the mother had simple problems with breastfeeding and was immediately recommended to give formula to the baby… (Pediatrician, 4.3.7.3.8, FGD, marz)

I am certain that if a research was to be conducted, we would find out that at the time of discharge from maternity hospitals, no more than 60% of babies are being breastfed. People always take the easy way out. …In many cases, the grandmothers, friends, relatives will say: "no, our girl should not have to face difficulties, the baby mustn't remain hungry", etc. …And if the medical staff also has an interest in prescribing more artificial milk, both at the maternity

and at the PHC levels… (Policy maker/expert, 4.3.7.3.12, IDI, Yerevan)

Mainly they come in this state [of being formula-fed] *from the maternities and we try to shift them back to breastfeeding. …Mainly these are women who have undergone C-section... they have milk production issues during the first week. And during this period they start feeding formula, which is easier to feed and allows the mother more time to sleep. ...Newly delivered mothers come to us straight from the maternity hospital with cracked nipples. But this actually happens at the maternity hospital. …So this means they have been feeding incorrectly, right? So where are the maternity staff members when all this is happening?* (Pediatrician, 4.3.7.3.4, FGD, Yerevan)

...They [maternity doctors] *prescribe these formulas left and right, and the mothers... they get quick results from this without having to go through difficulties during the first few days and the baby is calm, it satisfies them at that moment - this fake bright period. Then they go home and the problems start with diarrhea, stool problems, the child's immune system begins to fall, they get ill quite often, etc...* (Policy maker/expert, 4.3.7.3.12, IDI, Yerevan)

Here in our city even 2 out of every 10 babies are not fed with formula. All babies are being breastfed. Our mothers prefer breastfeeding. Firstly, mothers prefer breastfeeding because of socio economic factors, as breastfeeding costs less. Secondly, exclusive breastfeeding is the best for the baby and the parents are not being financially affected. In Yerevan there are hospitals that are in contact with formula brands. You know, it is a business… (Pediatrician, 4.3.7.3.5, FGD, marz)

The artificial milk producing companies do everything in their power to have more and more of their product utilized. In its turn this [formula feeding] *is very easy for the medical staff... instead of having to stand next to the mother and help her to feed or pump, they are ready to feed formula to the baby.* (Policy maker/expert, 4.3.7.3.12, IDI, Yerevan)

We encourage breastfeeding and try our best to make sure that the baby isn't deprived from his/her mother's milk. In my case at least, when the mother is compliant, my efforts are successful and I manage to return them to breastfeeding in around ninety-something percent of cases. (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

We try to remove the formula if we can, by decreasing the formula amounts and increasing the frequency of breastfeeding. Sometimes there can be problems with nipple wounds. These complications, flat nipples and pain are the reasons why mothers avoid frequent long breast feedings. When we see that the baby does not gain weight, we prescribe formula. (Pediatrician, 4.3.7.3.13, FGD, marz)

…In my district there was a case that the mother's nipples were not good and the baby was week and could not eat breast milk on its own. It did not gain weight, and we prescribed formula. When the baby started gaining weight and became stronger the mother replaced formula with breast milk and did not use formula anymore. (Pediatrician, 4.3.7.3.5, FGD, marz)

...When mothers return [from maternities], *they replace formula with breast milk. The process is difficult, but we manage... especially when families understand that formula is not financially affordable for them.* (Pediatrician, 4.3.7.3.14, FGD, marz)

It is more difficult to convince mothers to breastfeed their first baby. We explain and explain, but during home visits we see that they have bought the formula and decided to feed the baby with artificial milk on their own, thinking that it is easier. We explain to them that the first days are the difficult ones and they need to be patient. However, in case of their second baby they initiate breastfeeding. (Pediatrician, 4.3.7.3.2, FGD, marz)

Prescriptions for healthy newborns: The majority of pediatricians claimed that they prescribe Vitamin D to healthy newborns. The dose is 400-500 units – one drop once a day – for a period of up to one year starting from the 7th day of life to all infants, regardless their feeding mode (breastfeeding or formula feeding). While some of the participants claimed that vitamin D must be given to babies for a period of up to two, even three years, the majority disagreed, saying that it must be given up to one year, because the standards have changed, and the current standard says that if there are no medical indications, then there is no need to give vitamin D for more than one year. A physician from Yerevan mentioned that the prescription of Vitamin D is almost non-existent in many regions of Armenia, or they prescribe it for only a very short period (10-30 days), which is not sufficient to prevent rickets. However, all the doctors from marzes stated that they prescribe it for at least a year.

Some of the pediatricians mentioned that they do not advise giving water to a baby if they are being exclusively breastfed. However, there were a few who mentioned that if the baby wants to drink water, then it is allowed to give it to him/her. A pediatrician noted that she recommends giving a newborn 100ml water per day, if the baby does not refuse drinking it. One of the participants noted that when a newborn is fed with formula, giving him/her water and tea is acceptable.

When asking if the pediatricians prescribe any medications to a healthy newborn, a few participants claimed that if the baby has colics and meteorism, then yes. They reported prescribing espumisan at a dose of 25 drops per bottle of milk (when feeding with formula). One pediatrician mentioned that it is given three times a day, while another – at every feeding. A pediatrician from Yerevan stated that disflatyl is another medication of choice for infants with meteorism. Still, some participants noted that meteorism does not occur during neonatal period; therefore, prescribing such drugs to a newborn is meaningless. However, one of the participants emphasized that sometimes maternity doctors prescribe espumisan, so when the mothers come to the pediatricians they are already using this medication. Another participant from the same FGD added that some mothers themselves give their newborns higher doses of espumisan than prescribed by physicians and they often do it to calm down themselves (to make sure that the baby will not have colic's) rather than to help their babies.

As prevention [of rickets] *we give them vitamin D. It used to be from 2 months of age in the past, but now it is from 7 days old. …In the past they used to say that we should not give it during summer, as we are a mountainous region. But now they have changed the order and we prescribe it full-year. We can give it for 3 years… Previously we were told not to give this preventative dose if they were on formula* [as formula contains vitamin D]*, but nowadays we are told to give it in any case*. (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

*Only vitamin D is prescribed to a baby***.** *In the policlinic pharmacy Vitamin D is available free of charge and is provided all day long, funded by the government. Our pharmacy distributes the brand of vitamin D that we suggest them to buy.* (Pediatrician, 4.3.7.3.2, FGD, marz)

[The dosage of vitamin D for an infant is] one *drop once a day, up to one year***.** (Pediatrician, 4.3.7.3.15, FGD, marz)

It is preferable to prescribe vitamin D for up to 2 years… as a prophylactic dose. (Pediatrician, 4.3.7.3.16, FGD, marz)

It is already a year since the standard has been changed. In the past the required period of Vitamin D intake was until 2 years but now, it is 1 year. (Pediatrician, 4.3.7.3.17, FGD, marz)

Vitamin D is required to be administered for a period of up to 1 year, but in case of clinical indications it should be administered for up to 2 years. (Pediatrician, 4.3.7.3.18, FGD, marz)

We can give Vitamin D for 2 years, without breaks during summer time. The prophylactic dose

we prescribe is 400-500 units. It depends which one we are giving though... There are 2 kinds of Vit D here in Armenia: the Polish Aqua D'trim, which we give at 500, and our Armenian D TriMed, which has a preventative dose of 400-500... It is in one drop. …I am sure you have heard that there is mainly no vitamin D preventive treatment in the regions. I have seen in some places, that they have only given a newborn vitamin D for 10 days. Or the doctor told: "finish off that one bottle and it is enough". …even a 50,000 unit dose [of vitamin D] *had not resulted in hypervitaminosis. So we are not worried about that.* (Pediatrician, 4.3.7.3.4, FGD, Yerevan)

If the mother breastfeeds exclusively, we do not recommend water. (Pediatrician, 4.3.7.3.13, FGD, marz)

We do not recommend giving tea to a newborn [all agreed]. (Pediatrician, 4.3.7.3.13, FGD, marz)

If the baby is being fed with formula, in that case water or teas are acceptable. (Pediatrician, 4.3.7.3.14, FGD, Yerevan)

We advise per baby's needs, as there might be a baby who will not even want to drink. In the summer if it is hot, we might recommend water if the baby is being fed with formula, but not if exclusively with breast milk. (Pediatrician, 4.3.7.3.14, FGD, Yerevan)

…Newborns should not receive additional liquids... no kind of additional liquid should enter their body. Not even water, tea... nothing. Because 97% of the breast milk they feed on is liquid. (Pediatrician, 4.3.7.3.4, FGD, Yerevan)

Say, if they [newborns] *have fed at 12 and the next feeding is around 14:30, then you should give the water at around 13:00 - 13:30. But this is only if the child wants this water and only if the outdoors weather is past 40^{o}C. For example, it's possible that the same baby does not require water in winter. We rose the previous generation on water and there is nothing wrong with them. We would give newborns 100 grams of water per day. It is simply a matter of medicine not being mathematics... There has to be an individual approach in case of babies, so you have to slightly bend the guidelines.* (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

We prescribe espumisan if babies have colic's: parents buy it on their own. The policlinic does not provide espumisan. We do not prescribe espumisan to a healthy baby who does not have colic's. (Pediatrician, 4.3.7.3.2, FGD, marz)

Espumisan is prescribed if babies have meteorism/tympanites. We advise 25 drops 2-3 times a day. (Pediatrician, 4.3.7.3.5, FGD, marz)

Espumisan... yes. But gas production starts bothering the baby only after 25-30 days. Until then

they just have colic's... what can you do against this? …Even the protocol states prescribing after 28 days [of age]. *It is given in 25 drops... if the baby is fed 6 times with a bottle, then you can drop 25 drops in that bottle every time. There is also disflatyl, which is given in 10-15 drops every time. In reality, these* [drugs] *relax the mother's head more than it calms the baby. So when the mother relaxes, so does the baby...* (Pediatrician, 4.3.7.3.3, FGD, Yerevan)

When they come to us from the maternity hospital, Espumisan is already prescribed to them. I am not sure, if they were aware that meteorism only starts from 3 weeks of age, they would probably not prescribe Espumisan to a newborn. It is just that the instruction label of this medication provides that it can be administered from newborn age, so they [maternity hospital staff] *just prescribe it...* (Pediatrician, 4.3.7.3.4, FGD, Yerevan)

4.3.7.4 Indications for and issues with newborn hospitalization

Many participants reported that they hospitalize newborns when the babies have danger signs and stated that otherwise the parents are allowed to keep their babies at home. From the words of one participant, "at the maternity units mothers are provided with a list of symptoms in case of which they should bring their baby to the hospital". In reality, however, this list asks parent to apply to a doctor when noticing any of these signs (refusing to eat, convulsions, rapid or difficult breathing, apathy or irritability, hypo- or hyperthermia, repeating vomiting or diarrhea, redness or purulence of umbilical fundus) in the baby. According to several respondents, parents accept the advice of doctors when they say that the child should be hospitalized. A participant from a marz told that parents sometimes skip them and take the child directly to the hospital by their own. This participant stated that often parents take the child to hospital even in simple cases when there is no need for it. However, the example he brought for this sounded somewhat unconvincing: if an antipyretic helps to reduce a 39˚C fever in a neonate to 37˚C, then hospitalization is not needed…

Hospitalizations of newborns from remote areas are organized either by parents or by ambulance. A pediatrician from a marz said that if they receive a call from the nearby villages, there are trained nurses who visit the child and, whenever needed, they contact the physicians and the doctors decide whether they should go to visit the baby or the baby should be taken to the hospital. So, neonates from villages are often taken to hospital without being seen by their

pediatrician. One of the Yerevan pediatricians claimed that it takes too much time before the ambulance arrives.

In case of high fever and dangers signs, the baby is hospitalized …When we advise to hospitalize, the parents actually go where they are referred…They sometimes even skip us and go straight to the hospital. (Pediatrician, 4.3.7.4.1, FGD, marz)

In case of villages, if there is a call, we go. In those situations a car is provided to us. In all villages there are nurses who are trained through the UNICEF and USAID programs, and provide neonatal care. Initially, nurses visit the baby then they phone physicians. Based on the information nurses provide over the telephone, we [physicians] *decide whether we should go or the baby should be brought to the hospital… There are no problems in this area. Our nurses in the villages take care of all their babies. They do everything to transport the baby to the hospital. If something deviates from the norm, parents immediately alert us.* (Pediatrician, 4.3.7.4.2, FGD, marz)

In light cases home treatment is acceptable… In case of the absence of danger sings… [home treatment is allowed]. (Pediatrician, 4.3.7.4.3, FGD, marz)

At the maternity units mothers are provided with a list of symptoms in case of which they should bring their baby to the hospital. We [physicians] *necessarily take actions if the baby vomits, has high fever, or refuses to eat* [danger signs]. *There is a printed list of indicators of danger signs, according to which mothers should take their babies to the hospital. Parents bring their babies to the hospital more often than is necessary. Sometimes when we are on duty in the inpatient unit, we have such cases when mothers give Ibuprofen* [antipyretic medication] *and run to the hospital without waiting for the fever to subside. They tell us that the baby has 39^{o}C temperature, but when we measure, it is already down to 37^{o} C. Therefore, there was no need to bring the baby to the hospital, as they could have waited for this to happen at home…* (Pediatrician, 4.3.7.4.2, FGD, marz)

The ambulance services handle the urgent hospitalization of a newborn from remote areas. We just go see them, send them to the hospital. If they have the means, then they go themselves, but if they cannot, then the ambulance comes and transports them. There are problems in this area, as when we call an emergency service ambulance, it takes for example 20 minutes or even longer for it to arrive. (Pediatrician, 4.3.7.4.4, FGD, Yerevan)

4.3.8 Educational needs of PHC providers on newborn care

4.3.8.1 Information sources on neonatal care for PHC providers

While a few pediatricians stated that they have access to modern information sources such as the Internet, clinical guidelines and professional publications, the majority claimed that unlike physicians of other specialties (e.g. gynecologists), pediatricians do not have clinical guidelines on different conditions, therefore they cannot be sure that the steps they undertake in the management of a given condition are correct. Also, they are not protected from the legal point of view. The lack of specific guidelines in pediatrics was perceived as a very serious issue that must be urgently addressed. Some participants from regions noted that new practices reach them very late and that their situation is much more difficult than those pediatricians employed in Yerevan as often they lack of the luxury to seek the advice of narrow specialists, because they are the only specialists in their area. A group of pediatricians raised a very important issue related to online materials, arguing that often the information provided there, which is used by nurses and mothers, is not trustworthy. In addition, several pediatricians mentioned that they are not even advised which websites to use to receive up-to-date information, and often the websites they want to use are not free of charge.

They are all accessible... specialized books are available, the internet is available, seminars are available, and conferences are available, guidelines also. Everything is available, the only thing left is to pick them up and become a literate healthcare provider [P1 agreed]. (Pediatrician, 4.3.8.1.1, FGD, marz)

We have video materials for pediatricians on the topics of first aid for children under 1 year, advantages of breastfeeding, psychological problems. Our physicians usually watch those video materials… provided by the WV, USAID, and UNICEF. …The application of international experience is very important for us. We have unlimited access to the Internet. The problem is that our nurses and population do not use appropriate Internet resources. They read whatever they find. If they could use proper health-related websites… though we recommend them. (Pediatrician, 4.3.8.1.2, FGD, marz)

We recommend them [nurses and mothers] *to use "Hay mayrikner" website. Internet is a great mode for dissemination of information. Internet is also a source of dissemination of false information. You can never tell if it is wrong or right, but they write in such a way that... Physicians would be more secured if they have had guidelines.* (Pediatrician, 4.3.8.1.3, FGD,

marz)

Professional publications and clinical guidelines are hardly available [P10 agreed]**.** (Pediatrician, 4.3.8.1.4, FGD, marz)

We do not have protocols in our work. X [name of a physician] *promised us that we will have protocols. So we would follow the specific steps putting marks on whatever we performed and would proceed to other steps. Each of our physicians treats respiratory failure differently but if there was a protocol we would be able to check if the steps were performed correctly. If we had protocols like in the healthcare units in US or other developed countries, we would be secure. Through the use of protocols we will secure ourselves…* (Pediatrician, 4.3.8.1.1, FGD, marz)

For pediatricians in Armenia the absence of guidelines is the most painful thing. We [pediatricians] *are the ones who should be very motivated to acquire new* [professional] *literature. They do not provide the appropriate websites that we can use. Mostly those are paid websites. We would pay for if we were provided with the correct ones, though. But we are not provided. During the conference in the "Arabkir" clinic I raised this question. Firstly the guideline would secure as from the legal side; that is there is a guideline and I follow it… But we do not have such thing in Armenia. You know, working in a Yerevan clinic or polyclinic is a completely different status, as pediatricians there have all narrow specialists besides them. But in marzes and especially in villages either there is no specialist or there is only one. You* [pediatrician] *have to stay next to the severely ill patient and you should have at least that guideline so you will be able to appropriately manage the patient at that point and later on.* (Pediatrician, 4.3.8.1.5, FGD, marz)

New practices reach us very late [P11 agreed]. *We do not know how to search information from the Internet correctly. This question has been raised a lot in different places: why obstetrician-gynecologists have* [guidelines] *but pediatricians do not have guidelines* [4 participants agreed]**.** (Pediatrician, 4.3.8.1.6, FGD, marz)

We do not have pediatric guidelines. The only guidelines we have concern convulsions… [Another participant confirmed that they have only guidelines for convulsions]**.** *The absence of guidelines is a global problem that should be spoken up, if you* [referring to the research team] *have the power to do so* [P 8 agreed]. (Pediatrician, 4.3.8.1.7, FGD, marz)

4.3.8.2 Opportunities for continuous education of pediatricians and pediatric nurses

The participants told that according to the existing system, each five years, all practicing pediatricians need to attend refreshment educational courses with a total duration of seven weeks

to obtain the needed number of credits. As to nurses, they need to receive trainings in nursing with overall duration of five weeks for a five-year period to receive the number of credits they need. Participants noted that they are free to choose the topic(s) and duration of their courses themselves (e.g., a one-week seminar will give them credits for a year, thus they need to receive seven such courses to cumulated the needed number of credits for a five-year period). Overall, they were satisfied with this credit system. While the participants from Yerevan claimed that the training opportunities they have are "too much", some participants from regions thought that the trainings they receive are insufficient and they would like to participate in more training courses. According to a few pediatricians, both physicians and nurses crave for new knowledge and skills, as it is very important to be updated on new practices given the high speed of scientific developments in the field. However, another participant disagreed with this claiming that his/her group members only say that they would prefer to have more training courses, but in fact, when training sessions are organized, they start complaining.

… Now, there is a system of [mandatory] *continuous education with credits... You can take a training session during the year and gain credits for it. So if you attend a week-long training, then you will already have one year down. And this is regardless of the topic of the training. We are the ones who select the topics, for example, I might say that I want to attend training in pediatric cardiology. If you go through the 7-week training session, then it covers the entire 5 years.* (Pediatrician, 4.3.8.2.1, FGD, Yerevan)

The 5 year credit program is very effective. (Pediatrician, 4.3.8.2.2, FGD, marz)

These [training sessions for pediatricians] *are organized quite often. The specialists come from abroad. For example they organized some in "Arabkir"* [hospital]*, which were very interesting and I participated in many of them with great pleasure. They presented on all pediatric topics and it was very helpful for us. I do not think that any doctor would refuse it. They* [doctors] *really want to increase their knowledge or experience to be able to work normally. … It means that if somebody missed it, he/she just did not manage to attend.* (Pediatrician, 4.3.8.2.1, FGD, Yerevan)

The trainings we have are even too much. (Pediatrician, 4.3.8.2.3, FGD, Yerevan)

The amount of training programs is not sufficient for us [for pediatricians]*…the more the better.* (Pediatrician, 4.3.8.2.4, FGD, marz)

We are getting informed of new practices regarding the neonates. So if there were more training

programs, it would be very good. (Pediatrician, 4.3.8.2.5, FGD, marz)

They just tell that having more frequent training programs is good [telling about the participants] *but when in fact training programs are organized they used to complain* [several participants disagreed]. (Pediatrician, 4.3.8.2.6, FGD, marz)

If the [training] *program is organized properly, the learning will be very effective. All of us* [physicians] *crave for new knowledge, data. The scientific breakthrough is very fast and the changes should reach the healthcare professionals very quickly. The same is about the nurses, they should be trained on topics related to their work and be aware of all new practices.* (Pediatrician, 4.3.8.2.7, FGD, marz)

Nurses, just like us [pediatricians], *also have* [mandatory] *trainings every 5 years* [P1 and P3 agreed]. (Pediatrician, 4.3.8.2.3, FGD, Yerevan)

Nurses are being trained once in 5 years [P 9 agreed]. (Pediatrician, 4.3.8.2.8, FGD, marz)

Some pediatricians stated that besides continuous education courses provided by YSMU departments within the credit system, they participate in other trainings as well. Two pediatricians from Yerevan stated that they attend so called "Pediatric school", three-day training sessions organized twice per year, which covers all the topics of neonatal care and completely addresses their training needs. The participants from the marzes were very satisfied with the training sessions formerly organized for them by UNICEF and the training materials they provided. They notified a number of positive features of these trainings, including the valuable training materials and posters, their organization on-site, so that the staff was always at the workplace, and the fact that UNICEF paid them for attending those courses. From the words of one of the pediatricians, the training classes were on neonatal resuscitation and were very well equipped with dummies, the needed equipment and the well-designed training materials. However, other participants claimed that this training topic (neonatal resuscitation) was out of their interest because they are allowed to work with infants only when they are at least 3 months old. In general, the participants valued very much the training courses organized by UNICEF before 2000s and their impact in term of providing essential knowledge and eliminating the problem with home births.

There is a training session called "Pediatric school", which is organized twice a year for three days. And every time we participate in this training, these [neonatal care] *topics are all covered.*

We do not have a shortage of this. We even discuss the questions that we have on the spot. (Pediatrician, 4.3.8.2.1, FGD, Yerevan)

Several years ago there were programs organized by the UNICEF. During those training programs, we were provided with books both for nursing and medical practice. The programs were really good, participants were not isolated from their daily work, the programs were being held here, on-site. These UNICEF programs were on neonatal resuscitation, they were teaching very good, bringing their equipment, dummies and, most importantly, they were providing literature … Even now in my cabinet I keep the materials provided by the UNICEF. (Pediatrician, 4.3.8.2.4, FGD, marz)

Does not matter if we have ever learned it [neonatal resuscitation] *before. No one is allowed to perform neonatal services… Before 3 months we are not allowed, just forget that* [refers to P11]. (Pediatrician, 4.3.8.2.9, FGD, marz)

The posters provided by the UNICEF on danger signs etc. still hang in our cabinet. In the past it was good: UNICEF representatives were coming and training us, also they were paying us for participation. The posters include information on disease symptoms, danger signs, with yellow, red, green lines. It was so simple and good… (Pediatrician, 4.3.8.2.7, FGD, marz)

UNICEF program was impactful. As whatever we know now we have learned by the virtue of the UNICEF program. (Pediatrician, 4.3.8.2.8, FGD, marz)

The situation with home births that we talked about earlier, has improved by the virtue of UNICEF. Back then before 2000s when I started working, during only one year UNICEF very quickly implemented a program and succeeded and had good outcomes [P6, P8 and P11 agreed]. (Pediatrician, 4.3.8.2.9, FGD, marz)

4.3.8.3 Obstacles for participating in training courses

A number of participants raised several obstacles for participating in training courses. These obstacles included the content, organization, and affordability of the trainings. A few participants claimed that often they are trained on matters that are very interesting and come from the European experience, but these are not applicable for Armenia because of sharp differences in material conditions and mentality. Some participants complained that they learn nothing new during the trainings to receive credits, while some others – that nobody takes care of them during these several-week trainings in the clinical settings of Yerevan and they need to observe and

learn on their own. Organizing the training courses in Yerevan was considered a serious obstacle for those from regions because of both financial difficulties connected with the travel and accommodation in Yerevan, and inability to interrupt the work for a long period because of having no replacement at the workplace. Finally, another serious problem emphasized by many participants was the financial difficulty related to participating in the training courses within the credit system, as these are not free of charge. The participants claimed that the negligible salary they receive (60,000 drams) cannot be compared with the amount they need to pay for the refreshment course that costs 140.000 drams. Indeed, they have to take vacation to participate in the training as they are neither allowed to be absent from work nor they receive their salary during the training. According to the participants, these conditions make the training unaffordable for many providers, especially those from the regions, and regional nurses who receive even lower salary. Two pediatricians noted that the refreshment training is state-funded for only those providers belonging to socially vulnerable groups, such us being disabled, taking care of a dependent person with disability, having many children, etc. The participants were uniform in their opinion that these conditions should be changed and the trainings needed within the scope of the credit system should be provided free of charge. Also, either the trainings should be organized on-site for the providers from far regions, or they should receive the means to attend the trainings and a replacement at their workplace. Nevertheless, few participants noted that if the financial issue is resolved, then the five-year credit program is an effective one.

Well, it is not possible to upgrade skills through theoretic knowledge alone...You know what is it that frustrates us? When we have people from Europe presenting us their experience... when their experience is absolutely impossible to implement in the present conditions in Armenia. So whatever they teach us is just not for us. It is very interesting, very good and seeing it would be good. But we just do not have the conditions for such things…There are tests adapted for teenagers from 12-18 years of age. But they have such question there that our children and even their parents are completely unaware of. For example in case of AIDS… they ask 12 year old children if they know what can be used in case of random sexual intercourse… [P 2 agreed]. (Pediatrician, 4.3.8.3.1, FGD, Yerevan)

Current training system is that the training sessions are organized ones in five years… well I am not familiar with the entire system but whatever I asked the physicians, they said that they go to Yerevan to some facility and they learn, see things on their own [nobody teaches them]... (Donor, 4.3.8.3.2, IDI, Yerevan)

The worst part is though that we do not learn anything new... What is the point of paying 140,000 AMD to go and hear the same thing that they have been saying for 40 years? Why do I need something that they teach me and I cannot practice. Ok, let us say they changed the spirit-based vitamin D to water-based... for what must I pay 140,000 AMD to be told about this again? (Pediatrician, 4.3.8.3.3, FGD, Yerevan)

It would be better to go for training that would last seven consecutive weeks but we cannot afford that. (Pediatrician, 4.3.8.3.4, FGD, marz)

If the financial problem was solved, we would say that the 5-year credit program is effective. I cannot tell about nurses, but for physicians the program is very important. (Pediatrician, 4.3.8.3.5, FGD, marz)

…We do have very good specialists in the regions … They have long experience, but they lack specialty trainings, gaining new knowledge and skills. In general they do not participate [in trainings]*, while the doctors in Yerevan probably go to conferences and seminars at least twice a week… I know some regions where from nobody comes. And in these regions medicine is at stone-age level. …there are regions from where no doctors come at all…Because these doctors must be sent over... the municipality of the city/village must provide them with means to travel that 200-300 km, a place to stay in Yerevan, so that they come to classes... So naturally if they do not, then these doctors will not come…* (Pediatrician, 4.3.8.3.1, FGD, Yerevan)

Our salaries are not enough to afford the training [and the expenditures associated with traveling to Yerevan and living there]. (Pediatrician, 4.3.8.3.6, FGD, marz)

Do you know what I have managed to realize for myself? I have realized that nobody from regions comes to participate [in continuous trainings] *solely because they do not have the means to do so. …Even the doctors in Yerevan are not in a good state* [financially], *let alone those from the regions. It is just not correct to have it* [trainings within the credit system] *as a paid service. Very few pediatricians receive a 140,000 AMD salary. There is no such salary* [all agree and express their frustration at this]. *What is the meaning of having a pediatrician who receives 60,000 AMD pay that much for the training?* (Pediatrician, 4.3.8.3.1, FGD, Yerevan)

If you are a nurse and are to receive your training on a state-order, then you either have to have multiple children, have a disabled person under your care, or be disabled yourself... to be from these socially vulnerable groups. So if you fall in any of these groups, you present the documents to the MOH and receive the training under the state order [P 2 agreed]. (Pediatrician, 4.3.8.3.1, FGD, Yerevan)

There might be problems related to coming and participating because the training is not for one

day... it might be for 5 days and who will replace that person in his/her facility? I am saying again, if there is only one neonatologist in a maternity hospital, how he/she can leave his/her job and come to participate in the training? There are thousand problems, therefore, when you go and organize trainings on the spot, it is more effective, they do not leave their job and even vice versa, our specialists solve many other problems on the spot. (Donor, 4.3.8.3.2, IDI, Yerevan)

Nurses also want to go and participate in trainings. They always ask why outreach training sessions are organized only for us [physicians]. *…Outreach training sessions are rarely organized for nurses.* (Pediatrician, 4.3.8.3.4, FGD, marz)

4.3.8.4 The role and educational needs PHC nurses in newborn care

The majority of the pediatricians claimed that nurses are physicians' assistants and that without them the PHC physicians would not be able to manage the work volume. To emphasize nurses' role in the primary care of newborns, a couple of pediatricians mentioned that nurses are the ones who identify that there is a pregnant women in the area or a sick child who's parents do not realize that the child needs medical help, or a newly relocated mother with children who are not yet registered in a PHC setting. While a few of the participants claimed that nurses are well prepared, involved in the care of newborns and that mothers trust them, others believed that the current qualification of nurses does not meet modern standards of working with newborns. Therefore, nurses need continuous training in neonatal care to obtain all the necessary skills. Furthermore, another participant supported this point saying that it is very difficult to persuade nurses to open the guidelines and read. However, when there are training sessions, they participate with delight. One of the participants noted that nurses in Armenia could not reach the level of nurses from abroad, even if they receive numerous trainings, because their mental abilities are limited. According to him, this is the reason why they did not apply for higher education but became nurses. Still, the participants believed that nurses should have sufficient knowledge on different issues such as child care and nutrition to answer mothers' questions and the physicians are the ones who should teach them, as they sometimes do not have the needed basic knowledge even on simple matters like how to perform an injection.

Pediatric and rural nurses are completely involved in the care of a newborn. Nurses are well-prepared, educated. (Pediatrician, 4.3.8.4.1, FGD, marz)

There is much more trust and intimacy [among mothers] towards *nurses.* (Pediatrician, 4.3.8.4.2, FGD, marz)

Without our nurses we would be lost [all participant agreed]. *During a day, we may send the nurse to visit the same baby for several times. If there were no nurses, physicians would not be able to manage all babies. Our mothers are more connected with nurses than with us…* (Pediatrician, 4.3.8.4.3, FGD, marz)

I do not think their [nurses'] *current qualification is in line with the requirements to work with newborns. Nurses still need further continuous education in neonatal care. As we have trained our nurses, we know that there is a need* [P 6 agrees]. *We all agree that nurses need training… We have many guidelines, and it is difficult to convince the nurses to open and read the guidelines. It is much easier to urge them to participate in a training, which they actually do with pleasure.* (Pediatrician, 4.3.8.4.4, FGD, marz)

I would not say if the number of training sessions [for nurses] *is increased and many more ones organized for nurses with having all the financial issues solved, the nurses will become properly educated in accordance with the international requirements... We have nurses who participated in conferences and they felt themselves the difference between them and the nurses from abroad. Our nurses seem to be jealous why nurses from abroad are far more qualified than they are. The reason is that …those who applied to study in the nursing college had poorer mental abilities; therefore they could not seek for higher education. The reason they became a nurse/chose the nursing specialization is their poor abilities. They need to continuously receive many training to gain the skills they need.* (Pediatrician, 4.3.8.4.4, FGD, marz)

…Nurses must have qualification, accreditation, seminars... a lot depends on them. For example, it is the nurse who identifies pregnant women, infections, etc., in a given neighborhood. It is possible that some parents do not realize that they need to take their child to a doctor. Nurses identify such cases. There have been cases when people have come from a region and lived in your neighborhood on rent… for months or even years and are not registered anywhere at all. So the nurse brings to our attention that in this address there is a woman who has this many children, none of whom are under physician's supervision. (Pediatrician, 4.3.8.4.5, FGD, Yerevan)

Nurses identify pregnant women, newborns, babies in fever, etc. If the mother wants to understand things, then the nurse must also know that, to teach the mother [P 3 agreed]*… such as the correct method of treating an infected eye... the direction in which the cotton swab must be moved over the eye and the need of using a new one for each eye. These are basic things, but I'm trying to say that the nurse must know all these details. The mother might ask about child care, nutrition, etc., and the nurse should be able to explain all of these to them. …At least you* [the

physician] *should… teach your nurse... She is a girl who has received her diploma, and comes and asks you where she should do the injection. What if she hits the nerve and disables a person?* [P3 disagreed and got irritated asking why a nurse should receive a diploma if she does not even know where to inject]. (Pediatrician, 4.3.8.4.5, FGD, Yerevan)

4.3.8.5 PHC providers' preferred training topics on newborn care

The training topics suggested by the FGD participants included recognizing the danger signs in newborns, especially in premature babies, emergency care for newborns, newborn resuscitation, and vaccination. Recognition of the signs of danger in newborns was considered important both for doctors and nurses. Some participants stated that they would like to receive trainings on all the neonatal care topics included in the checklist that was administered to them at the beginning of the discussion. They again underscored the importance of having clinical guidelines and protocols not only on different aspects of neonatal care, but on all pediatric conditions, including diagnostics of pediatric conditions and steps to be undertaken during emergencies.

I would like to participate in training programs related to vaccinations [P4 disagreed claiming that they frequently have trainings on vaccination]**.** (Pediatrician, 4.3.8.5.1, FGD, marz)

Neonatal issues are very important for us. If there was an opportunity to have training on the topics that you have listed in the checklist, it would be very good for us to ensure better care during the neonatal period. (Pediatrician, 4.3.8.5.2, FGD, marz)

…We [both nurses and doctors] *are not easily oriented in the danger signs of the neonatal period… we wait for some time to pass, re-assess* [the signs] *several times to be sure. …The* [danger] *signs in premature babies have completely different picture, for example it is difficult to differentiate the* [pathological] *weakness from the normal physiological condition. Neonatal care is a narrow specialty and it would be preferable for physicians and nurses to have knowledge on that* [All participants agreed]. (Pediatrician, 4.3.8.5.3, FGD, marz)

We would like to have more training programs, especially those on emergency care [P 6 and P 4 added that on emergency care of children and not newborns**].** (Pediatrician, 4.3.8.5.4, FGD, marz)

We would like to receive training on resuscitation… to know the new approaches and the further actions that are to be performed… We need to be able to direct patients correctly. We as pediatricians never dig into serious neonatal cases...We refer those cases for consultation. But what I mean is that physicians and nurses should be able to assess serious conditions and plan

further steps. (Pediatrician, 4.3.8.5.3, FGD, marz)

We would like to have guidelines regarding all [pediatric] *topics* [all agreed]. (Pediatrician, 4.3.8.5.5, FGD, marz)

And a guideline on diagnostics ... Many new practices have been introduced but we are unaware of those. (Pediatrician, 4.3.8.5.6, FGD, marz)

5. MAIN FINDINGS

Findings from the desk review

Strategies and neonatal services' structural features proved as effective in reducing NMRs

- In 2005, it was estimated that approximately two-thirds of neonatal deaths can be avoided in LMICs with implementation of several feasible and cost-effective intervention packages (such us resuscitation of a neonate, emergency neonatal care for infections, asphyxia, prematurity, and jaundice; case management for pneumonia; and special care for low birthweight neonates) to be practiced with high coverage at both community and hospital levels.
- For intrapartum period, the package of suggested interventions include:
  - Emergency obstetric care with timely management of delivery complications,
  - Application of antibiotics for preterm and premature rupture of membranes, and
  - Prescription of antenatal corticosteroids in case of preterm labour.

  For postnatal period, the suggested interventions include:
  - Resuscitation of a neonate,
  - Emergency neonatal care for infections, asphyxia, prematurity, and jaundice,
  - Case management for pneumonia, and
  - Special care for low birthweight neonates that should include provision of additional warmth, appropriate hygiene, feeding with breast milk and Kangaroo mother care.
- In low-resource settings, stimulation and ventilation are believed to be the most effective steps of neonatal resuscitation, whereas intubation and chest compression add only little benefit in terms of further reduction of neonatal mortality in such settings.
- Successful resuscitation of newborns include the use of pulse oximetry in the delivery room, resuscitation beneath a radiant heat source, the initial use of humidified and heated air or low (30%) oxygen concentrations rather than 100% oxygen, the application of positive airway pressure as an alternative to routine intubation for extremely preterm newborns.
- The referral hospital should be easily accessible from the place of birth and able to provide the needed level of care that includes breathing support, maintenance of adequate oxygenation and thermal, glucose, and fluid balance.

- The referral hospital should be connected with the local settings via emergency transport system which is equipped accordingly to provide basic supportive care to newborns and maintain their temperature and blood glucose level during transportation.
- The most important aspect of neonatal care related to better outcomes is its quality, which should include both clinical care quality and all the other aspects (interpersonal, timeliness, efficacy, and equity), and should be monitored via an auditing system.
- The likelihood of survival of LBW neonates is higher in bigger NICUs that treat at least 50 very LBW neonates per year. The same is true for the volume of delivery units: the bigger is the unit, the lower are the NMRs. Thus, centralized provision of care is recommended to pregnant women of high risk.
- Other factors contributing to reduced neonatal mortality include higher degree of specialization of clinical and nursing staff and their optimal workload (nurse-to-neonate ratios of 1:4 or 1:3 for those neonates at lower severity levels, and 1:1 or more for those at the highest severity levels).
- The appropriate transport for neonatal transfers should provide at least transport incubator, equipment for emergency resuscitation, means for administration of medications, oxygen supply, ventilator, and equipment for vital functions monitoring during the transfer.

Situation with NMRs and neonatal care services in Armenia

- During the last decades, the reduction of neonatal mortality rate in Armenia was disproportionately slower compared to the reduction of infant mortality rate. Neonatal deaths constitute almost three fourths of all infant deaths and over seventy percent of these deaths occur during the first seven days of life. Almost half of the latter occur during the first day.
- The real situation with early neonatal mortality rates could be more serious than the official numbers indicate, because of a tendency of reporting a portion of early neonatal deaths as stillbirths in some maternity hospitals.
- The most frequent diseases that cause early neonatal deaths in Armenia include respiratory distress syndrome (29.3%), inborn pneumonia (28.0%), congenital defects (20.0%), and asphyxia/ intrauterine hypoxia (17.3%).
- There are 62 maternity hospitals in Armenia and three referral hospitals for neonates, of which two (Muratsan University Hospital and “Surb Astvatsamayr” MC) are located in

Yerevan and one (Austrian Hospital) in Gyumri. The majority of the registered cases of early neonatal deaths occur in maternity hospitals.

- The share of deaths among LBW babies is substantial in the structure of early neonatal mortality in Armenia (87.4% in 2014).
- Among those babies born with extremely low birthweight (<1000 g), only 16% are registered as livebirth. Of these, almost two-thirds die during the first week of life, with 88% of these deaths occurring in maternity hospitals, and only12% in referral hospitals.
- In maternity hospitals of Armenia, 70% of all early neonatal deaths occur among LBW neonates. Thus, interventions to improve the care of LBW neonates in maternity hospitals have the highest potential of reducing neonatal mortality in the country.
- There is a wide gap between Yerevan and regional maternity hospitals in terms of the availability and quality of neonatal care services, which, combined with the deficiencies in the referral system, seriously decrease the chances of survival of critically ill neonates born in regional hospitals.
- During the recent years, donor and professional organizations were engaged in a number of projects to strengthen neonatal services in Armenia. These activities had high coverage and considerable impact in improving neonatal services and, thus, achieved some reduction in the rate of early neonatal mortality. However, there is still a considerable room for improvement.

Lessons learned from other countries that achieved significant reduction of NMRs

- In 2014, the early neonatal mortality rate in Russia was 2.8 per 1000 live births and stillbirth rate 6.0 per 1000 births (the latter rates were 5.4 and 16.5, respectively, in Armenia in 2014).
- Russia has achieved a steady decline in neonatal mortality rate, which is believed to be due to optimizing the maternity care system in terms of its accessibility and quality. Particular interventions included:
  - Personnel trainings to improve prenatal diagnosis and neonatal intensive care,
  - Increased use of advanced technologies and medical-genetic services,
  - Implementation of counseling services via telecommunication, and
  - Establishing remote counseling centers that have mobile (both ground and air) teams of specialists equipped with diagnostic and resuscitation equipment and portable incubators.

- Standardization of maternal and newborn care and application of clear indications for hospitalization of pregnant women in different-level facilities in accordance with the established territorial referral patterns for each facility, and
- Shift to a system that requires accreditation of doctors to be allowed to practice medicine.

- Russia allocates adequate finances to enhance maternity and newborn healthcare services.
- There is a tendency of increasing the number of facilities providing higher-level care and establishing more perinatal centers in Russia, because these centers are believed to address best the needs of extremely premature and critically ill neonates.
- The rapid reduction of infant mortality rates in Ukraine was also mainly attributed to the:
  - Establishment of a network of regional perinatal centers equipped with the latest technology.
  - Allocation of appropriate funding, and
  - Practicing an effective referral system in the country's maternity services with referrals of women to the appropriate level of care corresponding to the degree of the risks they face.
- Introduction of better standards of maternity and newborn care were the prerequisites of impressive reduction of neonatal mortality rates in Lithuania.

Needs in trainings and clinical guidelines

- Neonatologists gave the highest priority to receiving trainings on neonatal resuscitation in delivery room, respiratory support including oxygen therapy, respiratory distress syndrome, pneumonia, asphyxia, and encephalopathy.
- The topics where the majority of neonatologists felt a need in training included also infusion therapy, acid-base balance, neonatal convulsions and shock, care for extremely LBW neonates, neonatal jaundice, and common congenital defects.
- Having clinical guidelines on infusion therapy and acid-base balance, newborn transfer, sepsis and antibacterial treatment were prioritized by neonatologists more than trainings on these topics.
- PHC providers considered respiratory distress syndrome, pneumonia, LBW newborn care and feeding, neonatal hypoglycemia, muscular tonus and convulsions, and neonatal jaundice as the most important topics for trainings and clinical guidelines.

Needs in human and material resources

- In the majority of regional maternity hospitals, there is only one neonatologist. Therefore, after 15:30, the neonatologist is available only on-call.
- None of the neonatal nurses in regional maternity hospitals are qualified as a NICU nurse.
- The average neonate-to-nurse ratio in the visited hospitals is 4.5:1, calculated for all neonates regardless of their health status.
- The main need related to equipment that was not addressed in the majority of the visited hospitals was the lack of devices for providing a neonate with appropriate, heated and humidified air-oxygen mixture during respiratory support, which is very important for preventing vision impairment.
- The types of the necessary equipment that were frequently missing included air compressor, air-oxygen blender, oxygen concentrator, respiratory circuit with heated humidifier, T-shaped resuscitator, electronic neonatal scale, neonatal tonometer, neonatal thermometer, and bilirubinometer.
- One incubator was available in the majority of the visited hospitals. One of the hospitals had no equipment for providing continuous respiratory support and none of the hospitals had artificial respiration equipment. The neonatal units of two hospitals had no additional electric power source.
- The quantity of pulse oximeters was often inadequate in the visited hospitals.
- The universal lack of nasal prongs of neonatal or premature size was of a particular concern. Participants reported insufficient supplies of intubation and air tubes, umbilical and venous catheters, aspiration catheters, and blankets for mother and baby.
- Roughly half of the essential laboratory and diagnostic tests for newborns were unavailable, including bacteriology, sensitivity to antibiotics, acid-base balance, direct and indirect Coombs reaction, serological blood tests, blood electrolytes, brain ultrasound and neonatal echocardiography. Generally, the tests were available only during the daytime working hours.
- The average percent score reflecting the diversity of the available equipment in the visited hospitals was 72.4% (range: 57.6% - 88.1%). There was no clear relation between the level

(IB or II) assigned to a maternity hospital and each of the scores reflecting the availability of equipment, supplies, and laboratory tests in that hospital.

- The neonatal ambulance service in "Muratsan" hospital consisting of two cars is the only such service in Armenia and serves the whole country. These cars are too small to be equipped in accordance with the existing standards, and currently each has an oxygen cylinder, a suction machine, a mechanical ventilator and a T-piece resuscitator. However, the lack of air compressor in the cars makes the mechanical ventilator and the T-piece resuscitator useless.

Ideally, neonatal ambulance cars should be equipped with a portable incubator, a portable mechanical ventilator, a cardiomonitor, an oxygen transport cylinder, an air compressor, a T-piece resuscitator, an air humidifier, a transilluminator, an infusion pump, a microlaboratory, a bilicheck and a phototherapy lamp.

Qualitative study findings

Organization and adequacy of neonatal services

- According to the prevailing opinion of participants, the present structure of neonatal care services in Armenia does not ensure equal access to quality services for all newborns regardless of their birthplace, as all the 3rd level maternities are confined to Yerevan, while the marzes are left with less-equipped and smaller-scale 1st and 2nd level facilities.
- Compared to families from Yerevan, higher level neonatal services are less accessible for families from regions both for geographical and financial reasons, and the limited availability of neonatal transportation services.
- Regional facilities are often lacking high quality specialists, equipment and supplies, and the motivation of specialists to treat complicated cases in regional facilities is low because of low salaries they receive, lack of state funding allocated to regional facilities for neonatal care, and procedural restrictions that require transferring sick neonates to higher-level facilities.
- Because of transferring all sick neonates to third level facilities, neonatologists in regions do not have sufficient opportunities to work with modern equipment and to practice their professional skills. Therefore, they gradually lose their skills and forget the details of operating the available equipment.

- Transferring sick neonates to Yerevan from remote areas takes many hours of waiting time and transportation, together often reaching 8-12 hours, which is too long for severely ill neonates (highly exceeding the accepted norm of ~2 hours).
- According to key informants, the current system of neonatal care consisting of over 50 small neonatal units is not cost-effective and does not provide satisfactory care. Therefore, considerably decreasing the number of neonatal units in Armenia, while making sure that the remaining units are well accessible and provide high quality care could be a reasonable solution.
- Another suggestion was to establish regional referral centers providing third level care in the remote marzes that will considerably shorten the time spent on transferring neonates, thus contributing to better outcomes. Also this will meet the considerable demand of regional population to be referred to a close-by referral center instead of being sent to Yerevan, which is not always affordable or feasible for them.
- For the same reason, hospitals in marzes are financially interested in admitting all local women (even those at high risk of delivering sick child) to give birth there. However, they are not interested in treating sick neonates, as they are not entitled to receive any additional state funding for that. This situation contradicts with the recommendation of referring all high-risk women to deliver in higher-level maternities.
- According to participants, not all the facilities are adequately equipped with proper equipment, and some are lacking the most vital equipment. But even with the existing equipment there are many problems, as many devices are left unused because of different reasons. Therefore, simply providing equipment to facilities or renovating the maternities does not guarantee high quality of care.
- The mentioned reasons for not using the available equipment include:
  - Not being trained on usage of certain equipment, because trainings organized in other areas (e.g., in Yerevan) are not feasible to attend because of inability to leave the work;
  - Forgetting the details concerning the operation of the devices, as in small units that treat very small number of severely sick newborns annually, the staff does not have a chance to use the equipment frequently enough;
  - Not having certain facility conditions for the correct use of equipment or the accessory devices that make a complete chain with the given equipment;

  - Not being able to fix the non-functioning equipment; and
  - Some reluctance of older age staff members to use modern equipment.
- Relocating the unused pieces of equipment from one facility to another under the supervision of MOH was suggested to resolve this situation. Also, the engineering service of the USAID/AANM that visited the facilities and repaired their old equipment was perceived by the participants as very important one that needs to become sustainable.
- The types of equipment perceived as mostly needed included devices for non-invasive respiratory support, bilirubinometer, and infusion pump. The need for cranial ultrasound and cardiac ultrasound machines, and equipment for measuring blood gas levels was also mentioned.
- Another issue raised was the insufficient quantity of equipment, supplies (e.g., suction catheters, tubes, PP3 catheters, extenders for intravenous injections), and essential medication. Lack of adequate quantities of some disposable items (catheters, tubes) was perceived as a possible source of nosocomial infections because of their re-use.
- The issue of outdated equipment was also raised, and the participants explained that even newly acquired equipment can be outdated and lead to lower-than-desirable outcome of care. However, the complexity of keeping up with the constant modernization of technology was realized.
- The gradual pattern of referrals from lower-level maternities to higher level ones is not actually followed, as the neonates with somatic conditions are mainly referred from all maternities of Armenia to a single referral center – Muratsan University Hospital. Even a number of third-level maternities in Yerevan refer their severe cases to Muratsan, although this is not justified as third level facilities should refer only those neonates requiring highly specialized care.
- Establishing an additional referral center for neonates was suggested to alleviate the current overload in Muratsan hospital.
- Some neonatologists felt that the existing system of referrals limits the motivation of neonatologists of lower-level maternities to improve their performance, as there is nothing left for them to do but to refer severe cases to higher-level facilities.
- Merging those maternities located very close to each other was suggested as a reasonable and efficient way of restructuring maternity and neonatal services in Armenia, as it will address

the issue of shortage of human and material resources in maternities and will provide the personnel sufficient chances to practice their skills and to improve their performance, hence – the quality of provided services. However, some participants thought that this solution cannon work universally in all regions, because the geography and nature of Armenia make some areas inaccessible, especially in winter, which justifies the need for these very small regional units. Another difficulty for merging maternities was the resistance of small maternity heads and owners. The participants highlighted the importance of ensuring that physicians working at the merged maternities receive adequate salary so that they have motivation to work there.

Medical staff of neonatal services

- At present, there are no professional qualification standards either for neonatologists or for neonatal nurses working at different level neonatal care services in Armenia. However, neonatologists recognized the necessity for these qualification standards and suggested developing a systematic approach to evaluate the qualification level of both neonatologists and neonatal nurses via regular tests.
- A majority of the neonatologists believed that neonatology is a more modern specialty compared to others and there have been continuous developments in the field – both due to the specialists' self-education and various training sessions, including those organized by AANM and the visits of specialists from abroad. However, compared to Yerevan neonatologists, marz neonatologists are less involved in these activities.
- The quality of newly graduated neonatologists is perceived as quite high. However, the quality of newly graduated nurses is considered completely inadequate. There is no specialization in neonatal nursing in nursing schools and nurses obtain the needed skills after getting employed, via undergoing an internal probation period under the staff supervision. However, neonatal units have no unified approach in training the newly employed nurses or improving their competences periodically.
- Participants agreed that there was a shortage of both neonatologists and nurses in various places. The main shortage in neonatologists was in marzes, with some places having only one specialist per region, which makes impossible both the presence of a neonatologist during each delivery and his/her round-the-clock availability in the NICU. The suggestions to

address this shortage included finding ways to motivate experienced neonatologists or new graduates, especially those originating from regions, to work there.

- Inadequate nurse-to-patient ratio in the NICUs of bigger hospitals in Yerevan was an issue. Instead of the optimal 1:1 ratio for severely ill neonates, this ratio often was less than 1:4, which could seriously influence both the quality of care and its safety in these units. Moreover, no standards for nurse-to-patient ratios in different units are specified in Armenia; and the hospital managers set the staff numbers based on available resources. Therefore, it is important to develop standard requirements for all facilities.
- Armenia lacks advanced newborn airways skills professionals, so the departments usually have one of their doctors (usually, a neonatologist or an anesthesiologist) to take care of this. As to the availability of intensive care consultant, regional services are provided with the list of contacts of some leading specialists in the country, who can be reached 24 hours per day through direct telephone calls or wireless telecommunication tablets provided in the scope of the AANN/USAID project.

Providers' knowledge, educational needs and quality of inpatient neonatal care

- According to the RA law, neonatologists, as all medical specialists in Armenia, must undergo specialty trainings every 5 years to gain the required number of credits that allows them to continue practicing medicine. Neonatologists can complete this requirement via a specialty training of seven-week duration, or a number of shorter trainings. In addition, neonatologists have enough opportunities to attend trainings conducted by different organizations (including AANM/USAID trainings on clinical guidelines) free-of-charge.
- There is no formal specialty training in neonatal nursing in Armenia. Still, the law requires that to be allowed to continue their nursing practice, nurses also gain particular number of credits via a five-week refreshment training in general nursing every five years. Compared to physicians, nurses have fewer opportunities for trainings in their specialty.
- The effectiveness of the credit system was perceived as questionable because of several deficiencies and challenges that the system poses for them. The latter included:
  - Organization of refreshment trainings in the capital, which requires that the medical personnel from marzes travel and stay in Yerevan and leave the work for considerable period of time while often being the only specialist in their respective area.

- The need to pay a sizeable amount of money (140,000 AMD for a 7-week course) for this mandatory training and cover all the expenses connected with traveling to and living in Yerevan during this period.
- The effectiveness of this training largely depends on a trainee's desire to learn, as there is no system in place to supervise their participation and learning. Moreover, anybody who pays, almost automatically receives the needed credits to work for an additional 5 years, regardless of the actual attendance and learning.
- The effectiveness of trainings suffers also because of those being mainly theoretical and providing no opportunity for the trainees to obtain skills via practicing.
- There is no requirement to pass an exam after the trainings and only then get an allowance for providing neonatal care.

- Participants felt that regular trainings on neonatal resuscitation must be organized locally in all regional facilities with involvement of all staff members. They suggested that neonatal care providers should periodically pass an exam on newborn resuscitation to make sure that they are competent in this.
- Some participants stressed the importance of finding incentives to increase the motivation of providers in learning, so that it would become a continuous, never ending process.
- The importance for the providers from marzes to have a practice at a third level NICU in Yerevan (Muratsan) or, preferably, to work in their regional unit for a while alongside a visiting highly qualified neonatologist was emphasized.
- It was thought that neonatologists were skilled in neonatal resuscitation but nurses, especially those from marz maternities, were not, and therefore they could be trusted to work with sick newborns without the supervision of neonatologists, even though there was shortage of specialists in the marzes, and neonatologists were physically unable to take care for all sick neonates. Indeed, some participants were against of nurses routinely performing resuscitation.
- Participants were dissatisfied with the overall quality of education in nursing schools. They mentioned that the new graduates of nursing schools learn everything at the workplace, while working under the supervision of senior nurses.
- The main areas suggested for continuing education of nurses were neonatal resuscitation, intensive care, respiratory assistance, infusion therapy, storage and administration of

antibiotics, monitoring of infant's vital signs, and stabilization and transportation of a newborn. Some neonatologists believed that to improve the neonatal services in Armenia, many of the current obligations of neonatologists should be delegated to neonatal nurses, after increasing their qualification and skills to the needed level.

- There were fewer areas for continuing education that neonatologists suggested for themselves: mainly, the use of equipment and infusion therapy.
- The guidelines which were developed by the AANM and distributed throughout the country following training sessions on each of them were one of the main sources of information for neonatologists. Other sources of information included Internet, literature, seminars, conferences, and consultations with other neonatologists. The participants expressed a desire to have regular meetings with their peers to discuss and share their experiences, as well as to participate in trainings conducted regularly by acknowledged neonatologists from abroad.
- The 25 new guidelines developed by AANM/USAID for the neonatal units providing 1st and 2nd level care were considered as complete and up-to-date, covering all the needed topics and bringing a number of other advantages, including uniformity of the treatment approaches they apply, confidence in specific steps to be undertaken in any situation, and protection against any questioning of their decisions that are based on the guidelines.
- No quality of care indicators are monitored in neonatal services of the country and only few participants feel the need of having a quality assurance system in place to see the overall situation of neonatal services, the long-term outcomes of neonatal care, and to find ways for improvement.
- There is no reliable data on neonatal care in the country, as some maternity hospitals are reluctant in reporting their actual data, considering it risky. Therefore, they hide the real data and only show statistics that others would like to see. Hence, the available statistics is tampered and do not reflect the true situation of neonatal services in the country.
- Although in many neonatal departments the staff gathers regularly to discuss some organizational issues, these gatherings mainly happen in case of issues, not always involve nurses, and, most importantly, the discussions are usually intended to blame somebody in case of failure, instead of constructively analyzing the situation to avoid future mistakes and to share correct approaches.

- Although in utero transfers of pregnant women at high risk of having severely ill fetus are recommended, the risk of preterm delivery is not always accurately estimated and the in-utero diagnosis of congenital conditions is not always successfully made, which results in sick newborns being born in regional maternities and only then being transferred, which is both risky for newborn's health and costly compared to in utero transfers.
- The quality of fetal antenatal diagnosis is higher at the facilities providing 3rd level care, and this is directly connected to the availability of up-to-date equipment and the ample opportunities to practice it, both of which are lacking in the regions. Insufficient quality and/or numbers of radiologists and laboratory technicians were also perceived as common reasons of misdiagnosis, or long queues in regional facilities.
- The financial issues in the field that affect the quality of care included:
  - Low salaries of both physicians and nurses, which decreases their work motivation.
  - Not being paid for treating sick neonates in the 1st and 2nd level neonatal units and inadequate state funding for treating severely ill children in the 3rd level NICUs. This decreases the motivation to keep sick newborns in regional units; and affects the care outcomes due to unneeded transfers and overcrowding in referral NICUs.
  - Lack of funding or allocation of local resources to create the needed facility conditions, to obtain, repair and maintaining the equipment.
- Adequate funding and salaries, reorganization of services, increased accountability and centralized monitoring, were suggested to improve the quality of neonatal care.
- Providing medical workers with state health insurance and legal protection from violence at the work were also suggested to increase their work motivation.

Family involvement in neonatal care

- There is some understanding about the importance of family-centered care in NICUs and AANM is making efforts to introduce it in a number of NICUs in Yerevan. However, various issues such as limited space and equipment in NICUs, overcrowding and staff overload make it difficult to implement the concept fully.
- In general, mothers can have free access to their neonates in NICUs unless the staff is working there at that time and mothers' presence could interfere with their work. In some

NICUs skin-to-skin contact and kangaroo care are encouraged. However, in many NICUs there are time restrictions for mothers and especially for fathers to visit their newborns.

- The main issues with ensuring minimum environmental stress (light and noise) for neonates, continuous skin-to-skin contact and soothing parental touch during painful procedures in NICUs were related to facility conditions: overload with babies, placement of the unit near a noisy corridor, stressful working atmosphere because of insufficient quantities of equipment and supplies.
- No donor milk is used in NICUs because there aren't any milk banks in Armenia. The first choice is mother's expressed milk. However, a major issue here is that units do not have beds for mothers to sleep in, or sitting areas where they can stay, and only few NICUs provide pumps to express milk. This creates difficulties for the mothers to supply the required amount of milk, which usually results in the baby being fed formula.
- Suggestions for improvements in this area included: creating the necessary conditions (room, bed) next to NICUs enabling mothers to stay in the hospital with their neonates and have unlimited access to them; supporting mothers with breastfeeding by providing them a room with necessary conditions (pumps, other supplies) where they can pump and store their milk; and creating conditions for using donor's milk by screening the potential donors for any infections they may have.
- Generally, there is no any practice in NICUs of providing parents with written information on their child's disease, treatment process and the regulations of the neonatal department.

Organizing the transfer of sick newborns

- The neonatologists have both ex-utero and in-utero transfer guidelines that content both indications for each type of transfer and a scoring tool developed by AANM that allows estimating the risk associated with the given case of neonatal transfer.
- All neonatal transfers from the regions and the majority of those from Yerevan maternities are organized by Muratsan hospital via its reanimobiles. The majority of participants felt that transfers of sick newborns are performed safe and effective.
- The two reanimobiles are small and speedy, but have only few devices because of limited space inside. It is advisable to have more small-size portable equipment in the vehicles, including transport incubator, cardio-monitor, air compressor, oxygen cylinder, humidifier,

mechanical ventilator, T-piece resuscitator, infusion pump, micro-laboratory, bilicheck, phototherapy lamp, and trans-illuminator.

- Although the tablets for 7/24 telemedicine consultations help a lot in stabilizing the newborn, in severe cases when invasive interventions are needed, the providers in regions often have no adequate competencies and equipment to stabilize the neonate before the reanimobile arrives.
- The factors that make neonatal transfers challenging include the lack of vehicle crews that are free from other responsibilities and have fixed salaries, long distances between Yerevan and some of the regions resulting in too long duration of waiting and transfer; poor geographical and weather conditions that sometimes make roads impassible; as well as shortage of vehicles and crews.
- To improve neonatal transfers, suggestions were made to:
  - Increase the number of neonatal reanimobiles and improve their equipping;
  - Rid the crew members of other responsibilities and provide them fixed salaries;
  - Provide neonatal ambulance vehicles to remote marzes;
  - Use air transfer service via a helicopter.

Donor projects on neonatal care in Armenia since 2010

- A number of donor projects on neonatal care were conducted in Armenia during recent years with wide coverage and valuable impact, especially those carried out by VivaCell/BirthLink and AANM/USAID. Particular activities included developing quality standards and guidelines (AANM, USAID, AECP), provider trainings (AANM, USAID, VivaCell/BirthLink, UNICEF, AECP, WV Armenia), introducing non-invasive respiratory support therapy (VivaCell/BirthLink), running a 7/24 telemedicine service (USAID/AANM), establishing neonatal retinopathy screening centers (AECP), provision of equipment for neonatal care (VivaCell/BirthLink, AECP, USAID, WV, WB), renovation of neonatal units (WB), etc.
- The above-mentioned donor organizations along with the MOH and the Department of Neonatology of the YSMU were repeatedly mentioned as having an impressive impact in the field. The role of the AANM was particularly appreciated as a successful replication of a western-type model for achieving advances in a particular field of medicine.

- All donor organizations conducted some monitoring activities to assess the effectiveness of their projects and generally they were satisfied with the results. Some of the positive results included improved knowledge and better communication between providers, better organization of newborns' transfers, improved case management of critically ill neonates in regional facilities, etc.
- The majority of neonatologists greatly appreciated the activities undertaken by donor and professional organizations that contributed to considerable advancements in the field and to the reduction of neonatal mortality.
- The main concern was the limited sustainability of the projects, as with the completion of these projects their impact will gradually diminish and the unaddressed needs in the neonatal services will emerge again. The further existence and functioning of AANM was of a particular concern.
- The lessons learned from monitoring of donor projects included:
  - Provider trainings organized in clinical settings are more effective than theoretical trainings conducted outside of the working atmosphere;
  - Hospitals receiving the same aid differ in the pace of advancement, with some developing faster than others, mainly due to management and personnel specifics;
  - To be effective and efficient in one's undertakings, one should have a clear picture of the most crucial needs in each setting to avoid repetitions and duplication of efforts.
  - Nurses in Armenia have no sufficient background knowledge to be able to obtain from the trainings the whole dept of the knowledge and skills that are standard requirements for their counterparts abroad.
- Only one of the donor project representatives stated that their project will have a continuation in future.

Outpatient neonatal care

- PHC pediatricians are immediately notified about a birth of a baby via the reverse card and once the neonate is discharged from the maternity, they receive the exchange card containing all the necessary information on newborn's health parameters, vaccination, and other performed manipulations.

- Two home visits should be made by a PHC pediatrician to a healthy newborn – within the first and second weeks of the baby's life, and at the age of 1.5 months the child should be taken to PHC setting for vaccination. Pediatricians from marzes confessed than often they do not manage to keep the schedule of home visits to newborns in rural areas because of the lack of transportation allocated for that. Therefore, often the village nurse makes the first visit alone and asks the pediatrician to visit the baby if there are some problems.
- When asked whether there are any issues with newborn vaccinations, a few pediatricians stated that there are parents who do not allow vaccinating their babies against Hepatitis B either because they afraid complications or because maternity hospital physicians advise parents to refuse this vaccination, while asking them to keep this in secret.
- Although PHC pediatricians appreciated the role of the "Schools for Mothers" in educating future mothers, they claimed that women usually learn nothing on child care and feeding during their short stay at maternity hospitals and that often new mothers are very ignorant in the issues of newborn care and nutrition.
- To address this issue, suggestions were made that women consultations distribute brochures among pregnant women on child care and feeding, so that they come to maternity hospitals already aware of these issues.
- The importance of educating couples to pass preconception screening before getting pregnant was also emphasized as a measure that can have great impact on the health of their future babies.
- Some of the participants noted that the current requirement of serving too many children leaves no time for a pediatrician for educating mothers and providing services of a needed quality.
- Mothers with breastfeeding difficulties (cracked nipples, painful feedings, low milk production, first delivery, weak/sick neonate, etc.) have no mean to receive professional lactation support either in maternity hospitals or at home. Moreover, often mothers come from Yerevan maternities already feeding with formula because they were advised to do so, especially if the mother had a C-section.
- PHC pediatricians reported that they hospitalize newborns when the babies have danger signs and that hospitalizations of newborns from remote areas are organized either by parents or by ambulance. Neonates from villages are often taken to hospital without being seen by their

pediatrician, as in case of a call from a village, the village nurse is sent to the newborn and, whenever needed, she contacts the physician and the doctor decides whether he/she should go to visit the baby or the baby should be taken to the hospital.

Educational needs of PHC providers on newborn care

- Pediatricians claimed that unlike physicians of other specialties, they do not have clinical guidelines on different conditions. Therefore, they cannot be sure that the steps they undertake in the management of a given condition are correct. Also, they are not protected from the legal point of view. The lack of specific guidelines in pediatrics was perceived as a very serious issue that must be urgently addressed.
- Pediatricians from marzes noted that new practices reach them very late and that their situation is more difficult as often they are the only specialists in their area and therefore cannot seek the advice of narrow specialists. As to online materials, these are often not trustworthy or not free of charge, and they are even not advised which websites to use to receive up-to-date information.
- The requirements of the credit system for pediatricians and pediatric nurses are the same as for neonatologists and neonatal nurses, respectively, with the same challenges and difficulties. Pediatricians from Yerevan reported that they have plenty of training opportunities unlike those from regions thinking that the trainings they receive are insufficient.
- The participants were uniform in their opinion that the trainings needed within the scope of the credit system should be provided free of charge. Also, either the trainings should be organized on-site for the providers from far regions, or they should receive the means to attend the trainings and a replacement at their workplace.
- Pediatricians from the marzes were very satisfied with the training sessions formerly organized for them by UNICEF and the training materials they provided. They mentioned several positive features of these trainings, including the valuable training materials and posters, the organization of trainings on-site, so that the staff was always at the workplace, and the fact that UNICEF paid them for attending those courses.
- A number of pediatricians believed that the current qualification of pediatric nurses does not meet modern standards of working with newborns. Therefore, nurses need continuous

training in neonatal care to obtain all the necessary skills. They also thought that first of all, physicians are the ones who should teach them, as they sometimes lack the basic knowledge even on simple matters.

- The training topics on neonatology suggested by pediatricians for themselves included recognizing the danger signs in newborns, especially in premature babies, emergency care for newborns, newborn resuscitation, and vaccination.

6. CONCLUSIONS AND RECOMMENDATIONS

- Neonatal deaths still constitute almost three fourths of all infant deaths in Armenia, and around half of these deaths occur during the first day of life.
- The most frequent causes of ENM in Armenia are respiratory distress (29.3%), inborn pneumonia (28.0%), congenital defects (20.0%), and asphyxia/ intrauterine hypoxia (17.3%). The share of deaths among LBW babies is substantial (87%) in the structure of ENM.
- The present structure of neonatal care services in Armenia does not ensure equal access to quality services for all newborns, as almost all 3rd level NICUs are confined to Yerevan and are less accessible for newborns from regions both for geographical and financial reasons.
- Regional facilities are often lacking high quality specialists, equipment and supplies, and the motivation of specialists to treat complicated cases in regional facilities is low because of low salaries they receive, lack of state funding allocated to regional facilities for neonatal care, and procedural restrictions that require transferring sick neonates to higher-level facilities.
- Not all regional facilities are adequately equipped with proper equipment, and some are lacking the most vital equipment. But even the available equipment is often left unused, as the patient flow of sick neonates is very low and neonatologists often forget how to use the equipment when needed.
- The main need related to equipment in regional hospitals is the lack of devices for providing a neonate with heated and humidified air-oxygen mixture during respiratory support. The most frequently missing equipment types are: air compressor, air-oxygen blender, oxygen concentrator, respiratory circuit with heated humidifier, T-shaped resuscitator, infusion pump, electronic scale, neonatal tonometer, neonatal thermometer, and bilirubinometer.
- Insufficient supplies in regional hospitals include nasal prongs of premature size, intubation tubes, catheters (umbilical, venous, and aspiration), and extenders for intravenous injections. Half of the essential laboratory and diagnostic tests for newborns are unavailable in regions.
- The gradual pattern of referrals from lower-level maternities to higher level ones is not actually followed, as the neonates with somatic conditions both from regional and Yerevan maternities are mainly referred to a single referral center – “Muratsan” hospital.

- The current structure of neonatal care in Armenia that includes over 50 small neonatal units is both inefficient and ineffective, and transferring neonates to Yerevan from remote areas takes too much time for severely ill neonates (8-12 hours on waiting and transportation).
- The neonatal ambulance service in "Muratsan" hospital is the only such service in Armenia. The two reanimobiles are suboptimally equipped because of limited space inside. Also, in the cases when invasive interventions are needed, the skills of providers and the equipment in remote regions are often inadequate to stabilize the neonate before the reanimobile arrives.
- There are no professional qualification standards either for neonatologists or neonatal nurses in Armenia. The overall quality of education in nursing schools is inadequate. There is a shortage of both neonatologists and neonatal nurses, with the former being especially pronounced in regional maternities, where often only one neonatologist is employed, and the latter – in Yerevan NICUs, which results in overly high patient-to-nurse ratios (4:1 or more).
- The existing credit system for continuous professional development poses several challenges for physicians and nurses, including difficulties for providers from marzes to attend trainings in Yerevan, to pay the cost for their attendance, to learn independently as there is no supervision of their participation, no opportunities to practice their skills, and no requirement to pass an exam upon completion.
- Neonatologists give the highest priority to receiving trainings on neonatal resuscitation, respiratory support, respiratory distress syndrome, pneumonia, asphyxia, encephalopathy, equipment use, and infusion therapy. They appreciate the new guidelines on neonatology developed by AANM as a complete and up-to-date source of information and support.
- The main areas suggested for continuing education for nurses are neonatal resuscitation, intensive care, respiratory assistance, infusion therapy, storage and administration of antibiotics, monitoring of infant's vital signs, and newborn's stabilization and transportation.
- PHC providers consider respiratory distress syndrome, pneumonia, LBW newborn care and feeding, neonatal hypoglycemia, muscular tonus and convulsions, and neonatal jaundice as priority topics for both trainings and clinical guidelines. They also prioritize trainings on danger signs in premature newborns, emergency newborn care, resuscitation and vaccination.
- No Quality of Care Indicators are monitored in neonatal services of Armenia and there is no reliable data on neonatal services, as maternity hospitals are often reluctant in reporting their

actual data. Staff gatherings in maternity hospitals are often intended to blame somebody for a failure, instead of constructively analyzing the situation to avoid future mistakes.

- Although in utero transfers of pregnant women at high risk of having severely ill baby are recommended, these risks are not always accurately estimated in regions due to lack of appropriate diagnostic equipment and qualified specialists. Maternities are not interested in in-utero transfers as, under the OCSC program, they get money for each delivery.
- There is no unlimited access of parents to their neonates in NICUs. The units often lack conditions for minimizing stress for neonates, providing beds for mothers to sleep in, or areas where they can express milk, which usually results in shifting to formula feeding.
- During recent years, several donor and professional organizations (VivaCell/BirthLink, AANM/USAID, AECP, etc.) were engaged in projects to strengthen neonatal services in Armenia. These activities had high coverage, considerable impact on improving providers' knowledge and communication, organization of newborn transfers, case management of severely ill neonates in regions, and other important areas, resulting in some reduction in ENM.
- With regard to donor projects, the main concern is their limited sustainabilityafter the project ends. The further existence and functioning of AANM is of a particular concern among neonatologists.
- Pediatricians from regions often do not manage to keep the schedule of home visits to newborns in rural areas because of the lack of transportation allocated for that. Hence, village nurses make the first visits alone and ask the pediatrician to come if they detect some problems.
- Newborns get hospitalized if have danger signs. Hospitalizations from remote areas are organized either by parents or by ambulance. Newborns from villages are often taken to hospital without being seen by their pediatrician, as in case of call from a village, the village nurse is sent to the newborn.

Based on the findings of this study, the following recommendations can be made for improving neonatal care services in Armenia:

- Organize on-site trainings on neonatal resuscitation in all maternity hospitals with involvement of all staff members periodically. The resuscitation should include stimulation

and ventilation beneath a radiant heat source with the use of pulse oximetry and application of positive airway pressure.

- In all maternity hospitals, create all the needed technical conditions (equipment, air and oxygen sources, and supplies) for CPAP with the needed concentration of humidified and heated air-oxygen mixture. Supply all the settings with the same type of CPAP equipment, so that a unified clinical protocol on its application can be used.
- In all maternities, ensure round-the-clock availability of personnel skilled in neonatal resuscitation and application of CPAP.
- Develop and monitor neonatal care quality indicators for all levels of care covering all aspects of its quality, including utilization, cost, and effectiveness in terms of newborn survival and other health outcomes. Periodically summarize the results of this monitoring and discuss those at different levels to find ways for improvement.
- Standardize maternal and newborn care with application of clear indications for hospitalization of pregnant women in different-level facilities with established territorial referral patterns for each facility. Provide regional facilities with the needed diagnostic equipment and specialists to timely identify and refer pregnant women at risk.
- Establish regional referral centers providing third level care in remote marzes to shorten the time spent on transferring sick neonates, thus contributing to better outcomes of care and addressing the demand of population from regions to be referred to a close-by referral center.
- Connect third level referral centers in remote marzes with the local settings via emergency transport system which is equipped accordingly to provide basic supportive care to newborns and maintain their temperature and blood glucose level during transportation.
- Allocate adequate state funding for the remote counseling center in the Muratsan hospital to make this service sustainable, including its telecommunication component, the needed number of well-equipped neonatal reanimobiles, and the teams of specialists for each reanimobile free from other obligations. Establish an air transfer service via a helicopter.
- Consider the possibility of merging two-three small regional maternity hospitals located very close to each other, to address the issue of shortage of human and material resources in each of them and creating sufficient opportunities for the personnel to practice their skills.
- To eliminate the shortcomings connected with the current system of financing of maternal and newborn care services (such us financial motivation of keeping even pregnant women at

risk of delivering sick infant, no funding for sick newborn care in regional maternities and inadequately low funding in 3rd level NICUs, no funding for equipment purchase, repair, and maintenance), find possibilities to exclusively cover maternal and newborn health care services from the state budget.

- To improve providers' work motivation and performance, consider increasing neonatologists' and neonatal nurses' reimbursement.
- Ensure the transparency of financial flows in the field and the accountability of services providing maternal and neonatal care.
- Find ways to make sustainable the activities undertaken by various donor organizations in the field of neonatal care.
- Make the trainings required in the scope of the continuous professional development credit system free of charge for providers. Revise the curriculum of these trainings to focus more on the themes prioritized by the providers. The trainings should be better mentored, provide opportunities to learn via practice, and end with an exam.
- Facilitate providers' learning on-practice via motivating experienced neonatologists to temporarily work side-by-side with the local providers in regional hospitals or create opportunities for regional neonatologists to work for a while in 3rd level NICUs in Yerevan.
- Improve the overall quality of education in nursing schools and develop a unified curriculum for postgraduate specialization in neonatal nursing. After increasing the qualification and skills of neonatal nurses to the needed level, many of the current obligations of neonatologists in lower-level maternity hospitals in regions can be delegated to neonatal nurses.
- Set professional qualification standards both for neonatologists and neonatal nurses. Make a shift to a system that requires licensing of doctors to be allowed to practice medicine.
- Create minimally stressful environment for newborns in NICUs with parents' unrestricted access to their newborns, mother's stay in the same hospital, and conditions for breast milk expression and storage. Implement Kangaroo mother care. Consider the possibility of creating conditions for using donor's milk in NICUs as needed.
- Improve pregnant women's education on newborn care and feeding via "Schools for mothers" and dissemination of health educational materials by women's consultations. Provide practical support to mothers for accurate breastfeeding and child care in maternity

hospitals. Make all the efforts to minimize the use of infant formula both for healthy newborns and for sick neonates in NICUs.

- Organize educational campaign for couples on the importance of undergoing preconception screening before making a decision to have a child.
- Develop specific guidelines on managing different neonatal conditions at PHC level and conduct trainings of PHC pediatricians and family doctors on these.
- Provide transportation means to pediatricians to make house visits to newborns in villages.
- Conduct research to identify the major determinants of neonatal survival in each area and consider these when designing a specific program to improve neonatal care.

7. REFERENCES

1. United Nations (2016) The Sustainable Development Goals Report 2016. New York: United Nations.
2. World Health Organization. *Sustainable Development Goals (SDGs)*. [cited 2017 June 22]; Available from: http://www.who.int/sdg/en/.
3. Europe PMC Funders Group (2016) Global, regional, national, and selected subnational levels of stillbirths, neonatal, infant, and under-5 mortality, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet* 388(10053):1725-1774.
4. Lawn JE, Kinney MV, Black RE *et al.* (2012) Newborn survival: a multi-country analysis of a decade of change. *Health Policy Plan* 27 Suppl 3:iii6-28.
5. UNICEF, WHO, The World Bank *et al.* (2013). *Levels and trends in child mortality: report 2013*. UNICEF: New York, USA.
6. Lawn JE, Blencowe H, Oza S *et al.* (2014) Every Newborn: progress, priorities, and potential beyond survival. *Lancet* 384(9938):189-205.
7. Chow S, Chow R, Popovic M *et al.* (2015) A Selected Review of the Mortality Rates of Neonatal Intensive Care Units. *Frontiers in Public Health* 3:225.
8. Dawodu A (1998) Neonatology in developing countries: problems, practices and prospects. *Ann Trop Paediatr* 18 Suppl:S73-S79.
9. Austin A, Langer A, Salam RA *et al.* (2014) Approaches to improve the quality of maternal and newborn health care: an overview of the evidence. *Reproductive Health* 11 Suppl 2:S1.
10. Wall SN, Lee AC, Carlo W *et al.* (2010) Reducing intrapartum-related neonatal deaths in low- and middle-income countries-what works? *Semin Perinatol* 34(6):395-407.
11. Bhutta ZA, Salam RA, Lassi ZS *et al.* (2014) Approaches to improve quality of care (QoC) for women and newborns: conclusions, evidence gaps and research priorities. *Reproductive Health* 11 Suppl 2:S5.
12. Manley BJ, Owen LS, Hooper SB *et al.* (2017) Towards evidence-based resuscitation of the newborn infant. *Lancet* 389(10079):1639-1648.
13. Darmstadt GL, Bhutta ZA, Cousens S *et al.* (2005) Evidence-based, cost-effective interventions: how many newborn babies can we save? *The Lancet* 365(9463):977-988.
14. Mazmanyan P, Mellor K, Dore CJ *et al.* (2016) A randomised controlled trial of flow driver and bubble continuous positive airway pressure in preterm infants in a resource-limited setting. *Archives of Disease in Childhood - Fetal and Neonatal Edition* 101(1):F16-20.

15. Lissauer T, Duke T, Mellor K *et al.* (2017) Nasal CPAP for neonatal respiratory support in low and middle-income countries. *Arch Dis Child Fetal Neonatal Ed* 102(3):F194-F196.
16. Owen LS, Manley BJ, Davis PG *et al.* (2017) The evolution of modern respiratory care for preterm infants. *The Lancet* 389(10079):1649-1659.
17. Harding JE, Cormack BE, Alexander T *et al.* (2017) Advances in nutrition of the newborn infant. *The Lancet* 389(10079):1660-1668.
18. Demirchyan A, Melkom Melkomian D, Abelyan G *et al.* (2016). *Institutional consultancy on assessing livebirth and stillbirth registration and reporting in Armenia*. American University of Armenia School of Public Health, Center for Health Services Research and Development: Yerevan, Armenia.
19. Armenian Association of Neonatal Medicine. (2016). *A Cross-Sectional Study Assessing the Quality of Neonatal Health Care in the Republic of Armenia*. USAID: Yerevan, Armenia.
20. BirthLink. (2013). *Improving Neonatal Care in Armenia*. VivaCell MTS. http://www.birthlinkuk.org/HA98UY/wp-content/uploads/WEB-PAGES-MMRGB.pdf.
21. GBD 2015 Child Mortality Collaborators (2016) Global, regional, national, and selected subnational levels of stillbirths, neonatal, infant, and under-5 mortality, 1980-2015: a systematic analysis for the Global Burden of Disease Study 2015. *The Lancet* 388(10053):1725-1774.
22. Shuvalova MP, Yarotskaya EL, Pismenskaya TV *et al.* (2015) Maternity Care in Russia: Issues, Achievements, and Potential. *Journal of Obstetrics and Gynaecology Canada* 37(10):865-871.
23. Володин НН (2008) Неонатология. Национальное руководство. Часть I. Москва: ГЭОТАР - Медиа.
24. Nigmatulina D & Becker C (2016) Is high-tech care in a middle-income country worth it? *Economics of Transition* 24(4):585-620.
25. Popovich L, Potapchik E, Shishkin S *et al.* (2011) Russian Federation: health system review. *Health Systems in Transition* 13(7):1-190.
26. Суханова ЛП, Бушмелева НН, Сорокина ЗХ (2012) Младенческая смертность в России с позиций достоверности ее регистрации. *Социальные аспекты здоровья населения* 6(28).
27. Lekhan VN, Rudiy VM, Shevchenko MV *et al.* (2015) Ukraine: health system review. *Health Systems in Transition* 17(2):1-153.
28. Nizalova OY & Vyshnya M (2010) Evaluation of the impact of the Mother and Infant Health Project in Ukraine. *Health Econ* 19 (Suppl):107-125.
29. Richardson E, Malakhova I, Novik I *et al.* (2013) Belarus: health system review. *Health Systems in Transition* 15(5):1-118.

30. Murauskiene L, Janoniene R, Veniute M *et al.* (2013) Lithuania: health system review. *Health Systems in Transition* 15(2):1-150.
31. Maternity Services Action Group. (2009). *Review of Neonatal Services in Scotland*. [cited; Available from: http://www.gov.scot/Publications/2009/04/30153006/11.
32. Rogowski JA, Horbar JD, Staiger DO *et al.* (2004) Indirect vs direct hospital quality indicators for very low-birth-weight infants. *JAMA* 291(2):202-209.
33. Phibbs CS, Baker LC, Caughey AB *et al.* (2007) Level and volume of neonatal intensive care and mortality in very-low-birth-weight infants. *N Engl J Med* 356(21):2165-2175.
34. Heller G, Richardson DK, Schnell R *et al.* (2002) Are we regionalized enough? Early-neonatal deaths in low-risk births by the size of delivery units in Hesse, Germany 1990-1999. *Int J Epidemiol* 31(5):1061-1068.
35. Bartels DB, Wypij D, Wenzlaff P *et al.* (2006) Hospital volume and neonatal mortality among very LBW infants. *Pediatrics* 117(6):2206-2214.
36. Obladen M (2007) [Minimum patient volume in care for very low birthweight infants: a review of the literature]. *Z Geburtshilfe Neonatol* 211(3):110-117.
37. Cifuentes J, Bronstein J, Phibbs CS *et al.* (2002) Mortality in LBW infants according to level of neonatal care at hospital of birth. *Pediatrics* 109(5):745-751.
38. Tucker J (2002) Patient volume, staffing, and workload in relation to risk-adjusted outcomes in a random stratified sample of UK neonatal intensive care units: a prospective evaluation. *Lancet* 359(9301):99-107.
39. Bennett CC, Lal MK, Field DJ *et al.* (2002) Maternal morbidity and pregnancy outcome in a cohort of mothers transferred out of perinatal centres during a national census. *Bjog* 109(6):663-666.
40. Ministry of Health of Singapore. (Sep 2001). *Licensing & Accreditation. Guidelines for Hospitals with Neonatal Intensive Care Service: Regulation 4 of the Private Hospitals and Medical Clinics Regulations [CAP 248, Rg 1]*.
41. Hamilton KE, Redshaw ME, Tarnow-Mordi W (2007) Nurse staffing in relation to risk-adjusted mortality in neonatal care. *Arch Dis Child Fetal Neonatal Ed* 92(2):F99-F103.
42. Rogowski JA, Staiger D, Patrick T *et al.* (2013) Nurse staffing and NICU infection rates. *JAMA Pediatr* 167(5):444-450.
43. Sherenian M, Profit J, Schmidt B *et al.* (2013) Nurse-to-patient ratios and neonatal outcomes: a brief systematic review. *Neonatology* 104(3):179-183.
44. Lemons JA & Lockwood CJe (2007) Guidelines for Perinatal Care. 6th. Washington, DC: American Academy of Pediatrics.

45. British Association of Perinatal Medicine (2010) Service Standards for Hospitals Providing Neonatal Care (3rd edition). London: British Association of Perinatal Medicine.
46. Curry LA, Nembhard IM, Bradley EH (2009) Qualitative and mixed methods provide unique contributions to outcomes research. *Circulation* 119(10):1442-1452.
47. Hsieh HF & Shannon SE (2005) Three approaches to qualitative content analysis. *Qual Health Res* 15(9):1277-1288.

8. APPENDICES

8.1 Appendix 1. FGD guides (in English and Armenian)

Consent form for Focus Group Discussion with Healthcare Providers

Hello. My name is …… . I am a researcher at the Zvart Avedisian Onanian Center for Health Services Research and Development of the American University of Armenia. At the request of UNICEF Armenia, our center is conducting a research to assess neonatal care services at maternity and primary healthcare levels in Armenia. The aim of this study is to explore the problems existing in the field of neonatal health care and recommend solutions.

This discussion, which you have been invited to attend, is a part of this project. You were selected purposefully as specialists involved in provision of neonatal care. Your experience, views and suggestions will help us to identify the current situation in the sphere of neonatal healthcare and suggest ways for improvement. Your involvement in this study will be limited to this single discussion and you will not be contacted again.

The discussion will last about an hour. After receiving your verbal consent for participation, we will ask each of you to complete a short questionnaire. Then we will provide you with some discussion themes and urge you to express your ideas concerning these matters. Your participation is voluntary. You can stop it at any time. Also, you may refuse to answer any question, if you so wish. There will be no any consequences for you if you decide to participate or decline to do so. You will not receive any direct benefits from participation either, but your active participation will assist us in developing suggestions to improve the existing practices.

During the discussion we will take notes and, if you allow, we will also audio-record the conversation to ensure that none of the ideas that you express escapes our attention. The discussion will be audio-recorded only if all participants agree to it. Participation carries no risks for you. The information you provide will be kept confidential. All the information received during the study will be summarized and presented as a report containing no any personal or institutional data or contact information.

If you have any questions regarding this study you can call the study coordinator Anahit Demirchyan (060 61 25 62). If you feel you have not been treated fairly during the study or think your participation in the study has damaged you in any way, you can contact the IRB Human Participants Administrator of the American University of Armenia, Varduhi Hayrumyan (060 61 26 17).

Do you agree to participate? If yes shall we start?

Do you agree to audio-recording? Please say yes or no.

If you are ready, now we will start.

Բուժաշխատողների հետ խմբային քննարկման իրազեկ համաձայնագիր

Բարև Ձեզ, իմ անունը …… է: Ես Հայաստանի ամերիկյան համալսարանի Զուարթ Աւետիսեան Օնանեանի անվան Առողջապահական ծառայությունների հետազոտման և զարգացման կենտրոնի գիտաշխատող եմ: ՅՈՒՆԻՍԵՖ-ի պատվերով մեր կենտրոնն իրականացնում է ծննդատնային և առաջնային բուժսպասարկման օղակներում նորածնային բուժօգնության ծառայությունների գնահատման որակական հետազոտություն՝ այդ ծառայություններում առկա խնդիրները վեր հանելու և լուծումներ առաջարկելու նպատակով:

Նշված հետազոտության մաս է կազմում այս քննարկումը, որին Դուք հրավիրվել եք մասնակցելու, քանի որ ներգրավված եք նորածինների բուժսպասարկման ոլորտում: Ձեր փորձը, տեսակետներն ու մոտեցումները կօգնեն մեզ պարզել այս ասպարեզում ներկայումս տիրող իրավիճակը և առաջարկել բարելավման ուղիներ: Ձեր մասնակցությունն այս հետազոտությանը կսահմանափակվի այս միակ քննարկմամբ:

Քննարկումը կտևի մոտ մեկ ժամ: Մասնակցելու Ձեր բանավոր համաձայնությունն ստանալուց հետո մենք կառաջարկենք Ձեզ լրացնել կարճ հարցաթերթիկ: Այնուհետև կսկսենք քննարկումը, որի ժամանակ Ձեզ կառաջարկենք թեմաներ և կխնդրենք արտահայտվել դրանց շուրջ: Ձեր մասնակցությունը կամավոր է: Դուք կարող եք ցանկացած պահի ընդհատել այն: Կարող եք նաև չպատասխանել որևէ հարցի, եթե չեք ցանկանում: Քննարկմանը մասնակցելը կամ դրանից հրաժարվելը Ձեզ համար որևէ հետևանք չի ունենա: Դուք որևէ ուղղակի օգուտ ևս չեք ստանա մասնակցությունից, սակայն Ձեր մասնակցությունը կօգնի համակարգը բարելավելու առաջարկներ կատարել:

Քննարկման ընթացքում մենք գրի կառնենք և, եթե թույլ տաք, կձայնագրենք այստեղ ասվածը, որպեսզի ոչ մի գաղափար չվրիպի մեր ուշադրությունից: Քննարկումը կձայնագրվի միայն բոլոր մասնակիցների համաձայնության դեպքում: Մասնակցությունը որևէ ռիսկ չի պարունակում Ձեզ համար: Ձեր տրամադրած տեղեկությունները կպահվեն գաղտնի: Հետազոտության ընթացքում ստացված բոլոր տեղեկությունները ի մի կբերվեն և կներկայացվեն միայն ընդհանրացված ձևով՝ չպարունակելով որևէ անուն, հաստատության անուն կամ անձնական տվյալ:

Այս հետազոտության վերաբերյալ հարցեր ունենալու դեպքում Դուք կարող եք զանգահարել հետազոտության համակարգող Անահիտ Դեմիրճյանին՝ 060 61 25 62 հեռախոսահամարով: Եթե մտածեք, որ այս հետազոտությանը մասնակցելու ընթացքում Ձեզ լավ չեն վերաբերվել կամ որ մասնակցությունը Ձեզ վնաս է պատճառել, կարող եք զանգահարել Հայաստանի ամերիկյան համալսարանի էթիկայի հանձնաժողովի քարտուղար Վարդուհի Հայրումյանին՝ 060 61 26 17 հեռախոսահամարով:

Դուք համաձա՞յն եք մասնակցել: Եթե այո, կարո՞ղ ենք սկսել:

Դուք համաձա՞յն եք, որ ես միացնեմ ձայնագրիչը: Խնդրում եմ ասեք՝ ԱՅՈ կամ ՈՉ:

Եթե Դուք պատրաստ եք, կարող ենք սկսել:

Focus Group Discussion Guide (Neonatologists of Maternities and Hospitals)

Date: _____Time: _____

Place: _____

Moderator: _____

Recorder: _____

Good afternoon and thank you very much for coming. My name is _____. I represent Gerald and Patricia Turpanjian School of Public Health of the American University of Armenia. As mentioned in the informed consent form you have read, with UNICEF's support, we conduct a study to explore the problems existing in the neonatal care services and recommend solutions. We would like to ask you to share your expertise in this area, which is very valuable for us. I will suggest you the themes for the discussion and ask all of you to express your opinion on those themes. It would be better if the discussion will pass as a free conversation, and everybody will participate in it without waiting to his turn. As mentioned in the informed consent form, the information you will provide will be fully confidential, and your name will not appear with that information. So, please, express your ideas freely. We will ask you to complete a short questionnaire first, and then we will start the discussion. If you don't mind, we will tape-record our conversation so that no any important piece of it is lost. Is it Ok? Please, let us begin now.

1. Organization and adequacy of neonatal services

1.1 In your opinion, does the structure of neonatal care services in Armenia ensure equal access to quality services for all newborns, regardless of their birthplace?

1.1.1 If not, what are the main obstacles to equal access? How to overcome them?

1.2 According to your experience, how well are maternity hospitals of Armenia equipped with the necessary equipment for neonatal intensive care and resuscitation? What are the pressing needs in this area?

1.3 According to your experience, to what extent are the providers of neonatal services prepared to use the available equipment correctly? What additional training is needed in this area?

1.4 Is there an effective referral system between different level neonatal care facilities in Armenia? Do you see a need for such a system?

1.5 Could you suggest any way for restructuring of neonatal care services that will improve the access to quality services (e.g., having in mind examples of these services in other countries)?

2. Medical staff of neonatal services

2.1 Do you think that in Armenia, the qualification of nurses in neonatal care departments meets the current requirements? What problems exist in this area?

2.2 Do professional qualification standards for nurses working at different level neonatal care services exist in Armenia?

2.2.1 If not, do you think that there is a need for such standards? What should be the standards?

2.2.2 If yes, do you think that these standards are adequate?

2.3 Do you think that the qualification of Armenian neonatologists meets the current requirements?

2.4 Do professional qualification standards for neonatologists working at different service levels exist in Armenia?

2.4.1 If not, do you think there is a need for such standards? What should be the standards?

2.4.2 If yes, do you think that these standards are adequate?

2.5 In your opinion, what can be done to increase the qualification of medical personnel of neonatal services and maintain that level?

2.6 According to your experience, do you think that the numbers of neonates served by one nurse and one physician at different levels of neonatal care are optimal in Armenia?

2.6.1 If not, what ratio do you think is optimal for neonatal pathology, intensive therapy and resuscitation departments?

2.7 Is there a neonatologist available at all times (in hospital or home duty) in maternity hospitals and neonatal units of Armenia? Do you think there is a need for that?

2.8 Is there a qualified intensive care consultant available at all times in maternity hospitals and neonatal units of Armenia to provide consulting by phone? Do you think there is a need for that?

3. Knowledge, educational needs and quality of care

3.1 Are all medical staff members of neonatal care departments skilled in neonatal resuscitation? What problems exist in this area? Who needs training in this area and at what frequency?

3.2 Are the maternity institutions able, whenever it is necessary, to immediately (within 5 minutes) assure the presence of a professional who is competent in advanced newborn airway skills?

3.3 In your opinion, what are the areas where the neonatal care nurses need additional professional training (e.g., intensive, special, or post-surgery newborn care, stabilization and transfer of a neonate [STABLE], resuscitation [NRP], breast feeding, etc.)?

3.4 In your opinion, in which priority areas do neonatologists need continuing education? What sources of specialized information do they use?

3.5 Are the existing clinical guidelines in the field of neonatology sufficient? What other guidelines would you like to have?

3.6 Do the maternity hospitals and neonatal units have quality of care indicators that they monitor, including long-term (e.g., two year) treatment outcomes? Do you think they are important?

3.7 Is there a practice in maternity hospitals and neonatal units to regularly discuss organizational issues with the entire staff? Do you think that there is a need for it?

3.8 What is the situation with fetal antenatal diagnosis and, based on that, planning the further treatment of newborns in maternity hospitals? What ways do you see for improving this area?

4. Family involvement in neonatal care

4.1 Based on your experience, do the maternity hospitals and neonatal care departments in Armenia ensure parents' unrestricted access to their newborn baby (if there are no medical contraindications)? Is mother's stay at the same hospital ensured? If not, why?

4.2 Do you think that everything possible is done to ensure the best care of a sick newborn in a minimally stressful environment, including skin to skin contact, feeding, soothing touch during painful procedures by parents, while minimizing neonate's exposure to noise, light, and pain?

4.3 What conditions exist in hospitals for breast milk expression and storage, or using donor milk? How the situation could be improved?

4.4 Do parents have the opportunity to receive written information on the disease, care, and treatment of their child, and the needed information on the regulations of the department? Do you see a need for it?

5. Organizing the transfer of sick newborns

5.1 Are the maternities and neonatal units of hospitals able to organize safe and effective transfer of a newborn anytime (land or air transfer)?

5.1.1 If not, what problems exist in this field?

5.2 Are there newborn/fetus *ex utero* and *in utero* transfer guidelines, which include the indications and contraindications for transfers, patient's care before and during the transfer, as well as the transportation of parent(s)? Is there a need for such guidelines?

5.3 Are the vehicles for newborns' transfer equipped adequately and have adequately qualified staff? What can be improved here?

Summarizing question

Would you like to add something else that could be done to improve the quality of neonatal services in Armenia?

Thank you very much for your time and contribution, which we highly appreciate!

Խմբային քննարկման ուղեցույց (ծննդատների և հիվանդանոցների նեոնատոլոգներ)

Ամսաթիվ: _____ **Ժամ:** _____

Վայր: _____

Վարող: _____

Գրանցող: _____

Բարի օր և շնորհակալություն, որ համաձայնեցիք զրուցել մեզ հետ: Իմ անունը _____: Ես ներկայացնում եմ Հայաստանի ամերիկյան համալսարանի Ժիրայր և Փաթրիշա Թրփանճեան Հանրային առողջապահության ֆակուլտետը: Ինչպես նշված է Ձեր կողմից ընթերցված համաձայնության ձևում, ՅՈՒՆԻՍԵՖ-ի աջակցությամբ մենք իրականացնում ենք հետազոտություն՝ նորածնային բուժօգնության ծառայություններում առկա խնդիրները վեր հանելու և լուծումներ առաջարկելու նպատակով: Մենք կցանկանայինք, որ Դուք ներկայացնեիք այդ մասին Ձեր կարծիքը, որը շատ կարևոր է մեզ համար: Ես Ձեզ կառաջարկեմ քննարկման թեմաներ և հարցեր, այնուհետև կխնդրեմ բոլորիդ արտահայտել Ձեր կարծիքն այդ թեմաների վերաբերյալ: Լավ կլինի, եթե քննարկումն անցնի որպես ազատ զրույց, և բոլորը մասնակցեն առանց իրենց հերթին սպասելու: Խնդրում եմ՝ արտահայտվեք ազատորեն, նկատի ունենալով, որ Ձեր տրամադրած ողջ տեղեկատվությունը մնալու է գաղտնի և Ձեր անունը ոչ մի տեղ չի հրապարակվելու: Նախքան հարցազրույցը սկսելը, խնդրում ենք Ձեզ լրացնել կարճ հարցաշար: Եթե չեք առարկում, ես կձայնագրեմ մեր զրույցը, որպեսզի Ձեր արտահայտած ոչ մի միտք չվրիպի մեր ուշադրությունից: Դեմ չե՞ք: Խնդրում եմ, թույլ տվեք այժմ սկսել:

1. ՆՈՐԱԾՆԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԻ ԿԱԶՄԱԿԵՐՊՈՒՄՆ ՈՒ ՀԱԳԵՑՎԱԾՈՒԹՅՈՒՆԸ

1.1 Ձեր կարծիքով, Հայաստանում նորածնային ծառայությունների կառուցվածքն ապահովու՞մ է որակյալ ծառայությունների հավասար մատչելիություն բոլոր նորածինների համար՝ անկախ ծննդյան վայրից:

1.1.1 Եթե ոչ, որո՞նք են հավասար մատչելիությունը խոչընդոտող հիմնական գործոնները: Ինչպե՞ս կարելի է հաղթահարել դրանք:

1.2 Ըստ Ձեզ, որքանո՞վ են Հայաստանի ծննդօգնության հաստատությունները հագեցած նորածինների ինտենսիվ թերապիա և վերակենդանացում իրականացնելու համար անհրաժեշտ սարքավորումներով: Ի՞նչ հրատապ կարիքներ կան այս ոլորտում:

1.3 Ելնելով ձեր փորձից, նորածնային ծառայությունների բուժանձնակազմը որքանո՞վ է պատրաստված առկա սարքավորումները ճիշտ կիրառելու համար: Ինչպիսի՞ լրացուցիչ ուսուցման կարիք կա այս ոլորտում:

1.4 Հայաստանում գոյություն ունի՞ նորածնային բուժսպասարկում իրականացնող տարբեր մակարդակի բուժհաստատությունների միջև ուղեգրումների արդյունավետ համակարգ: Դուք տեսնու՞մ եք այդպիսի համակարգի անհրաժեշտություն:

1.5 Դուք կարո՞ղ եք առաջարկել նորածնային ծառայությունների վերակազմակերպման որևէ տարբերակ, որը կբարելավի որակյալ ծառայությունների մատչելությունը (օրինակ՝ այլ երկրներում այդ ծառայությունների կազմակերպման օրինակով):

2. ՆՈՐԱԾՆԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԻ ԲՈՒԺԱՆՁՆԱԿԱԶՄԸ

2.1 Կարծու՞մ եք, արդյոք, որ Հայաստանում նորածնային բաժանմունքների միջին բուժանձնակազմի որակավորումը համապատասխանում է ժամանակակից պահանջներին: Ի՞նչ խնդիրներ կան այս ոլորտում:

2.2 Հայաստանում գոյություն ունե՞ն տարբեր մակարդակների նորածնային բաժանմունքներում աշխատող միջին բուժանձնակազմի մասնագիտական որակավորմանը ներկայացվող պահանջներ:

2.2.1 Եթե ոչ, կարծու՞մ եք, որ այդպիսի պահանջների կարիք կա: Ինչպիսի՞ն պետք է լինեն այդ պահանջները:

2.2.2 Եթե այո, կարծու՞մ եք, որ այդ պահանջները բավարար են:

2.3 Կարծու՞մ եք, արդյոք, որ Հայաստանի նեոնատոլոգների որակավորումը համապատասխանում է ժամանակակից պահանջներին:

2.4 Հայաստանում գոյություն ունե՞ն տարբեր մակարդակների ծառայություններում աշխատող նեոնատոլոգների մասնագիտական որակավորմանը ներկայացվող պահանջներ:

2.4.1 Եթե ոչ, կարծու՞մ եք, որ այդպիսի պահանջների կարիք կա: Ինչպիսի՞ն պետք է լինեն այդ պահանջները:

2.4.2 Եթե այո, կարծու՞մ եք, որ այդ պահանջները բավարար են:

2.5 Ըստ Ձեզ, ի՞նչ կարելի է անել նորածնային ծառայությունների բուժանձնակազմի որակավորումը անհրաժեշտ մակարդակի հասցնելու և այդ մակարդակի վրա պահելու համար:

2.6 Կարծու՞մ եք, արդյոք, որ տարբեր մակարդակի նորածնային ծառայություններում մեկ բուժքրոջ կամ բժշկի կողմից սպասարկվող նորածինների թիվն օպտիմալ է:

2.6.1 Եթե ոչ, ինչպիսի՞ հարաբերակցությունները կլինեին օպտիմալ նորածնային պաթոլոգիայի, ինտենսիվ թերապիայի և վերակենդանացման բաժիններում:

2.7 Հայաստանի ծննդատներում և նորածնային բաժանմունքներում ապահովվու՞մ է նեոնատոլոգի շուրջօրյա ներկայությունը (հիվանդանոցային կամ տնային հերթապահությունների ձևով): Կարծու՞մ եք, որ դրա անհրաժեշտությունը կա:

2.8 Հայաստանի ծննդատներում և նորածնային բաժանմունքներում ապահովվու՞մ է ինտենսիվ բուժման փորձ ունեցող որակյալ կոնսուլտանտի շուրջօրյա հեռախոսային խորհրդատվության հնարավորությունը: Արդյո՞ք դրա կարիքը կա:

3. ԳԻՏԵԼԻՔՆԵՐ, ԿՐԹԱԿԱՆ ԿԱՐԻՔՆԵՐ ԵՎ ԲՈՒԺՕԳՆՈՒԹՅԱՆ ՈՐԱԿ

3.1 Արդյո՞ք նորածնային բաժանմունքների բուժանձնակազմի բոլոր անդամները հմուտ են նորածնային վերակենդանացման գործում: Ի՞նչ խնդիրներ կան այս ոլորտում: Ովքե՞ր ունեն այս ուղղությամբ ուսուցման կարիք և ի՞նչ հաճախականությամբ:

3.2 Արդյո՞ք ծննդօգնության հիմնարկներն ի վիճակի են անհրաժեշտության դեպքում անմիջապես (5 րոպեի ընթացքում) ապահովել նորածինների շնչուղիների վարման բարձր հմտությունների տիրապետող մասնագետի ներկայությունը:

3.3 Ըստ ձեզ, որո՞նք են այն ոլորտները, որտեղ նորածնային բաժանմունքների բուժքույրերը կարիք ունեն լրացուցիչ մասնագիտական ուսուցման (օր.՝ նորածնի ինտենսիվ, հատուկ, կամ հետվիրահատական խնամք, նորածնի կայունացում և տեղափոխում [STABLE], վերակենդանացում [NRP], կրծքով սնուցում և այլն):

3.4 Ըստ ձեզ, որո՞նք են այն ոլորտները, որտեղ նեոնատոլոգներն ունեն շարունակական մասնագիտական կրթության առաջնահերթ կարիք: Մասնագիտական տեղեկատվության ինչպիսի՞ աղբյուրներից են նրանք օգտվում:

3.5 Արդյո՞ք գոյություն ունեցող կլինիկական ուղեցույցները նեոնատալոգիայի ոլորտում բավարար են: Ի՞նչ այլ ուղեցույցներ կցանայիք ունենալ:

3.6 Արդյո՞ք ծննդատներն ու նորածնային բաժանմունքներն ունեն որակի մշտադիտարկվող ցուցանիշներ, այդ թվում՝ բուժման հեռակա (օրինակ՝ երկտարյա) արդյունքների մասին: Կարծու՞մ եք, որ դրանք կարևոր են:

3.7 Ծննդատներում և նորածնային բաժանմունքներում գոյություն ունի՞ կազմակերպչական բնույթի հարցերը պարբերաբար ողջ անձնակազմով քննարկելու պրակտիկա: Կարծու՞մ եք, որ դրա անհրաժեշտությունը կա:

3.8 Ինչպիսի՞ն է պտղի անտենատալ ախտորոշման և ըստ դրա՝ նորածնի հետագա բուժման պլանավորման վիճակը ծննդօգնության հաստատություններում: Այս ոլորտում բարելավման ի՞նչ ուղիներ եք տեսնում:

4. ԸՆՏԱՆԻՔԻ ՆԵՐԳՐԱՎՎԱԾՈՒԹՅՈՒՆԸ ՆՈՐԱԾՆԻ ԽՆԱՄՔՈՒՄ

4.1 Ելնելով Ձեր փորձից, ծննդատներում և նորածնային բաժանմունքներում ապահովվու՞մ է ծնողների անսահմանափակ մուտք իրենց նորածնի մոտ և մոր համատեղ կացություն նույն հիվանդանոցում: Եթե ոչ միշտ, ի՞նչ պատճառով:

4.2 Կարծու՞մ եք, արդյոք, որ արվում է հնարավորը՝ հիվանդ նորածնի համար ապահովելու առավելագույն խնամքի և նվազագույն ստրեսի միջավայր, այդ թվում՝ ծնողների կողմից մաշկը՝ մաշկին շփում, կերակրում, հանգստացնող հպում ցավոտ միջամտություններ ժամանակ, ինչպես նաև՝ աղմուկի, լույսի, ու ցավի հնարավոր նվազագույն մակարդակի պահպանում:

4.3 Հիվանդանոցներում ինչպիսի՞ պայմաններ կան կրծքի կաթի կթման, պահպանման, կամ դոնորական կաթի կիրառման համար: Ինչպե՞ս կարելի է բարելավել իրավիճակն այստեղ:

4.4 Ծնողները հնարավորություն ունե՞ն գրավոր տեղեկություններ ստանալու իրենց երեխայի հիվանդության, խնամքի և բուժման ընթացքի, ինչպես նաև՝ բաժանմունքի հիմնական կանոնակարգերի վերաբերյալ: Դուք տեսնու՞մ եք դրա անհրաժեշտությունը:

5. ՀԻՎԱՆԴ ՆՈՐԱԾԻՆՆԵՐԻ ՏԵՂԱՓՈԽՈՒԹՅՈՒՆՆԵՐԻ ԿԱԶՄԱԿԵՐՊՈՒՄԸ

5.1 Արդյո՞ք ծննդատներն ու հիվանդանոցների նորածնային բաժանմունքներն ունեն ցանկացած պահի նորածնի ապահով ու արդյունավետ տեղափոխություն (ցամաքային կամ օդային տրանսպորտով) իրականացնելու հնարավորություն:

5.1.1 Եթե ոչ, ի՞նչ խնդիրներ կան այս ասպարեզում:

5.2 Գոյություն ունե՞ն նորածնի/պտղի *ex utero* և *in utero* տեղափոխությունների ուղեցույցներ, որոնք ներառում են դրանց ցուցումներն ու հակացուցումները, հիվանդի վարման կարգը մինչև տեղափոխությունը և դրա ընթացքում, ինչպես նաև՝ ծնող(ներ)ի տեղափոխումը: Կա՞ այդպիսի ուղեցույցների անհրաժեշտություն:

5.3 Արդյո՞ք նորածինների տեղափոխությունն իրականացնող մեքենաներն ունեն անհրաժեշտ սարքավորումներ և համապատասխան որակավորում ունեցող անձնակազմ: Ի՞նչ կարելի է բարելավել այս հարցում:

<u>(Ամփոփիչ հարց)</u> – Կցանկանայի՞ք ավելացնել որևէ բան, որ կարելի է անել՝ Հայաստանում նորածնային ծառայությունների որակը բարելավելու համար:

Շնորհակալություն Ձեր ժամանակի և արդյունավետ զրույցի համար:

Focus Group Discussion Guide (Primary Health Care Pediatricians)

Date: _____Time: _____

Place: _____

Moderator: _____

Recorder: _____

Good afternoon and thank you very much for coming. My name is _____. I represent Gerald and Patricia Turpanjian School of Public Health of the American University of Armenia. As mentioned in the informed consent form you have read, with UNICEF's support, we conduct a study to explore the problems existing in the neonatal care services and recommend solutions. We would like to ask you to share your expertise in this area, which is very valuable for us. I will suggest you the themes for the discussion and ask all of you to express your opinion on those themes. It would be better if the discussion will pass as a free conversation, and everybody will participate in it without waiting to his turn. As mentioned in the informed consent form, the information you will provide will be fully confidential, and your name will not appear with that information. So, please, express your ideas freely. We will ask you to complete a short questionnaire first, and then we will start the discussion. If you don't mind, we will tape-record our conversation so that no any important piece of it is lost. Is it Ok?

Please, let us begin now.

1. Organization of neonatal services and mother's preparation for newborn care

1.1 In your opinion, does the structure of neonatal care services in Armenia ensure equal access to quality services for all newborns, regardless of their birthplace?

1.1.1 If not, what are the main obstacles to equal access? How to overcome them?

1.2 Do you think home births remain a problem in some regions of Armenia?

1.2.1 If yes, to what extent and for what reasons? What would you suggest to overcome this problem?

1.2.2 If the baby is born at home, what steps are followed if he/she is born healthy? What if he/she is born sick? Is it possible for him to receive timely and quality medical care?

1.3 Which proportion of the population you serve prefers to give birth in a nearby medical facility and which proportion in the regional center or in Yerevan? This decision is primarily based on personal preference, medical indications, or financial status of the family?

1.4 Have you noticed a connection between the health status of a newborn and the area of his/her birth? If yes, what kind of connection?

1.4.1 Does mother's knowledge on child's care and feeding differ depending on the area of her delivery?

1.5 In general, how would you describe the level of awareness among mothers and families about child care and feeding when the infant is brought home?

1.5.1 How much does their awareness affect child's health? How it can be improved? How accessible are written public education materials on these topics for parents?

1.6 Usually, how many days after the birth the newborn is discharged from the maternity hospital? How and when are you informed about the birth of a newborn in your district? In which cases the notification might be delayed? How often does that happen?

1.7 What vaccinations should receive a neonate in the maternity hospital? Are there any problems in this sphere? If yes, what problems?

1.8 When the newborn is ill and the mother healthy, is there a possibility for the mother to stay in the same hospital with her baby? If the mother is discharged before the baby, what problems may arise from this?

1.9 Usually how well are newborn's exchange cards filled? Are you satisfied with the information written in these cards?

2. Newborn's medical care at home

2.1 Could you describe how the newborn's medical care is performed, when he/she is brought home (who visits him/her, when and how often)?

2.1.1 Does the newborn's medical care received at home differ depending on the place of residence (town or village)? If yes, how? Could this difference affect the newborn's health? Do you see ways to overcome this difference?

2.2 Please describe, what are the tasks of the physician when he/she visits the newborn for the first time at home? How important is that visit and why?

2.2.1 The presence of what symptoms should be checked by a physician and what questions should be covered, when visiting a newborn for the first time?

2.3 What recommends the pediatrician concerning the care of a newborn's umbilical cord stump? How does this advice change depending on the status of the umbilicus? Usually, what is the condition of the baby's umbilical cord stump at the time of discharge from maternity hospital?

2.4 What advice does the pediatrician give on child's feeding if the child is on breastfeeding (concerning feeding frequency, position at the breast, breast care, using water or herbal teas)?

2.4.1 What advice does the physician give if the child is already receiving other milk or infant formula (what milk to feed the baby and how, whether to give water, tea or other food)?

2.5 How often newborns receive infant formula in the maternity hospital? Does it depend on the maternity hospital the child was born? In your opinion, what are the reasons for giving a formula to a newborn at the maternity hospital?

2.6 What advice does a physician give on baby's skin care, hygiene, clothing, sleep, and air baths?

2.7 Are healthy newborns prescribed any medication (e.g., vitamin D, espumisan, glucose, magnesium, chofitol, another remedy)? If yes, in what dose and for how long?

2.8 In case of what symptoms the newborn can be treated at home and in case of what symptoms he/she must be referred to the hospital?

2.8.1 How often do parents follow the recommendation of a physician to hospitalize their newborn? What can be the reasons for newborn's late hospitalization or death at home?

2.9 How is the urgent hospitalization of a newborn from remote areas organized? Are there problems in this area and how imperative is their solution?

3. Knowledge, educational needs and quality of care

3.1 How much are the pediatric and rural nurses involved in the care of a newborn? Do you think that their current qualifications are in line with the requirements to work with a newborn? Is there a need for improvement?

3.2 How accessible are the modern information sources to medical workers (including the Internet, professional publications, and clinical guidelines)?

3.3 What is the current system of specialty trainings for pediatricians and pediatric nurses? Do you think that the existing system is sufficient for upgrading regularly their knowledge and skills? If no, how would you suggest improving the system?

3.4 Please, indicate, on which topics related to newborn care would you like to have clinical guidelines or participate in trainings?

Summarizing question

Would you like to add something else that could be done to improve the quality of neonatal services in Armenia?

Thank you very much for your time and contribution, which we highly appreciate!

Խմբային քննարկման ուղեցույց (առաջնային բուժհաստատությունների մանկաբույժներ)

Ամսաթիվ: _____ Ժամ: _____

Վայր: _____

Վարող: _____

Գրանցող: _____

Բարի օր և շնորհակալություն, որ համաձայնեցիք զրուցել մեզ հետ: Իմ անունը _____: Ես ներկայացնում եմ Հայաստանի ամերիկյան համալսարանի Ժիրայր և Փաթրիշա Թրփանճեան Հանրային առողջապահության ֆակուլտետը: Ինչպես նշված է Ձեր կողմից ընթերցված համաձայնության ձևում, ՅՈՒՆԻՍԵՖ-ի աջակցությամբ մենք իրականացնում ենք հետազոտություն՝ նորածնային բուժօգնության ծառայություններում առկա խնդիրները վեր հանելու և լուծումներ առաջարկելու նպատակով: Մենք կցանկանայինք, որ Դուք ներկայացնեիք այդ մասին Ձեր կարծիքը, որը շատ կարևոր է մեզ համար: Ես Ձեզ կառաջարկեմ քննարկման թեմաներ և հարցեր, այնուհետև կխնդրեմ բոլորիդ արտահայտել Ձեր կարծիքն այդ թեմաների վերաբերյալ: Լավ կլինի, եթե քննարկումն անցնի որպես ազատ զրույց, և բոլորը մասնակցեն առանց իրենց հերթին սպասելու: Խնդրում եմ՝ արտահայտվեք ազատորեն, նկատի ունենալով, որ Ձեր տրամադրած ողջ տեղեկատվությունը մնալու է գաղտնի և Ձեր անունը ոչ մի տեղ չի հրապարակվելու: Նախքան հարցազրույցը սկսելը, խնդրում ենք Ձեզ լրացնել կարճ հարցաշար: Եթե չեք առարկում, ես կձայնագրեմ մեր զրույցը, որպեսզի Ձեր արտահայտած ոչ մի միտք չվրիպի մեր ուշադրությունից: Դեմ չե՞ք: Խնդրում եմ, թույլ տվեք այժմ սկսել:

1. ՆՈՐԱԾՆԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԻ ԿԱԶՄԱԿԵՐՊՈՒՄՆ ՈՒ ՄԱՅՐԵՐԻ ՆԱԽԱՊԱՏՐԱՍՏՈՒՄԸ ՆՈՐԱԾՆԻ ԽՆԱՄՔԻՆ

1.1 Ձեր կարծիքով, Հայաստանում նորածնային ծառայությունների կառուցվածքն ապահովու՞մ է որակյալ ծառայությունների հավասար մատչելիություն բոլոր նորածինների համար՝ անկախ ծննդյան վայրից:

1.1.1 Եթե ոչ, որո՞նք են հավասար մատչելիությունը խոչընդոտող հիմնական գործոնները: Ինչպե՞ս կարելի է հաղթահարել դրանք:

1.2 Ըստ ձեզ, տնային ծննդաբերությունները շարունակու՞մ են խնդիր հանդիսանալ Հայաստանի որոշ բնակավայրերում:

1.2.1 Եթե այո, ի՞նչ չափով և ի՞նչ պատճառներով: Ի՞նչ ուղիներ կառաջարկեիք այդ խնդիրը հաղթահարելու համար:

1.2.2 Եթե երեխան ծնվում է տանը, ի՞նչ քայլեր են հաջորդում, եթե նա ծնվել է առողջ: Իսկ եթե ծնվել է հիվա՞նդ: Որքանո՞վ է հաջողվում ապահովել նրան որակյալ արդիական բուժօգնությամբ:

1.3 Ձեր սպասարկած բնակչության ո՞ր մասն է գերադասում ծննդաբերել մոտակա բուժհաստատությունում, և ո՞ր մասը՝ մարզկենտրոնում կամ Երևանում: Այդ որոշումն ավելի

շատ ինչո՞վ է պայմանավորված՝ անձնական նախապատվությամբ, բժշկական ցուցումներո՞վ, թե՞ ընտանիքի նյութական վիճակով:

1.4 Դուք նկատե՞լ եք կապ նորածնի առողջական վիճակի և ծննդաբերության վայրի միջև: Եթե այո, ինչպիսի՞ կապ:

1.4.1 Իսկ մոր գիտելիքները մանկան խնամքի և կերակրման մասին տարբերվու՞մ են՝ կախված նրա ծննդաբերության վայրից:

1.5 Ընդհանրապես, ինչպե՞ս կբնութագրեիք մայրերի և ընտանիքների տեղեկացվածության աստիճանը՝ մանկան խնամքի ու կերակրման հարցերի մասին, երբ նորածինը բերվում է տուն:

1.5.1 Որքանո՞վ է նրանց տեղեկացվածությունը անդրադառնում մանկան առողջության վրա: Ի՞նչպես կարելի է այն բարելավել: Որքանո՞վ են ծնողների համար մատչելի գրավոր հանրակրթական նյութերն այս հարցերի մասին:

1.6 Սովորաբար, կյանքի ո՞րերորդ օրն է առողջ նորածինը դուրս գրվում ծննդատնից: Դուք ինչպե՞ս և ե՞րբ եք տեղեկանում Ձեր սպասարկման տարածքում նորածնի ծննդյան մասին: Ո՞ր դեպքերում է հնարավոր, որ այդ տեղեկացումը ուշանա: Որքա՞ն հաճախ է դա լինում:

1.7 Ի՞նչ պատվաստումներ պետք է ստանա նորածինը ծննդատանը: Այս ոլորտում կա՞ն արդյոք խնդիրներ: Եթե այո, ինչպիսի՞:

1.8 Երբ նորածինը հիվանդ է, իսկ մայրը՝ առողջ, որքանո՞վ է հնարավոր նրա մնալը նույն հիվանդանոցում, որտեղ բուժվում է երեխան: Եթե մայրը դուրս է գրվում երեխայից շուտ, ի՞նչ խնդիրներ է դա առաջացնում:

1.9 Սովորաբար ինչպե՞ս են լրացված նորածնի փոխանակման քարտերը: Ձեզ բավարարու՞մ են այդ քարտերում պարունակվող տեղեկությունները:

2. ՆՈՐԱԾՆԻ ԲՈՒԺՍՊԱՍԱՐԿՈՒՄԸ ՏԱՆԸ

2.1 Կարո՞ղ եք նկարագրել, թե ինչպե՞ս է իրականցվում նորածնի բուժսպասարկումը՝ երբ նա բերվում է տուն (ո՞վ է նրան այցելում, ե՞րբ և ի՞նչ հաճախականությամբ):

2.1.1 Տանը նորածնի ստացած բուժսպասարկումը տարբերվու՞մ է՝ կախված նրա բնակության վայրից (քաղաք կամ գյուղ): Ինչպե՞ս: Կարո՞ղ է այդ տարբերությունն ազդել նորածնի առողջության վրա: Դուք տեսնու՞մ եք այդ տարբերության հաղթահարման ուղիներ:

2.2 Նկարագրեք, խնդրեմ, թե ի՞նչ անելիքներ ունի բժիշկը՝ առաջին անգամ նորածնին տանը այցելելիս: Որքանո՞վ է այդ այցելությունը կարևոր և ինչու՞:

2.2.1 Ի՞նչ ախտանիշների առկայությունը պետք է ստուգի բժիշկը և ի՞նչ հարցերի անդրադառնա՝ նորածնին առաջին անգամ այցելելիս:

2.3 Ի՞նչ խորհուրդներ է տալիս բժիշկը՝ նորածնի պորտալարի մնացորդի խնամքի մասին: Ինչպե՞ս է այդ խորհուրդը փոխվում՝ կախված պորտի վիճակից: Սովորաբար, ի՞նչ վիճակում է լինում երեխայի պորտալարի մնացորդը՝ ծննդատնից դուրս գրվելիս:

2.4 Ի՞նչ խորհուրդներ է տալիս բժիշկը երեխայի սնուցման վերաբերյալ, եթե երեխան սնվում է կրծով (կերակրումների հաճախականության, դիրքի, կրծքերի խնամքի, ջրի կամ խոտային թեյերի օգտագործման մասին):

2.4.1 Իսկ եթե երեխան արդեն ստանում է այլ կաթ կամ կաթնախառնուրդ, ի՞նչ խորհուրդներ է տալիս բժիշկը (ինչո՞վ և ինչպե՞ս կերակրել մանկանը, տա՞լ արդյոք ջուր, թեյեր կամ այլ սնունդ):

2.5 Որքա՞ն հաճախ է երեխան ստացած լինում կաթնախառնուրդ ծննդատանը: Դա կախվա՞ծ է նրանից, թե ո՛ր ծննդատանն է ծնվում երեխան: Ըստ ձեզ, որո՞նք են նորածնին ծննդատանը կաթնախառնուրդ տալու պատճառները:

2.6 Ի՞նչ խորհուրդներ է տալիս բժիշկը՝ նորածնի մաշկի խնամքի, հիգիենայի, հագուստի, քնի, օդային լոգանքների մասին:

2.7 Առողջ նորածիններին նշանակվու՞մ է որևէ դեղամիջոց (օր.՝ վիտամին D, էսպոմիզան, գլյուկոզա, մագնեզիում, խոֆիտոլ, այլ միջոց): Եթե այո, ի՞նչ դեղաչափով և ի՞նչ տևողությամբ:

2.8 Ի՞նչ ախտանիշների առկայության դեպքում կարելի է նորածնին բուժել տանը, և ո՞ր ախտանիշների առկայության դեպքում է անհրաժեշտ ուղեգրել նրան հիվանդանոց:

2.8.1 Հիվանդանոց ուղեգրման դեպքում որքա՞ն հաճախ են ծնողները հետևում այդ խորհրդին: Ինչո՞վ կարող է պայմանավորված լինել նորածնի ուշ հոսպիտալիզացիան կամ տնային մահը:

2.9 Ինչպե՞ս է կազմակերպվում հեռու բնակավայրերից նորածնի շտապ հոսպիտալիզացիան: Այս հարցում կա՞ն խնդիրներ և որքանո՞վ է հրատապ դրանց լուծումը:

3. ԳԻՏԵԼԻՔՆԵՐ, ԿՐԹԱԿԱՆ ԿԱՐԻՔՆԵՐ ԵՎ ԲՈՒԺՕԳՆՈՒԹՅԱՆ ՈՐԱԿ

3.1 Որքանո՞վ են մանկական և գյուղական բուժքույրերը ներգրավված նորածնի բուժսպասարկման գործում: Կարծու՞մ եք, արդյոք, որ նրանց ներկայիս որակավորումը համապատասխանում է նորածնի հետ աշխատելու՝ նրանց ներկայացվող պահանջներին: Այստեղ կա՞ բարելավման անհրաժեշտություն:

3.2 Որքանո՞վ են տեղեկատվության ժամանակակից աղբյուրները մատչելի բուժաշխատողների համար (այդ թվում՝ համացանցը, մասնագիտական գրքերն ու ամսագրերը, կլինիկական ուղեցույցները):

3.3 Ինչպիսի՞ն է մասնագիտական վերապատրաստումների ներկա համակարգը մանկաբույժների և մանկական բուժքույրերի համար: Կարծու՞մ եք, արդյոք, որ այն բավարար է՝ գիտելիքներն ու հմտությունները պարբերաբար արդիականացնելու համար: Եթե ոչ, ի՞նչ կառաջարկեիք այդ համակարգը բարելավելու համար:

3.4 Նշեք, խնդրեմ, թե նորածնի բուժսպասարկմանը վերաբերվող ո՞ր թեմաներով դուք կցանկանայիք ունենալ կլինիկական ուղեցույցներ կամ մասնակցել դասընթացների:

(Ամփոփիչ հարց) – Կցանկանայի՞ք ավելացնել որևէ բան, որ կարելի է անել՝ Հայաստանում նորածինների բուժսպասարկումը բարելավելու համար:

Շնորհակալություն Ձեր ժամանակի և արդյունավետ զրույցի համար:

8.2 Appendix 2. IDI guides (in English and Armenian)

Consent Form for In-depth Interview Participant

Hellow. My name is …… . I am a researcher at the Zvart Avedisian Onanian Center for Health Services Research and Development of the American University of Armenia. At the request of UNICEF Armenia, our center is conducting a research to assess neonatal care services at maternity and primary healthcare levels in Armenia. The aim of this study is to explore the problems existing in the field of neonatal health care and recommend solutions.

This interview, which you have been invited to participate in, is a part of this project. You were selected purposefully as an expert in the field. Your experience, views and attitudes will help us to identify the current situation in the sphere of neonatal healthcare and suggest ways for improvement. Your involvement in this study will be limited to this single interview.

The interview will last about an hour. After receiving your verbal consent for participation, we will ask you to complete a short questionnaire. Then we will start the interview asking some questions and urging you to express your ideas concerning these matters. Your participation in this interview is voluntary. You can stop the interview at any time. Also, you may refuse to answer any question, if you so wish. There will be no any consequences for you if you decide to participate or decline to do so. Your will not have any direct benefits from participation either, but your participation will assist us in developing effective measures for improving the existing practices in Armenia.

During the interview we will take notes and, if you allow, we would also like to audio-record the conversation to ensure that none of the ideas that you express escapes our attention. This interview carries no risks for you. The information you provide will be kept confidential. The information received during the study will be summarized and presented as a report containing no any personal or institutional data or contact information.

If you have any questions regarding this study you can call the study coordinator Anahit Demirchyan (060 61 25 62). If you feel you have not been treated fairly during the study or think your participation in the study has damaged you in any way, you can contact the IRB Human participants' administrator of the American University of Armenia, Varduhi Hayrumyan (060 61 26 17).

Do you agree to participate? If yes shall we start?

Do you agree to audio-recording? Please say yes or no.

If you are ready, now we will start.

Խորացված հարցազրույցի իրազեկ համաձայնագիր

Բարև Ձեզ, իմ անունը …… է: Ես Հայաստանի ամերիկյան համալսարանի Զուարթ Աւետիսեան Օնանեանի անվան Առողջապահական ծառայությունների հետազոտման և զարգացման կենտրոնի գիտաշխատող եմ: ՅՈՒՆԻՍԵՖ-ի պատվերով մեր կենտրոնն իրականացնում է ծննդատնային և առաջնային բուժսպասարկման օղակներում նորածնային բուժօգնության ծառայությունների գնահատման որակական հետազոտություն՝ այդ ծառայություններում առկա խնդիրները վեր հանելու և լուծումներ առաջարկելու նպատակով:

Նշված հետազոտության մաս է կազմում այս հարցազրույցը, որին Դուք հրավիրվել եք մասնակցելու որպես փորձագետ այս ոլորտում: Ձեր փորձը, տեսակետներն ու մոտեցումները կօգնեն մեզ պարզել նորածնային բուժսպասարկման ոլորտում ներկայումս տիրող իրավիճակը և առաջարկել բարելավման ուղիներ: Ձեր մասնակցությունն այս հետազոտությանը կսահմանափակվի այս միակ հարցազրույցով:

Հարցազրույցը կտևի մոտ մեկ ժամ: Մասնակցելու Ձեր բանավոր համաձայնությունն ստանալուց հետո մենք կառաջարկենք Ձեզ լրացնել կարճ հարցաթերթիկ, այնուհետև կսկսենք հարցազրույցը, որի ժամանակ կխնդրենք արտահայտել Ձեր կարծիքը հետազոտության նյութին առնչվող մի շարք հարցերի վերաբերյալ: Ձեր մասնակցությունը կամավոր է: Դուք կարող եք ցանկացած պահի ընդհատել այն: Կարող եք նաև չպատասխանել որևէ հարցի, եթե չեք ցանկանում: Հարցազրույցին մասնակցելը կամ դրանից հրաժարվելը Ձեզ համար որևէ հետևանք չի ունենա: Դուք որևէ ուղղակի օգուտ ևս չեք ստանա մասնակցությունից, սակայն Ձեր մասնակցությունը կօգնի մշակել համակարգը բարելավելու առաջարկներ:

Հարցազրույցի ընթացքում մենք գրի կառնենք և, եթե թույլ տաք, կձայնագրենք մեր զրույցը, որպեսզի Ձեր արտահայտած ոչ մի գաղափար չվրիպի մեր ուշադրությունից: Այս հարցազրույցը որևէ ռիսկ չի պարունակում Ձեզ համար: Ձեր տրամադրած տեղեկությունները կպահվեն գաղտնի: Հետազոտության ընթացքում ստացված բոլոր տեղեկություններն ի մի կբերվեն և կներկայացվեն միայն ընդհանրացված ձևով՝ չպարունակելով որևէ անուն, անձնական տվյալ կամ տվյալ հաստատության վերաբերյալ, որտեղ Դուք աշխատում եք:

Այս հետազոտության վերաբերյալ հարցեր ունենալու դեպքում կարող եք զանգահարել հետազոտության համակարգող Անահիտ Դեմիրճյանին՝ 060 61 25 62 հեռախոսահամարով: Եթե մտածեք, որ այս հետազոտությանը մասնակցելու ընթացքում Ձեզ լավ չեն վերաբերվել կամ որ մասնակցությունը Ձեզ վնաս է պատճառել, կարող եք զանգահարել Հայաստանի ամերիկյան համալսարանի Էթիկայի հանձնաժողովի քարտուղար Վարդուհի Հայրումյանին՝ 060 61 26 17 հեռախոսահամարով:

Դուք համաձա՞յն եք մասնակցել: Եթե այո, կարո՞ղ ենք սկսել:

Դուք համաձա՞յն եք, որ ես միացնեմ ձայնագրիչը: Խնդրում եմ ասեք՝ ԱՅՈ կամ ՈՉ:

Եթե Դուք պատրաստ եք, կարող ենք սկսել:

In-depth Interview Guide (Neonatologists of Maternities and Hospitals)

Date: _____Time: _____

Place: _____

Moderator: _____

Recorder: _____

Good afternoon and thank you very much for the opportunity to talk to you. My name is _____. I represent Gerald and Patricia Turpanjian School of Public Health of the American University of Armenia. As mentioned in the informed consent form you have read, with UNICEF's support, we conduct a study to explore the problems existing in the neonatal care services and recommend solutions. We would like to ask you to share your expertise in this area, which is very valuable for us. If you don't mind, we will tape-record our conversation so that no any important piece of it is lost. As mentioned in the informed consent form, the information you will provide will be fully confidential, and your name will not appear with that information. So, please, express your ideas freely. Please, let us begin now.

1. Organization and adequacy of neonatal services

1.1 In your opinion, does the structure of neonatal care services in Armenia ensure equal access to quality services for all newborns, regardless of their birthplace?

1.1.1 If not, what are the main obstacles to equal access? How to overcome them?

1.2 According to your experience, how well are maternity hospitals of Armenia equipped with the necessary equipment for neonatal intensive care and resuscitation? What are the pressing needs in this area?

1.3 According to your experience, to what extent are the providers of neonatal services prepared to use the available equipment correctly? What additional training is needed in this area?

1.4 Is there an effective referral system between different level neonatal care facilities in Armenia? Do you see a need for such a system?

1.5 Could you suggest any way for restructuring of neonatal care services that will improve the access to quality services (e.g., having in mind examples of these services in other countries)?

2. Medical staff of neonatal services

2.1 Do you think that in Armenia, the qualification of nurses in neonatal care departments meets the current requirements? What problems exist in this area?

2.2 Do professional qualification standards for nurses working at different level neonatal care services exist in Armenia?

2.2.1 If not, do you think that there is a need for such standards? What should be the standards?

2.2.2 If yes, do you think that these standards are adequate?

2.3 Do you think that the qualification of Armenian neonatologists meets the current requirements?

2.4 Do professional qualification standards for neonatologists working at different service levels exist in Armenia?

2.4.1 If not, do you think there is a need for such standards? What should be the standards?

2.4.2 If yes, do you think that these standards are adequate?

2.5 In your opinion, what can be done to increase the qualification of medical personnel of neonatal services and maintain that level?

2.6 According to your experience, do you think that the numbers of neonates served by one nurse and one physician at different levels of neonatal care are optimal in Armenia?

2.6.1 If not, what ratio do you think is optimal for neonatal pathology, intensive therapy and resuscitation departments?

2.7 Is there a neonatologist available at all times (in hospital or home duty) in maternity hospitals and neonatal units of Armenia? Do you think there is a need for that?

2.8 Is there a qualified intensive care consultant available at all times in maternity hospitals and neonatal units of Armenia to provide consulting by phone? Do you think there is a need for that?

3. Knowledge, educational needs and quality of care

3.1 Are all medical staff members of neonatal care departments skilled in neonatal resuscitation? What problems exist in this area? Who needs training in this area and at what frequency?

3.2 Are the maternity institutions able, whenever it is necessary, to immediately (within 5 minutes) assure the presence of a professional who is competent in advanced newborn airway skills?

3.3 In your opinion, what are the areas where the neonatal care nurses need additional professional training (e.g., intensive, special, or post-surgery newborn care, stabilization and transfer of a neonate [STABLE], resuscitation [NRP], breast feeding, etc.)?

3.4 In your opinion, in which priority areas do neonatologists need continuing education? What sources of specialized information do they use?

3.5 Are the existing clinical guidelines in the field of neonatology sufficient? What other guidelines would you like to have?

3.6 Do the maternity hospitals and neonatal units have quality of care indicators that they monitor, including long-term (e.g., two year) treatment outcomes? Do you think they are important?

3.7 Is there a practice in maternity hospitals and neonatal units to regularly discuss organizational issues with the entire staff? Do you think that there is a need for it?

3.8 What is the situation with fetal antenatal diagnosis and, based on that, planning the further treatment of newborns in maternity hospitals? What ways do you see for improving this area?

4. Family involvement in neonatal care

4.1 Based on your experience, do the maternity hospitals and neonatal care departments in Armenia ensure parents' unrestricted access to their newborn baby (if there are no medical contraindications)? Is mother's stay at the same hospital ensured? If not, why?

4.2 Do you think that everything possible is done to ensure the best care of a sick newborn in a minimally stressful environment, including skin to skin contact, feeding, soothing touch during painful procedures by parents, while minimizing neonate's exposure to noise, light, and pain?

4.3 What conditions exist in hospitals for breast milk expression and storage, or using donor milk? How the situation could be improved?

4.4 Do parents have the opportunity to receive written information on the disease, care, and treatment of their child, and the needed information on the regulations of the department? Do you see a need for it?

5. Organizing the transfer of sick newborns

5.1 Are the maternities and neonatal units of hospitals able to organize safe and effective transfer of a newborn anytime (land or air transfer)?

5.1.1 If not, what problems exist in this field?

5.2 Are there newborn/fetus *ex utero* and *in utero* transfer guidelines, which include the indications and contraindications for transfers, patient's care before and during the transfer, as well as the transportation of parent(s)? Is there a need for such guidelines?

5.3 Are the vehicles for newborns' transfer equipped adequately and have adequately qualified staff? What can be improved here?

6. Projects on neonatal care

6.1 Do you know what kind of donor and other projects have been implemented in the last three years in the field of neonatology in Armenia (for example, changes in the structure and practices, development and implementation of clinical guidelines, staff training)?

6.2 What information do you have about the process and the effectiveness of those programs?

Summarizing question

Would you like to add something else on what could be done to improve the quality of neonatal services in Armenia?

Խորացված հարցազրույցի ուղեցույց (ծննդատների և հիվանդանոցների նեոնատոլոգներ)

Ամսաթիվ: _____ **Ժամ:** _____

Վայր: _____

Վարող: _____

Գրանցող: _____

Բարի օր և շնորհակալություն, որ համաձայնեցիք զրուցել մեզ հետ: Իմ անունը _____: Ես ներկայացնում եմ Հայաստանի ամերիկյան համալսարանի Ժիրայր և Փաթրիշա Թրփանճեան Հանրային առողջապահության ֆակուլտետը: Ինչպես նշված է Ձեր կողմից ընթերցված համաձայնության ձևում, ՅՈՒՆԻՍԵՖ-ի աջակցությամբ մենք իրականացնում ենք հետազոտություն՝ նորածնային բուժօգնության ծառայություններում առկա խնդիրները վեր հանելու և լուծումներ առաջարկելու նպատակով: Մենք կցանկանայինք, որ Դուք ներկայացնեիք այդ մասին Ձեր կարծիքը, որը շատ կարևոր է մեզ համար: Եթե չեք առարկում, ես կձայնագրեմ մեր զրույցը, որպեսզի Ձեր արտահայտած ոչ մի կարևոր միտք չվրիպի մեր ուշադրությունից: Խնդրում եմ արտահայտվեք ազատորեն, նկատի ունենալով, որ Ձեր տրամադրած ողջ տեղեկատվությունը մնալու է գաղտնի և Ձեր անունը ոչ մի տեղ չի հրապարակվելու: Խնդրում եմ, թույլ տվեք այժմ սկսել:

1. ՆՈՐԱԾՆԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԻ ԿԱԶՄԱԿԵՐՊՈՒՄՆ ՈՒ ՀԱԳԵՑՎԱԾՈՒԹՅՈՒՆԸ

1.1 Ձեր կարծիքով, Հայաստանում նորածնային ծառայությունների կառուցվածքն ապահովու՞մ է որակյալ ծառայությունների հավասար մատչելիություն բոլոր նորածինների համար՝ անկախ ծննդյան վայրից:

1.1.1 Եթե ոչ, որո՞նք են հավասար մատչելիությունը խոչընդոտող հիմնական գործոնները: Ինչպե՞ս կարելի է հաղթահարել դրանք:

1.2 Ըստ Ձեզ, որքանո՞վ են Հայաստանի ծննդօգնության հաստատությունները հագեցած նորածինների ինտենսիվ թերապիա և վերակենդանացում իրականացնելու համար անհրաժեշտ սարքավորումներով: Ի՞նչ հրատապ կարիքներ կան այս ոլորտում:

1.3 Ելնելով ձեր փորձից, նորածնային ծառայությունների բուժանձնակազմը որքանո՞վ է պատրաստված առկա սարքավորումները ճիշտ կիրառելու համար: Ինչպիսի՞ լրացուցիչ ուսուցման կարիք կա այս ոլորտում:

1.4 Հայաստանում գոյություն ունի՞ նորածնային բուժսպասարկում իրականացնող տարբեր մակարդակի բուժհաստատությունների միջև ուղեգրումների արդյունավետ համակարգ: Դուք տեսնու՞մ եք այդպիսի համակարգի անհրաժեշտություն:

1.5 Դուք կարո՞ղ եք առաջարկել նորածնային ծառայությունների վերակազմակերպման որևէ տարբերակ, որը կբարելավի որակյալ ծառայությունների մատչելությունը (օրինակ՝ այլ երկրներում այդ ծառայությունների կազմակերպման օրինակով):

2. ՆՈՐԱԾՆԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԻ ԲՈՒԺԱՆՁՆԱԿԱԶՄԸ

2.1 Կարծու՞մ եք, արդյոք, որ Հայաստանում նորածնային բաժանմունքների միջին բուժանձնակազմի որակավորումը համապատասխանում է ժամանակակից պահանջներին: Ի՞նչ խնդիրներ կան այս ոլորտում:

2.2 Հայաստանում գոյություն ունե՞ն տարբեր մակարդակների նորածնային բաժանմունքներում աշխատող միջին բուժանձնակազմի մասնագիտական որակավորմանը ներկայացվող պահանջներ:

2.2.1 Եթե ոչ, կարծու՞մ եք, որ այդպիսի պահանջների կարիք կա: Ինչպիսի՞ն պետք է լինեն այդ պահանջները:

2.2.2 Եթե այո, կարծու՞մ եք, որ այդ պահանջները բավարար են:

2.3 Կարծու՞մ եք, արդյոք, որ Հայաստանի նեոնատոլոգների որակավորումը համապատասխանում է ժամանակակից պահանջներին:

2.4 Հայաստանում գոյություն ունե՞ն տարբեր մակարդակների ծառայություններում աշխատող նեոնատոլոգների մասնագիտական որակավորմանը ներկայացվող պահանջներ:

2.4.1 Եթե ոչ, կարծու՞մ եք, որ այդպիսի պահանջների կարիք կա: Ինչպիսի՞ն պետք է լինեն այդ պահանջները:

2.4.2 Եթե այո, կարծու՞մ եք, որ այդ պահանջները բավարար են:

2.5 Ըստ Ձեզ, ի՞նչ կարելի է անել նորածնային ծառայությունների բուժանձնակազմի որակավորումը անհրաժեշտ մակարդակի հասցնելու և այդ մակարդակի վրա պահելու համար:

2.6 Կարծու՞մ եք, արդյոք, որ տարբեր մակարդակի նորածնային ծառայություններում մեկ բուժքրոջ կամ բժշկի կողմից սպասարկվող նորածինների թիվն օպտիմալ է:

2.6.1 Եթե ոչ, ինչպիսի՞ հարաբերակցությունները կլինեին օպտիմալ նորածնային պաթոլոգիայի, ինտենսիվ թերապիայի և վերակենդանացման բաժիններում:

2.7 Հայաստանի ծննդատներում և նորածնային բաժանմունքներում ապահովվու՞մ է նեոնատոլոգի շուրջօրյա ներկայությունը (հիվանդանոցային կամ տնային հերթապահությունների ձևով): Կարծու՞մ եք, որ դրա անհրաժեշտությունը կա:

2.8 Հայաստանի ծննդատներում և նորածնային բաժանմունքներում ապահովվու՞մ է ինտենսիվ բուժման փորձ ունեցող որակյալ կոնսուլտանտի շուրջօրյա հեռախոսային խորհրդատվության հնարավորությունը: Արդյո՞ք դրա կարիքը կա:

3. ԳԻՏԵԼԻՔՆԵՐ, ԿՐԹԱԿԱՆ ԿԱՐԻՔՆԵՐ ԵՎ ԲՈՒԺՕԳՆՈՒԹՅԱՆ ՈՐԱԿ

3.1 Արդյո՞ք նորածնային բաժանմունքների բուժանձնակազմի բոլոր անդամները հմուտ են նորածնային վերակենդանացման գործում: Ի՞նչ խնդիրներ կան այս ոլորտում: Ովքե՞ր ունեն այս ուղղությամբ ուսուցման կարիք և ի՞նչ հաճախականությամբ:

3.2 Արդյո՞ք ծննդօգնության հիմնարկներն ի վիճակի են անհրաժեշտության դեպքում անմիջապես (5 րոպեի ընթացքում) ապահովել նորածինների շնչուղիների վարման բարձր հմտությունների տիրապետող մասնագետի ներկայությունը:

3.3 Ըստ ձեզ, որո՞նք են այն ոլորտները, որտեղ նորածնային բաժանմունքների բուժքույրերը կարիք ունեն լրացուցիչ մասնագիտական ուսուցման (օր.՝ նորածնի ինտենսիվ, հատուկ, կամ հետվիրահատական խնամք, նորածնի կայունացում և տեղափոխում [STABLE], վերակենդանացում [NRP], կրծքով սնուցում և այլն):

3.4 Ըստ ձեզ, որո՞նք են այն ոլորտները, որտեղ նեոնատոլոգներն ունեն շարունակական մասնագիտական կրթության առաջնահերթ կարիք: Մասնագիտական տեղեկատվության ինչպիսի՞ աղբյուրներից են նրանք օգտվում:

3.5 Արդյո՞ք գոյություն ունեցող կլինիկական ուղեցույցները նեոնատալոգիայի ոլորտում բավարար են: Ի՞նչ այլ ուղեցույցներ կցանայիք ունենալ:

3.6 Արդյո՞ք ծննդատներն ու նորածնային բաժանմունքներն ունեն որակի մշտադիտարկվող ցուցանիշներ, այդ թվում՝ բուժման հեռակա (օրինակ՝ երկտարյա) արդյունքների մասին: Կարծու՞մ եք, որ դրանք կարևոր են:

3.7 Ծննդատներում և նորածնային բաժանմունքներում գոյություն ունի՞ կազմակերպչական բնույթի հարցերը պարբերաբար ողջ անձնակազմով քննարկելու պրակտիկա: Կարծու՞մ եք, որ դրա անհրաժեշտությունը կա:

3.8 Ինչպիսի՞ն է պտղի անտենատալ ախտորոշման և ըստ դրա՝ նորածնի հետագա բուժման պլանավորման վիճակը ծննդօգնության հաստատություններում: Այս ոլորտում բարելավման ի՞նչ ուղիներ եք տեսնում:

4. ԸՆՏԱՆԻՔԻ ՆԵՐԳՐԱՎՎԱԾՈՒԹՅՈՒՆԸ ՆՈՐԱԾՆԻ ԽՆԱՄՔՈՒՄ

4.1 Ելնելով Ձեր փորձից, ծննդատներում և նորածնային բաժանմունքներում ապահովվու՞մ է ծնողների անսահմանափակ մուտք իրենց նորածնի մոտ և մոր համատեղ կացություն նույն հիվանդանոցում: Եթե ոչ միշտ, ի՞նչ պատճառով:

4.2 Կարծու՞մ եք, արդյոք, որ արվում է հնարավորը՝ հիվանդ նորածնի համար ապահովելու առավելագույն խնամքի և նվազագույն ստրեսի միջավայր, այդ թվում՝ ծնողների կողմից մաշկը՝ մաշկին շփում, կերակրում, հանգստացնող հպում ցավոտ միջամտություններ ժամանակ, ինչպես նաև՝ աղմուկի, լույսի, ու ցավի հնարավոր նվազագույն մակարդակի պահպանում:

4.3 Հիվանդանոցներում ինչպիսի՞ պայմաններ կան կրծքի կաթի կթման, պահպանման, կամ դոնորական կաթի կիրառման համար: Ինչպե՞ս կարելի է բարելավել իրավիճակն այստեղ:

4.4 Ծնողները հնարավորություն ունե՞ն գրավոր տեղեկություններ ստանալու իրենց երեխայի հիվանդության, խնամքի և բուժման ընթացքի, ինչպես նաև՝ բաժանմունքի հիմնական կանոնակարգերի վերաբերյալ: Դուք տեսնու՞մ եք դրա անհրաժեշտությունը:

5. ՀԻՎԱՆԴ ՆՈՐԱԾԻՆՆԵՐԻ ՏԵՂԱՓՈԽՈՒԹՅՈՒՆՆԵՐԻ ԿԱԶՄԱԿԵՐՊՈՒՄԸ

5.1 Արդյո՞ք ծննդատներն ու հիվանդանոցների նորածնային բաժանմունքներն ունեն ցանկացած պահի նորածնի ապահով ու արդյունավետ տեղափոխություն (ցամաքային կամ օդային տրանսպորտով) իրականացնելու հնարավորություն:

5.1.1 Եթե ոչ, ի՞նչ խնդիրներ կան այս ասպարեզում:

5.2 Գոյություն ունե՞ն նորածնի/պտղի *ex utero* և *in utero* տեղափոխությունների ուղեցույցներ, որոնք ներառում են դրանց ցուցումներն ու հակացուցումները, հիվանդի վարման կարգը մինչև տեղափոխությունը և դրա ընթացքում, ինչպես նաև՝ ծնող(ներ)ի տեղափոխումը: Կա՞ այդպիսի ուղեցույցների անհրաժեշտություն:

5.3 Արդյո՞ք նորածինների տեղափոխությունն իրականացնող մեքենաներն ունեն անհրաժեշտ սարքավորումներ և համապասխան որակավորում ունեցող անձնակազմ: Ի՞նչ կարելի է բարելավել այս հարցում:

6. ՆՈՐԱԾՆԱՅԻՆ ԲՈՒԺՕԳՆՈՒԹՅԱՆ ՈԼՈՐՏԻ ԾՐԱԳՐԵՐ

6.1 Դուք տեղյա՞կ եք, թե ինչպիսի՞ դոնորական և այլ ծրագրեր են իրականացվել Հայաստանում նեոնատալոգիայի ոլորտում վերջին երեք տարվա ընթացքում (օրինակ՝ կառուցվածքի կամ գործելակերպի փոփոխությունների, կլինիկական ուղեցույցների մշակման և ներդրման, բուժանձնակազմի ուսուցման ոլորտներում):

6.2 Ի՞նչ կասեիք այդ ծրագրերի ընթացքի և արդյունավետության մասին:

(Ամփոփիչ հարց) – Կցանկանայի՞ք ավելացնել որևէ բան, որ կարելի է անել՝ Հայաստանում նորածնային ծառայությունների որակը բարելավելու համար:

Շնորհակալություն Ձեր ժամանակի և արդյունավետ զրույցի համար:

In-depth Interview Guide (Representatives of Donor Organizations)

Date: _____Time: _____

Place: _____

Moderator: _____

Recorder: _____

Good afternoon and thank you very much for the opportunity to talk to you. My name is _____. I represent Gerald and Patricia Turpanjian School of Public Health of the American University of Armenia. As mentioned in the informed consent form you have read, with UNICEF's support, we conduct a study to explore the problems existing in the neonatal care services and recommend solutions. As your organization implements programs in this area, we would like you to express your opinion about these programs and the existing problems in the field of neonatal care in Armenia. If you don't mind, we will tape-record our conversation so that no any important piece of it is lost. As mentioned in the informed consent form, the information you will provide will be fully confidential, and your name will not appear with that information. So, please, express your ideas freely. Please, let us begin now.

1. Projects on neonatal care

1.1 What kind of projects were implemented by your organization over the past five years in the neonatal care field of Armenia (e.g., structural or procedural changes in facilities, provision of equipment for intensive care, development of clinical guidelines, trainings of providers, etc.).

1.2 Which medical facilities were included and what kind of assistance did they receive in the scope of these programs (list, please, the quantity and the type of equipment provided to each facility)? Are there any current projects in the field? If so, with what duration and coverage?

1.3 Does your organization conduct a monitoring of these programs?

1.3.1 If yes, how and with what frequency? Could you present the results of this monitoring?

2. The need for improvement of neonatal care services

2.1 Has your organization carried out an assessment of neonatal care services in Armenia? If so, when and how? Could you, please, provide us with the results of that evaluation?

2.2 In your opinion, does the structure of neonatal care services in Armenia ensure equal access to quality services for all newborns, regardless of their birthplace?

2.2.1 If not, what are the main obstacles to equal access? How to overcome them?

2.3 In your opinion, how well are different level maternity hospitals of Armenia equipped with the necessary equipment for neonatal intensive care and resuscitation? What are the pressing needs in this area?

2.4 In your opinion, to what extent are the providers of different level services prepared to use the available equipment correctly? What additional training is needed in this area?

2.5 Could you suggest any way for restructuring of neonatal care services that will improve the access to quality services (e.g., having in mind examples of these services in other countries)?

2.6 In your opinion, what can be done to increase the qualification of medical personnel of neonatal services and maintain that level?

2.7 Are the maternities and neonatal units of hospitals able to organize safe and effective transfer of a newborn anytime (land or air transfer)?

2.7.1 If not, what problems exist in this field?

2.8 Are the vehicles for newborns' transfer equipped adequately and have adequately qualified staff? What can be improved here?

2.9 What are the future plans of your organization aiming to improve the neonatal care in Armenia?

Summarizing question

Would you like to add something else that could be done to improve the quality of neonatal services in Armenia?

Thank you very much for your time and contribution, which we highly appreciate!

Խորացված հարցազրույցի ուղեցույց (դոնոր կազմակերպությունների ներկայացուցիչներ)

Ամսաթիվ: _____ **Ժամ:** _____

Վայր: _____

Վարող: _____

Գրանցող: _____

Բարի օր և շնորհակալություն, որ համաձայնեցիք զրուցել մեզ հետ: Իմ անունը _____: Ես ներկայացնում եմ Հայաստանի ամերիկյան համալսարանի Ժիրայր և Փաթրիշա Թրփանճեան Հանրային առողջապահության ֆակուլտետը: Ինչպես նշված է Ձեր կողմից ընթերցված համաձայնության ձևում, ՅՈՒՆԻՍԵՖ-ի աջակցությամբ մենք իրականացնում ենք հետազոտություն՝ նորածնային բուժօգնության ծառայություններում առկա խնդիրները վեր հանելու և լուծումներ առաջարկելու նպատակով: Քանի որ Ձեր կազմակերպությունը ծրագրեր է իրականացնում այս ոլորտում, մենք կցանկանայինք, որ Դուք ներկայացնեիք այդ ծրագրերը և Ձեր կարծիքը՝ Հայաստանում նորածինների բուժսպասարկման ոլորտում առկա խնդիրների մասին: Եթե չեք առարկում, ես կձայնագրեմ մեր զրույցը, որպեսզի Ձեր արտահայտած ոչ մի միտք չվրիպի մեր ուշադրությունից: Խնդրում եմ արտահայտվեք ազատորեն, նկատի ունենալով, որ Ձեր տրամադրած ողջ տեղեկատվությունը մնալու է գաղտնի և Ձեր անունը ոչ մի տեղ չի հրապարակվելու: Խնդրում եմ, թույլ տվեք այժմ սկսել:

1. ՆՈՐԱԾՆԱՅԻՆ ԲՈՒԺՕԳՆՈՒԹՅԱՆ ՈԼՈՐՏԻ ԾՐԱԳՐԵՐ

1.1 Ձեր կազմակերպությունն ինչպիսի՞ ծրագրեր է իրականացրել Հայաստանում նորածինների բուժսպասարկման ոլորտում վերջին հինգ տարվա ընթացքում (օրինակ՝ բուժհաստատությունների կառուցվածքի կամ գործելակարգի փոփոխություններ, ինտենսիվ թերապիայի սարքավորումների տրամադրում, կլինիկական ուղեցույցների մշակում, բուժանձնակազմի ուսուցում և այլն):

1.2 Այդ ծրագրերի շրջանակներում ո՞ր բուժհաստատություններն են ներառվել և ի՞նչ աջակցություն են ստացել (թվեք, խնդրեմ, յուրաքանչյուր հաստատությանը տրամադրված սարքավորումների տեսակն ու քանակը): Կա՞ն, արդյոք, ընթացիկ ծրագրեր: Եթե այո, ի՞նչ տևողություն և ընդգրկում ունեն այդ ծրագրերը:

1.3 Ձեր կազմակերպությունն իրականացնու՞մ է այդ ծրագրերի մշտադիտարկում:

1.3.1 Եթե այո, ինչպե՞ս և ի՞նչ հաճախականությամբ: Կարո՞ղ եք ներկայացնել այդ մշտադիտարկման արդյունքները:

2. ՆՈՐԱԾՆԱՅԻՆ ԾԱՌԱՅՈՒԹՅՈՒՆՆԵՐԻ ԲԱՐԵՓՈԽՈՒՄՆԵՐԻ ԿԱՐԻՔԸ

2.1 Ձեր կազմակերպությունն իրականացրե՞լ է Հայաստանում նորածնային ծառայությունների գնահատում: Եթե այո, ե՞րբ և ի՞նչ կերպ: Դուք կարո՞ղ եք մեզ տրամադրել այդ գնահատման արդյունքները:

2.2 Ըստ Ձեզ, Հայաստանում նորածնային ծառայությունների կառուցվածքն ապահովու՞մ է որակյալ ծառայությունների հավասար մատչելիություն բոլոր նորածինների համար՝ անկախ ծննդյան վայրից:

2.2.1 Եթե ոչ, որո՞նք են հավասար մատչելիությունը խոչընդոտող հիմնական գործոնները: Ինչպե՞ս կարելի է հաղթահարել դրանք:

2.3 Ըստ ձեզ, որքանո՞վ են Հայաստանի տարբեր մակարդակի ծննդօգնության հաստատությունները հագեցած նորածինների ինտենսիվ թերապիա և վերակենդանացում իրականացնելու համար անհրաժեշտ սարքավորումներով: Ի՞նչ հրատապ կարիքներ կան այս ոլորտում:

2.4 Ըստ ձեզ, տարբեր մակարդակի բուժհաստատությունների բուժանձնակազմը որքանո՞վ է պատրաստված առկա սարքավորումները ճիշտ կիրառելու համար: Ինչպիսի՞ լրացուցիչ ուսուցման կարիք կա այս ոլորտում:

2.5 Դուք կարո՞ղ եք առաջարկել նորածնային ծառայությունների վերակազմակերպման որևէ տարբերակ, որը կհանգեցնի որակյալ ծառայությունների մատչելության բարելավման (օրինակ՝ այլ երկրներում այդ ծառայությունների կազմակերպման օրինակով):

2.6 Ըստ Ձեզ, ի՞նչ կարելի է անել նորածնային ծառայությունների բուժանձնակազմի որակավորումը անհրաժեշտ մակարդակի հասցնելու և այդ մակարդակի վրա պահելու համար:

2.7 Ըստ Ձեզ, Հայաստանի ծննդատներն ու հիվանդանոցներն ունե՞ն ցանկացած պահի նորածնի ապահով ու արդյունավետ տեղափոխություն (ցամաքային կամ օդային տրանսպորտով) իրականացնելու հնարավորություն:

2.7.1 Եթե ոչ, ի՞նչ խնդիրներ կան այս ասպարեզում:

2.8 Ըստ Ձեզ, նորածինների տեղափոխությունն իրականացնող մեքենաներն ունե՞ն անհրաժեշտ սարքավորումներ և համապատասխան որակավորում ունեցող բուժանձնակազմ: Ի՞նչ կարելի է բարելավել այս ոլորտում:

2.9 Ապագայի ինչպիսի՞ ծրագրեր ունի Ձեր կազմակերպությունը՝ ուղղված Հայաստանում նորածինների բուժսպասարկման բարելավմանը:

<u>(Ամփոփիչ հարց)</u> – Կցանկանայի՞ք ավելացնել որևէ բան, որ կարելի է անել՝ Հայաստանում նորածնային ծառայությունների որակը բարելավելու համար:

Շնորհակալություն Ձեր ժամանակի և արդյունավետ զրույցի համար:

8.3 Appendix 3.1 Demographic questionnairs with knowledge area checklist (in English and Armenian)

Questionnaire for the study participant (neonatologists)

Please answer following questions by writing on the horizontal line or marking (√) the square next to the correct response option for each question.

1. Your age (completed years): _____
2. Your gender: □ Male
   □ Female
3. Your residency: □ Yerevan
   □ Syunik
   □ Gegharkunik
4. Your specialization: □ Neonatologist
   □ Pediatrician or Family Physician
5. In total, how many years have you worked with your specialization: _____ years
6. After 2010, have you received any training on neonatal care?
   □ Yes (*please, mention the topic*_____)
   □ No
7. How important do you consider receiving a training and clinical guideline on each of the following topics on neonatal care?

1= Very important, 2= Important, 3= Unimportant	**Training**			**Clinic. guideline**		
17. Neonatal resuscitation in delivery room	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
18. Respiratory support. Oxygen therapy	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
19. Respiratory distress syndrome and pneumonia	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
20. Extremely LBW neonates	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
21. Enteric feeding and feeding difficulties	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
22. Sepsis and antibacterial treatment	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
23. Prevention of nosocomial infections	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
24. Heart and other common congenital defects	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
25. Neonatal convulsions	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
26. Neonatal jaundice	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
27. Asphyxia and encephalopathy	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
28. Shock	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
29. Neonates of diabetic mothers	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
30. Hemorrhages. Blood components transfusion	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
31. Infusion therapy. Acid-base balance	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
32. Catheterization of umbilical vein	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
33. Newborn transfer	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
34. Other topic _____	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3

Thank you for answering the questions!

Հարցաթերթիկ հետազոտության մասնակցի համար (նեոնատոլոգներ)

Խնդրում ենք պատասխանել հետևյալ հարցերին՝ գրելով տրված տողի վրա կամ √ նշան դնելով համապատասխան վանդակում:

1. Ձեր տարիքը (լրացրած տարիների թիվը). _____
2. Ձեր սեռը. □ Արական
   □ Իգական
3. Ձեր բնակավայրը. □ Երևան
   □ Սյունիք
   □ Գեղարքունիք

   Ձեր մասնագիտությունը. □ Նեոնատոլոգ
   □ Մանկաբույժ կամ ընտանեկան բժիշկ
4. Քանի՞ տարի եք աշխատել Ձեր մասնագիտությամբ: _____ *տարի*
5. 2010թ.-ից հետո անցե՞լ եք ուսուցում նեոնատոլոգիական որևէ թեմայով:
   □ Այո (*նշեք՝ ո՞ր թեմայով.* _____)
   □ Ոչ
6. Գնահատեք, խնդրեմ, նեոնատոլոգիական ներքոհիշյալ թեմաներով դասընթացի մասնակցելու և կլինիկական ուղեցույց ունենալու կարևորությունը Ձեզ համար՝

1= շատ կարևոր է; 2= կարևոր է; 3= կարևոր չէ	Դասընթաց			Կլ. ուղեցույց		
1. Նորածնի վերակենդանացում ծնարանում	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
2. Ռեսպիրատոր աջակցություն: Թթվածնաբուժում	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
3. Շնչառական խանգարումներ և թոքաբորբ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
4. Ծայրահեղ ցածր քաշով ծնված նորածիններ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
5. Էնտերալ սնուցում, սնուցման դժվարություններ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
6. Սեպսիս և հակաբակտերիալ բուժում	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
7. Նոզոկոմիալ ինֆեկցիաների կանխարգելում	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
8. Սրտի և այլ տարածված բնածին արատներ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
9. Նորածնային ցնցումներ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
10. Նորածնային դեղնուկներ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
11. Ասֆիքսիա և էնցեֆալոպաթիա	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
12. Շոկ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
13. Շաքարային դիաբետով մայրերի նորածիններ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
14. Արյունահոսություններ: Տրանսֆուզիա	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
15. Ինֆուզիոն թերապիա: Թթվա-հիմնային բալանս	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
16. Պորտային երակի կաթետերիզացիա	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
17. Նորածնի տեղափոխում	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
18. Այլ թեմա _____	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3

Շնորհակալություն հարցերին պատասխանելու համար:

Questionnaire for the study participant (pediatricians and family doctors)

Please answer following questions by writing on the horizontal line or marking (√) the square next to the correct response option for each question.

1. Your age (completed years): _____
2. Your gender: □ Male
   □ Female
3. Your residency: □ Yerevan
   □ Syunik
   □ Gegharkunik
4. Your specialization: □ Neonatologist
   □ Pediatrician or Family Physician
5. In total, how many years have you worked with your specialization: _____ years
6. After 2010, have you received any training on neonatal care?
   □ Yes (*please, mention the topic*_____)
   □ No
7. How important do you consider receiving a training and clinical guideline on each of the following topics on neonatal care?

1= Very important, 2= Important, 3= Unimportant	**Training**			**Clinic. guideline**		
1. Neonatal resuscitation	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
2. Healthy newborn care and feeding	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
3. LBW newborn care and feeding	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
4. Breastfeeding problems	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
5. More common congenital abnormalities	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
6. Neonatal infections and sepsis	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
7. Neonatal conjunctivitis	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
8. Neonatal respiratory distress and pneumonia	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
9. Neonatal growth monitoring	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
10. Neonatal sense organs and development	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
11. Muscular tonus and convulsions	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
12. Safety of a neonate	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
13. Neonatal jaundice	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
14. Neonatal hypoglycemia	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
15. Neonatal hypothermia	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
16. Some other topic *(suggest, please)* _____	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3

Thank you for answering the questions!

Հարցաթերթիկ հետազոտության մասնակցի համար (մանկաբույժներ)

Խնդրում ենք պատասխանել հետևյալ հարցերին՝ գրելով տրված տողի վրա կամ √ նշան դնելով համապատասխան վանդակում:

1. Ձեր տարիքը (լրացրած տարիների թիվը). _____
2. Ձեր սեռը. □ Արական
   □ Իգական
3. Ձեր բնակավայրը. □ Երևան
   □ Սյունիք
   □ Գեղարքունիք
   Ձեր մասնագիտությունը. □ Նեոնատոլոգ
   □ Մանկաբույժ կամ ընտանեկան բժիշկ
4. Քանի՞ տարի եք աշխատել Ձեր մասնագիտությամբ: _____ *տարի*
5. 2010թ.-ից հետո անցե՞լ եք ուսուցում նեոնատոլոգիական որևէ թեմայով:
   □ Այո (*նշեք՝ ո՞ր թեմայով.* _____)
   □ Ոչ
6. Գնահատեք, խնդրեմ, նորածնային բժշկության ներքոհիշյալ թեմաներով դասընթացի մասնակցելու և կլինիկական ուղեցույց ունենալու կարևորությունը Ձեզ համար՝

1= շատ կարևոր է; 2= կարևոր է; 3= կարևոր չէ	Դասընթաց			Կլ. ուղեցույց		
1. Նորածնի վերակենդանացում	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
2. Առողջ նորածնի սնուցում և խնամք	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
3. Ցածր քաշով նորածնի սնուցում և խնամք	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
4. Կրծքով կերակրման դժվարություններ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
5. Առավել տարածված բնածին արատներ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
6. Նորածնային ինֆեկցիաներ և սեպսիս	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
7. Նորածնային կոնյուկտիվիտ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
8. Նորածնի շնչական խանգ.-ներ և թոքաբորբ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
9. Նորածնի աճի հսկողություն	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
10. Նորածնի զգայարաններ և զարգացում	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
11. Մկանային տոնուս և ցնցումներ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
12. Նորածնի անվտանգություն	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
13. Նորածնային դեղնուկներ	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
14. Նորածնային հիպոգլիկեմիա	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
15. Նորածնային հիպոթերմիա	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3
16. Որևէ այլ թեմա՞ (առաջարկեք, խնդրեմ) _____	□ 1	□ 2	□ 3	□ 1	□ 2	□ 3

Շնորհակալություն հարցերին պատասխանելու համար:

8.4 Appendix 4. Checklist for human and material resources of neonatal units of regional maternity hospitals (in English and Armenian)

Neonatal services checklist for availability of the required equipment and medical staff

1. Assessor _____ 1.1 Date ____/_____/_____

2. Marz _____ 2.1 City _____

3. Name of the medical facility _____

4. Neonatal pathology department □ 1.Not available □ 2.Available (# of beds _____)

5. Neonatal intensive care department/ward □ 1.Not available □ 2.Available (# of beds _____)

6. Neonate ambulance brigade □ 1.Not available □ 2.Available (#_____)

7. Service volume

	2016
1. Number of deliveries	
2. Number of live births	
3. Number of newborns with LBW (<2500 g)	

8. Medical staff

	Total in the hospital		**In the neonatal pathology ward**	
Hours	*9:00-15:30*	*15:30-9:00*	*9:00-15:30*	*15:30-9:00*
1. Number of neonatologists				
2. Total number of neonatal nurses				
3. Of which, number of intensive care nurses				
4. Average neonate/nurse ratio				

Adequacy

9. Delivery room	**Number**	**Of which, working**	**Of which applied**
1. Resuscitation table with radiant heating lamp			
2. AMBU bags with different size masks			
3. Pulse oxymeter			
4. Electric suction machine			
5. Oxygen source			

9. Delivery room	**Number**	**Of which, working**	**Of which applied**
6. Flow meter			
7. Air compressor			
8. Respiratory circuit with heated humidifier			
9. Laryngoscope with blades of different size			
10. Laryngeal mask			
11. T-shaped resuscitator			
12. Neonatal scale			
13. Disinfection device			
14. Neonatal thermometer (up to 25˚C)			
15. Wall/room thermometer			
16. Sterile kit for cord cut and clamping			
17. Heater for maternity unit			
18. Stethoscope			
19. Clock with timer			
20. Heating pad for a newborn			
21. Syringe pump			

10. Intensive care (resuscitation) unit (ward)	**Number**	**Of which, working**	**Of which applied**
1. Incubator			
2. Resuscitation table with radiant heating lamp			
3. AMBU bags with different sizes of masks			
4. Electric suction machine			
5. T-shaped resuscitator			
6. Centralized oxygen supply system			
7. Oxygen cylinder			
8. Oxygen concentrator			
9. Air compressor			
10. Air-oxygen blender			
11. Respiratory circuit with heated humidifier			
12. Infusion pump			
13. Flow meter			
14. Oxygen tent			
15. Phototherapy lamp			
16. Laryngoscope with blades of different size			
17. Nasal CPAP			

10. Intensive care (resuscitation) unit (ward)	**Number**	**Of which, working**	**Of which applied**
18. Heated, humidified high-flow nasal cannula (HHHFNC)			
19. Artificial respiration equipment			
20. Pulse oxymeter			
21. Bactericide lamp			
22. Neonatal scale			
23. Disinfection device			
24. Drum			
25. Anatomical tweezers			
26. Scissor			
27. Surgical forceps			
28. Neonatal thermometer (up to 25˚C)			
29. Wall/room thermometer			
30. Electric heating mattress			
31. Stethoscope			
32. Clock with timer			
33. Additional electric power source			
34. Full day water supply			
35. Neonatal tonometer			
36. Bilirubinometer			
37. Glucometer			
38. Refrigerator for medications			

11. Supplies *(1=available in sufficient quantity; 0=not available or the quantity is insufficient)*			
1. Sterile gloves		10. Drip injection systems	
2. Sterile diapers		11. Syringes with different volumes	
3. Oxygen tubes		12. “Butterfly” needles (various sizes)	
4. Medical vials		13. Gastric probes (different sizes)	
5. Tweezers		14. Umbilical and venous catheters	
6. Scissors		15. Nasal cannulas (different sizes)	
7. Surgical forceps		16. Intubation tubes	
8. Medical tape		17. Aspiration catheters ` 10, 12, 14 F	
9. Blankets for mother and baby		18. Air tubes	

12. **Laboratory and diagnostic tests** *(1=yes, 0=no)*

	In the facility		**In the city**	
	Available for 24 hours	*Available for limited time*	*Available*	*Not available*
1. Hemoglobin				
2. Hematocrit				
3. Blood group and rhesus factor				
4. Blood glucose (biochemical test)				
5. Complete blood count				
6. Leykoformula				
7. C-reactive protein				
8. Bacteriology (culture)				
9. Sensitivity to antibiotics				
10. Blood electrolytes				
11. Coagulogram				
12. Acid-base balance				
13. Proteins in blood				
14. Urea, creatinine				
15. Direct and indirect Coombs reaction				
16. Serological blood tests				
17. Blood compatibility				
18. Liver function tests				
19. Brain ultrasound				
20. X-ray examination				
21. Echocardiography				
22. Electrocardiography				

13. Clinical guidelines (Protocols) *(1=available; 0=not available)*			
1. Neonatal respiratory distress		11. Care of LBW neonates	
2. Oxygen therapy		12. Feeding of LBW neonates	
3. Convulsions		13. Neonate transfer	
4. Infusion therapy		14. Hemorrhagic disorders	
5. Hypoglycemia		15. Drug dosages	
6. Hypothermia		16. Normal laboratory test results	
7. Sepsis, antibacterial treatment		17. Jaundice	
8. Prevention of nosocomial infections		18. Feeding difficulties	
9. Healthy newborn care		19. HFNC	
10. Newborn resuscitation		20. CPAP	

ՍԱՐՔԱՎՈՐՈՒՄՆԵՐՈՎ ԵՎ ԲՈՒԺԱՆՁՆԱԿԱԶՄՈՎ ՆՈՐԱԾՆԱՅԻՆ ԾԱՌԱՅՈՒԹՅԱՆ ՀԱԳԵՑՎԱԾՈՒԹՅԱՆ ՍՏՈՒԳԱԹԵՐԹԻԿ

1. Գնահատող _____ 1.1 Ամսաթիվ ____/_____/_____

2. Մարզ _____ 2.1 Քաղաք _____

3. Բուժհաստատության անվանումը _____

4. Նորածնային պաթոլոգիայի բաժանմունք. □1.Չկա □2.Առկա է (մահճ.-ների թիվը ___)

5. Նորածնային ինտենսիվ թերապիայի պալատ/բաժ-ք. □ 1.Չկա □ 2.Առկա է (մահճ.-ների թիվը ___)

6. Նորածնի շտապ օգնության բրիգադ □ 1.Չկա □2.Առկա է (թիվը _____)

7. Սպասարկման ծավալ

	2016թ.
1. Ծննդաբերությունների թիվը	
3. Կենդանածինների թիվը	
2. Ցածր քաշով (<2500 գրամ) ծնված նորածինների թիվը	

8. Բուժանձնակազմ

	Ընդամենը հիվանդանոցում		**Նորածնային պաթոլոգիայի բաժանմունքում**	
<u>Ժամեր</u>	**9:00-15:30**	**15:30-9:00**	**9:00-15:30**	**15:30-9:00**
1. Նեոնատոլոգների թիվը				
2. Նորածնային բուժքույրերի ընդհանուր թիվը				
3. Որից՝ ինտ. թերապիայի բժք.-ի բուժքույրերի թիվը				
4. Նորածին/բուժքույր (միջին) հարաբերակցությունը				

Հագեցվածություն

9. Ծնարան	**Թիվը**	**Որից՝ սարքին**	**Որից՝ կիրառվող**
1. Վերակենդանացման սեղան՝ ճառագայթային տաքացնող լամպով			
2. Ամբուի պարկ՝ տարբեր չափսերի դիմակներով			
3. Պուլսօքսիմետր			
4. Էլեկտրական արտածծիչ սարք			
5. Թթվածնի աղբյուր			
6. Հոսքաչափ (flowmeter)			

9. Ծնարան	Թիվը	Որից՝ սարքին	Որից՝ կիրառվող
7. Սեղմված օդի աղբյուր			
8. Շնչական խառնուրդի խոնավացուցիչ			
9. Լարինգոսկոպ՝ նորածնային լեզվակների հավաքածուով			
10. Լարինգեալ դիմակ			
11. T-աձև վերակենդանացման սարք			
12. Նորածնային կշեռք			
13. Ախտահանող սարք			
14. Նորածնի ջերմաչափ (մինչև 25˚C)			
15. Պատի սենյակային ջերմաչափ			
16. Պորտալարի անջատման և կապման հավաքածու			
17. Տաքացուցիչ՝ ծնարանը տաքացնելու համար			
18. Ստեթոսկոպ			
19. Ժամացույց՝ վայրկենաչափով			
20. Ջեռակ՝ նորածնին տաքացնելու համար			
21. Տանձիկ			

10. Ինտենսիվ թերապիայի (վերակենդանացման) բաժանմունք (պալատ)	Թիվը	Որից՝ սարքին	Որից՝ կիրառվող
1. Կյուվեզ			
2. Վերակենդանացման սեղան՝ ճառագայթային ջեռուցիչով			
3. Ամբուի պարկ՝տարբեր չափսերի դիմակներով			
4. Էլեկտրական արտածծիչ սարք			
5. T-աձև վերակենդանացման սարք			
6. Թթվածնի մատակարարման կենտրոնացված համակարգ			
7. Թթվածնի բալոն			
8. Թթվածնի կոնցենտրատոր			
9. Սեղմված օդի աղբյուր			
10. Բլենդեր			
11. Շնչական խառնուրդի խոնավացուցիչ			
12. Ինֆուզիոն պոմպ			
13. Հոսքաչափ (flowmeter)			
14. Թթվածնի վրան			
15. Ֆոտոթերապիայի լամպ			
16. Լարինգոսկոպ՝ նորածնային լեզվակների հավաքածուով			

10. Ինտենսիվ թերապիայի (վերակենդանացման) բաժանմունք (պալատ)	**Թիվը**	**Որից՝ սարքին**	**Որից՝ կիրառվող**
17. Քթային CPAP			
18. Բարձր հոսքային քթային բեղիկներ (HHHFNC)			
19. Արհեստական շնչառության սարք			
20. Պուլսօքսիմետր			
21. Բակտերիցիդ լամպ			
22. Նորածնային կշեռք			
23. Ախտահանող սարք			
24. Բիքս			
25. Պինցետ՝ անատոմիական			
26. Մկրատ			
27. Վիրաբուժական կորնցանգ			
28. Ջերմաչափ (նորածնի համար՝ մինչև 25 աստիճան)			
29. Պատի սենյակային ջերմաչափ			
30. Ջեռուցող էլեկտրական ներքնակ			
31. Ստեթոսկոպ			
32. Պատի ժամացույց՝ վայրկենաչափով			
33. Էլեկտրաէներգիայի լրացուցիչ աղբյուր			
34. Շուրջօրյա ջրամատակարարում			
35. Նորածնային տոնոմետր			
36. Բիլիռուբինոմետր			
37. Գլյուկոմետր			
38. Սառնարան՝ դեղորայքի համար			

11. Պարագաներ *(1=առկա է բավարար քանակությամբ; 0=չկա կամ քանակը բավարար չէ)*			
1. Ստերիլ ձեռնոցներ		10. Կաթիլային ներարկման համակարգեր	
2. Ստերիլ տակաշորեր		11. Տարբեր ծավալների ներարկիչներ	
3. Թթվածնի խողովակներ		12. «Թիթեռնիկ» ասեղներ (տարբեր չափերի)	
4. Բժշկական սրվակներ		13. Ստամեքսային զոնդեր (տարբեր չափերի)	
5. Պինցետներ		14. Երակային և պորտային կաթետերներ	
6. Մկրատներ		15. Քթային բեղիկներ (տարբեր չափերի)	
7. Վիրաբուժական կորնցանգ		16. Ինտուբացիոն խողովակներ	
8. Կպչող սպեղանի		17. Արտածծիչ կաթետերներ՝ 10, 12, 14 F	
9. Վերմակ՝ մոր և նորածնի համար		18. Օդատար խողովակներ	

12. Լաբորատոր և գործիքային քննություններ *(1=այո, 0=ոչ)*

	Բուժհաստատությունում		Բնակավայրում	
	Շուրջօրյա	Ոչ շուրջօրյա	Արվում է	Չի արվում
1. Հեմոգլոբին				
2. Հեմատոկրիտ				
3. Արյան խումբ և ռեզուս				
4. Արյան գլյուկոզա *(բիոքիմիական տեստ)*				
5. Արյան ընդհանուր անալիզ				
6. Լեյկոֆորմուլա				
7. C ռեակտիվ սպիտակուց				
8. Հեմոկուլտուրա				
9. Անտիբիոտիկների հանդեպ զգայունություն				
10. Արյան էլեկտրոլիտներ				
11. Կոագուլոգրամմա				
12. Թթվահիմնային հավասարակշռություն				
13. Սպիտակուցն արյան մեջ				
14. Միզանյութ, կրեատինին				
15. Կումբսի ուղղակի և անուղղակի ռեակցիա				
16. Արյան շճաբանական քննություն				
17. Արյան համատեղելիություն				
18. Լյարդային պրոբաներ				
19. Գլխուղեղի ՈՒՁՀ				
20. Ռենտգենաբանական քննություն				
21. Էխոկարդիոգրաֆիա				
22. Էլեկտրասրտագրություն				

13. Կլինիկական ուղեցույցներ (Պրոտոկոլներ) *(1=առկա է; 0=առկա չէ)*			
1. Նորածնի շնչառական խանգարումներ		11. Ցածր քաշով նորածինների խնամք	
2. Օքսիգենոթերապիա		12. Ցածր քաշով նորածինների սնուցում	
3. Ցնցումներ		13. Նորածնի տեղափոխում	
4. Ինֆուզիոն թերապիա		14. Հեմոռագիկ խանգարումներ	
5. Հիպոգլիկեմիա		15. Դեղորայքի դեղաչափեր	
6. Հիպոթերմիա		16. Նորմալ լաբորատոր ցուցանիշներ	
7. Սեպսիս, հակաբակտերիալ բուժում		17. Դեղնուկներ	
8. Նոզոկոմիալ ինֆեկցիաների կանխում		18. Կերակրման դժվարություններ	
9. Առողջ նորածնի խնամք		19. HFNC	
10. Նորածնի վերակենդանացում		20. CPAP	