Osteoporosis and Behavioral Risk Factors

• Behavioral risk factors for developing osteoporosis:
  • Smoking
  • Low calcium intake
  • Lack of physical activity
  • Excessive alcohol intake

• Called a childhood disease with old age consequences - building healthy bones in youth helps preventing osteoporosis and fractures later in life
Smoking and Bone Health

• Cigarette smoking first identified as a risk factor for osteoporosis decades ago

• Recent studies demonstrate a direct relationship between tobacco use and decreased bone density

• Long-term cigarette use associated with increased bone loss and can lead to osteoporosis, fractures, and dental and periodontal disease
Smoking and Bone Health

• Most studies suggest smoking increases the risk of having a fracture:
  – Longer duration of smoking and higher number of cigarettes consumed per day increase the risk of fracture in old age
  – Smokers with fractures may take longer to heal than nonsmokers and may experience more complications during the healing process
  – Significant bone loss detected in older smokers
Smoking and Bone Health

• Compared with nonsmokers, smoking women often produce less estrogen and tend to experience menopause earlier, which may lead to increased bone loss

• Quitting smoking may reduce the risk of low bone mass and fractures - in several years
Smoking and Bone Health:

*A meta-analysis of cigarette smoking, bone mineral density and risk of hip fracture*

- Postmenopausal bone loss greater in smokers - cumulative effect of this over many years substantial, with a difference of 6% at age 80
- Among older smoker women 20% to 100% increased likelihood of hip fracture
  - Excess risk increases with age: 0% at age 50 years, 17% at age 60 years, 41% at age 70 years, 71% at age 80 years, and 108% at age 90 years
- Among all women, 1 in 8 hip fractures directly attributable to smoking cigarettes
- Data in men limited but suggest similar proportionate effects in smokers

Chronic cigarette use and bone strength and fractures

- Increased likelihood of falling
- Low bone strength
- Impaired healing of fractures (traumatic and osteoporotic)
- Osteoporotic fractures involving the axial and appendicular skeleton

Medscape © http://www.medscape.com
Secondhand smoke (SHS)

Mainstream Smoke (MS): The smoke drawn through the mouthpiece of the cigarette when puffs are taken.

Sidestream Smoke (SS): The smoke emitted from the smoldering cigarette between puffs.

Secondhand Smoke (SHS): Combination of SS and exhaled MS.

Combination of smoke emitted from the burning end of a cigarette and smoke exhaled by the smoker.
SHS and Osteoporosis

• Exposure to SHS during youth and early adulthood may increase the risk of developing low bone mass

• SHS exposure and intensity of exposure significantly associated with increased risk of postmenopausal osteoporosis, independent of other factors - implying that SHS alters bone metabolism.
  – Duration of SHS exposure at home positively associated with femoral neck osteoporosis (p for trend= 0.032)
  – Participants with any home exposure exhibited increased adjusted OR for osteoporosis (OR, 2.26; 95 % CI, 1.07–4.78)
  – Secondhand smokers of >1 cigarettes/day exhibited increased adjusted OR for lumbar (OR, 2.02; 95 % CI, 1.08–3.78) and femoral neck (OR, 2.74; 95 % CI, 1.25–6.03) osteoporosis

Burden of Smoking in Armenia

Smoking prevalence 2010 (≥ 16 years)\(^1\)

- 63.0% men
- 2.0% women

At least one smoker in the home\(^2\)

- 82.2% households
- 70.0% no smoking restrictions in their households in 2007

Exposure to SHS at public places (13-15 yrs)\(^3\)

- 78.3% of never smokers

Household member daily smokes at home\(^1\)

- 54.8% of households

\(^1\)DHS, 2010
\(^2\)Knowledge, attitudes, and practices on tobacco control policies in adult population in Armenia. American University of Armenia, 2007
\(^3\)GYTS 2009, Armenia
WHO Framework Convention on Tobacco Control

- WHO FCTC developed in response to globalization of tobacco epidemic
- WHO FCTC evidence-based treaty reaffirming the right of all people to the highest standard of health
- Armenia acceded in 2004
- One of the first 40 countries to sign FCTC
- The first NIS country to become a party to FCTC
National Tobacco Control Law

Total ban on smoking
- Healthcare facilities
- Educational facilities
- Cultural facilities
- Public transportation

Smoking restriction
- All other types of facilities

No restriction
- Bars and restaurants

Adopted on December 24, 2004
Enacted on March 2, 2005
AUA School of Public Health and Tobacco Control

• Founding member of the Coalition for Tobacco Free Armenia

• Multi-year programs to develop tobacco control advocacy efforts, policy change, and research in Armenia

• Active collaboration with the Ministry of Health, local agencies, Johns Hopkins Institute for Global Tobacco Control and Global Bridges Healthcare Alliance for Tobacco Dependence Treatment
Annual Celebrations of World and National No Tobacco Days (advocacy and awareness)
Annual Celebrations of World and National No Tobacco Days (advocacy and awareness)
WORLD NO TOBACCO DAY, 2013

Tobacco Advertising, Promotion & Sponsorship in Armenia
Undergraduate students of Basics of Healthy Lifestyle Course conducted observations of smoking in public places in Armenia and shared the results.
Conferences, meetings, round table discussions, youth and social activities (advocacy, awareness, policy change)
First Conference on “Tobacco or Health” in Armenia

First smoke-free awards ceremony
Research Epidemiology & Intervention for Tobacco Control in Armenia (research, awareness, policy change)

Objective

• Reducing SHS exposure in Armenia and the region

Components

• Demonstration project at public places (hospitals and universities)
• Clinical trial in homes
• Dissemination

Funding

• FAMRI Center of Excellence in Translational Research at Johns Hopkins
Demonstration Project in 2 Hospitals and 2 Universities

PM$_{2.5}$ concentrations in both hospitals and one university as high as concentrations observed in bars in other countries
Demonstration Project: Intervention in 1 Hospital and 1 University
Demonstration Project: Pre-post Assessment of PM$_{2.5}$

Intervention Hospital

[Graph showing PM$_{2.5}$ levels in different areas: Lobby, Cafeteria, Office]
Demonstration Project: Lessons Learned

- **Objective assessment of SHS**
  - Document distribution and extent of SHS exposure
  - Monitor trends, compare buildings and evaluate the impacts of policies and interventions aimed at reducing SHS in indoor air

- **Share the baseline results with administration**
  - Present the real picture to motivate policy change

- **Involvement of employees**
  - Sense of ownership of the interventions

- **Positive feedback**
Clinical Trial - 250 Homes in Yerevan

Objective

• To educate non-smoking mothers on dangers of SHS & encourage implementation of smoking restrictions at homes

Measurements

• Air nicotine monitoring
• Surveys
• Biomonitoring

Intervention

• Counseling
• Demonstration of PM$_{2.5}$ measurement
• Two follow-up calls
GRAPHICAL PRESENTATION OF THE PM$_{2.5}$ MEASUREMENT

Before smoking
During smoking
After smoking
Outside

Aerosol, mg/m$^3$

Date & Time
25 Tue May 2010
Clinical Trial - 250 Homes in Yerevan

Lessons Learned

• Counseling along with the demonstration of the measurement of SHS home air pollution was effective in
  – educating mothers on the dangers of SHS exposure
  – encouraging smoking restrictions in the homes

• The intervention model can be disseminated to more households

• The intervention model can be tested in other settings, such as primary health care pediatric offices
  – to educate and empower non-smoking mothers
  – to educate and encourage smoking mothers
  – to reduce SHS inside homes


Remaining Major Gaps

A. Policy not harmonized with the international treaty FCTC
   • Ineffective and incomplete restrictions of smoking
   • Low price of tobacco products

B. Lack of effective public awareness campaigns

C. Healthcare system - no infrastructure
   • Smoking cessation guidelines are not endorsed
   • Lack of training on smoking cessation among health professionals
   • High prevalence of smoking among physicians
Collaborate with the University of Geneva to implement a pilot project on smoking cessation counseling training for medical residents in Armenia and the Czech Republic

- 37 medical residents trained in Yerevan
- Evaluation in progress
- Support from Swiss Agency for Development and Cooperation and Swiss National Science Foundation
Building Capacity for Tobacco Dependence Treatment

• “Implementing the FCTC Article 14 in Armenia through Building National Capacity in Smoking Cessation Training”

• Develop and implement an evidence-based smoking cessation training program for primary healthcare physicians to enable them to advise and assist smoking patients to quit
Pharmaceutical Market Research

• **Aim**
  – Determine availability, affordability, and prices of smoking cessation drugs in the Armenian pharmaceutical market

• **Main Findings**
  – Lack of awareness of and demand for treatment among health professionals and consumers
  – No promotion of pharmacotherapy
  – Little incentive for pharmacies to stock and promote drugs
  – Even drugs licensed for sale in Armenia are not always available for purchasing
Thank you!