

Health Care In Armenia: Challenges and Opportunities

- Article 38 of the RA Constitution
 - “everyone shall have the right to benefit from medical aid and service under the conditions prescribed by the law. **Everyone shall have the right to benefit from free of charge basic medical aid and services.**”
- World Health Organization
 - “The protection of health is one of most important and fundamental human rights.”

Primary Care Strengthening

- The Sustainable Development Goals place a clear emphasis on achieving universal health coverage,
 - “ensuring that all people and communities can use the ... health services they need, ***of sufficient quality to be effective***, while also ensuring that the use of these services does not expose the user to financial hardship”.

THE ARMENIAN GOVERNMENT'S 2021-2026 PROGRAM

27 AUGUST 2021



4.5 ԱՌՈՂՋԱԿԱՆՈՒԹՅՈՒՆ

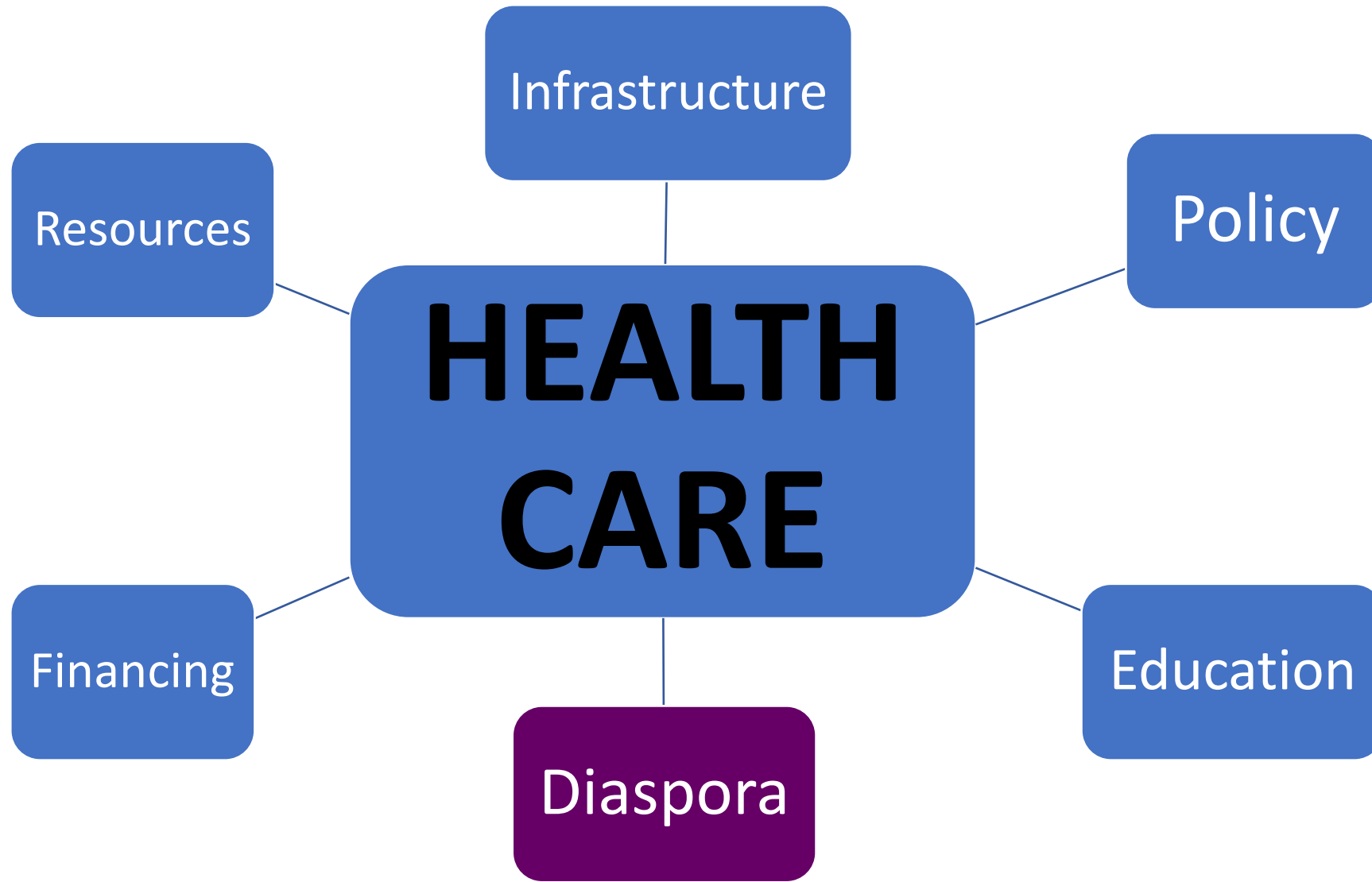
Առողջապահության ոլորտի զարգացումը Կառավարության հիմնական առաջնահերթություններից է: Կառավարության քաղաքականությունն ուղղված է լինելու անհատի և հանրային առողջության պահպանմանն ու բարելավմանը՝ ապահովելով հասանելի, արդիական, բարձր որակի առողջապահական ծառայությունների մատուցում:

- Քաղաքացիների համար առողջապահական ծառայությունների հասանելիության և մատչելիության ապահովման համար ներդրվելու է առողջության համապարփակ ապահովագրության համակարգը, որն ուղղված է լինելու առողջապահական ծառայություններ ստանալու պահին քաղաքացու համար զգալի ծախսերի նվազեցմանը: Առողջության համապարփակ ապահովագրության համակարգը ներառելու է արտահիվանդանոցային դեղորայքի, ինչպես նաև հատուկ և դժվարամատչելի ախտորոշիչ հետազոտությունների փաթեթը: Համապարփակ ապահովագրության համակարգի ներդրման շնորհիվ կընդգրկվեն նաև պարտադիր բժշկական զննումների փաթեթներ ռիսկային տարբեր խմբերի համար: Ներդրվելու են բժշկական օգնության և սպասարկման

- Healthcare is an expensive commodity
- Armenia is a developing country
 - 42% GDP drop
- Legacy of the “Semashko” system
 - Centralization
 - Specialization
 - Informal payments

Meeting the Need

Access, Cost, Quality



Health Care Policy Reforms

- Optimization programs
 - Reduction of the unused capacities
- Privatization of healthcare institutions
- Decentralization
- Focus on basic healthcare needs
 - Obstetrics
 - Primary Care
 - Allocation to regions

A comparative analysis of health policy performance in 43 European countries.

Mackenbach JP, McKee M.

¹ Department of Public Health, Erasmus MC, Rotterdam, The Netherlands.

- Assessment of 10 health policy markers
 - Tobacco
 - Alcohol
 - Food and nutrition
 - Fertility
 - Pregnancy and childbirth
 - Child health
 - Infectious diseases
 - Hypertension detection and treatment
 - Cancer screening
 - Road safety
 - Air pollution

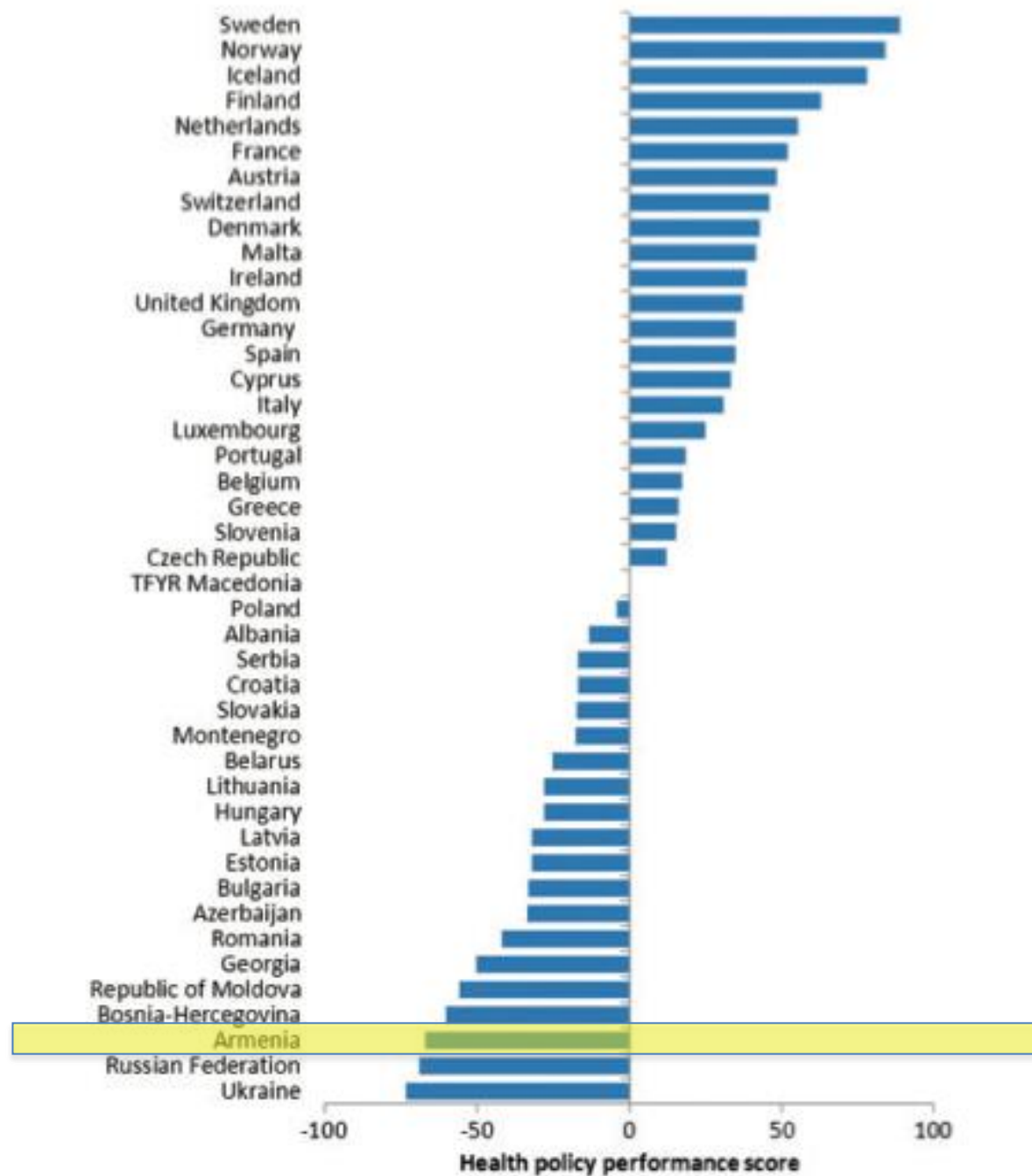


Figure 1 Summary scores for health policy performance, by country

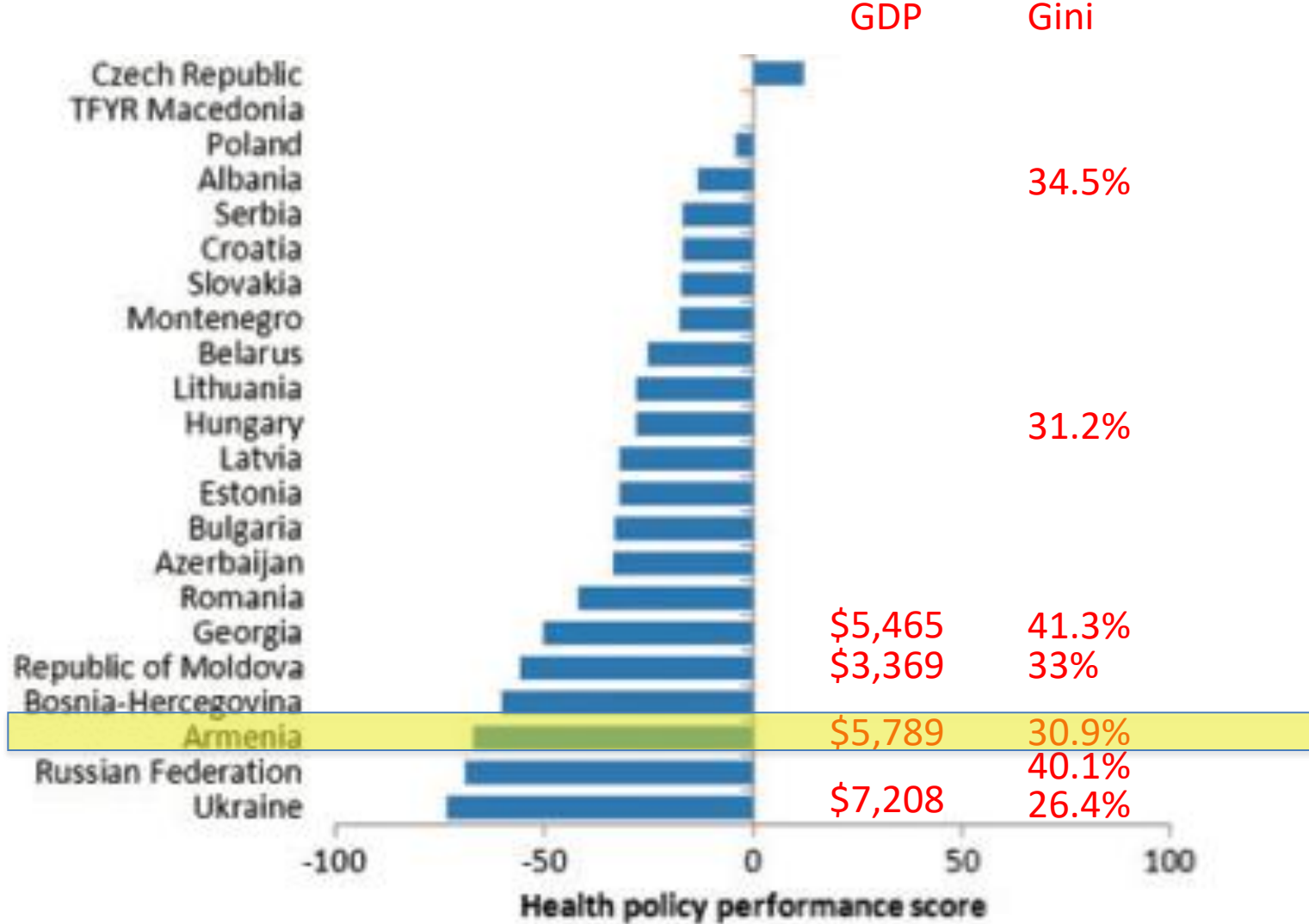


Figure 1 Summary scores for health policy performance, by country

Policies

Table 2: Score card for core population-based interventions

| Interventions | Rating | Criterion for rating |
|--------------------------------------------------------------|----------|------------------------------------------------------------------------------------------|
| Range of anti-smoking interventions | | |
| Raise tobacco taxes | Limited | Tax is 25% of retail price |
| Smoke-free environments | Limited | 100% smoke-free environment enforced in schools and hospitals only |
| Warnings of dangers of tobacco and smoke | Moderate | Warning labels on all tobacco products are at least 30% of package size (front and back) |
| Bans on advertising, promotion and sponsorship | Limited | Ban on national television and radio |
| Quit lines and nicotine replacement therapy ^a | Limited | There are no quit lines, NRT available at full cost for the individual |
| Interventions to prevent harmful alcohol use | | |
| Raise taxes on alcohol | Limited | Tax is 20% of retail price. A special tax of 10% on imported alcoholic beverages |
| Restrictions and bans on advertising and promotion | Limited | Regulatory frameworks exist to regulate content and volume of alcohol marketing. |
| Restrictions on availability of alcohol in the retail sector | Limited | Regulatory frameworks on serving of alcohol in governmental and educational institutions |
| Minimum purchase age regulation and enforcement ^a | Moderate | Minimum purchase age of 18 years for all alcohol products and effective enforcement |
| Allowed blood alcohol level for driving ^a | Moderate | Blood alcohol content maximum 0.4 g/L and zero for novice and professional drivers |

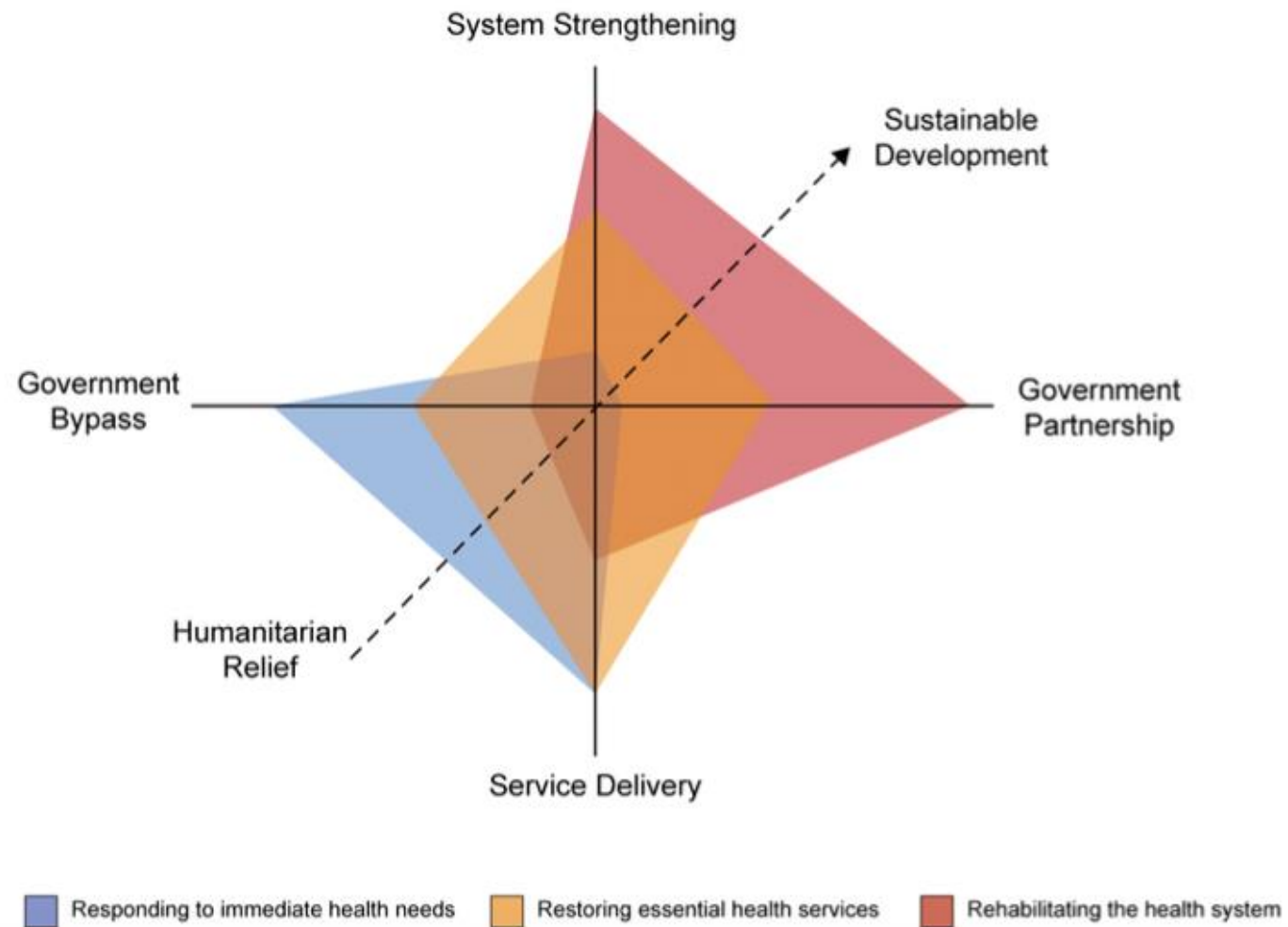
Policies

Table 2: Score card for core population-based interventions (continued)

| Interventions | Rating | Criterion for rating |
|----------------------------------------------------------------------------------------|----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Interventions to improve diet and physical activity | | |
| Reduce salt intake and salt content in foods | Limited | A greater than 10% reduction in salt intake in past 10 years |
| Virtually eliminate <i>trans</i> -fatty acids from the diet | Limited | There is no evidence that <i>trans</i> -fats have been significantly reduced in diets |
| Reduce free sugar intake ^a | Limited | No action has been taken |
| Increase intake of fruit and vegetables ^a | Limited | The aim to increase consumption of fruit and vegetables is in line with the WHO/FAO recommendations of at least 400 g/day and some initiatives exist |
| Reduce marketing pressure of food and non-alcoholic beverages to children ^a | Limited | Marketing of foods and beverages to children is noted as a problem but has not been translated into specific action in government-led initiatives. |
| Promote awareness about diet and activity ^a | Limited | There has been little workforce development for nutrition and physical activity; nutrition and physical activity are not priority elements in primary care |

Policy

- Deficiencies remain in
 - Licensing/accreditation
 - Regulation
 - Transparency in reform
 - Civil Society
 - Focus on basic health determinants
 - Evaluation and feedback
 - Resource/Capacity optimization
 - Introduction of Information, Communication, Technology (ICT)



From services to systems:
Entry points for donors and non-
state partners seeking to
strengthen health systems in
fragile states

Financing

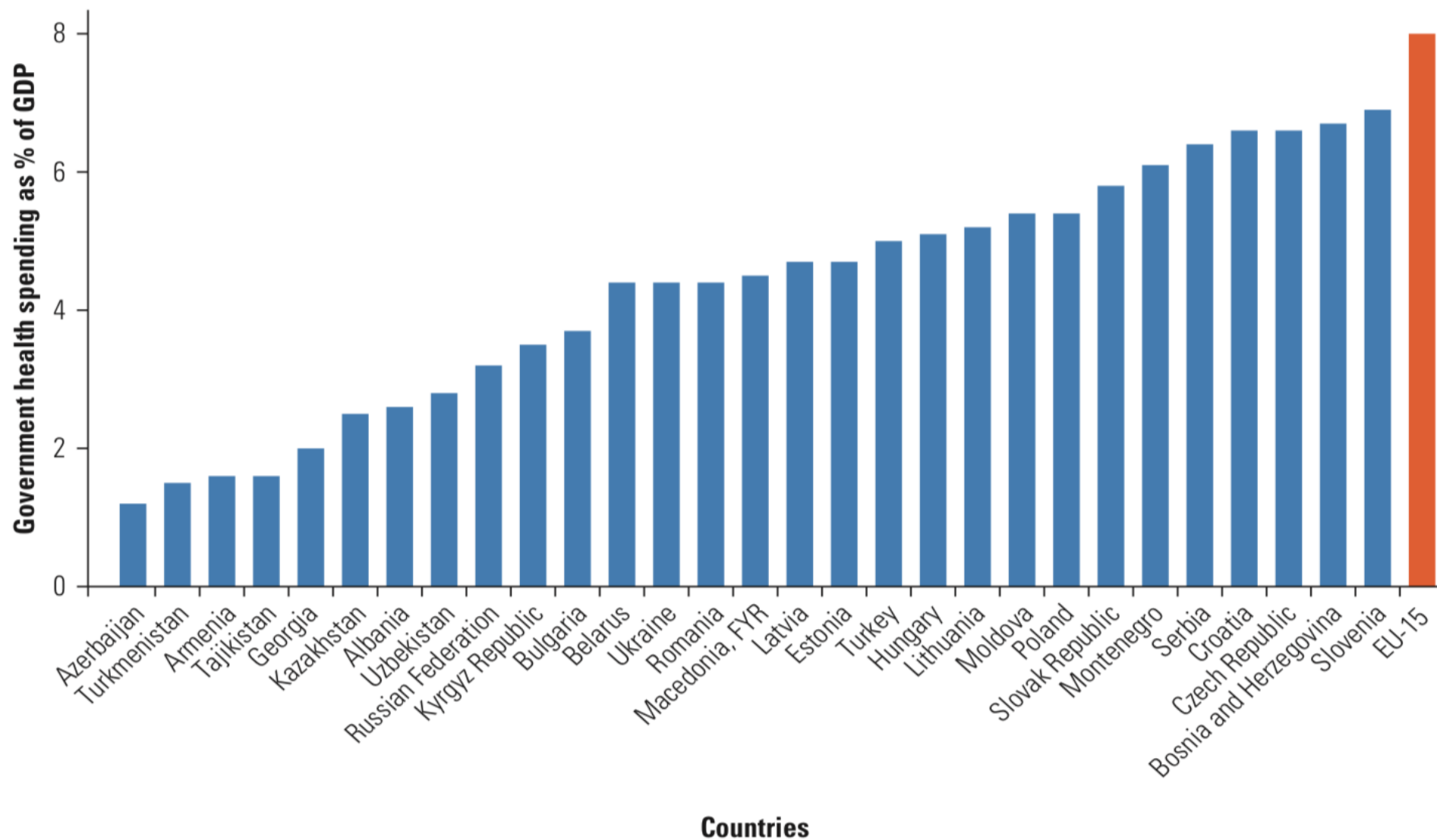
- Increase in health spending
 - 2010 spending 6 times 2000 level
 - Recently, significant amount in absolute dollars
 - Basic healthcare services package

Financing

- 2006 Armenia household health expenditure study
 - Armenia has the highest out of pocket healthcare spending in the world
 - Highly regressive
 - 5.2% for richest quarter, 26.2% for poorest
 - 16 to 26% of Armenian households incur catastrophic health expenditures.
- 1.66% of GDP is spent on health care
- Developing countries spend ~6%

FIGURE 0.14

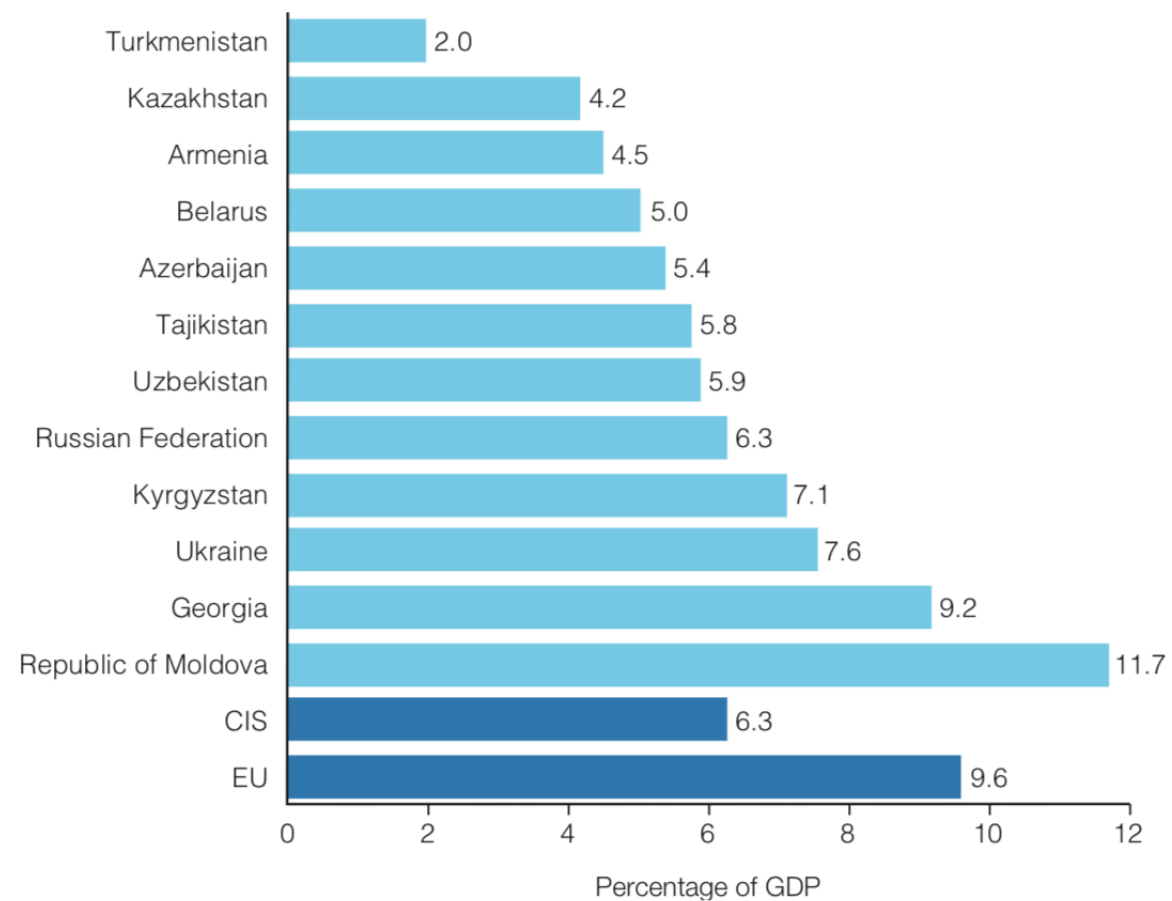
Government Health Budgets in ECA Cover a Wide Range but Are Smaller than in the EU-15



Source: WHO 2012.

Note: ECA = Europe and Central Asia; GDP = gross domestic product.

Fig. 4.1 Total health expenditure as % of GDP, WHO estimates, 2012



Source: WHO, 2014b.

Financing

- Threshold designed for countries with younger population and optimized resources
 - 1 MD per 270 citizens
 - 1 hospital bed per 227 citizens
- Low public spending combined with more costs in Armenia

Financing

- Overall average wage in Armenia
 - \$302 USD/month
- Average wage of healthcare worker
 - \$190 USD (68k AMD)
 - \$200 for MD's
 - \$156 for RN's
 - 1.3 times higher than the minimal consumer basket

Financing- Improvements

- Increases planned in Medium Term Expenditure Framework
- Development of social safety net
- Maternity vouchers

Medical Education- Positive Developments

- Reduction of medical graduates from 622 to 428/yr
- Introduction of English curriculum
- Revision of medical education curriculum in accordance to Bologna process agreement
- Introduction of primary healthcare training
- Licensing of physician (2001)
 - Not in effect

Medical Education- Problems

- No control of quantity of medical graduates
- Lack of accreditation
- Lack of updated curriculum
- No regulation in number and types of residency positions available
- No control of experience and training of residents
- Absence of licensing and continuing medical education requirements

This Provisional PDF corresponds to the article as it appeared upon acceptance. Fully formatted PDF and full text (HTML) versions will be made available soon.

Pediatric emergency medical care in Yerevan, Armenia: a knowledge and attitudes survey of out-of-hospital emergency physicians

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Abstract

Background

Out-of-hospital emergency care is at an early stage of development in Armenia, with the current emergency medical services (EMS) system having emergency physicians (EPs) work on ambulances along with nurses. While efforts are underway by the Ministry of Health and other organizations to reform the EMS system, little data exists on the status of pediatric emergency care (PEC) in the country. We designed this study to evaluate the knowledge and attitudes of out-of-hospital emergency physicians in pediatric rapid assessment and resuscitation, and identify areas for PEC improvement.

Methods

We distributed an anonymous, self-administered Knowledge and Attitudes survey to a convenience sample of out-of-hospital EPs in the capital, Yerevan, from August to September 2012.

Results

With a response rate of 80%, the majority (89.7%) of respondents failed a 10-question knowledge test (with a pre-defined passing score of ≥ 7) with a mean score of 4.17 ± 1.99 SD. Answers regarding the relationship between pediatric cardiac arrest and respiratory issues, compression-to-ventilation ratio in neonates, definition of hypotension, and recognition of shock were most frequently incorrect. None of the participants had attended pediatric-specific continuing medical education (CME) activities within the preceding 5 years. χ^2 analysis demonstrated no statistically significant association between physician age, length of EMS experience, type of ambulance (general vs. resuscitation/critical care), or CME attendance and pass/fail status. The majority of participants agreed that PEC education in Armenia needs improvement (98%), that there is a need for pediatric-specific CME (98%), and that national out-of-hospital PEC guidelines would increase PEC safety, efficiency, and effectiveness (96%).

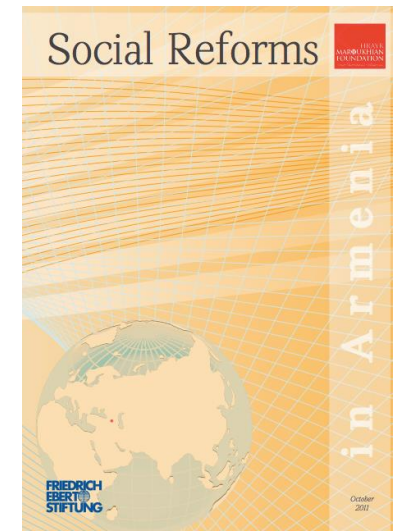
Conclusions

Out-of-hospital emergency physicians in Yerevan, Armenia are deficient in pediatric-specific emergency assessment and resuscitation knowledge and training, but express a clear desire for improvement. There is a need to support additional PEC training and CME within the EMS system in Armenia.

Quality

- The mechanisms for quality medical care are as yet of a fragmentary nature.
- Little motivation for medical workers to introduce and continue quality improvement measures

*Social Reforms in Armenia. Hrayr
Maroukhian Foundation, October, 2011*



- Obstacles to the improvement of the situation
 - Inadequate requirements for licensing and continuing professional education
 - Absence of an accreditation system
 - Low level of competition and motivation between medical establishments.

- “In general, the systematic approaches aimed at improving the level of quality medical care... **cannot as yet be considered adequate**”

Quality

Mortality due to low-quality health systems in the universal health coverage era: a systematic analysis of amenable deaths in 137 countries



Margaret E Kruk, Anna D Gage, Naima T Joseph, Goodarz Danaei, Sebastián García-Saisó, Joshua A Salomon

Summary

Background Universal health coverage has been proposed as a strategy to improve health in low-income and middle-income countries (LMICs). However, this is contingent on the provision of good-quality health care. We estimate the excess mortality for conditions targeted in the Sustainable Development Goals (SDG) that are amenable to health care and the portion of this excess mortality due to poor-quality care in 137 LMICs, in which excess mortality refers to deaths that could have been averted in settings with strong health systems.

Methods Using data from the 2016 Global Burden of Disease study, we calculated mortality amenable to personal health care for 61 SDG conditions by comparing case fatality between each LMIC with corresponding numbers from 23 high-income reference countries with strong health systems. We used data on health-care utilisation from population surveys to separately estimate the portion of amenable mortality attributable to non-utilisation of health care versus that attributable to receipt of poor-quality care.

Findings 15·6 million excess deaths from 61 conditions occurred in LMICs in 2016. After excluding deaths that could be prevented through public health measures, 8·6 million excess deaths were amenable to health care of which 5·0 million were estimated to be due to receipt of poor-quality care and 3·6 million were due to non-utilisation of health care. Poor quality of health care was a major driver of excess mortality across conditions, from cardiovascular disease and injuries to neonatal and communicable disorders.

Interpretation Universal health coverage for SDG conditions could avert 8·6 million deaths per year but only if expansion of service coverage is accompanied by investments into high-quality health systems.

Funding Bill & Melinda Gates Foundation.

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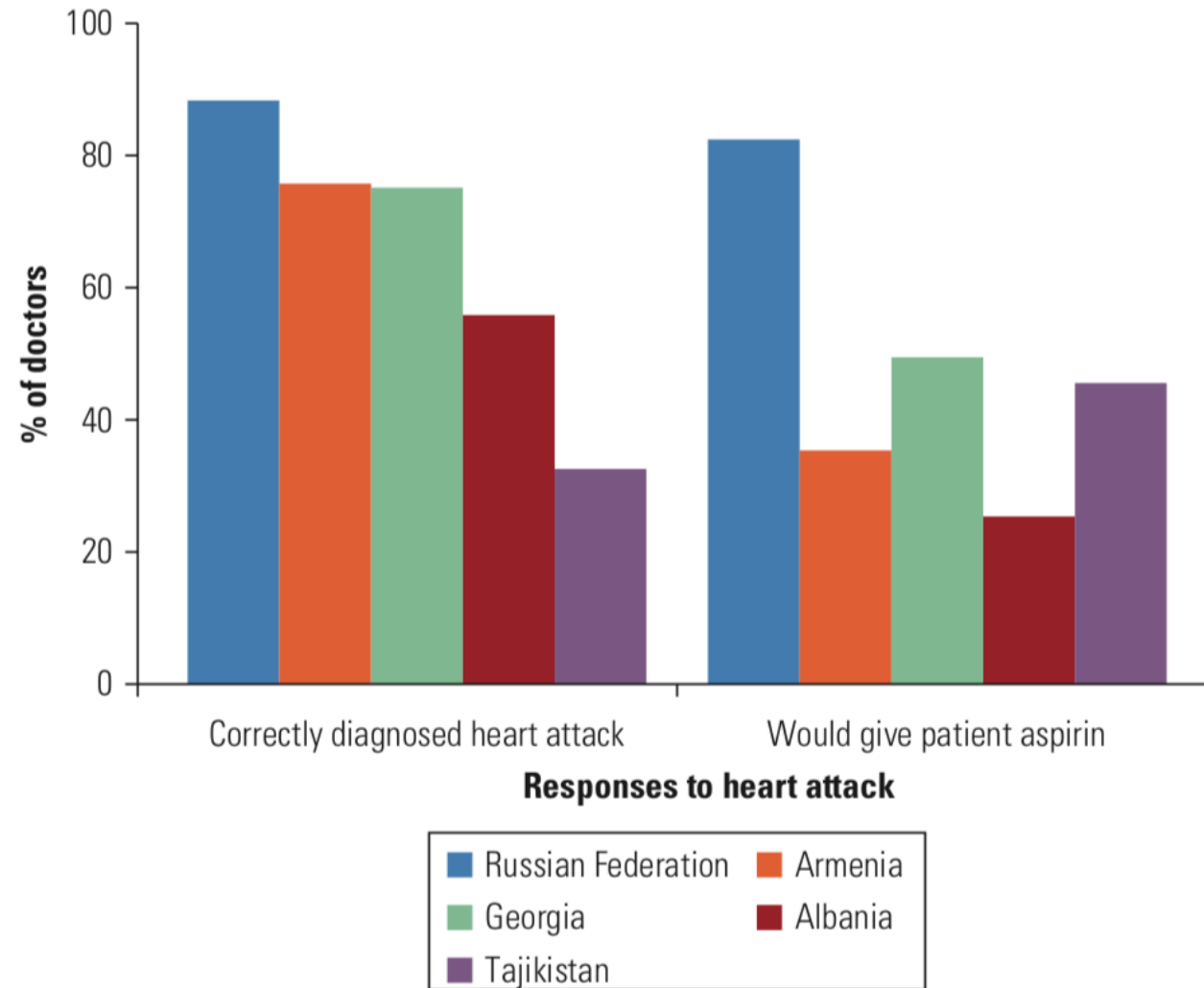
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Table S5. Country results table

| Country | Avertable deaths | | Amenable deaths | | Percent of amenable deaths due to poor quality | Years of life lost to poor quality (1000s) | Poor quality deaths per 100,000 people |
|----------------|------------------------------------------------------|--------------------------------|----------------------------|-------------------------------|------------------------------------------------|--------------------------------------------|----------------------------------------|
| | Deaths preventable by population level interventions | Deaths amenable to health care | Deaths due to poor quality | Deaths due to non-utilization | | | |
| Afghanistan | 83,540 | 80,556 | 46,153 | 34,403 | 57% | 2,609 | 142 |
| Albania | 1,222 | 2,407 | 2,081 | 326 | 86% | 64 | 72 |
| Algeria | 17,122 | 28,554 | 17,966 | 10,588 | 63% | 1,047 | 45 |
| American Samoa | 12 | 30 | 23 | 6 | 79% | 1 | 23 |
| Angola | 45,581 | 48,092 | 17,075 | 31,017 | 36% | 993 | 68 |
| Argentina | 10,010 | 39,488 | 29,229 | 10,258 | 74% | 1,118 | 67 |
| Armenia | 1,010 | 2,995 | 1,600 | 1,396 | 53% | 53 | 53 |
| Azerbaijan | 7,132 | 12,394 | 8,000 | 4,394 | 65% | 400 | 82 |
| Bangladesh | 117,549 | 182,905 | 91,631 | 91,275 | 50% | 3,801 | 57 |
| Belarus | 17,424 | 12,382 | 7,906 | 4,477 | 64% | 231 | 83 |
| Belize | 190 | 281 | 208 | 73 | 74% | 9 | 52 |
| Benin | 24,833 | 22,456 | 12,777 | 9,679 | 57% | 786 | 117 |

FIGURE 0.10

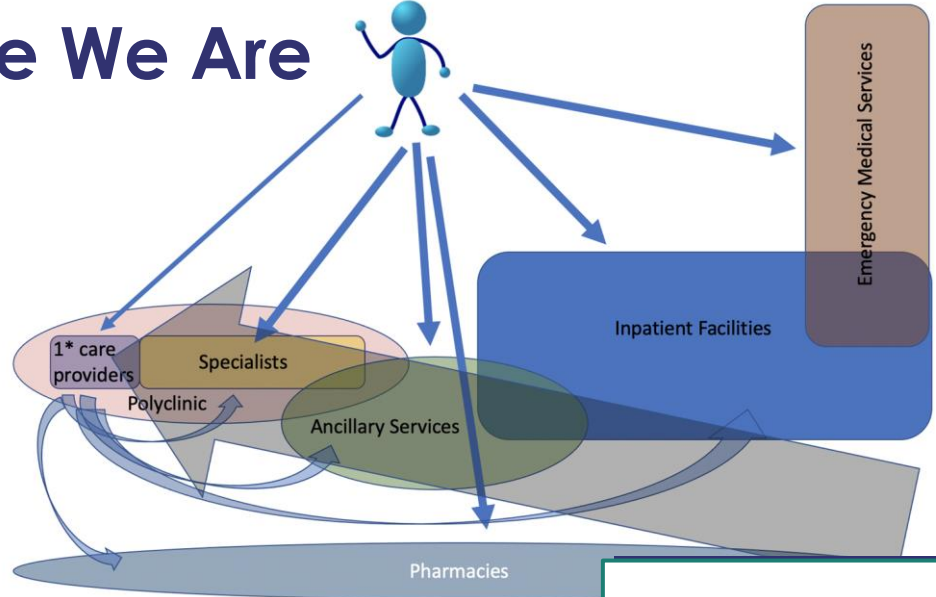
The Quality of Key Health Care Services Can Be Improved



Source: World Bank 2013.

Note: Figure shows provider responses to clinical vignette of heart attack. Results for the Russian Federation are from Kirov oblast.

Where We Are



1. Focuses on treating disease rather than keeping population healthy/promoting health

2. Is expensive, not cost effective, and does not lead to desired health outcomes

6.5%
of GDP spent on non-communicable diseases

16.1%
of household spend over 10% of their income on health, above the regional average of 7.4%

2.5%
of population becoming impoverished yearly because of health expenditures

84%
of hypertension patients' are not controlled

>90%
of women do not receive screenings for breast and cervical cancers

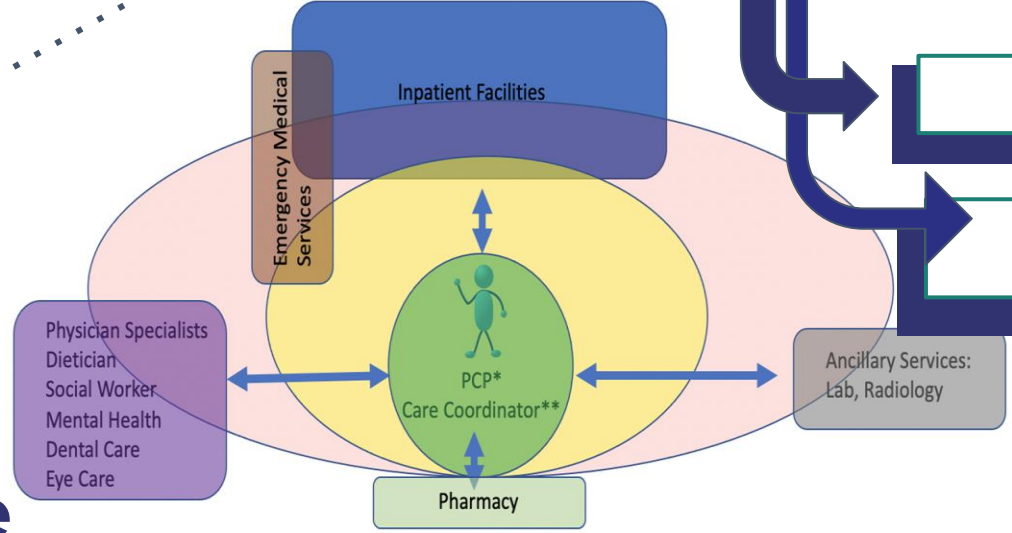
1. Focuses on keeping patients healthy

2. More effective in reducing morbidity and mortality

3. Highest return on investment for health care spending

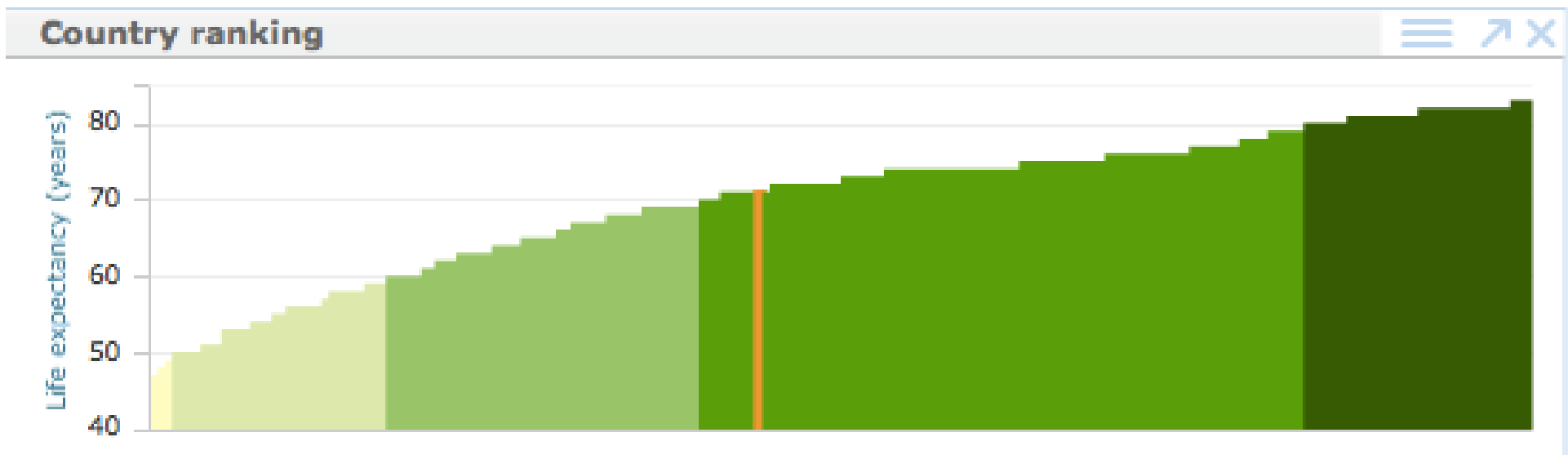
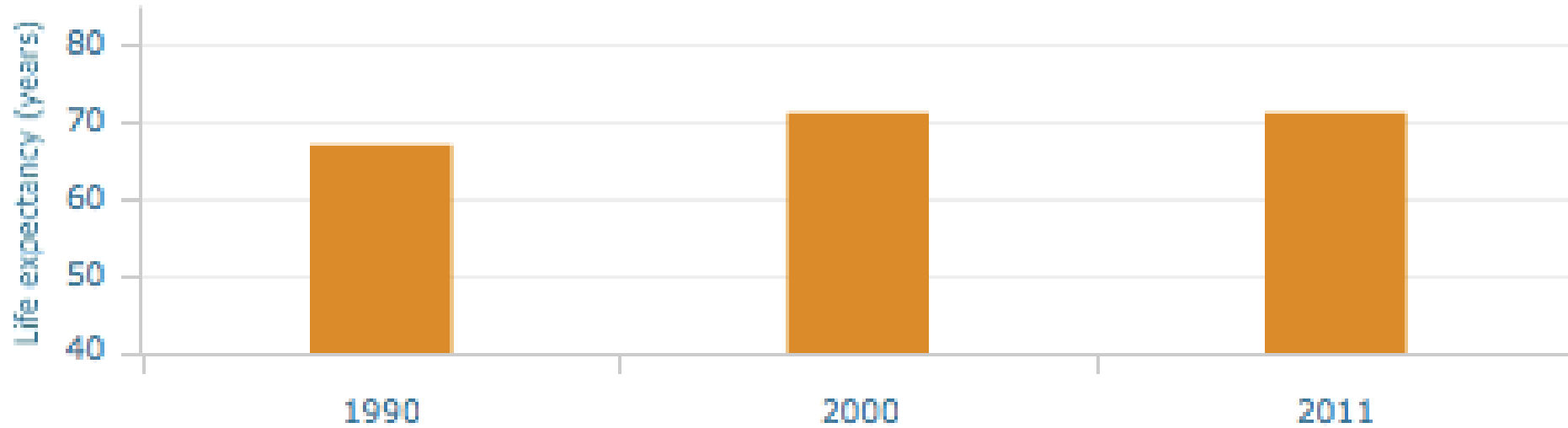
4. Contributes to the economy

5. In line with global healthcare trends



Where We Want To Be

Life Expectancy



Quality- Data and Research

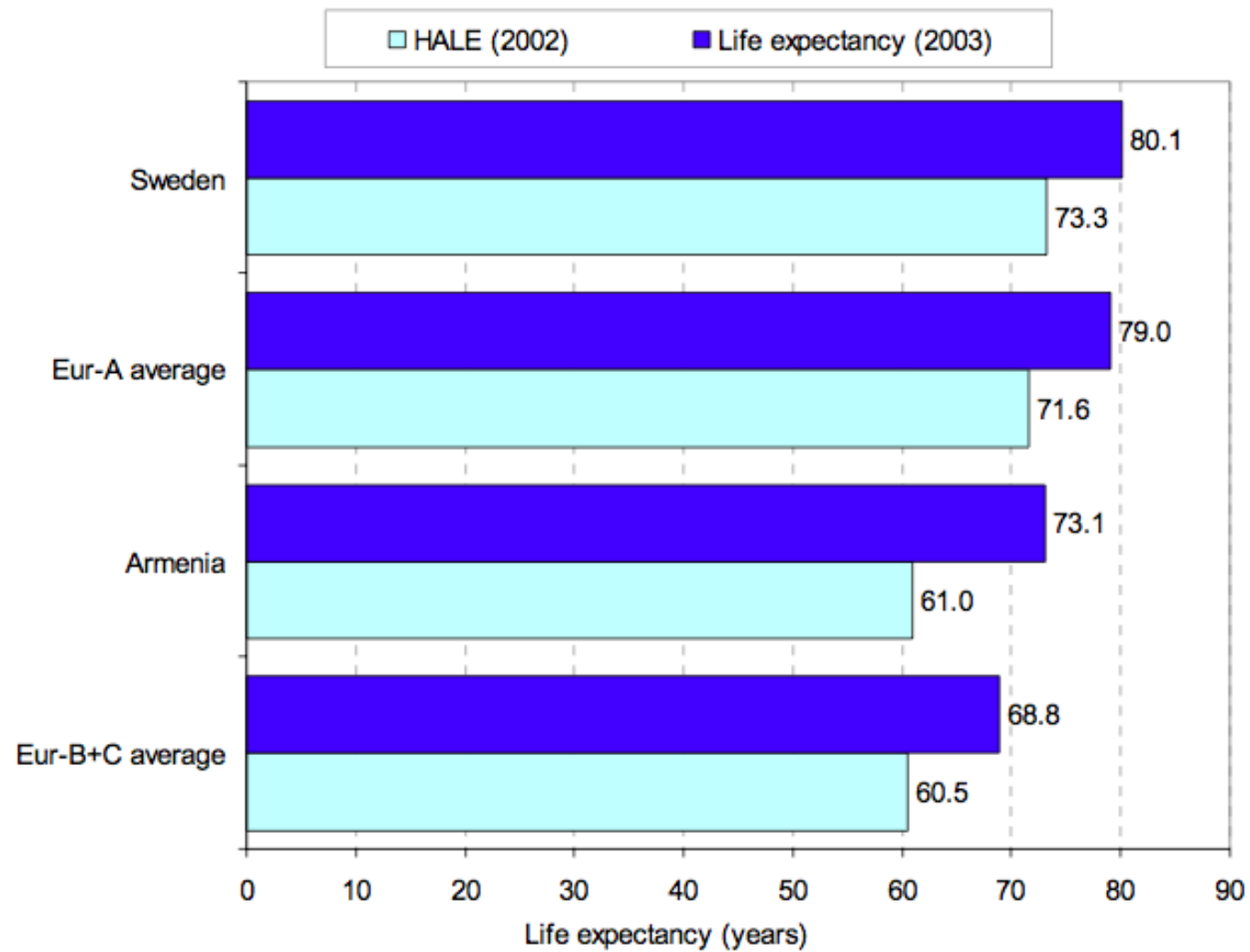
Table 2.1 Official and estimated life expectancies, latest available year (in parentheses)

| | Official data | WHO estimate (2011) | Difference |
|----------------------------|----------------------|--------------------------------|-------------------|
| Armenia (2012) | 74.6 | 71 | -3.6 |
| Azerbaijan (2007) | 73.7 | 71 | -2.8 |
| Belarus (2009) | 70.6 | 71 | 0.4 |
| Georgia (2010) | 74.7 | 72 | -2.7 |
| Kazakhstan (2010) | 68.6 | 67 | -1.6 |
| Kyrgyzstan (2010) | 69.5 | 69 | -0.5 |
| Republic of Moldova (2012) | 71.1 | 71 | -0.1 |
| Russian Federation (2010) | 69.0 | 69 | 0.0 |
| Tajikistan (2005) | 73.7 | 68 | -5.7 |
| Turkmenistan (1998) | 66.1 | 63 | -3.1 |
| Ukraine (2012) | 71.3 | 71 | -0.3 |
| Uzbekistan (2005) | 70.5 | 68 | -2.5 |

Source: WHO, 2014.

Healthy Life Expectancy

LE and HALE in Armenia, Sweden, Eur-A and Eur-B+C averages,
latest available year



Armenia Today (with some exceptions)

- No overall shortage of physicians
 - 38.8 MD's per 10,000 (EU average 35/10,000)
 - Maldistribution
 - 13.9/10,000 (Armavir) to 19.8/10,000 (Shirak)
 - 72.5/10,000 in Yerevan
 - 56.6 RN's per 10,000
 - EU average is 72/10,000
- Surplus of hospitals
 - 3.6 beds /1,000
- Surplus of medical trainees
- Availability of nearly all necessary technologies

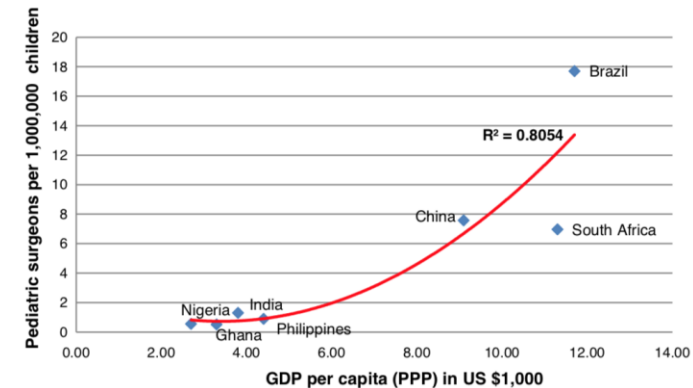


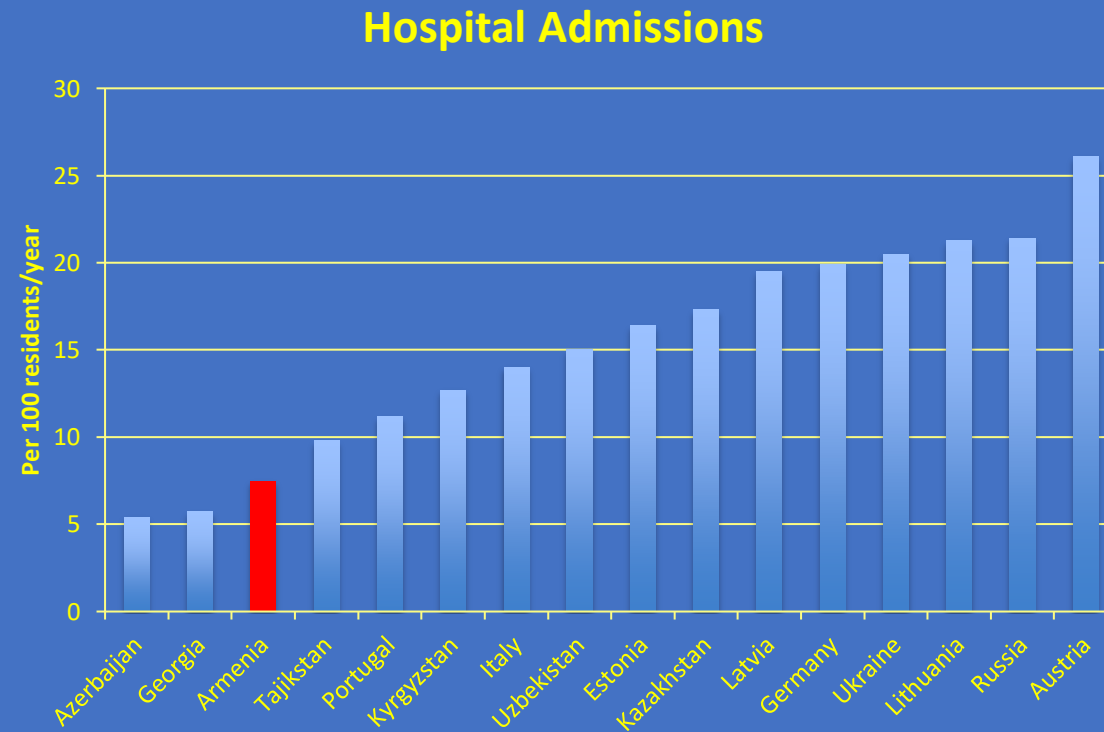
Fig. 2. The number of pediatric surgeons per million children is positively correlated with the GDP per capita in countries with less than US\$20,000 per capita.

Utilization/Infrastructure

- Yerevan
 - Population 1 million
 - Size 86 square miles
 - Hospitals = 41
- Los Angeles (county)
 - Population 10 million
 - Size 4,751 square miles
 - Hospitals 122
- **To reach Yerevan saturation**
 - **410 hospitals for population**
 - **2,265 hospitals for size**

Utilization

- Armenia has older age distribution
 - 30% of population over age 60



Millenium Development Goals

- 8 international development goals set by United Nations

MDG 1- Eradicate Extreme Poverty

| Halve, between 1990 and 2015, the Proportion of People who Suffer from Hunger | | | | | | | | | | | |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------------------|---------------|------|------|------|------|------|----------------------------------|-----------------------------------------------|----------------------|--------------------------------------------|
| INDICATORS | | 1999 | 2004 | 2005 | 2006 | 2007 | 2008 | 2015 (pre-crisis projections) | 2015 (new estimates; baseline scenario) | Target value in 2015 | Will the target value be achieved by 2015? |
| 6 | Prevalence of underweight children under five years of age, % | 2.6 (2000) | ... | 4.0 | ... | ... | ... | 1.9 | 1.9 | <1.4 | * |
| 7 | Proportion of population below minimum level of dietary energy consumption, % | 21.0 | 6.4 | 4.6 | 4.1 | 3.8 | 3.1 | 1.6 | 2.3 | <2 | ** |

MDG 4- Reduce Child Mortality

| Reduce, by Two-Thirds between 1990 and 2015, the Under-Five Mortality Rate | | | | | | | | | | |
|----------------------------------------------------------------------------|--------------------------------------------------------------|------|------|------|------|--------------------|----------------------------------|-----------------------------------------------|----------------------|-----------------------------------------------|
| | | 1990 | 1999 | 2004 | 2007 | 2008 | 2015 (pre-crisis projections) | 2015 (new estimates; baseline scenario) | Target value in 2015 | Will the target value be achieved by 2015? |
| 20 | Under-five mortality rate, per 1,000 live births | 23.8 | 19.3 | 13.0 | 12.3 | 12.2 | 9.6 ⁵⁰ | 10.0 | <10 | ** |
| 21 | Infant mortality rate, per 1,000 live births | 18.3 | 15.7 | 11.5 | 10.8 | 10.8 ⁵¹ | 8.2 ⁵² | 8.7 | <8 | ** |
| 22 | Proportion of 2 years-old children immunized against measles | 95.2 | 91.1 | 91.5 | 92.0 | 94.5 | >96 ⁵³ | >96 | > 96 | ** |

MDG 5- Improve Maternal Health

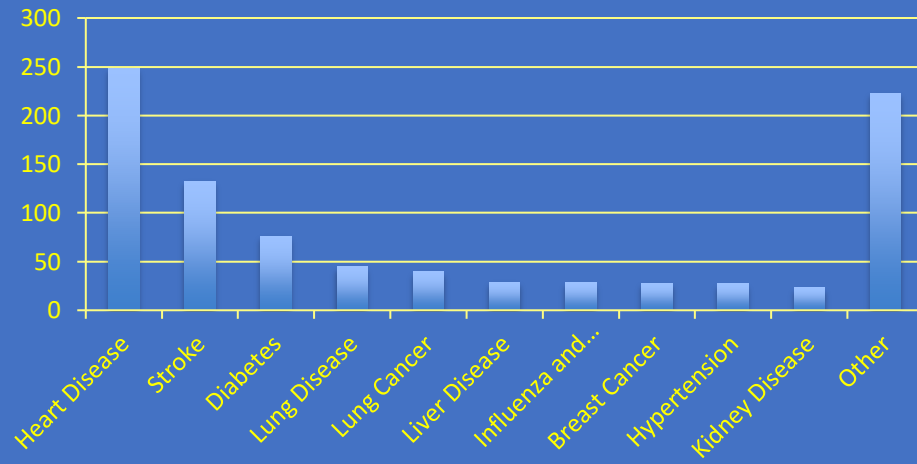
| Reduce, by Three Quarters between 1990 and 2015, the Maternal Mortality Ratio | | | | | | | | | | |
|-------------------------------------------------------------------------------|--------------------------------------------------------------|-------|-------|-------|-------|-------|----------------------------------|-----------------------------------------------|----------------------|--------------------------------------------|
| | | 1990 | 1999 | 2004 | 2005 | 2007 | 2015 (pre-crisis projections) | 2015 (new estimates; baseline scenario) | Target value in 2015 | Will the target value be achieved by 2015? |
| 23 | Maternal mortality, per 100,000 live births (3-year average) | 32.6 | 35.4 | 22.6 | 24.0 | 26.0 | 10.3f | 11.6 | <10 | * |
| 24 | Proportion of births attended by skilled health personnel, % | 98.6c | 96.8a | 99.5c | 97.8b | 99.7c | > 99.5 | >99.5 | >99.5 | *** |

MDG 6- Combat HIV, Malaria, TB

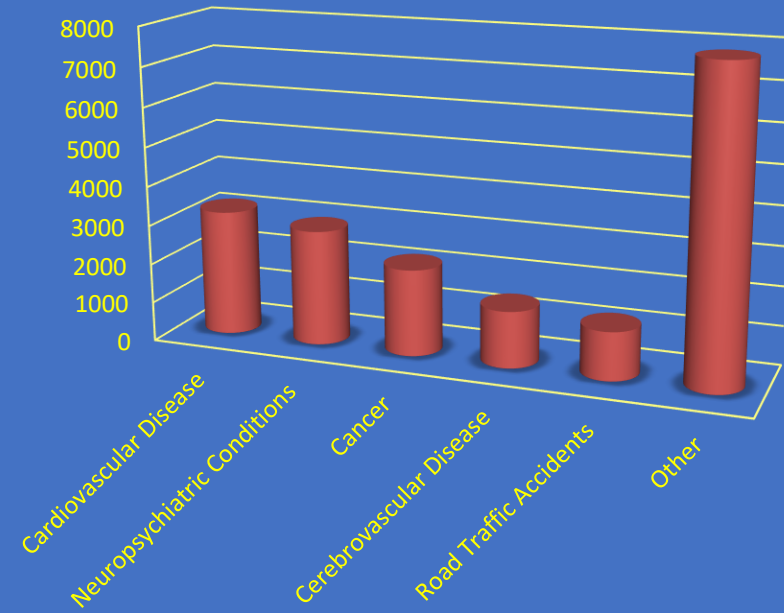


Burden of Disease

Causes of Death

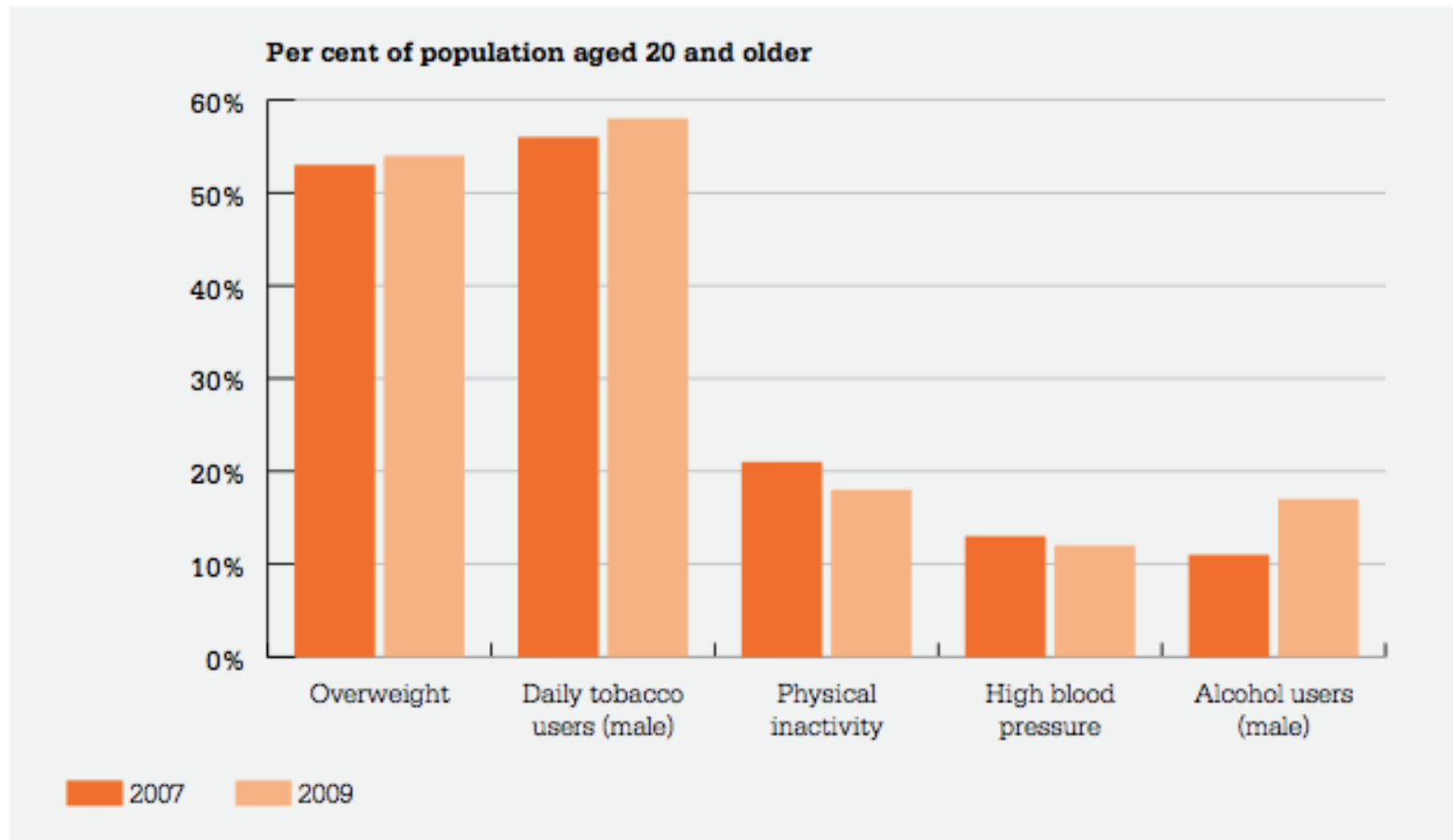


Morbidity (DALY's)



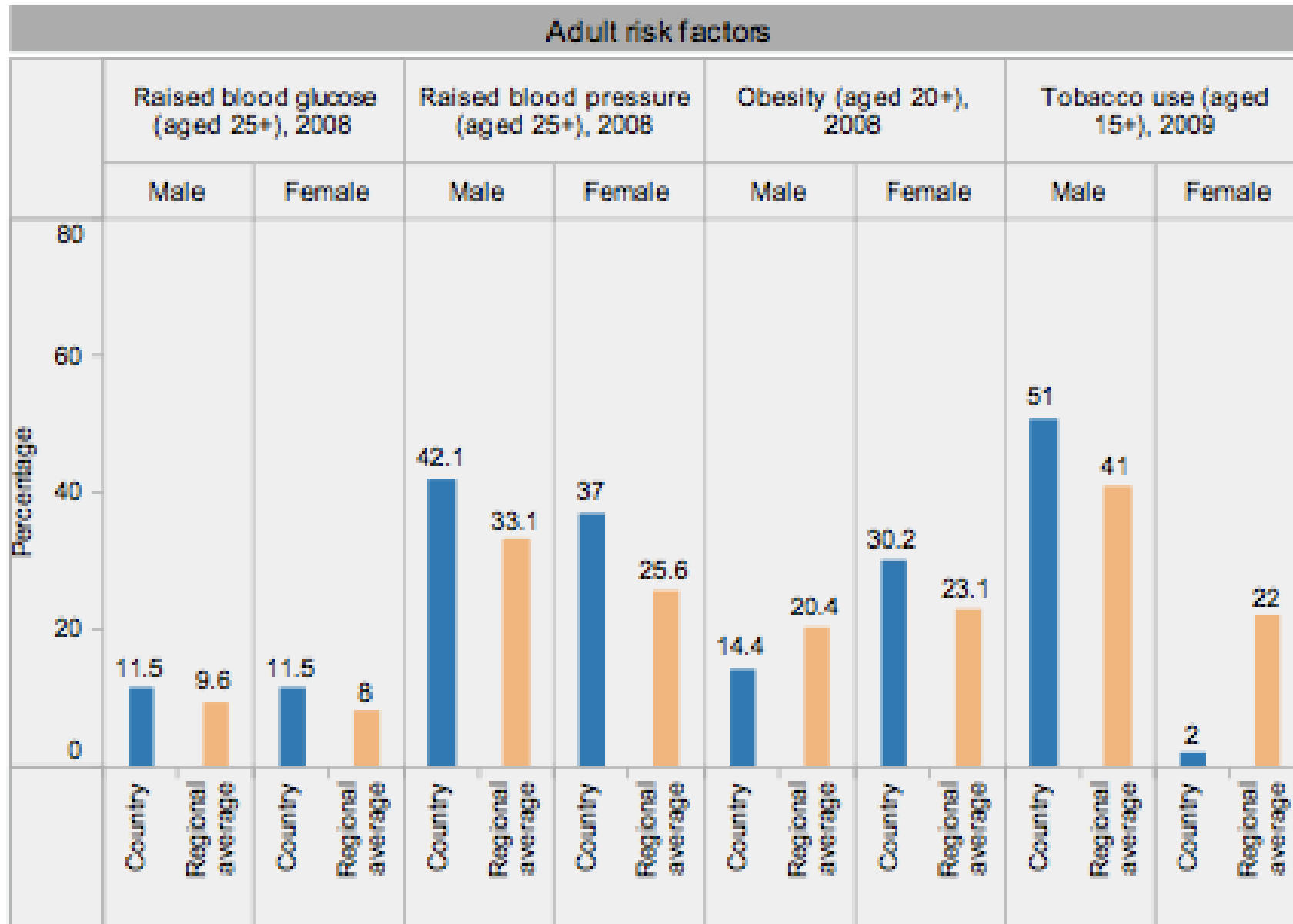
Risk Factors

Fig. 64. Prevalence of health risk factors among Armenians age 20 and older, 2007 and 2009



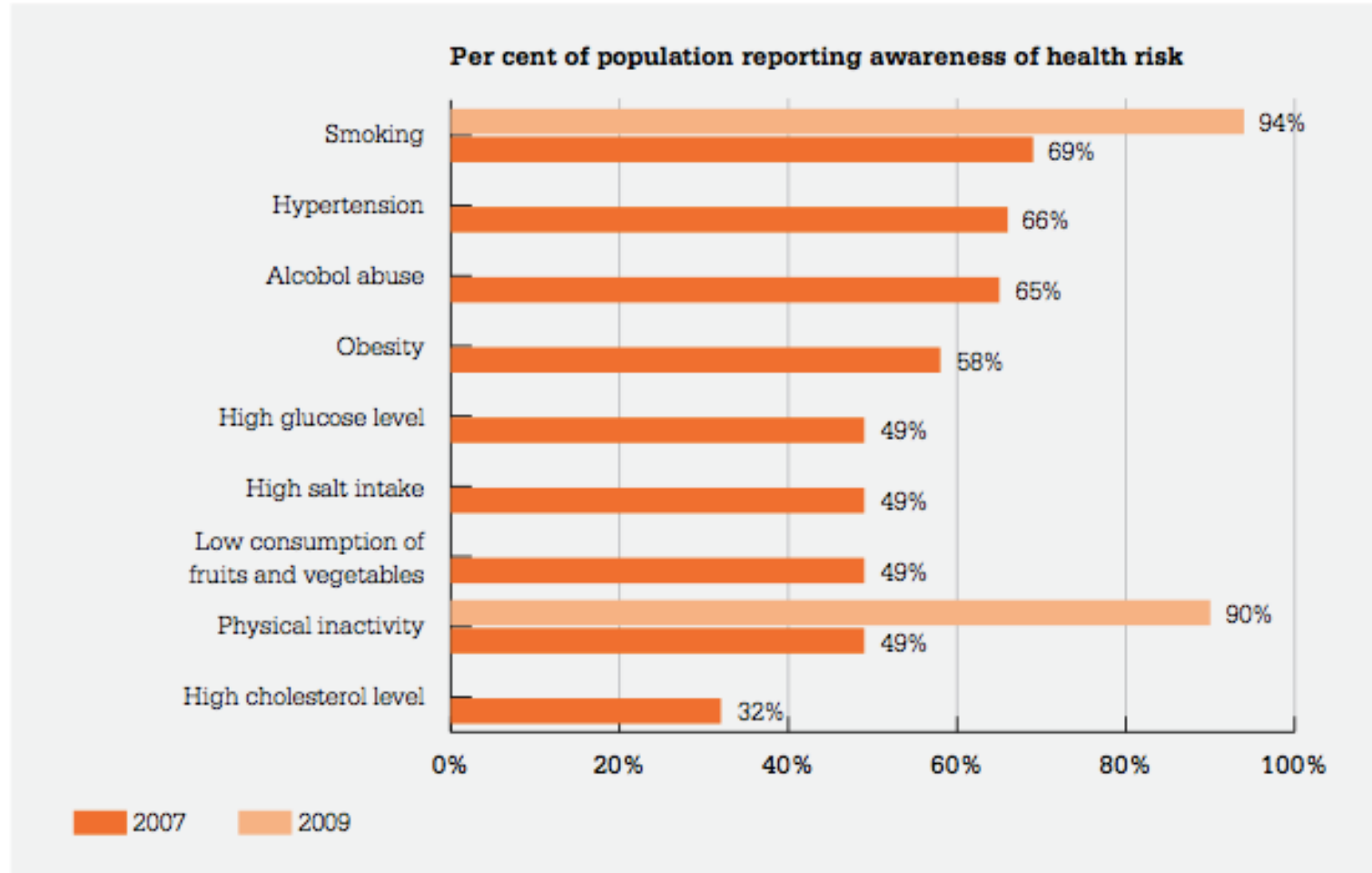
Sources: HSPA 2007 and 2009.

Risk Factors



Risk Factors- AWARENESS

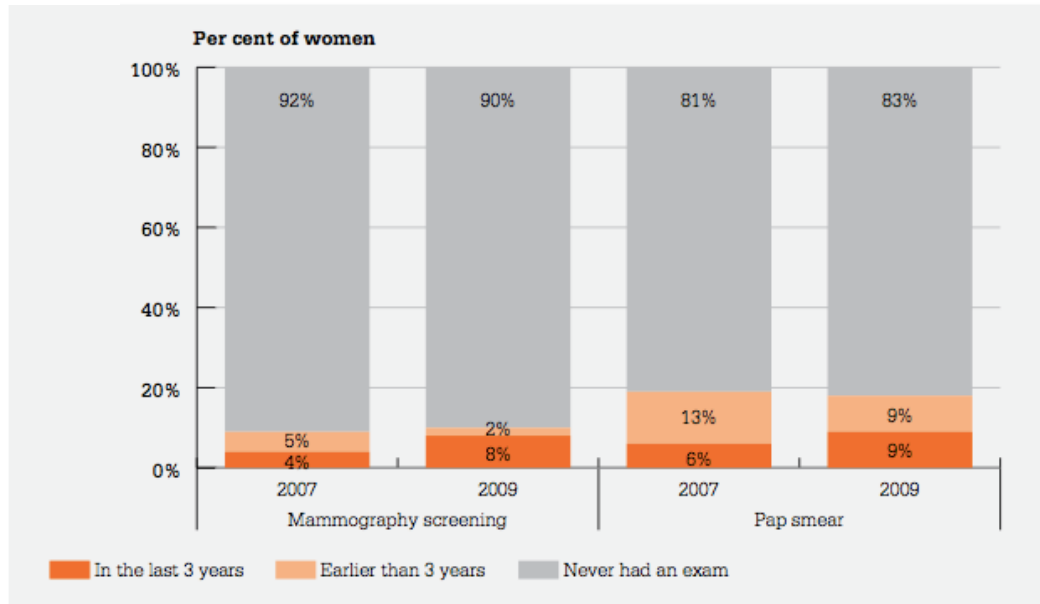
Fig. 68. Per cent of population age 20 and older who are aware of health risk factors, 2007 and 2009



Sources: HSPA 2007 and 2009.

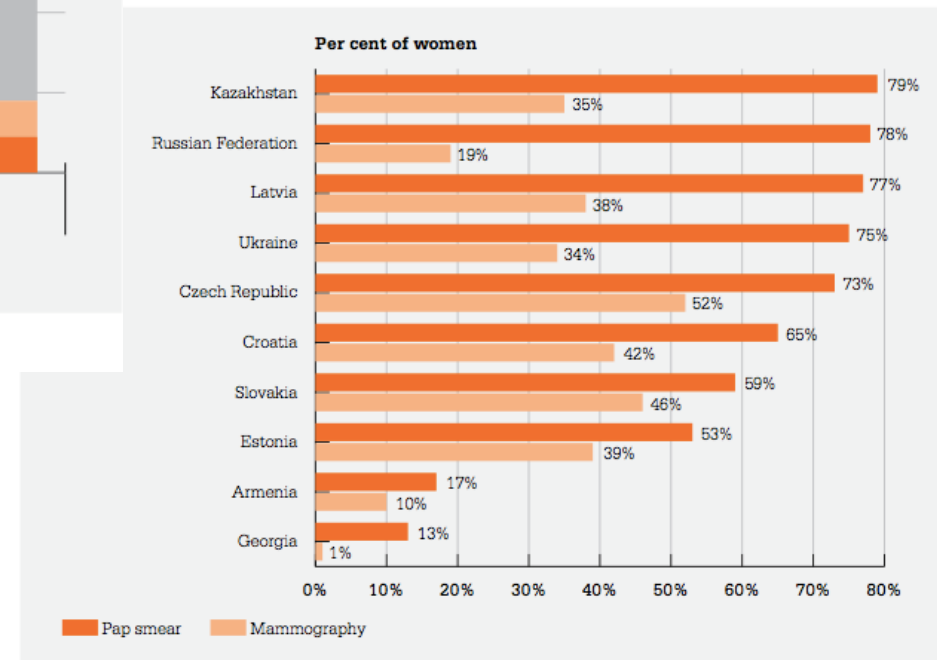
Preventative Health

Percentage of women age 30–60 who reported having had mammography and Pap smears, 2007 and 2009



Sources: HSPA 2007, 2009.

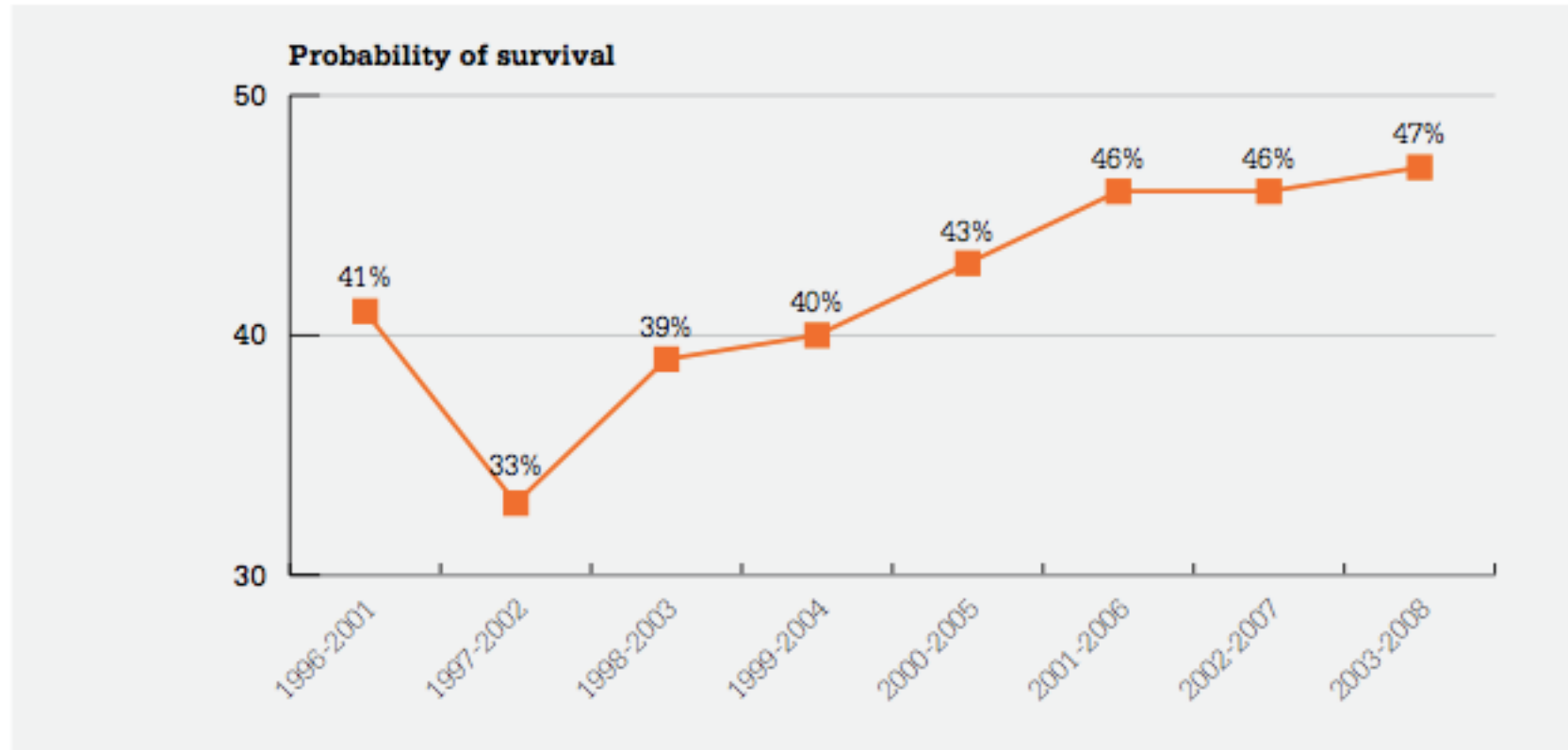
Percentage of women who have had Pap smears and mammography, selected countries, 2000–2006



Source: WHO, 2008 (30).

Preventative Health

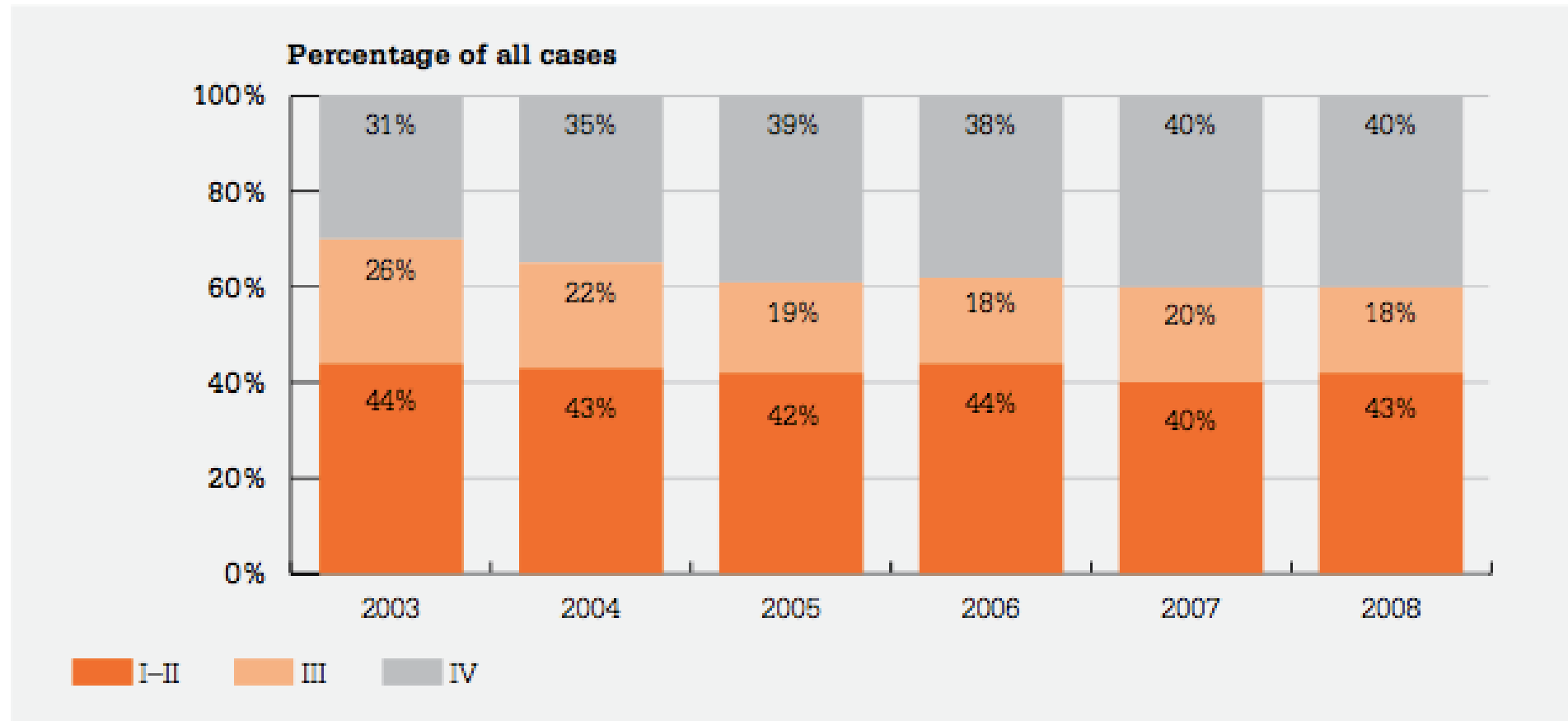
Fig. 49. Five-year survival rate following diagnosis of breast cancer, females 2001–2008



Source: National Oncology Centre.

Preventative Health

Fig. 50. Per cent of malignant neoplasms detected by stage of disease, all cancer, 2003–2008



Source: National Oncology Centre.

National Oncology Strategy

- Availability of Services
- Early detection of cancers is a challenge
 - More than half (57%) of cancers were diagnosed in stages III and IV in 2013, as in 2003
 - 35% of cervical cancer and 62% of breast cancer were diagnosed at stages III and IV according to the National Oncological Centre.
 - In 2011, the percentage of cases with stage IV breast cancers was about four to five times the typical percentage in EU countries (IAEA, 2012).

Colorectal Cancer

Assessing Knowledge, Perceived Susceptibility, Severity, Benefits, and Barriers, of Colorectal Cancer Screening in Armenia

Evelyn A. Abrami MS, Taron Torosian MS, Nika M. Harutyunyan MD,

Garegin Dallakyan MPH, Hovhannes Hovhannisyan MPH, Roxanne L. Massoumi MD, Armen Aboulian MD, Marine Hovhannisyan MD, MPH, DSc,

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Background

Armenia

• Low-middle income country in the *South Caucasus* region of *Western Asia*

Population: 3 million people

Colorectal Cancer (CRC)

- Third most common cancer in Armenia (incidence 19 per 100,000)
- 8.2% cancer related mortality and one of the highest CRC related mortality in the Eastern Mediterranean region

Despite these facts, Armenia currently lacks an organized screening program for CRC.

Research Inquiry

Given the health benefits of colorectal cancer screening (CRCS), our study sought to assess the knowledge, attitudes, and beliefs about CRCS among patients who visit polyclinics within the capital city of Yerevan, Armenia.

Hypothesis

We hypothesize that significant gaps in knowledge about CRC and CRCS exist in the country.

The purpose of this study was to gain insight into the various factors that would help contribute to implementing a successful and cost-effective CRCS program in Armenia.

Materials and Methods

Quantitative Survey using Magpi

- Survey questions were translated from English into Armenian and then subsequently reverse translated into English to verify accuracy.

Study Population:

- Men and women 40-64 years of age visiting primary care clinics in Yerevan, Armenia
- A sample size of 384 patients was calculated using a margin error of 5% and confidence level of 95%

Study Location:

- Polyclinics within the twelve districts of the capital (Yerevan)

Study Dates:

- September-October 2018

Inclusion:

- Patients aged 40-64

Exclusion:

- History of CRC
- Living outside of Yerevan

Survey Design:

- Health Belief Model

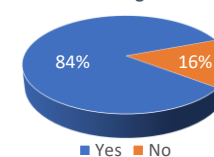
Analysis:

- Univariate analysis was performed. A p-value of < 0.05 was considered significant.

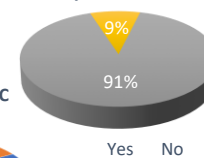


Results

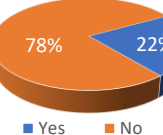
Knowledge of CRC



Getting checked regularly increases chances of early detection



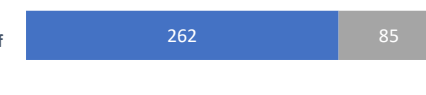
Knowledge of CRC Screening Test



Provider has discussed CRCS



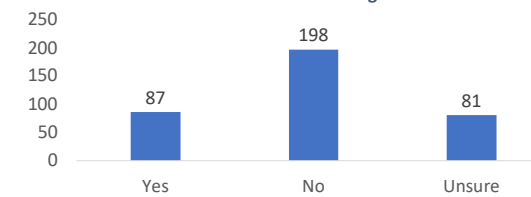
Willing to undergo CRCS if recommended by provider



0% 20% 40% 60% 80% 100%

■ Yes ■ No

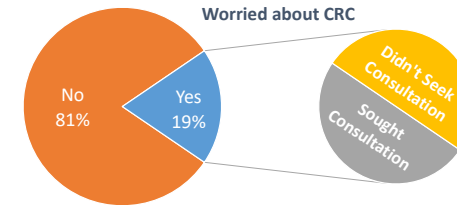
Fear of CRC Screening



Screening Compliance Based on Cost



Worried about CRC



Conclusion & Future Implications

Despite high self-reported familiarity with CRC, **knowledge of CRCS in Armenia remains low** and **significant barriers exist**. These findings suggest that interventions to *increase awareness* of CRC and CRCS, *encouraging providers to discuss CRCS*, and *minimizing out-of-pocket costs* should be considered when implementing CRCS in Armenia.

Acknowledgments

Master of Science in Global Medicine, University of Southern California, The Dhablania and Kim Family Global Medicine Fellowship

Colorectal Cancer

Model Structure

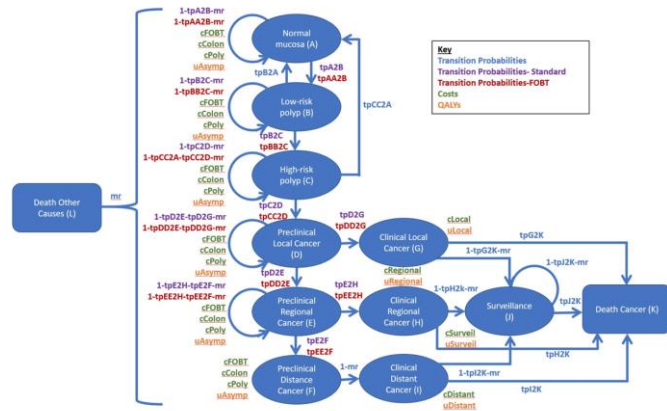


Figure 4. Model Structure

Table 5. Deterministic Results

| Deterministic Results | | |
|-----------------------|--------------|----------|
| | Cost | QALYs |
| Standard | \$192,933.45 | 11943 |
| FOBT | \$456,046.13 | 12188 |
| Difference | \$263,112.68 | 245 |
| ICER | | |
| FOBT vs. Standard | \$1,074.82 | per QALY |

Transition Probabilities

| Transition State | Transition Probabilities | 95% Confidence Interval |
|-----------------------------------------------------------|--------------------------|-------------------------|
| Normal mucosa to low-risk polyp | 0.01 | 0.004-0.01 |
| Low-risk polyp to high-risk polyp | 0.04 | 0.01-0.06 |
| High-risk polyp to preclinical local cancer | 0.04 | 0.02-0.07 |
| Preclinical local cancer to preclinical regional cancer | 0.17 | 0.12-0.22 |
| Preclinical local cancer to clinical local cancer | 0.17 | 0.12-0.22 |
| Preclinical regional cancer to preclinical distant cancer | 0.10 | 0.05-0.15 |
| Preclinical regional cancer to clinical regional cancer | 0.21 | 0.20-0.27 |
| Clinical local cancer to cancer death | 0.02 | 0.01-0.06 |
| Clinical regional cancer to cancer death | 0.07 | 0.05-0.20 |
| Clinical distant cancer to cancer death | 0.18 | 0.10-0.41 |
| Surveillance to cancer death | 0.07 | 0.05-0.10 |

Table 1: Transition Probabilities

Other Relevant Probabilities

| Test Parameters | Probability | 95% Confidence Interval |
|---------------------------------|-------------|-------------------------|
| FOBT | | |
| Sensitivity for low risk polyp | 0.05 | 0.02-0.075 |
| Sensitivity for high risk polyp | 0.10 | 0.05-0.15 |
| Sensitivity for cancer | 0.50 | 0.4-0.6 |
| Specificity | 0.95 | 0.90-0.99 |
| Colonoscopy | | |
| Sensitivity for low risk polyp | 0.95 | 0.90-0.99 |
| Sensitivity for high risk polyp | 0.95 | 0.90-0.99 |
| Sensitivity for cancer | 0.95 | 0.90-0.99 |
| Specificity | 1.00 | 1.00 |

Table 2: Test Parameters

Utilities

| Baseline Prevalence | Probability |
|-----------------------------|-------------|
| Low-risk polyp | 0.09 |
| High-risk polyp | 0.04 |
| Preclinical local cancer | 0.00 |
| Preclinical regional cancer | 0.00 |
| Preclinical distant cancer | 0.00 |

Table 3: Baseline Prevalence

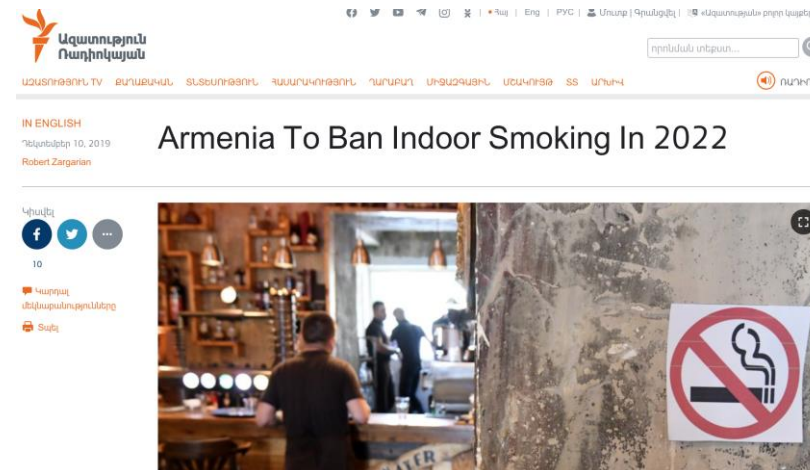
| Utilities | Base case utility | Range for sensitivity analyses |
|--------------------------|-------------------|--------------------------------|
| Asymptomatic | 0.92 | 0.85 - 0.96 |
| Clinical local cancer | 0.76 | 0.70 - 0.82 |
| Clinical regional cancer | 0.76 | 0.70 - 0.82 |
| Clinical distant cancer | 0.64 | 0.55 - 0.75 |
| Surveillance | 0.85 | 0.83 - 0.88 |

Policy- Tobacco Control

Based on the number of adult smokers in Armenia,
591,000 in 2017

WHO estimates more than half would die
prematurely in the absence of stronger policies
Projecting 295,500 premature deaths attributable to
smoking

The most effective anti-tobacco policy is to increase
cigarette taxes.



Policy- Universal Health Coverage

Armenia proposes universal health insurance – and a hefty tax increase

Many Armenians are unwilling to pay 6 percent of their incomes, regardless of how much they make, for a European-style health care system.

Ani Mejlumyan Dec 2, 2019



Popular

- 1 Inside the t
Giorgi Lomsad
- 2 Kyrgyzstan
- 3 Testing Tas
Uzbekistan
Sam Bhitia

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Հայաստանի Հանրապետության Կառավարության որոշում «--« սեպտեմբերի 2019 թվականի N ----- Լ Հայաստանի Հանրապետությունում առողջության համապարփակ ապահովագրության ներդրման հայեցակարգի հավանություն տալու մասին

#աղետալի ծախսեր, #առողջության համապարփակ ապահովագրություն, #առողջության նախարարություն, #ֆինանսական հասանելիություն, #ֆինանսական պաշտպանվածություն

8635 - Agree
11143 - Disagree

Brief description Draft Justification Summary

Նախագծում վերլուծվել է Հայաստանի առողջապահության համակարգի կառավարման ու ֆինանսավորման առկա իրավիճակը, ներկայացվել են գործող պետական պատվերի համակարգում առկա հիմնախնդիրները, որոնք պայմանավորված են բնակչության տարբեր խմբերի համար տարբերվող բժշկական ծառայությունների փաթեթների առկայությամբ, բժշկական ծառայությունների փոփոխությունների գների տարբերություններով, բուժօգնության որակի ապահովման համար կլինիկական

Discussed
22.11.2019 - 09.12.2019

Why Focus on NCD?

- The four major NCDs (cardiovascular diseases (CVD), cancer, chronic obstructive pulmonary diseases and diabetes) account for the vast majority of the disease burden and of premature mortality in the Region.
- It has been estimated that the loss of productivity due to NCDs is significant: for every 10% increase in NCD mortality, economic growth is reduced by 0.5%

Why Focus on NCD?

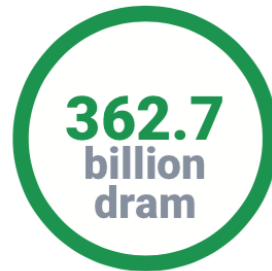
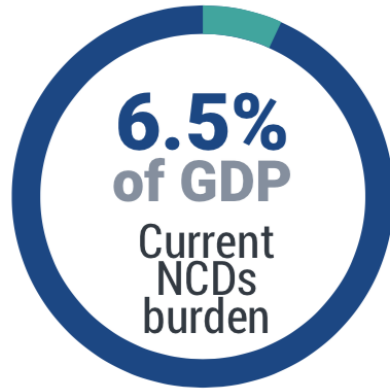
- Noncommunicable diseases (NCDs) account for an estimated 93% of all deaths in Armenia
- While Armenians live longer than other CIS countries, they do so in poor health. Disability-adjusted life expectancy in Armenia was 63.1 years for men and just 59.1 years for women (WHO, 2015)

- Armenia has a high burden of NCDs and among the highest rates of premature mortality in the WHO European Region.
 - Age-standardized premature mortality rate from the four major NCDs was 470/100k population in 2015, above the WHO European Region average of 380
 - The life expectancy at birth in Armenia (72 years for men and 78 years for women) was below the regional average of 78 years in 2015

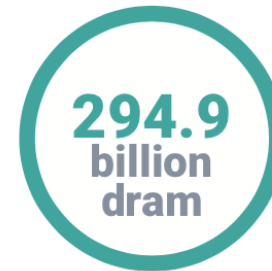
- In 2016, 26,300 people died from NCDs while still in their prime productive years (WHO, 2018b)
- In 2017, NCDs cost Armenia's economy 362.7 billion dram

ARMENIA

The case for investment in prevention and control of noncommunicable diseases (NCDs)



lost per year



indirect cost due to loss
of workforce and
reduced productivity

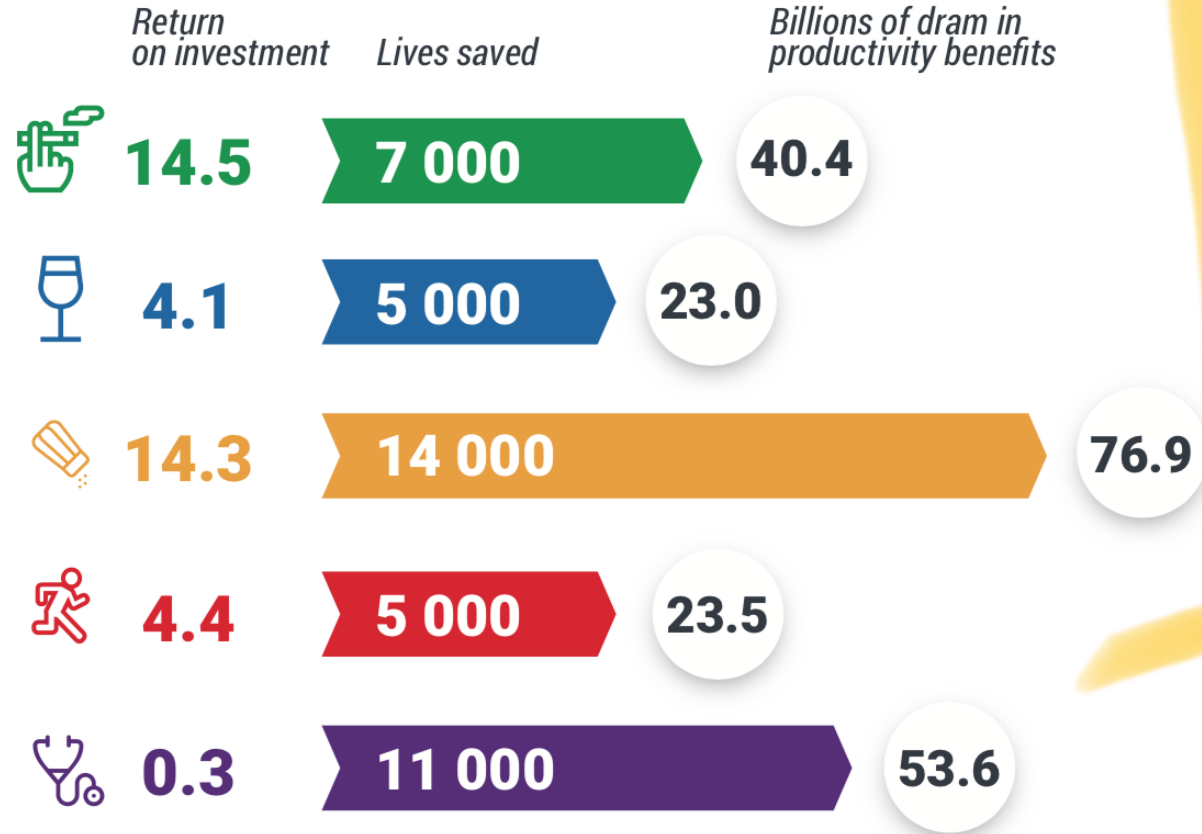


of dying prematurely
from one of the
four main NCDs

217.6
billion dram



Return
on investment
over a
15-year period



- The probability of premature death (before the age of 70 years) from one of the four major NCDs for a person living in Armenia was 22% in 2016 and was twice as high for men as for women.
- Cardiovascular diseases are the main driver of premature mortality in the country. significantly higher probability for men (31%) than women (15%)
- 1/3 of the population 18–69 years old have 3–5 NCD risk factors
- 17% of the population 40–69 years old are at high risk of a cardiovascular disease event or death over the next 10 years.

- 38% of adults have raised blood pressure and 6% have raised blood glucose.
- 51% of men currently smoke tobacco
- 46% of men drink alcohol; among men in the general population, 11% engage in heavy episodic drinking.

- Half the adult population (48%) is overweight or obese
 - One of the highest levels in the WHO European Region
- Salt intake is high.

Economic Burden

- Total government health expenditure for Armenia in 2017 was 87.9 billion dram.
- Annual spending on the four main groups of NCDs for 2017 is 55.8 billion dram (63% of total health expenditure):
 - 35.9 billion dram (41%) on cardiovascular diseases
 - 8.0 billion dram (9%) on cancer
 - 9.4 billion dram (11%) on chronic respiratory diseases
 - 2.3 billion dram (3%) on endocrine and metabolic diseases (largely diabetes)

Economic Burden

- Government expenditure on health-care for NCDs resulting from NCDs is 55.6 billion dram
 - The tip of the iceberg.
- Hidden additional costs from lost productivity are more than four times higher, at 294.9 billion dram.
- Altogether, the current economic cost of NCDs to the Armenian economy is 362.7 billion dram per year
 - **Equivalent to 6.5% of the country's annual gross domestic product in 2017**

Fig. 5. Structure of the economic burden of NCDs in Armenia, 2017

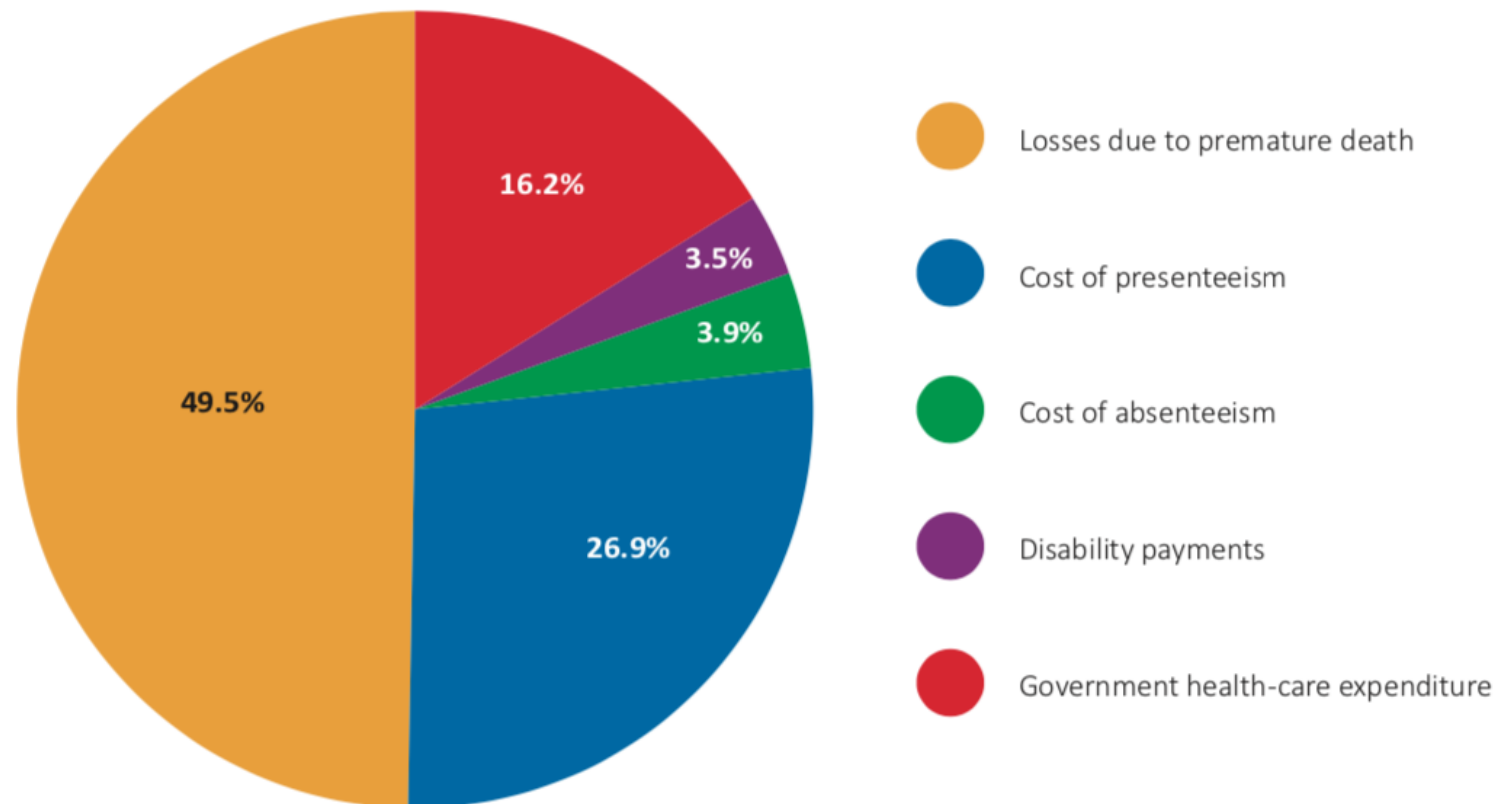


Fig. 4. Costs of premature death for four NCDs in billions of dram, 2017

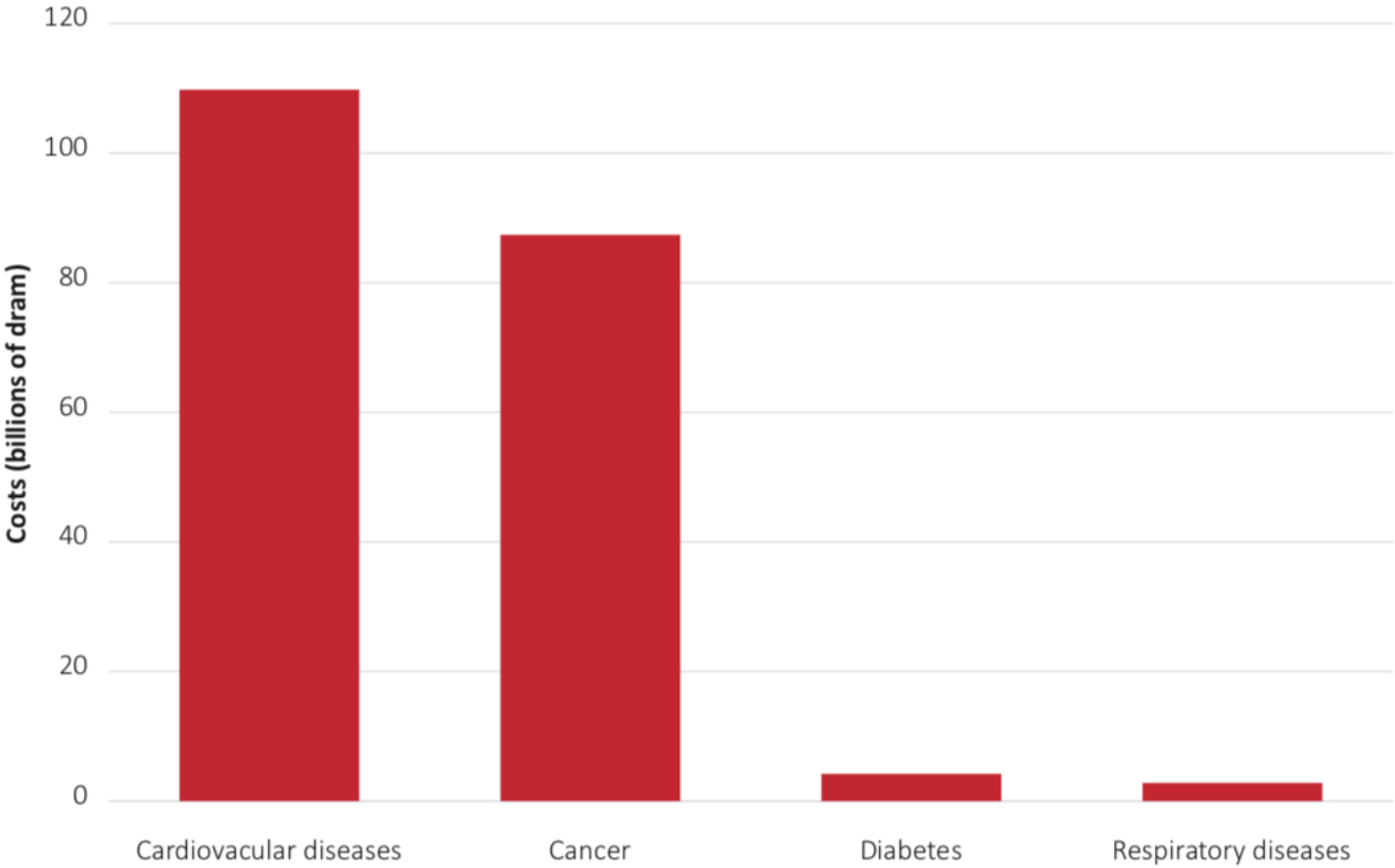
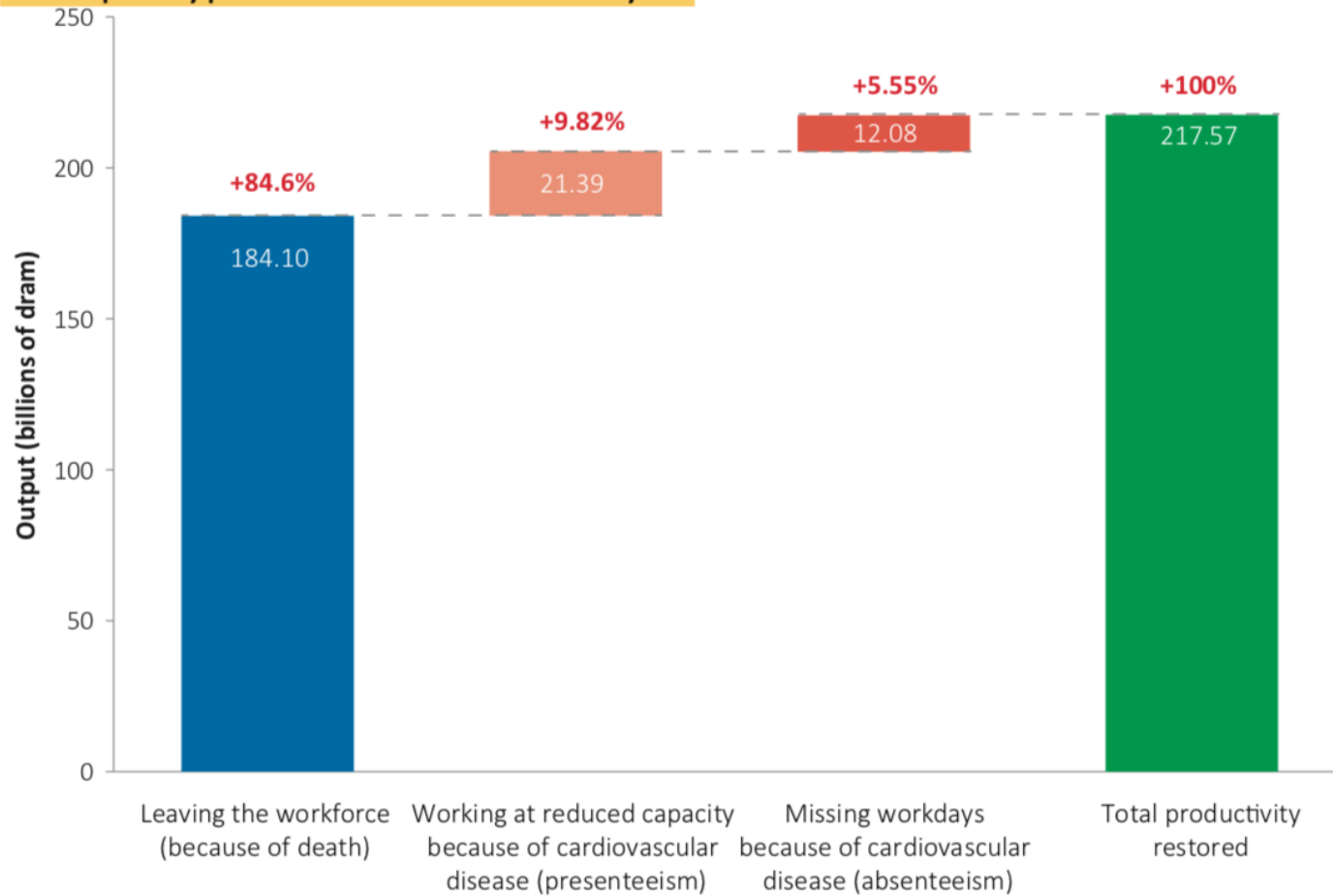


Fig. 6. Recovered economic output expected from tobacco, alcohol, physical activity, salt and cardiovascular disease primary prevention interventions over 15 years

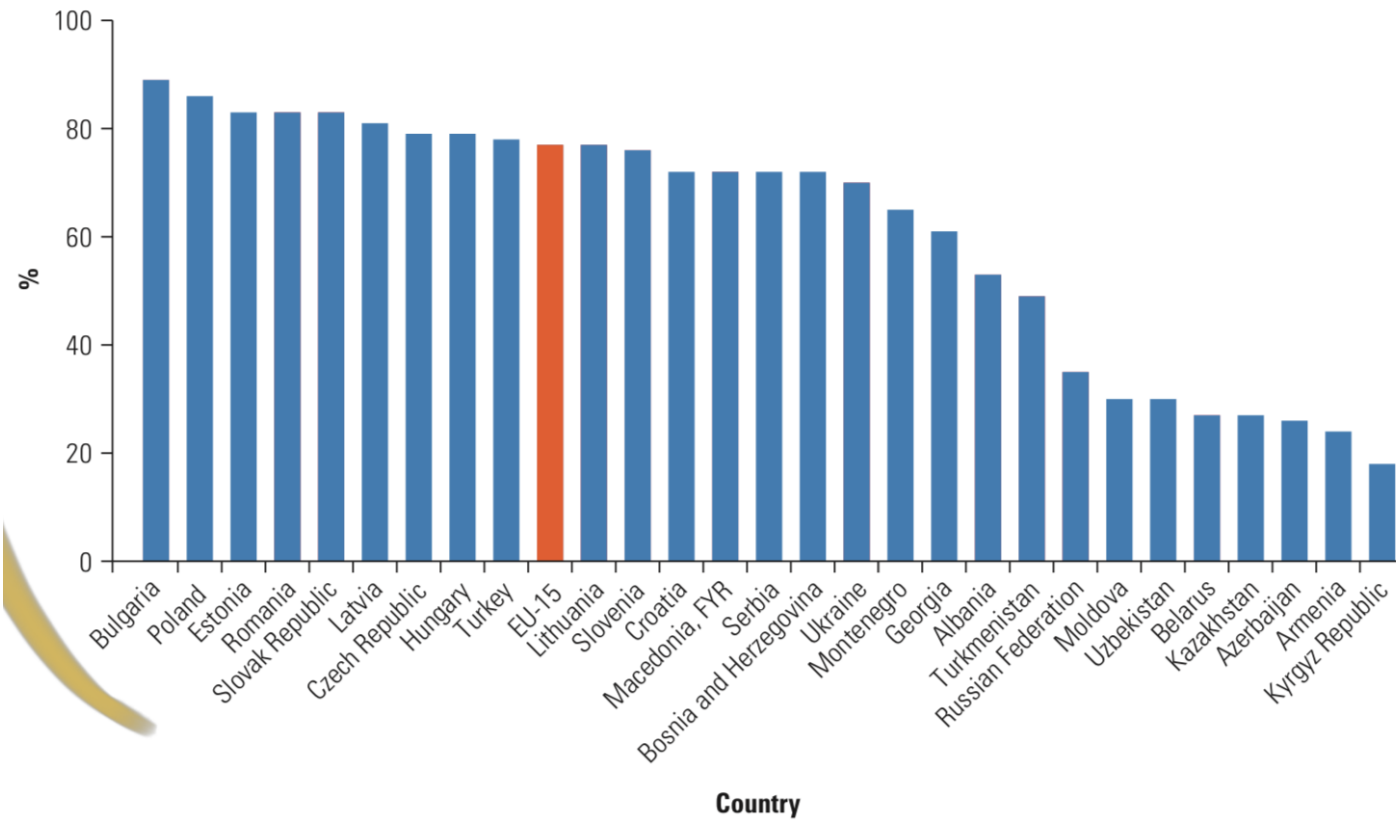


Risk Factors- Tobacco

- Based on the number of adult smokers in Armenia, 591,000 in 2017
 - WHO estimates more than half would die prematurely in the absence of stronger policies
 - Projecting 295,500 premature deaths attributable to smoking
- The most effective anti-tobacco policy is to increase cigarette taxes.
- The tobacco control policy package achieved a benefit–cost ratio of 14.51

FIGURE 3.5

Tobacco Taxation Can Be Strengthened in Many ECA Countries



Source: WHO 2011a.

Note: Figure shows cigarette taxes as a percentage of the 2011 retail price. ECA = Europe and Central Asia.

Risk factors- Alcohol

- According to the 2013–2014 Health Behaviour in School-aged Children study
 - 16% of boys and 6% of girls 11 years old drink alcohol at least once a week
 - Highest percentage among all 44 countries where the study has been carried out (Arabkir Medical Centre, 2016).
 - Among 11-year-olds, 7% of boys and 2% of girls had been drunk on at least two occasions
 - For 15-year-olds, the equivalent figures are 19% of boys and 4% of girls

Ris

Risk Factors- Other

- Salt consumption in Armenia is about twice the recommended daily allowance
- 48% of adults are overweight (BMI ≥ 25 kg/m²) and 20% are obese (BMI ≥ 30 kg/m²) (Andreasyan et al., 2018)

Table 1. Crude prevalence of metabolic risk factors among adults by age and sex

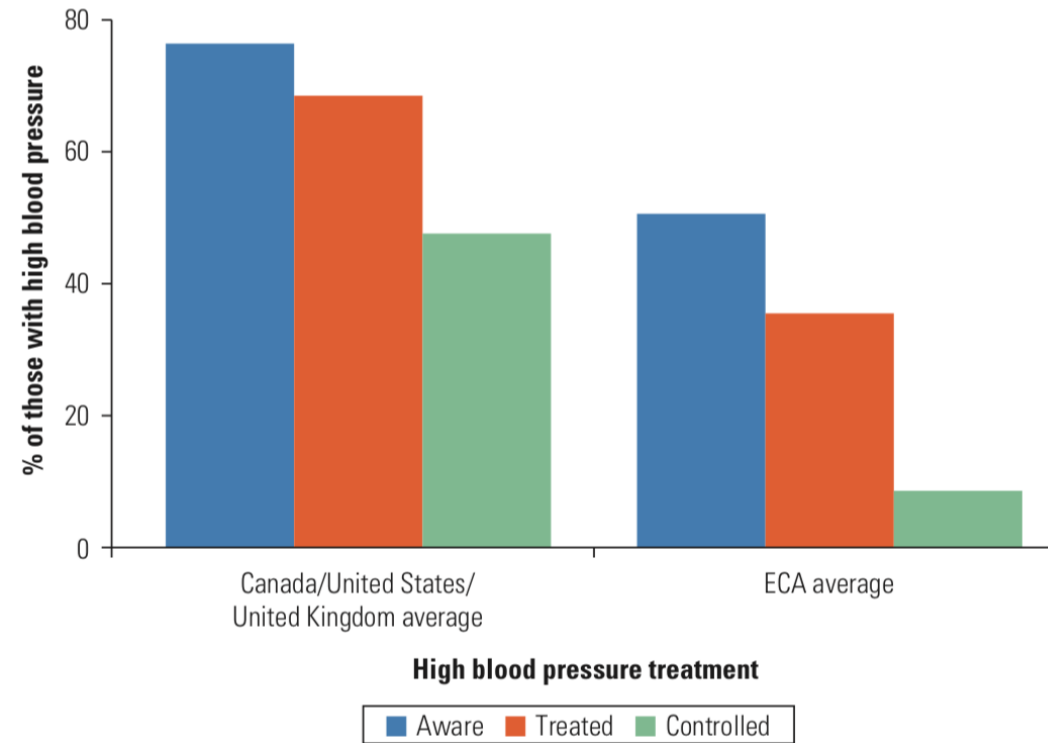
| Factor | Men | | Women | |
|--------------------------|-------------|-------------|-------------|-------------|
| | 18–44 years | 45–69 years | 18–44 years | 45–69 years |
| Raised blood pressure | 25% | 64% | 18% | 66% |
| Raised total cholesterol | 17% | 36% | 12% | 47% |
| Raised blood sugar | 5% | 10% | 2% | 9% |

Source: Andreasyan et al. (2018).

- Of those who were prescribed antihypertensive drugs
 - 80% did not take their medication during the 24 hours before the survey (National Institute of Health, 2016).
- According to the STEPS survey, of those diagnosed with hypertension,
 - Only 64% receive treatment (men 60%, women 66%)
 - 16% of those diagnosed are currently controlled
 - Mean blood pressure of those diagnosed with hypertension is 183/125

FIGURE 0.9

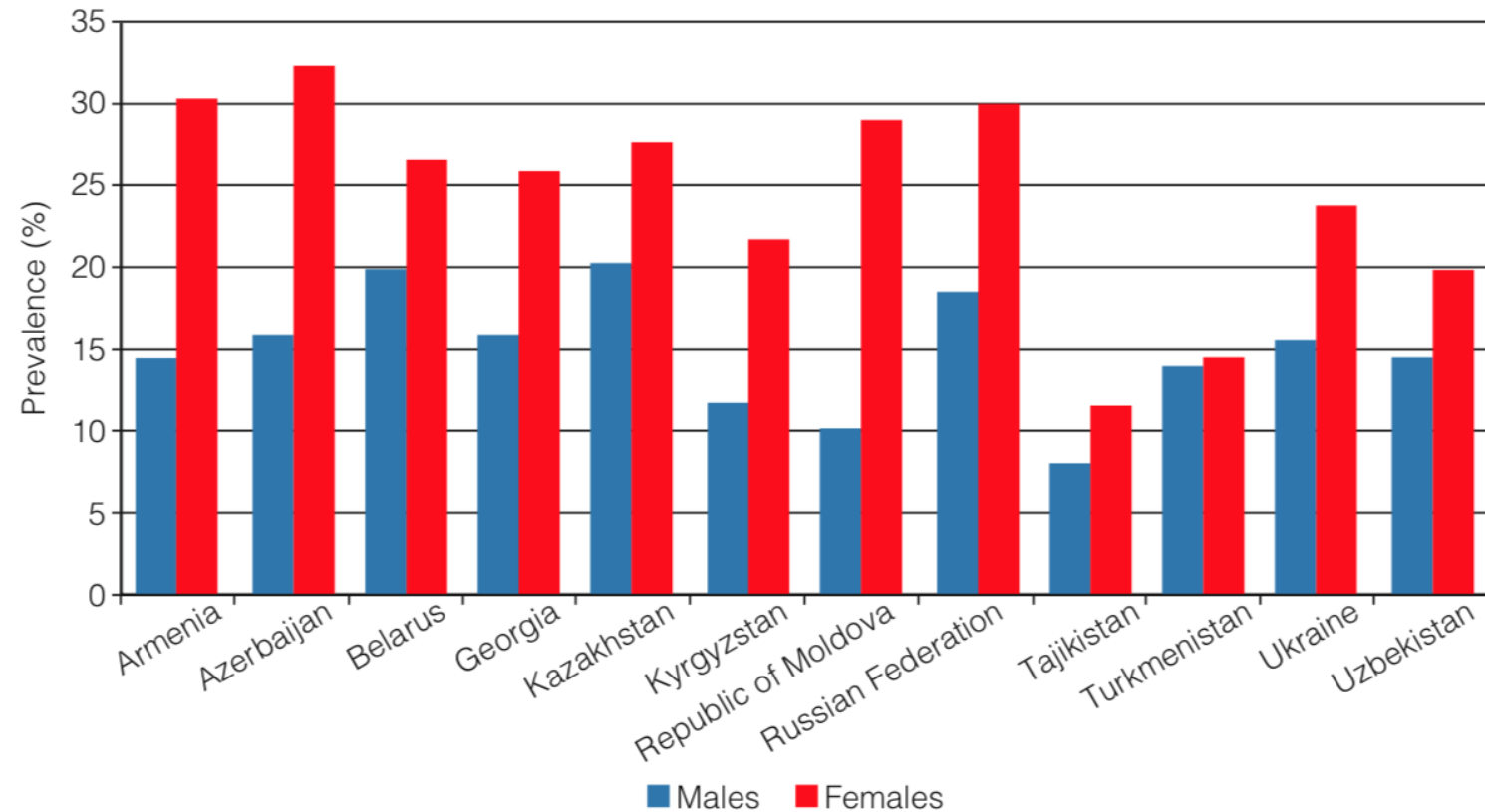
High Blood Pressure Is Not Being Treated and Controlled



Source: World Bank 2012a.

Note: ECA = Europe and Central Asia.

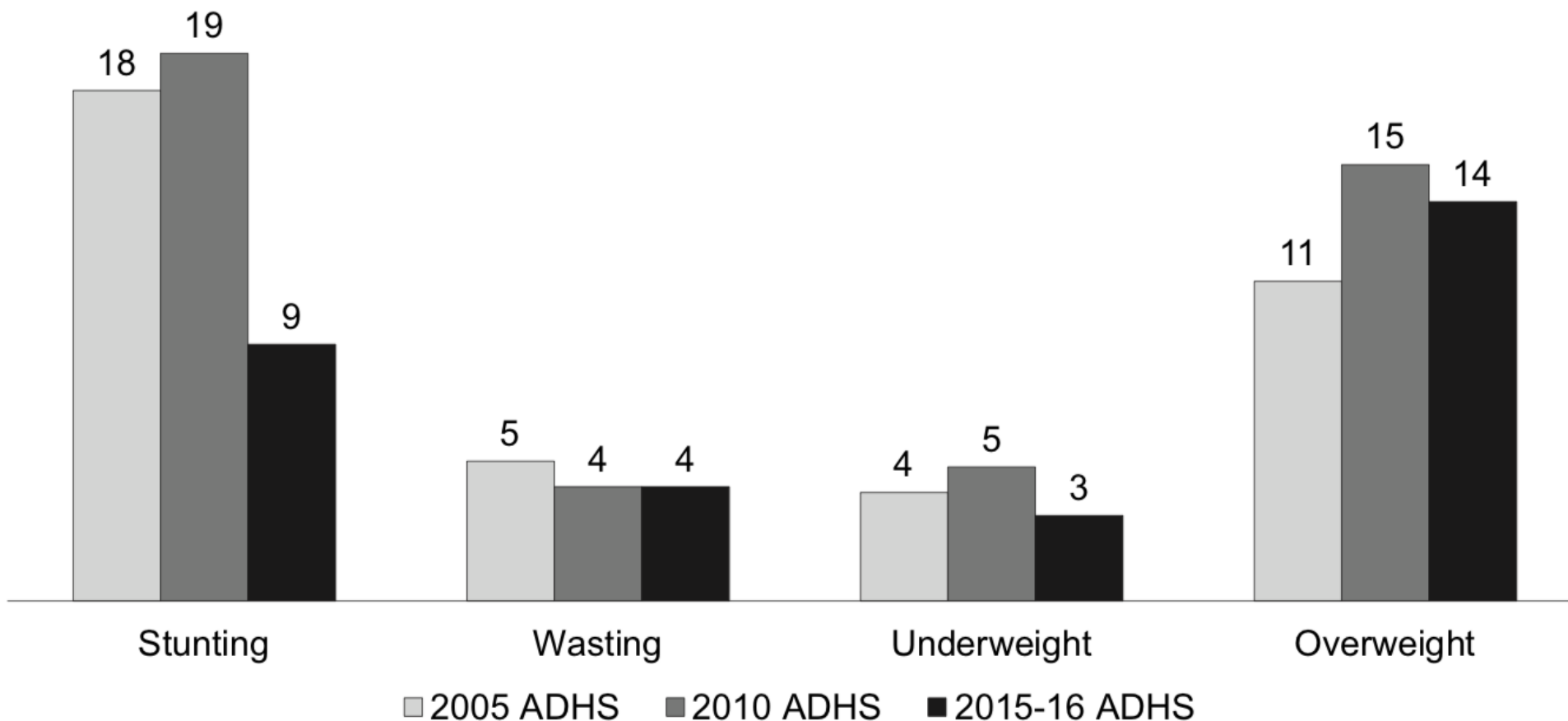
Fig. 2.4 Prevalence of obesity in 2008, by gender and country (age-standardized)



Source: WHO, 2013.

Figure 6 Trends in children's nutritional status, Armenia 2005-2016

Percent

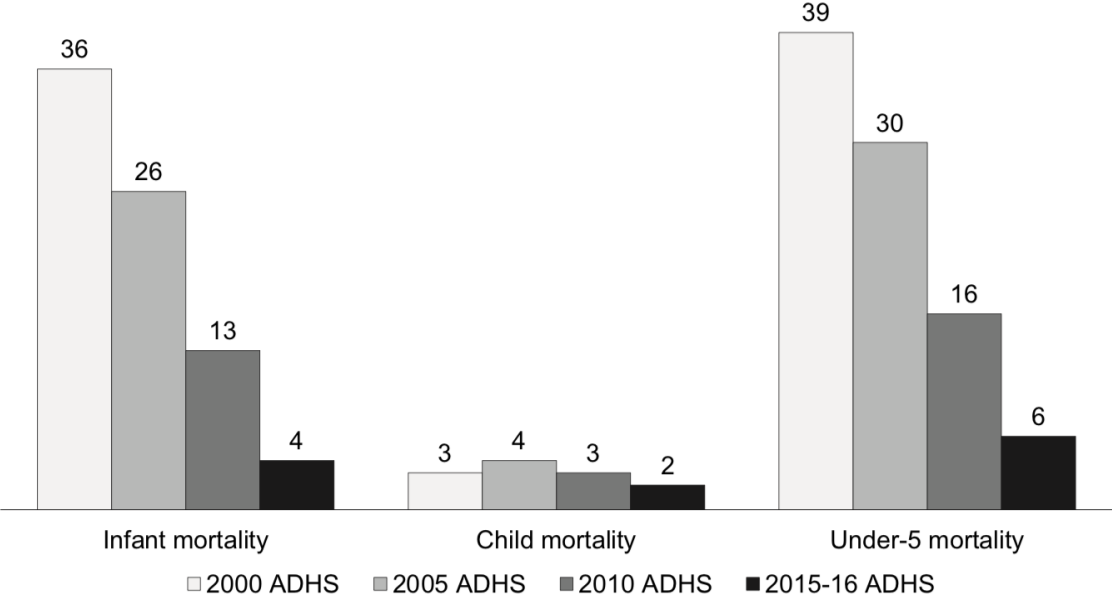


Note: For comparative purposes in Figure 6, data on children's nutritional status from the 2005 ADHS survey were re-calculated according to the 2006 WHO Child Growth Standards and are different from those presented in the published 2005 ADHS final report that were determined according to the 1977 International Reference Population defined by the NCHS/CDC/WHO.

Accomplishments

Figure 3 Trends in childhood mortality, 2000-2016

Deaths per 1,000
live births





vision statement

use of **digital technologies for health** in ways that facilitate **access to care** and service delivery, improve **effectiveness and efficiency**, and promote **accountability**

digital solutions for health

Health Management Solutions

- EHR / EMR
- Hospital
- Pharmacy
- Physician / Clinic
- Prescriptive Analytics

Health Services Search

- Medical Concierge
- Medical Tourism
- Track & Trace
- Triage

InsurTech

- Health Claim Management
- Health Insurance
- Medical Payments

Medical Diagnostics

- Diagnosis Tools
- Genomics Related Diagnosis
- Liquid Biopsy
- Medical Imaging

Medical Education

- Consumer Education
- HCP Education
- Health Information Platform

Online Health Communities

- Patient Health Forums
- Physician Networks
- Other HCP Networks

Online Marketplace

- Consumer Marketplace
- On-demand Lab Tests
- Professional Marketplace

Patient Solutions

- Digital Therapeutics
- Disease Management
- Patient Self-Diagnosis

Population Health Management

- Corporate Health
- Integrated Solutions

Remote Monitoring

- Care Coordination
- Home Healthcare
- Remote Monitoring Devices

Research

- Clinical Trials
- Drug Discovery
- Genomics Related Research
- Next Generation Sequencing

Telemedicine

- Teleconsultation
- Telepathology
- Teleradiology
- Telesurgery

Veterinarian

- Animal Imaging
- Animal Monitoring
- Health Forums

Wellness

- Genomics Related Applications
- Smart Equipment
- Wearables
- Wellness Apps
- Wellness Information Platform

Safety & Security

- Counterfeit Tracking
- Cybersecurity

Healthcare Logistics

- Transportation Management
- On-demand Delivery

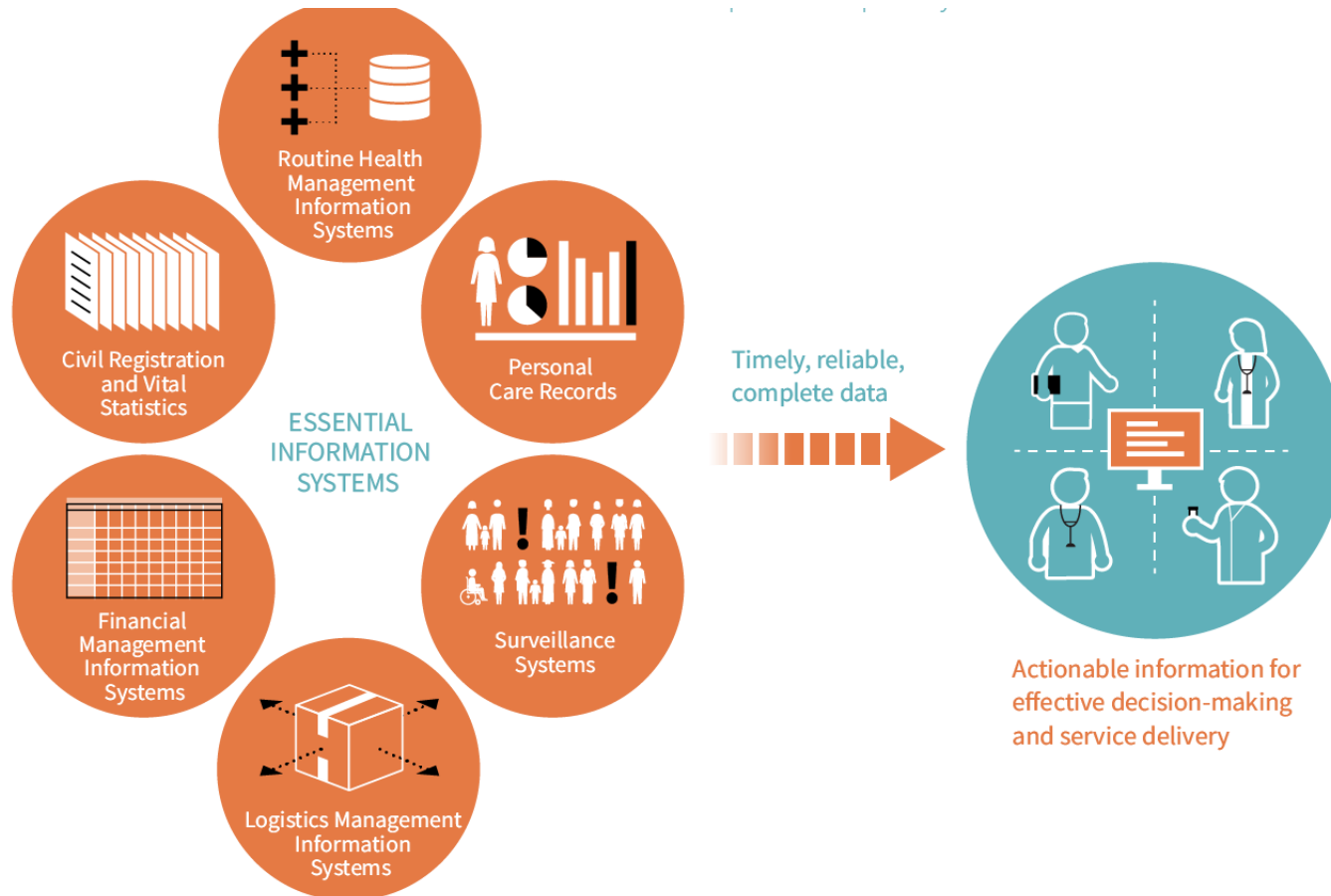
Others

- Contamination Management
- HCP Job Board
- Social Enterprise
- Software Provider

definitions & boundaries for PHC

1. Information systems for PHC

Collecting, processing, storing and transferring timely, reliable and complete data for planning, managing and delivering coordinated, continuous and comprehensive primary healthcare.



2. Applications of digital technologies

- Health Management Solutions
- Patient Solutions
- Telemedicine
- Remote Monitoring
- Medical Diagnostics
- Wellness
- Medical Education

assessment framework

System

Inputs

Service Delivery

Outputs

Outcomes

Civil Registration and Vital Statistics Systems

Register all births and deaths, issue birth and death certificates, and compile and disseminate vital statistics, including cause-of-death information.

Routine Health Management IS

Facility reporting systems used to collect routine data from public, private, and community-level health facilities and institutions.

Personal Care Records

Systems used to provide a longitudinal health history of patients across a patient's care experience.

Logistics Management IS

Records systems that supply chain workers and managers use to collect, organize, present, and use logistics data about the supply and demand for commodities.

Financial Management IS

System used to manage and track the flow of funds at the facility level, including expenditure, staff, line-item budgets, internally generated funds, and reimbursed pooled payments.

Health surveillance IS

Multimodal networks that bring together information from facilities and communities with a focus on specific notifiable disease and events.

Data generation

Data are recorded by health and other relevant sectors.

Compilation

Data are collected and organized from health and other relevant sectors.

Analysis and synthesis

Data are checked for overall quality, relevance, and timeliness and subsequently analyzed as needed.

Communication and use

Data are converted into information for health-related decision making in formats that meet the needs of multiple users (i.e. policymakers, managers, providers, and communities) and used to drive decision-making and planning.

Resilient IS

Capacitated to withstand crises using systems for data backup, coordination with other sectors, and regular performance assessments.

Functional IS

Accessible and user-friendly technologies fit into existing workflows with systems in place to ensure data quality, appropriate communication and use, and appropriate training for health workers

Well-defined IS

Standard operating procedures for data collection and analysis ensure that information systems capture data that is timely, reliable, comprehensive, and relevant

Comprehensive & Coordinated IS

Capture and monitor all health services and functions across all levels of the health system

Interoperable & Interconnected IS

Enables types of information systems and end users to connect, exchange, and cooperatively use information across all parts of the health system network

Adaptable & scalable IS

Interoperable and interconnected with clear standards, decision-making structures, and sustainability plans

key gaps & needs

1. The primary consumers of the system are the health care facilities providing state-funded services. Meanwhile, most health care facilities are not using ARMED to collect data on privately paid services and cases.
2. The reporting functions of the ARMED system primarily serve the purpose of managing state-funded services. Analytical and on-demand reporting tools and forecasting capacity of the system is lacking or have no practical application.
3. The MOH, NIH, and regional health and social security departments make little or no use of the ARMED.
4. The system does not yet implement the disease registers' functions, health statistics, and disability datasheets.
5. Electronic referrals and electronic prescription functionalities have begun to be used by the health sector recently. Still, there is a need for a systematic approach and a robust legal basis for implementing these services.
6. The ARMED system lacks supporting health care professionals with clinical work, collection, and reporting of yearly statistical information, quality of care indicators
7. Users sometimes report various technical problems, including slow system performance, data loss, and inaccuracies during the data entry process, unnecessary input fields, frequent system changes that are not reflected in user training videos on time
8. By the concession agreement, the parties of the contract are the government, MOH, EKENG, and ArMed. However, there is no precise distribution of roles and responsibilities mentioned
9. The system is not yet interoperable with other governmental information systems such as the State Revenue Committee, Ministry of Labour and Social Affairs, Ministry of Justice, and the Armenia Police
10. Although the ARMED system implements a patient portal, portal capacities are limited and require further enhancements (no access to see and download medical documents (epicrisis, copy of the prescription, and so on) and receive counseling in cases of various clinical conditions and diseases).

Key data:

Legislation:

- **Law on Medical Care and Service to population**
 - ❖ *In 2018, specific chapters on eHealth and telemedicine ((i) definition of eHealth systems and services; (ii) definition of and description of telemedicine, health care databases and purposes of their maintenance.*
- **The law on Personal Data Protection**

ArMed

- **operates in around 500 health care institutions, 6 insurance companies, and State Health Agency (SHA)**
- **primarily used for reporting and reimbursement of publicly funded services covered under the BBP**

enables:

- **population to freely choose a PHC provider**
- **to register for a visit to PHC via patient portal**
- **digitizing the process of referring the patients from PHC facilities to hospitals**
- **patient to see info on visits to PHC facilities or hospitals**

Subscription fee for HC facilities (varies on types)

State budget payment per population served?

key recommendations

| | Gaps | Recommendations |
|---------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Legal framework for eHealth services | The terms in the Law on Medical Care and Service to population reflect only the key concepts of eHealth, no further policies or adaptation of other legal acts | <ol style="list-style-type: none"> 1. Develop training requirements and procedures for the PHC users of EHIS 2. Define the minimum technical requirements and specifications for connecting (to become a subscriber of) to EHIS 3. Define the procedures for establishing, managing and maintaining the disease registers 4. Define the rules for viewing health data by patient, the rules for accessing the patient's electronic health information 5. Appoint Deputy Minister in charge of eHealth and the eHealth Strategy Implementation Working Group |
| Standards and interoperability | National and international standards, Interoperable eHealth infrastructure | <ol style="list-style-type: none"> 5. Ensure interoperability with other information systems operating at the national level (drug registry, electronic registry of licensed health providers, health workforce information system) 6. Mandate making data exchange interfaces available to third-party providers of IS to PHC providers |
| Leveraging health data analytics | Lack of utilization of the EHIS by end-users (health service providers, MOH, and the relevant agencies) because of low quality of data entry and absence of reporting and analytical capability. | <ol style="list-style-type: none"> 7. Improve data analysis and reporting capabilities of the MOH to effectively use data 5. Empower the standard reporting capabilities of the existing system 6. Build an advanced analytical module and introduce new functions across the existing system and databases (ad-hoc reporting, data warehouse, etc.); 7. Train the PHC end-users to utilize and visualize the existing data from the system effectively 8. Implement geo-enabled health data analytics (ex. COVID) |
| New eHealth services | Currently, EHIS supports: <ol style="list-style-type: none"> (i) Registration of patient visits and services; (ii) Population enrollment (physician choice); (iii) eReferrals (except the referrals to laboratories); (iv) eBooking (partially); (v) Telemedicine consultations (pilot); (vi) Vaccination inventory management; | <ol style="list-style-type: none"> 9. Regulatory framework developed and adopted to mandate: <ol style="list-style-type: none"> I. ePrescriptions to improve patient experience in obtain prescription medicines, improve drug prescription accuracy, increase patient safety, improve supply chain, and reduce costs, as well as enable secure, real-time, bi-directional, electronic connectivity between clinicians and pharmacies. II. eReferral system finalization III. Electronic disability sheet process finalization 10. Introduce disease registries for cancer, diabetes, coronary heart disease, arterial hypertension, mental diseases, and narcology patients 11. Telemedicine piloting on substitution of scheduled patient visits to PHC physician for medication referrals 12. Introduce electronic health workforce register |
| Empowering HC providers | Low uptake and use of EHIS by HC providers (limited / low-quality data input). | <ol style="list-style-type: none"> 13. Enhance the IT capacity (digital skills) of for physicians and nurses, and the administrators 14. Enhance the technical capacities for more effective use of the eHealth services |
| Empowering population | Patients are inactive and not skilled in managing their health and wellbeing | <ol style="list-style-type: none"> 5. Run public awareness campaign to enhance the awareness of the population using electronic health services 6. Enhance the system to provide more features for the patients to interact with the health information system 7. Strengthen security aspects related to the use of personal information. |