



Medical and Healthcare Innovation in Estonia

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Module Content

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Section 1

Estonia Overview



Geographical Location and Demographics



<https://estonia.ee/>

Population: **1.3 million**

Capital: **Tallinn**

Official Language: **Estonian**

Official Currency: **euro**



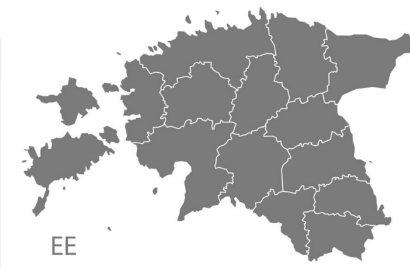
Estonian Soviet Socialist Republic, 1940-1990



Estonian Flag



Republic of Estonia Government



President Kersti Kaljulaid



<https://president.ee/en/president/biography/index.html>

Prime Minister Jüri Ratas



<https://www.valitsus.ee/en/government-members/prime-minister-juri-ratas>



Estonian Embassy in the United States

**Estonian Ambassador
Jonatan Vsevirov**



<https://washington.mfa.ee/>



United States Embassy in Estonia

US Ambassador Brian Roraff



<https://ee.usembassy.gov/>



Ohio State University students visit the University of Tartu in Estonia

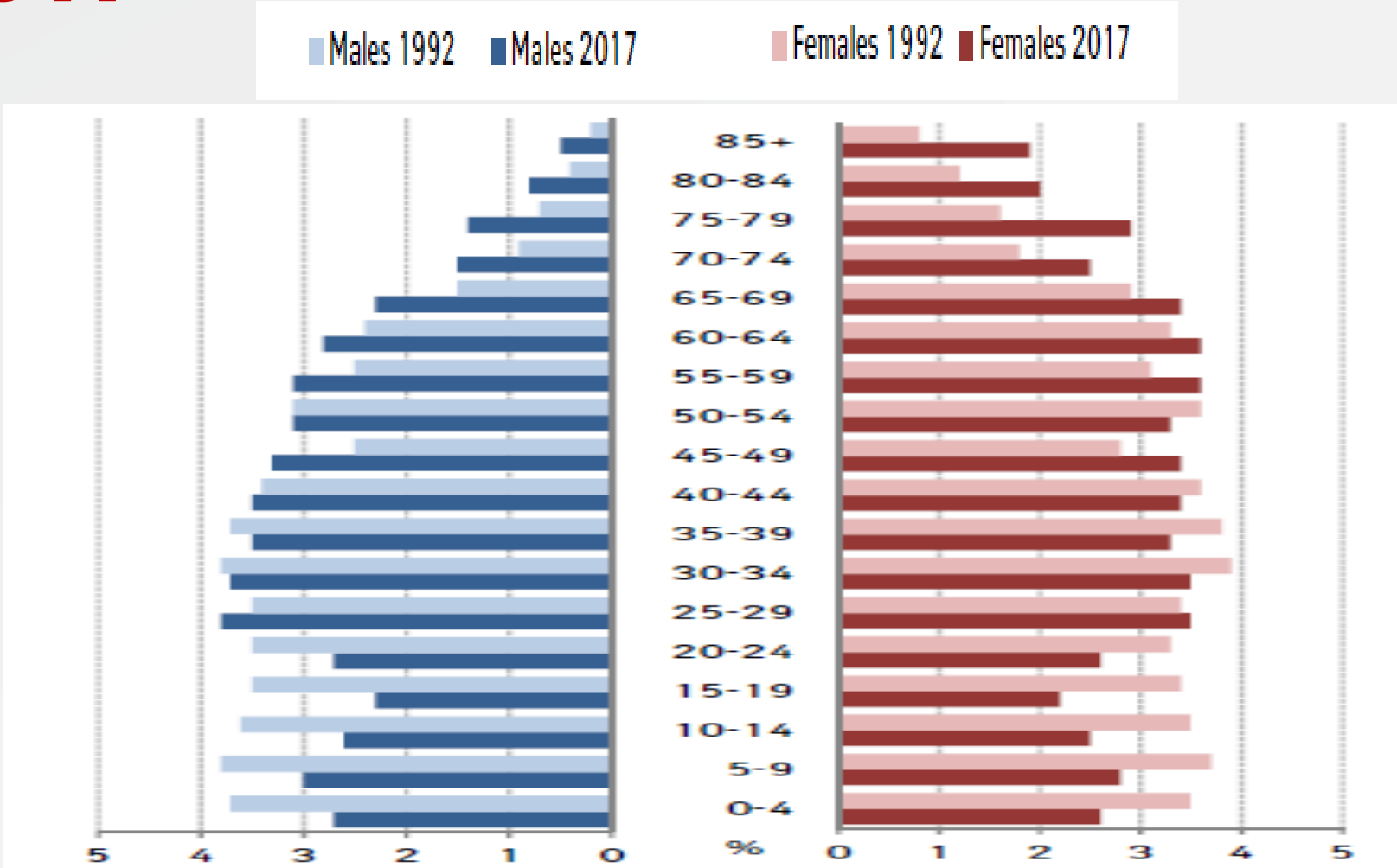


Section 2

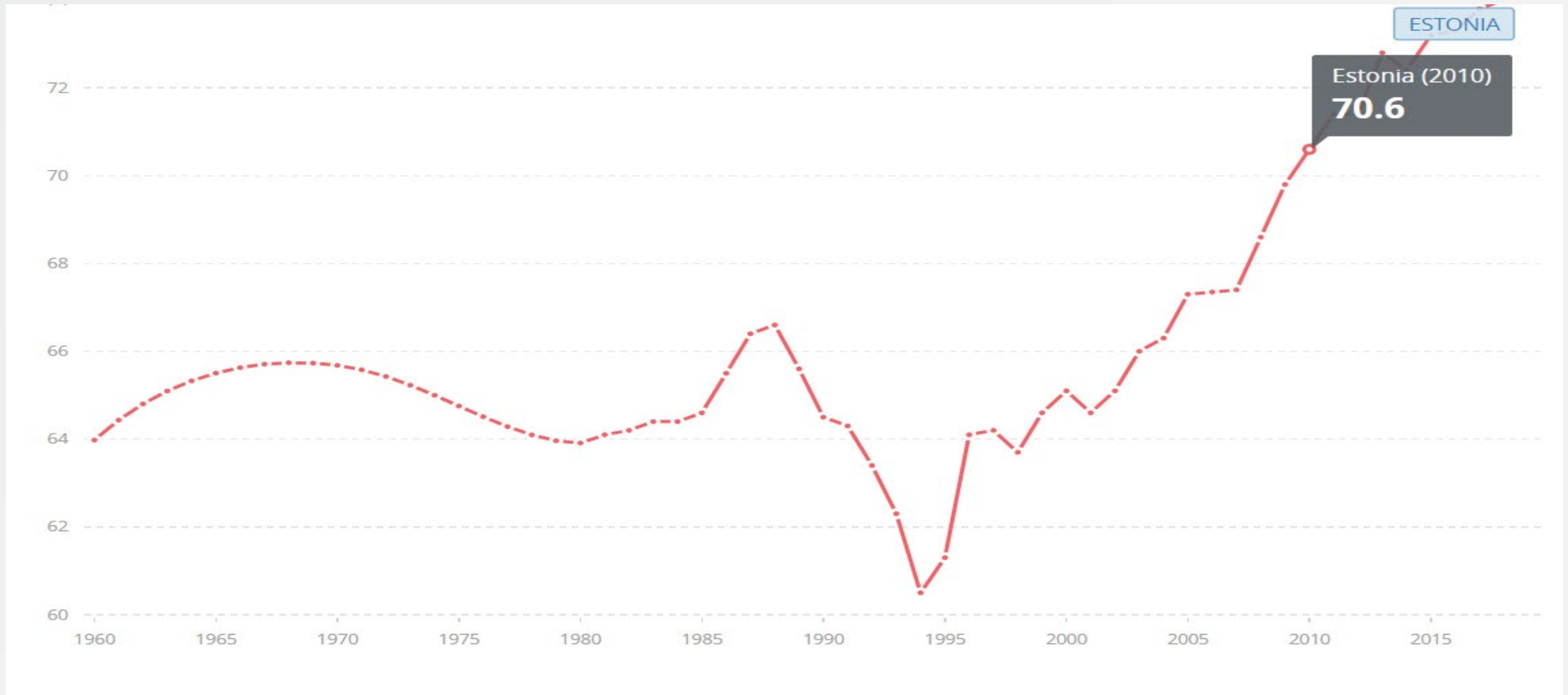
Estonian Population Health Demographics



Estonian Population by Sex and Age, 1992 and 2017



Estonian Life Expectancy, 1960-2015



Life Expectancy, at Birth, of Select Countries, 2018

Country	Life Expectancy at Birth (years)
France	80
Finland	79
United States	76
Estonia	74
Lithuania	71
Latvia	70



Leading Causes of Death in Estonia, 2017

Ranking	Disease/Condition
1	Ischemic heart disease
2	Hypertensive heart disease
3	Stroke
4	Alzheimer's disease
5	Lung cancer
6	Colorectal cancer
7	Cirrhosis
8	Stomach cancer
9	Chronic kidney disease
10	Pancreatic cancer

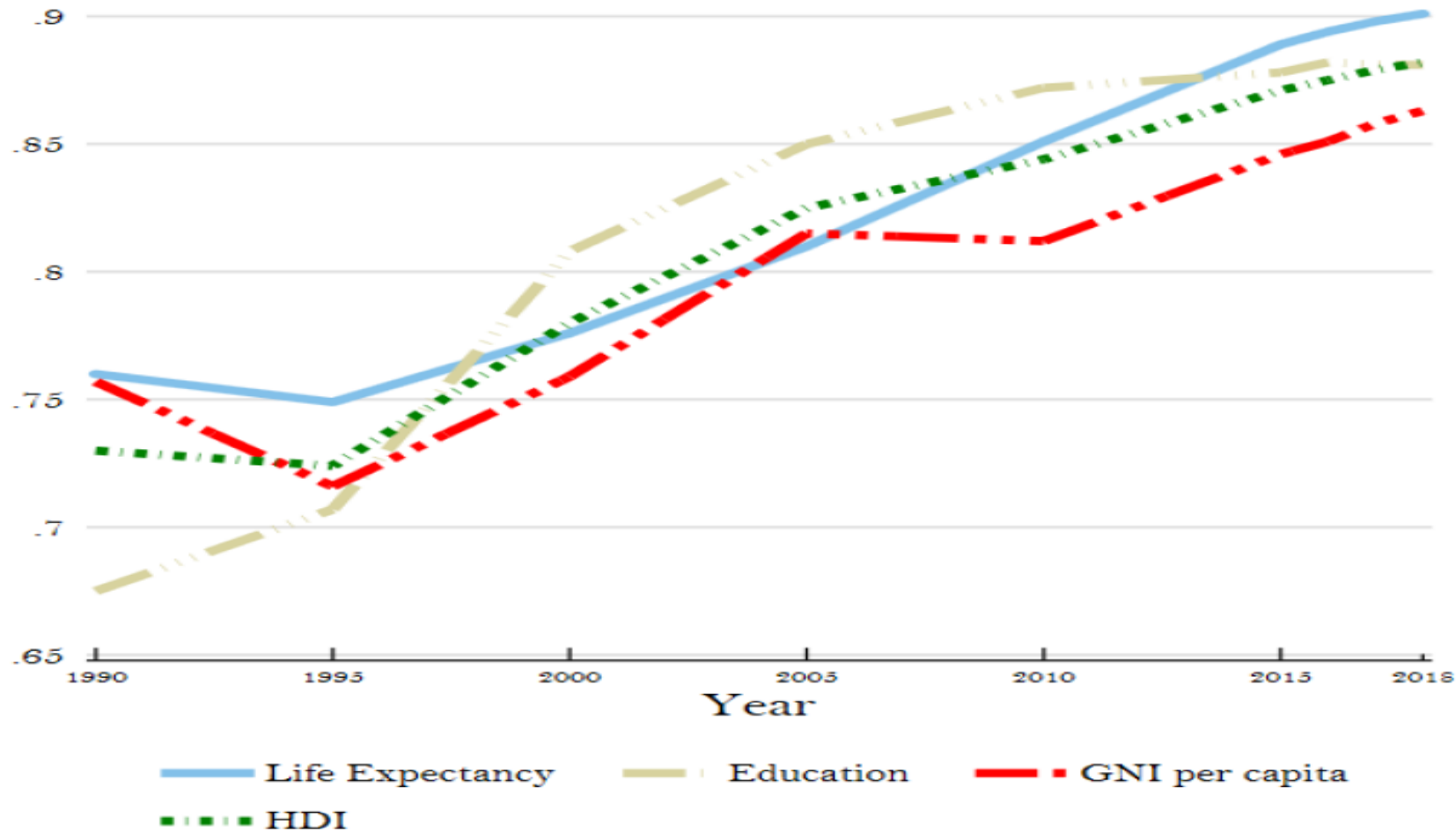


Leading Causes of Disability in Estonia, 2017

Ranking	Disease/Condition
1	Low back pain
2	Falls
3	Headache disorders
4	Diabetes
5	Depressive disorders
6	Age-related hearing loss
7	Stroke
8	Neonatal disorders
9	Alcohol use disorders
10	Neck pain



Estonian Human Development Component Indices and Human Development Index, 1990-2018



Human Development Index (HDI) of Select Countries, 2019

Rank	Country(ies)	HDI Value
1	Norway	0.954
2	Switzerland	0.946
3	Ireland	0.942
4	Germany and Hong Kong	0.939
10	Netherlands	0.933
15	United States and United Kingdom	0.920
25	Spain	0.893
30	Estonia	0.882
34	Lithuania	0.869
39	Latvia	0.854



Section 3

Estonian Healthcare System Structure



Town Hall Pharmacy (Raeapteek, 1422)



<https://www.visitestonia.com/en/town-hall-pharmacy>



Medical Education in Estonia

UNIVERSITY OF TARTU

1632

Contacts of UT units

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Admissions

Home » Admissions » Medicine in English (6 years)

- > Bachelor's
- > Master's
- > PhD
- ▼ **Medicine**
 - ▶ Admission
 - ▶ Medical Studies in Estonian
- > Study Estonian
- > Short-term Studies
- > International Summer University
- > FAQs
- > Contact

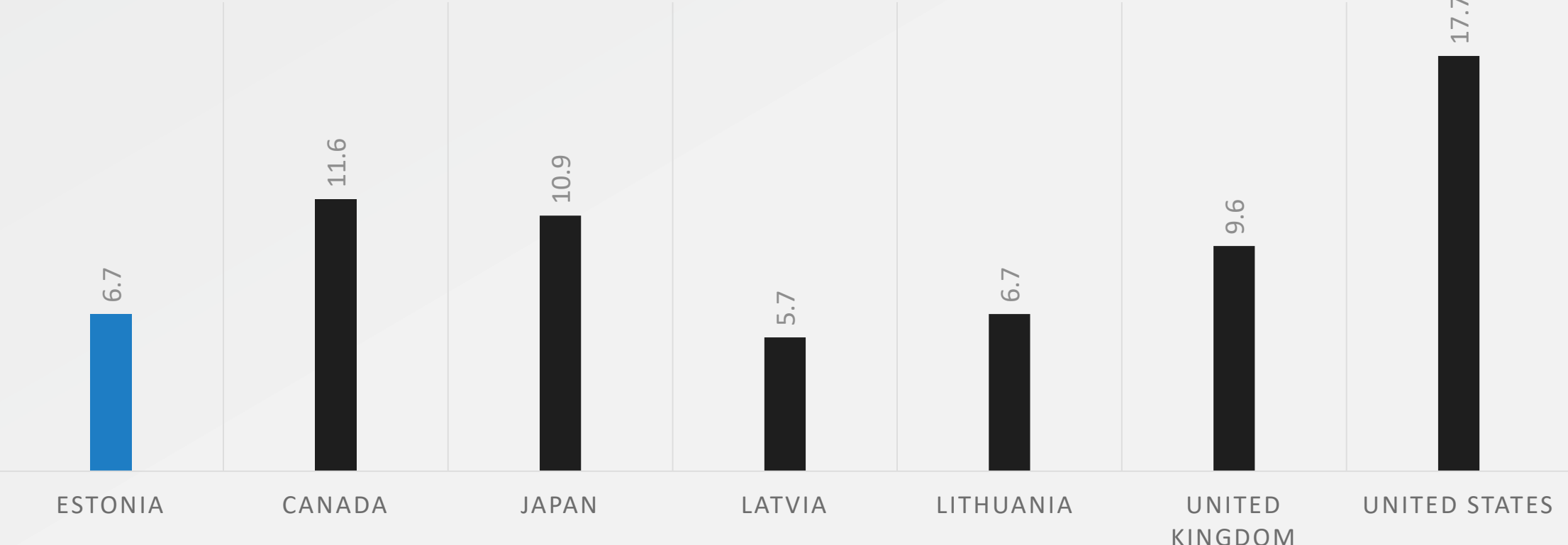
Medicine (MD)

99% of Estonian doctors have graduated from UT

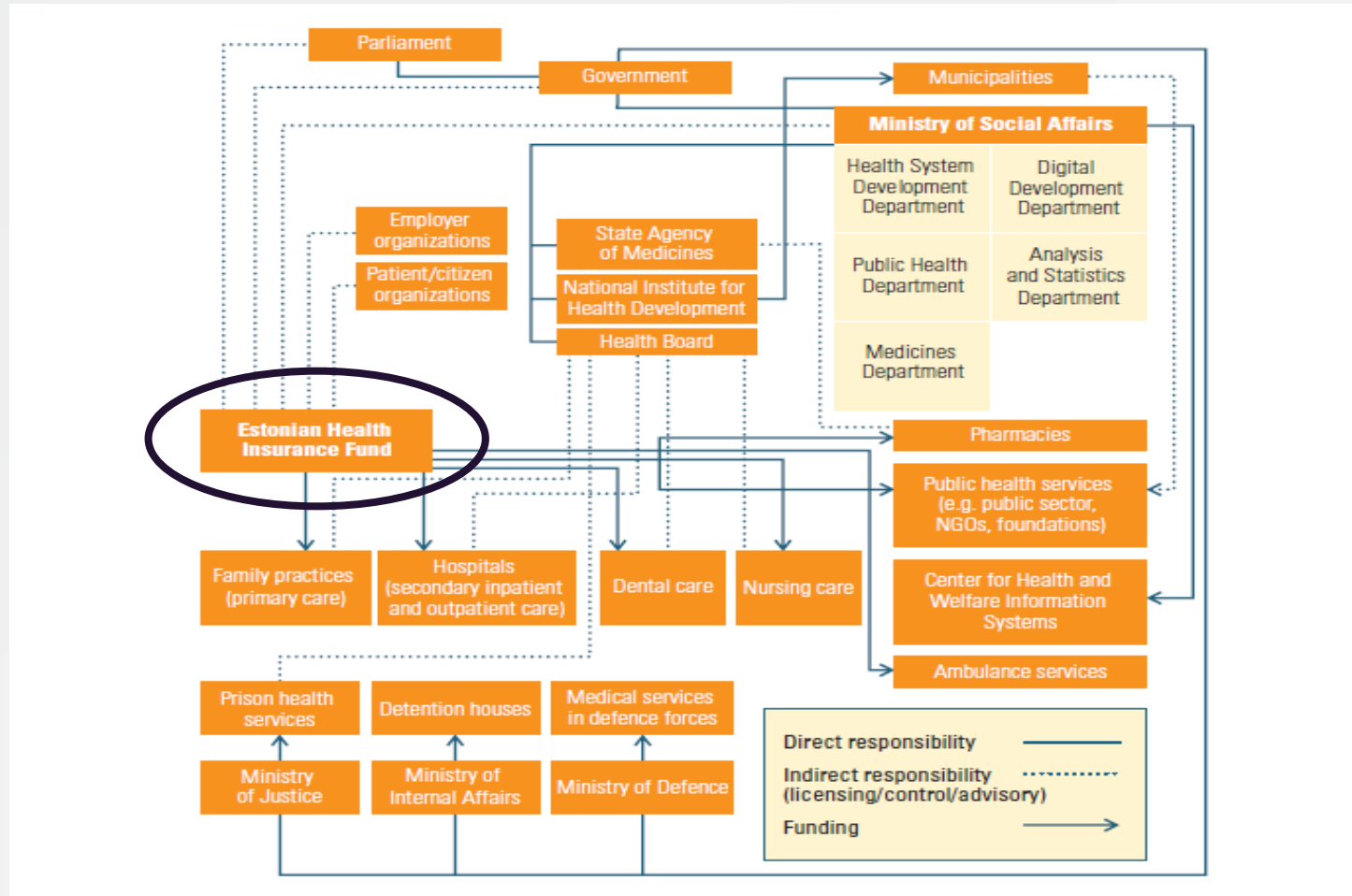
TARTU ÜLIKOO



Health Expenditures in Gross Domestic Product (%)—2016 to 2018



Estonian Health Care System Organizational Structure



Overview of e-Health Services in Estonia

- Patient Portal
- Digital Prescriptions
- e-Ambulance
- e-Consultation
- Interoperability
- International Expectations



Significant Primary Care Milestone Timeline

Year	Milestone
1991	National reforms focus on establishing primary care as the foundation of the healthcare system
1993	Family medicine was recognized as a medical specialty
2001	Health Services Organization Act—Primary care was identified as first point of contact for patients within the health system
2003	University of Tartu—Family Medicine residency training program was established
2005	Family Doctor Hotline—24 hour access to primary care health consultation, in both Estonian and Russian languages, was now available to nationwide



Access to Healthcare throughout Estonia

Primary Care

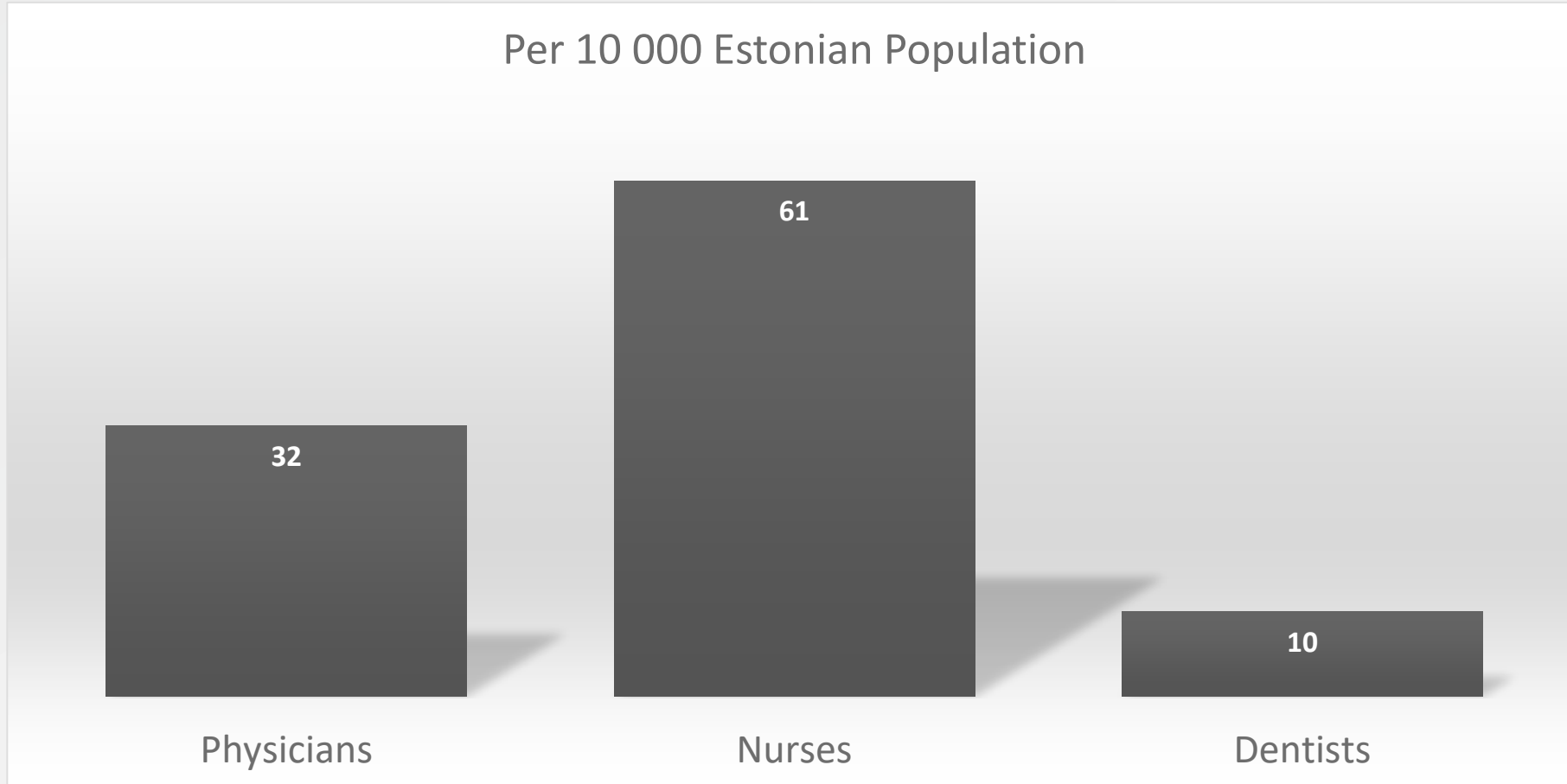
- Patients identify a personal family physician through the Estonian registry.
- Great majority (≈ 800) of family physicians are contracted through the Estonian Health Insurance Fund.

Specialty Care

- With the exception of psychiatry, gynecology, dermatology or ophthalmology, referral from a patient's family physician is needed for specialty consultation.
- Specialty care is available in large cities (Tallinn, Tartu and Parnu).



Practicing Healthcare Personnel, 2016



Determinants of Health

Health is influenced by many factors, which may generally be organized into five broad categories known as determinants of health:

- Genetics
- Behavior
- Environmental and physical influences
- Medical care
- Social factors



Social Determinants of Health

Goals of the World Health Organization's Commission on Social Determinants of Health:

- Improve daily living conditions
- Tackle the inequitable distribution of power, money, and resources
- Measure and understand the problem and assess the impact of action



Behavioral Risk Factors in Estonia

Behavioral Risks	Percentage of Deaths due to Behavioral Risks
Poor diet (e.g., high sodium, high saturated fat)	26%
Cigarette smoking	15%
Excessive alcohol consumption	10%
Low physical activity	3%



Section 4

Estonian Personalized Medicine



Defining Personalized or Precision Medicine

“Personalized medicine is an emerging practice of medicine that uses an individual's genetic profile to guide decisions made in regard to the prevention, diagnosis, and treatment of disease. Knowledge of a patient's genetic profile can help doctors select the proper medication or therapy and administer it using the proper dose or regimen.”



Human Genes Research Act (HGRA)

Established: December 13, 2000

HGRA Objectives:

- Regulate the establishment and maintenance of a gene bank
- Organize the necessary genetic research
- Ensure the voluntary nature of gene donation and the confidentiality of the identity of gene donors
- Protect persons from misuse of genetic data and from discrimination based on interpretation of the structure of their DNA and the genetic risks arising therefrom



Estonian Biobank

- Estonian Biobank is a population-based biobank of the Estonian Genome Center at the University of Tartu (EGCUT).



Estonian Biobank Cohort

- Cohort size is currently 200,000 gene donors (≥ 18 years of age)
- Estonians: 83%, Russians: 14%, other nationalities: 3%
- All subjects have been recruited randomly by general practitioners and physicians in hospitals



Computer Assisted Personal Interview (CAPI)

- Personal data (e.g., place of birth, place(s) of living, nationality)
- Genealogical data (e.g., family history of medical conditions spanning four generations)
- Educational and occupational history
- Lifestyle data (e.g., physical activity, dietary habits, smoking, alcohol consumption, women's health, quality of life)



Section 5

Additional Estonian Health-Related Resources



Additional Resources

- [e-Estonia](#)
- [Estonia Health System Review](#)
- [Estonian Chamber of Commerce and Industry](#)
- [Visit Estonia](#)
- [What the U.S. Medical System Can Learn From Estonia](#)

