Medical and Healthcare Innovation in Estonia

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Module Content

Section 1: Estonia Overview
Section 2: Estonian Population Health Demographics
Section 3: Estonian Healthcare System
Section 4: Estonian Personalized Medicine
Section 5: Additional Estonian Health-Related Resources
Section 1

Estonia Overview
Geographical Location and Demographics

Population: 1.3 million
Capital: Tallinn
Official Language: Estonian
Official Currency: euro

https://estonia.ee/
Estonian Soviet Socialist Republic, 1940-1990
Estonian Flag
Republic of Estonia Government

President Kersti Kaljulaid

Prime Minister Jüri Ratas


Estonian Embassy in the United States

Estonian Ambassador
Jonatan Vseviov

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 Life Expectancy, 1960-2015

https://data.worldbank.org/indicator/SP.DYN.LE00.MA.IN?locations=EE
## Life Expectancy, at Birth, of Select Countries, 2018

<table>
<thead>
<tr>
<th>Country</th>
<th>Life Expectancy at Birth (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>80</td>
</tr>
<tr>
<td>Finland</td>
<td>79</td>
</tr>
<tr>
<td>United States</td>
<td>76</td>
</tr>
<tr>
<td><strong>Estonia</strong></td>
<td><strong>74</strong></td>
</tr>
<tr>
<td>Lithuania</td>
<td>71</td>
</tr>
<tr>
<td>Latvia</td>
<td>70</td>
</tr>
</tbody>
</table>
### Leading Causes of Death in Estonia, 2017

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Disease/Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ischemic heart disease</td>
</tr>
<tr>
<td>2</td>
<td>Hypertensive heart disease</td>
</tr>
<tr>
<td>3</td>
<td>Stroke</td>
</tr>
<tr>
<td>4</td>
<td>Alzheimer's disease</td>
</tr>
<tr>
<td>5</td>
<td>Lung cancer</td>
</tr>
<tr>
<td>6</td>
<td>Colorectal cancer</td>
</tr>
<tr>
<td>7</td>
<td>Cirrhosis</td>
</tr>
<tr>
<td>8</td>
<td>Stomach cancer</td>
</tr>
<tr>
<td>9</td>
<td>Chronic kidney disease</td>
</tr>
<tr>
<td>10</td>
<td>Pancreatic cancer</td>
</tr>
</tbody>
</table>
# Leading Causes of Disability in Estonia, 2017

<table>
<thead>
<tr>
<th>Ranking</th>
<th>Disease/Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Low back pain</td>
</tr>
<tr>
<td>2</td>
<td>Falls</td>
</tr>
<tr>
<td>3</td>
<td>Headache disorders</td>
</tr>
<tr>
<td>4</td>
<td>Diabetes</td>
</tr>
<tr>
<td>5</td>
<td>Depressive disorders</td>
</tr>
<tr>
<td>6</td>
<td>Age-related hearing loss</td>
</tr>
<tr>
<td>7</td>
<td>Stroke</td>
</tr>
<tr>
<td>8</td>
<td>Neonatal disorders</td>
</tr>
<tr>
<td>9</td>
<td>Alcohol use disorders</td>
</tr>
<tr>
<td>10</td>
<td>Neck pain</td>
</tr>
</tbody>
</table>
Estonian Human Development Component Indices and Human Development Index, 1990-2018

http://hdr.undp.org/sites/all/themes/hdr_theme/country-notes/EST.pdf
## Human Development Index (HDI) of Select Countries, 2019

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

For more details, visit: [human development index ranking](http://hdr.undp.org/en/content/2019-human-development-index-ranking)
Section 3

Estonian Healthcare System Structure
Town Hall Pharmacy (Raeapteek, 1422)

Medical Education in Estonia

UNIVERSITY OF TARTU

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› Master’s
› PhD
› Medicine
› Admission
› Medical Studies in Estonian
› Study Estonian
› Short-term Studies
› International Summer University
› FAQs
› Contact

Home » Admissions » Medicine in English (6 years)

Medicine (MD)

99% of Estonian doctors have graduated from UT

https://www.ut.ee/en/prospective-students/medicine-studies
Health Expenditures in Gross Domestic Product (%)—2016 to 2018

- Estonia: 6.7%
- Canada: 11.6%
- Japan: 10.9%
- Latvia: 5.7%
- Lithuania: 6.7%
- United Kingdom: 9.6%
- United States: 17.7%
Estonian Health Care System Organizational Structure

[Diagram showing the organizational structure of the Estonian health care system, including key institutions and their relationships.]

https://www.haigekassa.ee/en
Overview of e-Health Services in Estonia

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

https://www.youtube.com/watch?v=H4QLzQGMI3k
## Significant Primary Care Milestone Timeline

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

[Source](https://www.euro.who.int/__data/assets/pdf_file/0011/377417/hit-estonia-eng.pdf?ua=1)
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

Per 10 000 Estonian Population

- Physicians: 32
- Nurses: 61
- Dentists: 10

Source: https://www.euro.who.int/__data/assets/pdf_file/0011/377417/hit-estonia-eng.pdf?ua=1
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

https://www.cdc.gov/nchhstp/socialdeterminants/faq.html
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

<table>
<thead>
<tr>
<th>Behavioral Risks</th>
<th>Percentage of Deaths due to Behavioral Risks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor diet (e.g., high sodium, high saturated fat)</td>
<td>26%</td>
</tr>
<tr>
<td>Cigarette smoking</td>
<td>15%</td>
</tr>
<tr>
<td>Excessive alcohol consumption</td>
<td>10%</td>
</tr>
<tr>
<td>Low physical activity</td>
<td>3%</td>
</tr>
</tbody>
</table>

[https://www.who.int/social_determinants/thecommission/en/](https://www.who.int/social_determinants/thecommission/en/)
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.”

https://www.genome.gov/genetics-glossary/Personalized-Medicine
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

https://www.who.int/genomics/elsi/regulatory_data/region/euro/078/en/
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