Digital Public Health and Cross-sectoral Collaboration

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What determines health, really?

Societal issues have a major impact on consumer health

<table>
<thead>
<tr>
<th>Factors that contribute to health outcomes, %</th>
<th>Average amount of data generated over a person’s lifetime</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social determinants of health</td>
<td>~40 terabytes (volume, variety, velocity, veracity)</td>
</tr>
<tr>
<td>Health behaviors</td>
<td>~20 terabytes (clinical data)</td>
</tr>
<tr>
<td>Clinical care</td>
<td>~15 terabytes (clinical data)</td>
</tr>
<tr>
<td>Nonmodifiable factors (e.g., genetics)</td>
<td>~25 terabytes</td>
</tr>
</tbody>
</table>
Strategic framework

National Health Strategy 2021-2030

Welfare Development Plan 2022-2030

National Digital Agenda 2030

National Health Strategy 2021-2030
National Health Strategy 2021-2030

**VISION**

- Assuring accessible quality health services integrated with social services
- Empowering and engaging people, health literacy
- Developing human capacity, leadership and responsibility
- Rethinking the service model, cooperating within and between sectors
- Enhancing health system quality and patient safety

**Reducing inequity and ensuring patient rights**

**Integrated care**
- HIK
- PAIK
- Stroke and other VBHC

**Human-centricity**
- PROMS
- Patient empowerment framework
- Consent service
- Decision supports

**Quality data & infrastructure**
- Data viewer
- Information centre
- Quality control
- NG-HIS

**Data warehouse**
- PROMS

**Analytics capacity**
- Testing sites
- Patient empowerment framework
- Assessment framework
- Virtual visits

**Remote services**

**Assuring accessible quality health services integrated with social services**

- Empowering and engaging people, health literacy
- Developing human capacity, leadership and responsibility
- Rethinking the service model, cooperating within and between sectors
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**Empowering and engaging people, health literacy**

- Patient empowerment framework
- Consent service
- Decision supports

**Rethinking the service model, cooperating within and between sectors**

- Testing sites
- Patient empowerment framework
- Assessment framework
- Virtual visits

**Enhancing health system quality and patient safety**

- Patient empowerment framework
- Consent service
- Decision supports

**Assuring accessible quality health services integrated with social services**

- Patient empowerment framework
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Building blocks for making sense of health
electronic ID

The strongest identity.

+ every Estonian has an eID
+ 17% of mobile-ID
+ 34% of smart-ID
+ e-Residency
One road to bind them all

Connecting…
…488 institutions
…155 public sector entities
…1223 interfaced information systems
X-Road, ID-card, State IS Service Register

UNEMPLOYMENT INSURANCE FUND
POPULATION REGISTER
BUSINESS REGISTER
STATE AGENCY OF MEDICINES - Coding Centre - Handlers of medicines
HEALTH CARE BOARD - Health care providers - Health professionals - Dispensing chemists
HEALTH INSURANCE FUND REGISTER
PRESCRIPTION CENTRE - 2010 January
QUALITY REGISTERS - Cancer, Myocardial infarction, HIV, Tuberculosis, etc.
SCHOOL NURSES - 2010 September
FAMILY DOCTORS
HOSPITALS

SOCIAL INSURANCE BOARD PORTAL / WORK-STATION
PATIENT PORTAL / WORK-STATION
DOCTOR PORTAL / WORK-STATION
X-ROAD GATEWAY SERVICE
PHARMACIES AND INDIVIDUAL DOCTORS
NATIONAL SUPPORT APPLICATIONS for AMBULANCE SERVICES
AMBULANCE SERVICE MOBILE WORKSTATIONS
STATISTICS PORTAL

ANONYMIZED DATA WAREHOUSE for ANALYTICS
NATIONAL MEDICAL IMAGES ARCHIVE PACS
NATIONAL HEALTH INFORMATION SYSTEM/ARCHIVE

VPN
International standards

- ICD-10
- SNOMED CT
  - HL7 CDA and v3 (FHIR soon to be here)
  - DICOM
  - LOINC
  - ATC
  - NCS P
**Universities, biobanks**

- Research institutions
  - Universities
  - Biobanks
  - Hospitals
  - Other

- Private sector
  - Global enterprises
  - SMEs
  - Start-ups

- Public sector
  - Ministries
  - Government agencies
  - Payers

**State controllers for health & social data e.g. ministry, insurance fund, state agencies**

- Other state controllers e.g. Statistics Estonia

**HCPs**

**Data Stockrooms**

- Access to data
- Computing infrastructure
- R&D toolbox
- Activity log

**Health Sense Secondary Data Warehouse**

- Aggregation, linking, pseudonymization etc

**DigInEst**

- Navigating data space
- Balancing interests
- Consent models
- High privacy & security standards

**Local Ecosystem**

- Projects
- Advice
- Engage
- Solutions

**R&D Space**

**Benefits:**

- *new innovative products and services for patients*
- *new research and partnership opportunities for professionals and local industry*
- *data-driven insight for policy*
- *advancement of medicine*
Where do we go from here?
The future is deeply personal – couple of example projects
Estonian Personalized Medicine Project

• Who: The National Institute for Health Development, Tartu University, Ministry, and others
• What: Developing risk scores and decision support software for family doctors
• How: Using primarily genotyped data in combination with EHRs to train algorithms that predict risk
• Why: Predict diseases for primary prevention, provide pharmacogenetic services