Personalizing health – the Nordic Way
Bridging Data & Genomics

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Large challenges regarding costs and inequality in health care

A large part of health care services and health expenditures are consumed by a small number of patients

Kilde: Health Navigator, Statens Seruminstitut, Sundhedsministeriet og Finansministeriet (upublicerede data)
Life Expectancy and Healthy Life Years

Kilde: The Lancet, 2013
“Precision medicine requires a different type of clinical trial that focuses on individual, not average, responses to therapy”
- Nicholas J. Schork, Ph.D.
From Pyramid to Silo

Population by age and gender (in thousands)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Females</th>
<th>Males</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-4</td>
<td>145K</td>
<td>98K</td>
</tr>
<tr>
<td>5-9</td>
<td>116K</td>
<td>100K</td>
</tr>
<tr>
<td>10-14</td>
<td>153K</td>
<td>171K</td>
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<tr>
<td>15-19</td>
<td>176K</td>
<td>171K</td>
</tr>
<tr>
<td>20-24</td>
<td>177K</td>
<td>170K</td>
</tr>
<tr>
<td>25-29</td>
<td>169K</td>
<td>161K</td>
</tr>
<tr>
<td>30-34</td>
<td>152K</td>
<td>145K</td>
</tr>
<tr>
<td>35-39</td>
<td>154K</td>
<td>161K</td>
</tr>
<tr>
<td>40-44</td>
<td>188K</td>
<td>189K</td>
</tr>
<tr>
<td>45-49</td>
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<td>50-54</td>
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<td>184K</td>
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<td>55-59</td>
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<td>80-84</td>
<td>170K</td>
<td>179K</td>
</tr>
<tr>
<td>85+</td>
<td>174K</td>
<td>177K</td>
</tr>
</tbody>
</table>

Share of population by age group

- Old: 24%
- Working age: 52%
- Young: 23%

Source: OECD and Dataminds
Preventative Health: From treatment to prevention

- Healthy/Lowest Risk
- At Risk
- High Risk
- Chronic Disease Early Stage
- Chronic Disease Progression
- Chronic Disease + End-of-Life Care

20% Population, Generates 80% Cost

Preventive vs. Reactive

Younger to Older

Value

Cost

20% Population, Generates 80% Cost
Value based Health: from input to outcome

INPUT
(Tactical/transactional)

OUTPUT
(Process optimization)

OUTCOME
(Business Transformation)

HOURS

KPI’S

VALUE

(Numbers of patients and treatments)

Burning platform

• Ageing and more years with disease
• 1% costs 30% - 10% costs 75-90%
• Comorbidity
• From “fee for service” to value based health
• Data Gold Mine – Between person and system
• Personalized health – from cradle to grave
• Broadening health concept and global health
Projects and Databases

- NIH National Human Genome Research Institute
- UNIVERSITY of TARTU Estonian genome center
- Human Genome Project
- FRANCE MÉDECINE GÉNOMIQUE 2025
- EURORDIS Rare Diseases Europe
- Personal Genome Project
- Qatar Biobank
- The Scottish Genomes Partnership
- 1000 Genomes
  A Deep Catalog of Human Genetic Variation
- Million Veteran Program (MVP)
- deCODE genetics
- Finngen
- Genomics England
- Human Longevity, Inc.
- 23andMe
Amazon, Berkshire Hathaway, and JPMorgan Chase to partner on US employee health care

- Amazon, Berkshire Hathaway and JPMorgan announce a partnership to cut health costs and improve services for employees.
- The idea is to create a company that would be “free from profit-making incentives.”
- News of the deal slammed suppliers in the industry including Express Scripts, Cigna, CVS, United Health and Aetna.
Megatrends

- Demographic development
- Focus on health
- Polarization
- Globalization
- Commercialization
- Individualization
- Network society
- Sustainability
- Knowledge society
- Immaterialization
- Democratization
- Acceleration and complexity
- Technologic development
- Economic growth
Scenario matrix
THE TANGLE

The main innovation behind IOTA is the Tangle, a revolutionary new blockless distributed ledger which is scalable, lightweight and for the first time ever makes it possible to transfer value without any fees. Contrary to today’s Blockchains, consensus is no-longer decoupled but instead an intrinsic part of the system, leading to decentralized and self-regulating peer-to-peer network. Read our Whitepaper.
Danskerne vil kende risikoen for arvelige sygdomme

Selvom sygdommene ikke kan behandles, ønsker de svar, viser en befolkningsundersøgelse.

Når det kommer til Information om genføj, er det helt afgørende for halvdelen af danskerne at kende til de alvorlige sygdomme, de har i deres arvemasse, viser en befolkningsundersøgelse. (Foto: Nikolai Linnares © Scanpix)

Af Maja Hald
AI, VR, AR
The health data ecosystem is described in this conceptual diagram, created by the WHO eHealth unit and the Health Ethics and Policy Lab, Epidemiology Biostatistics and Prevention Institute, University of Zurich.
How do we combine data?
General Data Protection Regulation

- Broad consent
  - Single point in time
  - Agree to the ‘rules of the game’
  - Often includes ‘future research’
  - Difficult to recontact

- Dynamic consent
  - Electronic record of consents
  - Channel of communication
  - Opportunity to review and revise
  - Tailored information

How distributed ledgers can improve provider data management and support interoperability

September 2016
Digital Health Revolution

- Aims to create a MyData ecosystem to give individuals more control over their data

Source: digitalhealthrevolution.fi
Individualisering
Actors

Citizen

Society

Research

Healthcare system

The public sector

Business
Relevant themes

Health
Collective vs. individual

Privacy

Sharing

Big Data

Legislation

Democratisation

Access, control, ownership
Focus on Health

The concept of health is evolving

1950
Healthy is one who is **not sick** or handicapped

1985
Healthy is one who is **good shape** physically and mentally

2015
Healthy is one who is **better than average** physical and mental endurance
Exploitation of the potential of genomics require knowledge about both individuals and groups.
Trust - a Nordic Strength
predictive, preventive, personalized and participatory
Co-operation programme for health and social affairs

Social security, preventative measures, and the promotion of innovation and research are among the top political priorities for the Council of Ministers for Health and Social Affairs over the next few years.

The ministers adopted this in a co-operation programme for health and social affairs for 2017 to 2020. The co-operation programme is available in all the Nordic languages and in English.

- Read the co-operation programme here
The specific trends and themes of the future of the Danish healthcare system can be divided into 3 subjects:

1. Polarisation and fragmentation
   - Globalised and intensified health competition
   - Specialisation and centralisation

2. Acceleration in health development
   - Specialisation and centralisation

3. New management paradigms
   - Individualised healthcare solutions
   - Instant gratification

4. Globalised and intensified health competition
   - Changing opinions
   - Data security and privacy

5. Specialisation and centralisation
   - Infotainment/Diagnostic
   - Changing opinions

6. Active patient network
   - Data security and privacy
   - Automation and smart technology

7. Digitalisation and mobility
   - Instant gratification

8. Advanced health technology
   - Changing opinions

9. Changeable health behaviour
   - Instant gratification

The future of personalized health in the Nordics (2030) - The Nordic Way - Person Centric Data Management in Health

Nordic Innovation
Thank you!

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