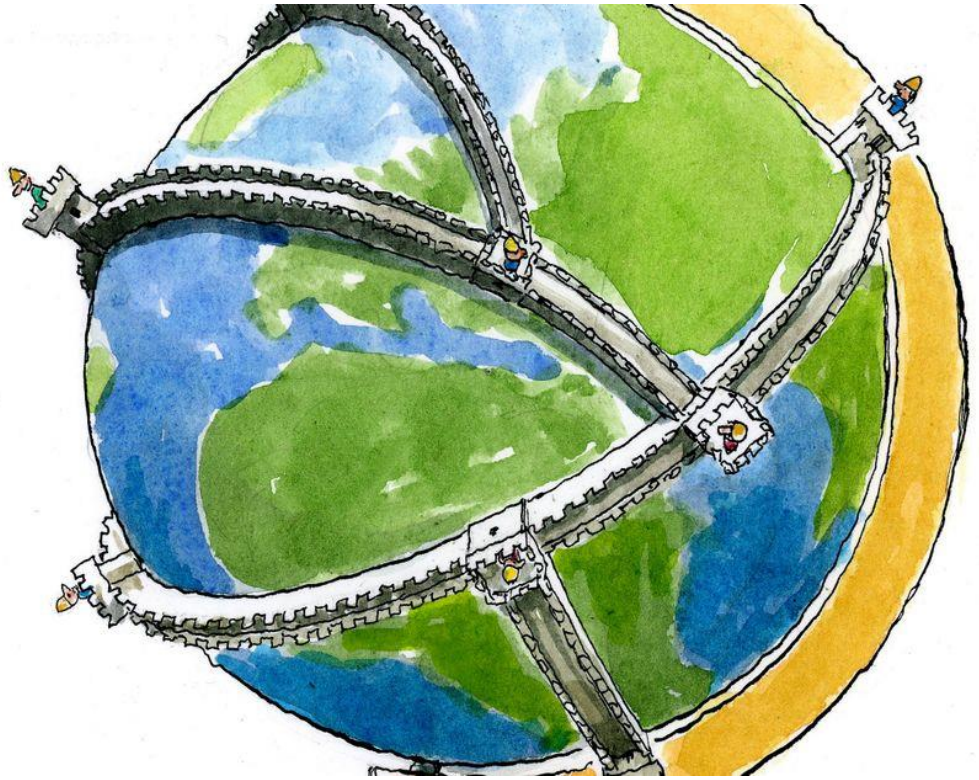
Megatrends and Technologies

A World in regions

- China-US conflict continues
  - Trade war and rearmament & Trump
- The world is divided into regions:
  - China versus China's closest neighbors who do not like the Chinese expansion (ASEAN, India ar Australia)
  - The EU as a region (England as an Atlantic islan
  - United States and Canada
  - Central and South America
  - Africa as the area everyone will try to gain influence over
  - Russia isolated or a smaller brother of China
- A world of wars and conflicts….



An unstable and unpredictable world

- US still a superpower – China a rival and India a rising one
- Russian invasion of Ukraine and war in Ukraine
- War in the middle East – or maybe peace?
- The multipolar regionalized world - many centers and dominant economies
- Resources and the power over it – a questing of national security for many countries
- Tariffs, inflation rebouncing, energy prices? – economic insecurity and reduced purchasing power – public expenditures
- AAU Health Science & Technology must be at the right side – are you prepared for that?

EU and Health

- Health have been a part of EU political frame since 2007
- Target: Creating equal assess to treatment and care
- We had – and still have – 27 very different systems of health care in the EU
- EU is creating a number of targeted initiatives regarding alcohol, nutrition and access to treatment at hospitals
- A single market for public health service
  - It’s a long way away… but under progress
  - Digital Health EU style
- Political frame = potential funding

Digital Health and Care

TRANSFORMATION OF HEALTH AND CARE IN THE DIGITAL SINGLE MARKET - Harnessing the potential of data to empower citizens and build a healthier society

European health challenges

- Ageing population and chronic diseases putting pressure on health budgets
- Unequal quality and access to healthcare services
- Shortage of health professionals

Potential of digital applications and data to improve health

- Efficient and integrated healthcare systems
- Personalised health research, diagnosis and treatment
- Prevention and citizen-centred health services

What EU citizens expect...

90% agree — To access their own health data (requiring interoperable and quality health data)

80% agree — To share their health data (if privacy and security are ensured)

80% agree — To provide feedback on quality of treatments

Support European Commission:

Updated 24042018

1 Secure access and exchange of health data

Ambition:

Citizens securely access their health data and health providers (doctors, pharmacies...) can exchange them across the EU.

Actions:

- eHealth Digital Service Infrastructure will deliver initial cross-border services (patient summaries and ePrescriptions) and cooperation between participating countries will be strengthened.
- Proposals to extend scope of eHealth cross-border services to additional cases, e.g. full electronic health records.
- Recommended exchange format for interoperability of existing electronic health records in Europe.

2 Health data pooled for research and personalised medicine

Ambition:

Shared health resources (data, infrastructure, expertise...) allowing targeted and faster research, diagnosis and treatment.

Actions:

- Voluntary collaboration mechanisms for health research and clinical practice (starting with "one million genomes by 2022" target).
- Specifications for secure access and exchange of health data.
- Pilot actions on rare diseases, infectious diseases and impact data.

3 Digital tools and data for citizen empowerment and person-centred healthcare

Ambition:

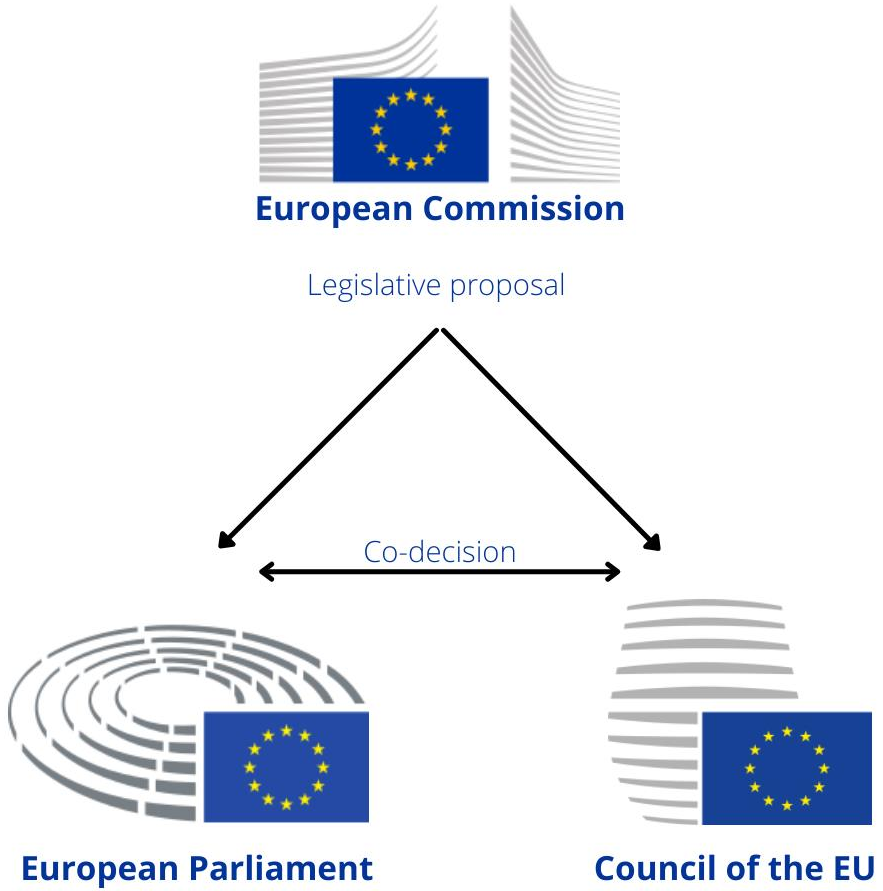
Citizens can monitor their health, adapt their lifestyle and interact with their doctors and carers (receiving and providing feedback).

Actions:

- Facilitate supply of innovative digital-based solutions for health, also by SMEs, with common principles and certification.
- Support demand uptake of innovative digital-based solutions for health, notably by healthcare authorities and providers, with exchange of practices and technical assistance.
- Mobilise more efficiently public funding for innovative digital-based solutions for health, including EU funding.

European Health data space

- **Compromise reached in May 2024**
- **The EHDS will:**
  - **Empower individuals to take control of their health data and facilitate the exchange of data for the delivery of healthcare across the EU (primary use of data)**
  - **Foster a genuine single market for electronic health record systems**
  - **Provide a consistent, trustworthy, and efficient system for reusing health data for research, innovation, policy-making, and regulatory activities (secondary use of data)**



Health in the future

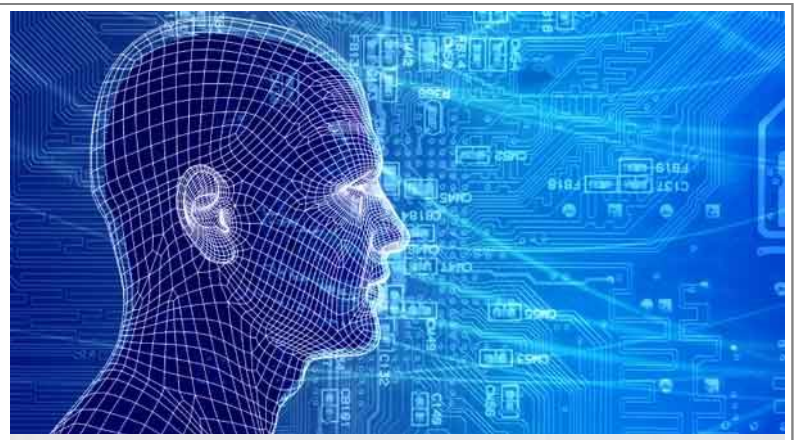
- Growing and aging population, demand for diagnosis and treatment, new pharma and new cures – It is a great world!
- Will we se the creation of a growing number of chronic patients?
- Preventive medicine will soar
- From general to personalized drugs
- Digital twins – and important tool
- Digital Health could be the cornerstone of treatment in the future
- You are set to shape the future of health treatment and research in Denmark - and perhaps across the EU

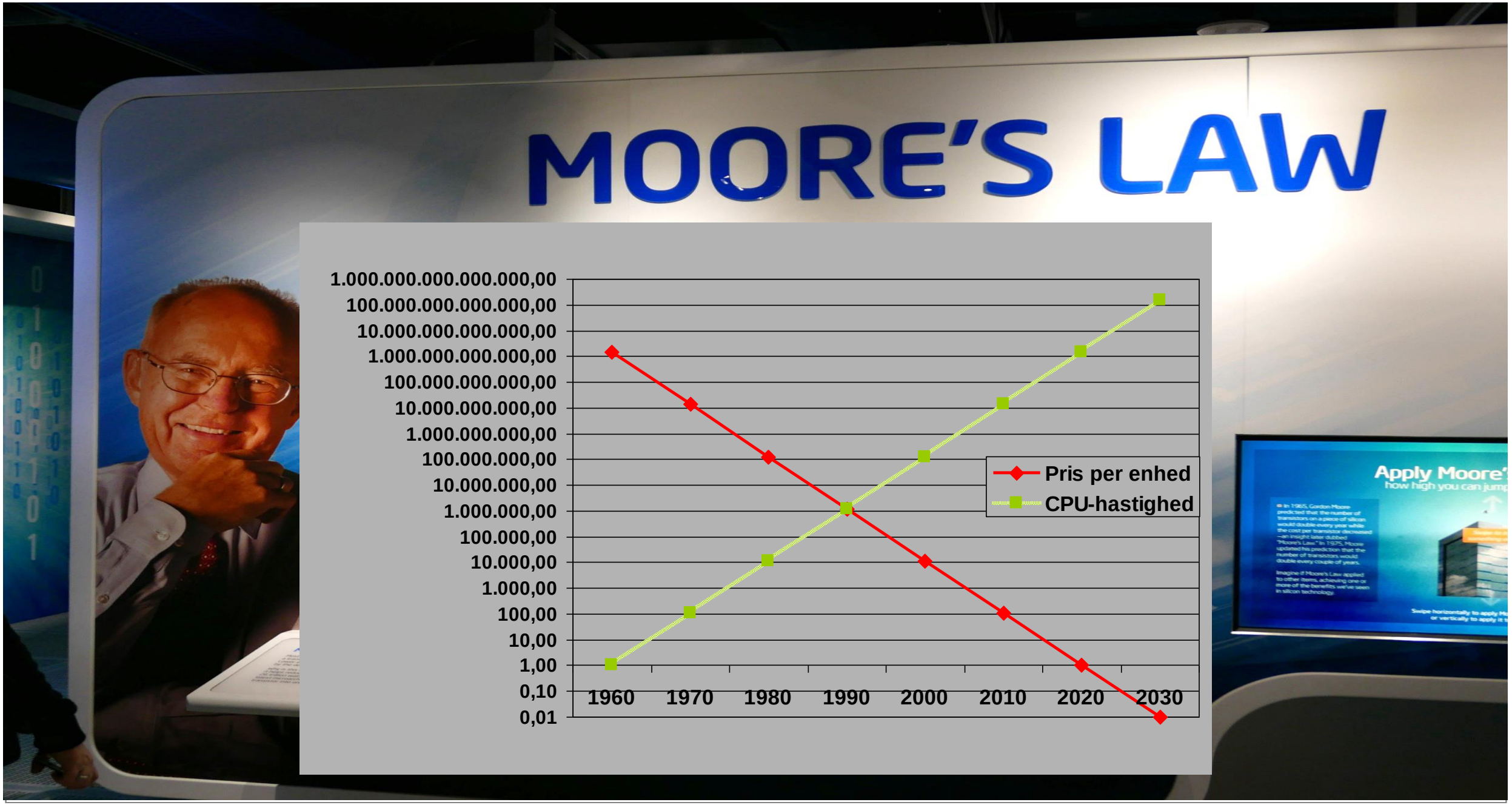
Evolving Trends in Medical Treatment and Patient Health

- Chronic medication use is rising for conditions such as high cholesterol, blood pressure, asthma, obesity, and more
- Advancements in medical treatment are increasing the number of treatable conditions and medication use per person.
- The requirements for being truly healthy are increasing
- Therefore, the larger future growth area will involve managing patients with complex medication interactions
- Siloed approaches to treatment in decline. New, integrated solutions are necessary for the future of healthcare

New technology and digitalization

- **New technology has three stages:**
  A: We do old things in a new way.
  - **The combustion engine replaces the steam engine.**
  - **IT is used for complex calculations.**
- **B: We start doing new things we couldn't do before.**
  - **A combustion engine on a horse carriage - cars and trucks.**
  - **IT enables text processing, PCs, spreadsheets, images, video, internet, etc.**
- **C: Society transforms.**
  - **Suburbs, production with semi-finished goods, globalization.**
  - **Digital Twins, new production methods, automation, robotics, teaching, research robots**

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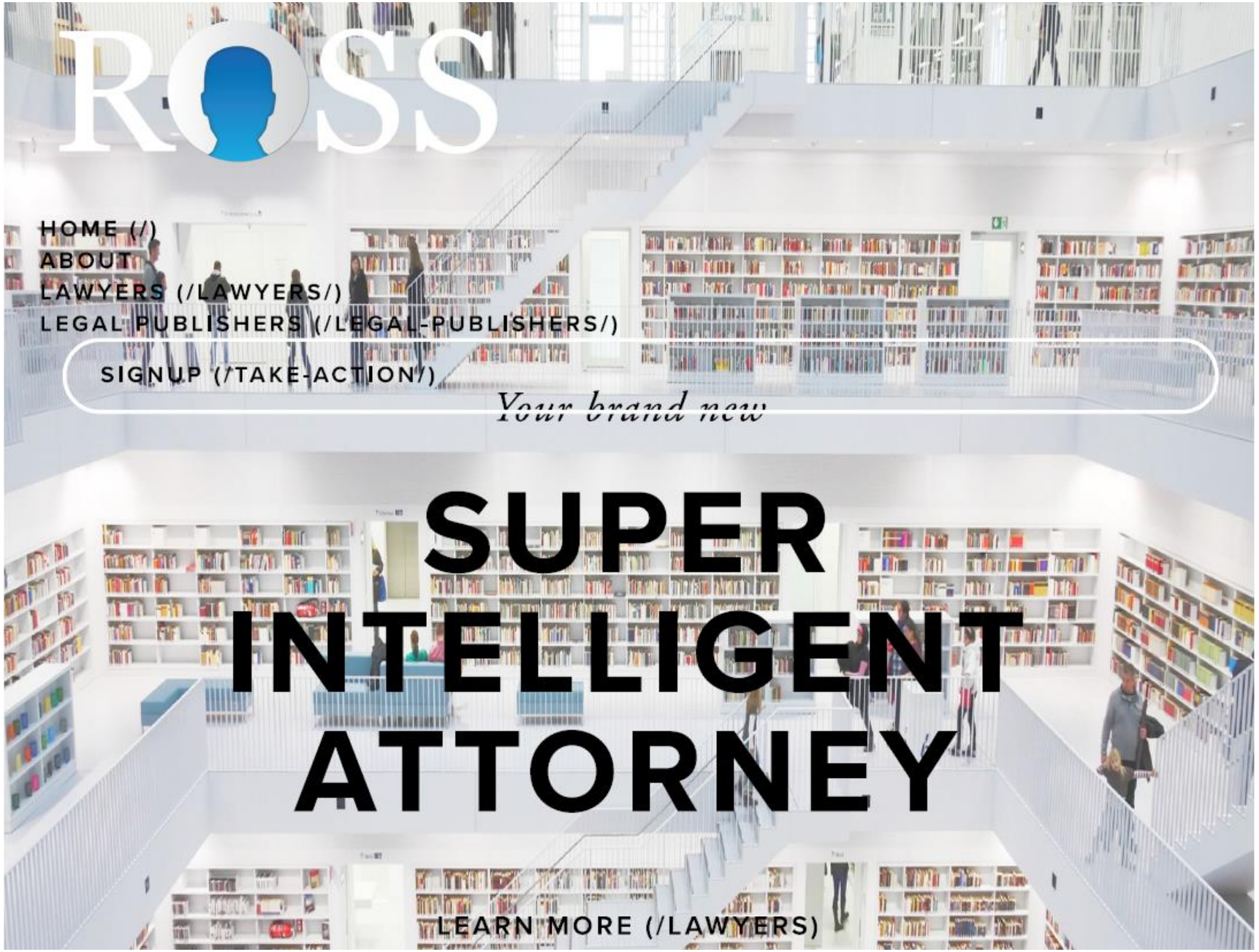


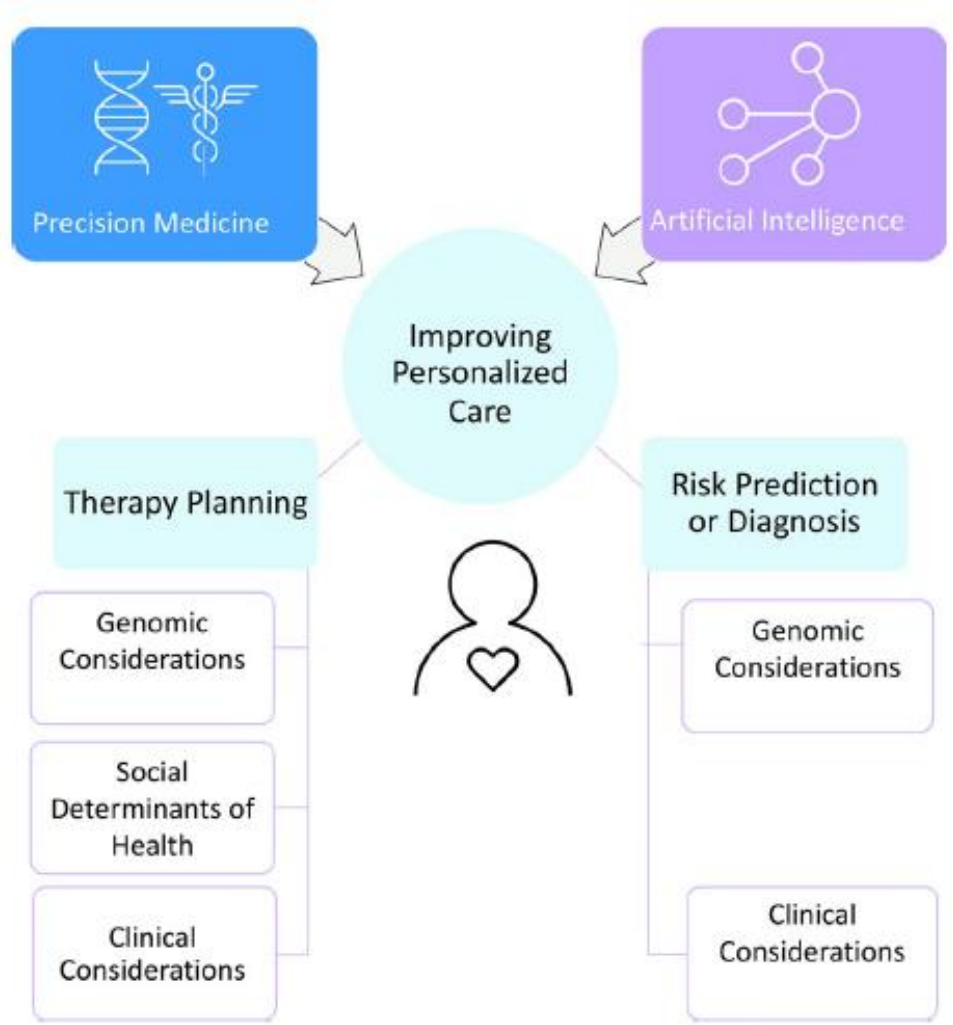
IBM Watson

BakerHostetler

AI and Healthcare in the future

Figure 1 A version of the Friedman's fundamental theorem of informatics describing the impact of augmented intelligence. "The healthcare system with AI will be better than the healthcare system without it." AI, artificial intelligence.

- **Healthcare with AI will be better than healthcare without AI – (and better that AI alone)**
- **We will need a lot of data to feed AI – and a lot of good quality data**
- **Where can we keep that enormous amount of data in the future?**
- **Should AAU Health Science &Technology have not only AI but also health data storage as a research priority?**



Key Applications of Digital Twins in Healthcare

- **Personalized Medicine**
  - **Patient-Specific Models: A digital twin of a patient can integrate data from imaging, wearables, genetic information, and health records.**
- **Disease Management**
  - **Chronic Conditions: Digital twins can model disease progression in chronic conditions like diabetes or cardiovascular disease, enabling more precise monitoring and interventions.**
  - **Early Detection: By analyzing deviations in the digital twin's "normal" behavior, healthcare providers can detect early signs of disease.**
- **Surgery and Treatment**
  - **Planning Surgical Simulations: Surgeons can practice on a digital twin of the patient before performing the actual procedure, reducing risks and improving outcomes.Radiation Therapy: Digital twins can predict the effects of radiation on tissues, ensuring maximum treatment efficacy with minimal side effects.**
- **Drug Development and Clinical Trials**
  - **Virtual Trials: Digital twins of patient populations can be used to simulate clinical trials, reducing extensive human trials and accelerating the approval process.**
  - **Predictive Toxicology: Digital twins to predict adverse drug reactions, improving drug safety profiles.**
- **Training and Education**
  - **Medical Training: Digital twins of organs or systems can serve as advanced training tools for medical professionals, offering realistic scenarios for practice without risking patient safety.**

Break 15 minutes

- https://www.youtube.com/watch?v=qeMFqkcPYcg

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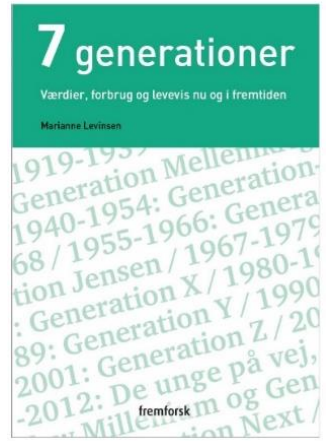

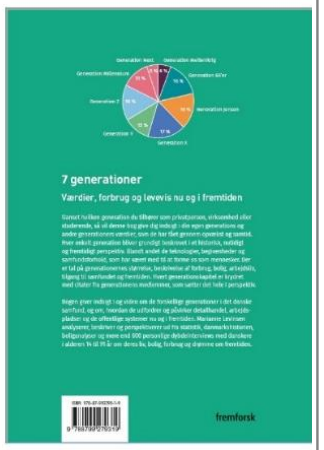


VOTE

Voting session

- **Which of the three subject will in your view become the most important for AAU Health Science and Technology on the road to 2030**

- **Vote by going to the area of exhibition for that subject**