



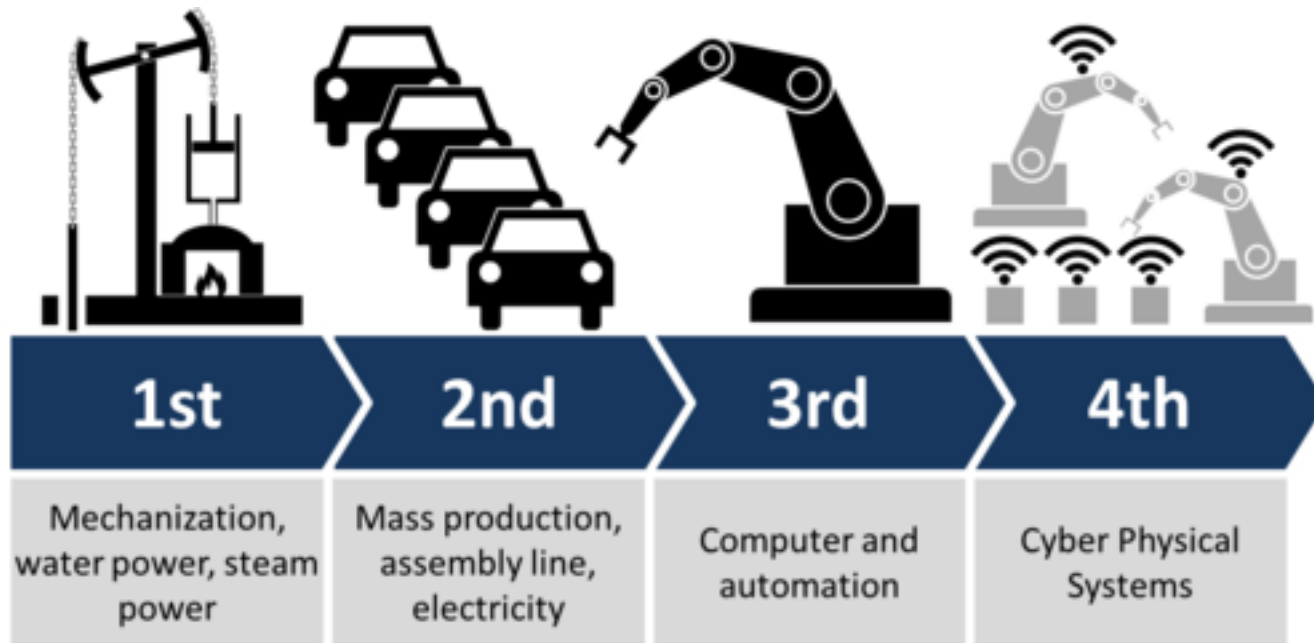
5G Health and Care

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Why do we need 5G Technology in the Health Domain?

- Demographic development: Societies are ageing and the demand for healthcare is age related
- Healthcare stands in Europe for 10% of the GDP, in the US for 18.5% of the GDP and in China for around 5% of the GDP.
- If the demand continues to rise at the current pace the gap between healthcare budget growth and GDP growth in most countries will increase. However: austerity has proven to be completely useless to curb this development as spending will just be postponed or money will be borrowed
- Staff costs make around 60-70% of hospital care
- Consequence: Hospital care needs to be replaced by outpatient care - wherever possible
- Patients and informal carers have to become “more involved”

Health 4.0 is the application of Industry 4.0 principles in the health domain



Industry 4.0 is the current trend of [automation](#) and data exchange in manufacturing technologies. It includes [cyber-physical systems](#), the [Internet of things](#) and [cloud computing](#).

Consequence: Virtualization of Care

Foundations / Health 1.0

- From Arts and Crafts to Science
- Institutionalization, regulations

Centralization / Health 2.0

- Standardization, health insurance
- Role-out of hospitals and pharma - mass production

Digitalization / Health 3.0

- Introduction of IT in the health industry
- Digitalization of medical devices

Virtualization / Health 4.0

- Automation, Cyber-physical systems
- Physical separation of service and point of care

Creating a 5G Health Framework in Europe and elsewhere



Automotive (5GAA Mission Statement)

High level activities to support the mission statement include:

- Define and harmonize use cases, business and go-to-market models for automotive and intelligent mobility applications, including rental cars, car sharing and electric vehicles
- Elaborate technology selection and roadmap evolution strategy including spectrum allocation requirements
- Influence standardization and regulatory bodies, certification and approval processes required for the deployment of future connected mobility solutions
- Address vehicle-to-x connectivity and communication challenges, including wireless and cellular
- access networks, security, privacy, authentication, distributed cloud architectures, technology platforms, protocols and data formats required for reliable communication and access to cloud content
- Run joint innovation and development projects leading to interoperability testing, large scale pilots and trial deployments

Health and Care (5GHC)

High level activities to support the mission statement include:

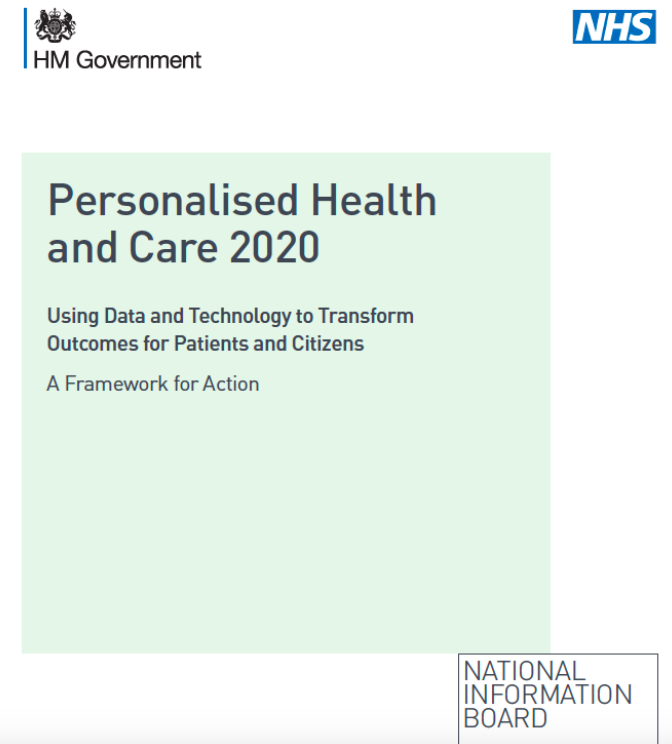
- Define and harmonize use cases, business and go-to-market models for health and care applications, including pharmaceutical, precision medicine and population health management applications
- Elaborate technology selection and roadmap evolution strategy including spectrum allocation requirements
- Influence standardization and regulatory bodies, certification and approval processes required for the deployment of future health and care solutions
- Address domain specific connectivity and communication challenges, including wireless and cellular
- Engage in privacy and ethics discussions and contribute to the social technological alignment of processes (GDPR,
- access networks, security, privacy, authentication, distributed cloud architectures, technology platforms, protocols and data formats required for reliable communication and access to cloud content
- Run joint innovation and development projects leading to interoperability testing, large scale pilots and trial deployments

Ericsson Report 2017 “From Healthcare to Homecare” and other reports

From Healthcare to Homecare URL

- <https://www.ericsson.com/en/networked-society/trends-and-insights/consumerlab/consumer-insights/reports/transforming-healthcare-homecare>

NHS Personalised Health and Care 2020



CONNECTING CARE

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Connected healthcare in Jiangsu, China

C.Thuemmler, 24.September 2017, Toronto



A HEALING HAND

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Access to remote healthcare specialists

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Machine to Machine (M2M) connections



Source: Cisco Visual Networking Index: Global Mobile Data Traffic Forecast Update, 2016–2021

12. September 2016

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TECH

Google Parent and Sanofi Name Diabetes Joint Venture Onduo

Joint venture will develop tools for managing the disease expected to affect 592 million people world-wide by 2035



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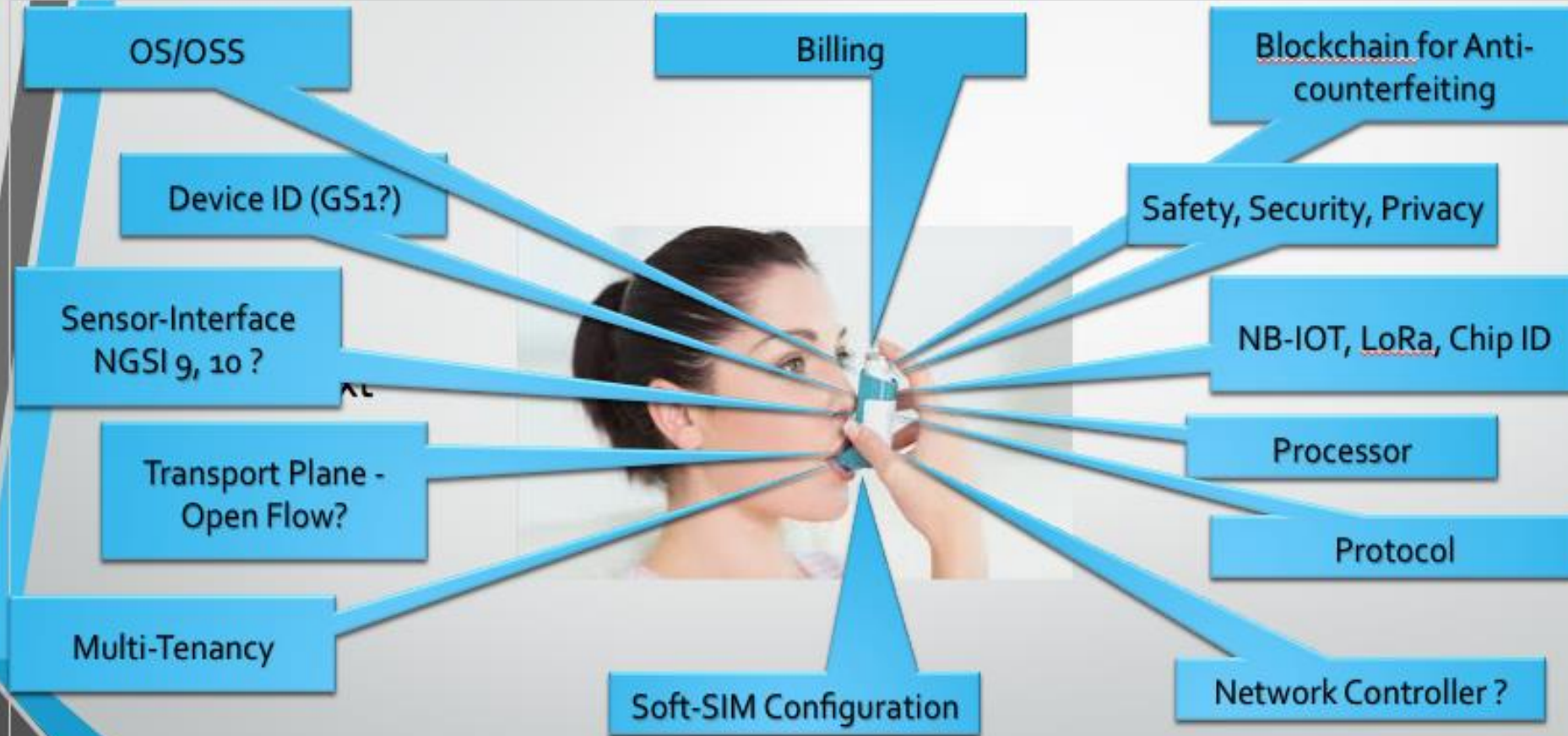
Joshua Riff, who was a senior executive at UnitedHealth Group's Optum, will be chief executive of the new unit. PHOTO: EUROPEAN

Saxon One



Tutima
GLASHÜTTE/SA

Smart Pharma Challenge



Smart Pharmaceuticals will not require Smart Phones as gateways in the future



3M Inhalers with display to be market ready by 2019

Billions of People will benefit from Health 4.0

- Asthma around 334 million people (Global asthma report 2014)
- COPD: 384 million people in 2010
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4693508/>
- Diabetes: around 420 million people (WHO 2014)
- Gastro-Esophageal Reflux Disease GERD prevalence estimates was 18.1%-27.8% in North America, 8.8%-25.9% in Europe, 2.5%-7.8% in East Asia, 8.7%-33.1% in the Middle East, 11.6% in Australia and 23.0% in South America (El-Serag HB, Sweet S, Winchester CC, Dent J (2013), [Gut](#). 2014 Jun;63(6):871-80. doi: 10.1136/gutjnl-2012-304269. Epub 2013 Jul 13
- Plus Cancer, Mental Health, Dementia, MS, etc

Towards a global 5GHC test bed...

- International Testbeds (Europe – US, Europe China) – potentially supported by industry and national / European funding
- Hospital@Home, Virtualised Rehabilitation, Smart Pharmaceuticals (LPWA), Chronic Disease Support (Algorithms), Real time assessment (LPWA)
- Topics
 - SDN, NFV
 - Multi-domain orchestration to satisfy the needs of pharmaceutical industry and device manufacturers
 - Low latency for remote assisted surgery and social robotics (end-to-end less than 200ms)
 - Network slicing and multi-tenancy
 - EC GDPR application and health specific standard compliance (ISO 80001, ISO 27000, ISO-IEEE 11073, IEEE 802.15.6, etc)



Thank you for your attention from Helios Klinik, Duisburg, Germany!
Have a great day in Toronto