DEPARTMENT OF CLINICAL RESEARCH
UNIVERSITY OF SOUTHERN DENMARK

DEPT. OF GERIATRICS
ODENSE UNIVERSITY HOSPITAL

e-Health across health care sectors

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Clinical Professor, University of Southern Denmark

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Digital health

~~e-Health~~ across health care sectors

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Acknowledgement and Information

All icons used in this presentation have been designed by Freepik

The speaker is a geriatrician and the presentation is therefore focused on the use of digital health in older adults

eHealth vs Digital Health

eHealth: “The use of information and communication technology in support of health and health-related fields”

- mHealth: ”The use of mobile wireless technologies for health”

Digital health: a broad umbrella term encompassing

- eHealth
  - mHealth
- ”The use of advanced computing sciences in ‘Big Data’, genomics and artificial intelligence”

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A little bit of history

1998

The World Health Organization in **1998** recognized the increasing importance of the Internet and its potential to impact health through the advertising and promotion of medical products, border advertising medical products

2005

The World Health Assembly in **2005** recognized the potential of eHealth to strengthen health systems and improve quality, safety and access to care, and encouraged Member to incorporate eHealt and services

2013

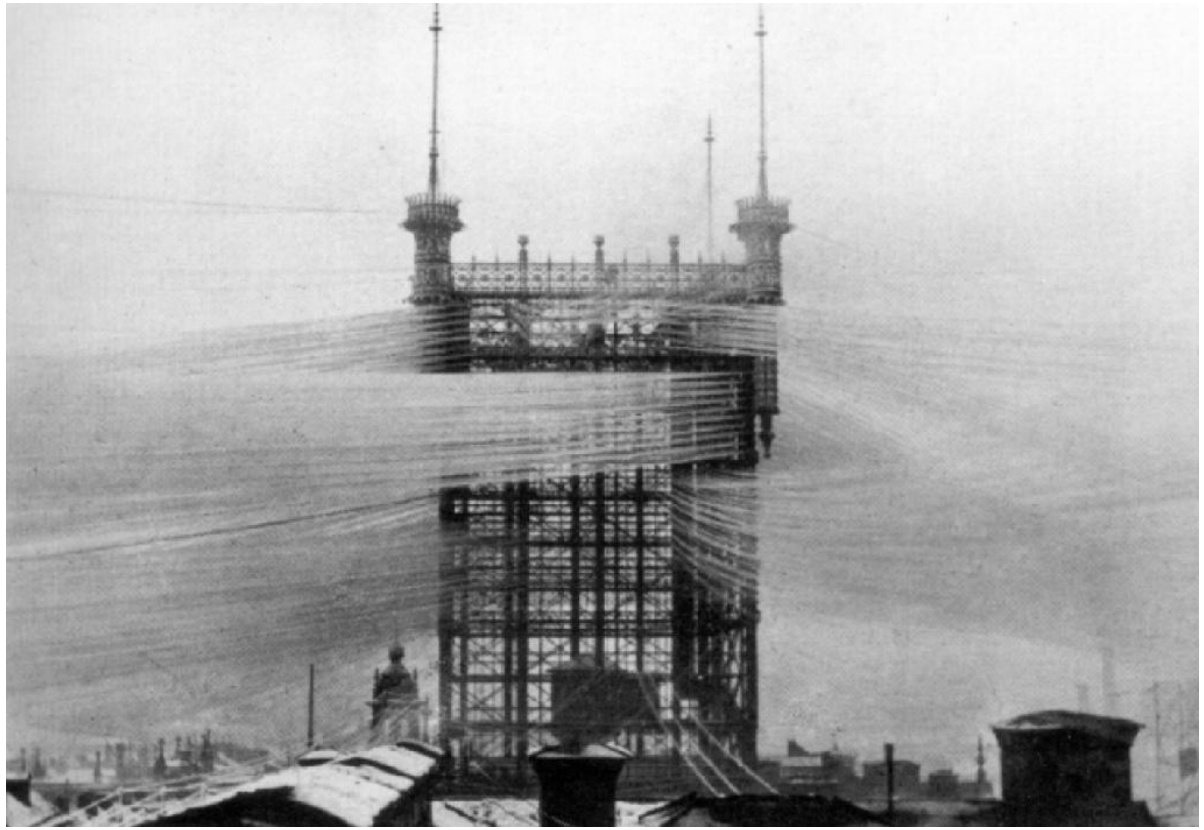
The World Health Assembly in **2013** recognized the need for health data standardization to be part of eHealth systems and services, and the importance of proper governance and operation o level Interne ".health"

2016

The Executive Board in **2016** considered "mHealth: use of mobile wireless technologies for public health," reflecting the increasing importance of this resource for health services delivery and public health, given their ease of use, broad reach and wide acceptance. "mHealth" or mobile health has been shown to increase access to health information, services and skills, as well as promote positive changes in health behaviours and manage diseases.

http://www.who.int/ehealth/about/en/

Stockholm Telephone Tower 1887



Smartphones 2019

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Ward rounds then and now (in some places)

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WHO recommendations (2018)

- Birth notification via mobile devices
- Death notification via mobile devices
- Stock notification and commodity management via mobile devices
- Client'-to-provider telemedicine
- Provider-to-provider telemedicine
- Targeted client communication via mobile devices
- Health worker decision support via mobile devices
- Digital tracking of clients' health status and services combined with decision support
- Digital tracking combined with a) decision supprt and b) targeted client communication
- Digital provision of training and educational content to health workers via mobile devices/mobile learning (mLearning)

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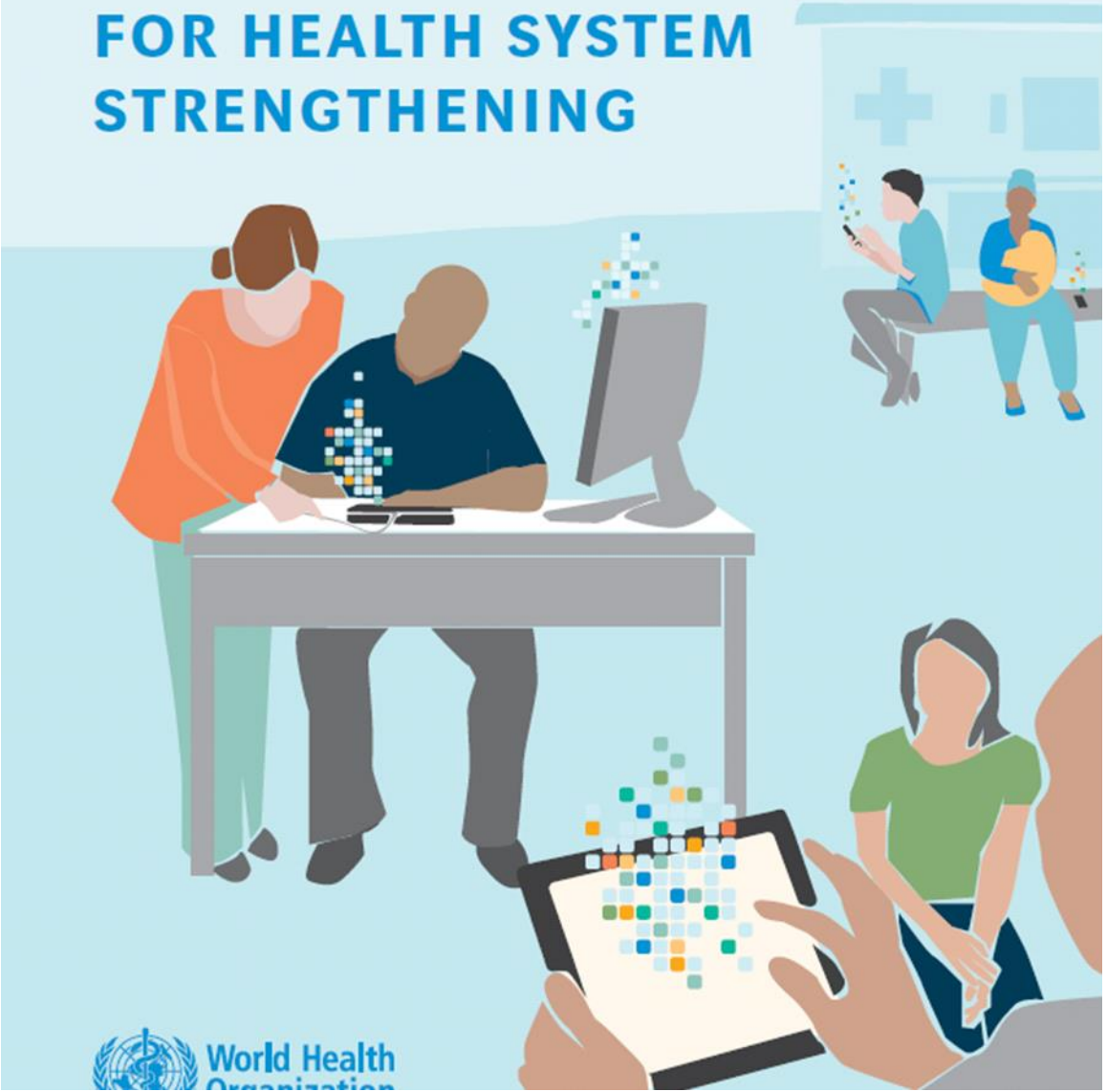
https://apps.who.int/iris/bitstream/handle/10665/311941/9789241550505-eng.pdf?ua=1

WHO GUIDELINE

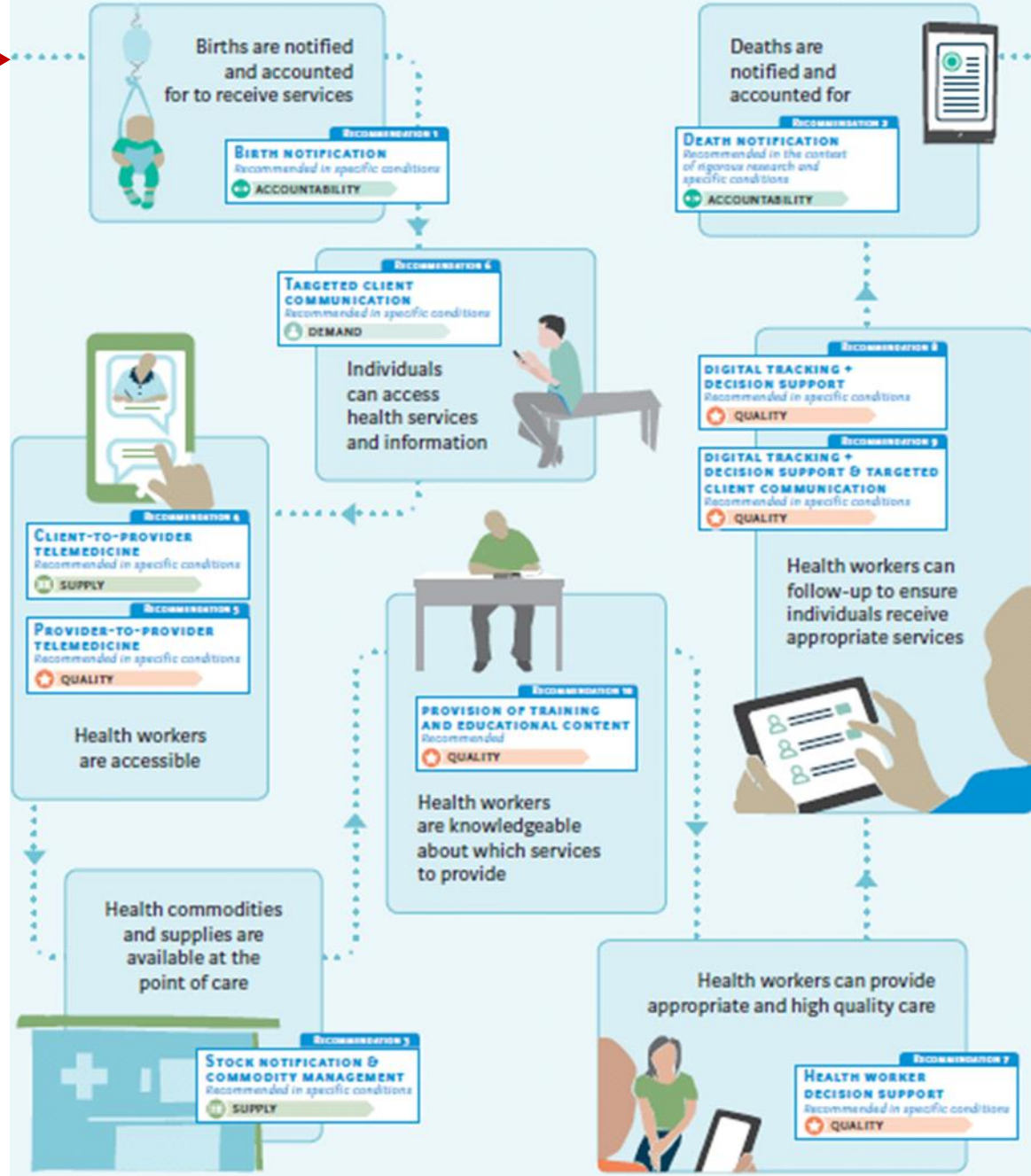
RECOMMENDATIONS ON DIGITAL INTERVENTIONS FOR HEALTH SYSTEM STRENGTHENING



World Health Organization

From craddle to grave

FIGURE 4 LINKAGES OF THE RECOMMENDATIONS ACROSS THE HEALTH SYSTEM



WHO recommendations (2018)

- Birth notification via mobile devices
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WHO recommendations:

- Health worker decision support via mobile devices
- Digital tracking of clients' health status and services combined with decision support
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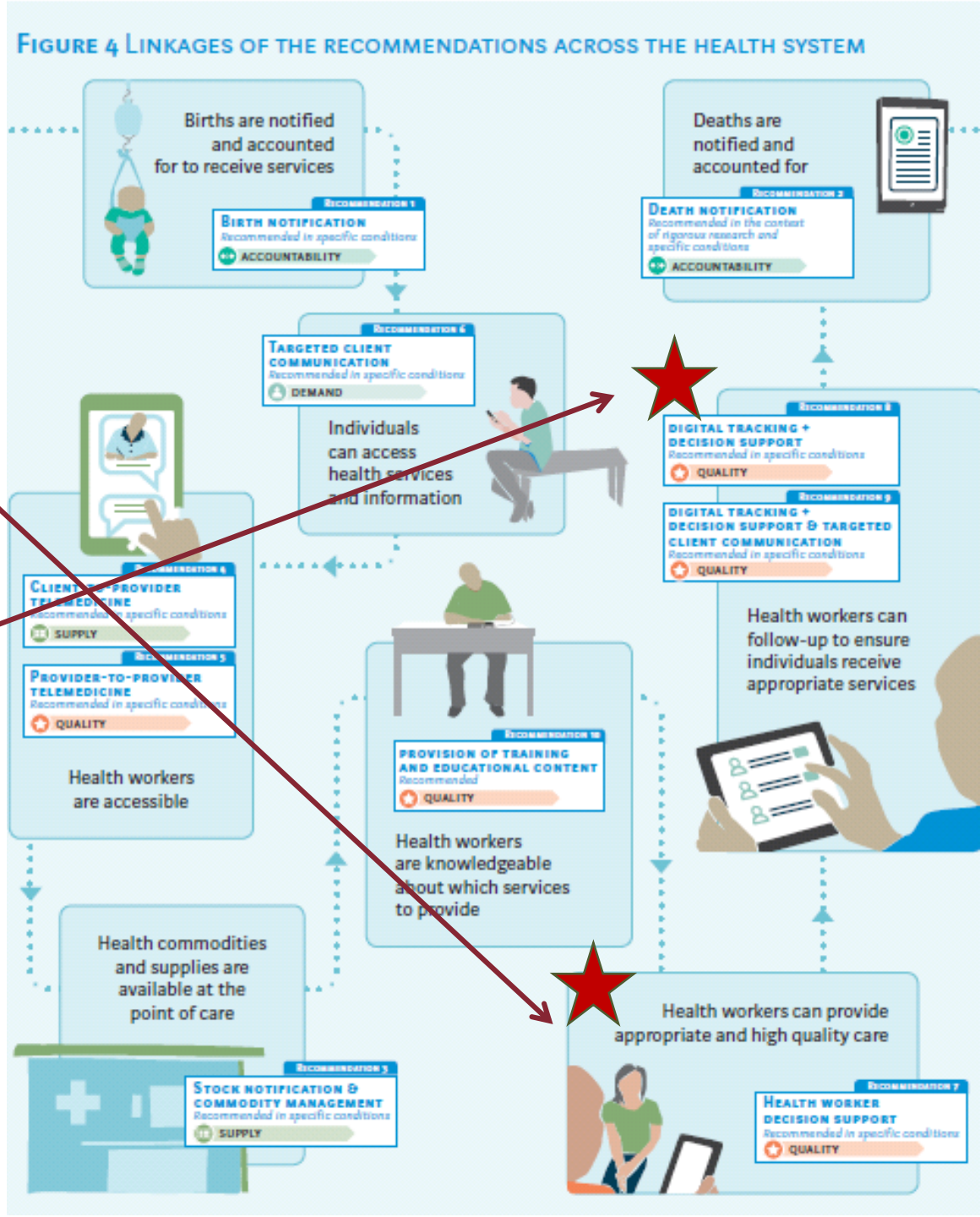
No mentioning of Digital Health across health care sectors !



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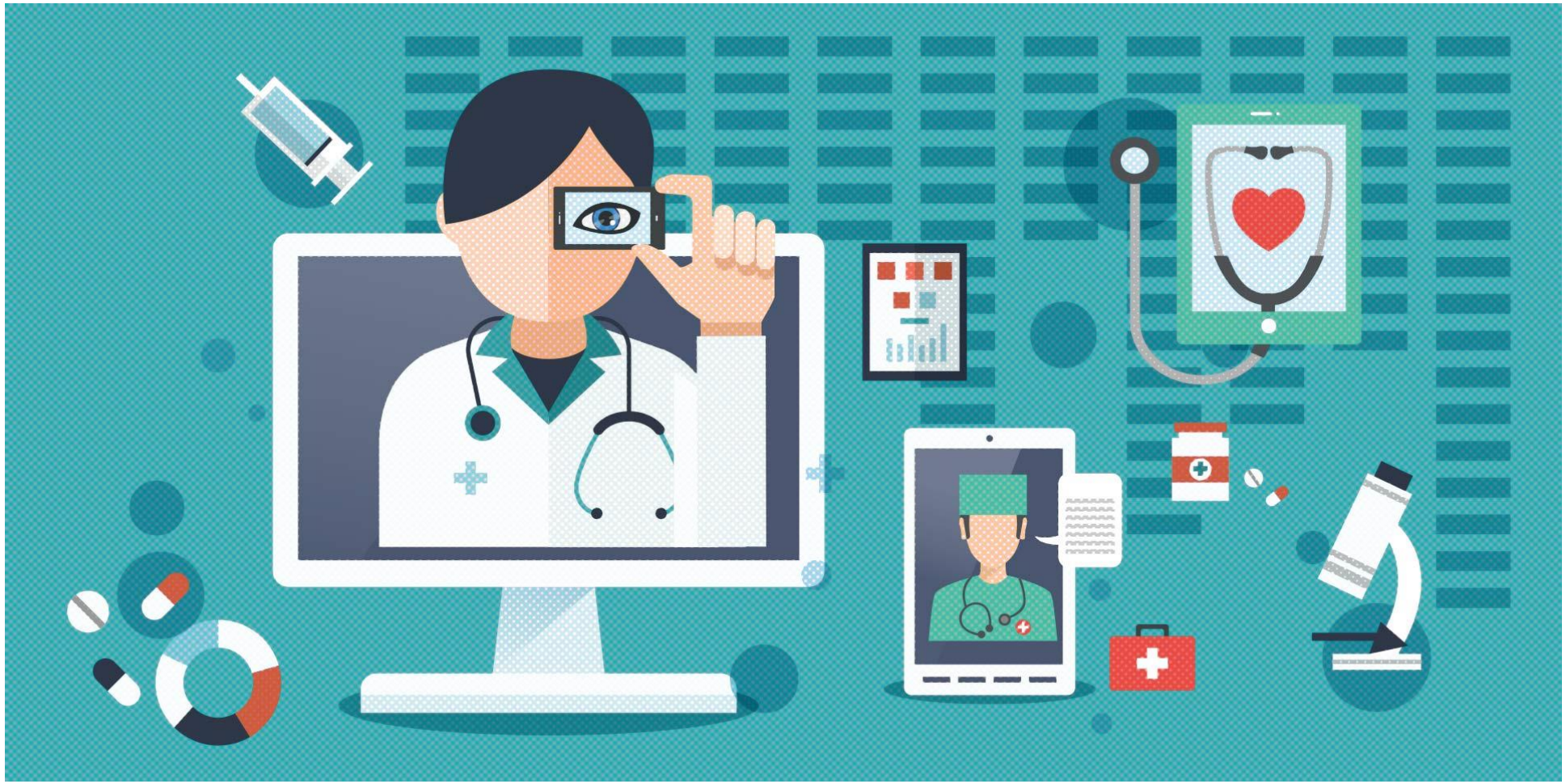
Why digital health ?



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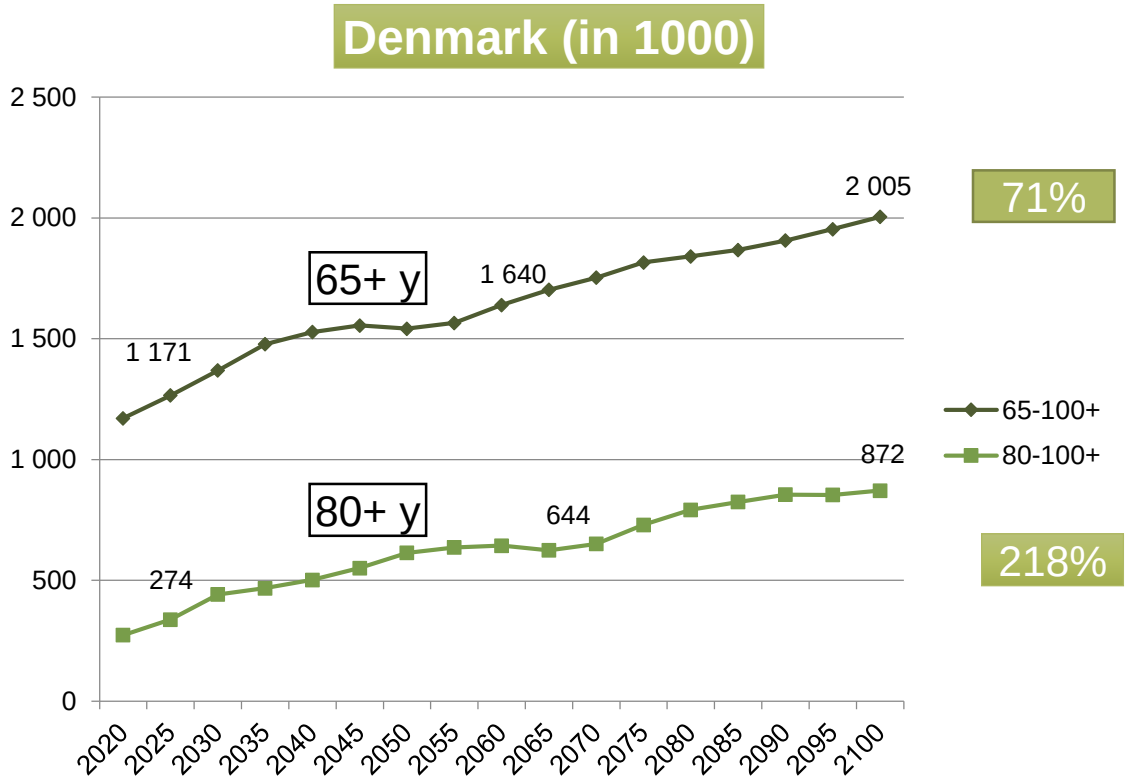
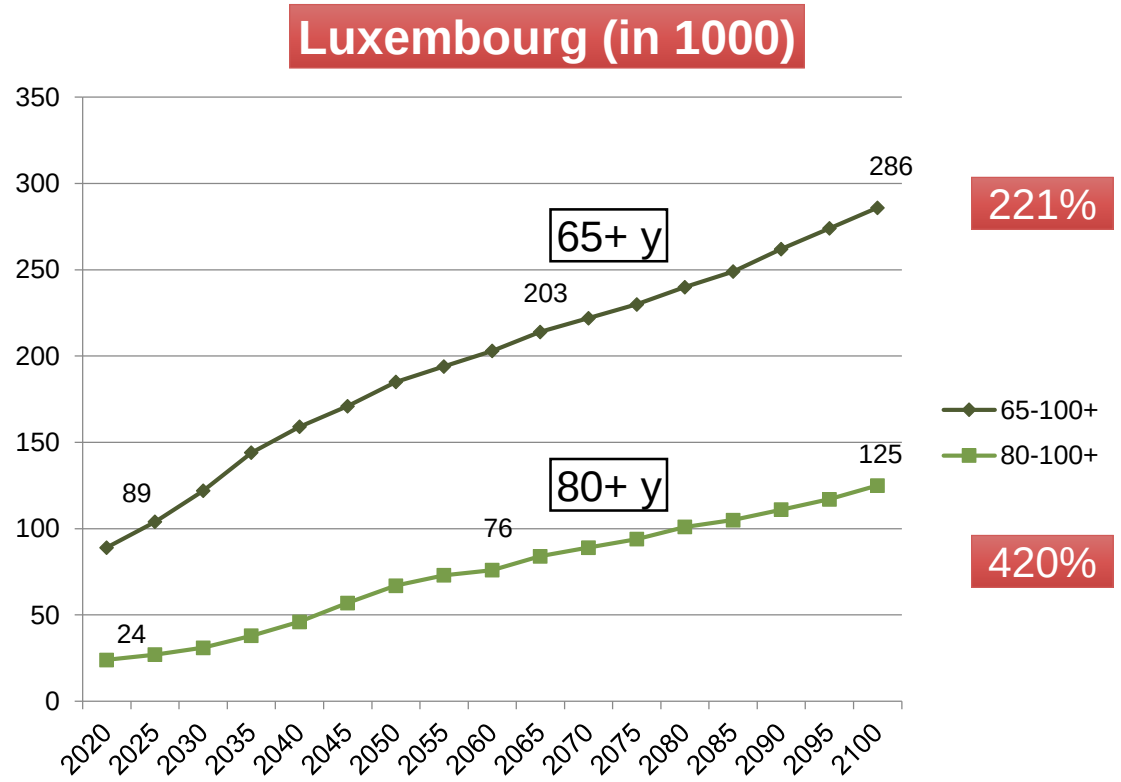
Population forecasts 65+ and 80+ year olds





UN Population Forecasts:
https://esa.un.org/unpd/wpp/

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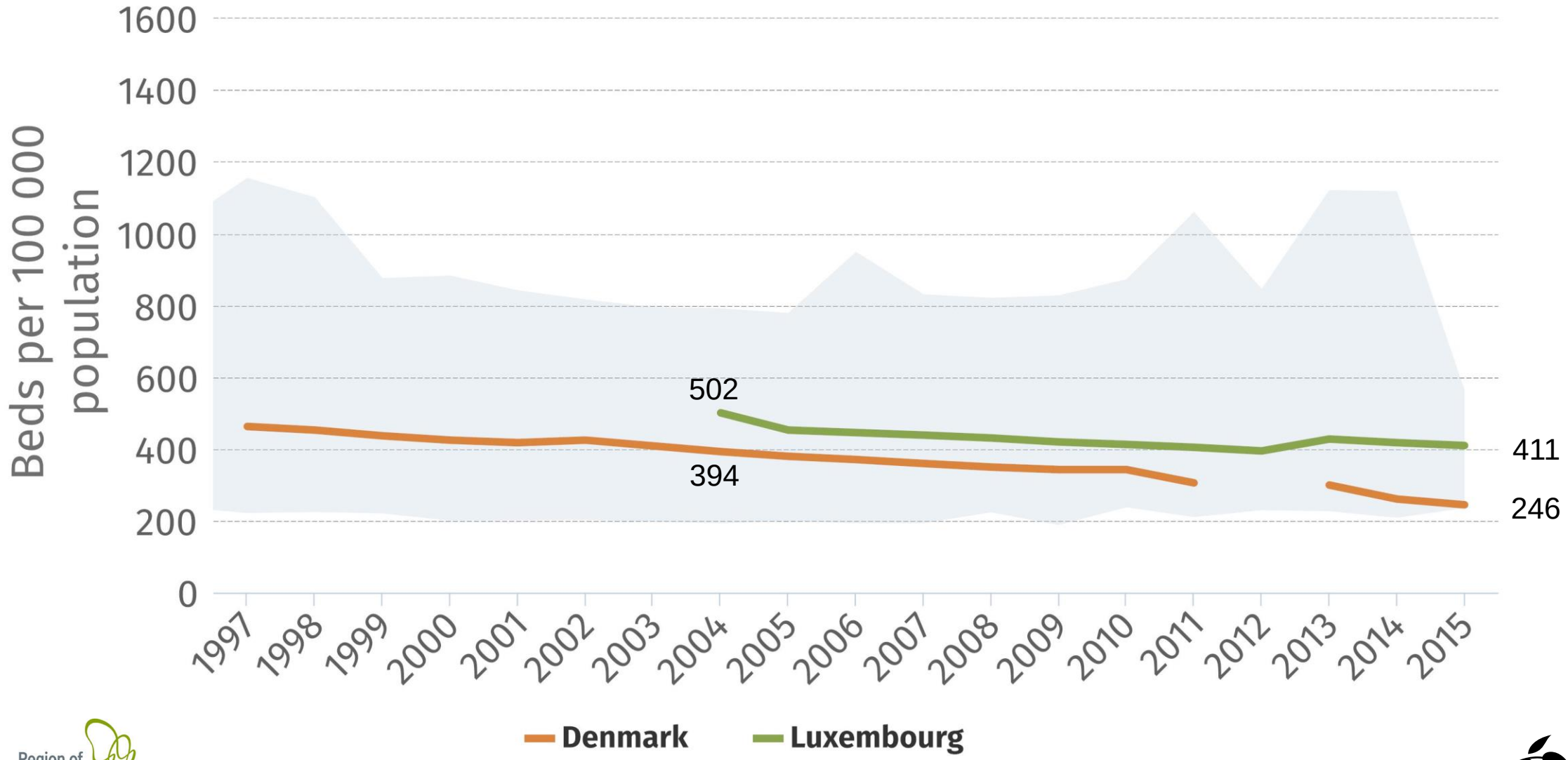
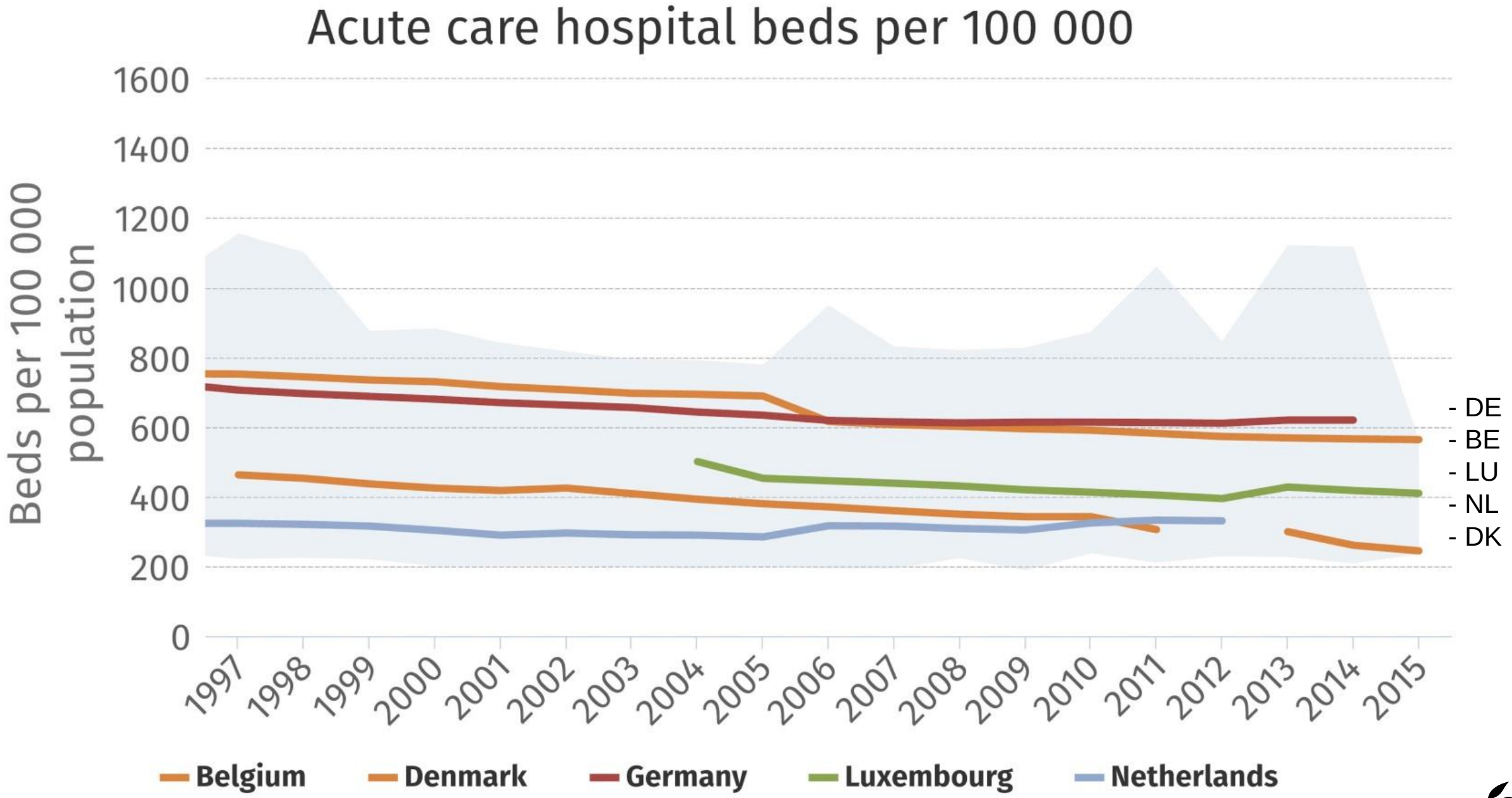
Acute care hospital beds per 100 000



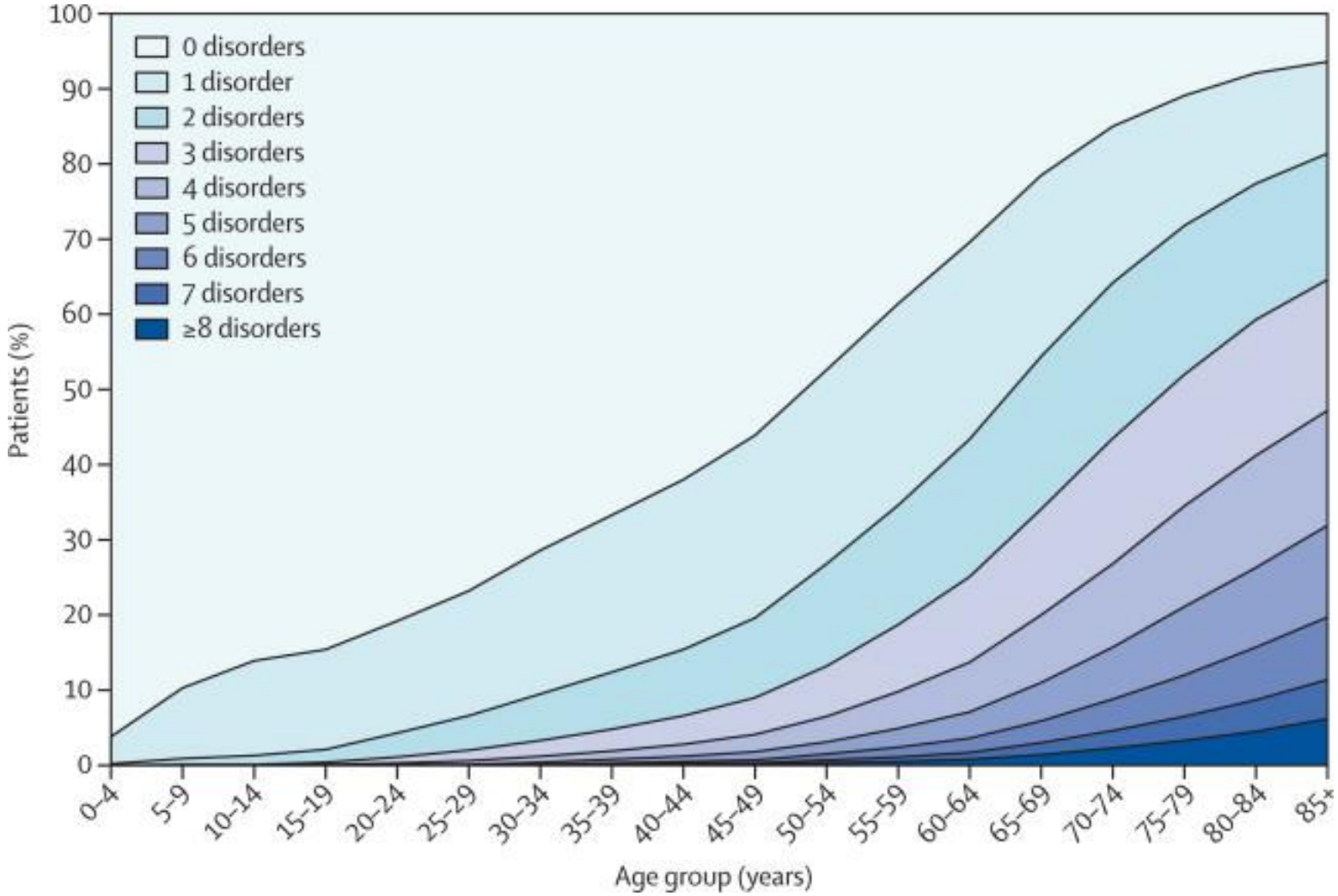
* The Republic of Macedonia (MKD is an abbreviation by the International Organization for Standardization (ISO))

https://gateway.euro.who.int/en/indicators/hfa_478-5060-acute-care-hospital-beds-per-100-000/



https://gateway.euro.who.int/en/indicators/hfa_478-5060-acute-care-hospital-beds-per-100-000/

Multimorbidity increases with age



Barnett et al. Lancet, 2012.
http://dx.doi.org/10.1016/S0140-6736(12)60240-2

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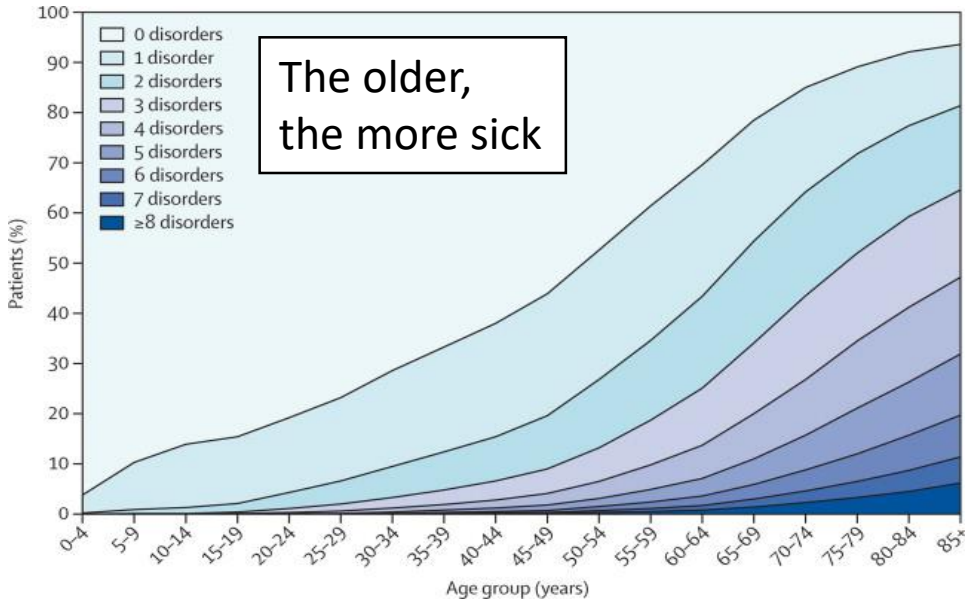
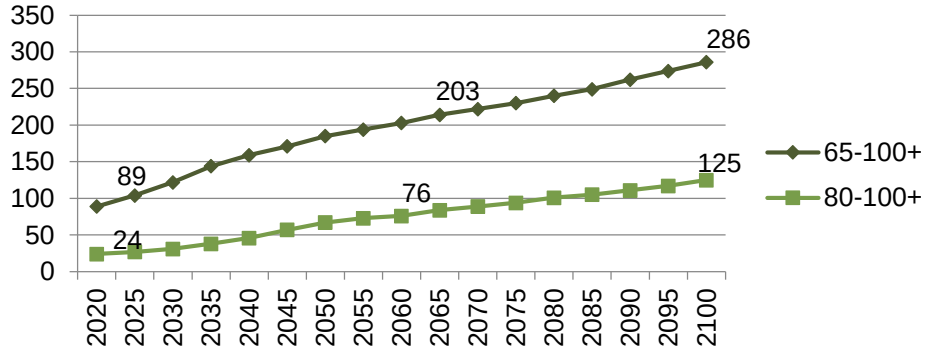
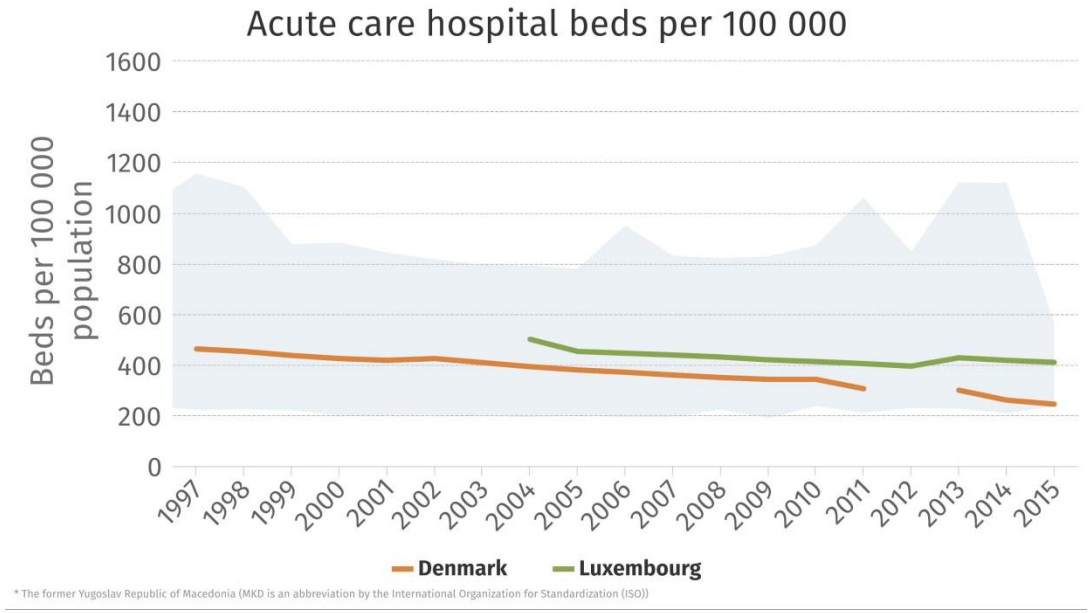
How are we going to manage in the future?



Luxembourg (in 1000)





⬇ 20%
2030

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The challenges of ageing

Society

- Lower fertility
  - → ageing populations
  - → fewer in the workforce
- Improved survival of older adults
  - increasing number of oldest old
- Reductions of hospital beds
- Fewer health professionals

Individual

Frail older people have

- Atypical/vague disease symptoms
- Multimorbidity
- Increased risk of
  - acute hospitalisation
  - hospital-acquired infections
  - functional loss and death

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When frail older people get sick (1)

Individual

- Atypical/vague disease symptoms
- Multimorbidity
- Increased risk of
  - acute hospitalisation
  - hospital-acquired infections
  - functional loss and death

→

- Subtle and inadequate information on symptoms
- Delayed recognition of emerging acute disease
- Is it an exacerbation of existing disease or a ‘new’ disease?
- Are we less aggressive in our approach towards older adults? (Ageism!)

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When frail older people get sick (2)

Individual

- Atypical/vague disease symptoms
- Multimorbidity
- Increased risk of
  - acute hospitalisation
  - hospital-acquired infections
  - functional loss and death

→

- Domino effect: acute disease triggers acute exacerbation of chronic diseases

Credit: Lenslife - Fotolia

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When frail older people get sick (3)

Individual

- Atypical/vague disease symptoms
- Multimorbidity
- Increased risk of
  - acute hospitalisation
  - hospital-acquired infections (HAI)
  - functional loss and death

- Older people have a less efficient immune system
- Acute disease + Hospitalisation ➔ Environmental stress ➔ Delirium
- HAI leads to increased LOS and loss of functions
- Increased need for (home) care after discharge

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The usual pathway when an older person gets ill……

Older patient

Primary Care Physician and allied health professionals

Hospital

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The usual pathway when an older person gets ill…… and their numbers in the future

Older patient

Primary Care Physician and allied health professionals

Hospital

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A health care system in silos…..

Secondary care

Patient

Home care

GP

Primary and Tertiary care

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Denmark and Luxembourg – Different health care systems

Denmark

- Beveridge system
  - health care is provided and financed by the government through tax payments
  - = the police force
  - = the public schools
  - No co-payment

Luxembourg

- Bismarck system
  - Insurance system “sickness funds”
  - Financed jointly by employers and employees through payroll deduction
  - Large reimbursements
  - Co-payment

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Health Care in Denmark

Secondary care

Citizens
Tax payers

Home care

GP

Primary and Tertiary care

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Tax funded health care in Denmark

Secondary care

Citizens
Tax payers

Municipal taxes

Home care

GP

Primary and Tertiary care

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Tax funded health care in Denmark

Governmental taxes

Municipal taxes

Home care

Citizens
Tax payers

GP

Governmental taxes

Secondary care

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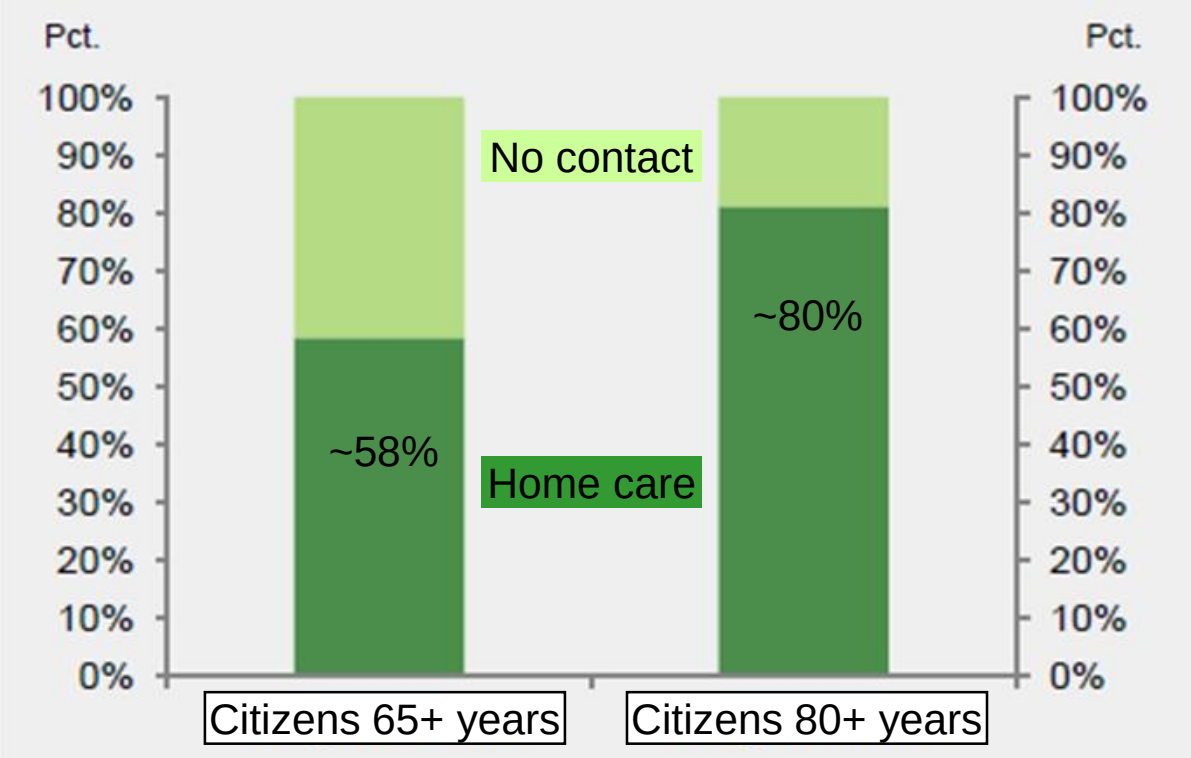
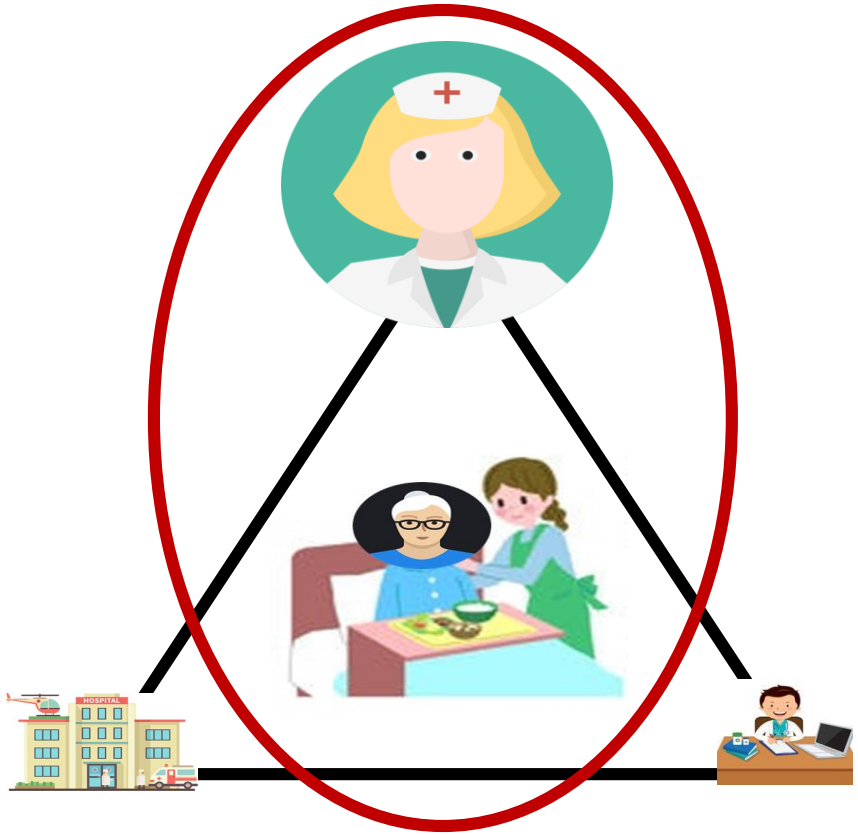
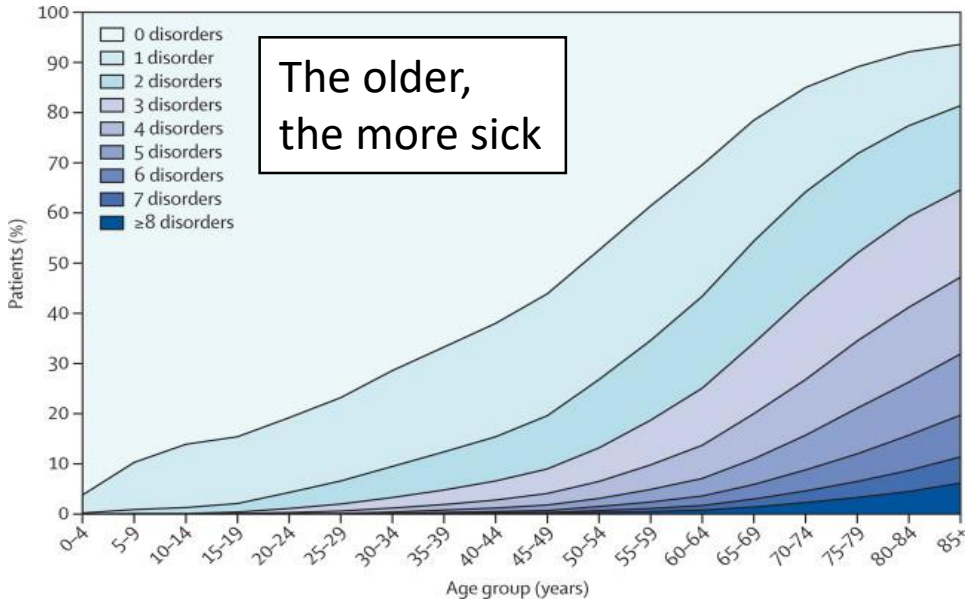
The most frail receives home care

Acutely admitted citizens receiving home care

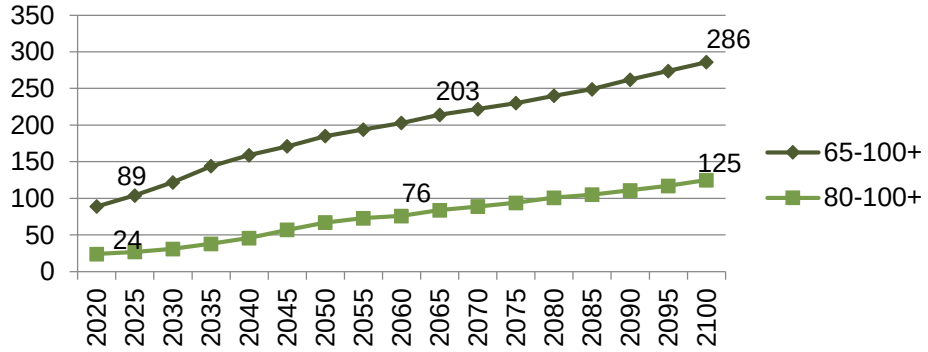


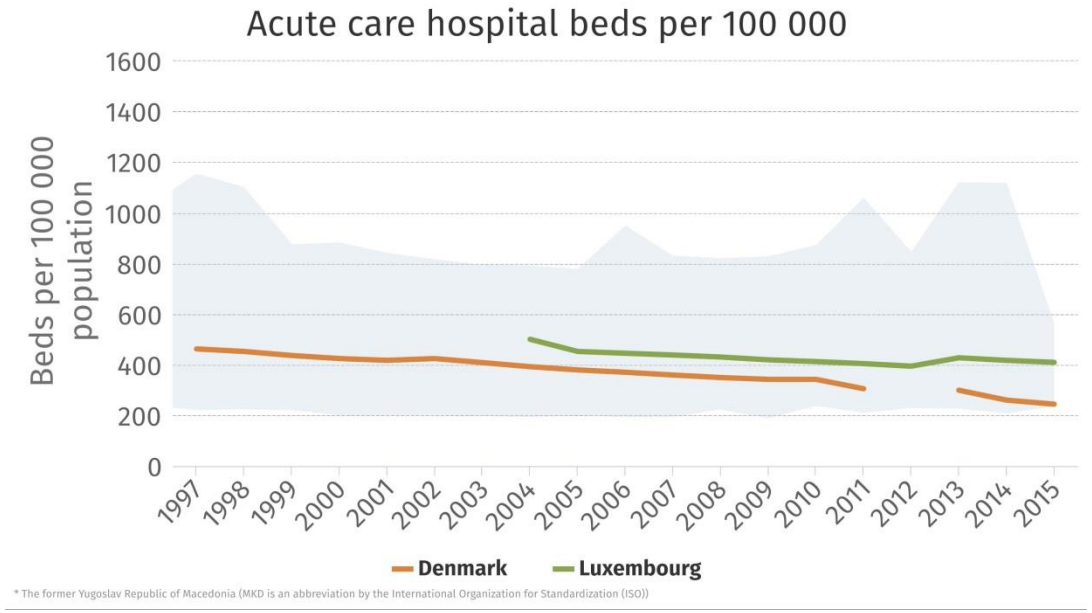


Remember!



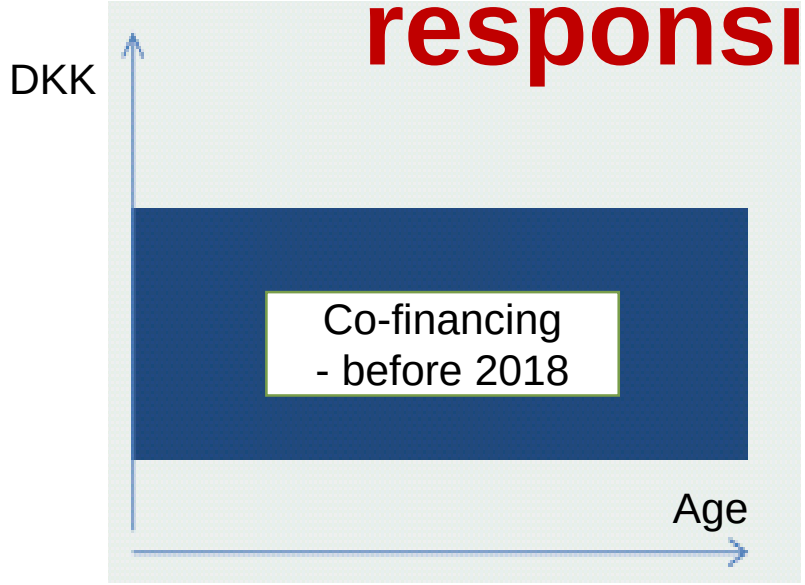
Luxembourg (in 1000)



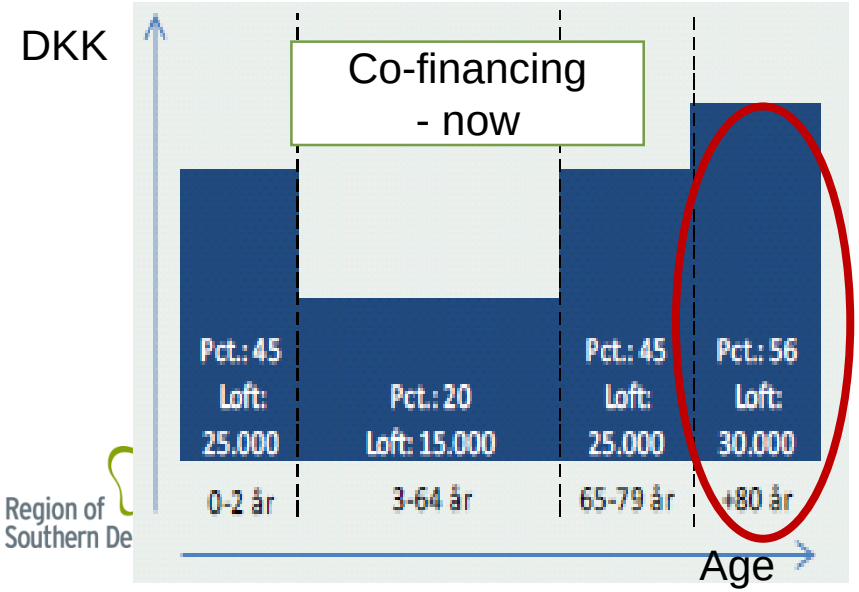


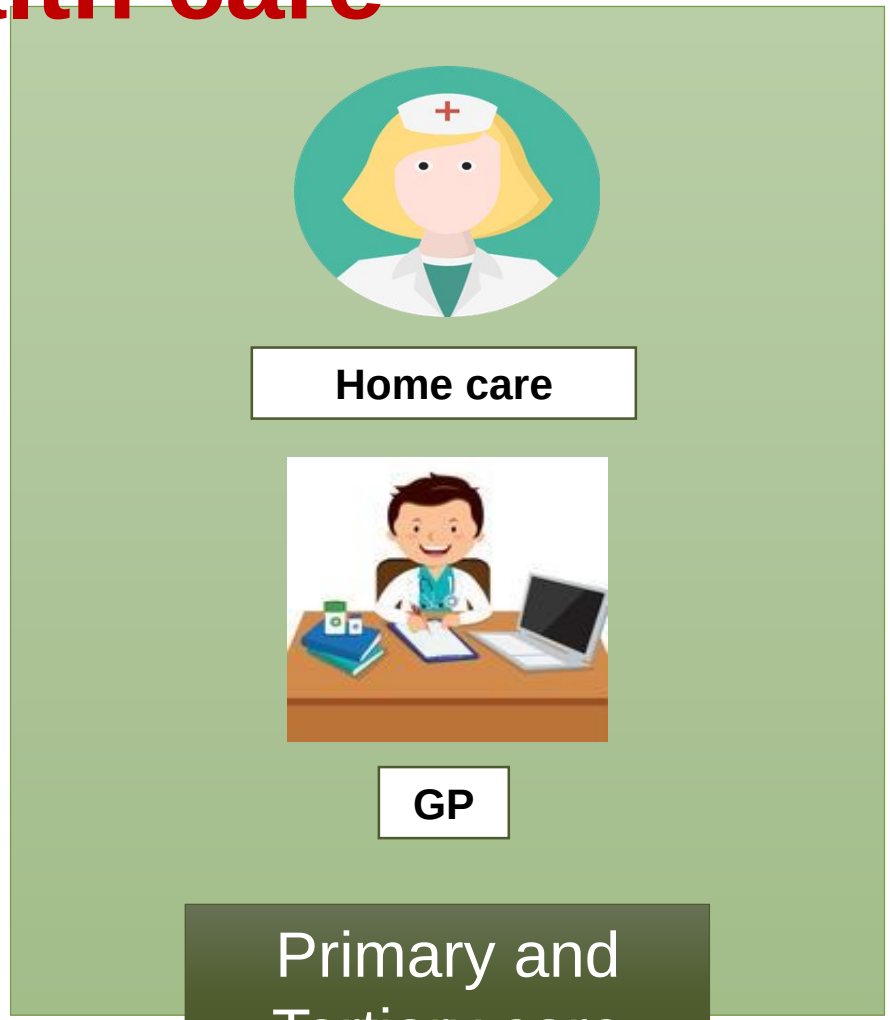
⬇ 20%
2030

Governmental incentive to increase municipal responsibility in health care



Patient





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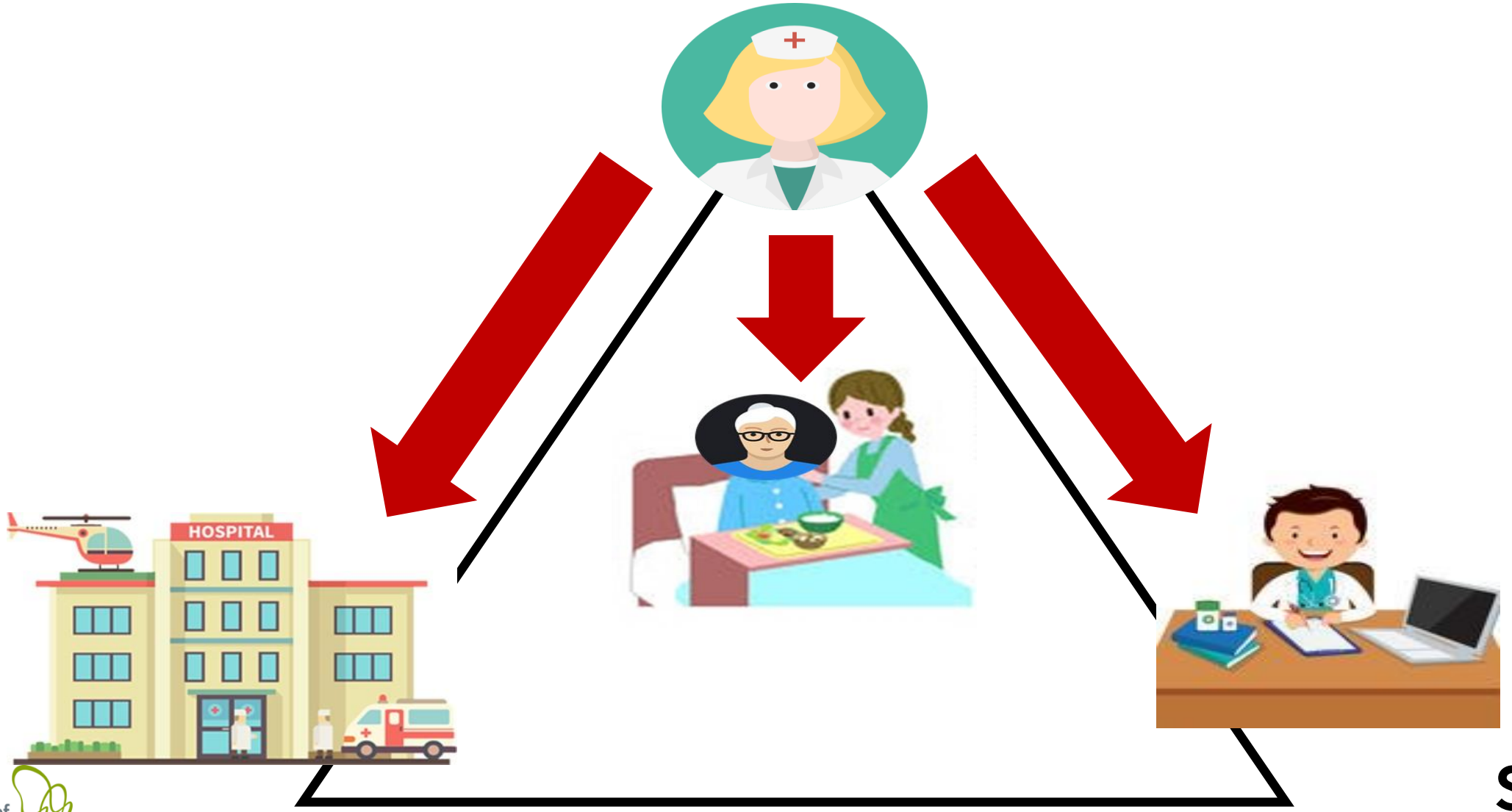
ACUTE home care nurses = FRONTLINE officers



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”Frontline Officers”
Acute home care nurses

- Early identification of ”something is wrong”
- Collaborate closely with the ‘basic’ home carers
- Carry out in-home advanced objective clinical health assessments
- Trained to use portable clinical assessment tools
- Monitor patients (Hospital@home)

ACUTE home care nurses = FRONTLINE officers

In collaboration with hospital
- Secondary prevention
- Hospital@home
- “Intensive” treatment

In collaboration with PrimCarePhys
- Primary prevention
- Early diagnostics
- Earlier treatment
- monitoring @home

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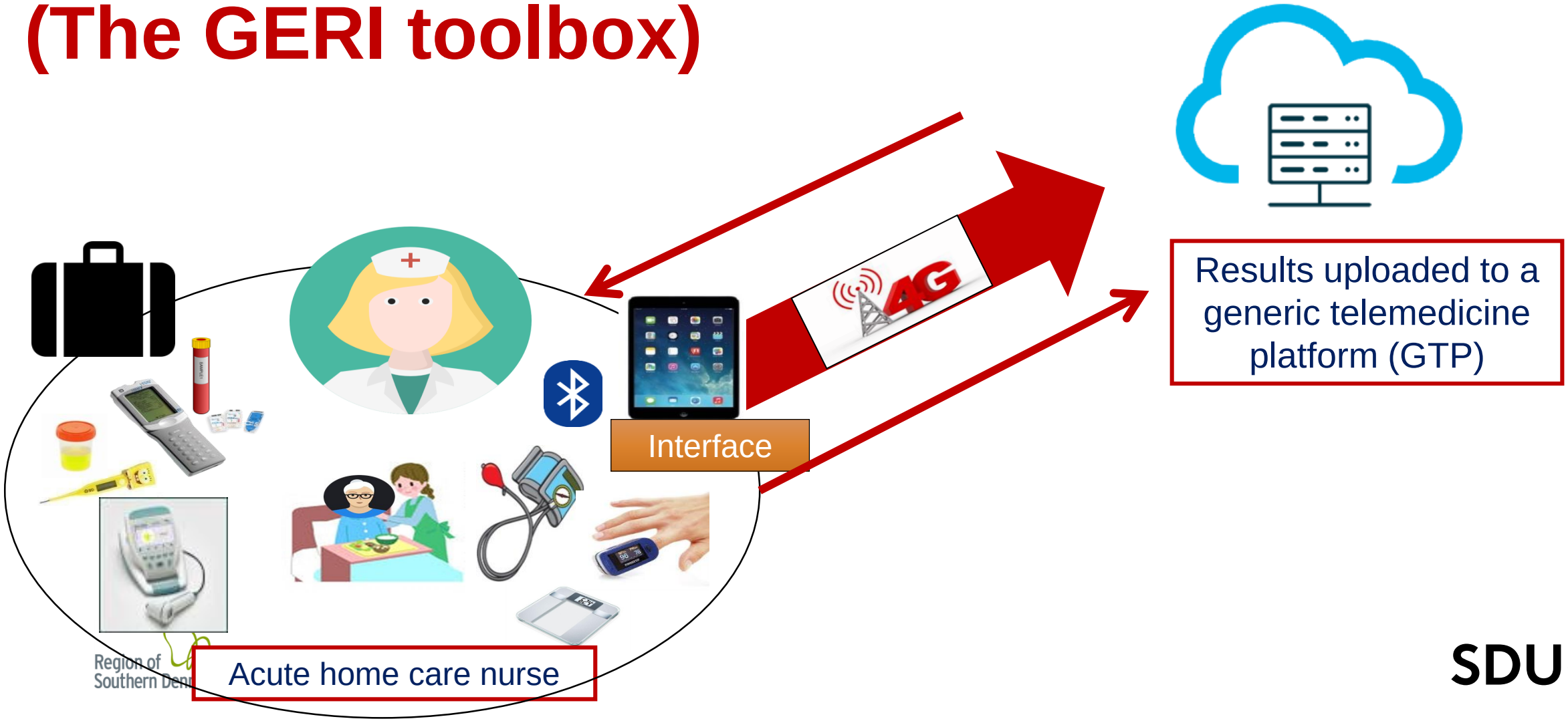
IT-supported clinical objective measurements by Point Of Care Testing (The GERI toolbox)



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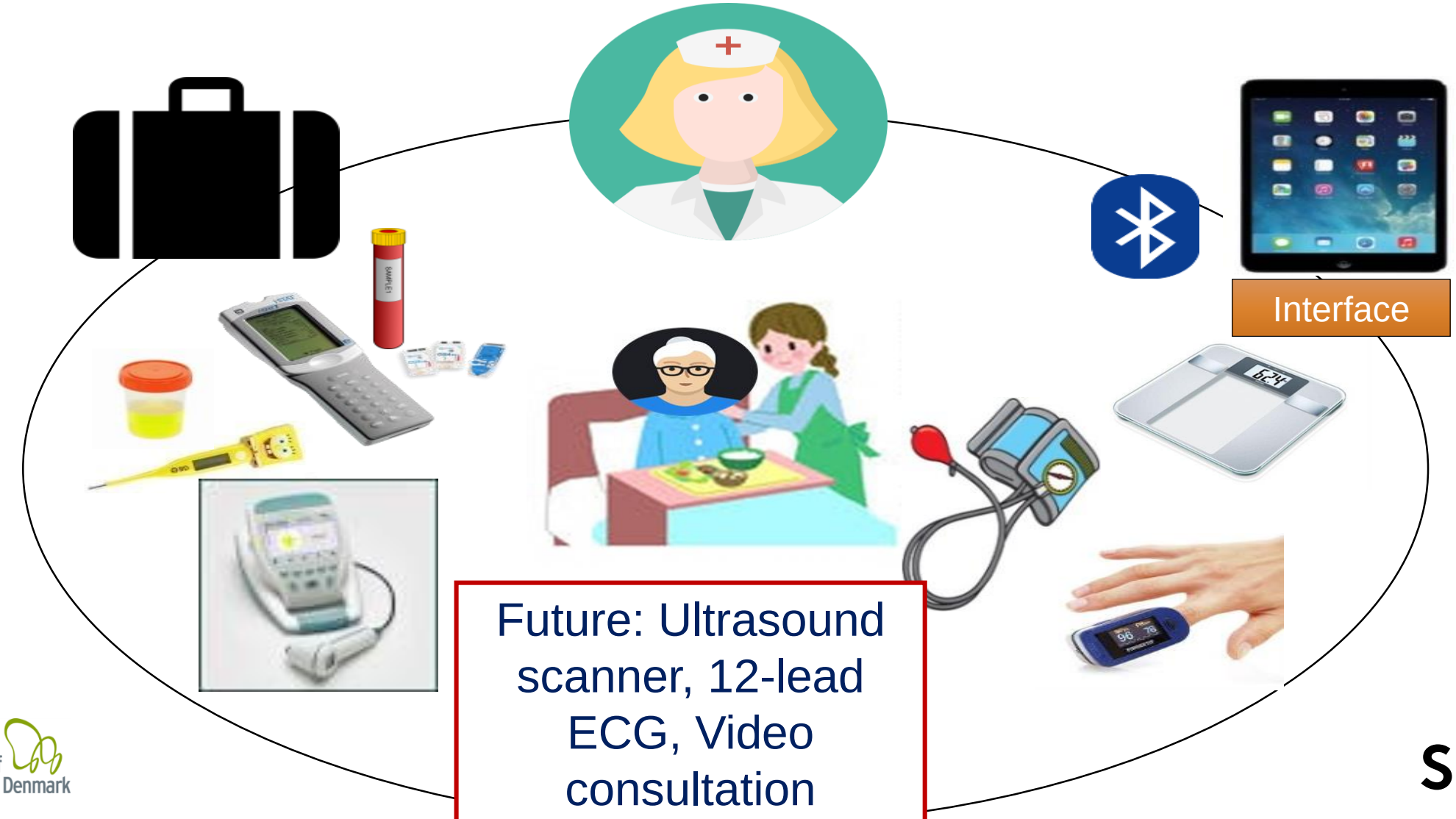
The GERI Toolbox



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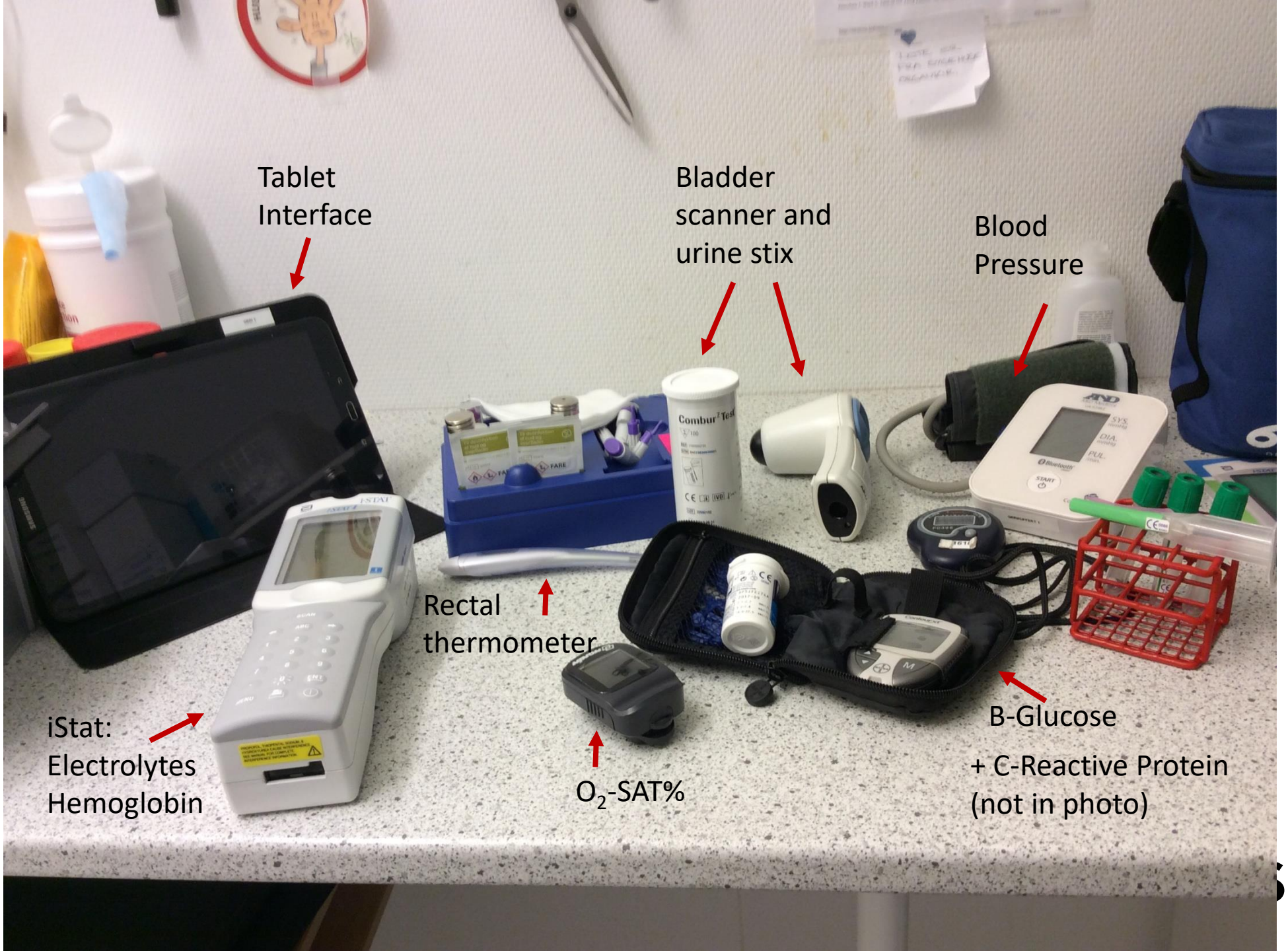

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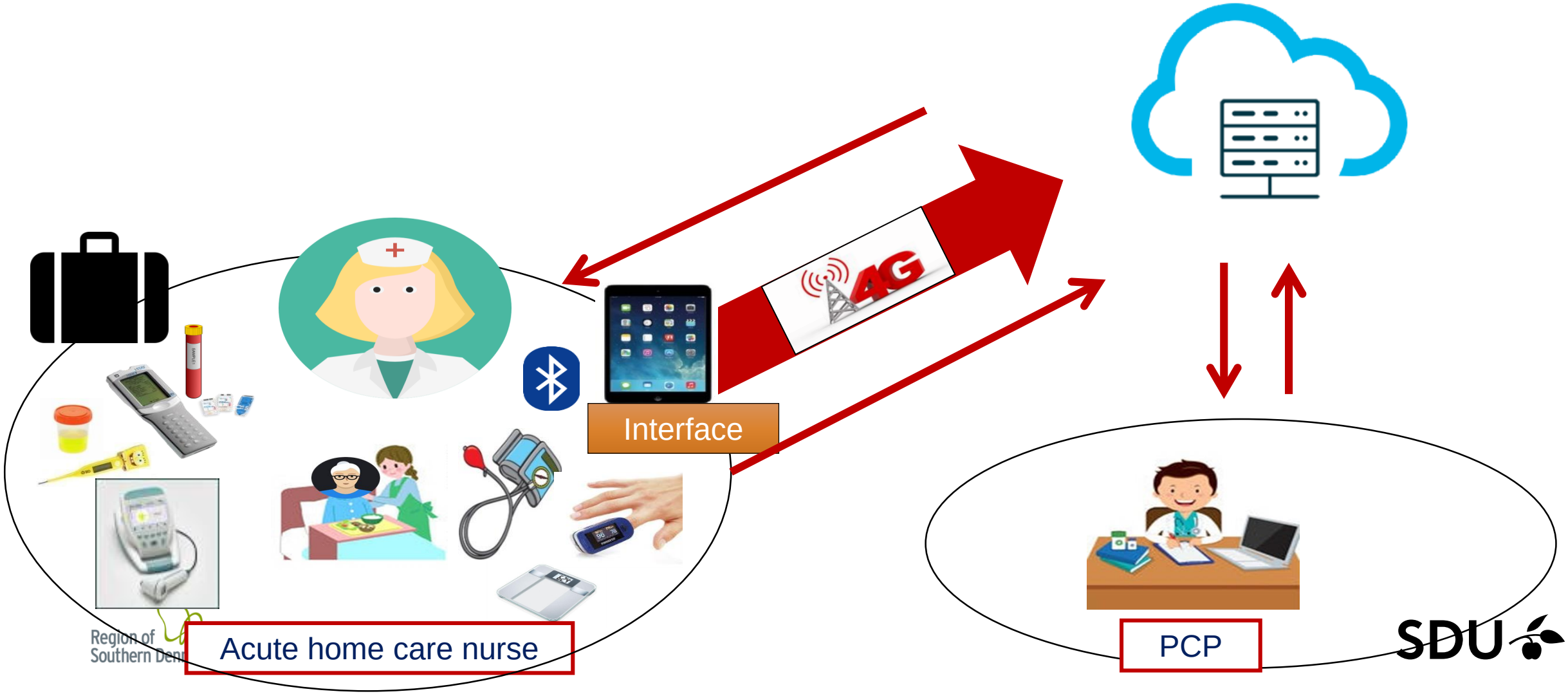
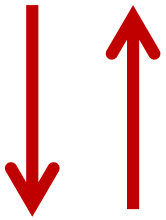
e-Communication to the Primary Care Physician (PCP)



Fast-track to Geriatric outpatient clinic

Fast-track geriatric consultation

Interface



PCP

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Acute home care nurse

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What is in the “sky”?

- Short information from the acute home care nurse regarding the patient
- Instructions on treatment and surveillance from treating physicians
- Vital status parameters
- Results of blood biochemistry – also previous
- Real time communication

How to increase efficiency without loosing quality of care?

- Increasing cross-sectorial communication
  - Rapid access to…..
- Increasing know-how at all levels and using home care nurses as frontline officers
  - Education, education, education…..
- Introducing acute in-home assessment by trained home care nurses
  - Vital status and Bed-side biochemistry
- Introducing digital health
  - Digital communication with PCP and/or hospital
  - “Your doctor will see you in a minute!” – Video consultation
  - In-home monitoring

Possibilities

- e-Technology exists
  - Cloud-based technology and e-Health platforms
  - Wireless technologies
  - Portable health care devices
- Prevention and early diagnosis
- Monitoring of disease treatment
- Supporting Hospital@home
- Comforting to patients and relatives
- Sharing eHealth record with patient (and relatives)
- Older patients are very positive

Challenges

- Deployment of IT communication
  - Private vs. public sector / different systems vs. one system
  - Private primary care physicians or specialist physicians
- Lack of home care support 24/7
- Education and upgrade of staff
- Education of patients in self-monitoring
- Access to mobile network (4G and above)
- Portable bedside clinical tools lacking
- Objections to in-home intensive care
- …….. and many other things….

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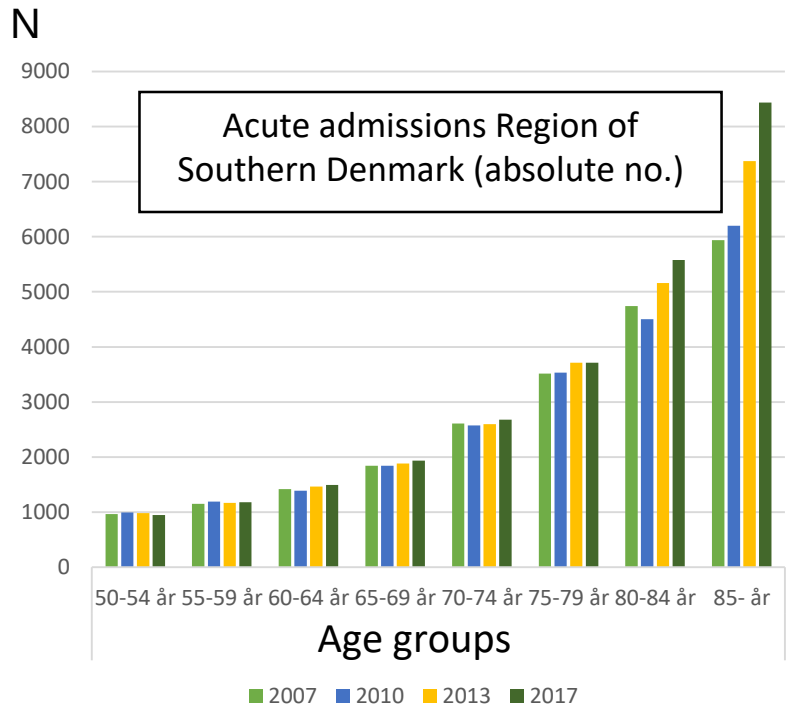
Another type of cross-sectorial collaboration:

Big Data to prevent acute hospitalisation of older adults

The Buzzword: preventable admission!

- Can acute admissions be prevented?
- Who are the acute older patients?
- Any detectable characteristics?



Increasing No. of acute admissions

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Big data: identifying older frail patients at risk of health deterioration and acute hospitalisation

Combining public data-sets at the individual level through a personal ID code:

<u>Municipal data</u>

- **Home care use (minutes/week)**
- Assessment scores and symptom registration from GERI toolbox (e.g. ADL, vital status, falls)

<u>Governmental data</u>

- **No. PCP contacts**
- New medication/medication list

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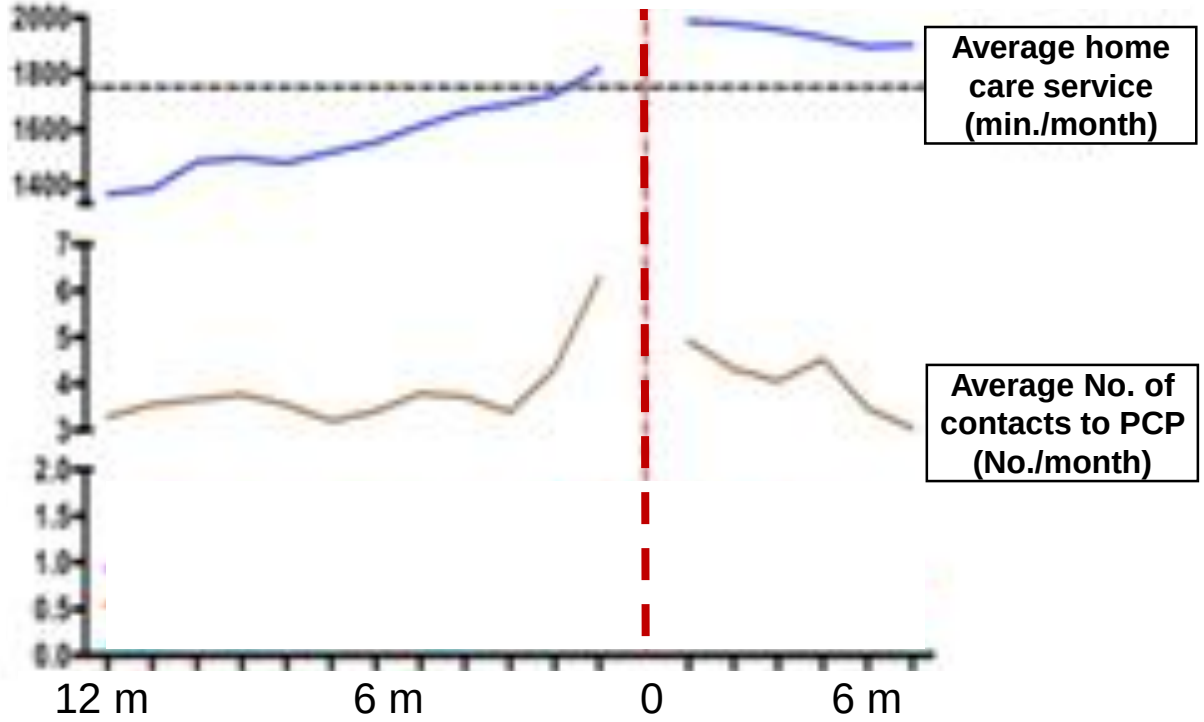
Increase in health care use prior to acute admission: Using Big Data!

Acute short-term (48h) hospital admission (70+ y) (N=157)

Average use of **home care** (minutes/per patient/per month)

Average use of **prim.care.phys** (counts/per patient/per month)



33 % increase in community care in the previous 12 months

79 % increase in GP contacts in the previous 3 months

Fournaise et al. EurGeriatrMed 2017
https://doi.org/10.1016/j.eurger.2017.07.018

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Cracking the code – current and future work

- In collaboration with IT-engineers
  - developing an algorithm based health administrative data
  - ongoing testing and adjustment of the algorithm (Svendborg Municipality)
- Pilot study: assessment using the GERI-toolbox on flagged citizens
- Future study: including clinical data from the GERI-toolbox

- **Can we identify citizens at risk correctly?**
- **Can we prevent acute admission by early identification and timely action?**

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To wrap up

Digital Health is here!
– we have to embrace it to meet the challenges of the future!

What is developed for older adults can easily be used in younger too,
- but not always the other way round!