On Clinical, Philosophical, Ethical and Behavioural Concepts for Personalised *Insilico* Medicine Supporting “Co-production of Health”

*or less complicated expressed:*

**Beyond Telemedicine – Taking Advantage of the Distance to Hospital**

Niels Boye, MD
Since care was part of the Church's business model - it has been something that

"we give to each other in Europe"

A societal task - but "tendered out" in different organisational models in different countries
Complicated organisational and financial systems are built to ensure:

- high professional standards,
- equal access to healthcare,
- an effective isolation of the patients from the true costs of healthcare, and
- a cost-effective operation of each link in the chain of a healthcare process (health service-supply chain)
Health challenges on all levels are the same all over Europe, and the methods for neutralising them are also similar – only organisational settings differs
WHO Definition of Health (1948):

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity.
Generic Components in Health(-care) Supply

Team work

Knowledge

Manual work

Technology
Knowledge

In the industrial society "knowledge was power"

In the digital society information - the raw material for knowledge - is a shared resource.

“POWER” nowadays is the abilities to compile and upgrade information to knowledge and make this knowledge operational with an impact in your own context
The specific knowledge to be operationalised in self-care

- Citizen Modifiable Risk Factors
  - Tobacco smoking
  - Alcohol consumption
  - Diet
  - Physical inactivity
  - Obesity

- Non-Modifiable Risk Factors
  - Accidents
  - Working environment
  - Environmental factors
  - Family history and gender

- Conditions
  - Type 2-diabetes
  - Preventable cancer
  - Cardiovascular disease
  - Osteoporosis
  - Musculoskeletal disorders
  - Hypersensitivity disorders
  - Mental disorders
  - Chronic obstructive pulmonary disease
Healthcare view

Single disease
Co-morbidity

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Conditions
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Co-morbidities

Often chronic diseases appear “clustered” at a single individual - and hence “lost in translation” between professional medical specialities.

One Non-communicable Chronic Diseases (NCD) is inducing chronic malfunctions in other areas of the system biology.
The “American Way”

EHTEL symposium, Bruxelles – 30 November 2011:

Dr. Amy Compton-Phillips, Kaiser Permanente, USA:
Setting the Scene: New Care Models for Persons with Chronic Diseases
(My Suggestions) of Lessons Leaned in Europe from Integrated Care in USA

Kaiser Permanente (and others) has shown that proactive, personalised care and support to self-care is "good business", when supported by dedicated knowledge-handling ICT systems.

It is therefore failures in current business modelling and new (public) management theories to visualise the above gain in a cross-organisational (European) context.

However, the overall idea that "health is something that we give to each other" is sound since this gives possibilities to exploit "common wisdom in health" as a societal asset.

Could Europe use knowledge better as a tool in cross-organisational and cross-memberstate coordination of care?
From “Integrated Care” to “Concurrent, Coordinated Care”

Creating the

100% Citizen ↔ “Digital Health Continuum” ↔ 100% Patient
The Digital Health Continuum

Professional range: Healthcare business and ICT “as usual”.

Coproduction range: The individual is a citizen with a health problem taking advantage to the distance to a hospital using a range of services organised in a personal ecosystem.
The high-level eHealth2020 task force of the EU has compiled five levers for change of healthcare using Information and Communication Technology (ICT):

#1: My data, my decisions,
#2: Liberate the data,
#3: Connect up everything,
#4: Revolutionise health,
#5: Include everyone.
“Knowledge Commons”

Clinical encounter

EHR

Quality assurance

Data- and information flows (from ecosystem)

Digital health avatar

HMO/Region

Hospital

Healthcare

Coproduction of Health
Co-production of health

Is a digital servicemodel supporting a mature, deregulated, and digital main-stream-market for healthiness based on structured and standardised communication in (volatile) personal ecosystems. Processing of data is based on *in-silico modelling*.

Co-production of health is a parallel, complementary, augmenting, and non-competitive servicemodel to current healthcare based on the same health evidence base. When implemented, it can service coordination of cross-sectional formal care (professional range) with informal- and self-care in the co-production range.
Business logic for coproduction of health

- Insilico condition-specific model
- Knowledge abstraction layer
- Organisational abstraction
- Sponsor abstraction

Standardized communication socket
Business logic for coproduction of health

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Behavioural support modelling

Standardized communication socket
Osterwalders business model generation canvas

Customer: Citizen with a health problem
Osterwalders business model generation canvas

Value proposition: Demand-driven co-produced health
Osterwalders business model generation canvas

Customer relations: Personal ecosystem for health
Osterwalders business model generation canvas

Channels: ICT – Products and services are sold with an electronic declaration that can populate *insilico*-models
Osterwalders business model generation canvas

Revenue streams: Calculated in “health capital” and translated into knowledge economy and society values.
Health production machinery in dual mode

Coproduction of health
A parallel, augmenting, proactive, preventive and personal modality in building health capital, which can only exist in ICT-based eco-systems with support of cross-sectional and cross-organisational team-work.

Conventional healthcare and care
Overall healthcare and professionals doing “business” as usual

*However accepting*
- Diminuend organisational control (maybe also internally)
- Changed values in health management
- Renouncement of “If Not Invented Here It Will Not Work” persuasion
Mode of thinking differs......

Conventional healthcare in Europe is a limited, highly regulated, hyper-managed societal resource - requiring a controlled environment with clear boundary conditions to society to be operational and create impact.

Digital service-models as Co-production of health could be an ample, pervasive, accessible, and complementary societal resource for health in a deregulated market.
Main messages

1

2
Diseases that break the bank

"The worldwide increase of non-communicable diseases is a slow-motion disaster, ... These are the diseases that break the bank. Left unchecked, these diseases have the capacity to devour the benefits of economic gain. ... A recent World Economic Forum and Harvard University study estimates that, over the next 20 years, non-communicable diseases will cost the global economy more than US$ 30 trillion, representing 48 percent of global GDP in 2010. ... non-communicable diseases deliver a two-punch blow to development. They cause billions of dollars in losses of national income, and they push millions of people below the poverty line, each and every year." (Margaret Chan, Director-General, WHO, addressing the UN General Assembly 2011)
Thank you - and now it is your turn!

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InSilico Models

Electronic Declarations of Products & Services

Individual’s Data

De-regulated marked for sensors and actuators

Infrastructure

(Platforms)

Information Banker & Broker

Knowledge Commons in Health
Co-morbidities

For the citizen with co-morbidities - it is the individual combination of:

- Professional ("all-inclusive") care
- Individually combined, dosed, and monitored pharmaceutical treatment
- Self-care and health literacy level
- Informal care
- Choice architectures
- Fulfilling social-economic status
Knowledge (forms) - related to health

- General evidence in medicine
- In context of the individual
- In context of a health providing organisation