BIGMedilytics

BigMedilytics

Big Data for Medical Analytics

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Four profound trends are shaping the future of health technology

Global resource constraints

Healthcare sector: 10% of EU's GDP
EU-28's total healthcare spending: €1.39 trillion

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Effectiveness of healthcare system:

Quality: Determined by efficacy, value and efficiency

Access: Those who can receive care when needed

Cost: Actual expense of patient care

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In 2060 Healthcare sector: 30% of EU's GDP
Chronic diseases result in loss of 3.4million potential productive years; equivalent to €115 billion annually

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Aging populations and the rise of chronic illnesses

Increasing consumer engagement

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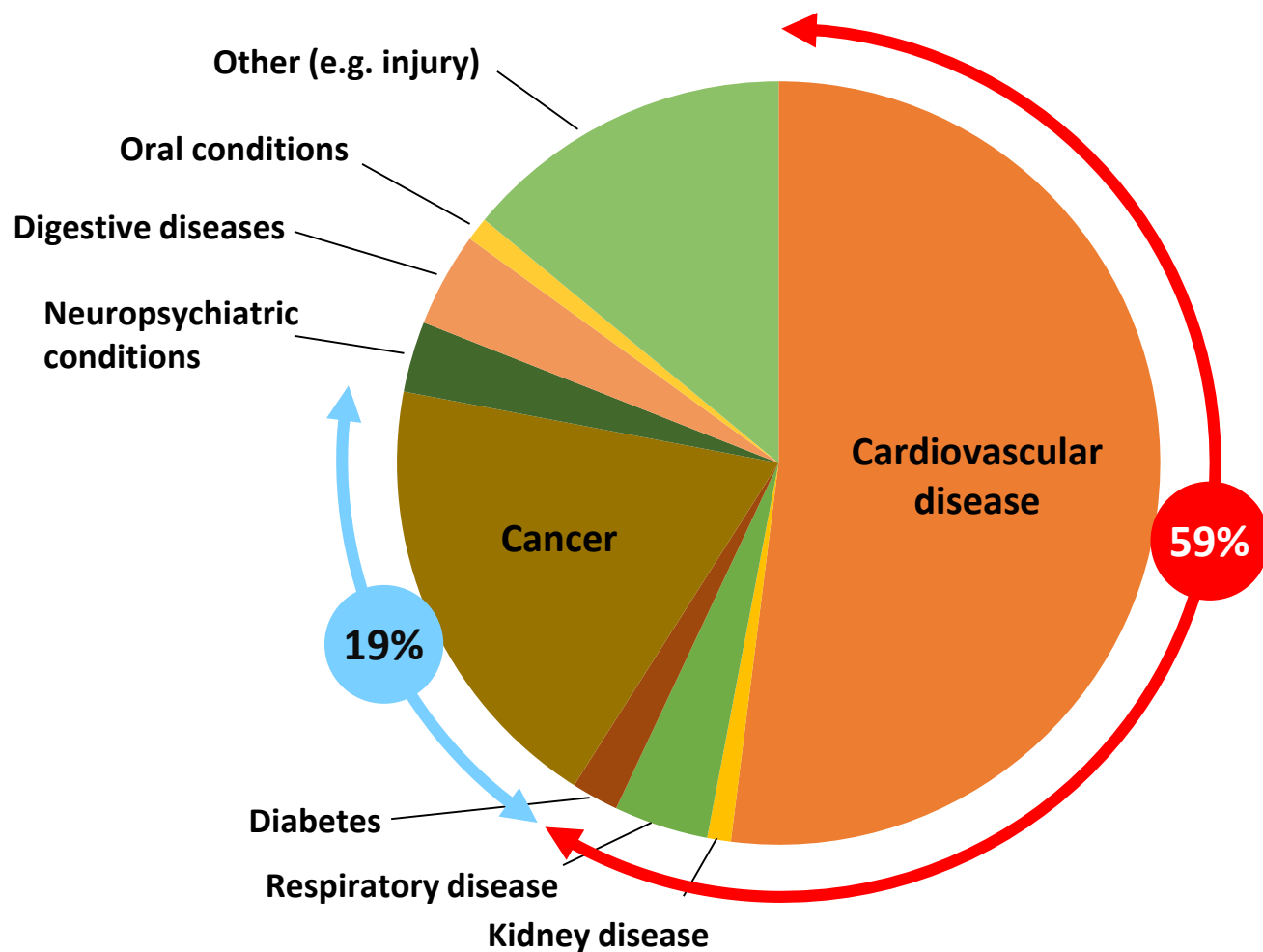
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Digitization

Extract knowledge from already existing large amounts of generated medical data
Big Data: Medical data currently estimated around 1 Zettabyte (152 Million years, UHD, 8K video)

BigMedilytics aims to use state-of-the-art Big Data technologies in order to improve the productivity of the Healthcare sector by reducing cost to the patient, improving quality through better patient outcomes and delivering better access

Percentage of deaths from non-communicable diseases in Europe

Cardiovascular disease — 59%

Cancer — 19%

Pie chart labels:
- Other (e.g. injury)
- Oral conditions
- Digestive diseases
- Neuropsychiatric conditions
- Diabetes
- Respiratory disease
- Kidney disease

BigMedilytics covers *all* the major disease groups in Europe which cause 78% of the deaths:

- Cardiovascular disease
- Cancer
  - Breast cancer
  - Lung cancer
  - Prostate cancer
- Chronic respiratory disease
- Diabetes
- Kidney disease
- Comorbidities

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Healthcare continuum
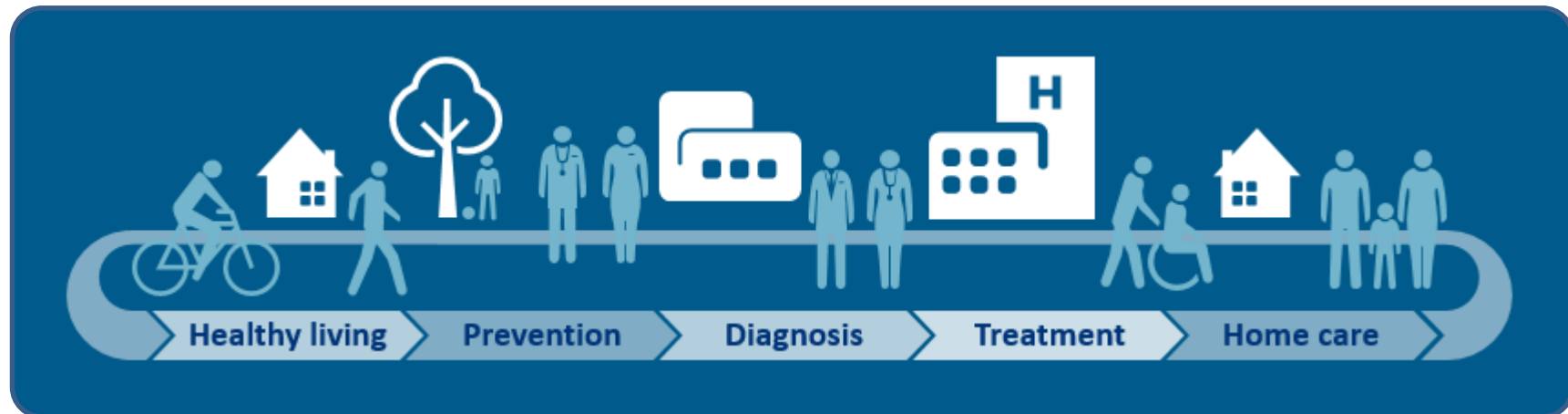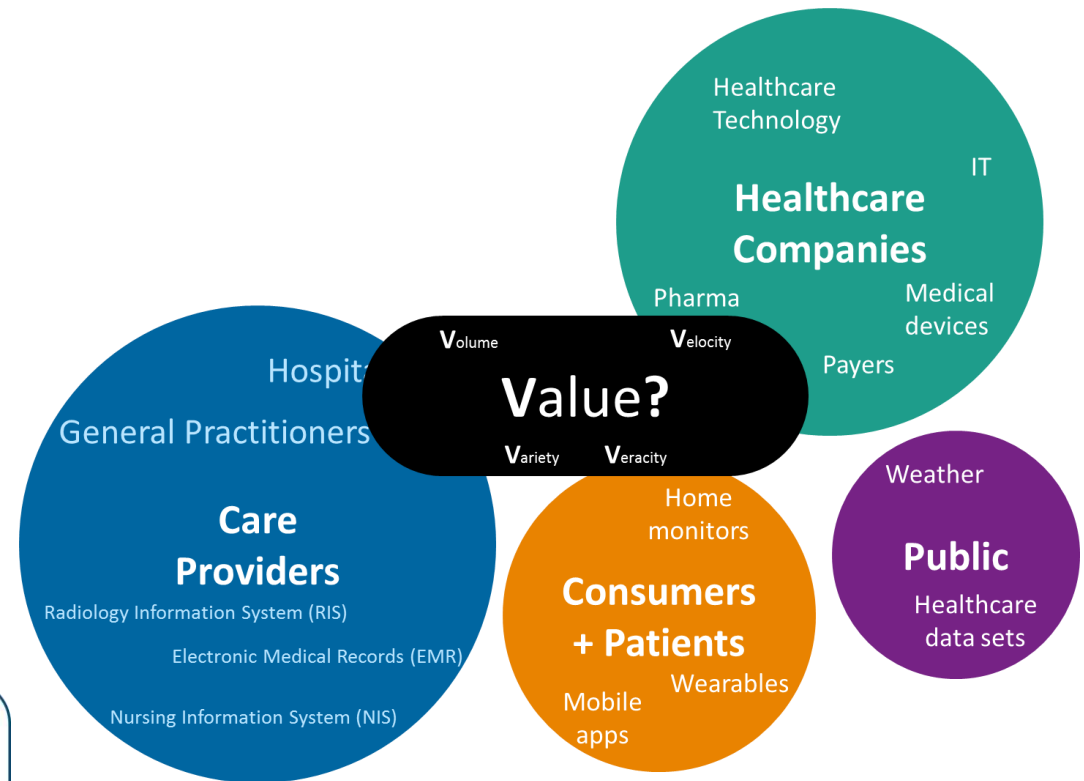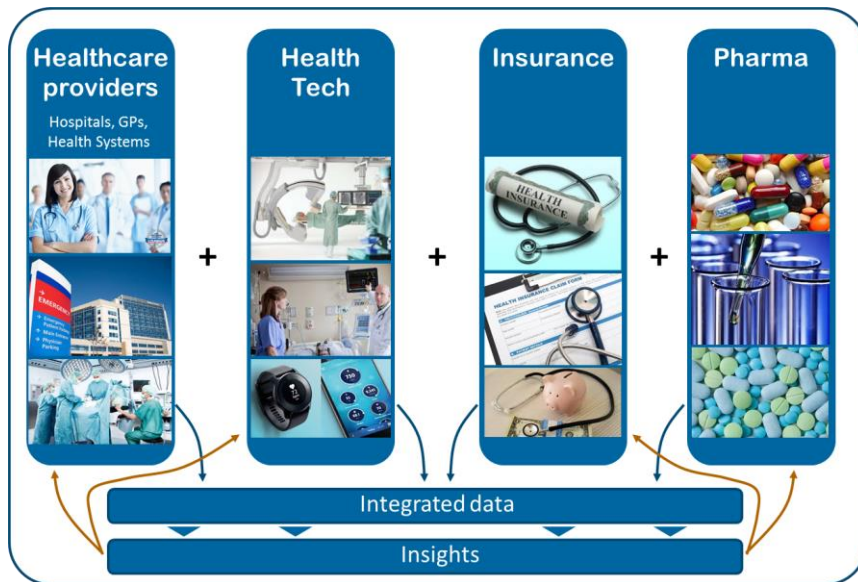

THEME 1: Population Health & Chronic Disease Management

THEME 2: Oncology

THEME 3: Industrialization of healthcare

Enabling collaborative innovation across all key players in the Healthcare and Data Value Chains

- Patients
- Healthcare Providers
- Payers
- Vendors (Medical diagnostics and Services, Pharmaceuticals, HealthcareIT)
- Knowledge Institutions

Healthcare Technology

IT

Healthcare Companies

Pharma

Medical devices

Payers

Hospitals

General Practitioners

Volume Velocity

Value?

Variety Veracity

Weather

Public

Healthcare data sets

Care Providers

Radiology Information System (RIS)

Electronic Medical Records (EMR)

Nursing Information System (NIS)

Home monitors

Consumers + Patients

Mobile apps

Wearables

Healthcare providers
Hospitals, GPs, Health Systems

+

Health Tech

+

Insurance

+

Pharma

Integrated data

Insights

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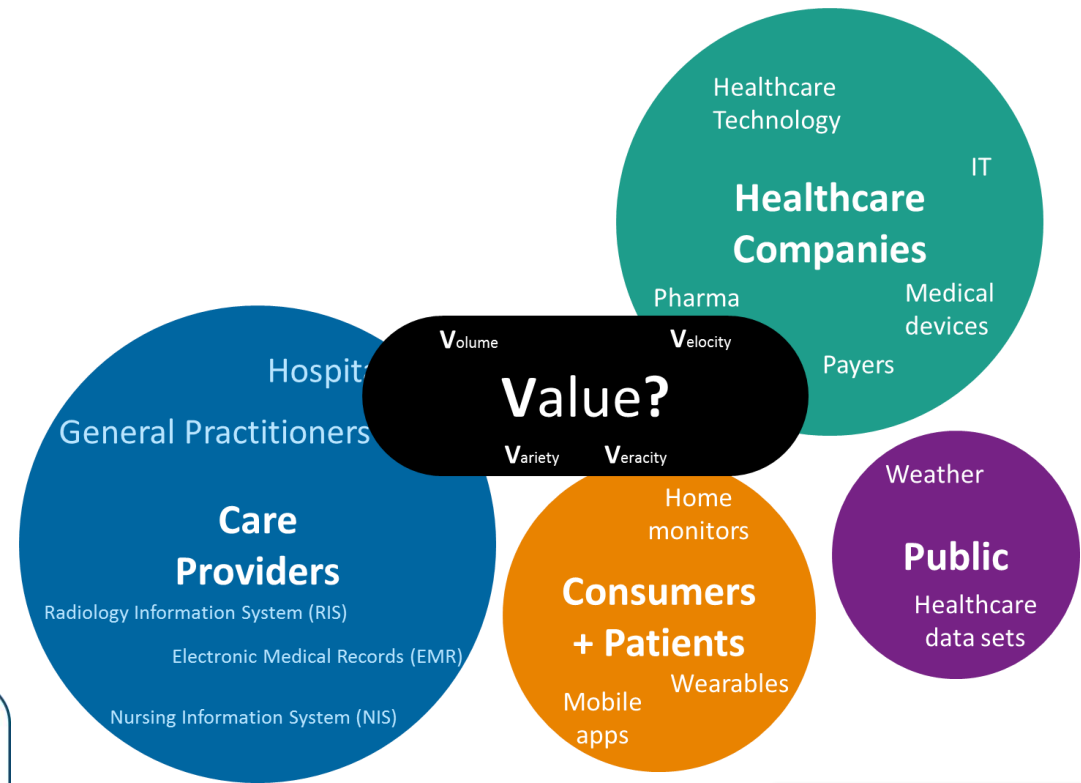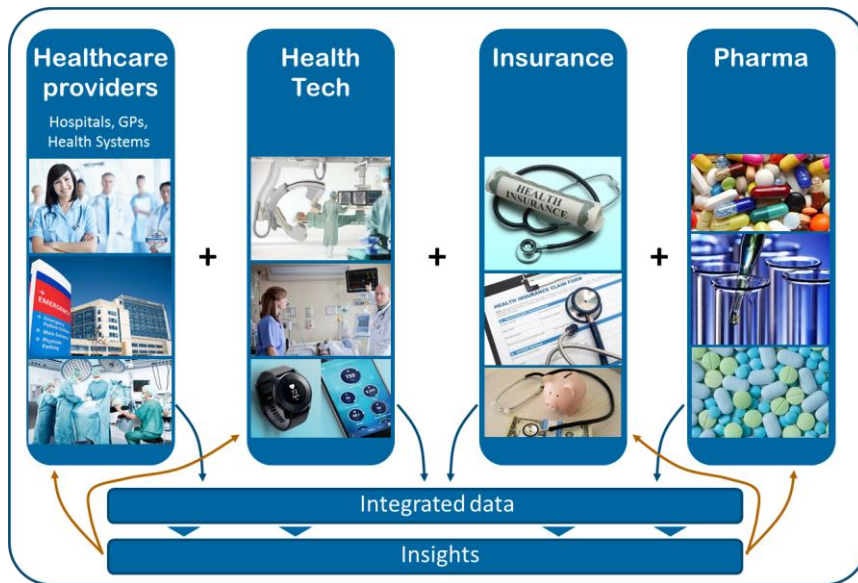
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Healthcare Companies
Healthcare Technology
IT
Pharma
Medical devices
Payers

Value?
Volume
Velocity
Variety
Veracity

Care Providers
Hospitals
General Practitioners
Radiology Information System (RIS)
Electronic Medical Records (EMR)
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Consumers + Patients
Home monitors
Mobile apps
Wearables

Public
Weather
Healthcare data sets

Healthcare providers — Hospitals, GPs, Health Systems
Health Tech
Insurance
Pharma
+
Integrated data
Insights

Business Model Innovation
Legal
Ethics

Scale concepts across Europe

12 pilots across 3 themes

BigMedilytics Pilots

Population Health & Chronic Disease Management
WP2 Leader: Incliva

Oncology
WP3 Leader: Philips

Industrializing Healthcare Services
WP4 Leader: Philips

6. Prostate cancer
Pilot Leader: Philips
Location: SE

8. Breast cancer
Pilot Leader: IBM
Location: FR

Hyper-Acute Workflows

12. Radiology Workflows

7. Lung cancer
Pilot Leader: Demokritos
Location: ES

11. Asset Management
Pilot Leader: OLVG
Location: NL

1. Comorbidities
Pilot Leader: Incliva
Location: ES

3. Diabetes
Pilot Leader: Huawei
Location: IE

5. Heart Failure
Pilot Leader: EMC
Location: NL

9. Stroke
Pilot Leader: ETZ
Location: NL

10. Sepsis
Pilot Leader: Incliva
Location: ES

Pilot Leader: ContextFlow
Location: AT

2. Kidney disease
Pilot Leader: Charite
Location: DE

4. COPD/ Asthma
Pilot Leader: Southampton
Location: UK

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Lung cancer pilot: vision

Present
- Standardised treatment protocol
- Same reference ratios for all patients
- Imprecise: diagnosis, treatment duration, toxicities, & comorbidities

Future
- Improve management of patients: treatment, follow-up, palliative care
- Improve experience and main outcomes
- Reduce healthcare costs

Key Performance Indicators (target 20% improvement)

Process
- Improved risk estimation
- Reduction of visits to ER due to minor adverse events
- Reduction in length of hospital stay
- Reduction of unscheduled visits due to toxicities

Patient experience and outcomes
- Reduction of toxicity incidences in polimedicated patients
- Increased patient satisfaction and information

Financial
- Reduced cost per patient and projected total cost over 10 years

Lung cancer pilot: big data approach

Big Data

Patient data
- Electronic Health Records
- Call center logs
- Mobile app logs

Open Data
- Publications
- Databases
- Ontologies

Artificial Intelligence

Data Analysis
- Text mining
- Statistical learning

Data Integration
- Knowledge graph
- Meta-analysis

Precision Medicine

- Improved risk stratification
- Discovery of potential toxicities
- Explanation of adverse effects

The BigMedilytics Community
35 organizations from 12 countries

Healthcare providers
Incliva (ES)
Karolinska (SE)
ErasmusMC (NL)
Rotunda Hospital (IE)
P. Hierro Hospital (ES)
Charite (DE)
OLVG (NL)
ETZ (NL)
Essen Hospital (DE)
Curie (FR)
MUW (A)

HealthTech/IT
Philips (NL)
IBM (IL)
ATOS (ES)
Huawei (DE)
Optimedis (DE)

Payers
AXA (FR)
Achmea (NL)
AOK (DE)

Pharma
AstraZeneca (UK)

SMEs
Nissatech (RS)
MyMHealth (UK)
ContextFlow (A)
ATC (GR)

Research Institutes
DFKI (DE)
ITI (ES)
TNO (NL)
NCSR-D (GR)
VTT (FI)
HPI (DE)

Universities
TU/e (NL)
UPM (ES)
iBMG (NL)
Uni. Of Southampton (UK)
LUH (DE)