



DEPARTMENT OF
ECONOMY
SCIENCE &
INNOVATION

Flanders, a health(y) ecosystem

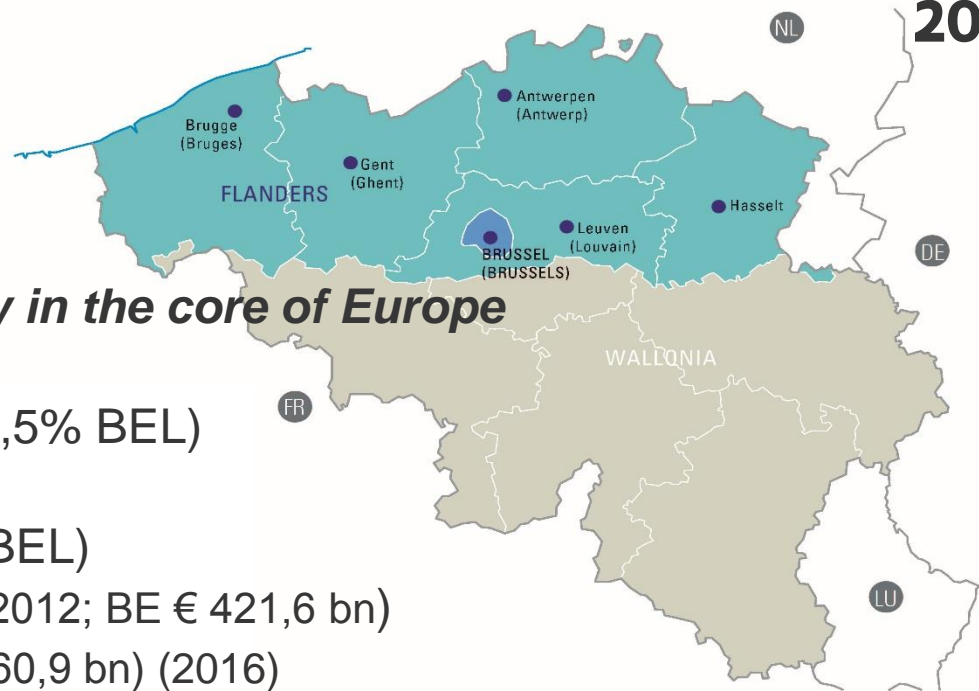
Kathleen.dhondt@ewi.vlaanderen.be

FLANDERS: Key Figures

2017

Flanders:

*a high-income region
with an open economy in the core of Europe*

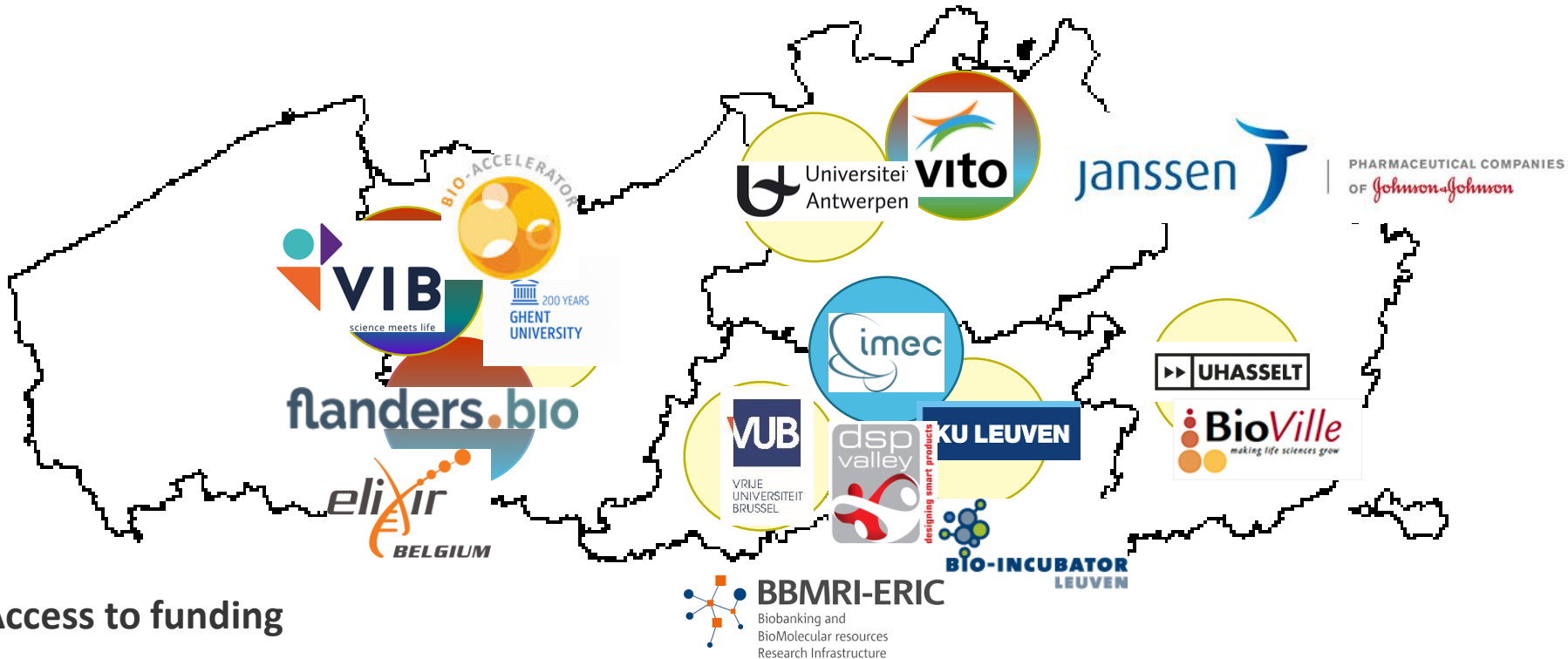


- **Population:** 6.50 million (= 57,5% BEL)
- **Language:** Dutch (NL)
- **Surface:** 13.521 km² (= 44% BEL)
- **GDP:** € 247,8 billion (225 bn in 2012; BE € 421,6 bn)
- **Export :** € 302,4 billion (BE € 360,9 bn) (2016)
- **GERD:** € 6.723 billion (+/- 2/3 of BEL), of which € 4.631 billion BERD
- **Research intensity - % GERD/ GDP:** 2,70% (2016)

- **Total public budget STI policy:** € 2,9 billion (€ 2,4 bn Flanders) of which € 1,6 billion R&D

The region has constitutional competences on research, innovation and economic policy

Health(y) ecosystem Flanders



Access to funding



imec xpend

FLANDERS
INNOVATION &
ENTREPRENEURSHIP



Flanders
State of the Art



imec: Interuniversity Micro Electronics Center

imec	2016	2017
Funding (M€)	77,44	109,23
Revenue (M€)	432.5	
Employees*	1,621	



Since 1984

- To be a center of excellence in semi-conductor technology, nano-electronics, nanotechnology, design methods and technology platforms for ICT systems, health and sustainable energy;
- To generate an optimal impact on the Flemish economy and society.

► Research areas

- CMOS scaling (lithography, logic and memory devices, (optical) interconnects, 3D integration)
- Internet of Things (wireless, image sensors and vision systems, flexible electronics, sensors)
- Internet of Power (solar cells, batteries, GAn power electronics)
- Internet of Health (wearable health monitoring, life sciences)

► Output

- Spin-offs: 40 (1984-2015)
- Publications: 10,504 journals and proceedings, WoS databases (2000-2014)
- Patents: 981 applications and 476 grants, EPO, PCT ar



► Initiatives

- Exascience Life Lab: HPC for life sciences (Intel, Janss
- Solliance: Thin film photovoltaic (partners from the Netherlands , Germany)
- NERF: Neuro Electronics Research Flanders (imec-VIB cooperation, see further)
- Energyville: sustainable energy and intelligent energy systems (VITO, ULeuven)



* Payroll employees headcount : the total staff, including non-payroll employees, for 2015 is ± 2,200;

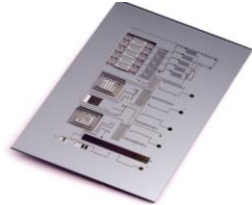
FULL ELECTRONICS R&D ECOSYSTEM

APPLICATIONS



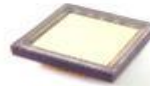
Green Radio

Low power
wireless
communication

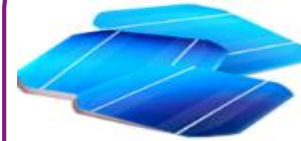


Healthcare

BAN
Life Sciences

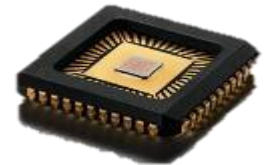


Sensors & imagers



Energy

Photovoltaics
Power devices



IC Link

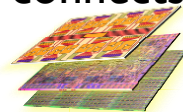
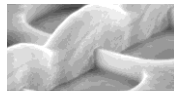
TECHNOLOGY

Core CMOS

Litho

Devices

Inter
connects

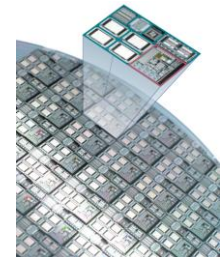


CMORE

MEMS, Photonics
CIS, eCCD



Flexible electronics

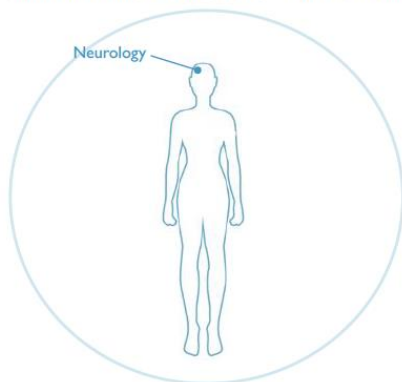


PERSONAL HEALTH SOLUTIONS: IMEC TECHNOLOGY AND AI FOR CHRONIC DISEASE MONITORING AND FOR PREVENTIVE HEALTH

CHRIS VAN HOOFF – senior director personal health solutions, imec

WEARABLE & PERSONAL HEALTH MONITORING

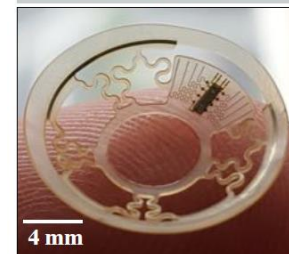
OUR INITIAL SWEET SPOTS – I. NEUROLOGY



NIHON KOHDEN



2017-2018 de-risk key building blocks: multiple focus, autofocus



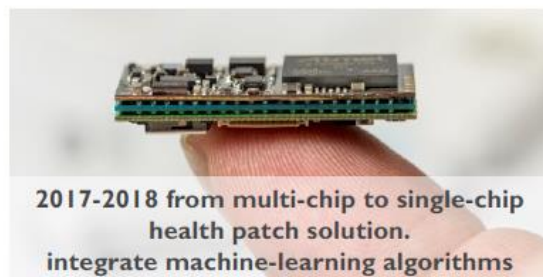
TRACK RECORD: CARDIAC MONITOR FDA APPROVED

WEARABLE MEDICAL SYSTEM DESIGNED BY IMEC AND WITH IMEC CIRCUITS INSIDE



DIGITAL PHENOTYPING

CAPTURING AN INDIVIDUAL'S CHARACTERISTICS THROUGH TECHNOLOGY



2017-2018 from multi-chip to single-chip health patch solution.
integrate machine-learning algorithms

PHYSIOLOGICAL



CHILLBAND

GSR
Temperature
Acceleration (3 dim)



CHEST PATCH

ECG
Acceleration (3 dim)

SMARTPHONE



QUESTIONNAIRES

Stress
Activity
Food/beverage intake
Sleep
Gastro intestinal symptoms



LOCATION

Continuous
During questionnaires



VOICE



PHONE DATA

Proximity
Acceleration
Step count
Screen on/off
Ambient light
Temperature
Humidity



QUESTIONNAIRES

Baseline information

WEBSITE

VITO: Flemish Institute for Technological Research

VITO	2016	2017
Funding (M€)	47.16	51.62
Revenue (M€)	114.4	
Employees*	568	596

* Payroll employees in FTE;

Since 1991

- innovative technological solutions, scientifically based advice and support to stimulate sustainable development and reinforce the economic and social fabric of Flanders”
- leading European independent **research and technology organisation** in the areas of cleantech and sustainable development.

► Output

- Spin-offs : 8 including LiboVITO China (1991-2015)
- Publications : 256 (2015)
- Patents: 25 applications (2015)



► Research areas

- sustainable chemistry, energy, materials; land use and health,
- called Reference Tasks related to sustainable development for the Flemish Government

► Health related:

- Technologies for health monitoring
- Medical molecular diagnostics

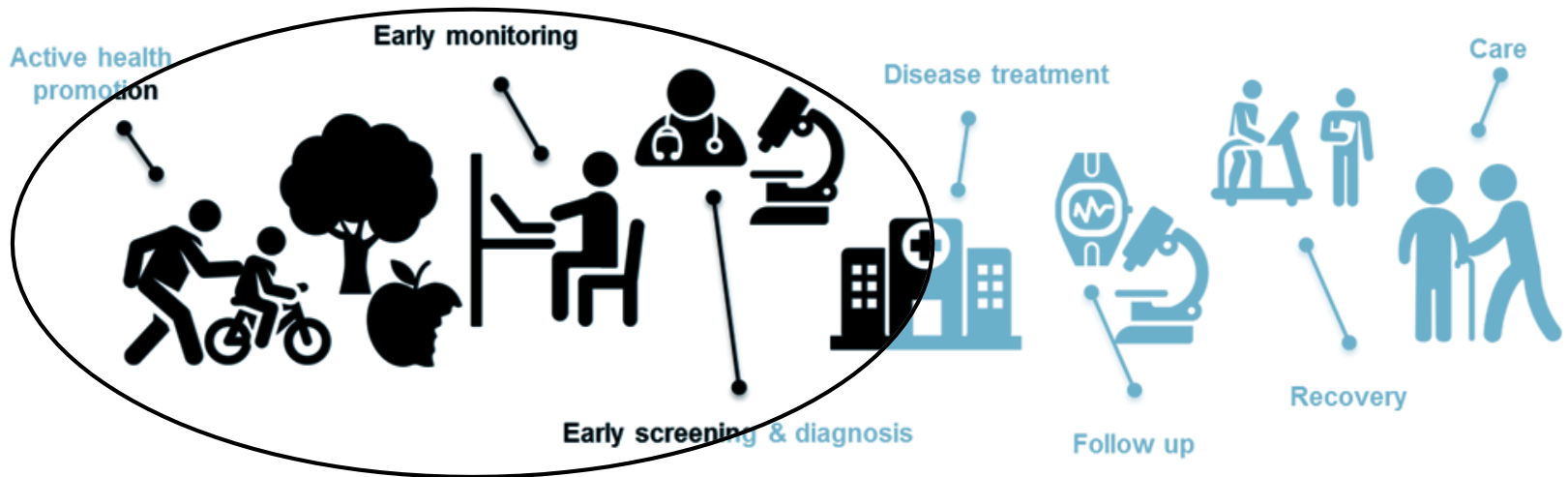
RESEARCH FOCUS



Health

Early stage of the health continuum

Personalized: exposure, lifestyle, genotype to phenotype



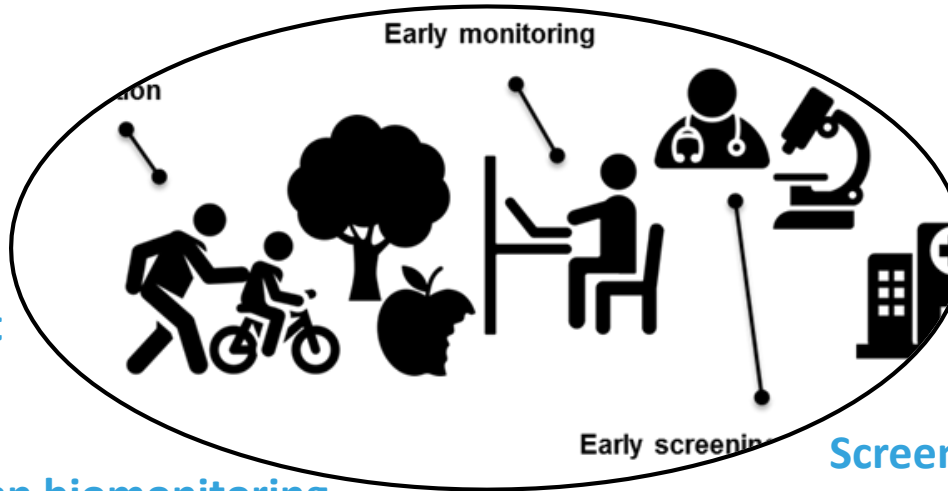
WHAT



Health

Environment
& health

Human biomonitoring



Companion Diagnostics

Early Diagnosis

Screening

Participatory projects



AGENTSCHAP
INNOVEREN &
ONDERNEMEN



Interreg
Vlaanderen-Nederland
Europees Fonds voor Regionale Ontwikkeling

- Biomarker discovery
- Analytical innovations
- Data science
- Biobank

VIB : Flanders Institute for Biotechnology

VIB	2016	2017
Funding (M€)	45.63	62.28
Revenue (M€)	84.10	
Employees*	1,470	1,507

* Intra muros and extra muros;

Since 1995

frontline biomolecular research in life sciences for the benefit of scientific progress and the benefit of society.



► Output

- Publications: 6,559 journals and proceedings, WoS databases (2000-2014)
- Patents: 245 applications and 60 grants, EPO, PCT and USTPO (2007-2014)
- Publications: 737 publications (206 top 5 publications) (2015)
- Income from industry 2015: 26.5 M€ (117 partner agreements, 84 employees)
- Attracting international biotech companies to Flanders: 429 employees
- 5 ERC grants in 2015

► Initiatives

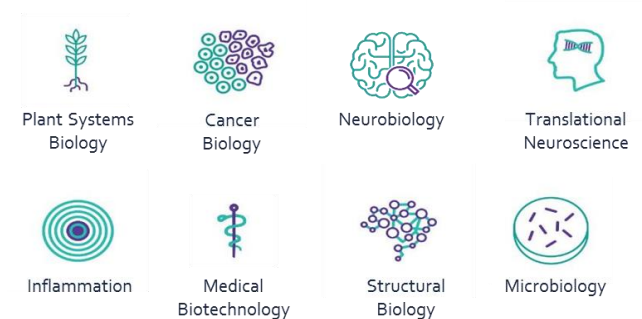
- V- Bio Ventures (2015): life sciences investment fund, 63 M€ capital (first round)
- NERF : Neuro Electronics Research Flanders (VIB-imec-kuLeuven cooperation)
- 3 Bio-incubators/accelerator (2 Ghent, 1 Leuven): 22 companies, 917 employees



VIB: Flanders Institute for Biotechnology

► Research areas (8 research departments, 75 research groups)

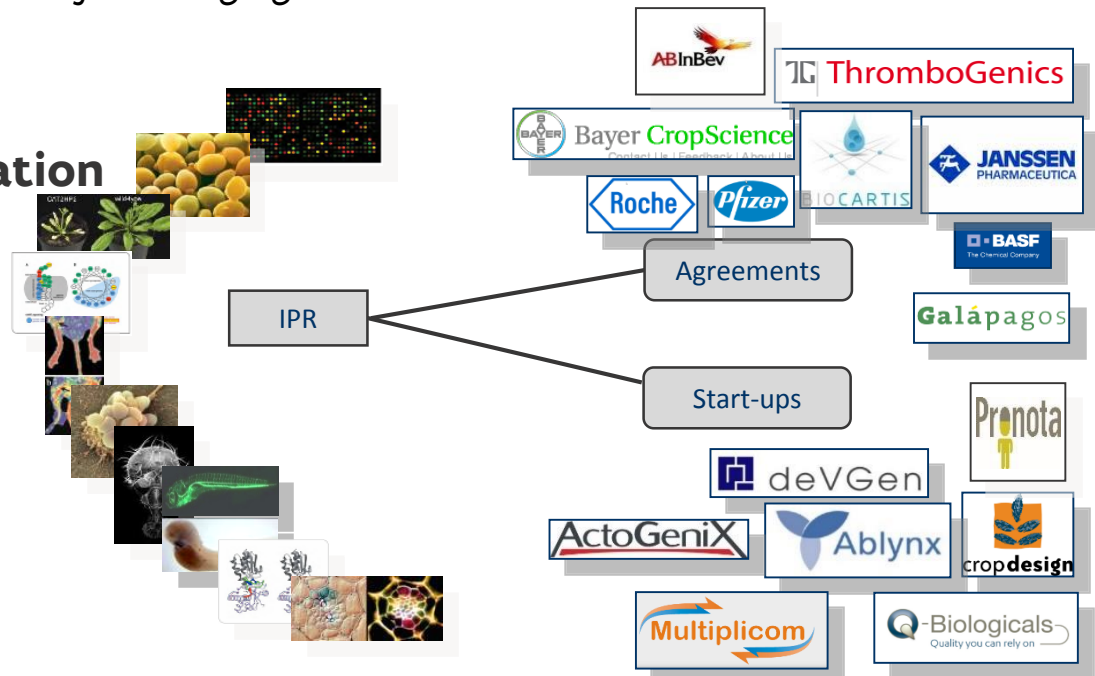
- Bioinformatics
- Cancer
- Cardiovascular medicine
- Developmental biology
- Inflammation and immunity
- Microbiology
- Neuroscience
- Plant biology
- Proteomics
- Structural biology
- Systems biology



► Research facilities and services

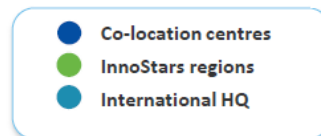
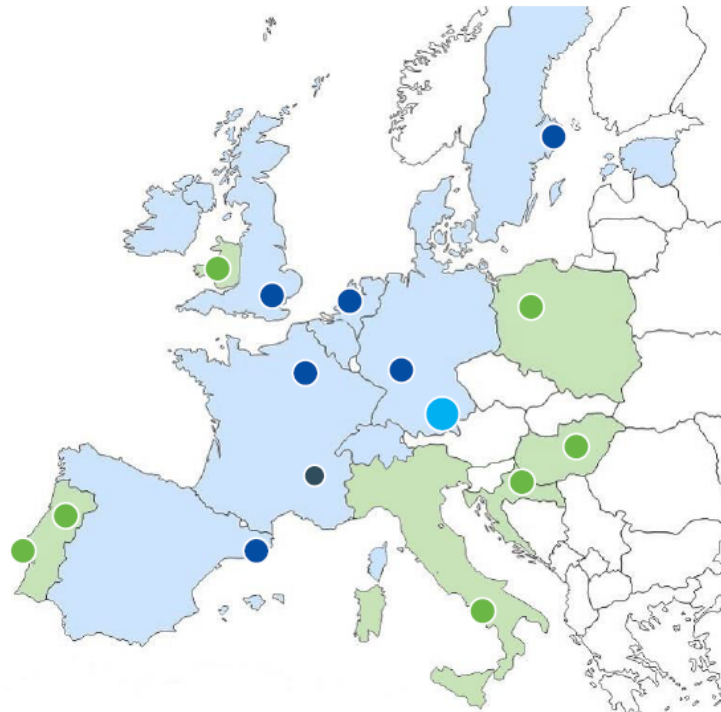
→ E.g. : sequencing, protein analysis, imaging,

► Path towards value creation

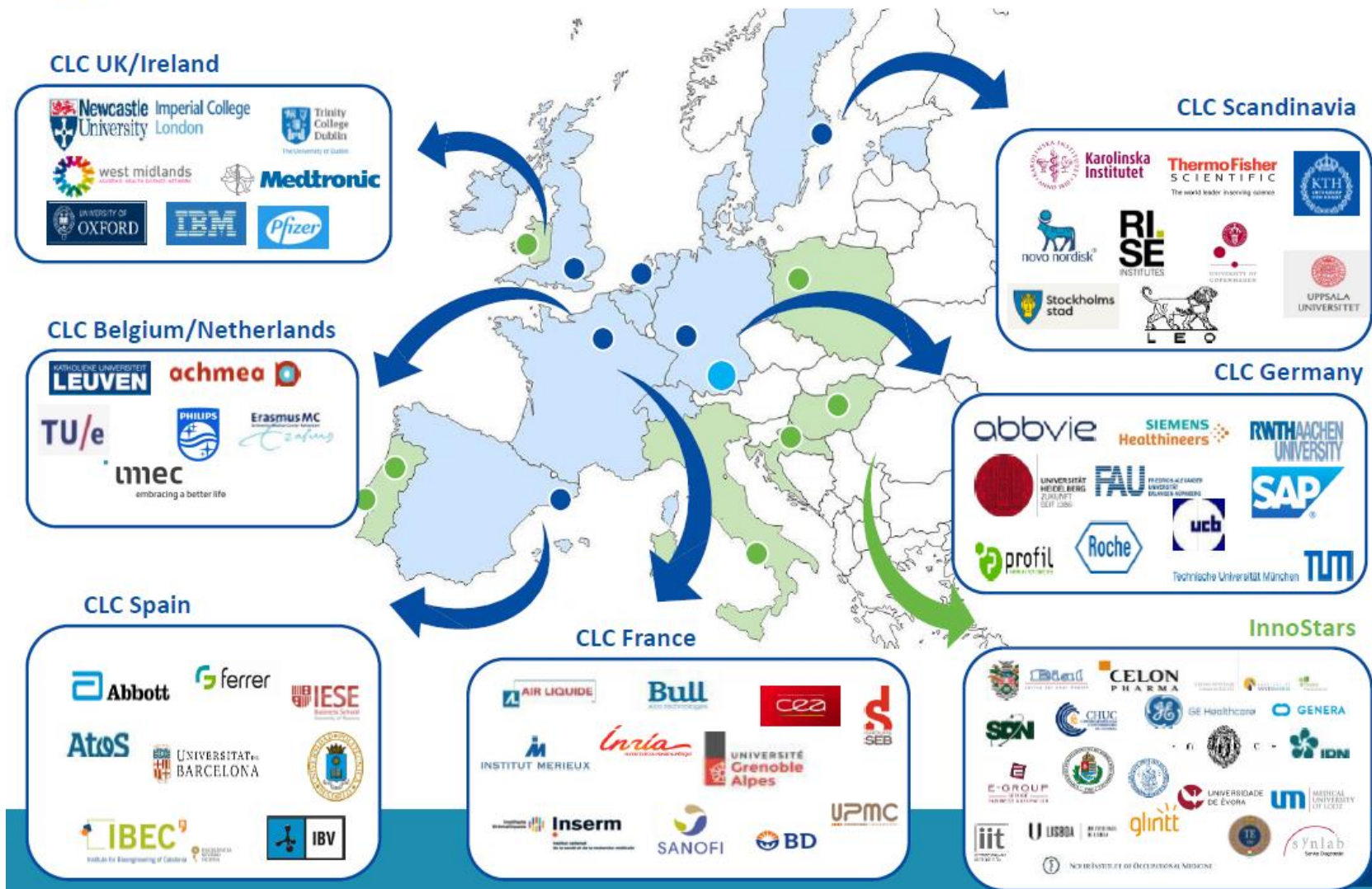


A Unique European Network

- **International Headquarter** in Munich
- **6 Co-Location Centres (CLCs):**
 - UK/Ireland (London)
 - Scandinavia (Stockholm)
 - Belgium/Netherlands (Rotterdam)
 - Germany /Switzerland (Mannheim/Heidelberg)
 - France (HQ in Paris + ARA)
 - Spain (Barcelona)
- **7 InnoStars regions** in 6 countries:
 - Croatia
 - Hungary
 - Poland
 - Portugal
 - Italy
 - Wales



A strong partnership across Europe



Facts and Figures



There are 17 million new strokes each year, about 6 million of which result in death¹.

Today,

70%

of all strokes occur in low and middle income countries where the incidence of stroke is rapidly increasing¹.



¹ Feigin, V.L., Forouzanfar, M.H., Krishnamurthi, R., Mensah, G.A., Connor, M., Bennett, D.A., Moran, A.E., Sacco, R.L., Anderson, L., Truelsen, T., et al. (2014). Global and regional burden of stroke during 1990-2010: findings from the Global Burden of Disease Study 2010. *Lancet* 383, 245-254.
² World Health Organization (2004). *Atlas of Heart Disease and Stroke*. [Online]. Available from: http://www.who.int/cardiovascular_diseases/resources/atlas/en/. Accessed 05/09/2014

P3-Stroke

- integrated hybrid Angio-MRI system.
- predictive prevention
- personalised interventional stroke therapy
- lower healthcare and socioeconomic costs
- unique selling proposition with new business opportunities.

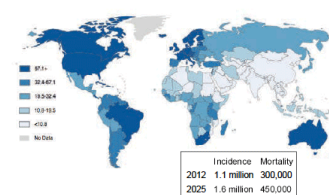
EIT projects in Flanders

Stockholm3

individualised prostate cancer risk, the Stockholm3 Risk Score

Prostate cancer is common and increasing...

Prostate cancer incidence



The STHLM3 Risk Score has shown to significantly enhance test characteristics versus current clinical practice

Study

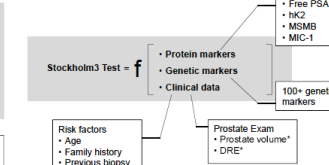
58,818 men recruited
6,777 men biopsied
Paired design
Conducted 2012-2015

Results compared to current clinical practice
50% reduction of unnecessary biopsies
20% increase in aggressive cancers found
Finds cancers in low PSA 1-3
Good health economics

THE LANCET Oncology JNCI
EUROPEAN UROLOGY

The STHLM3 Risk Score estimates the risk of aggressive prostate cancer by combining biomarkers and clinical data

Risk of aggressive prostate cancer, %

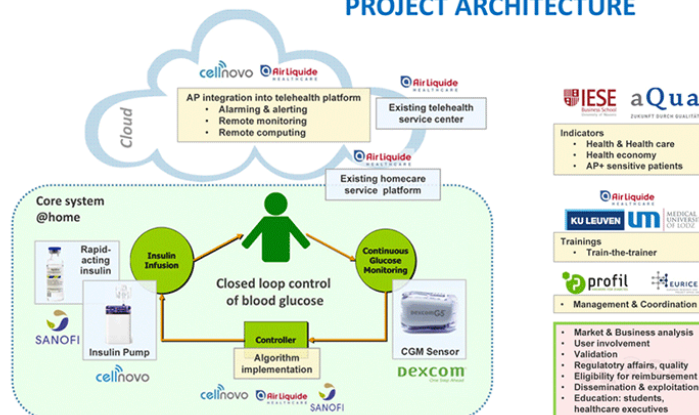


* Only measured on biopsied men

CLOSE

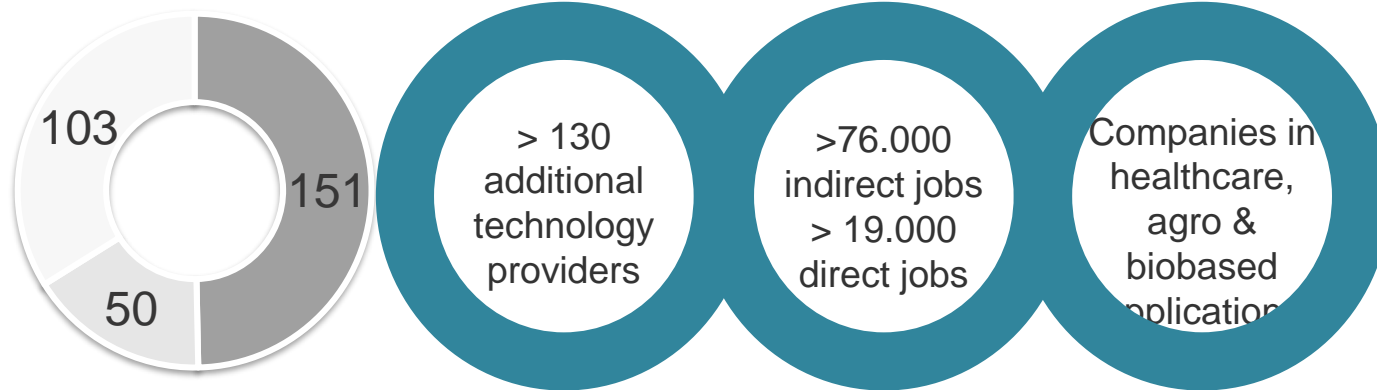
Automated Glucose Control at home for people with chronic disease

PROJECT ARCHITECTURE



FLANDERS, Brussels: Strongly developed life sciences industry

300 + organizations → coming from 31 in 1995!



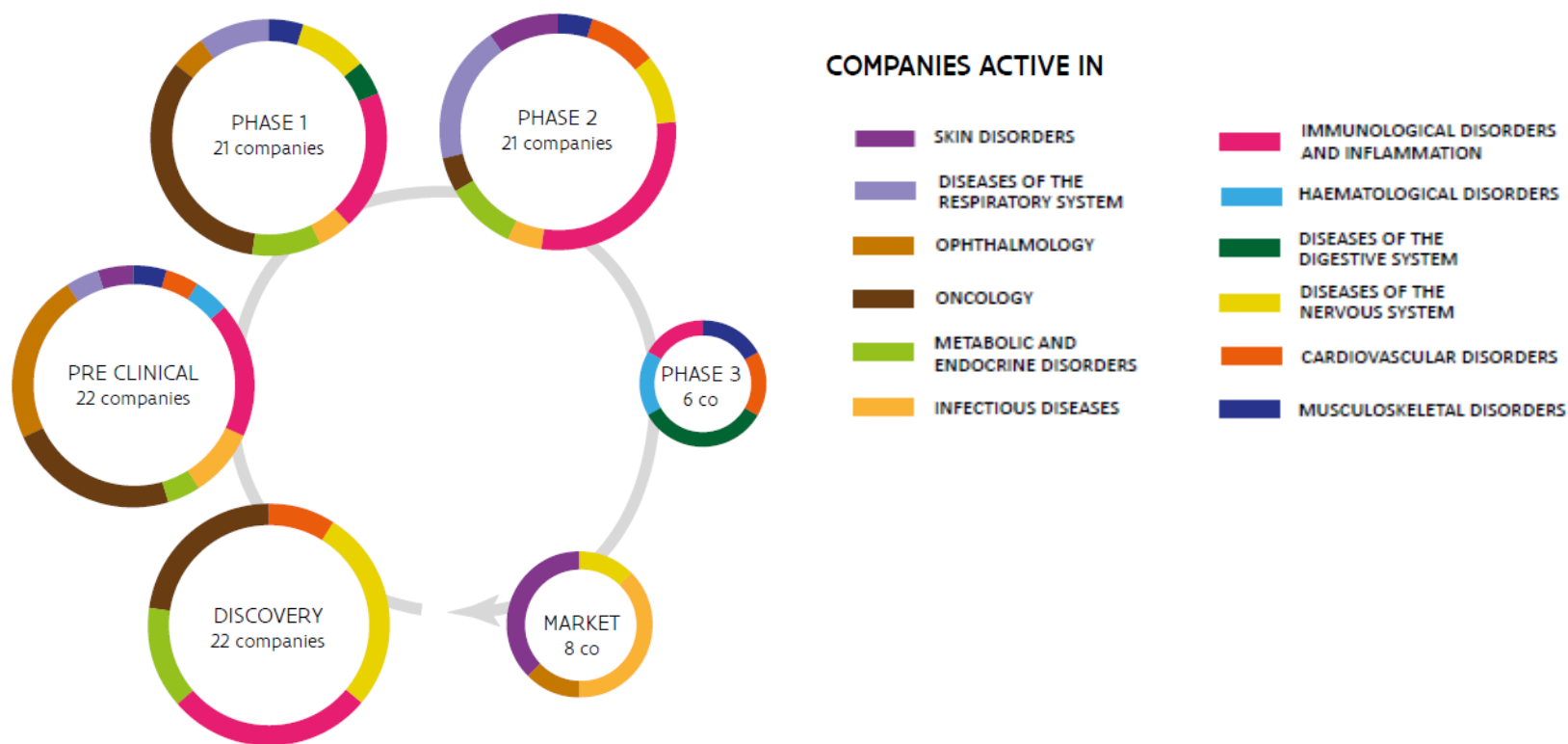
- with R&D activities
- with production activities
- dedicated competence providers

Biopharma concentration is unique

- **Within 1 hour drive:**
Janssen Pharmaceutica (Johnson & Johnson), Pfizer, GSK vaccines, UCB, Roche Diagnostics, Novartis, Sanofi, Baxter...
- Large R&D centers in addition to HQs and manufacturing facilities

Pipeline of Health Solution Companies

151 Products in the Pipeline

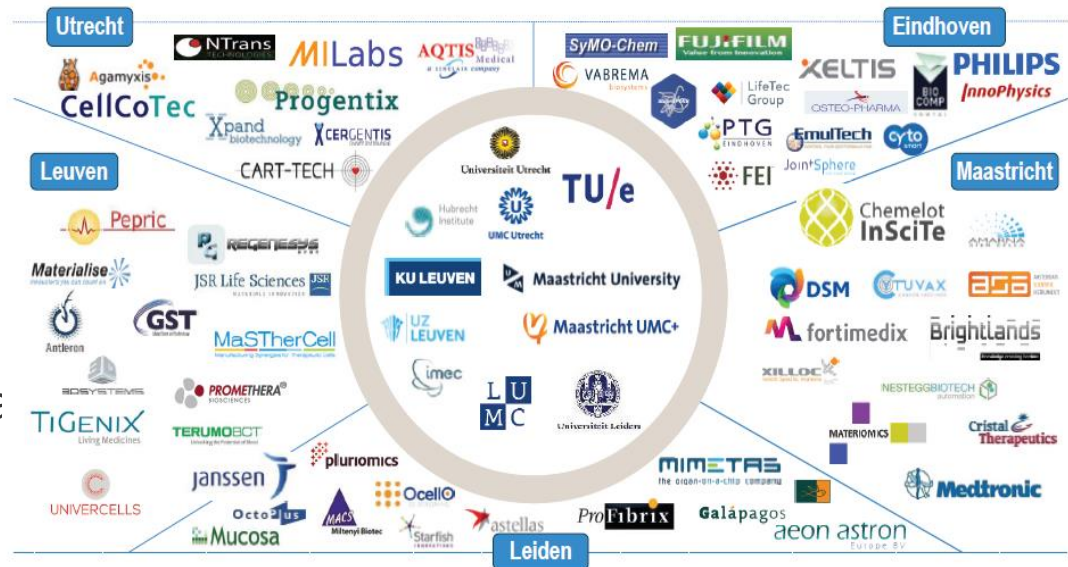


THE STRATEGIC POLICY FRAMEWORK for SMART SPECIALISATION in FLANDERS

Policy Note of the Department Economy, Science and Innovation (rev. 12/2014)

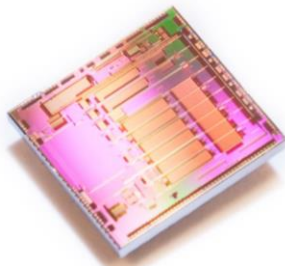
► smart specialisation priority domains

- Advanced materials
- Sustainable chemistry
- Smart manufacturing
- Value added logistics
- Specialised agro-food
- Building-environment-cleec
- Energy
- ICT -platforms
- Personalised cure and care



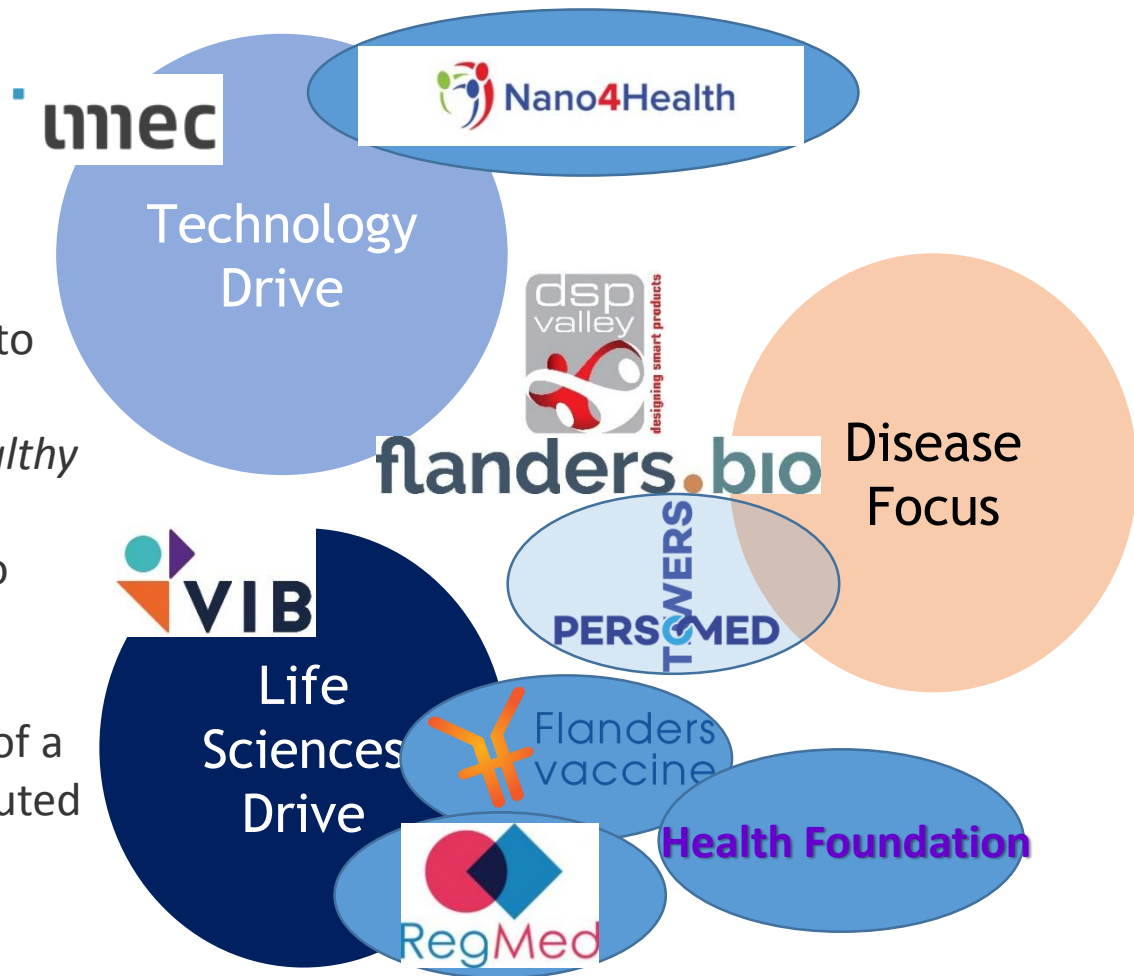
► Focus areas - examples

- Biobanking
- ELIXIR
- Cancer
- Microbiome - personalised health and nutrition
(workshop May 2016; October 2017)
- RegMed XB VL-NL



- Medtech S3
- Health Foundation

“**Health generation platform 2.0**” to inform **personalised healthy aging** *Flanders without disease, for a healthy future and longer healthy live*
Empower individuals in Flanders to maintain their current and future health and that of their family through the active support of a shared and connected platform routed in the strong science base of Flanders in life science & health.





S3 Thematic Platforms

Industrial Modernisation

Regions, industrial partners and business intermediaries



Advanced manufacturing



Non-food Biomass



Efficient and Sustainable Manufacturing



SMEs to the Industry 4.0



Sport



Digitalisation and Safety for Tourism



3D-Printing



New Nano-Enabled Products



Cybersecurity



Social Economy



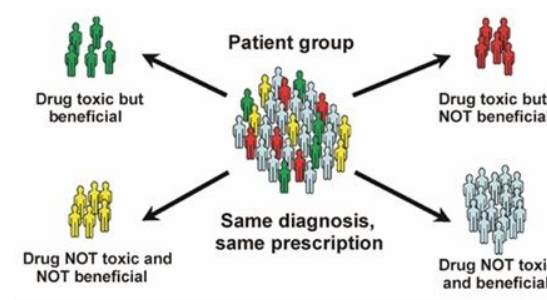
Textile Innovation



Medical technology



Photonics



- Vlaanderen - Belgium
- Limburg – The Netherlands
- East Holland – The Netherlands

Personalised Medicine



Thank you



Vlaanderen

is economie,
wetenschap & innovatie

http://www.ewi-vlaanderen.be/sites/default/files/bestanden/sti_in_flanders.pdf