



# EU efforts in cancer research: towards personalised medicine

**IMI Stakeholder Forum  
Consultation workshop Oncology  
Brussels, 29 September 2016**

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Head of Unit  
Non communicable diseases and the  
challenge of healthy ageing  
DG Research and Innovation  
European Commission**



# The context



- A global health priority
- A changing healthcare landscape
- Raising costs and increasing pressure on European healthcare systems
- Differences in outcomes, insufficient comparative assessment of current practices and approaches
- Advancing understanding of cancer biology
- Innovative drugs in the pipeline
- Molecular profiling and risk classification approaches
- Stratified and subsequently personalised medicine can deliver cost savings and better outcomes for patients



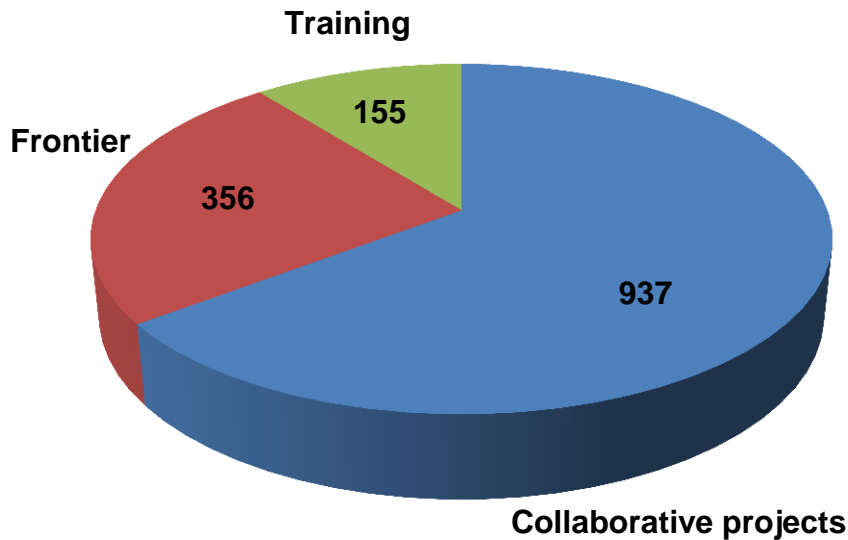


- *Provide evidence-based solutions for clinical challenges*
- *Foster integrated translational research*
- *Shorten the innovation life cycle*
- *Build expertise and leverage resources*
- *Promote research coordination*
- *Develop research capacities in EU and globally*
- *Underpin the development of health policies*



European Commission

# EU cancer research – what’s being funded (FP7)



in million Euro

- *translational research*
- **metastasis**
- **tumour microenvironment**
- **biomarkers, drugs, MoAbs**
- **imaging**
- **models**
- **resistance**
- **technology**
- **prevention**
- **early detection**
- *investigator-driven trials*
- *palliative & end-of-life care*

The Oncologist



Emphasising the European Union’s Commitment to Cancer Research: A Helicopter View of the *Seventh Framework Programme for Research and Technological Development*

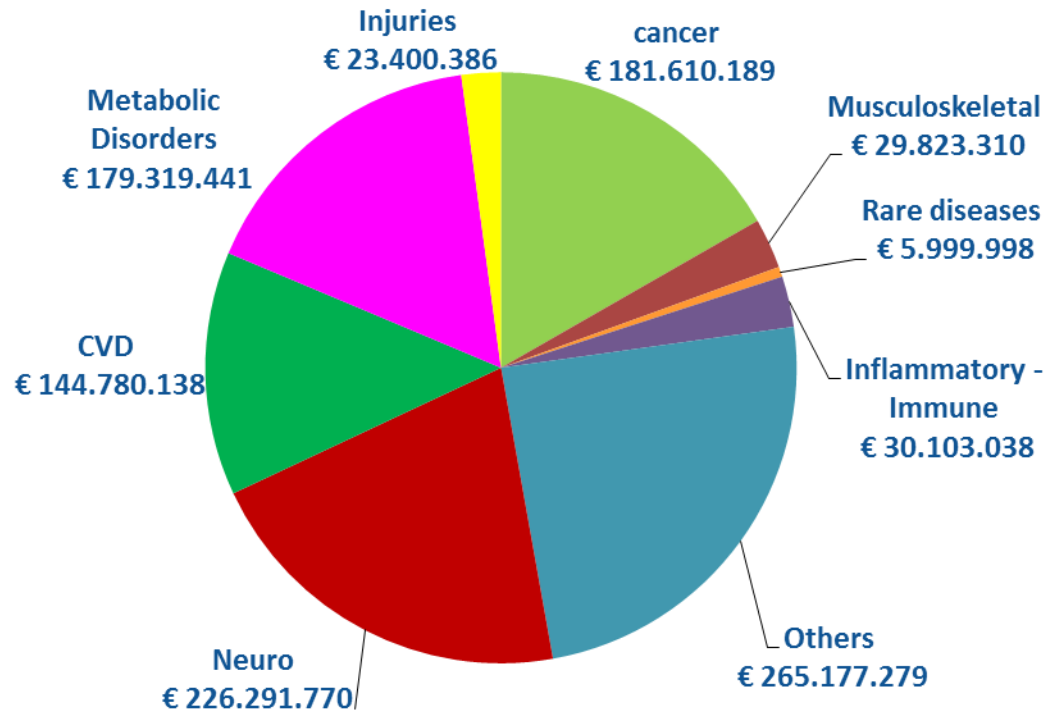
JAN-WILLEM VAN DE LOO, DOMINIKA TRZASKA, KARIM BERKOUK, MARIA VIDAL, RUXANDRA DRAGHIA-AKLI

European Commission, Health Directorate, Directorate General for Research and Innovation, Brussels, Belgium

**FP7: € 1,5 billion (2007-2013)**

**Increased focus on clinical research**

**> 340,000 patients recruited**  
**165 Projects, 286 CTs , € 1.1 billion**



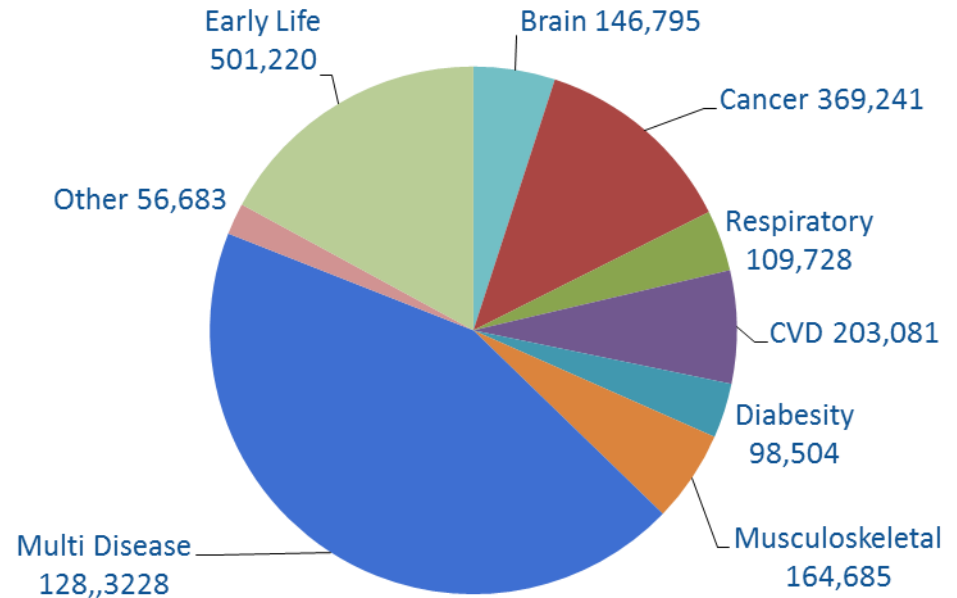
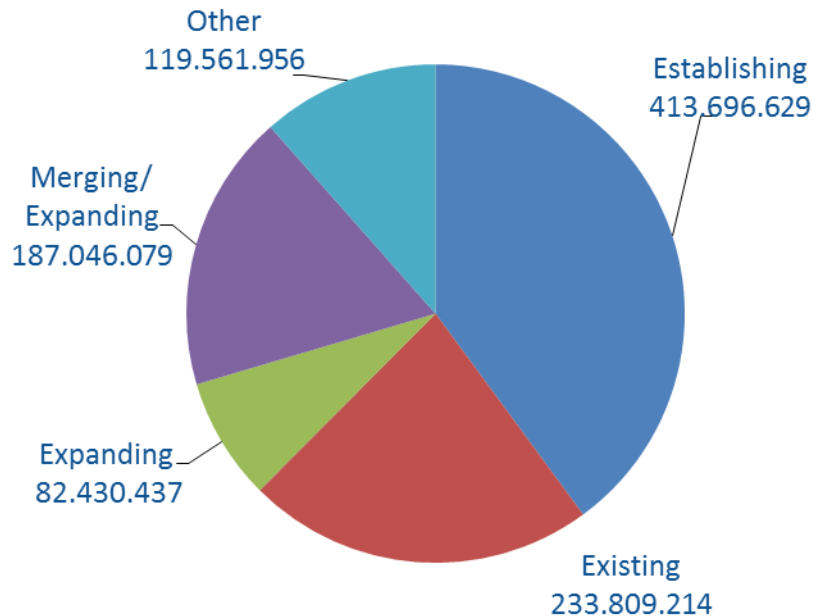
Phase I : 16%  
Phase I/II : 23 %  
Phase II : 21%  
Phase II/III : 5 %  
Phase III : 6 %  
Phase IV : 1 %  
Interventional Study: 17 %

**FP7 Health Programme**

# Maximising cohorts value



**266 projects, > € 1 billion**  
**55 collaborative projects ~ 3 million subjects**



**FP7 Health Programme**  
Number of subjects in 55 projects

# National research policies - Stronger together



- Linking national/regional cancer registries and bio-banks to improve quality of data collection, optimise cancer control in Europe and evaluate therapy effectiveness



- Linking 29 national/regional funding organisations in 20 countries working on translational cancer research. EUR 33 million mobilised

- **1<sup>st</sup> joint call on 'Tumour heterogeneity' (EUR 16 million)**
- **2<sup>nd</sup> joint call on 'Immunotherapy' (EUR 10 million)**



European  
Commission

# Horizon 2020: Three priorities





# Health, demographic change and wellbeing



## Our priorities 2014-2017



### Personalised medicine

Call 2014-15:  
EUR 1.3 B

Call 2016-17:  
EUR 1.4 B



Healthy ageing  
(2014-2017)



Health ICT  
(2014-2017)



Maternal and child  
health  
(2016-2017)

Human  
biomonitoring  
(2016-2017)



# Setting the path for personalised medicine



**Stratification and high risk groups**

**Molecular understanding of disease**

**Molecular classification of cancer sub-types**

**Molecular taxonomy**

**Biomarker identification for:**

- Diagnosis
- Prognosis
- Prediction
- Monitoring

**Medical Imaging to optimize treatment options**

**Wide range of animal models**

**In silico models**

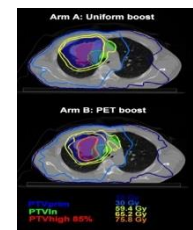
**In vitro & ex-vivo models (xeno patients)**

**Targeted drug development via biology driven hypothesis**

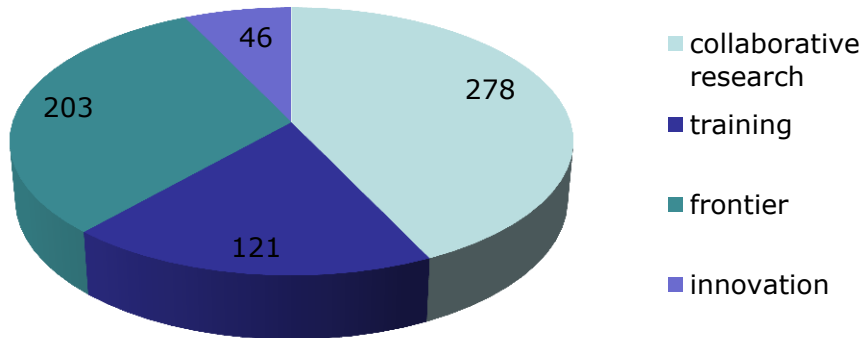
**Bio-informatics for treatment decision making**

**Novel CT design**

**Identification of sub-groups for better quality of life**



# EU cancer research – what's being funded (HORIZON2020)



- *translational research*
  - **metastasis, resistance**
  - **tumour microenvironment**
  - **biomarkers, drugs, MoAbs**
  - **imaging and technology**
  - **models**
  - **prevention & early detection**
  - **co-morbidities**
- *investigator-driven trials*
- *comparative effectiveness*
- *palliative & end-of-life care*

**€ 650 million (2014-2016)**

**€ 103 million on cancer prevention and early diagnosis**

- **Increased focus on innovation and research to patients, to market**

# Advancing targeted therapies development

**137 projects**  
**258 million EUR**

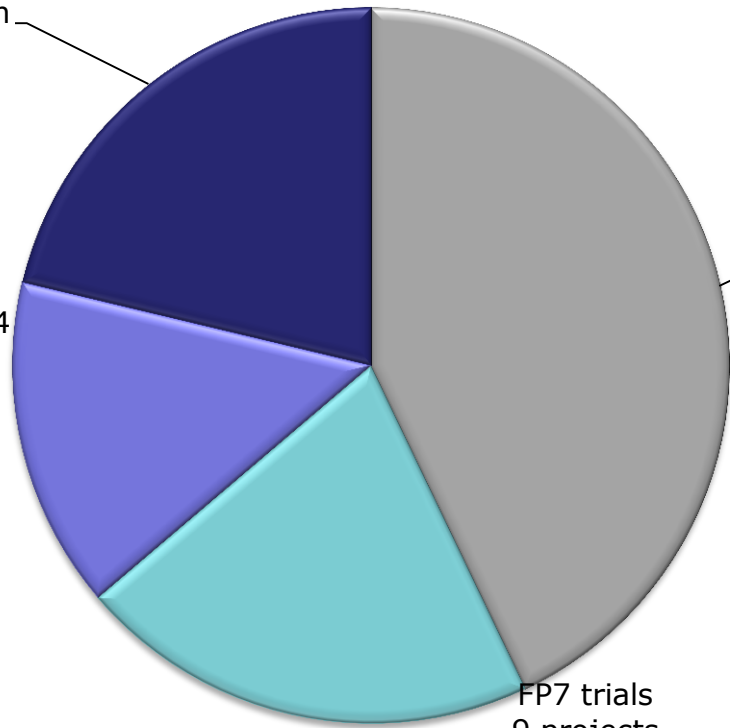
- T-CAR cells
- DNA vaccines
- RNA vaccines
- Peptide vaccines
- Dendritic cells
- Antibodies

H2020 trials  
10 projects  
EUR 54 million

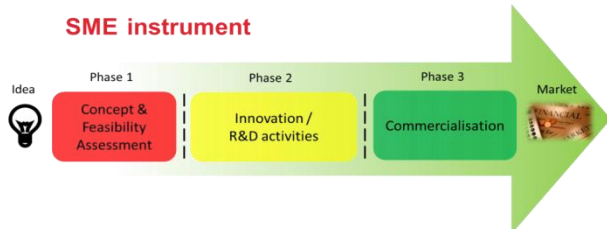
H2020 preclinical  
34 projects  
EUR 38 million

FP7 preclinical  
88 projects  
EUR 109 million

FP7 trials  
9 projects  
EUR 53 million



# Biomarkers informing care



| Cancer indication | Project             | Beneficiary   | EU funding | What it will deliver   |
|-------------------|---------------------|---------------|------------|--|
| Multiple          | NO-META             | Cytofind      | € 50,000   | Liquid biopsy using a new method to count and isolate CTCs based on single cell determination of the anomalous metabolic properties of tumour cells (Warburg effect) |
| Multiple          | MAINTRAC-Auto       | SIMFO GmbH    | € 50,000   | Automatization and validation of a liquid biopsy assay "Maintrac-AUTO CTC-analyser"  |
| Colorectal cancer | CYTOPRO             | CYTOTRACK APS | € 50,000   | A device to identify and isolate metastatic cancer cells from a blood sample based on CTC KRAS analysis  |
| Multiple          | ONCOCHECK           | LIFE LENGTH   | € 50,000   | Prognosis and monitoring test based on the determination of telomere length in peripheral blood  |
| Leukaemia         | SENSITIVITY MARKERS | NTRC          | € 50,000   | Clinical validation of prognostic biomarkers of chemotherapy response in liquid biopsies   |
| Lung cancer       | CELLETEST           | STEM SEL      | € 50,000   | medical device for non-invasive diagnosis and prognosis of metastatic lung cancer  |
|                   |                     |               |            |  |

# Patient-centred quality-of-life



**PanCare Studies in Fertility and Ototoxicity to Improve Quality of Life after Cancer during Childhood, Adolescence and Young Adulthood**



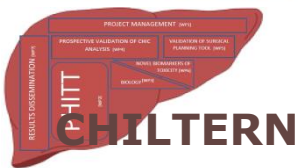
**Validating predictive models of radiotherapy toxicity to improve quality-of-life and reduce side-effects in cancer survivors**



**Advance Care Planning; an Innovative Palliative Care Intervention to Improve Quality of Life in Cancer Patients - a Multi-Centre Cluster Randomized Clinical Trial**



**Randomised controlled trial to evaluate electronic Symptom Management using the Advanced Symptom Management System (ASyMS) Remote Technology for patients with cancers**



**Children's Liver Tumour European Network**



# Big Data – it's about better data



Auffray et al. *Genome Medicine* (2016) 8:71  
DOI 10.1186/s13073-016-0323-y

Genome Medicine

OPINION

Open Access

## Making sense of big data in health research: Towards an EU action plan



Charles Auffray<sup>1,2\*</sup>, Rudi Balling<sup>3\*</sup>, Inês Barroso<sup>4</sup>, László Bencze<sup>5</sup>, Mikael Benson<sup>6</sup>, Jay Bergeron<sup>7</sup>, Enrique Bernal-Delgado<sup>8</sup>, Niklas Blomberg<sup>9</sup>, Christoph Bock<sup>10,11,12</sup>, Ana Conesa<sup>13,14</sup>, Susanna Del Signore<sup>15</sup>, Christophe Delogne<sup>16</sup>, Peter Devilee<sup>17</sup>, Alberto Di Meglio<sup>18</sup>, Marinus Eijkemans<sup>19</sup>, Paul Flicek<sup>20</sup>, Norbert Graf<sup>21</sup>, Vera Grimm<sup>22</sup>, Henk-Jan Guchelaar<sup>23</sup>, Yi-Ke Guo<sup>24</sup>, Ivo Glynne Gut<sup>25</sup>, Allan Hanbury<sup>26</sup>, Shahid Hanif<sup>27</sup>, Ralf-Dieter Hilgers<sup>28</sup>, Ángel Honrado<sup>29</sup>, D. Rod Hose<sup>30</sup>, Jeanine Houwing-Duistermaat<sup>31</sup>, Tim Hubbard<sup>32,33</sup>, Sophie Helen Janacek<sup>20</sup>, Haralampos Karanikas<sup>34</sup>, Tim Kievits<sup>35</sup>, Manfred Kohler<sup>36</sup>, Andreas Kremer<sup>37</sup>, Jerry Lanfear<sup>38</sup>, Thomas Lengauer<sup>12</sup>, Edith Maes<sup>39</sup>, Theo Meert<sup>40</sup>, Werner Müller<sup>41</sup>, Dörthe Nickel<sup>42</sup>, Peter Oledzki<sup>43</sup>, Bertrand Pedersen<sup>44</sup>, Milan Petkovic<sup>45</sup>, Konstantinos Pliakos<sup>46</sup>, Magnus Rattray<sup>41</sup>, Josep Redón i Màs<sup>47</sup>, Reinhard Schneider<sup>3</sup>, Thierry Sengstag<sup>48</sup>, Xavier Serra-Picamal<sup>49</sup>, Wouter Spek<sup>50</sup>, Lea A. I. Vaas<sup>36</sup>, Okker van Batenburg<sup>50</sup>, Marc Vandelaer<sup>51</sup>, Peter Varnai<sup>52</sup>, Pablo Villoslada<sup>53</sup>, Juan Antonio Vizcaino<sup>20</sup>, John Peter Mary Wubbe<sup>54</sup> and Gianluigi Zanetti<sup>55,56</sup>

<https://genomemedicine.biomedcentral.com/articles/10.1186/s13073-016-0323-y>



## In projects

- Partners
- Through ethics board, safety monitoring board, and patient input platform
- Offer patients' perspective on recruitment, study design, project communication
- Translate results in lay language, modify guidelines to better fit patients' needs, contribute to dissemination activities...

## In policy design

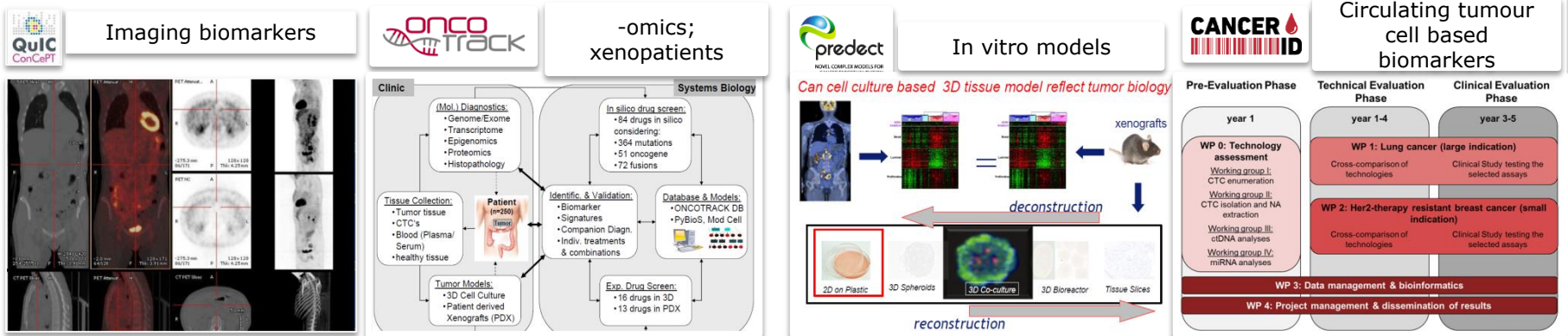
- Work programmes based on wide consultations:
  - Advisory Group: representative of European Patient Associations
  - workshops: participation patients
- Horizon 2020 topics are patient-centred
- Many events are triggered by patient organisations



# Innovative Medicines Initiative



- **Public-private partnership between the EU and pharmaceutical industry launched in 2008**
- **Cancer is strategic priority (Strategic Research Agenda 2014-2020)**
- **Cancer research has benefited from IMI support:**



## IMI2 topics

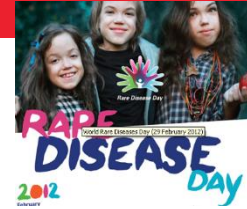
**Development of an outcomes-focused data platform to empower policy makers and clinicians to optimize care for patients with hematologic malignancies**

**A comprehensive 'paediatric preclinical POC platform' to enable clinical molecule development for children with cancer**

# Timing up with global partners

## International Rare Disease Research Consortium

- 200 new therapies by 2020
- 43 international partners, funders so far
- Commitment to allocate \$10 million over 5 years



## International KO Mouse Consortium

- Mutate all protein-encoding genes in the mouse
- NIH, EU Commission, Genome Canada
- Total investment > \$100 million; EU: €13 million



## International Cancer Genome Consortium

- Full molecular fingerprint 50 tumours
- NIH, EU Commission, and 11 other countries
- Total investment > \$250 million; EU: €21 million



## International Human Epigenome Consortium

- Identify genome-wide DNA methylation patterns of all human genes
- NIH, EU Commission, CA, DE, UK, IT, Korea
- Total investment > \$120 million



# International Consortium for Personalised Medicine (IC PerMed)

## WHAT

Collaboration of research funders and policy makers from EU Member States and beyond

## WHY

- Establish Europe as a global leader in PM research
- Support the PM science base through a coordinated approach to research
- Provide evidence to demonstrate the benefit of PM to citizens and healthcare systems
- Pave the way for PM approaches for citizens

## HOW

Implementation of a Roadmap based on PerMed Strategic Research Agenda (SRIA)



# IC PerMed Challenges and facilitators



**Maria Judith Molnar**  
Health Ministry, Hungary

**Policy, Funders, Researchers,  
Industry, Ethics/Data committees,  
Patients/Citizens**



**Wolfgang Ballensiefen**, Ministry of  
Research (DLR-PT), Germany

**Policy, Patients/Citizens,  
Industry, Funders,  
Researchers**



**Industry, Policy,  
Regulators, Funders,  
Researchers,  
Patients/Citizens**



**Daria Julkowska**, National  
Research Agency, France  
**Hemma Bauer**, Ministry of Science,  
Research and Economy, Austria

**Innovations**  
in Diagnosis, Therapies,  
Prevention & ICT  
with **economic value**  
and **fair access**.

**Gaetano  
Guglielmi**  
Ministry of  
Health, Italy



**Policy, Providers,  
Health Technology  
Assessment ,  
Insurances,  
Patients/Citizens**



**Policy, Industry,  
Health Technology  
Assessment ,  
Providers,  
Researchers,  
Patients/Citizens**



**Peter Honggaard Andersen**  
Innovation Fund, Denmark

## ***IC PerMed roadmap – under development***

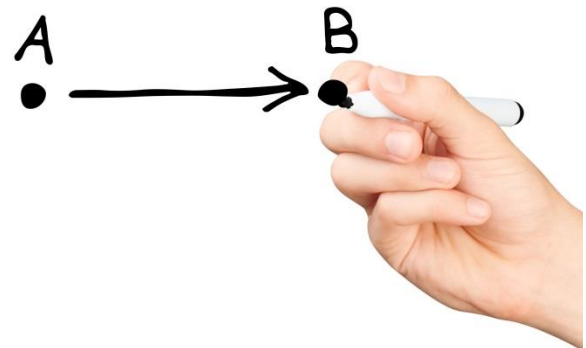
*Will include actionable research activities*

*Aims to map ongoing activities*

*Proposed means for implementation – EU, national, regional levels*

*Available in Q4 2016*

*Will be updated regularly*



[https://ec.europa.eu/research/conferences/2016/permed2016/pdf/towards\\_ic\\_permed.pdf](https://ec.europa.eu/research/conferences/2016/permed2016/pdf/towards_ic_permed.pdf)

# What can we EU offer ?



- **A network of collaborative projects throughout Europe and beyond, addressing the continuum of cancer research**
- **An efficient public-private partnership to accelerate the delivery of innovative therapies**
- **An established framework for effective research coordination between EU countries**
- **A strong experience in international/global cooperation, via a flexible model**

# Conclusions



- **Lot of potential for collaboration, knowledge and data across disciplines and sectors, including public-public and public-private partnerships, building on existing projects and schemes**
- **Accelerating innovative research for the benefit of patients: prevention, risk reduction, early diagnosis, treatment, care**
- **Strong support to international efforts, including the development of research plans and policies**

**Horizon 2020 provides many opportunities to rapidly deliver in the field of cancer research!**

# Learn more

- [Horizon 2020 Societal Challenge 1 website](#)
- Participant portal: [All H2020 calls and topics](#)
- Search topics by keywords - [use the search engine of the Participant Portal](#)
- Find partners: register to [Fit for Health](#)
- Support & advice about Horizon 2020: [Spanish NCPs](#)



The screenshot shows the 'RESEARCH & INNOVATION Participant Portal' website. The header includes the European Commission logo and navigation links: HOME, FUNDING OPPORTUNITIES, HOW TO PARTICIPATE, EXPERTS, SUPPORT, Search PP, LOGIN, and REGISTER. A banner for 'Horizon 2020 Funding Starting from 1/1/2014' is displayed. Below the banner, a section titled 'On this site you can find and secure funding for projects under the following EU programmes:' lists several programmes. Two columns of user actions are provided: 'Non-registered users' and 'Registered users'. At the bottom, a grid of six icons represents different portal sections: WHAT'S NEW?, FUNDING OPPORTUNITIES, HOW TO PARTICIPATE, WORK AS AN EXPERT, MY PERSONAL AREA, and INFORMATION AND SUPPORT.

RESEARCH & INNOVATION  
Participant Portal

European Commission

European Commission > Research & Innovation > Participant Portal > Home

HOME FUNDING OPPORTUNITIES HOW TO PARTICIPATE EXPERTS SUPPORT Search PP LOGIN REGISTER

Horizon 2020 Funding  
Starting from 1/1/2014

On this site you can find and secure **funding** for projects under the following EU programmes:

- 2014-2020 Horizon 2020 - research and innovation framework programme
- 2007-2013 7th research framework programme (FP7) and Competitiveness & Innovation Programme (CIP)
- Research Fund for Coal & Steel, COSME, 3rd Health Programme, Consumer Programme, Justice Programme
- New since January 2016: Promotion of Agricultural Products Programme

**Non-registered users**

- search for funding
- read the H2020 Online Manual & download the legal documents
- check if an organisation is already registered
- contact our support services or check our FAQs

**Registered users**

- submit your proposal
- sign the grant
- manage your project throughout its lifecycle
- register as expert advising the Commission

WHAT'S NEW? FUNDING OPPORTUNITIES HOW TO PARTICIPATE WORK AS AN EXPERT MY PERSONAL AREA INFORMATION AND SUPPORT