The Comprehensive Cancer Centre for quality and innovation of cancer care

Ulrik Ringborg

171208

Cancer – an increasing societal problem

- The number of new cancer patients in Europe will increase from 3,6 to 4,3 million in the next two decades, amounting to 716 000 additional cases annually.

- The number of patients living with a cancer diagnosis is increasing even more – cancer is becoming a main chronic disease.

- Globally, 23 000 patients die every day due to cancer.

- **Health care and prevention are not balancing the increasing problem. We need innovation of cancer care and prevention**

There are two main barriers

- **The intrinsic complexity of cancer** – large number of diseases and subgroups with variability in outcome, genomic instability and heterogeneity

- **Fragmentation** – research, clinical care, prevention, funding

Main reasons for fragmentation of cancer research

- **Suboptimal translational cancer research** – both early and late translational research
- **Lack of critical mass**
- Outcomes of the EUROCAN+PLUS project

The Comprehensive Cancer Centre – a key structure

Integration of:

- Multidisciplinary/multiprofessional cancer care
- Prevention
- Research for innovation– translational cancer research
- Education

Criteria and quality assurance of Comprehensive Cancer Centres

- The **Comprehensive Cancer Centre (CCC)** has all components for care, prevention, research and education with aim to innovate

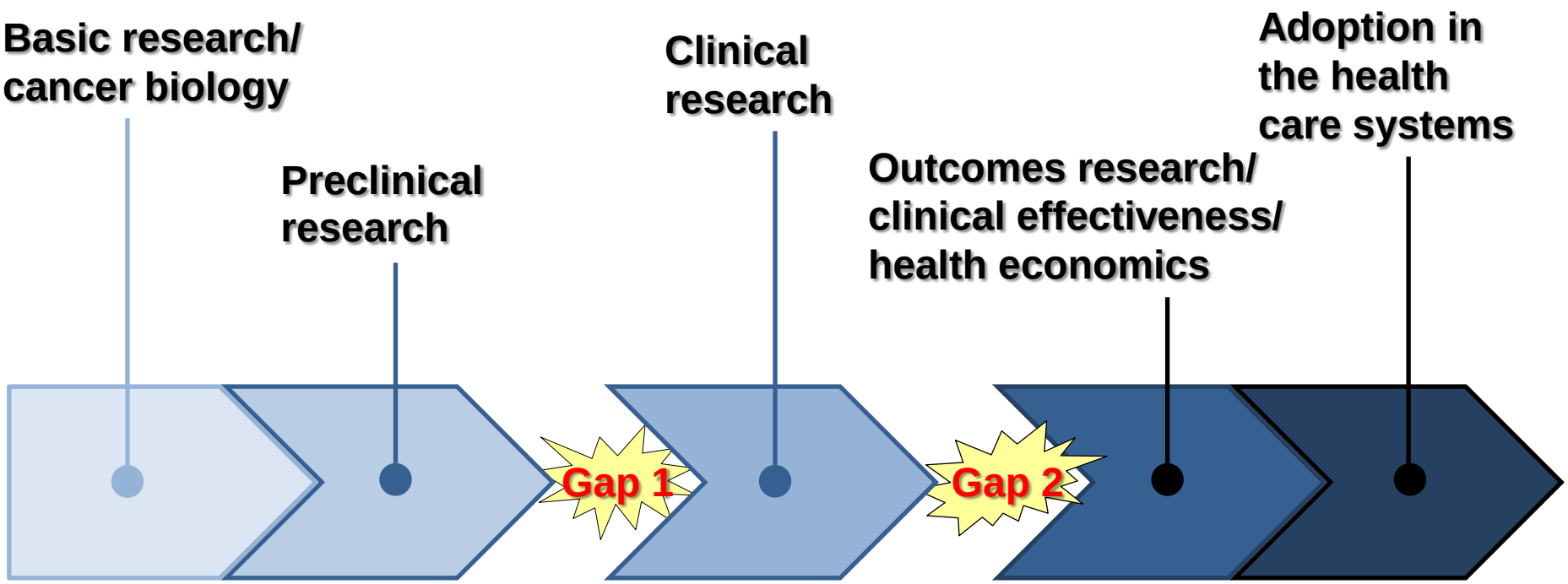
- **Accreditation programs** by:
- Organisation of European Cancer Institutes (OECI)
- German Cancer Aid (Deutsche Krebshilfe)

Cancer care is an infrastructure for research

High quality cancer - an increasing challenge

- A complete multidisciplinary/professional care has to cover the whole clinical pathway
- All diagnostic and treatment/care components have to be integrated in one organisation
- Quality is dependent on a continous innovation
- The increasing knowledge of cancer biology is a prerequisite for development of predictive and personalized cancer medicine

Translational cancer research – a coherent research continuum



Infrastructures and resources needed for translational cancer research

- Technical omics platforms, bioinformatics and functional/molecular imaging
- Screening facilities for new anticancer agents
- Animal facilities/models
- Clinical trial structures for early clinical trials and next generation clinical trials
- Pharmacology
- Biobanks for tumours, normal tissues and liquid biopsies

Infrastructures and resources needed for translational cancer research, cont.

- Quality assured patient registries containing treatment information, also for long term follow-up
- Structure for bidirectional translational research – clinical registries with treatment information and biological materials
- Biostatistics, epidemiology and outcomes research
- Structure for health related quality of life assessment

EurocanPlatform project

- Focus on critical mass for personalized/precision cancer medicine research by collaboration between cancer research centres

- Deliverables:
- Cancer Core Europe
- Cancer Prevention Europe
- Program for Designation of CCCs of Excellence

Collaboration between centres necessary to reach the critical mass – a few examples

- Personalized and predictive cancer medicine – biomarker discovery & validation
- Genetic dependencies of tumours – taxonomy
- Next generation clinical trials
- Bidirectional translational cancer research
- Outcomes research – clinical validation/utility of innovations, survivorship

Cancer Core Europe

Six Comprehensive Cancer Centers

CAMBRIDGE Cancer CENTRE

dkfz. GERMAN CANCER RESEARCH CENTER IN THE HELMHOLTZ ASSOCIATION

GUSTAVE ROUSSY CANCER CAMPUS GRAND PARIS

Karolinska Institutet

NETHERLANDS CANCER INSTITUTE ANTONI VAN LEEUWENHOEK

VHIO VALL D'HEBRON Institut d'Oncologia

Criteria and quality assurance of Comprehensive Cancer Centres of Excellence

- A designation program has been developed by the EurocanPlatform project & the European Academy of Cancer Sciences
- Accredited Comprehensive Cancer Centres (CCCs) can be assessed by the European Academy of Cancer Sciences for designation of excellence
- Focus on assessment of **translational cancer research** in a CCC

A parallel development in Germany

- **German Cancer Research Consortium (DKTK)** – a formal collaboration between eight German CCCs
- **National Center for Tumour diseases** – now a partnership between two DKTK centres – aim to strengthen the clinical part of translational cancer research

Personalized/precision cancer medicine

- Critical mass regarding patients and biological materials
- Sharing technological resources
- Sharing competences
- Environment for open science – sharing clinical and research data

Open science is a key question

Molecular taxonomy replacing histogenetic classification of tumours

- Genomics
- Epigenomics
- Transcriptomics
- Proteomics
- Metabolomics

- Mutations driving the tumour
- **Molecular pathways driving the tumour**

Next generation clinical trials

- Histology based – enrichment of patients
- Histology agnostic
- Platform trials
- Basket trials
- Adaptive trials
- Single subject clinical trials – ”N-of-1”

- **Dependent of improved stratification methods**
- **Molecular imaging**

Bidirectional translational research

- Clinical information linked to biological materials
- Biopsies before, after and during treatment – tumour tissue, liquid biopsies, normal tissue
- Biomarker discovery – prediction of antitumour effects and side-effects
- Resistance – intrinsic, acquired
- Tumour cell heterogeneity
- Tumour infrastructure

Bridging preclinical and clinical research

Outcomes research

- Outcomes of innovations from early translational research – new drugs and diagnostic technologies
- Outcomes of added value of innovations when compared to existing treatment programs
- Assessment of health related quality of life
- Outcomes of treatment in real life
- Long-term follow-up – cancer survivorship

End points: both survival and quality of life

Clinical efficacy versus clinical effectiveness

- Assumptions on the effects of anti-cancer therapies are usually based on results from clinical trials i.e. the **clinical efficacy.**

- We need data on **clinical effectiveness**, i.e. effects of a new therapeutic intervention on a population based patient cohort, **equal to clinical validation**

- Data on clinical effectiveness necessary for **cost-effectiveness** assessment

Health expenditure on cancer in EU

- €35.7 billion in 1995
- €83.2 billion in 2014

Drugs:

- €7.6 billion in 2005
- €19.1 billion in 2014

B. Jönsson

9/10 drugs are failing registration

Costs for one approved drug

800 million USD

Cancer – a model for the main chronic diseases

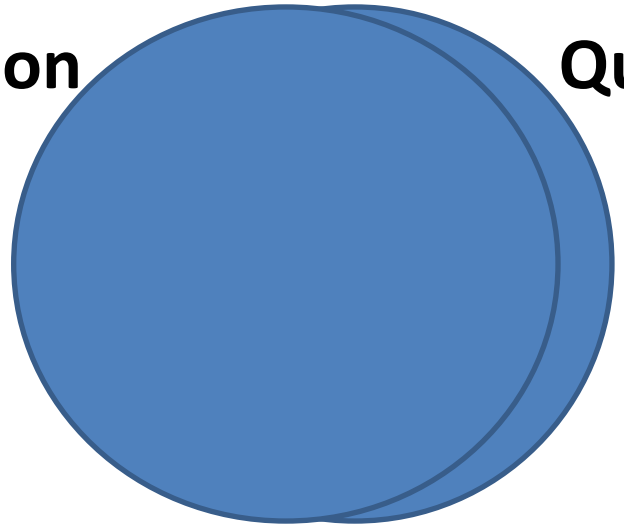
- Research strategies for translational cancer research towards personalized/precision cancer medicine and prevention
- Quality assured research environments for translational cancer research, CCCs
- Consortias of CCCs to reach the critical mass
- European Academy of Cancer Sciences for science policy support and analyses of research strategies

Quality and innovation cannot be separated in cancer care

- Improved early translational cancer research increases the demands on the clinical research
- Improved structuring and collaboration will allow more patients to participate in research – new treatments available for more patients
- Research to assess the added clinical value of innovations is an unmet need and should be increased – new treaments available for the health care
- Addition of health economics (cost-effectiveness) makes prioritisation in the health care possible
- Efficient innovation and quality of care will not be possible without CCCs and collaborations between CCCs

So, quality of care and innovation – two sides of the same coin

Innovation



Quality of care

Congratulations to Athens and Germany for important contribution to integrated European cancer research!

THANKS!

Karolinska Institutet