Slaying the Cancer Demons: Optimising Patient Outcome by Leveraging Learnings through Big Data and Clinical Research Platforms in a Dual Longitudinal Continuity Framework

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**EORTC by the numbers**

<table>
<thead>
<tr>
<th>A world-class network</th>
<th>An expert HQ</th>
<th>Unique output</th>
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</thead>
<tbody>
<tr>
<td>• 4,600 collaborators</td>
<td>• 191 employees</td>
<td>• 18 new studies opened in 2015</td>
</tr>
<tr>
<td>• 640 institutions</td>
<td>• 190,000 patients in database</td>
<td>• 48 studies open to patient entry</td>
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<tr>
<td>• 37 countries</td>
<td>• 24,000 patients in follow-up</td>
<td>• 25 studies in protocol outline development</td>
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<tr>
<td>• 21 groups &amp; task-techniques</td>
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<td>• 22 studies in protocol development</td>
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<tr>
<td>• 100 collaborative groups</td>
<td></td>
<td>• 14 studies in regulatory activation</td>
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<td>• 83,551 pts on studies (2000-2015)</td>
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<td>• Working on ≈ 190 studies</td>
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SPECTA: precision oncology platform
The basic principles towards transformation

- Precision oncology is here to stay
- Immunotherapy is taking a central role in drug development and in therapeutic strategies
- Increasing role of predictive biomarkers
- New types of end-points and data.
- Rapid changes of the health care systems

Tumor heterogeneity and escape mechanisms to be the next challenges

The journey through cancer is not simply like the same disease that recurs
Recurrent pivotal questions

• Is the classical phase I, II, II process still adequate?
• How to access efficiently sub-group of molecularly defined patients?
• What are the pre-analytical requirements for biological samples, handling?
• What are the adequate steps for analytical and clinical validation of a biomarker and related assay?
• How to qualify cut-off values for decision process?
• What is the impact on clinical trial designs and optimal assessment of clinical utility?
• How the process of drug registration and access will evolve?
• How will new treatments be valued at the light on their true benefit in real life?
Towards a data driven Healthcare
From “omics” to economics

Biomarker analytical and clinical validation
Innovative trial designs / Trial access
QA/QC validated platforms & Services
Collected data

Clinical Utility
Regulatory pathway / Market access supported by agile licensing

Treatment guideline development

Faster access to (cost)effective care

Business risk reduction
Oncology Has The Lowest Success Rate
Probability Of Success For Oncology vs Non-Oncology
(2006-2015)

Source: BIO
The Biotechnology Innovation Organization, Emerging Therapeutic Company
Investment and Deal Trends, June 2016
Strong Pipeline in Oncology Highlights Increasing Competition in the Future
Total Number of Transitions by Disease (2006-2015)

Source: BIO
The Biotechnology Innovation Organization, Emerging Therapeutic Company
Investment and Deal Trends, June 2016
Quality of life in years

Costs (€) per QALY

Cytotoxic drugs

- Trabectidin in STS
- GEM in PC
- Oxali 1st line CRC
- Camto 2nd line CRC
- TAX 1st line OVCA
- TEM in GBM
- TXT 2nd line NSCLC

Costs (€) per QALY

Upper limit NICE
Upper limit US Government
Upper limit Dutch Government
Median limit US Medical Oncologists

Courtesy of J Verweij

Barret A et al, BMJ 2006; 333:1118-1120
Quality adjusted life years

Costs (€) per QALY
Monoclonal antibodies

BEV BC 1st line
BEV RC
TRAS BC adjuvant
TRAS beyond PD
CETUX H/N 1st line M1
CETUX CRC 3rd line wt K-RAS

0 50000 100000 150000 200000 250000

Upper limit NICE
Upper limit US Government
Upper limit Dutch Government
Median limit US Medical Oncologists

Courtesy of J Verweij

Dedes KJ et al; EJC 2009; 45: 1397-1406
Tappenden P et al; EJC 2007, 43:2487-2494
Value Health 2009, March 10 (volume 12)
Chan et al, Ann Pharmacother. 2009 Feb;43:296-303
Barret A et al, BMJ 2006; 333:1118-1120
Mittmann N et al, JNCI 2009; 101:1182-1192
Starling N et al, BJC 2007; 96:206-212
The changing clinical research pathway

Early clinical trials (R&D)
- Biology / imaging driven
- Integrated TR
- Screening platforms
- Collection of high quality data from various sources

Pivotal trials
- Highly targeted
- Large differences

Population-based studies
- Real world data
- Quality of life
- Health economics
- HTA
- Pragmatic trials

From trials “designed to learn” to real life situation

New continuity solutions that span from proof of concept into effectiveness

Selected but non exhaustive challenges...

- Drug development is currently not patient centered
  - Protocols seeking patients → patient seeking protocols
  - One protocol/one drug/one population/one technology is non efficient
  - Sub-optimal anticipation of real life questions i.e. combinations...
  - Number of combinations novel-novel remain very small
  - Inappropriate set ups for long term outcome research
  - Patients do need continued solutions along the evolution of their disease (patterns of progression and resistance)

How to reconcile the continuum of care and the continuity of solutions for drug development?
The principle of dual longitudinal continuity
From R&D to real life...

Early Drug Development

- Manufacturer 1
- Manufacturer 2
- Manufacturer 3

Market access

Real Life Use

- Drug A
- Drug B
- Drug C

Combos & Integration with existing treatments

Basic researcher

Drug developers

Regulators and payers

The future of cancer therapy
Transformation proposal

Longitudinal large scale data capture platform constantly curated and annotated

- Clinical
- Biological
- Imaging
- Treatment details
- Outcomes
- Quality assurance parameters

Towards a data driven Healthcare
From “omics” to economics
TRANSFORMATION NEEDS 2 SPECIFIC ASSETS TO BE DEVELOPED

New clinical research architecture
- Patient centric
  - From real life into real life

Operational and regulatory innovation
- Collaboration between and across stakeholders

- Multiple new drug development based on biology
- Application at any time of the drug development and beyond
- Standardisation of methodologies: designs, endpoints, technologies, populations etc...
- Shared control population/contemporary benchmarking solutions
- Permanent capacity for enrollment in clinical trials
- Complex clinical trials made easier: basket concept, adaptive designs, MAMS etc...
- Efficient data exchange compatibility
- Shared operational infrastructure
New access platforms / shared knowledge

- Incoming flow of patients
  - Biological, imaging clinical data
- Access to clinical trials
  - Adaptive programs
  - Drug registration
  - Off label
  - Drug developers
  - Regulators
- Building prospective real life cohorts

Researchers
- Understanding the biology
  - Research
  - Biomarker prevalence studies
  - Documentation of practice

Technology Developers
- Knowledge development

Payers
- Benchmarking Outcome research
- HTA

Knowledge development ~ Conclusion ~ Effective implementation

The future of cancer therapy
Expected deliveries

• Alignment of competencies of stakeholders
• Rapid identification of patient sub groups in a pre-competitive manner and expedite the start of clinical trials
• Connect more efficiently knowledge development to real life issues
• Benchmarking technologies/benchmarking populations/standardization of methodologies
• Long term outcome research across data sets i.e. immunotherapy
The ultimate need...

Independent data capture for all types of clinical, biological, imaging data and records alongside biomarker test results and all therapies received, in databases which are constantly curated and annotated.
The SPECTA collaborative platform: Knowledge development

A prospective and longitudinal clinically annotated biobank

Molecular Screening Platform

1st line trial

Standard treatment (no open trial)

2nd line trial

Standard treatment

3rd line trial

Standard treatment (no open trial)

Academia investment

Industry cooperation

A prospective and longitudinal clinically annotated biobank

The future of cancer therapy
28TH EORTC-NCI-AACR SYMPOSIUM

EORTC
NCI
AACR
2016

‘MOLECULAR TARGETS AND CANCER THERAPEUTICS’

SAVE THE DATE

29 NOVEMBER 2016
2 DECEMBER 2016

MUNICH, GERMANY

Organised by

EORTC
National Cancer Institute
American Association for Cancer Research