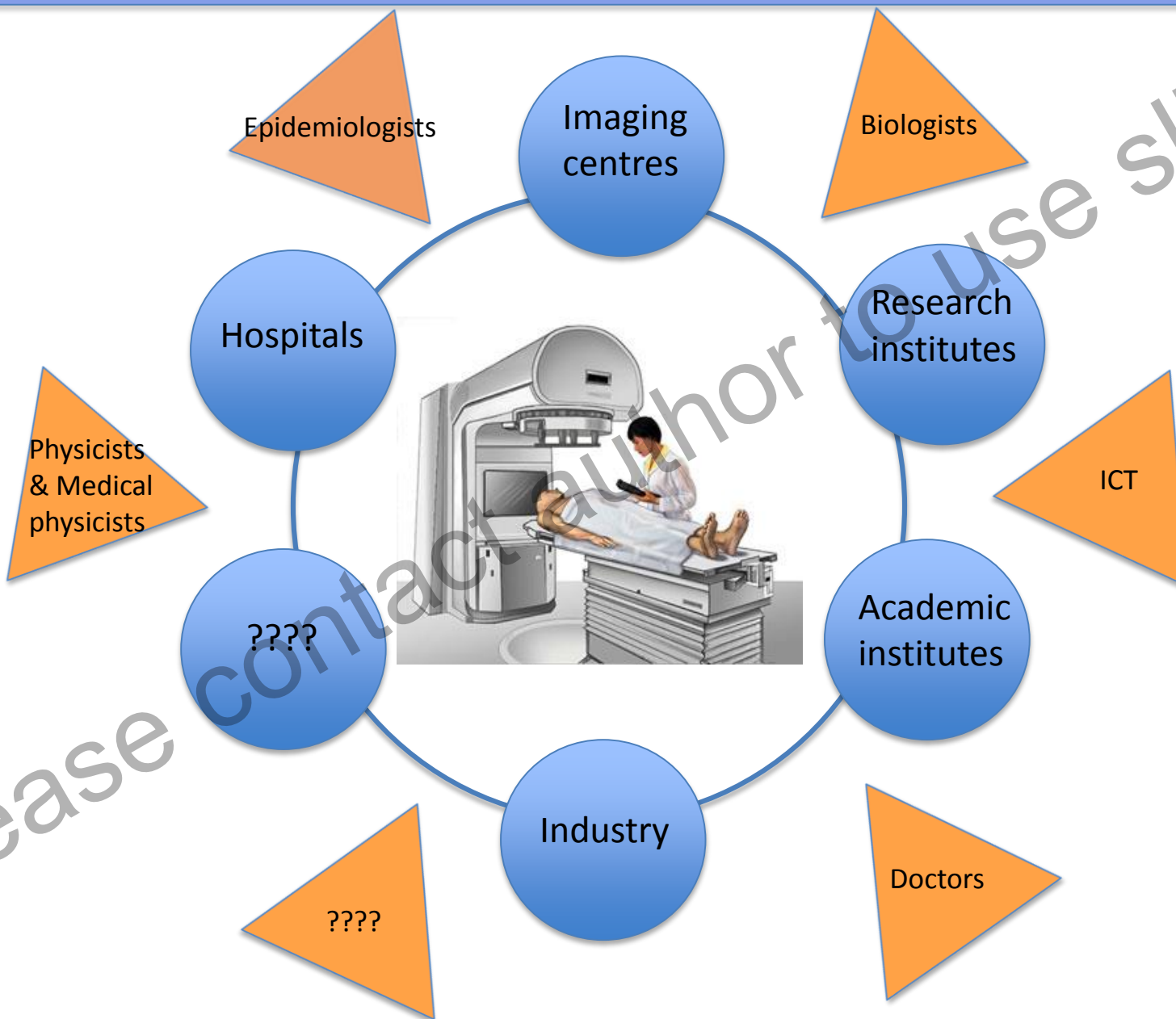


# ENLIGHT is a open collaborative network



# ENLIGHT: where did we come from?

- The idea germinated in **2001** by ESTRO HT group at Med-AUSTRON meeting
- ENLIGHT was launched in **2002** to coordinate European research in hadrontherapy
- The Network was funded by the European Commission between **2002 and 2005**
- In **2006** the community decided to continue with ENLIGHT even without funding since it was found to be essential catalyst for collaboration
- We are still here in 2015!!

# ENLIGHT was established to .....

- Create common multidisciplinary platform
- Share knowledge:
- Share best practices
- Harmonise data: challenging
- Provide training, education
- Identify challenges
- Innovate
- Lobbying for funding
- .....



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- **Create common multidisciplinary platform:** e.g. annual meetings, initiating and implementing projects, ICTR-PHE, jobs, opportunities, continuity since 2006 and is on-going
- **Share knowledge:** website, ENLIGHT Highlights, ESTRO newsletter/ashes, publicity via flyers, articles, animations videos, provide support via letters and talks in member institutes/countries, Open access journal articles for ENLIGHT publications e.g. JRR, Frontiers in Oncology etc
- **ENLIGHT office:** organisation of meetings, future perspective, Enlight open membership kept informed no payment
- **Share best practices:** reports, visits, ENLIGHT meeting moves around, posters/prizes for visibility for young people
- **Harmonise and share data:** challenging

# ENLIGHT has done..... 2

- **Provide training, education:** training young generations, training, hands on experience, short term/mid term fellowship, being done well (eg PARTNER researchers at MedAustron),
- **Identify challenges:** need involvement of young medical researchers/staff
- **Innovate:** always work in progress
- **Lobbying for funding:** great success in FP7, Horizon2020 challenging
- **ENLIGHT office:** organisation of meetings, future perspective, Enlight open membership kept informed, no payment, ENLIGHT members get involved in many new initiatives e.g. ICTR-PHE, APAE, young researchers in CERN Open Day, European Researcher's Night
- .....

## But this is not all... (M. Baumann´ slides

Currently particle therapy is by far more expensive and by far more dependent on a huge team of highly skilled experts

Range of beam is needed

Novel approaches need to be investigated (discovery and basic research) and translated into the clinics (development)

Education and Training

Societal challenges: Innovation and health economy research

# But this is not all...

Motion, anatomic changes during treatment,  
biological changes during treatment

Taking full advantage of particle therapy in terms of physics  
requires:

- Full image guidance (real time)
- Reduced range uncertainties (real time beam imaging)
- In vivo dosimetry
- Highest level treatment planning
- Adaptive algorithms including all items above
- Very rapid and exact dose delivery (repaityng, tracking)
- ....

# But this is not all...

<sup>10</sup> Biology based treatment stratification and treatment planning requires:

- RBE assessment for a large range of beam qualities, energies and positions on the depth curve and beyond
- RBE assessment for a large range of clinical relevant cell systems and organ systems
- In the context of combinations used in patients
- Under knowledge of emerging molecular biomarkers and functional imaging
- Mechanistic understanding
- Systems biology approaches for development of comprehensive models for patient use



## But this is not all...

Currently particle therapy is by far more expensive and by far more dependent on a huge team of highly skilled experts

Range of beam is needed

Novel approaches need to be investigated (discovery and basic research) and translated into the clinics (development)

Education and Training

Societal challenges: Innovation and health economy research

# European particle network

Brussels Meeting 2015:

All European centers, ESTRO, EORTC,  
CERN, ENLIGHT/ULICE

- Scoring and endpoints
- Technology, dosimetry, QA
- Trial inventory (Website);  
towards joint clinical trials
- Image guidance in PT
- TPS in PT
- Radiobiology, RBE
- Health Economy



# 1st Particle Therapy Meeting, Brussels (8th April 2015)



WP	Title	Suggested Coordinators
1	Scoring of normal tissue reactions and tumor response particle/photon RT; endpoint definitions, outcome database	Hans Langendijk, Mechthild Krause, Roberto Orrechia
2	Dose assessment, quality assurance, dummy runs, technology inventory	Dietmar Georg, Oliver Jäckel, Sairos Safai
3	Trials inventory (website); „Towards joint clinical trials“	Karin Hausterman, Cai Grau, Daniel Zips, Jacques Balosso
4	Image Guidance in particle therapy	Aswin Hoffmann, Alessandra Bolsi
5	TPS in particle therapy	Hakan Nystrom, Tony Lomax
6	Radiobiology, RBE	Bleddyn Jones, Jörg Pawelke, Jan Alsner, Martin Prutschy, Manjit Dosanjh
7	Health Economy	Yolande Lievens, Klaus Nagels

+ Education and Training

# 2nd Particle Therapy Meeting, Brussels, 2016



-----**SAFE THE DATE**-----

## 2nd Particle Therapy Meeting

When: Wednesday, May 18th 2016

Where: ESTRO office, Brussels, Belgium

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# The 7 CERN Initiatives

- Radio-Isotopes (imaging and possibly treatment)
- **Detectors** for beam control and medical applications
- **Diagnostics and Dosimetry (pot)** for radiation therapy
- Biomedical Facility
  - creation of a facility at CERN that provides **beams of different types and energies to external users** for radiotherapy and detector development
  - Iterative experimental verification of simulation results
- Large Scale Computing for simulations, treatment planning telemedicine
- Computer Simulations for Medical Applications
- New Update of Accelerator Design
  - coordination and international collaboration to design a **new compact, cost-effective facility**, using the most advanced technologies
- “Cancer Therapies; Ablative Therapies...”

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Each Initiative is part of a package but also is important as a stand-alone project



# OPENMED

Conceptual Design Report

ISC-meeting

18 September, 2015 – Krakow, Poland

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# Background and context

- 2011 brainstorming meeting: “community call for a dedicated radiobiological research facility”
- Concepts presented and discussed, e.g. in [Brainstorming Meeting on LEIR in 2012](#)
- Proof of principle also presented, e.g. in global feasibility study ([Abler et al.](#)) and study of transfer line ([Abler et al.](#))
- Need to go beyond this initial work and establish a coherent proposal based on solid requirements and assumptions
- Should reflect the views of a “community” and not of a single institute
- CDR is basis for initial approval of a project
- Then a Technical Design Report, following R&D and detailed technical studies, is basis for construction.
- A CDR is also the fruit of a Collaboration, whereby several institutes elaborate the concept together.



It is time for reflection

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# ENLIGHT Organisation

## ENLIGHT General Assembly

Should be representative of all centres, all disciplines,  
ENLIGHT members

## Core Group

Desired composition

50% medical members

50% scientific technical members

How many members

Desired prerequisite

Interest, availability and time

Country distribution

What was?

What is?

What is the future?

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# Points for discussion today

.....

European Platform  
(ESTRO+all centres.....

PTCOG

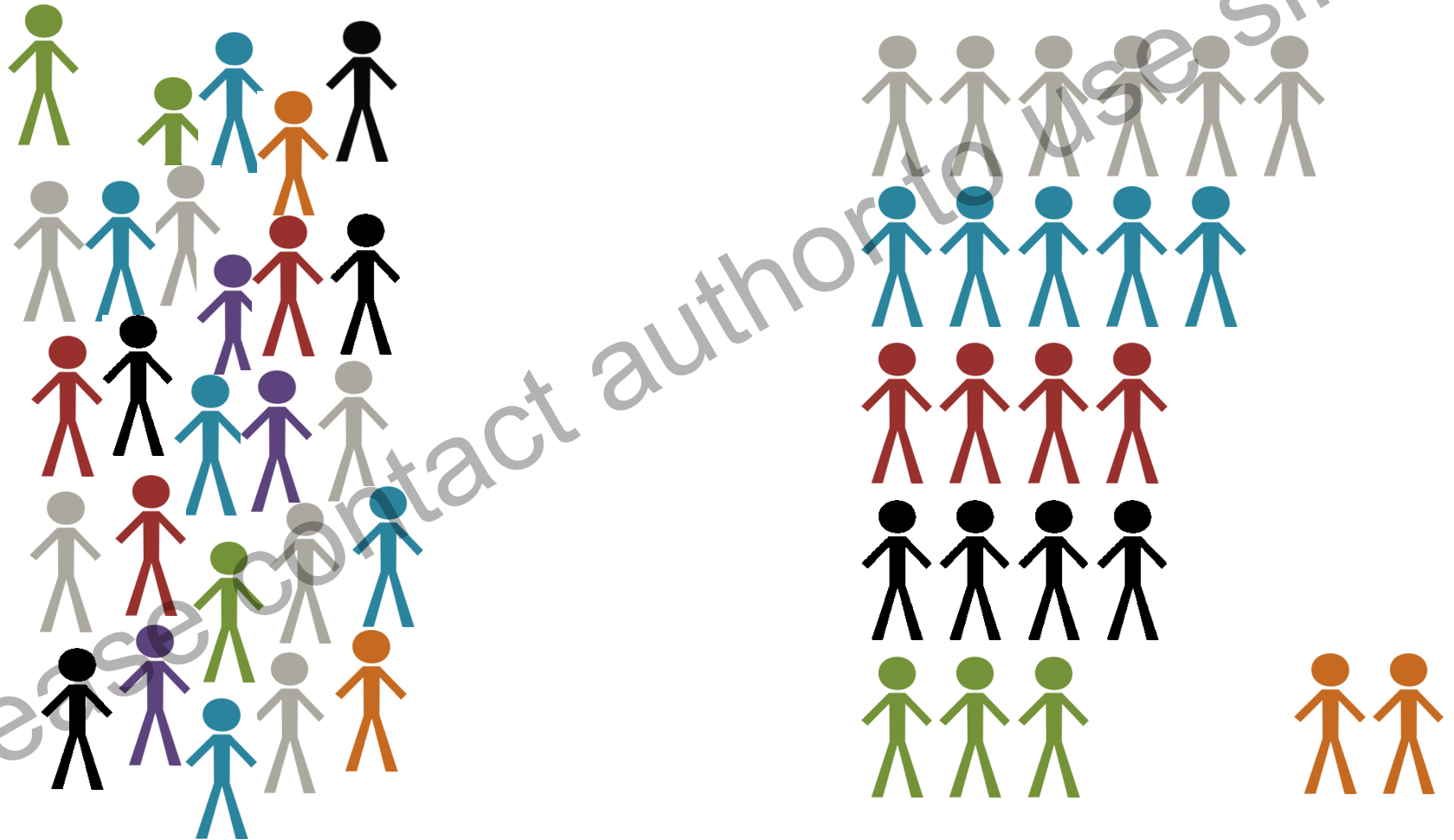
EORTC

Funding

Future (....next meeting)

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# Personalized precision oncology



# Personalized precision oncology

- Small numbers per center
- Particle trials more affected than photon trials:
  - less centers
  - less patients,
  - additional stratification factors which are less relevant for X-rays



# DOSE PLAN DATA BANKS RADPLANBIO (DKTK ROG)

## 1. Clinical data

### eCRF

Title: Clinical data

Page:

Diagnosis:

Date of diagnosis: 06-Apr-2010

Histology: C = SCC

Grading: G = G3

p16 status (IHC cut off 70%): 0 = negative, 1 = positive, 2 = not performed

HPV:

HPV array: 0 = none, 1 = any

Availability of specimen:

Tumor site: 1 = oral cavity, 2 = oropharynx, 3 = hypopharynx, 4 = larynx, 5 = nasopharynx, 6 = cancer of unknown primary (CUP)

## 2. Dataexport

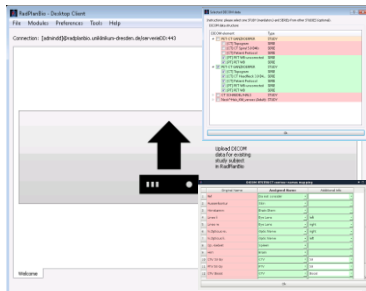
- Data sets
- Statistics
- DICOM data port (offline)
- DICOM data port (online = WADO)
- ....

## 3. Data analysis

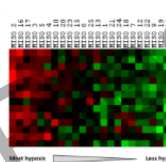
- Advanced (Re) TPS
- Spatially resolved – dose corrected outcome
- Radiomics
- TCP/NTCP
- Complex models
- trial hypotheses
- secondary analysis
- machine learning
- ...

Case ID	Site	Stage	Grade	HPV	p16	Outcome	Analysis
1	1	1	1	1	1	1	1
2	1	1	1	1	1	1	1
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## DICOM Data



## Bio-Data



Contents lists available at ScienceDirect

**Radiotherapy and Oncology**

journal homepage: [www.thegreenjournal.com](http://www.thegreenjournal.com)

Creating a data exchange strategy for radiotherapy research: Towards federated databases and anonymised public datasets

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