



Klinikum rechts der Isar
Technische Universität München



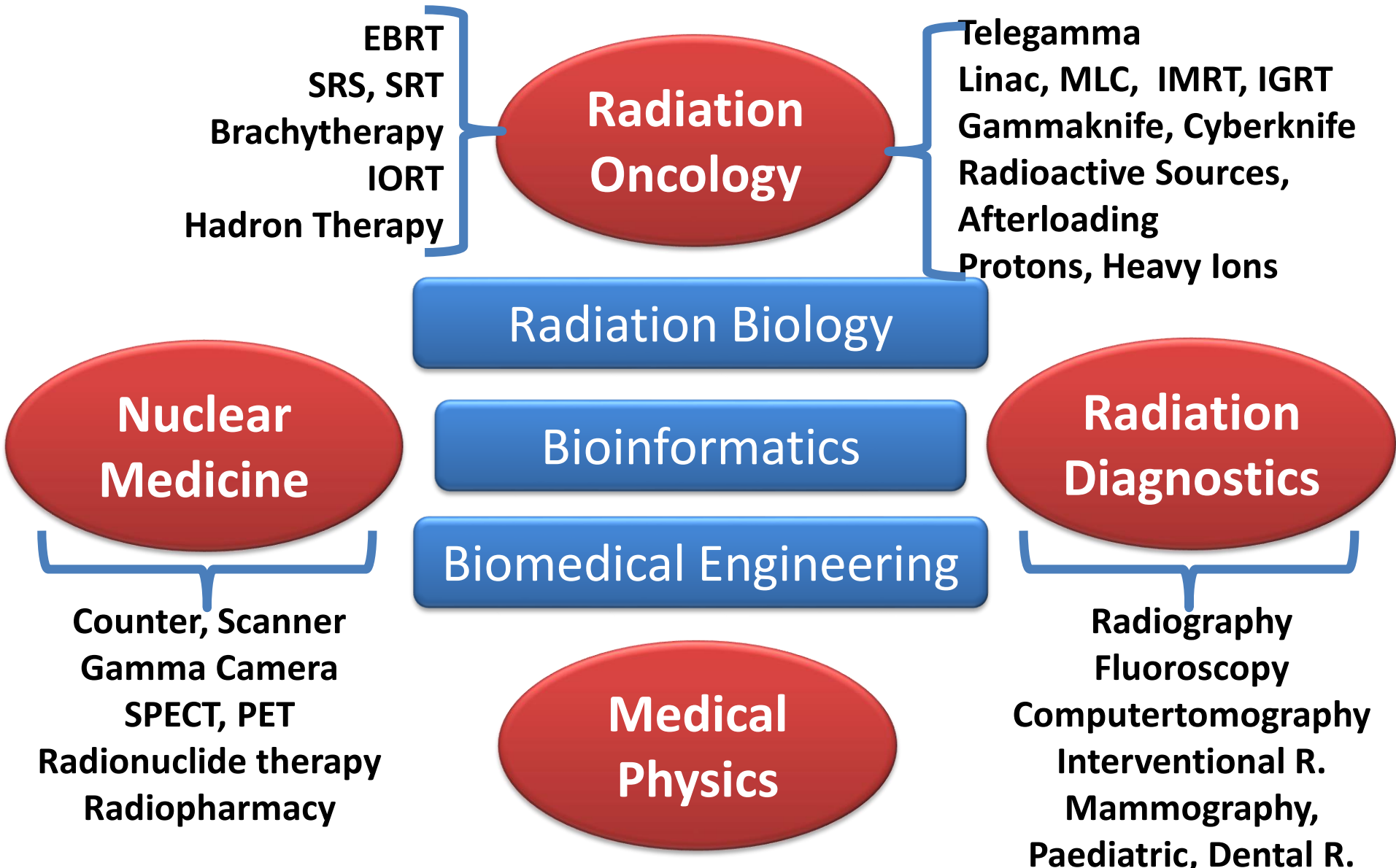
New Radiation Health Technologies – Challenges, Opportunities, Limitations

IRPA-13 Glasgow

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und Radiologische Onkologie

Radiation Health Technologies



Replacement of Ionizing Radiation ? ? ?

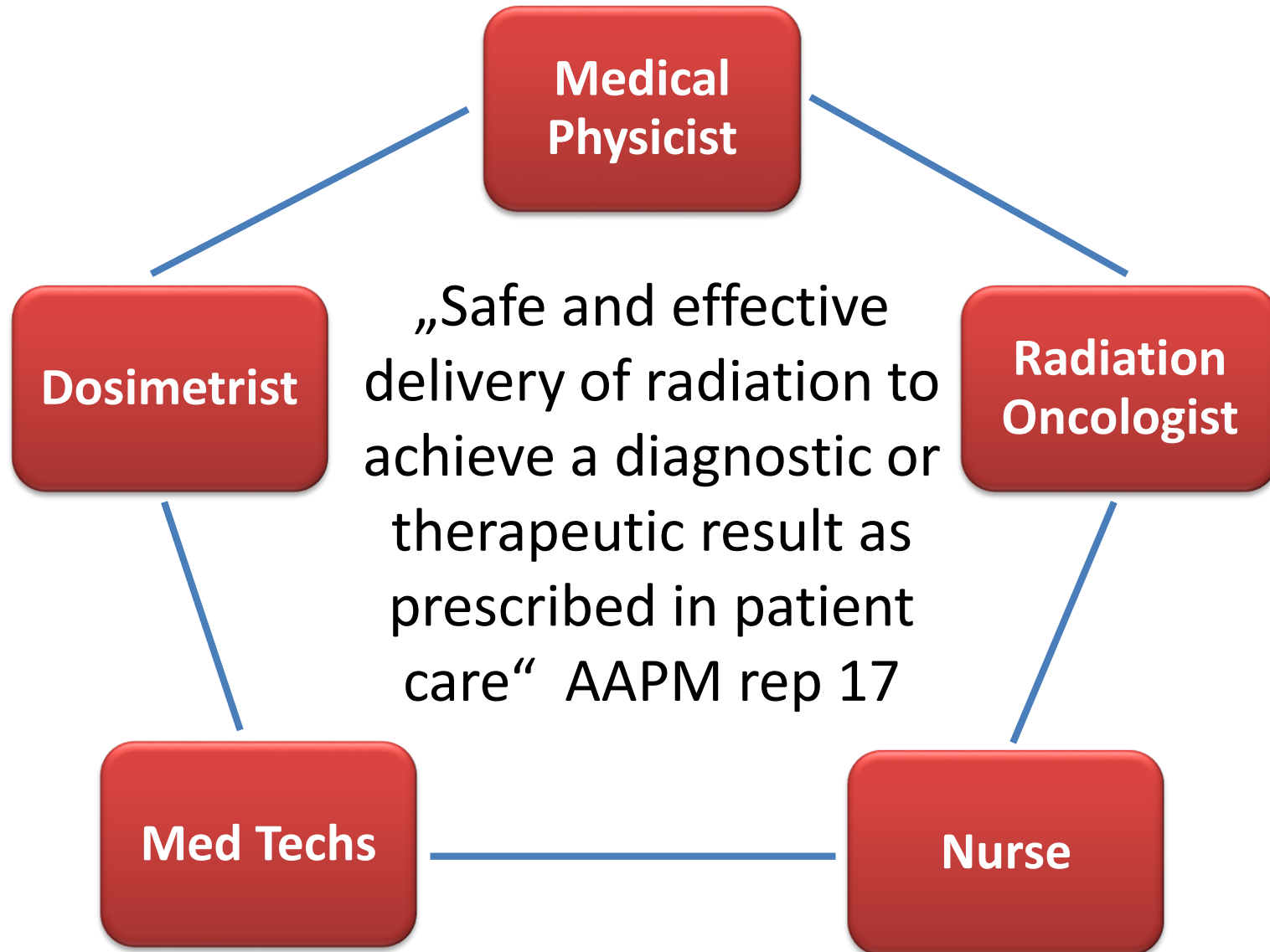
Imaging

- Ultrasound
 - Limitation: Physics (Soft tissue); 2D; Data Fusion
- MRI
 - Limitation: Costs, Complexity
- Optical Imaging:
 - Limitation: Physics (Range of light), 2D; Research

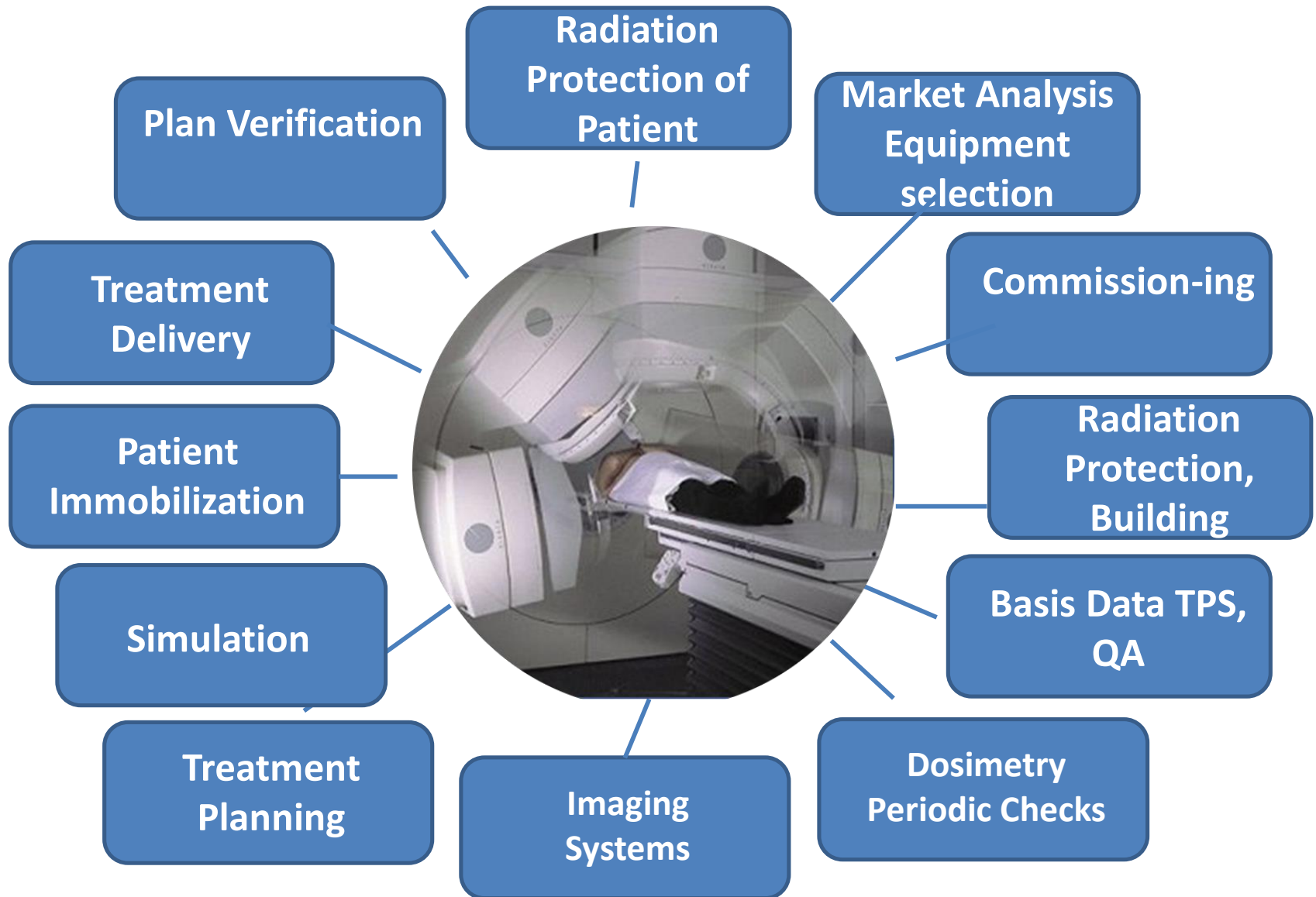
Cancer Therapy

- Drugs
 - Limitation: Efficacy; Costs

The Radiotherapy Team

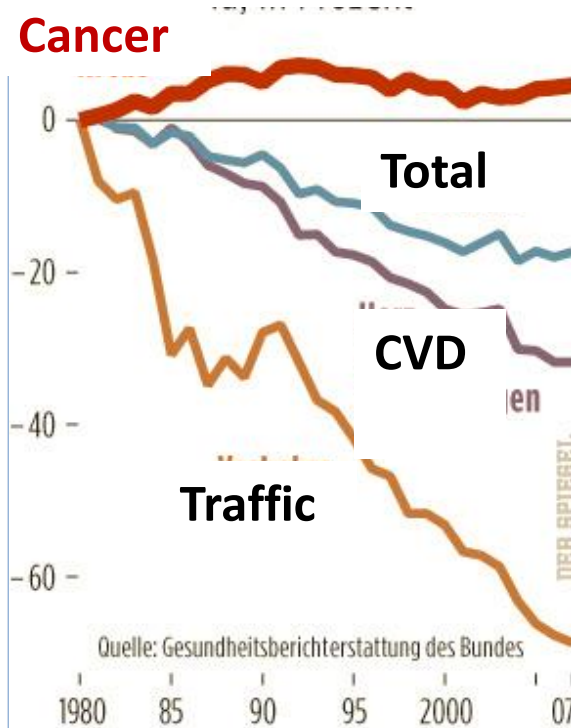


Radiotherapy Process

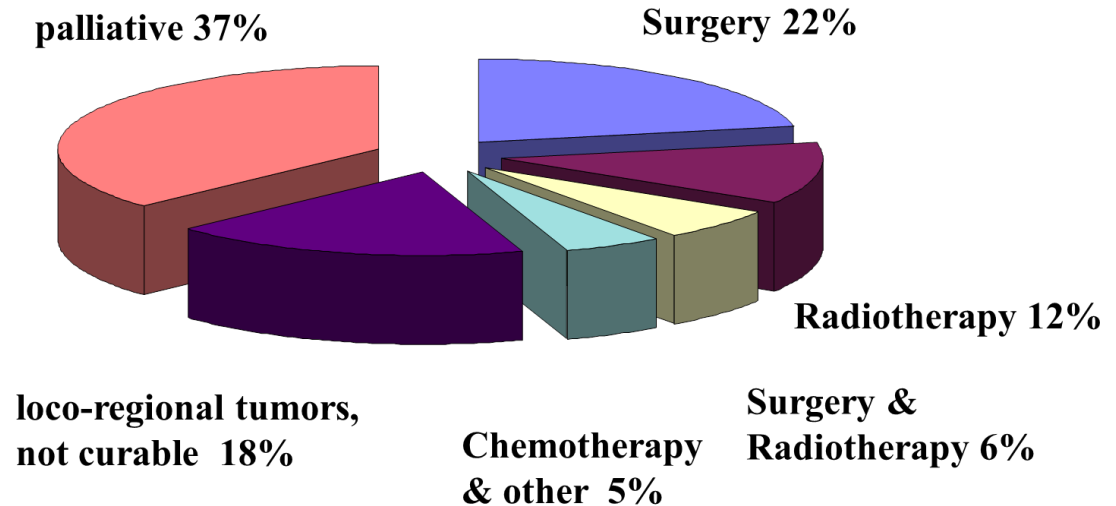


Cancer in Developed Countries

Mortality per 100 000 inhabitants in Germany: Changes from 1980-2007

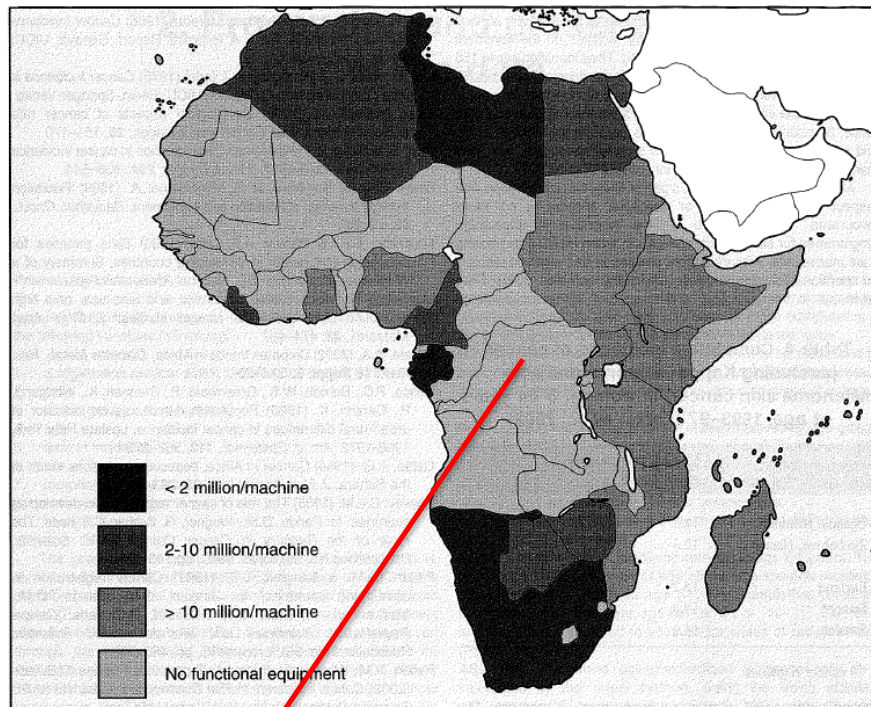


Survey on Cancer Treatment in Europe



Cancer in Developing Countries

From Levin *et al.* (1999), IARC, WHO



No functional equipment available

27 WHO member states have no any RT-units

- Increase of annual cancer morbidity rate worldwide: From 10 Mio in 2000 up to 16 Mio in 2020
- 70% of all cancer patients in LMI-countries
- 70% of all cancer deaths in LMI-countries

- Adapted facilities for diagnosis & treatment
- Development of adapted technologies
- Training of staff
- Telemedicine

*Programme of **A**ction for **C**ancer **T**herapy (IAEA)*

PACT's Integrated System for Comprehensive Cancer Control

PACT's Integrated System for Comprehensive Cancer Control

Maximize the Impact of Interventions including
Radiotherapy through Balanced Investments across the System

Population Based Cancer Control Programme
(WHO Guidelines on Planning, Management and Evaluation)

Cancer Knowledge Transfer and Technology Evaluations

Cancer Epidemiology and Surveillance System

Multidisciplinary Education, Training and Research in Cancer

Multisectoral Partnerships including Cancer Society Building
(Advocacy, Public Education, Policy, Legislation and Resource Mobilization)

Cancer Prevention
(Controlling Cancer
Risk Factors)

Screening and
Early Detection

Diagnosis, Treatment,
Follow-up and
Rehabilitation
(Pathology, Surgery,
Imaging, Radiotherapy/
Nuclear Medicine,
Chemotherapy, Other)

Palliative Care and
Support for Patients
and Families
(Symptom Control, especially
Opiates and Radiotherapy,
Psychological Interventions,
Other)

Advisory Group on increasing access to Radiotherapy (AGaRT): Mandatory elements of a RT package

- Treatment Unit incl. Data Management System, Remote Control, Auxillaries
- Treatment Planning System
- Access to Imaging (CT-Simulator)
- QA-instruments
- Service/Maintenance, Spare parts
- Education & Training (product specific, academic, radiation protection)

Programme of Action for Cancer Therapy (IAEA)

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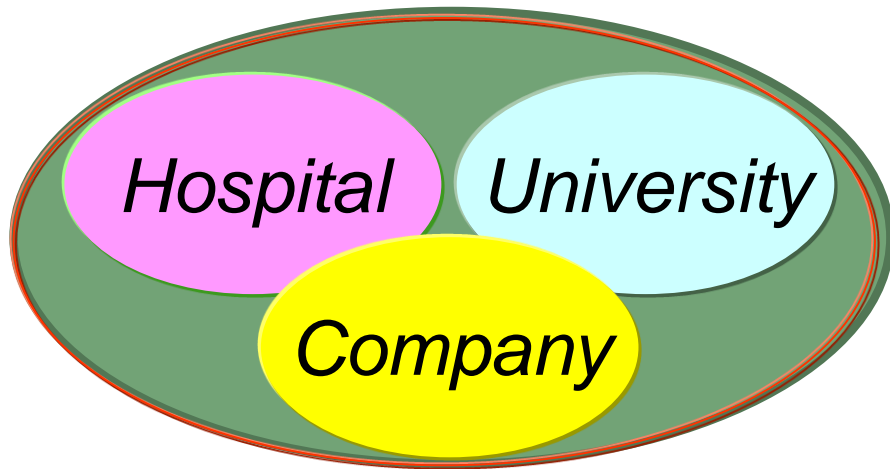
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Key issues of a basic E&T system

- Sustainability by continuous repetition of courses
- Prevention of brain drain by on-site training
- Product specific training by company staff
- Basic medical physics training according to agreed standards (IAEA teaching material, IOMP experts)
- Practicals on-site

IOMP Proposal: Regional Networks for Basic Education & Training Courses



WHO

IAEA

IOMP

Travel Grants
Course Materials
Selection of Experts
Accreditation

- **Location:** Customer's Hospital (Reference site of the company)
- **Academia:** Link to a local University
- **Faculty:** Preferably local & few foreign Trainers
- **Sustainability:** repeated courses, e.g. every 6-8 months
- **Course:** 2 modules, one week each
 - **Week 1:** Fundamental MP & Practicing (IOMP)
 - **Week 2:** First maintenance (Company Staff)

Conclusion

- Radiation Health Technologies are most effective, can be applied safely and are cost efficient
- New developments in Radiation Health Technologies are driven by
 - Methods of radiation dose reduction
 - Multi-modality imaging
 - Integration of imaging and radiotherapy
- Developing countries require
 - appropriate, affordable and suitable equipment (disease adapted)
 - Sustainable training at local/regional centers (e.g. e-learning, pre-application training)
 - Joint actions of professional organizations, industry and the IAEA & WHO to implement Radiation Health Technologies and establish proper infrastructures