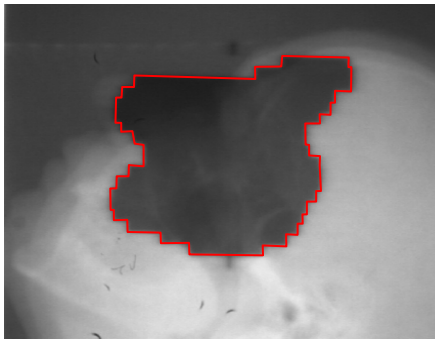
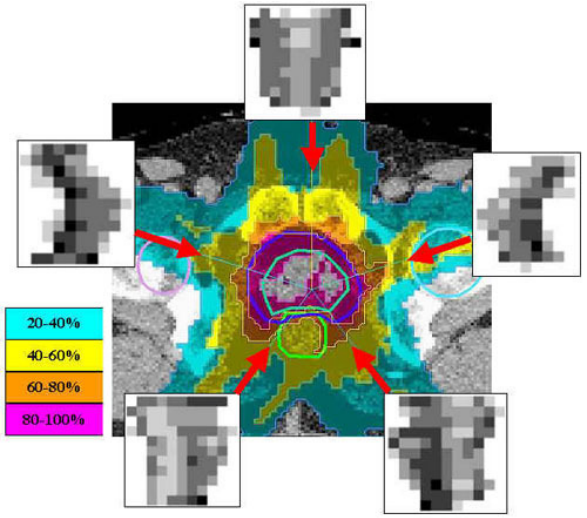
Capacity Building for Sustained Use of New Radiation Medicine Technology in New Surroundings

G. H. Hartmann
Department Medical Physics I Radiotherapy
German Cancer Research Center, Heidelberg
g.hartmann@dkfz.de

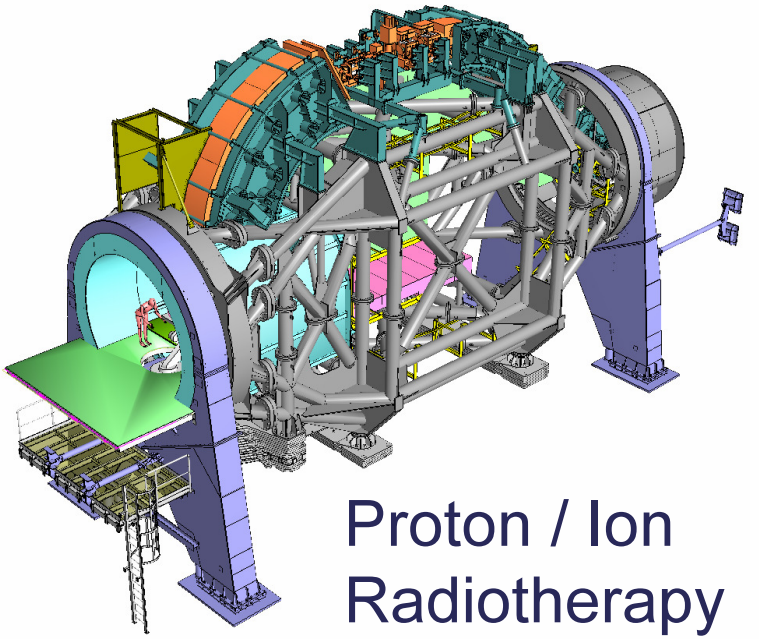
Important Examples of New Treatment Techniques:

3D conformal radiotherapy

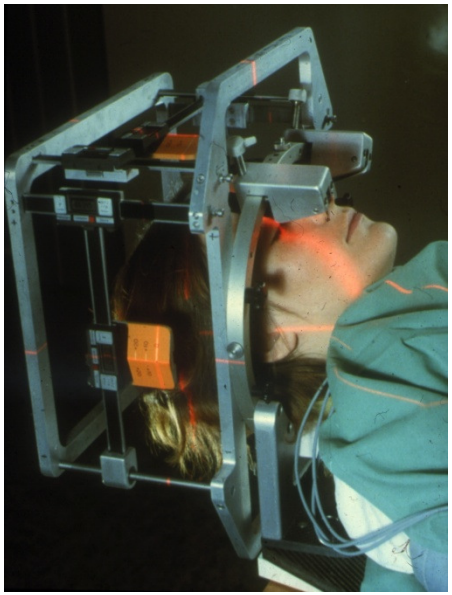




Intensity Modulated Radiotherapy



Proton / Ion Radiotherapy



Radiosurgery

Capacity Building: Establishment of New Treatment Facilities in Developing Countries

- Establishing new treatment facilities is a long process and requires strong governmental support.
- Requirements to meet before initiating the treatment program are:
  - **program** specification (plus registration and licensing)
  - **facility** planning and construction
  - **equipment** specification, procurement and installation, acceptance testing and commissioning
  - designing protocol and procedure manuals
  - staff **education & training**
- Typically, about five years are needed to complete all phases.

Capacity Building & Programs

- We do have programs!
- Also a series of models are available such as:
  - Modern radiotherapy facilities for the first time have set up in **Ethiopia, Ghana, Mongolia, Namibia, and Uganda**
  - Existing Cooperations:
    AFRA (African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology)
    ARCAL (Regional Co-operative Arrangements for the Promotion of Nuclear Science and Technology in Latin America)
- IAEA document: **Setting up a RT programme**

Capacity Building & Facility and Equipment

- Radiotherapy requires significant **initial investment** in equipment and infrastructure.
- Availability: The economic situation and the availability of financial resources for investments in radiation medicine equipment is certainly quite different in different developing countries.
- However, whether or not investments are done also depends on the decision makers of the individual country. (Not always the decision makers realize the potential and cost-effectiveness of novel technologies.)
- Sustained use of equipment strongly depends on **well balanced** investments in equipment and infra-stucture (models to assess the amount of required investments are available).

Capacity Building & Staff Education and Training

- The **key factor** for a sustained use of new radiation medicine technology is the availability of **qualified staff**.
- Required Staff in Radiotherapy:
  - Radiation therapists/therapy radiographers
  - Clinically qualified radiotherapy medical physicists
  - Clinicians
- Qualification must be based on both, appropriate **education & training.**
- Requirements on the content can be taken from IAEA or EFOMP Policy Statements:

Capacity Building & Staff Education and Training

- From my point of view:
  Getting the competence by training is the most important item, and, at the same time, the most severe bottle neck in capacity building.
  It cannot be purchased !!!!
- Methods for training could be:
  - spending a period of time in a host institution whose staff have considerable experience in the new techniques or equipment;
  - visit from an expert to the institution.
- However, by far the cheapest alternative would be to establish own training capacities in the country or in the region.

Capacity Building & Staff Training

- Worth of mentioning:
  The IAEA's Guide for the clinical training of radiation oncology medical physicists (Developed through the RCA project RAS6038)
- First experiences with this guide in Thailand and in the Philippines, scheduled introduction in ARASIA (Arab. States in Asia)

Last Personal Remarks on the Training Issue

- Successful training requires a really strong commitment by:
  - the country and/or other organizations (ressources)
  - the trainers (supervision & control)
  - and trainees
- Training must be performed within a structured program accompanied by a criteria referenced assessment of success (=competence)
- It is my expectation that simulation methods will play an increasing role in the training process (E-Training!).

E-Training: Beam Calibration Simulation