Plans for Future Radiotherapy Physics Education in the Russian Federation

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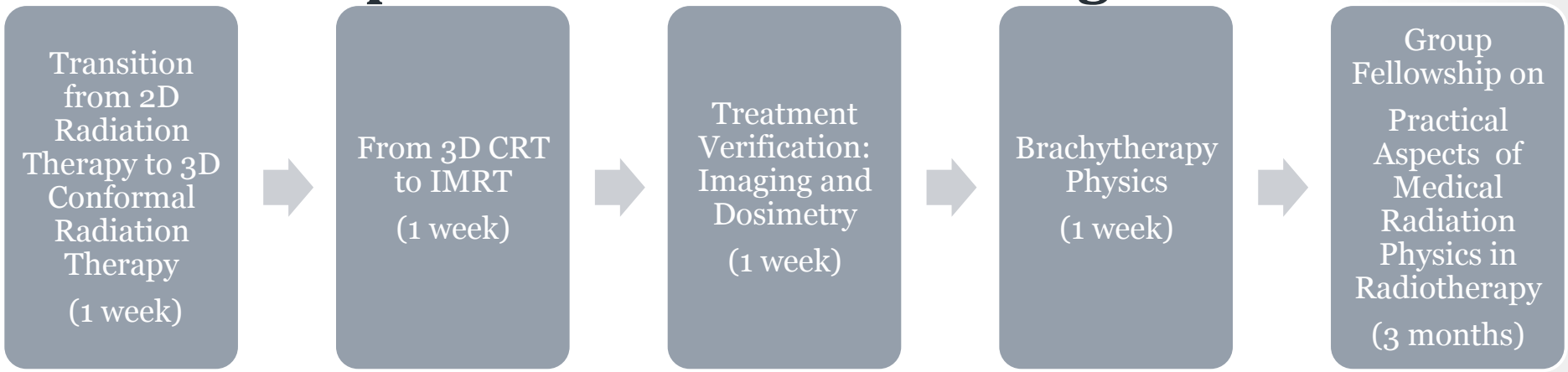
Established plans

- **Development of the new training courses**



- **Undertaking courses according to the schedule**
- **Organization of the joint AMPR/AAPM training in December 2014**
- **Procurement of the new equipment dedicated to training purposes**

New training courses: 2D-3D

	Monday	Tuesday	Wednesday	Thursday	Friday
9:30-10:15	Welcome, introduction	Radiobiology (Introduction)	Dosimetry (absolute/ relative)	QA/QC	Evidence based radiotherapy
10:20-11:05	Evolution of RT from 2D to 3D	Radiobiology (NTCP, TCP, alpha/beta)	Treatment planning	QA/QC	Audits in radiotherapy
Break					
11:20-12:05	Imaging (for diagnostics)	R&V	Treatment planning	Acceptance, commissioning	Assessing the needs (staff requirements, department layout)
12:10-12:55	Imaging (for therapy)	Equipment selection, specification	Plan evaluation	Geometrical uncertainties	Assessing the needs (continued)
Lunch					
14:00-14:45	Immobilization equipment	Equipment selection, specification	Introduction to Eclipse	Practical planning	Exam
14:50-15:35	Reporting and recording RT, target volume delineation	Equipment specifics for 3D (MLC)	Practical planning	Practical planning	Closure
Break					
15:50-16:35	TPS (hardware, software, algorithms)	Equipment specifics for 3D (imaging)	Practical planning	Practical planning	
16:40-17:25	TPS (to be continued)	Dosimetry equipment (phantoms, detectors)	Practical planning	Practical planning	

New training courses: 3D-IMRT

	Monday	Tuesday	Wednesday	Thursday	Friday
9:30-10:15	Welcome, Introduction	Planning concepts (ICRU 83)	Machine specific QA	Treatment planning – lecture	Practical planning
10:20-11:05	Evolution of RT from 3D to IMRT (evidence based)	Equipment selection, specification, methods	Machine specific QA (to be continued)	Treatment planning - lecture	Practical planning
Break					
11:20-12:05	Imaging and immobilization with special focus on IMRT and special techniques	Equipment selection, specification, methods (to be continued, special techniques, Cyberknife, SBRT, FFF)	Patient specific QA	Introduction to Eclipse	Practical planning
12:10-12:55	Radiobiology	IGRT (methods, equipment, doses)	Patient specific QA	Practical planning	Practical planning
Lunch					
14:00-14:45	TPS (specifics for IMRT)	Geometrical uncertainties and IGRT correction strategies	IGRT QA	Practical planning	What next in radiotherapy
14:50-15:35	Plan evaluation IMRT	Tracking and gating of moving targets	Audits in radiotherapy	Practical planning	Exam
Break					Closure
15:50-16:35	TPS (Optimization & inverse planning)	QA/QC general (specifics of IMRT)	Assessing the needs	Practical planning	
16:40-17:25	TPS (Optimization & inverse planning- continued)	Small field dosimetry	Practical work on accelerator Machine specific QA/Patient specific QA	Practical planning	
17:25-18:15	FREE	FREE		FREE	

New training courses: RT Verification

	Monday	Tuesday	Wednesday	Thursday	Friday
9:30-10:15	Welcome & introduction	Simulator and CT-SIM	IGRT QA (mechanics)	Dosimetric verification: equipment	Audits in radiotherapy
10:20-11:05	Role of imaging in RT (Introduction)	QA of Simulator and CT	IGRT QA (image quality, dosimetry)	Dosimetric verification: methods	Audits in radiotherapy (end-to-end)
Break					
11:20-12:05	Uncertainties in radiotherapy	Delineation accuracy	Clinical implementation of IGRT correction strategies	In vivo dosimetry	New IGRT tools
12:10-12:55	QA of radiotherapy process	Imaging in TPS	Managing imaging dose	IMRT/VMAT patient specific QA	Adaptive radiotherapy
Lunch					
14:00-14:45	Physical parameters of imaging equipment	IGRT techniques (equipment)	Record & Verify systems and their QA.	Portal dosimetry	Exam
14:50-15:35	Physical parameters of imaging equipment	IGRT techniques (methods)	TPS QC	4D-CT	Closure
Break					
15:50-16:35	Imaging diagnostic equipment	Practical work - QA of simulator/CT	Practical work – IGRT system QA	Gating and tracking	
16:40-17:25	Imaging diagnostic equipment	Practical work - QA of simulator/CT	Practical work – IGRT system QA	Practical work – patient specific QA	
17:25-18:15				Practical work QA of Gating and tracking	

Course schedule for the rest of 2014

2014 (international, national)

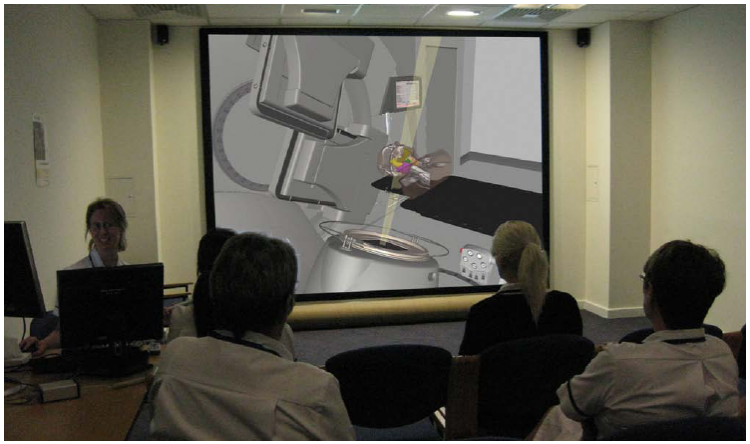
- **1 September – 1 December – group fellowship**
- **1-12 September – Dosimetry and QA**
- **29 September – 3 October – 2D-3D**
- **13-17 October – 3D-IMRT**
- **3-7 November – Treatment verification**
- **10 November – 5 December – Physics of modern radiotherapy, including**
  - **1-5 December – AAPM course on modern RT**

Course list 2015

- Group fellowship (3 months)
- Physics for Clinical Radiotherapy (3 weeks)
- Commissioning and QA of RTPSs (2 weeks)
- Strategy of Radiotherapy Modernization and Development: Equipment and Staffing (1 week)
- Brachytherapy Physics (1 week)
- Physics of modern radiotherapy (4 weeks)
- Practical aspects of commissioning in RT (1 week)

New equipment for training

- VERT system with RTT and MP modules



- Absolute dosimetry set (1D WP, Unidos + IC) x2
- Relative dosimetry set (3D WP, ICs, diodes)
- CTDI set (Phantom, 10cm IC)
- CIRS phantoms (thorax, pelvis)

Standardization of university MP curriculums

- There is a great need in expanding the “state standard” by including more mandatory special disciplines such as radiobiology, brachytherapy, nuclear medicine, etc.
- Less freedom to universities in choosing special disciplines
- Publishing of local/translated educational literature

University-clinic cooperation

- Establishing formal cooperation with local cancer centers – advocacy, promotional and legislative work needs to be done
- Access to clinical equipment
- Supervision by clinical medical physicists
- Possibility to choose the field of investigation according to the actual needs of the clinic
- Covering the lack of staff for clinics
- Preparation of ready-to-work specialists

PhD programs

- Medical physicist should have a possibility to get postgraduate education in the field of medical physics – the need in formation of dissertation council for medical physics
- Cooperation with Russian and foreign clinics and universities (sandwich programs?)
- Access to international exchange programs
- PhD online?

Training courses

- 3 clinical centers offering medical physics training – all located in Moscow. Only AMPR training is popular, self-sustainable, audited by respected international organizations (IAEA, AAPM, ESTRO). Need to organize a training center located in central/eastern Russia.
- Offsite training courses by AMPR.
- Mostly, basic topics are covered – need to develop advanced medical physics training courses.
- RTT training courses from physics point of view?

Certification issues

- ABR certification as a good example of professional certification
- Information for employers and patients
- Knowledge-based instead of position-based formation of professional society
- Popularization of lifelong training
- CAMPEP accreditation as a good tool for educational institution quality assurance

On-site audits

- Audits have to become a standard QA procedure
- On-site audits may include practical training for local MPs
- Familiar environment and equipment helps
- Solving of actual problems

Conclusions

- AMPR does a great job in organization of medical physics training courses – and developing new courses
- Graduate and post-graduate education in the field requires “more medical physics” – and this is mostly legislative work
- Certification will gradually increase the interest in the profession and lifelong training
- On-site audits will become a good QA and educational tool with implementation of practical training

Thank You for Your Attention !