Assessing Quality in Medical Physics Residency Education

Kristi Hendrickson, PhD DABR Associate Professor of Medical Physics Director of Medical Physics Residency Program University of Washington Seattle WA



\mathbf{W} university of Washington

Thanks to contributors:

- Dr. Anna Rodrigues, Duke University Medical Center
- •Dr. Kamil M. Yenice, University of Chicago
- Dr. Leah Schubert, University of Colorado School of Medicine

W UNIVERSITY of WASHINGTON

Two levels of assessment of quality of residency education

- Individual resident: to assess their progress through your program, to measure their competency against expectations
- Program: to compare your program quality to national standards, to compare your program quality to other programs

Individual resident assessments

	786	740
 The resident has observed at least 2 whole brain external beam treatments" 	x	
Comment		
	Ves	No
7. The resident has observed at least 2 brain tumor (glioma or other) external beam treatments."	X	
Comment		
	Vita	No
8. The resident has observed at least 2 lung external beam treatments.*	х	
Comment		
	Ves	No
 The resident has observed at least 2 head and neck external beam treatments." 	х	
Comment		
	View	No
10. The resident has observed at least 2 liver external beam treatments."	X	
Comment		
	Vies	No
 The resident has observed at least 2 spine (and other pallative) external beam treatments.⁴ 	X	

W UNIVERSITY of WASHINGTON

Individual resident assessment

-

Learning objectives checklist with scaling: end of rotation
 evaluation by faculty mentor or oversight committee

Evaluator: Dt. Heindrichson, Kriets						
Notes: Rotation starting (L10/17) Service: U10AO Med Phon - GA/GO						
New Date 11250017 Congette 11500017 Reviewe: 11000017						
Peace rule the resident for each competency in this clinical resident was rated 3 or issuer and therefore requires remedia remediation plan that addresses the specific needs of the re	relation to selecting the appropriate separate, using the s after to achieve a presting level of competency. All compet- sident for successful completion of this volation. Policying	cale provided. Al least a level 4 rate encies must eventually be percent to the resident's remediation you will be	g is required in each competence successive complete the rotation is required to complete the comp	o'o pass, in the comment as on. If any remediation is neo pointing Remediation Pare.	clores, pisates provide specific Needback on any com real, pourshould meet with the Program Oraclor to a	priorities where the point in the design of a
	Dronge Designed	Desgree	Testfol	Apres	Thomas Agree	104
The resident understands the difference between acceptance teeting and commissioning Commank				1		
	200-ga Deep-te	Despise	Taultel	Apres	2004gy April	104
 The resident can perform and be competent in the mechanical, safety and radiation tests required for accordinance of a lower from a version. The resident indust the equipmentitialities used for such testing. 						
1.000000	Brook Teans	Tanana	India	4100	Total and	100
	and the state of t					
5. The resident understands measurement of trachment unit fease testage and streading adequary tests & Constants						
	200-ph Despise	Despise	Taultel	Apres	Thomps Agree	hghi
		2	2			
 The vanisher understands how becarier is defined and measured and how mechanic phratilation bocarier is resided to un board measure becarier. 						

		Competen	cy Evaluatio	in			Medical physics experient	te in the ri	outine radiatio	n oncology pres	cece that you r	ave orectado	
Resident Enskator Date of Exolustion								Unable to assess	Little or no knowledge or experience	Familiar with subject but inadequate competency	Knowledgen bie but has limited experience	Could carry out task with minimal supervision	Very competent: able to work independently
							Basic dosimetry calculations	D	0	D	0		0
 Professional attitution Interpretarial Selfa 	Linable to assess	smatter skils	Adequate	ficed	Very ficed	Outstanding	Addity to perform quality control tests (monthly/annual) on equipment as per a published protocol (i.e. TG- 242)			D			
Instatue Serve of responsibility Adeptebility	0	0	0	0	0	0	Ability to calibrate rediation emitting equipment as per a published protocol (i.e. TG- 51)			D			
Oral skills Written skills Gearning ability	0	0	0	0		0	Ability to perform treatment machine morning warmup and daily QA	D		D	0	٥	0
							Ability to troubleshoot and triage machine issues (CT/Linep/HDR)						
							Ability to understand and safely clear treatment machine faults/contact appropriate vendor for service as needed			D	a		
							Ability to resolve software issues (ARIA/Pinnacle/Eclipse/MIM			۵			



Individual resident assessments

 Feedback form from staff/faculty; aggregated for discussion with PD monthly

	Inadequate	Average	Good	Exceptional	Comments
Quality of completion					
Attention to detail					
Available when needed					
Finish on-time without reminding					
Finish assigned reading					
Understands physics behind procedures					
Communicates well with physicians					
I'd like to see improvement in					

W UNIVERSITY of WASHINGTON

Individual resident assessments

ACGME Radiation Oncology Milestones

Name - Honolance / Level / Sevel / Sev	version 07/2013	Radiation On	corogy Ministories, ACGME Re	port worksheet	
Link Link <thlink< th=""> Link Link <thl< th=""><th>Breast — Patient Care</th><th></th><th></th><th></th><th></th></thl<></thlink<>	Breast — Patient Care				
 Agama sampar dari sampar dari	Level 1	Level 2	Level 3	Level 4	Level 5
	 Acquires accurate and relevant history and performs a general physical examination identifies relevant anatomy Recognizes situations with a need for urgent or emergent medical care, including Iffe threatening conditions 	 Performs a detailed directed physical exernination; integrates pathology and imaging reports; accurately stages a patient and designate prognostic factors List organs at risk; understands proper patient positioning and immobilization 	 Explains the main treatment options Contours target(s) and normal tissue with minimal inaccuracies; states appropriate dose planning objectives for normal tissues and target(s) 	Makes a comprehensive treatment recommendation that is appropriate, describes evidence that supports the treatment plan Contours normal tissue and target(s) accurately: critically evaluates treatment plan options	 Conducts clinical research Develops special expertise to treat and manage the most complex cases Develops protocols to minimize toxicities/symptoms or has an exceptional understanding of management of toxicities/symptoms
	Comments:				Not yet rotated
Comments: Not yet rotated					

SITY of WASHING		Indivi	idual resi	ident asse	essments
Version 07/2013	Radiation One	cology Milestones, ADGME Rep	ort Worksheet		
Medical Physics — Medical	Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5	
Recognizes the importance of medical physics in radiation oncology	Understands basic concepts of medical physics	 Applies concepts of medical physics to clinical situations 	 Thoroughly understands medical physics concepts for safe delivery of radiation 	Conducts medical physics research	
Radiation/Cancer Biology -	– Medical Knowledge				
Level 1	Level 2	Level 3	Level 4	Level 5	
 Recognizes the importance of radiation/cancer biology in radiation oncology 	 Understands basic concepts of radiation/cancer biology 	 Applies concepts of radiation/cancer biology to clinical situations 	 Thoroughly understands radiation/cancer biology concepts for safe delivery of radiation therapy 	Performs radiation/cancer biology research	
Comments:				Not yet rotated 🗔	



W ими	ERSITY	of W	'ASH	ING	TON						In	di	ivic	luc	al resid	ent asses
Exc	amp	le	r	nil	es	stc	n	е	f	or	r	ne	ed	lic	al ph	ysics
Machine QA ar Resident:	nd Technical Sk	ills													Basic Proced Knows how t	ures o operate the controls im the console
Has Not Achieved Level 1	Level 1 (Novice)			Level 2		Le	vel 3			Level 4			Level 5 (Expert)		Correctly use equipment Familiar with mechanical o	Correctly uses of the mechanical a equipment Familiar with safety precautions di mechanical collision of gantry and
	Competently performation basic procedures" in indirect supervision Recognizes and me complexities of basic procedures	rna rnder reges	Compete Interned as define program Recogniza Complexi Interned	ntly partici late proces d by the re es and mar ties of late proce	nna dures, sidency nages dures	Competent advanced p defined by program Recognizer complexity advanced p	ty partic receivent the resident and ma- si of receivent	ens res, an dency rages res	Able to indepe the fail proced	compete ndently pr lowing wreat	rfy and rform	Able to to juni	s teach proce or-level resid	edures Senta	and radiation Intermediate Must unders with in-phan calibrated ion Must unders ion chamber	exposure <u>Procedures</u> and the calibration pri tom measurements us in chamber tand the calibration pri array, and be able to o
Faculty Comments			<i></i>			feesident 1		-]						treatment ur and analyze 1 physics guide Must be fam and electron machines inc	treatment units in the QA mode to p and analyze the findings in accordan physics guidelines established (IMRI Must be familiar with the TG-51 pro and electron dose specification for e machines including the concepts of
events of Pacific		D				nan dan t	19121				C				conversion fr Advanced Pr	ections, chamber calib om dose in plastic to d ocedures

priysics
asic Procedures
nows how to operate the controls from within the
orrectly uses of the mechanical and radiation test
amiliar with safety precautions dealing with
echanical collision of gantry and table components
nd radiation exposure
termediate Procedures
lust understand the calibration principles involved ith in-phantom measurements using a dose
alibrated ion chamber
lust understand the calibration principles of diode or
in chamber array, and be able to operate the eatment unit in the QA mode to perform the tests
nd analyze the findings in accordance with the
hysics guidelines established (IMRT QA).
lust be familiar with the TG-51 protocol for photon
nd electron dose specification for external beam
achines including the concepts of temperature and
ressure corrections, chamber calibration factor, and proversion from dose in plastic to dose in water
dvanced Procedures
then a OA shack indicates a parameter is presenting 10

nents

W UNIVERSITY of WASHINGTON

Individual resident assessments

Oral exams or mock oral ABR exams

- End of rotation presentations to oversight committee
- Oral questioning at the end of the presentation
- OR no presentation but trainee appears before oversight committee to answer questions related to the rotation topic (oral exam)
- Mock ABR exams annually or more frequently on all ABR topics

W UNIVERSITY of WASHINGTON

Individual resident assessments

Potential issues with individual assessment

 Hesitation for honesty in critical feedback, potential for retaliation

Possible solutions:

- Become better at giving critical feedback; how to engage millennials in their own learning
- Aggregate feedback from multiple faculty members
- Milestones with explicit list of what defines each level of competence in each milestone category, minimizes subjectivity of assessment

Assessing quality of education at the program level

W UNIVERSITY of WASHINGTON

Program assessments

Metric of program quality: reputation

Track admissions numbers

- How many applicants?
 Perceived quality of applicants
 Success in filling positions with favored candidates

W UNIVERSITY of WASHINGTON

Program assessments

- Feedback requests: Formal survey requests from current residents on rotations,
- workload, faculty mentors
- Likewise survey requests from faculty
- Open door policy for program director to be available for feedback on the program at any time

Follow up on feedback:

Steering committee meets regularly (monthly or quarterly) to discuss collected feedback, propose and implement program changes/improvements

Program assessments

Exit Interviews

- Individual interview with each trainee
- Ask: looking back over the 2-3 years of their training, what was the best/worst of the educational program?

W UNIVERSITY of WASHINGTON

Program assessments

Follow up surveys

- 1-year survey of graduate: What aspects of your residency training prepared you well for your current job? What preparation for your current job was missing from your training program?
- 1-year survey of the employer

W UNIVERSITY of WASHINGTON

Program assessments

Graduates' success

- Ability of trainees to secure their preferred job before graduating from your program
- ABR Part II and III pass rates

Conclusions

What's missing?

- National standards for individual assessments, like ACGME milestones
- Metrics to compare quality of education with other residency programs

W UNIVERSITY of WASHINGTON

Thank you

Kristi Hendrickson krgh@uw.edu