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#### INTRODUCTION

Professionalism is one of the CAMPEP standards required for accreditation of medical physics residency programs. However, there is a lack of information on whether physics residents are formally trained in professionalism and if so, what exactly is taught, how it is taught, as well as how this training is evaluated.

Furthermore, professionalism is a broad topic with numerous related aspects, so there is a lack of consensus on the specific knowledge, attitudes, and skills related to professional behaviour, as it applies to a medical physicist. Due to the sparse resources and lack of standardization on this topic, this work aims to design an effective survey to collect data from program directors (PDs) on the current status of formalized professionalism training.

### SURVEY DESIGN METHOD

- A working group of 6 AAPM-MPRTP/SDAMPP committee members interested in professionalism training was formed.
- A short pilot survey was sent out to 15 PDs to assess the need, which prompted the working group to design an official survey via a consensus-based approach.
- Over the course of 15-20 meetings, members of the working group created, discussed and revised each question and associated choices in a thorough manner.
- A survey of 20 questions divided into 6 sections was developed to collect information from PDs nationwide:
  - residency program demographics
  - professionalism training methods and frequency
  - $\succ$  assessment of professionalism training and frequency
  - $\succ$  access to resources for training
  - > definition of essential skills inherent to professionalism
  - desired resources for improved training and removal of barriers.
- The list of choices for professionalism skills originated from the Medical Physics Leadership Academy (MPLA) in order to maintain some level of standardization within the community.
- After multiple revisions within the group, the survey was presented to an independent reviewer for cognitive pretesting, which involved verbal discussion and qualitative evaluation of question intent and efficacy.

## **Consensus-Based Survey Design:** Assessing Formalized Professionalism Training in **Medical Physics Residency Training Programs**

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### **QUANTITATIVE VALIDATION METHOD**

- Upon incorporating feedback from the qualitative evaluation, the survey then underwent quantitative evaluation by content experts. For the purposes of this work, context experts were defined as medical physicists who are directly involved in residency program education and/or administration. The survey instrument was developed using published guidelines.<sup>1</sup>
- They rated the clarity and relevance of each question using a 1-4 scale, with 1 being unclear or irrelevant and 4 being clear or relevant
- The ratings were then analyzed to determine:
  - 1. the <u>reliability agreement (RA)</u>, which is the extent to which the experts agree in their ratings.
  - 2. the <u>content validity index (CVI)</u>, which quantifies the collective level of the experts' validity ratings.
- The reliability agreement was calculated by counting whether all experts rated an item in one of two groups (1 or 2 and 3 or 4). If all clear or relevant.

### RESULTS

- There was 90% agreement amongst experts regarding relevance of questions, as compared with 85% agreement regarding clarity of questions.
- In terms of CVI, the experts agreed that 98% of the questions were relevant and 97% of the questions were clear.
- The CVI was calculated for each question by counting the number of experts rating the item as 3 or 4 and dividing that number by the total number of experts.
- Questions and response options for which expert ratings did not agree, received a CVI <1.0, or which received suggestions for improvements were then either removed from the survey or refined accordingly.
- Validation results for relevance ratings are displayed in Table 1.

Question	Reviewer						Interrater Agreement		Content Validity Index
<u>RELEVANCE</u>	Α	B	С	D	Ε	F	Consensus Rating: 1-2	Consensus Rating: 3-4	CVI
1	4	4	4	4	4	4	_	1	1.00
2	4	4	4	4	4	4	_	1	1.00
3	4	4	4	4	4	4	_	1	1.00
4	2	4	4	4	3	4	_	-	0.83
5	2	4	4	4	4	4	_	-	0.83
6	4	4	4	4	3	1	_	-	0.83
7	4	4	4	4	4	3	_	1	1.00
8	4	4	4	4	4	4	_	1	1.00
9	4	4	4	4	4	4	_	1	1.00
10	4	4	4	4	4	4	_	1	1.00
11	4	4	4	4	4	4	_	1	1.00
12	4	4	4	4	4	4	_	1	1.00
13	4	4	4	4	4	4	_	1	1.00
14	4	4	4	4	4	4	_	1	1.00
15	4	4	4	4	4	3	_	1	1.00
16	4	4	4	4	4	4	_	1	1.00
17	4	4	4	4	4	4	_	1	1.00
18	4	4	4	4	4	4	_	1	1.00
19	4	4	4	4	4	4	_	1	1.00
20	4	4	4	4	*	4	_	1	1.00
*This cell is left blank intentionally.							Average RA	0.85	
	Unfortunately, reviewer#5 left question 20 unrated.						Average CVI	0.98	

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<sup>-</sup> 6 content experts evaluated each survey question and response option using a form adapted from Gehlbach et. al<sup>2</sup> & Rubio, et. al<sup>3</sup>

ratings were 1 or 2, then question was considered unclear or irrelevant. If all ratings were 3 or 4, then the question was considered



### CONCLUSIONS

- Average RA and CVI scores were all > 85%, which indicates strong agreement between the 6 independent content experts in terms of both relevance and clarity of survey questions and answer choices.
- Overall validation results demonstrated the success of a consensus-based approach for survey question design with minimal suggested revisions and/or comments.
- Final survey revisions will incorporate validation results and feedback prior to official distribution to PDs of residency programs.
- Based on this experience, a consensus-based approach to survey design is strongly recommended, as well as both qualitative and quantitative validation methods by appropriate content experts.

### REFERENCES

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