

Start from Scratch:

How to Craft Your Own Survey Questions, Methods, and Workflows



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Conflict of Interest Disclosure

I have no conflicts of interest related to this presentation

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Why is Survey Research Important?

- ▶ Survey can find answers to
 - Determine current practices
 - Identify a gap or need
 - Evaluate effectiveness
 - Measure attitudes, opinions, behaviors
- ▶ Examples in Medical Physics
 - Clinic
 - Profession
 - Research



Hendrickson, et. al, "The MedPhys match survey: Search criteria and advice for programs and applicants" JACMP, 2021.
Kisling, et. al, "A snapshot of medical physics practice patterns" JACMP, 2018.

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Why Use *High Quality* Surveys?

- ▶ Accurate information that reflects the population of interest
- ▶ Motivate people to respond
 - Minimize the cost of their participation
 - Maximize the perceived benefits of their participation
- ▶ Respond accurately
 - Best practices for creating & distributing surveys
- ▶ If the survey is written or distributed poorly, people won't complete the survey and the data you collect might be inaccurate



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What Does This Mean to Me?

- ▶ Ever gotten a survey that you don't know its purpose, so you ignore it as a waste of your time?
- ▶ Ever started a survey, and the questions were so poorly written that you quit because it was too frustrating to continue?
- ▶ Ever started a survey that went on and on, so you quit halfway through because it took too long?

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Learning Objectives for this Session

- ▶ Tips and tricks for writing high quality surveys
- ▶ Adapting existing surveys
- ▶ Motivating people to respond on a local/national/international scale

Overall goal: Collect accurate data in order to make accurate conclusions

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How to Start Writing a Survey



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Perspective of a Medical Physicist

- ▶ Needed to generate surveys in the department
 - Quality improvement initiatives
 - Residency training techniques
- ▶ No formal training in survey research
- ▶ Completed education research & curriculum design certificate program



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How to Start: Find Your Resources

- ▶ Programs and mentors outside of the medical physics field
 - Qualitative researchers in social science fields
 - Education specialists
- ▶ Medical physics community
- ▶ This session!



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Step 1: Identify Survey Goals



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Clearly Identify the Goals of your Survey

Goals

- ▶ Critically important step
 - ▶ Spend time upfront
 - ▶ What do you hope to gain?
 - ▶ What do you want to find out?

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Advantages of Clear Goals

- ▶ Give direction when writing your questions
- ▶ Every question should be aligned to your goals

When should physicists first receive training in physics plan reviews?

- Graduate Program
- Residency Program
- Post-Residency

When should physics plan reviews be performed?

- Before the first fraction
- Between fractions 1 through 3
- After fraction 3

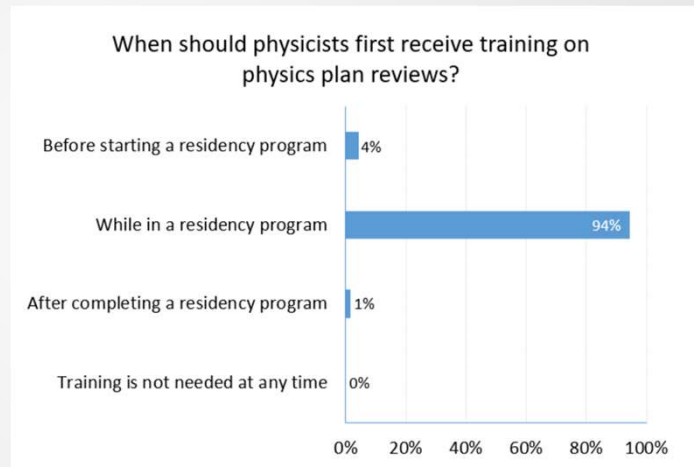
Goal related to residency training

Goal related to clinical practice

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Advantages of Clear Goals

- ▶ Give direction when analyzing your results
- ▶ Plan out the analysis in advance
- ▶ Picture the results in a table or figure



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Step 2: Write the Questions



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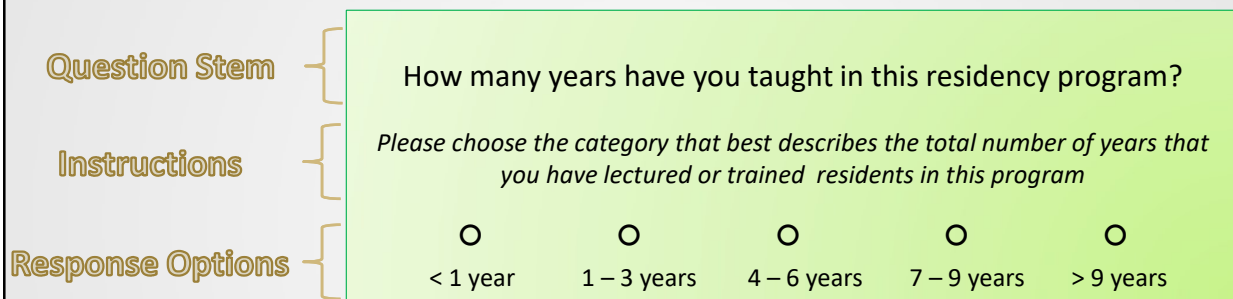
Writing Survey Questions

- ▶ Each question should be relevant to
 - Survey goals
 - Survey analysis
- ▶ Survey length short as possible
- ▶ Minimizes the cost of participation
- ▶ Increases the chances that respondents will complete the survey



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Anatomy of a Survey Question



- ▶ Work together to provide primary source of meaning to the respondent
- ▶ Each component should be well written
 - Understands the question as intended
 - Able to report an accurate answer

Dillman, et. al. Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method 3rd ed. 2008.

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Tips for Writing Good Question Stems

- ▶ Applicable
- ▶ Unambiguous
- ▶ Easy to understand
- ▶ Clearly written
- ▶ Complete, succinct sentences
- ▶ Avoid multiple questions in one stem
- ▶ Avoid negatively posed questions



Dillman, et. al. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method* 3rd ed. 2008.
Artino, et. al. "Developing questionnaires for educational research: AMEE Guide No. 87" *Medical Teacher*, 2014.

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Example

Is it considerably important that physics residents do not miss out in professionalism and ethics training at this time?

Do your residents learn about professionalism from you?

- Too wordy
- Negatively posed
- Multiple questions in one stem

- Ambiguous
- What does 'learn' really mean?
- Does 'you' mean you personally or others in your clinic?

What is the importance of training physics residents in professionalism?

What is the importance of training physics residents in ethics?

What teaching methods does your program use to train residents in professionalism?

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Response Options

► Close-ended

- Options classified into groups
- Ranking (eg best to worst)
- Rating (eg Likert)

► Open-ended

- Specific value, free text
- More granular information
- Information that can't be predicted

Example Five-Point Unipolar Likert-type Response Options

Interest

- Not at all interested
- Slightly interested
- Moderately interested
- Quite interested
- Extremely interested

Effort

- Almost no effort
- A little bit of effort
- Some effort
- Quite a bit of effort
- A great deal of effort

Frequency

- Almost never
- Once in a while
- Sometimes
- Often
- Almost always

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Tips for Writing Good Response Options

- Match the question stem
- Include all possible options
- No overlaps between groups
- All options labeled
- Equally balanced
- Consistent across the survey



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Artino, et. al. "Developing questionnaires for educational research: AMEE Guide No. 87" *Medical Teacher*, 2014.

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Example

How many years have you worked here?

○ ○ ○ ○
 1 - 5 years 5 - 10 years 10 - 15 years 15 - 20 years

- Options don't include all possibilities
- Overlaps between groups

How interesting is this presentation?

○ ○ ○ ○ ○
 Moderately worthwhile Extremely worthwhile

- Options not labeled
- Options don't match the stem
- Not balanced

How many years have you worked here?

○ ○ ○ ○ ○
 < 5 6 - 10 11 - 15 16 - 20 > 20
 years years years years years

How interesting this presentation?

○ ○ ○ ○ ○
 Not at all Somewhat Moderately Quite Extremely
 Interesting interesting interesting interesting interesting

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Step 3: Order Your Questions



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Strategically Order Your Questions

- ▶ Organized like a conversation
- ▶ Follow logical order
- ▶ Make it easy to follow along
- ▶ If not strategically ordered
 - Answers less likely to be well thought out
 - Respondents might quit



Dillman, et. al. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method* 3rd ed. 2008.

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Strategically Order Your Questions

- ▶ Group related questions on similar topics
- ▶ Start with questions that are
 - Likely applicable to nearly all
 - Easy to answer
- ▶ Place sensitive questions near the end
 - Already engaged
 - Understand the context



Dillman, et. al. *Internet, Mail, and Mixed-Mode Surveys: The Tailored Design Method* 3rd ed. 2008.

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Example

Have you made an error during physics plan reviews that resulted in a patient mistreatment?

Please write in detail how you perform a physics plan review.

How many physicists do you work with?

How important is patient safety to you?

What is your primary source of employment?

- Starts with a sensitive question
- Second question takes a long time to complete
- Jumps around to different topics

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Step 4: QA Your Survey



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Why Should You QA Your Survey?

- ▶ Remember, you want to make it easy to
 - Respond and keep responding
 - Respond accurately and thoughtfully
- ▶ Assess whether the questions are
 - Well written
 - Strategically ordered
 - Relevant to survey goals
 - Needed for analysis



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Numerous Ways to QA Your Survey

- ▶ Independent reviews
 - Write it yourself, ask another reader to review
 - Write it with a group of people, ask another to review
- ▶ Formal validation techniques
 - Expert validation
 - Cognitive pre-testing
- ▶ Pilot testing



Artino, et. al "Developing questionnaires for educational research: AMEE Guide No. 87" Medical Teacher, 2014.
 Gehlbach, et. al, "Measure twice, cut down error: A process for enhancing the validity of survey scales" Review of General Psychology, 2018.
 Will & Artino, "What do our respondents think we're asking? Using cognitive interviewing to improve medical education surveys" Journal of Graduate Medical Education, 2013.

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Summary

- ▶ Using high quality survey is important
- ▶ Tips on how to start
- ▶ Framework for writing your own survey

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