The Incorporation of Critical Thinking into Medical Education
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Results (Student Reflections):
- "The nature of the problem we set out to solve was uncertain [...] As we began our research our options immediately exploded outside of the limited three sectors that were presented."
- "The problem we set out to solve was unclear. As ideas were discussed, the objectives of understanding how to examine and evaluate different domains became more apparent."
- "Although it was intentionally left vague, we were able to make sense of them."
- "No matter how vague or ill defined [a problem] may feel, there is always some direction you can take with more critical thinking."
- "Though [it] felt a little vague to begin with [...] there was so much discussion and it felt more streamlined and thought provoking."
- "Having a safe open space to bounce ideas off of each other and flesh out these complicated issues from our viewpoints was invaluable."

Value of group discussion for brainstorming and broadening perspective
- "We all think from different angles."
- "It was useful to participate in the discussion, to hear all aspects to this question and how this question can be systematically approached from so many different angles."

Value in having to defend a different sub-topic of the same issue
- "It made me look for support of the side I don't actually agree with, broadening my perspective."
- "It allowed us to consider both sides and understand the arguments that could be made from each side and the logic behind them even though we were partial to one side."

Insight into complexity of multidisciplinary problems
- "It made me realize that these problems are not as clear-cut as they initially appear."
- "Allowed for a better understanding of what goes into evaluating each domain and how to begin to consider which to prioritize based on available evidence."
- "It was clear [...] we will face decisions like this throughout our careers as researchers, reviewers, etc."
- "I definitely see the skills practiced during these sessions as useful in almost any career."

Appreciation of utility of critical thinking skills in future careers
- "These are really important conversations for SCIENTISTS to contribute to and yet they rarely do."
- "I realized that THESE are the questions we should be asking, these are the conversations that will shape our future."

Results (Facilitator Reflections):
With the input of students, attending faculty members and outside consultants, we sought to structure these sessions to optimize our approach. Throughout the pilot, we used our own observations and student and faculty input to adjust our strategy in order to stay in line with our objectives. We found the following components of our design to be the most effective:

Required Element | Result
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Presentation to Peers | Compelled High quality work
Use of references from both public and biomedical domains | Increased diversity and creativity of arguments
Collaboration within a small group | Broadened individual perspectives
Defense of multiple sides of the same problem | Reinforced complexity and uncertainty of multi-dimensional problems

Conclusions:
We assessed this exercise by anonymous reflective feedback, open discussion, and analysis of the written and oral presentations. Through these assessments, several themes emerged. Students initially felt discomfort in having to define a vague problem, but this discomfort diminished as the exercise proceeded. Students saw the merit of working in a group, citing that their peers helped them to define an initially vague problem and that the group discussion expanded their perspective. They appreciated the value of analyzing a problem from multiple angles, citing that this highlighted the complexity and often inconclusiveness of multi-disciplinary problems. On a broader scale, students were initially skeptical of this exercise in how it related to their careers, but as the exercise progressed, their perception of its utility increased. While this was a pilot study limited by both the number of students and sessions, preliminary results suggest that there is value in early emphasis of critical thinking to improve students' ability to define, organize, and analyze relevant information, and to broaden their perception of skills that will be useful to both their clinical and research careers.

References:
4. Krupat E, Richards JB, Sullivan AM, Fleenor TJ Jr, Schwartzstein RM. Assessing medical students’ ability to define, organize, and analyze relevant information and to broaden their perception of skills that will be useful to both their clinical and research careers. Acad Med. 2015 Nov 24

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“We look for medicine to be an orderly field of knowledge and procedure. But it is not. It is an imperfect science, an enterprise of constantly changing knowledge, uncertain information, fallible individuals, and at the same time lives on the line.” — Albert Gwande