Participatory Design Thinking in Radiation Oncology

Adam Rule[1], Erin Gillespie[2], Nadir Weibel[1], Todd Pawlicki[2]
[1] UC San Diego, Design Lab, [2] UC San Diego, School of Medicine, Department of Radiation Medicine and Applied Sciences

Abstract

Our submission is unique on two fronts. First, little has been done to improve the process of peer review in radiation oncology as demonstrated by the literature referenced in our proposal. Secondly, we present a uniquely design-centered approach to reworking healthcare processes. We detail planned revisions to the practice of peer review (the process of one clinician checking another clinician's work) in a department of radiation oncology. This will have relevance to those seeking to improve their peer review process in oncology and other specialties. Secondly, we describe the process behind our redesign that will be of interest to those seeking to take a similarly human-centered approach to redesigning their healthcare processes. Our contributions are two-fold: describing the specific redesign of peer review in a department of radiation oncology, and a more general reflection on the role of design thinking in the reworking of healthcare processes. Our main goal is for workshop participants to come away with a better understanding of how to apply design thinking to their own process improvement projects.

Introduction

Peer review is widely accepted as a useful and necessary form of quality assurance in radiation oncology [1]. Many facilities conduct peer review through weekly chart rounds meetings where clinicians discuss new patient cases. These meetings operate on the principle that "a larger and more diverse group of people will usually... be able to make a better evaluation [of the treatment plan] than just the person doing the work" [2].

However, there is little evidence that peer review improves quality [3] or guidance for effective review. In place of detailed guidelines the ACR-ASTRO Practice Parameter for Radiation Oncology recommends that facilities "participate in several formats of peer review" [4]. A recent survey of ASTRO members found that 74% wanted ASTRO to make stronger recommendations [5].

Chart rounds, the most popular format of peer review, was first developed in the era of 2D radiotherapy, in which X-ray films with large blocks delineating the treatment field were reviewed. In the past 15 years, 3D-based planning and image-guided techniques have enabled the delivery of highly conformal treatment plans based on complex

contours of target structures and organs at risk. This has in turn made review far more difficult.

Recent studies of chart rounds raise doubts about their effectiveness, finding that plans are discussed for an average of just 3 minutes [6] and changed only 4-12% of the time [7,8,9]. A survey of practices in Ontario further revealed that most cases were reviewed after treatment had already started [10]. These studies beg the question: Is chart rounds an effective means of peer review?

Redesigning Peer Review

To address these concerns, we assembled a team of six people from UC San Diego's Department of Radiation Oncology and The Design Lab for two half-day workshops to redesign peer review in radiation oncology. A central component of the workshops was the application of design thinking, a formal method of solving complex problems that encourages taking time to thoroughly explore and define the problem before brainstorming and testing solutions. This is commonly referred to the "double-diamond" process. This paper will describe that process and make recommendations for how to apply design thinking to other complex healthcare problems.

The Workshops

The first workshop had four stages. In the first, participants were asked to list the goals of peer review and group these goals into themes. Next, drawing on extensive observation, they were asked to describe how peer review is conducted at UC San Diego with respect to three prompts (process and products, people and places, problems and successes). Third, participants were asked to consolidate these observations by generating "How might we..." statements that captured key areas where peer review could be improved. Finally, participants voted on the three most promising "How might we..." statements and brainstormed initial solutions. During the second workshop, participants selected the most promising solutions to prototype and test using a design matrix to prompt solution generation.

Workshop 1

Stage 1: Defining the goals of peer review

During the first stage, participants listed thirty goals of peer review and clustered them into four categories: quality assurance, decision support, education, and team building.

Quality Assurance included ensuring patient safety by checking key quality measures such as dose constraints and dose-volume histograms. This goal covered checking well-documented best practices that, if violated, would be considered an error.

Like Quality Assurance, Decision Support dealt with plan quality, but emphasized decisions made by the physician, including the decision to treat with radiation, the appropriate general volumes covered, prescribed dose and fractionation, as well as radiotherapy technique.

Education included not only educating residents, but also providing continuing education for physicians. This included keeping up to date on published literature, learning about clinical trials that patients could be enrolled in, and learning how other, expert physicians treat various cancers.

Team Building is rarely talked about in the literature but was considered an important goal by the workshop participants. It included sub-goals such as creating an environment where people don't hide shortcomings and providing time during busy clinic days to connect with other members of UC San Diego's Radiation Oncology team.

Stage 2: Mapping the current state of peer review

During the second stage of the workshop, participants made over a hundred observations of how peer review is conducted in radiation oncology at UC San Diego. Participants first mapped out the process and products involved in radiotherapy, then added in the people and places involved in each step, and finally noted problems and successes with the current process.

Stages 3 and 4: How might we… and initial solutions

These observations were then consolidated during the third phase of the workshop, in which participants generated 16 "How might we..." statements that captured key areas where peer review could be improved. The top three areas for improvement are listed below. After identifying these problem areas, participants brainstormed initial solutions, a process that continued in the second workshop.

How might we document and disseminate informal peer review?

While chart rounds may be the most recognized form of peer review in radiation oncology, it is not the most common. Our workshop observed that phone calls, opportunistic hallway conversations, and emails such as those to the "breast team" are frequently used to achieve some level of peer review. These informal reviews can provide timely and directed feedback but often go undocumented and are less likely to include residents or extensive discussion of recent literature. Put another way, they provide timely decision support but lack rigorous quality assurance or education.

How might we ensure that people feel that time spent on peer review is time well spent?

The workshop also observed that, for certain people at certain times, chart rounds could feel like wasted time. First, dosimetrists and physicists contribute little to the discussion at general chart rounds, even if they helped create the plan being reviewed. Moreover, some physicians and residents only contribute significantly to discussion when their cases are being reviewed. Thus many people are present at chart rounds but only a few are engaged at any one time and some never contribute to discussion. Secondly, unless plans are meaningfully changed, or discussing them leads to new knowledge, time spent reviewing them can feel wasted.

How might we facilitate a culture of collaboration, safety, and team building?

Lastly, our workshop observed that while Radiation Oncology at UC San Diego has an excellent team of practitioners, at times chart rounds could feel more combative than collaborative. As a result, those presenting cases are more encouraged to defend their decisions than to raise safety issues or seek advice. Drawing inspiration from the field of aviation safety, workshop members asked how peer review could be used to build a culture of collaboration and safety.

Workshop 2

During the second workshop participants selected promising solutions to prototype and test by composing a design matrix of the problems and goals of peer review identified in the first workshop. Traversing the cells of this design matrix (e.g. How might documenting informal peer review support education) lead to the generation of potential solutions, two of which we describe below.

Online Peer Review

A key finding from the first workshop was that informal peer review (e.g. stopping a colleague in the hall) is an excellent means of decision support, but does not promote education or team building because the number of people involved in these reviews is relatively small. The second design session highlighted that properly reviewing complex cases takes more time and attention to detail than is currently allowed in chart rounds. Combining these two observations, the group asked how informal means of peer review could be revised to promote education, team building, and documentation while allowing sufficient time to review complex cases.

One solution is to abolish chart rounds and move peer review to an online system. At the end of treatment planning, this system would aggregate information about the patient and their plan and send an email to a randomly selected clinician, asking them to review

the case. This setup would let clinicians fit peer review into the gaps in their schedule and would save clinicians and residents from spending time aggregating routine information about cases. The online system mediating these reviews could also perform routine checks on quality measures, such as dose volume constraints. Clinicians would be encouraged to review these cases during ad-hoc meetings with their residents. Discussing cases with residents would benefit resident education and may help clinicians catch errors or suboptimal plans by encouraging them to articulate patient information and justify treatment plans, rather than just skim information.

Educational Case Review

Another key finding of the design sessions was that time spent on chart rounds can feel wasted unless plans are meaningfully changed or attendees learn something from the case.

One way to increase the educational value of peer review would be to abolish chart rounds in its current form, use the online review system described above, and hold a regular Case Review meeting to discuss the more complex and interesting cases. All members of the department would be expected to attend this meeting and given protected time to do so. Having nurses and therapists in these meetings along with physicians, residents, and physicists could foster a team-care and safety culture in the department. Cases would be selected by letting planning and reviewing physicians flag complex or interesting cases during their online review as well as letting any member of the department submit an issue to discuss that occurred at some other point in the planning and treatment process, such as near misses and errors in treatment.

Conclusion

Peer review in radiation oncology is ripe for redesign as there is little evidence that its current manifestation (chart rounds) is effective. Our design thinking workshops uncovered four main goals of peer review in radiation oncology identified three areas ready for improvement and generated two potential solutions to prototype and test. Next steps include prototyping and testing these solutions on a small scale with actual patient cases.

While aimed at improving peer review in radiation oncology, our process also demonstrated the value of applying participatory design thinking to complex healthcare problems. For those seeking to apply design thinking at their own organizations, we encourage assembling an interdisciplinary team of clinicians and designers, actively discouraging any solution generation until the problem has been adequately defined, and using flexible frameworks like design matrices to seed solution generation.

Citations

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