Original Article

Virtual and Peer Reviews of Grant Applications at the Agency for Healthcare Research and Quality

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Objectives: This study documents the first six unplanned virtual review (VR) sessions conducted during the 2012 hurricane season at the Agency for Healthcare Research and Quality and their effects on review outcomes. It also compares these VR sessions with five face-to-face (FF) sessions.

Methods: In the first part of this study, six VR sessions are analyzed in terms of feasibility, reproducibility, and reviewers' responses to a questionnaire about VR. In the second part, the VR sessions are compared with five other FF meetings in terms of costs and duration per discussed application.

Results: Despite their technical novelty, all of the VR sessions have been successfully conducted to the satisfaction of reviewers and agency organizers. Special emphasis panel reviewers are more receptive to the new technology than study section reviewers: 75% versus 42%, respectively ($P < 0.05$). Although the duration per discussed application is comparable to FF, the cost per reviewer is much lower for VR sessions than FF sessions.

Conclusions: VR has successfully been used in six review sessions with a maximum of 34 discussed applications per session, special emphasis panel reviewers are more receptive to VR than SS reviewers, VR is a duplicable and low-cost method of review, and practitioners and scientists are urged to serve as reviewers because doing so may assist them in receiving funding.

Key Words: development/evaluation, health services research, medical education–faculty development, peer review, virtual review

The purpose of this study was to evaluate the first six unplanned virtual review (VR) sessions conducted during the 2012 hurricane season at the Agency for Healthcare Research and Quality (AHRQ),[1] to assess their effects on review outcomes, and to compare them with five face-to-face (FF) sessions.

Although VR or Web-based review has been in existence for some time, only one previous study[2] has compared VR with the traditional FF meeting. In the latter situation, as its name indicates, reviewers meet face-to-face to evaluate and discuss applications before making their final decision.

The high cost of FF meetings has resulted in funding agencies seeking ways to minimize the costs of the review process without affecting its quality; therefore, VR has been investigated as an alternative. There are those, however, who see the new technology as an unproven substitute for FF meetings.

By 2012, the National Institutes of Health (NIH) had experimented with various VR technologies including Cisco's Movi, Jabber, and WebEx (Cisco Systems, San Jose, CA); Citrix GoToMeeting (Citrix Systems, Santa Clara, CA); and Adobe Connect (Adobe Systems, San Jose, CA). Each VR system has its unique technical problems; however, preservation of the confidentiality of the peer review process remains a common problem to all of these technologies. Because AHRQ

Key Points

- Virtual review (VR) of grant applications has been used successfully in six review sessions, with up to 34 applications discussed per session.
- Special emphasis panel reviewers are more receptive to VR than are study section reviewers.
- VR is a duplicable and affordable method of review, even for reviewers and officials new to the system.

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Table 1. Questionnaire

Virtual review session evaluation

1. Please indicate your position:
   -Reviewers…….. -PO ……
   -SRO …….. -Others …….
2. Assessing the WebEx virtual session is:
   1. Simple …….
   2. ……..
   3. ……..
   4. ……..
   5. Difficult ……
3. Was the premeeting technical WebEx walk-through useful?
   -Yes …… -No ..……
4. Was the virtual review orientation better than the phone orientation?
   -Yes……. -No…….
   -Have not gone through a virtual review orientation……
   -Have not gone through a phone orientation…….
   -If yes, in what way? .....
5. Was the Web display good?
   -Yes……. -No……..
6. Was the audio good?
   -Yes…… -No…….
7. Did you experience any difficulty?
   -Yes…… -No…….
   -Please specify……..
8. What would you like to see improved about the virtual review session?
   ……..…….
9. Would you like to use this technology again?
   -Yes …….. -No …….
   -Why? …….
10. In your opinion, what are the advantages and disadvantages of the virtual review?
    ……..

PO, program officer; SRO, scientific review officer.

has previously used WebEx[3] for videoconferencing and after considering other technologies, the AHRQ Division of Scientific Review decided to use the WebEx technology.

Methods

In the first part of the study, we analyzed six VR sessions conducted at AHRQ when Superstorm Sandy struck the US East Coast in late 2012. We reviewed their feasibility, reproducibility, and reviewers' responses to a questionnaire they received pertaining to those sessions. In phase two of the study, we compared the length of application discussions and the costs of the six VR sessions with five FF meetings conducted in June 2012.

WebEx has been described as a virtual platform by which people meet through their computers. The system has audio, high-definition 2 × 2 video, real-time content sharing, and the capability to feed up to seven simultaneous webcam videos. Because scientific review officers and reviewers were both new to this technology, a half-hour of basic training was provided to both groups regarding use of the WebEx software.

Following the meeting session, a questionnaire developed to survey VR users was sent to all 110 reviewers who participated in the six VR sessions (Table 1), asking for their feedback on the VR process. Because reviewers answered neither "yes" nor "no" to questions 4, 7, and 9, three responses were possible: yes, no, and no response (Table 3). Results from the VR reviewers are tabulated in Tables 2 and 3. The number of reviewers in each session, the response rate, the number of applications discussed versus the number received, the meeting length, and the duration of each discussed application are detailed in Table 2. Table 4 compares the VR sessions' costs per reviewer and the duration of each discussed application with those of the five regular FF meetings conducted in June 2012.

Results

Four study section (SS) meetings and two special emphasis panel (SEP) meetings were conducted virtually. An SS is a chartered review group that meets three times per year, whereas an SEP is an ad-hoc review group. Of 194 total grant applications reviewed, 128 applications were discussed, with a range of 6 to 34 applications per session. Of all of the reviewed applications, the low-scoring ones were not discussed so as to give reviewers ample time to concentrate on the ones with higher scores.

Table 2. Demographics of the six virtual review sessions

SS/SEP no.	Reviewer, no.	Response rate, %	Applications discussed/total	Meeting length, min	Length per discussed app, min
SS 1	20	25	22/36	450	22
SS 2	24	21	34/59	540	16
SS 3	15	60	16/28	210	13
SS 4	21	5	16/23	495	31
SEP 1	7	57	6/6	225	37
SEP 2	23	65	34/42	660	19
Total-average	110	38	128/194	2580	20 (average)

SEP, special emphasis panel; SS, study section.

Table 3. Perceived characteristics of the VR process

VR characteristics	Yes, %	No, %	No response, %
Easy access	76 (32/42)	24 (10/42)	0
Premeeting session useful	67 (28/42)	26 (11/42)	7 (3/42)
Good display	90 (38/42)	5 (2/42)	5 (2/42)
Good audio	81 (34/42)	19 (8/42)	0
Technical difficulties	26 (11/42)	50 (21/42)	24 (10/42)
Would use VR again	40 (17/42)	33 (14/42)	26 (11/42)

VR, virtual review.

The overall response rate to the questionnaire was 38% (42/110), a rate that is consistent with basic paper-and-pencil interview responses.[4] SEP and SS reviewers did, however, react differently to the questionnaire: 63% and 29%, respectively. When VR reviewers accessed the WebEx system, they found access to be simple (76%) and the premeeting walk-through useful (67%). Audio and the Web display were rated as excellent in 80% and 90% of cases, respectively. One-fourth of the reviewers experienced difficulty working with the system. Forty percent of reviewers indicated they would participate in VR reviews again, whereas 33% would not (Table 3). SEP reviewers were more receptive than SS members to this new technology (75% vs 42%, respectively; $P < 0.05$).

VR reviewers noted several advantages to the Web-based sessions, including less travel (64%), decreased costs (19%), and faster reviews (10%). They cited some disadvantages, including minimal interaction among reviewers (43%), distractions (14%), and less thorough reviews (14%). These drawbacks and advantages of the VR system have not been documented in any previous article.

The duration of time spent discussing each application by VR ranged from 13 to 37 minutes (Table 2), with an average of 20 minutes spent compared with 26 minutes for an FF discussion. The cost per day per reviewer was $1314 for FF meetings and $314 for VR sessions (Table 4). Regarding the FF sessions, the second day of review was less expensive than the first because airfare expenses already had been included in the first day's costs.

This study is limited by the low response rate, a rate that is consistent with basic paper-and-pencil interview response rates of 30% to 35%.[4] In addition, the unplanned use of a virtual review and the technical problems inherent in this emerging technology are additional limitations. The combining of the review sessions conducted during a 5-week period during the hurricane season also may have adversely affected the result of the study. Lastly, the questionnaire is intended to give a more qualitative than a quantitative assessment.

Discussion

AHRQ's mission is to produce evidence to make health care "safer, of higher quality, more accessible, equitable and affordable." AHRQ fulfills its mission through the establishment of a broad base of scientific research to improve healthcare quality by accelerating implementation of patient-centered outcomes research.

The peer review of grant applications for scientific and technical merit is legislatively mandated under amended Title IX of the Public Health Service Act (42 USC 299 et seq) and implemented under Article 42 CFR 52 h. In June 2010, AHRQ implemented a revised peer review process (used in this study) to evaluate the scientific and technical merits of new grant applications.[5] The latter is intended to ensure an unbiased evaluation of the research proposals based on five criteria: significance, investigators, innovation, approach, and environment. Each proposal received by AHRQ in response to a funding opportunity announcement is directed either to one of the five SSs or an SEP within the agency.

At a time when research budgets are decreasing as demands for funding are increasing, the NIH and AHRQ have been reassessing their priorities. They either must decrease the funding rate, the funds allocated per grant, or the cost of peer review. Using the 2007 National Sciences and Engineering Research Council of Canada statistics, Gordon et al[6] demonstrated that the Council could give $41,000 to 10,000 qualified researchers if the peer review system were abolished and the extra money could have yielded better innovation on the part of Canadian scientists. Although we do not suggest abolishing the peer review system, which is not seen as perfect by some,[7,8] we believe that the cost of peer review is high and could be decreased somewhat by using VR for some of the review sessions.

Although some institutions have used VR in peer review for some time, NIH and AHRQ have only recently begun the process. At the American Institute of Biological Sciences, Gallo et al compared 2 years of FF review (2009–2010) to 2 years of VR (2011–2012).[2] Topic areas included but were not limited to drug abuse, nutrition, blood-related cancer, kidney

Table 4. Comparison between FF and VR groups

Type of review	Discussed application, N	Meeting length, min	Average length per discussed application, min	Cost per reviewer/day, $
FF (6 sessions)	113	2937	26	1314
VR (5 sessions)	128	2580	20	324

FF, face-to-face; VR, virtual review.

diseases, autoimmune diseases, malaria, tuberculosis, osteoporosis, arthritis, and autism research. The review panels were small, with 10 to 15 reviewers each time, and the mechanism used was similar to the NIH R01 model.[7] Approximately 1600 applications were reviewed during this 4-year period. Overall, they found few differences between the two methods in terms of overall merit scores, score distributions, standard deviations, reviewer demographics, and the amount of time spent on each discussed application. They concluded that review outcomes were unaffected by the review setting.[2]

The report by Gallo et al is the largest reported comparative study involving FF and VR sessions, and as expected and against the concerns of reviewers regarding new technology, these two methods have been proven to be equivalent in terms of review outcomes. One could argue that the basic sciences fields are not as complex as the medical sciences or that panel teams are small enough to be accommodated by VR. The American Institute of Biological Sciences, however, has been successful in its use of this new technology for peer review and has proven the two methods yield similar results.

One of the reasons why VR has been slow to gain popularity is that it is a departure from traditional review methods and therefore can be met with initial resistance. The other major barrier to its spread is the potential loss of confidentiality of the review process. With many reviewers involved in each session, organizers cannot always be sure who is present on the other end of the line; a reviewer's camera could be angled in such a way that organizers would be unable to detect any additional person(s) present in the same room with the reviewer.

Because there is no documented study addressing the benefits and disadvantages of VR technology and its incidence to date, the research is considered anecdotal at this time. Perceived disadvantages of VR include loss of interaction and socialization among peers, less thorough reviews than those conducted in an FF meeting, a shorter review session, and distractions with the use of new technology. Based on our experience, which is being tabulated, a VR session could be as effective, if not more so, than an FF meeting. It can depend on the interest of the reviewers and the significance of the topic being discussed; however, further studies are needed on this topic.

Regarding the amount of time devoted to each discussed application, which could serve as a parameter for thoroughness of discussion, each VR application discussion lasted 20 minutes compared with the usual 26 minutes for an FF meeting. Although there is a small difference in duration, its overall impact is negligible because no correlation between duration per discussed application and the high scoring of the application has been documented thus far. In addition, if some VR cases had been discussed for 13, 16, and 19 minutes each, others had taken as long as 31 or 37 minutes in this series (Table 2).

Reviewers in this series have indicated that VR distracted them from their work. Although this has not been documented in any previous study, they believed they were unable to focus on the small computer screen for a long period of time. Based on our experience, this factor could be minimized if breaks are scheduled frequently—for example, a 10-minute break for every 90-minute session. Contrary to what reviewers have believed, in this series we have conducted two 2-day review sessions using VR, during which 34 cases were discussed on each occasion. Although this is feasible, we would like to suggest that until proven otherwise, such a lengthy VR session should be reserved for emergency situations such as the one that occurred during Superstorm Sandy. Any planned 2-day review session should be held as an FF meeting. Further studies are needed to confirm these data.

In this pilot study, reviewers and scientific review officers who were new to this technology were able to use it well the first time. The process is simple for anyone to use and time and money saved are tremendous: approximately $1000 per reviewer per day or $20,000 to $30,000 per session depending on the number of reviewers involved in each VR session. With three sessions per year per study group, the savings could be substantial. Although the technology may be imperfect, the savings generated from the use of this system, as well as an investment in better technology with a full-screen image of the reviewers that provides a live view of all group members, would be helpful. Further studies are needed to validate this potential, however; this approach would help eliminate various complaints from VR reviewers and would allow them to interact more personally with their colleagues without traveling. This technology is available; it simply needs to be implemented and the problems resolved as they occur.

Above is a broad view of the virtual and peer-review systems conducted at AHRQ. The more a physician or scientist participates in the peer-review system, the more knowledgeable he or she will be regarding the grant review process and which elements are considered important or will be discussed. Being a reviewer also has its advantages: reviewing affords opportunities to meet with and engage colleagues and leeway in the grant application process.[9]

Conclusions

Based on our analysis of this study, we conclude that VR can be used successfully, having been implemented in six review sessions with up to 34 applications reviewed per session; SEP reviewers are more receptive to virtual review than SS reviewers; the VR process is a replicable and low-cost method of review; solving technical problems related to this new technology may improve its attractiveness and uniformly decrease the cost of the review process; and there are advantages to serving as a reviewer.

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