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Competition in collaborative clothing: a qualitative case study of influences on collaborative quality improvement in the ICU

Katie N Dainty,¹ Damon C Scales,^{2,3} Tasnim Sinuff,^{2,3} Merrick Zwarenstein^{4,5}

¹Li Ka Shing Knowledge Institute, St. Michael's Hospital, Toronto, Ontario, Canada
²Department of Critical Care Medicine, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada
³Interdepartmental Division of Critical Care Medicine, University of Toronto, Toronto, Ontario, Canada
⁴Sunnybrook Research Institute, and Institute for Clinical Evaluative Sciences, Toronto, Ontario, Canada
⁵Institute of Health Policy, Management and Evaluation, University of Toronto, Toronto, Ontario, Canada

Correspondence to

Dr Katie N Dainty,
 Li Ka Shing Knowledge Institute,
 St. Michael's Hospital, 30 Bond
 Street, Toronto, ON, Canada
 M5B 1W8;
 kndainty@gmail.com

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ABSTRACT

Background Multiorganisational quality improvement (QI) collaborative networks are promoted for improving quality within healthcare. Recently, several large-scale QI initiatives have been conducted in the intensive care unit (ICU) environment with successful quantitative results. However, the mechanisms through which such networks lead to QI success remain uncertain.

We aim to understand ICU staff perspectives on collaborative QI based on involvement in a multiorganisational improvement network and hypothesise about theoretical constructs that might explain the effect of collaboration in such networks.

Methods Qualitative study using a modified grounded theory approach. Key informant interviews were conducted with staff from 12 community hospital ICUs that participated in a cluster randomized control trial (RCT) of a QI intervention using a collaborative approach between 2006 and 2008. Data analysis followed the standard procedure for grounded theory using constant comparative methodology.

Results The collaborative network was perceived to promote increased intrateam cooperation over interorganisational cooperation, but friendly competition with other ICUs appeared to be a prominent driver of behaviour change. Bedside, clinicians reported that belonging to a collaborative network provided recognition for the high-quality patient care that they already provided. However, the existing communication structure was perceived to be ineffective for staff engagement since it was based on a hierarchical approach to knowledge transfer and project awareness.

Conclusions QI collaborative networks may promote behaviour change by improving intrateam communication, fostering competition

with other institutions, and increasing recognition for providing high-quality care. Other commonly held assumptions about their potential impact, for instance, increasing interorganisational legitimisation, communication and collaboration, may be less important.

INTRODUCTION

The care of the critically ill is a vital aspect of modern healthcare; its importance reflected in the fact that admissions to the intensive care unit (ICU) are costly and continue to increase.¹ Because of their severity of illness and associated high mortality, it is vital that critically ill patients receive evidence-based practices that are known to improve clinical outcomes. Although many evidence-based critical care practices exist, gaps in implementation remain prevalent^{2–5} resulting in unnecessary morbidity and mortality in vulnerable patients, as well as wasted healthcare resources.^{2–8}

A popular approach to improving the implementation of evidence-based care practices has been to develop multiorganisational quality improvement (QI) collaborative networks. A QI collaborative network is typically defined as multiple teams located in healthcare facilities in different geographic areas, or in different units within the same organisation, working together to solve a practice gap.⁹ The proposed advantage of the collaborative approach is predicated on the idea that learning from the successes of others, and sharing of information between institutions or different teams within the same institution is more likely to lead to improvements in care through a group effort.^{10–12} QI initiatives that

involve more than one centre are appealing for a number of reasons, including but not limited to the fact that, within such a collaborative environment, the sharing of information should create efficiencies in knowledge transfer and innovation. In the last decade, there have been several of these large-scale QI initiatives conducted in the critical care environment, some claiming highly successful results.^{13–15}

Avedis Donadbedian said ‘Measurement in the classical sense—implying precision in quantification—cannot reasonably be expected for such a complex and abstract object as quality’.¹⁶ Yet, most QI collaboratives have been evaluated using only quantitative outcome measures selected for clinical relevance (eg, infection rates, length of stay). However, these provide little insight into the causal mechanisms through which the interventions lead to change or how these are moderated by different contextual factors and situational barriers.^{16–17} To date, we have yet to empirically understand what the benefits are of using collaboratives over single organisation- or department-level QI efforts, which might be less expensive, more relevant and less time-consuming methods of knowledge transfer. Qualitative research methodology is most appropriate for in-depth exploration of these types of questions,¹⁸ and so we conducted a qualitative case study with bedside clinicians and unit leaders to elicit their perspectives on collaborative QI and their involvement in a multiorganisational ICU QI network. Our goal was to be able to hypothesise about the theoretical constructs that might have explained how this collaborative QI network worked and, in general, how networks may actually contribute to the achievement of significant improvement in implementing best practices.

METHODS

Setting

The Ontario ICU Clinical Best Practices Project was a 2-year cluster randomised trial of a multifaceted QI collaborative designed to increase the proportion of patients who received six evidence-based care practices in the ICU: prophylaxis against deep vein thrombosis; prevention of ventilator-associated pneumonia; daily spontaneous breathing trials; prevention of catheter-related bloodstream infections; decubitus ulcer prevention; early enteral feeding.

The participating ICUs were located within 15 community hospitals representing various geographic locations and hospital sizes across the province of Ontario, Canada. Characteristics of these ICUs and study methods have been previously reported.¹⁹ A large academic ICU was used as the pilot site for the behaviour-change strategies, but performance in the academic ICU was not used to evaluate the effectiveness of the network. A central coordinating office (located at the academic institution) was responsible for conducting the QI interventions, disseminating educational and promotional materials, arranging annual in-person

conferences, monthly videoconferences, and analysing collected data. Teams from each ICU met in person biannually and participated in monthly face-to-face video chats via the Ontario Telemedicine Network videoconferencing infrastructure. The monthly videoconferences included discussions of site implementation activities and issues; live interactive educational sessions with content experts for each targeted care practice; and discussion of the overall improvement data. The interactive educational sessions were recorded and available to individuals for subsequent web-based access. At the end of the 1-year trial period, this multifaceted collaborative approach led to greater adoption overall of the targeted practices in the intervention ICUs compared with controls. However, improved performance among all practices and across all ICUs was not uniform.²⁰

Participants and data collection

Twelve of the 15 ICUs that were part of the original implementation study participated. Bedside clinicians (nurses, respiratory therapists, physicians) and unit managers from the participating ICUs were recruited. We used a purposive sampling strategy²¹ to select a sample of healthcare workers that represented the various hospital sizes, locations and staff groups involved in the study. An invitation email, including the letter of information and consent-to-interview forms, was sent to the project contact in each ICU, and volunteer participants were recruited through intraunit communication. All the staff who volunteered were interviewed.

We used open-ended, one-on-one key informant interviews. Each interview was conducted via telephone by an independent consultant to ensure no familiarity bias. A semistructured interview guide was designed by the study investigators based on the existing literature and objectives of the study, and was modified during the course of the interviews to take into account for further exploration of recurring concepts (see Appendix A). All interviews were audio-taped and transcribed verbatim. After completing approximately half the interviews, the research team met with the interviewer to discuss the emerging themes and areas for further exploration during subsequent interviews.

Analyses

Analyses were conducted using a constant comparative approach.²² Interviews were initially analysed sequentially to understand how the discourse between interviewer and interviewees evolved over time. A coding framework was developed by the lead investigator (KD) and compared with a secondary analysis by a coinvestigator (TS) to ensure logic and breadth. As there was close agreement for the basic themes and coding decisions, all interviews were then coded to determine recurrent themes and the relationships between themes. Codes were continuously reviewed

to verify their descriptive content and to confirm that they were grounded in the data. In addition, 'deviant' or 'negative' cases (events or themes that ran counter to emerging propositions) were noted.

To ensure that the analyses were systematic and valid, several common qualitative techniques were employed including consistent use of the interview guide, audiotaping and independent transcription of the interview data, double coding and analysis of the data and triangulation of investigator memos to track the course of analytic decisions.¹⁸

Ethics

Approval to conduct this qualitative study was obtained from the research ethics review boards of all 15 participating hospitals.

RESULTS

A total of 32 interviews were completed representing 12 of the 15 community hospital sites that participated in the ICU Clinical Best Practices Project. No responses to follow-up requests by the researcher team were received from the remaining three sites. The non-participating sites were not significantly different from the participating sites considering ICU organisational characteristics (ie, size of unit, staffing ratios, project involvement, improvement results, etc). The participants were a mix of men (4/32) and women (28/32), and included frontline staff nurses (20/32), respiratory therapists (3/32), physicians (3/32), dieticians (1/32) and unit managers/leaders (5/32). Their experience in the ICU setting ranged from 1 to 32 years (mean=15.7 years) and all were employed in their respective ICUs during the timelines of the ICU Clinical Best Practices Project. Using the constant comparative method of analysis, four key themes emerged and participant quotations supporting each are provided.

Competition in collaborative clothing

The central theme was that the collaborative provided an avenue for friendly competition between the different ICUs. This competition was achieved through access to the interunit comparative data, and was cited as a main motivation for improvement. Participants frequently mentioned the importance of receiving the regular audit feedback data both for stimulating competition and to provide proof of their own progress. While a shared goal, or pursuit, is generally the desired outcome of collaboration, the collective effort was not always characterised by shared objectives and motivations on the part of each of the individual participants in this case.

(Participant 9)—...we knew it wasn't just within our organization, like, we actually represented our organization in a bigger group, so it kind of instilled a little bit of competitiveness—and that helps, that never hurts...when we saw improvement or that we were

doing better than others it allowed us to advocate for some practices and resources that we didn't have and so in the end it was successful. (Staff Nurse)

(Participant 4)—Well I don't think it would have changed my practice but it might have been kind of nice to compare ourselves and see whether we were better or not, because then, you know, you get that competitive spirit going. (Staff Nurse)

(Participant 22)—when you get feedback then you know what you're doing right and what you are doing wrong and what you can change, so I think that's very important. Otherwise you don't know if you're making any change, if you're making any progress. (Staff Nurse)

Receiving the interunit comparative data from the central coordinating office appeared to be more acceptable to participants than communicating with the other units directly. Overall, respondents did not characterise the collective effort in terms of shared objectives and motivations. Most of the frontline clinicians stated that they never interacted, or felt the need to interact, with other units, and often stated that they did not necessarily consider 'collaboration' a benefit of the project. This may have some relationship to how they are typically measured within the new focus on indicator reporting and pay for performance in the Ontario healthcare system, and certainly speaks to the impact of existing system influences on organisational behaviour for QI.

The QI collaborative and unit reputation

Overall, participants' reflections about their ICUs' participation in the ICU Best Practices Collaborative were positive. Most participants noted that the benefits of belonging to a collaborative were derived by their organisation rather than by individuals. The participants described the collaboratives' role in increasing external recognition of the high-quality care that their unit provided and the impact on the organisation's reputation.

(Participant 11): There is an expectation that you will participate, because it is a <government> initiative and that if you're not seen to be participating then that will have an impact on your [ICU's] reputation. (Staff Nurse)

(Participant 30): ...I think anybody who cares about their work and their status in the community and whether we should be a considered a reliable ICU where people would want to have their family members come if they needed to, we need to care about how we are compared to other hospitals....Not that I...care what <hospital x> or <hospital y> really do, but it's just nice to know if we're comparable to our colleagues. (Staff Nurse)

Frontline clinicians in these ICUs, most of which are within small community hospitals, expressed great

pride in their role in improving quality and their unit's existing ability to provide high-quality care despite having fewer resources (eg, personnel, financial) than larger academic centres. They considered their participation in the collaborative as a validation, or recognition, of their reputation. Their identity was expressed as being related to their ICU's ability to provide high-quality care—participation in the multi-hospital group project was not legitimising for themselves as clinicians but for their organisation. This relates directly to the central theme of competitive motivation versus necessarily collaborative goals or pursuits.

Staff engagement and communication

Frontline staff engagement in the project and communication, both *intra*-organisational communication between staff and management and perceptions of *inter*-organisational communication, were perceived to be very important. However, there was a perceived lack of staff engagement in decision making about participating in the project or discussion about the project's purpose. Participants reported severe communication blockages and lack of stakeholder engagement. During the interviews there was frequent use of discourse such as “they said”, “this is what we're doing and this is our focus and these are the kinds of things we're going to be watching for”, and “...then we would chose one and give it to the staff”, suggests that frontline staff were not formally engaged in the planning or implementing this QI initiative. Therefore, the experiences of staff involved did not support the ideal use of widespread and meaningful staff engagement, which is often considered a key to the success of a collaborative QI.

Participants also reported that nursing management or individuals selected as ‘project leads’ (often unit managers or charge nurses) held a disproportionate share of the information about the project, interfering with the knowledge transfer between management and frontline clinicians. In general, participants perceived that there was a hierarchy of individuals involved in QI efforts, and a lack of dissemination or engagement across the multidisciplinary team.

(Participant 34): Most of our initiatives are led by management. I am management, and I think we have done a great job. But, if we are able to figure out a way to involve the front-line staff sooner, we would be able to improve our performance—not just improve our performance, but improve performance faster. (Chief Nursing Officer)

(Participant 3)—I didn't know a whole lot of details. There was only really discussion about it amongst our managers and some staff. Like when we found out we were going to be participating in the project there was some talk about it and then there was the board [referring to an information bulletin board in the unit], but that was about it. So I guess I didn't get enough

information to really make me that interested in it. (Staff Nurse)

In many instances, frontline participants also referred to communication about the targeted care practices as occurring accidentally, indicating an apparent lack of planning or clear communication structures within ICUs. By contrast, participants who were in leadership roles provided detailed, lengthy and sometimes celebratory accounts of activity and engagement on the part of their ICU. This may, in effect, directly contribute to the lack of opportunity to actually leverage collaboration as a driver for improvement in these types of networks.

DISCUSSION

We conducted a qualitative evaluation of participant staff perspectives of a QI collaborative in 12 ICUs, and found that most perceived that the main impact of the collaborative was to foster ‘friendly competition’ between units. The notion of the collaborative also instilled pride among participants and seems to have motivated them to provide better care within a positive competitive attitude. At the local level, limitations in communication, hierarchy and lack of stakeholder engagement appeared to limit effective implementation of the QI initiative.

There has been mounting pressure on healthcare organisations to improve quality of care, either by achieving certain quality benchmarks established by health authorities or through membership in regional and national QI initiatives. Our study suggests that the frontline staff within these organisations are often not motivated to conform to such institutional goals, but instead may be more responsive to factors that legitimise their reputation in providing high-quality care within the healthcare system. Participants in our study reported the importance of being involved in a larger initiative along with other hospitals; and for smaller organisations, of being recognised for delivering a quality of care that was similar to that provided by larger teaching centres, despite the differences in resources. These observations suggest a competitive attitude may dominate over collaborative ones for motivating change; an important concept for consideration when multiple organisations are recruited to achieve common quality goals.

The context into which the collaborative approach was introduced also seems to have strongly influenced staff engagement, communication and the actual act of collaboration. Our results suggested a lack of communication and, therefore, engagement at the frontline which likely influenced the overall results of the QI initiative. This finding has been noted by other evaluations of similar QI programmes.^{23 24} The theory of collaborative advantage suggests that there may be additional gains when something unusually creative is produced *synergistically*, allowing an overall objective to be

achieved more efficiently in multiple institutions compared with what could be achieved by individual institutions working independently.²⁵ In other words, hospitals or ICUs working together should be able to achieve *better* outcomes and *faster* results in QI initiatives if they are working on the same initiatives together.^{26–29} We now understand that a common overall objective was not a driver for staff engagement within our collaborative and, in fact, distant goals (ie, not locally tailored) which are not well communicated may have the opposite effect, causing staff to disengage with what they see as top-down management.

Finally, our findings suggest that competition between sites may also play an important role in influencing behaviour change. By definition, ‘collaboration’ describes the *act* of working together, whereas other similar terms, for instance, ‘cooperation’, stress the *product* of the work.³⁰ Based on our findings, we propose that the concept of collaboration for QI in the ICU is actually a misnomer, that in fact these units may not be driven by collaboration, but rather, by cooperation and competition. In the case of multiorganisational QI in this ICU setting, the principal benefit appeared to be those design elements that foster healthy competition, such as having individual unit support and access to comparative data through a centralised resource, rather than from consensus-building or shared goals.

By incorporating a more detailed contextual evaluation of collaborative efforts within a working QI collaborative, we aimed to move towards a better understanding of the influence of social constructs on the theoretical underpinnings of the effect of collaboration in healthcare QI. Hence, by grounding initial theory development within the data gathered from participants in this particular collaborative, we are able to suggest that a functional theory of collaborative QI could posit that

- ▶ Healthcare organisations seem to benefit from more competitive-style advantages rather than collaborative advantages in multiorganisational QI programmes.
- ▶ Healthcare organisations join multiorganisational QI programmes for reputational recognition as equal to or better than their counterparts in terms of quality (rather than to aim to be ‘like’ stronger peer organisations).
- ▶ Access to comparative data and information about what others are doing is seen as the advantage of multiorganisational QI projects for frontline staff in participating organisations (rather than building interorganisational relationships).
- ▶ Organisational communication structures and staff engagement directly impact improvement results and embeddedness of QI interventions.

A recent theoretical evaluation published by Dixon-Woods *et al* of the large Michigan Intensive Care Unit Project,³¹ which is very similar in design to our collaborative, described some opposing constructs to those

described here (they found institutional isomorphism, a strong sense of community, and an increased ‘safe’ communication), as well as some which our findings support (impact of audit and feedback). Chassin has previously referred to the reputational pathway as a potential lever for greater improvement gains, although his findings specifically reference the impact of audit and feedback on the reputation of those organisations publicly named as outliers with poor performance.³² The differing conclusions derived from these other evaluations suggest that perhaps there can never be one grand theory of collaborative improvement, and that local empirical work must be conducted during such projects to determine the *relative* influence of the context and fidelity of QI projects in various circumstances to help further existing ex-post theories.

Strengths of our study include the rigorous approach to conducting qualitative interviews, sampling of a broad spectrum of healthcare providers from multiple organisations, and the focus on the experience during participation in an actual QI collaborative (as opposed to opinions of the ‘concept’ of collaboration). Our study empirically investigated the effect of the collaborative approach itself in motivating participants to engage in behaviour change. Qualitative research provides an excellent method for describing diverse facets and dimensions of complex social interventions like this,³³ and the human factors side of QI in healthcare.

Our study also has limitations. We conducted a single case study of one collaborative in a specific clinical area, and our results may not apply to other collaborative initiatives. In particular, our telemedicine intervention enabled frequent discussions among participants that may not be possible in regions without such telemedicine resources. Similarly, although participants could see and hear each other through the telemedicine link, some nuances of communication would undoubtedly be different if participants met more regularly in person. A more geographically dense network where physical togetherness may form the basis of the intervention may have an entirely different experience, however, such a design has not been common in the published literature of existing collaboratives. We successfully recruited participants from the majority (12 of 15) of hospitals, but we can only speculate on reasons why participants at the remaining three sites did not respond to our recruitment emails. Although there were no significant differences in the hospital-level characteristics of these units, it is possible that inclusion of participants from these non-responding ICUs may have provided additional insights. The experience of collaborative QI in the ICU may in itself be a unique entity due to the complexity of care provided, staffing ratios and relative composition of the ICU team, and varying models of ICU organisation and ICU capacity. However, the single case study was the best approach to explore this area for practical reasons, and will help

to inform the design and evaluation of other collaboratives involving multiple institutions. Finally, while we believe the themes describing both inter- and intraorganisational influences in a multi-institutional collaborative are likely to be relevant to other settings, we only intended to hypothesise about associations rather than infer direct causation.

CONCLUSION

In 2002, Ovreteit *et al* identified four research questions about QI collaboratives that call for a more critical theoretical paradigm: (1) whether improvements spread more quickly in collaborative programmes; (2) if the resulting improvements are larger in magnitude; (3) if the results last longer and (4) if the best practices are spread more widely.³⁴ Based on our results, we believe a fifth question should be: ‘what is the intended mechanism of the collaborative approach?’ We hypothesize that our findings demonstrate that large-scale QI collaboratives may not all function by the commonly held assumptions of legitimisation, engagement and communication, and collaboration, but may instead also be driven by competition and a desire to improve reputation. Participating organisations and people may respond to these motivators differently, and this may explain the observed variability in the ability of collaboratives to consistently produce sustainable improvements. Further study of how such interventions actually work, the impact of context and organisational behaviours on improvement, and the motivations for large-scale change provides a rich field of inquiry for future QI research and programme development.

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Contributors KND, DS and TS conceived of and designed the study. KND, DS, TS and MZ were all involved in discussion of the analysis and interpretation of data, drafting the article and revising it critically for important intellectual content and final approval of the version to be published.

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Demonstration Project. He currently holds a New Investigator Award from the Canadian Institutes for Health Research. KND, TS and MZ report no competing interests.

Patient consent Obtained.

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REFERENCES

- 1 Leeb K, Jokovic A, Sandhu M, *et al*. CIHI survey. Intensive care in Canada. *Health Care Q* 2006;9:32–3.
- 2 Pronovost PJ, Rinke ML, Emery K, *et al*. Interventions to reduce mortality among patients treated in Intensive Care Units. *J Crit Care* 2004;19:158–64.
- 3 Shehata N, Wilson K, Mazer CD, *et al*. The proportion of variation in perioperative transfusion decisions in Canada attributable to the hospital: (La proportion de variation dans les pratiques transfusionnelles perioperatoires au Canada imputable aux hopitaux). *Can J Anaesth* 2007;54:902–7.
- 4 McIntyre L, Hébert P, Fergusson D, *et al*. and The Canadian Critical Care Trials Group. A survey of Canadian intensivists’ resuscitation practices in early septic shock. *Crit Care* 2007;11:R74.
- 5 Kalhan R, Mikkelsen M, Dedhiya P, *et al*. Underuse of lung protective ventilation: analysis of potential factors to explain physician behavior. *Crit Care Med* 2006;34:300–6.
- 6 Rothen H, Stricker K, Einfalt J, *et al*. Variability in outcome and resource use in intensive care units. *Intensive Care Med* 2007;33:1329–6.
- 7 Cook DJ, Guyatt GH, Jaeschke R, *et al*. Determinants in Canadian health care workers of the decision to withdraw life support from the critically ill. *JAMA* 1995;273:703–8.
- 8 Chen E, Naylor CD. Variation in hospital length of stay for acute myocardial infarction in Ontario, Canada. *Med Care* 1994;32:420–35.
- 9 Schouten LM, Hulscher ME, van Everdingen JJ, *et al*. Evidence for the impact of quality improvement collaboratives: Systematic review. *BMJ (Clinical Research Ed)* 2008;336:1491–4.
- 10 Institute for Healthcare Improvement. *The breakthrough series: IHI’s collaborative model for achieving breakthrough improvement*. Boston, MA: IHI Innovation White Paper, 2003.
- 11 Leatherman S. Optimizing quality collaboratives. *Qual Saf Health Care* 2002;11:307.
- 12 Berwick DM. Continuous improvement as an ideal in health care. *NEJM* 1989;320:53–6.
- 13 Hackbarth AD, McCannon CJ, Martin L, *et al*. The hard count: Calculating lives saved in the 100,000 Lives Campaign. *ACP Guide for Hospitalists*. Apr 2006:1–5

- <http://www.ihl.org/knowledge/Pages/Publications/ThehardcountCalculatinglivesavedinthe100000LivesCampaign.aspx> (last accessed 20 Aug 2011).
- 14 Levy MM, Dellinger RP, Townsend SR, *et al.* The Surviving Sepsis Campaign: results of an international guideline-based performance improvement program targeting severe sepsis. *Intensive Care Med* 2010;36:222–31.
 - 15 Pronovost P, Needham D, Berenholtz S, *et al.* An intervention to decrease catheter-related bloodstream infections in the ICU. *NEJM* 2006;355:2725–32.
 - 16 Donabedian A. *Explorations in quality assessment and monitoring*. Ann Arbor, MI: Health Administration Press, 1980.
 - 17 Michie S, Fixsen D, Grimshaw JM, *et al.* Specifying and reporting complex behaviour change interventions: the need for a scientific method. *Implementation Sci* 2009;4:40.
 - 18 Denzin NK, Lincoln YS. *Handbook of qualitative research*. 2nd Ed edn. Sage Publications, 2000.
 - 19 Scales DC, Dainty K, Hales B, *et al.* An innovative telemedicine knowledge translation program to improve quality of care in intensive care units: protocol for a cluster randomized pragmatic trial. *Implementation Sci* 2009;4:5.
 - 20 Scales DC, Dainty K, Hales B, *et al.* A multifaceted intervention for quality improvement in a network of intensive care units: a cluster randomized trial. *JAMA* 2011;305:363–72.
 - 21 Bernard HR. *Research Methods in Anthropology: qualitative and quantitative methods*. 3rd edn. Walnut Creek, California: AltaMira Press, 2002.
 - 22 Glaser BG. *Doing grounded theory: issues and discussions*. Sociology Press, 1998.
 - 23 Benning A, Ghaleb M, Suokas A, *et al.* Large scale organisational intervention to improve patient safety in four UK hospitals: mixed method evaluation. *BMJ* 2011;342–356.
 - 24 Rantz MJ, Zwiygart-Stauffacher M, Flesner M, *et al.* Challenges of Using Quality Improvement Methods in Nursing Homes that “Need Improvement”. *J Am Med Dir Assoc* 2012;8:732–8.
 - 25 Huxham C, MacDonald D. Introducing collaborative advantage: achieving inter-organizational effectiveness through meta-strategy. *Manag Decis* 1992;30:50–6.
 - 26 Greenhalgh T, Robert G, Macfarlane F, *et al.* Diffusion of innovations in service organizations: systematic review and recommendations. *Milbank Q* 2004;82:581–629.
 - 27 Fennell ML, Warnecke RB. *The diffusion of medical innovations: an applied network analysis*. New York: Plenum Press, 1988.
 - 28 Grilli R, Lomas J. Evaluating the message: the relationship between compliance rate and the subject of a practice guideline. *Med Care* 1994;32:202–13.
 - 29 Meyer AD, Goes JB. Organizational assimilation of innovations: a multilevel contextual analysis. *Acad Manag J* 1988;31:897–923.
 - 30 Panintz T. A definition of collaborative vs. cooperative learning, 1996. <http://www.londonmet.ac.uk/deliberations/collaborative-learning/panitz-paper.cfm> (accessed Aug 2012).
 - 31 Dixon-Woods M, Bosk CL, Aveling EL, *et al.* Explaining Michigan: developing an ex post theory of a quality improvement program. *Milbank Q* 2011;89:167–205.
 - 32 Chassin M. Achieving and sustaining improved quality: lessons from New York State and cardiac surgery. *Health Aff* 2002;21:40–51.
 - 33 Walshe K. Understanding what works—and why—in quality improvement: the need for theory-driven evaluation. *Int J Qual Health Care* 2008;19:57–9.
 - 34 Ovretveit J, Bate P, Cleary P, *et al.* Quality collaboratives: lessons from research. *Qual Saf Health Care* 2002;11:345–51.