A Qualitative Evaluation of Geographical Localization of Hospitalists: How Unintended Consequences May Impact Quality

Siddhartha Singh, MD, MS^{1,2} and Kathlyn E. Fletcher, MD, MA^{1,2,3}

¹Center for Patient Care and Outcomes Research, Medical College of Wisconsin, Milwaukee, WI, USA; ²Division of General Internal Medicine, Department of Medicine, Medical College of Wisconsin, Milwaukee, WI, USA; ³Clement J. Zablocki VAMC, Milwaukee, WI, USA.

BACKGROUND: Geographical localization of hospitalist teams to nursing units may have an impact on the quality of inpatient care. The perceptions of individuals who provide patient care in a localized model of care have not been adequately studied.

OBJECTIVE: To determine the impact of geographic localization of hospitalist teams by evaluating the perceptions of hospitalists (faculty and physician assistants) localized to a single nursing unit and the nurses who staffed that unit.

DESIGN: Focus group study.

SUBJECTS: Six hospitalist faculty and three hospitalist physician assistants who provided patient care while localized to a single nursing unit, as well as 29 nurses who staffed the nursing unit where localization occurred.

MAIN MEASURES: Themes that emerged from grounded theory analysis of focus group transcripts.

KEY RESULTS: Participants perceived an overall positive impact of localization on the quality of patient care they provide and their workflow. The positive impact was mediated through proximity to patients and between members of the healthcare team, as well as through increased communication, decreased wasted time and increased teamwork. The participants also identified increased interruptions, variability in patient flow, mismatches in specialization and perverse incentives as mediating factors leading to unintended consequences. A model emerged that can inform future deployment and evaluation of localization interventions.

CONCLUSIONS: Geographical localization of hospitalist teams is perceived to be desirable by both hospitalists and nurses. Others who attempt localization could use our conceptual model as a guide to maximize the benefit and minimize the unintended consequences of this intervention.

KEY WORDS: localization; hospitalist; focus group.

J Gen Intern Med 29(7):1009–16

DOI: 10.1007/s11606-014-2780-6

© Society of General Internal Medicine 2014

BACKGROUND

Hospitalists are the fastest growing specialty in the history of US medicine,¹ and increasing numbers of patients are being cared for by hospitalists.² The growth of the specialty was incited by many factors—prominent among them was the benefit of localizing the practice of general internist in a hospital as opposed to being dispersed over the ambulatory and inpatient arena.^{1,3} This localizing of clinical practice to the hospital has led to gains in the value of inpatient care.⁴ Within hospitals, hospitalists usually care for patients dispersed across many nursing units. The same stream of logic that led to the localization of clinical practice to hospitals is now leading to efforts to further localize the practice of individual hospitalists to single nursing units. O’Leary et al. have shown that such localization can lead to increase in the quality and quantity of communication between members of the healthcare team.⁵ In addition, this localization allows for interdisciplinary rounds that improve communication, teamwork and patient safety.^{6–8}

In 2010, we localized two hospitalist teams to a single nursing unit. We evaluated this using quantitative methods and found better workflow and increased productivity, but also an increase in length of stay.⁹ Qualitative methods are complementary to quantitative methods and useful for studying new and complex interventions.^{10,11} Hence, we conducted a focus group study of the participants in this localization effort, with an aim to better understand the impact of localization not captured by our previous quantitative evaluation. We also aimed to develop a conceptual model for geographical localization of general medical teams to aid future deployment and evaluation of this intervention.

Received August 1, 2013

Revised November 20, 2013

Accepted January 13, 2014

Published online February 19, 2014

METHODS

Setting

We conducted our study at a 500-bed academic medical center in the Midwestern United States. During the study period, general medical inpatient care in this institution was provided by ten teams. Six of these teams were housestaff teams, and were led by either a hospitalist or non-hospitalist internist faculty. These teams consisted of three housestaff and up to three medical students. The four additional teams were hospitalist-physician assistant (H-PA) teams and did not have housestaff or medical students. During the pre-intervention period, general medicine patients were admitted to any one of 14 nursing units.

Intervention: Between April 2010 and July 2010, we completely limited the location of the patients admitted to 2H-PA teams to one nursing unit. We have previously described the details of this intervention.⁹ The nursing staff, pharmacists, case managers and social workers were localized to this unit prior to our intervention and continued to be localized during our intervention.

Participants

We recruited all hospitalists, physician assistants and nurses who provided patient care during the study period on the intervention nursing unit to participate in the focus groups. Participants were recruited by e-mail.

Design

We conducted five focus groups in total. Four focus groups consisted of nurses. The fifth focus group consisted of hospitalists and physician assistants. We prepared a focus group guide after reviewing the literature on geographic localization. We conducted the focus groups using the same semi-structured focus group guide consisting of eight main questions and follow-up prompts as needed (see [Appendix](#)). Key terms were defined. The focus groups were moderated by the investigators.

Written informed consent was obtained before the focus groups began. The participants received no compensation for their participation, but were served a light meal during the focus group. The focus groups were audio recorded and then transcribed with all names mentioned deleted.

Analysis

Two investigators analyzed the transcripts of the focus groups using grounded theory, which is an approach that emphasizes allowing themes to be generated directly from the data.^{12,13} We began with open coding, by independently reading the transcripts and making notes of themes. Next, we discussed the results of our open-coding and agreed upon a coding scheme. We developed a conceptual model through meetings

to discuss and explore the relationships between the themes. One author reviewed and coded all the focus groups using the agreed-upon coding scheme.

We evaluated agreement by reviewing 15 % of each transcript and dividing the number of agreed-upon quotes by the total number of quotes assigned to each section of the text. The starting point of the text was chosen randomly. We resolved discrepancies by consensus. None represented major differences of opinion. Rather, they usually represented the difficulty of choosing one primary code to fit an utterance that could be represented by several codes.

RESULTS

Twenty-nine nurses participated in four focus groups. Six hospitalist faculty and three physician assistants (PA) participated in the fifth focus group. The characteristics of the participants are described in [Table 1](#). Coding agreement between the two investigators was 61 %.

The conceptual model ([Fig. 1](#)) illustrates the findings of our study. At the top of the model is our intervention—geographical localization of general medical teams. Mediating factors flow downwards from the intervention. At the bottom of the model are the consequences of the intervention on patient care, which mirror the six aims of high quality care as defined by the Institute of Medicine (IOM). The left side of the figure represents mediating factors that improved quality of care, and the right side represents mediating factors that led to unintended decreases in quality of care. We describe the components of the conceptual model below, with representative quotations from nursing and hospitalist (faculty and PA) respondents.

Mediating Factors That Improved Quality of Care

Increased physical proximity of medical teams to all their patients as well as other members of the healthcare team was the main mediating factor for the effects of geographical localization. This led to a number of secondary mediating factors:

Increased communication with patients: The participants noted that localization led to providers spending more time communicating with their patients. Providers also visited their patients multiple times a day, and sometimes patients themselves were able to seek out their providers to ask questions. Nurses commented, “*I see the physicians in the room more than just once a day...*”, “*I’ve seen doctors take patients back into the doctors’ room or families and draw diagrams*”, “*And you know the patients are walking around looking for them, too. I mean, that’s not always good, but they’re just – they’re interacting more with them*” Hospitalists noted “*(patients) trust you more because you have more communication with them. You inform them more often of what’s going on...and they trust you.*”

Table 1. Characteristics of Focus Group Participants

	Total number	Age median (range)	Gender number female	Years since completing training median (range)
Nurses	29	29 (22–53)	27	3 (< 1–32)
Hospitalist Physicians	6	31 (29–33)	1	1.3 (< 1–2)
Hospitalist PA*s	3	27 (25–27)	3	1.5 (1.5–1.5)

*PA Physician Assistant

Increased unstructured communication with members of the healthcare team: The participants noted that they interacted with each other more frequently, and more of these interactions were face-to-face. A nurse stated, “*There’s more face to face (communication) I think... I think it’s good,*” and hospitalists noted, “*You can physically talk to them (consulting services), you know, ... meet them and talk—it’s much easier to get the—an idea of where the patients at, paging them or waiting for the notes to be written... It increases the face-to-face time,*” “*The best is sometimes you’ll be able to come out of the patient’s room and the nurse will be walking by and you’re like, hey, this is what we’re doing with this person today.*”

Increased structured communication with members of the healthcare team: Interdisciplinary rounds (IDR) were an expectation before the localization intervention, but were not functional, as teams could have patients on many different units and could not participate in these rounds on each unit. Participants noted that IDR were far more effective during the localization intervention. Nurses commented, “*The physicians didn’t even come (to IDR)...prior to having it localized to the floor,*” “*I think, too, with our interdisciplinary rounding... That’s huge...and they’re sitting right there at the table with you, the hospitalist and the PA, they’re right there, and any question as, I mean, as simple as, you know, ‘why is this test ordered’ or ‘when is this patient going home’ or, you know, the case managers and the social workers are right there at, you know, asking the doctor, when are they gonna go, what do we need to set up. It helps us to understand the whole process....*” Hospitalists agreed, “*It allows us to—to do (interdisciplinary) rounds, whereas if we had patients on multiple different floors, doing rounds is just not feasible, so in that way it’s good, so we have that time to get the whole team together and discuss each patient and—and everyone gets on the same page.*”

Increased teamwork: Nurses felt more part of the team and participants felt they knew each other by name more often. Participants noted more rapport with other disciplines. Nurses were able to notice the challenges providers faced during their workday and vice-versa. This led to a feeling of ‘empathy,’ which strengthened the notion of teamwork. Nurses noted, “*it builds a good rapport, with you and the doctors. ‘Cuz they get to know who you are and they get to know who you are,’*” “*It brought nursing to be more part of the team with the doctors... more teamwork,*” and “*I think the doctor–nurse relationship is better because they see the*

struggle that we go through because they’re up here and they know them, so they under—they have empathy towards us when it comes to really difficult patients....” Hospitalists similarly stated “*It also builds more of a team care aspect, where you get to know the—the other members of the medical team better as opposed to if we have patients on different floors....*”

Decrease in wasted time: Nurses felt that they had to spend less time paging providers and waiting for pages to be returned. Providers felt that they had to spend less time travelling about the hospital from patient to patient. Nurses said, “*if a doctor calls you or if you call the doctor, if you have multiple patients with them, you are able to just knock everything out and just ask them all... you need, instead of trying to track down all different people,*” “*because the physicians only have to be in one area for the most part, and they can just, you know, make their rounds right on the floor and they’re not running from the fourth floor, to the fifth floor, to the ninth floor,*” and hospitalists said, “*you’re more likely to have extra time, that you’re not running around.*”

Mediating Factors that Led to Unintended Consequences

The study participants also revealed mediating factors that led to unintended consequences of geographical localization of general medical teams.

Increased Interruptions

Nurses noticed the impact of increased opportunities for communication on the hospitalist’s workflow. They noted, “*from what I’ve seen from the doctor’s point of view, it can be frustrating to be available all the time, because you’re trying to write full daily notes on each patient and...I think nursing feels more comfortable. Maybe it’s something that you probably wouldn’t have paged the doctor for, you probably would’ve just waited until you saw them, but since they’re right there, I can just, kinda ask them quickly and I think it can be...it’s get frustrating for them sometimes.*” Hospitalists similarly noted that, “*The downside to that is, sometimes they bring up an issue when you’re trying to finish up your work...there are sometimes minor issues that*

Figure 1. Conceptual model depicting impact of geographical localization of general medical teams on quality of care. Mediating factors that lead to better quality of care are described in blue boxes. Mediating factors that are unintended and lead to worsening quality of care are described in grey boxes. The impact on domains of quality of care is described in pink boxes. ‘↑’ indicates an increase; ‘↓’ indicates a decrease; *IDR* Interdisciplinary Rounds.

can wait while we’re finishing up and that, to a certain extent, becomes a nuisance.”

Mismatch of Specialization

The nursing unit where we conducted the localization was previously a ‘pulmonary unit’ where some patients with chronic pulmonary issues would be located; e.g., severe pulmonary fibrosis requiring many admissions in a year. This was partly lost during localization. Nursing felt that they had developed a feel for these patients’ clinical conditions and could recognize changes quickly. For example, a nurse noted that “I get a lot of people like pancreatitis, a lot of GI stuff going on, and before it was all shortness of breath... like some of our patients that we saw all the time, you know when they’re okay, you know when they’re bad. You don’t get to recognize that as quickly with these people that we don’t interact as much with.”

Variability in Patient Flow

As the localized H-PA teams admitted patients mainly during the day, the nurses noted an increase in workload

during the day with a lower workload at night. They stated, “I think it’s a different kind of hard.... Sometimes it’s hard to do two discharges at the same time. Sometimes we do a discharge and admission,” and “We’re busy...we’re really busy, getting people in and out... Either we’re really busy or we’re really slow... There’s no in-between.”

Perverse Incentives

Hospitalists noted that if they were efficient in discharging patients, they would be burdened with more work. They stated, “if you discharge a bunch of people, you can get an influx of, you know, eight, nine patients—new patients in a day,” and “we’re so successful with discharging, we’re a victim of our own success.”

Impact on Quality of Care

The study participants in general noted that geographical localization led to benefits in all six domains of quality as defined by the IOM. In the domains of Safety and Efficiency, despite the net benefit, there was some balancing of these benefits by unintended consequences.

Safety

Participants felt that patient care was safer, mainly due to the ability of providers to respond to a decompensating patient quickly. Nurse noticed fewer calls to the rapid response teams and quicker transfers to the intensive care unit when patients decompensated. In addition, nurses noted fewer telephone orders. A nurse noted that, *“there was a patient that was transferred—or brought up here from the ER at our last rotation—and clearly needed to be moved to the MI (medical ICU), and it was—from what I heard, it was a very quick transition, they were up here, everything was—plans were made and things were put together; they were moved to the unit immediately. They weren't sitting up here, the nurse trying to page this doctor, trying to get a hold of that doctor, not knowing which doctor to call, trying to get them to agree on moving the patient. It seems like if a patient needs to be in the unit, it happens much quicker”* and a hospitalist said, *“it's a lot easier to fine tune, you know, or catch things before they're a real problem and even, you know, one of our colleagues prevented someone from being ICU, you know, transferred because we nipped the problem in the bud.”*

On the other hand, safety was sometimes decreased by the variability in patient flow. A nurse noted *“it's not safe for the patients. It also affects patient satisfaction. You can't really care for them the way you would ideally want to, because you're stretched so thin.”* Additionally, safety was also compromised by the mismatch between nurse specialization and the general medical population they had to take care of as a result of the localization. A nurse noted, *“...in general, my nursing care is good for them, but I'm sure that someone who is more familiar with that diagnosis, it could better care or they might recognize changes quicker in that patient.”*

Timeliness

Patients were noted to have to wait less for getting admitting orders. Patient discharges were also characterized by quicker decision making. As one nurse said, *“You get them (Admission orders) within an hour of the patient being admitted... because they're—they're there to see their patients.... They're there right away... And if they can't be, it's still faster than it was... and you can get like at least a diet order; 'cuz that's all the patients really care about,”* and a hospitalist noted, *“it's easier to access the patient, like, you know, very quick if something is happening to the patient regarding the floor...you have a minute to go, rather than like some of the patients on (different units). You never know, you might have to walk down or sometimes the elevator is late.”*

Efficiency

Nursing workflow was more efficient, as staff had to rely less on paging, and providers had to spend less time traveling about the hospital. A nurse mentioned, *“...the doctor is right there instead of*

you paging him, then going to the next person waiting for them to call back, maybe needing to page again, you can just go ask, and they say give half the dose and the order is right there, and you're still giving your morning meds at the time that you're supposed to be giving your morning meds so, it's made things a little bit easier that way,” and hospitalists noted, *“I just noticed that, like, I really had a dramatic decrease in the amount of pages that I could count... Was it because they were coming in face-to-face asking me these questions, or was it because, the questions were answered because I was part of these rounds or would interact with them as I saw patients?”* *“My approach towards taking care of all the patients was a little more efficient, just because I felt more organized and I felt like things were a little bit more centered, and I had a home-base that I could kind of work from.”*

On the other hand, the perverse incentives led to a negative impact on efficiency. One hospitalist noted, *“(If) I can discharge six patients today, you know, I might not be interested in doing that, because obviously that is going to increase my patient encounter if I discharge patients and get more patients.”* Similarly, increased interruptions sometimes led to decreased efficiency, as noted by a hospitalist: *“The nurses were interacting with us so frequently at different intervals rather than bundling a few, you know, points for one conversation, that it slowed my—like the PAs and me down.”*

Effectiveness

Increased interdisciplinary communication, mainly through functional interdisciplinary rounds, led to development of effective care plans. A nurse said, *“because of the interdisciplinary rounds, so much is getting done and happening and the communication is more effective that, you know, we are seeing more patients and having more discharges and admissions because of that process,”* and a hospitalist similarly stated, *“multidisciplinary rounding ... if strictly adhered to...then it can be a very powerful tool and—and, like we talked about, building everyone's knowledge of what's happening with the patient and everything.”*

Equity

As all patients were in relatively equal proximity to their providers, they were more likely to be attended to equally. A quote from a nurse reflects this: *“It almost seems like, too, that you guys probably round more consistently, too, with the patients, where they're actually more in the know, instead of like, oh, you know, like if you've got patients all over the hospital, you might not get to see one patient by, you know, 3 o'clock in the afternoon.”* Similarly, a hospitalist reflected equity in care by stating, *“if you're scattered all over and every floor does not have a similar approach, then not all those patients get to benefit the same way, where up here, if you localize people and then*

implement these types of things on each of those floors, then I think you can kind of standardize that all the patients then are able to get that type of care.”

Patient Centeredness

The increased time providers had to spend with their patients, as well as the increase in the amount and quality of communication with their patients, led to increased patient centeredness. As one nurse said, *“You have a patient who wants to see the physician, it’s not impossible to get them to come up and see them sometime during the next hour or so. I think you just get things a lot quicker. Their needs are met.”* The physicians noted improved relationships with the patients, for example: *“being visible throughout the day gives that patient and their family a sense that you are there, actively working, and maybe are doing things that are related to their care and that might be, overall, better—a pleasant thing, versus hospitalizations where they might see a patient—a physician for just 10 min in the morning....”*

The participants thought that net effect of localization was clearly beneficial. A nurse mentioned *“...if you’re asking me to choose between one or the other, I would definitely choose the localization.”* When asked how the participants would like their loved ones cared for, they unanimously responded that they would choose care under the localized model. When nurses were asked by a moderator, *“If you were to make a decision and decide whether...geographical localization is worth it or not, what would be your opinion?”* they responded, *“Absolutely.”*

DISCUSSION

We performed a qualitative evaluation of the perception of nurses, hospitalists and physician assistants who participated in a geographic localization intervention, and identified the factors mediating the effect of localization on quality of care. Some mediating factors improved quality, while others worsened quality and led to unintended consequences. We translated this into a conceptual model to inform future deployment and evaluation of localization efforts. The study participants clearly articulated that localization had a net effect of improving quality of care.

The proximity of medical teams to their patients as well as other members of the healthcare team was the central mediating factor to the benefits of localization. Currently, there is no standard way to measure localization, but measures of proximity may have the potential to be a measurable surrogate for the extent of localization interventions. This measurability of the extent of localization becomes increasingly important when localization is deployed in a partial form; i.e. when some of an inpatient

team’s patients are located on a single nursing unit and the rest are dispersed through the hospital. For example, a localization intervention with six of ten patients localized to a unit and the other four patients widely dispersed over four other units is likely to be different from a localization intervention with six of ten patients localized to a unit and the other four patients localized in an adjacent unit. Simplistic measures such as percentage of patients localized to a single unit will miss these differences, but measures based on proximity will better differentiate them.

Communication and teamwork between members of the healthcare team was improved by localization, consistent with previously published literature. Importantly, we noted that good physician–nurse communication ‘cascaded’ to patients through nurses as well as across nursing shifts. Communication between patients and their medical teams increased. Localization decreased wasted time by decreasing time spent in waiting and motion, consistent with lean thinking.¹⁴ Our study also confirmed the value of localization in allowing for functional interdisciplinary rounds and their contribution to improving the quality of clinical care. Some of these positive effects of localization were borne out in our previously published quantitative evaluation of the localization intervention, such as evidence of more face-to-face communication (fewer pages with localization), less wasted time (fewer pages and less distance walked during the work day) and increased productivity (higher relative value unit generation).⁹ We also noted that there were 37 rapid response calls on the study nursing unit in the 3 months prior to localization, which decreased to 19 during the 3 months after localization. For the rest of the hospital, the number of rapid response calls remained almost the same—92 in the 3 months before and 90 calls in the three months after our localization). This may represent better safety and timeliness of care due to localization.

We also noted mediating factors that led to unintended consequences of localization. First, as opportunities to communicate increased, so did interruptions. Increased interruptions are a problem, as they could lead to medical errors and compromise safety.^{15,16} These interruptions may be avoided by structured communication practices and batching communications by provider. Second, localization distills the patient flow impact of the localized inpatient teams. Prior to our intervention, the study unit housed patients from all ten medical teams, which had admitting schedules staggered

Table 2. Lessons Learned: Preventing Unintended Consequences of Geographic Localization of General Medical Teams

1. Deploy structured communication practices and batch communication between members of the localized team
2. Adjust admitting schedules to smooth patient flow through localized unit
3. Avoid localizing general medical teams to units where nursing is specialized to care for specific disease states
4. Mitigate perverse incentives by setting accountability for a balanced set of quality metrics for the localized unit

across the day. So the patient flow through the unit was uniform. When we localized only two teams, both of which admitted mainly during the day, the nursing units had more patient flow during the day and less overnight. This introduced variability in nursing workload that could compromise patient safety.¹⁷ Others attempting localization could minimize this patient flow variability by creating admitting schedules that level workload through the day. Third, nursing units are traditionally specialized for a particular set of patients. Localization of general medical teams may disrupt the benefits of this specialization. Finally, total localization could lead to perverse incentives to delay the discharge of patients. This has the potential to mitigate any gains in efficiency as reflected in our quantitative study as an increase in length of stay.⁹ This may be avoided by setting in place incentives and expectations of ‘accountable care systems’ at the unit level.^{18,19} We have summarized our suggestions to avoid the unintended consequences of localization in (Table 2).

Our study has limitations. Our study was conducted at a single nursing unit in a single hospital, which may limit the generalizability of our findings. We did not include other members of the healthcare team such as pharmacists, social workers, case managers and physical therapists in our focus groups. Including them could have provided richer information, especially information on the optimal composition of a localized healthcare team beyond hospitalist and nurses. Some of the opinions of the participants of localization may have been confounded by the difference between interacting with housestaff teams before localization (larger teams with a variety of less experienced individuals) and only H-PA teams during localization. If we had conducted interdisciplinary focus groups with nurses and providers together, the discussion could have been richer. We did not do so, as we felt that each group would speak more freely without the other present. The authors conducted the focus groups as well as analyzed the material. An independent investigator did not conduct a confirmability audit. We had low to moderate interrater agreement (61 %), but this was mostly due to the possibility of a single item being eligible for different codes due to the inter-relations between the IOM domains of quality, and was easily resolved by consensus. We cannot guarantee thematic saturation for hospitalist faculty and PAs, as we could conduct only a single focus group, given the limited subject pool.

In conclusion, the results of our study show that localization of general medical inpatient teams is considered beneficial by nurses, hospitalist faculty and physician assistants. It is a powerful intervention that can have a positive impact on every domain of quality of care. This impact is mediated by proximity, better communication, better teamwork and less wasted time. It also has the potential for unintended negative consequences. Our research provides a framework for others deploying similar interventions to maximize the benefits and mitigate the unintended consequences of localization. We also call for more research evaluating geographic localization using a

balanced array of process and outcome metrics covering every domain of quality—especially safety and efficiency, as these domains are most likely to suffer unintended negative consequences.

Acknowledgements: The authors would like to thank the section of hospital medicine at the Medical College of Wisconsin and the nursing staff on 9NT Froedtert Hospital for supporting this research.

Prior Presentations: None.

Conflict of Interest: The authors declare that they do not have a conflict of interest.

Corresponding Author: Siddhartha Singh, MD, MS; Center for Patient Care and Outcomes Research, Medical College of Wisconsin, 9200 West Wisconsin Avenue, Milwaukee, WI 53226, USA (e-mail: ssingh@mcw.edu).

APPENDIX: FOCUS GROUP GUIDE

1. Is the localization of medical teams desirable? If so/ if not – why?
2. What is the impact of localization of medical teams on **quality** of inpatient care?
3. What is the impact of localization of medical teams on your **workflow**?
4. What is the impact of localization of medical teams on your **workload**?
5. What is the impact of localization of medical teams on your interaction with other members of the health care team?
6. Can you describe a time that the dispersal model of medical teams resulted in an adverse patient event? A near miss? What specific aspects contributed to adverse events?
7. Describe certain situations where localization of medical teams had an adverse impact on patient care?
8. How would you define optimal localization of medical teams?

Quality: Defined as meeting the 6 aims of IOM – safety, effectiveness, efficiency, equity, patient centeredness and timeliness.

Workflow: defines as the sequences of tasks or interruptions, coherence, appropriate prioritization etc.

Workload – defined as the subjective feeling of how hard you work.

REFERENCES

1. Wachter RM. The state of hospital medicine in 2008. *Med Clin N Am.* 2008;92(2):265–273.
2. Kuo Y-F, Sharma G, Freeman JL, Goodwin JS. Growth in the care of older patients by hospitalists in the United States. *N Engl J Med.* 2009;360(11):1102–1112.

3. **Wachter RM.** An introduction to the hospitalist model. *Ann Intern Med.* 1999;130(4_Part_2):338–342.
4. **Coffman J, Rundall TG.** The impact of hospitalists on the cost and quality of inpatient care in the United States: A research synthesis. *Med Care Res Rev.* 2005;62(4):379–406.
5. **O'Leary K, Wayne D, Landler M, et al.** Impact of localizing physicians to hospital units on nurse–physician communication and agreement on the plan of care. *J Gen Intern Med.* 2009;24(11):1223–1227.
6. **O'Leary KJ, Boudreau YN, Creeden AJ, Slade ME, Williams MV.** Assessment of teamwork during structured interdisciplinary rounds on medical units. *J Hosp Med.* 2012;7(9):679–683.
7. **O'Leary KJ, Buck R, Fligiel HM, et al.** Structured interdisciplinary rounds in a medical teaching unit: improving patient safety. *Arch Intern Med.* 2011;171(7):678–684.
8. **O'Leary KJ, Haviley C, Slade ME, Shah HM, Lee J, Williams MV.** Improving teamwork: Impact of structured interdisciplinary rounds on a hospitalist unit. *J Hosp Med.* 2011;6(2):88–93.
9. **Singh S, Tarima S, Rana V, et al.** Impact of localizing general medical teams to a single nursing unit. *J Hosp Med.* 2012;7(7):551–556.
10. **Pope C, Mays N.** Qualitative Research: Reaching the parts other methods cannot reach: an introduction to qualitative methods in health and health services research. *BMJ.* 1995-07-01 00:00:00 1995;311(6996):42–5.
11. **Sofaer S.** Qualitative methods: what are they and why use them? *Health Serv Res.* 1999;34(5 Pt 2):1101–1118.
12. **Strauss BGGAL.** The discovery of grounded theory: strategies for qualitative research. Chicago, IL: Aldine Publishing Company; 1967.
13. **Strauss JCA.** Basics of qualitative research: techniques and procedures for developing grounded theory. Thousand Oaks, CA: Sage Publication, Inc; 2007.
14. **Radnor ZJ, Holweg M, Waring J.** Lean in healthcare: The unfilled promise? *Soc Sci Med.* 2012;74(3):364–371.
15. **Alvarez G, Coiera E.** Interdisciplinary communication: An uncharted source of medical error? *J Crit Care.* 2006;21(3):236–242.
16. **Fisman DN, Harris AD, Sorock GS, Mittleman MA.** Sharps-related injuries in health care workers: a case-crossover study. *Am J Med.* 2003;114(8):688–694.
17. **Litvak E, Buerhaus PI, Davidoff F, Long MC, McManus ML, Berwick DM.** Managing unnecessary variability in patient demand to reduce nursing stress and improve patient safety. *Jt Comm J Qual Patient Saf.* 2005;31(6):330–338.
18. **Shortell SM, Casalino LP.** Health care reform requires accountable care systems. *JAMA.* 2008;300(1):95–97.
19. **Payne C, Odetoynbo D, Castle B, Methvin A, Vazquez J, Burleson M, et al.** Accountable care unit on a medical ward in a teaching hospital: a new care model designed to improve patient and hospital outcomes [abstract]. *J Hosp Med.* 2012;7(Suppl 2):191.