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Parent Perceptions of Children's Hospital Safety Climate

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Abstract

Background—Because patients are at the frontline of care where safety climate is closely tied to safety events, understanding patient perceptions of safety climate is crucial. We sought to develop and evaluate a parent-reported version of the Agency for Healthcare Research and Quality (AHRQ) Hospital Survey on Patient Safety Culture and to relate parent-reported responses to parental need to watch over their child's care to ensure mistakes aren't made.

Methods—Parents (n=172) were surveyed about perceptions of hospital safety climate (14 items representing 4 domains—overall perceptions of safety, openness of both staff and parent communication, and handoffs and transitions) and perceived need to watch over their child's care. Confirmatory factor analysis (CFA) was used to validate safety climate domain measures. Logistic regression was used to relate need to watch over care to safety climate domains.

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Results—CFA indices suggested good model fit for safety climate domains. Thirty-nine percent of parents agreed or strongly agreed they needed to watch over care. In adjusted models, need to watch over care was significantly related to overall perceptions of safety (odds ratio=0.20, 95% confidence interval 0.11–0.37) and to handoffs and transitions (0.25, 0.14–0.46), but not to openness of staff (0.67, 0.40–1.12) or parent (0.83, 0.48–1.45) communication.

Conclusion—Findings suggest parents can provide valuable data on specific safety climate domains. Opportunities exist to improve our safety climate's impact on parent burden to watch over their child's care, such as targeting overall perceptions of safety as well as handoffs and transitions.

Keywords

Communication; Patient safety; Patient-centred care

INTRODUCTION

The crucial nature of understanding patient experiences with care has resulted in considerable progress in developing and applying these measures to improve outcomes such as adherence and satisfaction with care, including care for children.[1–5] Patient perspectives on safety represent a potential complement to the existing measures of patient experiences and are suggested to be highly correlated with patient experiences of care.[6] Patient perspectives on safety are also critically important because patients are at the frontline of care, where these perceptions may be most closely associated with important outcomes such as Patient Safety Indicators and readmissions.[7–11]

Patients possess the knowledge and willingness to engage as partners in ensuring safe care to varying degrees, depending upon factors related to the patient personally (educational attainment), characteristics of the illness, the healthcare setting, and the tasks involved.[12–16] Numerous expert bodies recommend patient engagement in ensuring safe care,[17–19] yet a recent Agency for Healthcare Research and Quality (AHRQ)-commissioned report identified the lack of tools to assess patient views of safety as a crucial gap in current patient safety efforts.[20] Safety climate, comprised of the values, attitudes, perceptions, competencies, and patterns of behavior within an organization, can be a useful metric for understanding a hospital's proficiency with and commitment to safety.[6] Understanding and assessing safety climate is a key strategy for improving patient safety.[21] Although several survey-based tools exist to evaluate safety climate from the viewpoint of clinicians, [6 22–27] to our knowledge, no instrument exists to evaluate safety climate from the viewpoint of patients or families.

Children are highly vulnerable to medical error,[28] due in part to their dependence upon adults' communication and other behaviors to prevent error. For this reason, experts and governing bodies have suggested family engagement in care can improve safety for hospitalized children.[29–32] Parents may well recognize their potential role in reducing error, with ~2/3 of parents of children hospitalized at a prominent US children's hospital feeling the need to watch over their child's care to ensure mistakes are not made.[33] Yet, given the psychological distress experienced during a child's hospitalization, perhaps the need for parents to watch over care is rather common and not necessarily reflective of parental perceptions of the hospital's safety climate.

To advance the field of pediatric patient safety, we sought to understand the potential value of parent reports about safety climate in children's hospitals. Specifically, we adapted and validated the AHRQ Hospital Survey on Patient Safety Culture as a tool for measuring parent perceptions of safety climate in children's hospitals, focusing on domains visible to

parents--overall perceptions of safety, handoffs and transitions, and communication openness. We further examined how parent perceptions of safety climate were associated with their need to watch over their child's care.

METHODS

During the period from October 2010-May 2011, the family of each child hospitalized on our general pediatric hospitalist, pulmonology, hematology, and oncology services across 3 hospital units was approached to participate in a study of parental perceptions of safety in our 60-bed, academic children's hospital. Our hospitalist service admits many children with acute concerns (e.g., dehydration or respiratory distress) while the other services admit mostly children with ongoing or chronic illnesses (e.g., cystic fibrosis, sickle cell disease, or pediatric cancers). Children with stigmatizing reasons for hospitalization (e.g., child neglect or mental health concerns) or whose parents were unavailable to consent (either absent or sleeping during our recruitment visits) were not eligible for participation. Our institution's IRB approved the study protocol.

Of 233 parents of eligible admissions in our continuous convenience sample, 194 agreed to learn about the study from our research team. Ultimately, parents of 172 of these admissions (87%) agreed to participate. When two parents were present, parents decided which parent would complete the consent process and surveys. Survey items included 14 items adapted from the AHRQ Hospital Survey on Patient Safety Culture[6] to assess parental perceptions of safety climate in our children's hospital and a single, previously published item inquiring about the need to watch over the child's care to ensure mistakes aren't made.[33] Parent surveys also gathered data on parent (age, gender, education, and race), child (age, gender, and health status) and hospitalization (reason for hospitalization and length of stay) characteristics, based on known or theorized potential impacts on parent need to watch over care. Response options for reason for hospitalization included a checklist of common reasons in lay terms (e.g., breathing problem) as well as medical diagnoses (e.g., asthma) and an "other" response in which families could provide free text. In instances of multiple responses, all reasons for hospitalization were retained and analyzed. The free text responses were sorted into other checklist categories when appropriate or into new categories if needed.

Survey items were selected from the published literature and adapted by a multidisciplinary team, including health services researchers, clinicians, our hospital's patient safety officer, a health psychologist, and experts in patient safety. The entire survey was pilot-tested by 8 parents purposively selected to represent various child ages, health status, and exposure to the healthcare system. Parent feedback led to several changes including 1) adding definitions for some terms, 2) addition of "not applicable" on items that the family may not have experienced (e.g., a transfer from one unit to another) and 3) re-ordering of some response options for clarity and flow.

Items assessing parental perceptions of our children's hospital safety climate were adapted from the AHRQ Hospital Survey on Patient Safety Culture to reflect parent perspectives.[6] We selected domains that focused on aspects of safety climate that are visible to parents, specifically overall perceptions of safety (4 items), communication openness (3 items reflecting staff communication openness), and handoffs and transitions (4 items). To extend the domain of communication openness to represent openness of parent communication, we adapted the staff communication items to reflect a "parent communication" domain (3 items), assessing parent ability to communicate openly with our staff during the hospitalization. Domain definitions and items are provided in Table 1. Item response options

were on a 5-point Likert scale (1=strongly disagree, 5=strongly agree). Negatively worded items were reverse-scored.

Parental perceptions of the need to watch over care to ensure mistakes do not happen was constructed as in the previously published study, with responses on a 5-point Likert scale (1=strongly disagree, 5=strongly agree) and referred to hereafter as “parent need to watch over care.”[33] In consideration of the response distributions and consistent with the published work, we dichotomized responses such that a response of 4 or 5 indicated a need to watch over the child’s care. A sensitivity analysis found that including the neutral (neither agree nor disagree) response as reflecting agreement or disagreement with the need to watch over care did not substantially affect findings. Thus, we present findings from a conservative approach where this response was indicative of not needing to watch over care.

Analyses

Means, standard deviations (sd), and proportions were used to describe our participants, their perceptions of safety climate, and their need to watch over the child’s care. To ensure the measurement structure for the parent-reported safety climate domains was consistent with AHRQ’s recommended measurement model for staff safety climate data,[6] confirmatory factor analysis (CFA) with weighted least squares estimators was performed using parent survey responses collected within 24 hours of admission. Standard model fit criteria were applied, including $\chi^2/\text{degrees of freedom (df)}$, root mean square error of approximation (RMSEA), comparative fit index (CFI), Tucker-Lewis Index (TLI), and weighted root mean square residual (WRMR).[34 35]

Due to the strong positive correlations between the safety climate domains, four separate adjusted logistic regressions were performed, with each model relating parent need to watch over care to perceptions of one of the four safety climate domains, adjusting for parent, child, and hospitalization characteristics. To account for confounding by parent, child, and hospitalization characteristics and to construct the most parsimonious model, we used the accepted approach of including covariates associated in bivariate models at $p < 0.20$ with our dependent variable, the need to watch over care.[36] Results are summarized as adjusted odds ratios (OR) and 95% confidence intervals (CI). Analyses were performed using MPlus or STATA 11.2. All tests of significance were at $p < 0.05$ level and two-tailed.

RESULTS

Parent, child, and hospitalization characteristics

Parents were predominantly mothers (84%) and non-minorities (83% white, non-Hispanic), with a wide range of educational attainment and an average age of 35 years (sd 7.75). On average, children were young (5.7 years (5.53)) and most were in good to excellent health (86%). The most common reasons for hospitalization as reported by parents were breathing problems (30%), stomach or intestinal problems (20%), and fever (17%). (Table 2)

Parental perceptions of hospital safety climate

CFA on a single-factor model of hospital safety climate failed to demonstrate good model fit, using standard criteria. A four-factor model produced indices indicative of good model fit for assessment of the 4 safety climate domains ($\chi^2/\text{df} = 2.06$, RMSEA = 0.08, CFI = 0.97, TLI = 0.96, WRMR = 0.86). Tau-equivalence testing supported equally weighting each indicator item, allowing construction of a summative scale for each of the four domains. Both unstandardized and standardized factor loadings are available in Table 1.

In general, parents viewed the safety climate in our institution positively. The most positively viewed safety climate domain was parent communication openness (mean 4.51 (0.58)). Overall perceptions of safety received a mean score of 4.15 (0.71), while staff communication openness and handoffs and transitions were rated similarly (3.97 (0.67) and 3.98 (0.72), respectively). (Table 3) Intercorrelations among the safety climate domains ranged from 0.40 to 0.83. (Table 4)

Parent need to watch over care and safety climate

Thirty-nine percent of parents agreed or strongly agreed they needed to watch over care to prevent mistakes. After adjustment for parent education and age, the child's gender, and being hospitalized for breathing problems, parent need to watch over care was significantly inversely related to overall perceptions of safety (0.20, 95% CI 0.11–0.37) and to handoffs and transitions (0.25, 95% CI 0.14–0.46). Thus, on average, when parents' overall perceptions of safety were 1-point higher, the odds of needing to watch over care decreased 80%. Similarly, when parent perceptions of our handoffs and transitions were 1-point higher, the odds of needing to watch over care decreased 75%. Parent need to watch over care was not significantly associated with staff (0.67, 95% CI 0.40–1.12) or parent (0.83, 95% CI 0.48–1.45) communication openness. (Table 5)

In all four adjusted models, parent need to watch over care was significantly associated with the child having been hospitalized for breathing problems, compared to all other reasons for hospitalization. Also, in adjusted models of the association of parent need to watch over care with handoffs and transitions, parent education was significantly associated with the parent need to watch over care. Compared to parents with some college, parents with more education (3.01, 95% CI 1.31–6.90) were significantly more likely to need to watch over care.

DISCUSSION

Our work advances the field of pediatric patient safety by adapting and validating a measurement model for parent views of safety climate in a children's hospital. We find that the previously validated models for staff survey data fit parent data well for domains that are visible to parents--overall perceptions of safety, handoffs and transitions, and communication openness. Such a measure could be useful in taking a patient-centered approach to patient safety and for ensuring safety climate is assessed at the frontline of care, where it most often correlates with safety events.[7–11] Further, two of the parent-reported safety climate domains are significantly associated with parent perceptions about needing to watch over care. Specifically, perceived need to watch over care was significantly associated with overall perceptions of safety and with handoffs and transitions. Our findings suggest potential targets to improve hospital safety climate and ultimately perhaps reduce parent burden for watching over care.

Beyond the recognized value of safety climate measures arising from the frontline of care, parent-reported safety climate measures for children's hospitals are needed for several reasons. Although hospitalized children disproportionately suffer medical errors, existing measures of patient safety are quite limited in their utility for the pediatric inpatient population and often focus on rare, high impact medical errors such as central line infections, more commonly seen in intensive care unit settings. Such measures are poorly suited to smaller institutions and for the general pediatric population, most of whom do not have central lines and in which it may be years before a single event such as a hospital-acquired central line infection is documented. Further, being flexible is a key element of organizations with a strong safety culture.[21] This flexibility includes deferring to expertise over rank and parents are assuredly the leading experts on their children's care.

Two other advantages of a parent-reported measure of safety climate arise from the characteristics of the data provided by parents. First, parent response rates to the survey were substantially higher than those of staff surveys.[10] While this may be because of the research nature of this work, parents may be highly motivated to report about the safety of care provided to their child. Second, parent data is more easily analyzable by hospital unit. In general, hospitalized children and their parents remain on the same unit throughout a hospital stay, barring a deterioration that requires transfer to intensive care services. This is in contrast to the experience of physicians or other staff who may work across multiple units. Understanding safety climate at the unit or service level has been recommended, as safety climates are “local” and analyzing at the institution level may mask opportunities for improving safety.[37 38]

As noted in the AHRQ-commissioned review, healthcare system employees and patients or parents may view safety differently, but both views have value.[39] In our work, parents rated handoffs and transitions as well as overall perceptions of safety considerably higher than AHRQ national data from hospital staff, which is similar to data from our institution. [40] Also, the minimum value for staff communication openness was quite high, perhaps reflecting either parents’ reluctance to report negatively about this aspect of care or that staff are careful about interactions that are visible to families. Further, parental experiences with specific aspects of hospital care (e.g., the policies and procedures that could prevent errors) may be limited, affecting their ability to report on these. Future studies might survey staff and patients/parents to examine similarities and differences in perceptions of safety climate. In addition, such studies could examine the responsiveness to change for parental reports of safety climate to understand whether these could be used to assess the impact of intervention to improve pediatric patient safety.

The associations found between parent need to watch over care and safety climate domains suggest potential targets to improve hospital safety climate and ultimately perhaps reduce parent burden for watching over care. Specifically, the likelihood that a parent felt the need to watch over care was significantly greater when parents held less positive views of our children’s hospital’s overall safety climate or our handoffs and transitions. To address overall perceptions of safety, the focus might include optimizing procedures and systems for preventing mistakes and making these procedures and systems visible to parents. Also, this domain’s items tap into parent need to see a commitment to safety that exceeds our drive to get the work done. Thus, focusing on ensuring families feel safe may be especially crucial when our hospital is busiest. For handoffs and transitions, the focus likely resides in demonstrating that staff are imparting important information during these critical times. For example, performing nursing shift changes at the bedside with the parent may reduce parent need to watch over care.[41 42] Since this study, our institution has implemented this type of nursing handoff at the bedside. Also, being explicit with parents about anticipated changes in healthcare team members (physicians or nurses) and perhaps doing these handoffs with the parent present could reduce parent need to watch over care.

Through our adjusted analyses, we were also able to consider how characteristics of the parent, the child, and the hospitalization impacted parent perceptions of safety. Specifically, having a child hospitalized for a breathing problem was associated with greater parent need to watch over care, compared to being hospitalized for any other reason. In addition, parent education significantly influenced parents’ beliefs about whether they needed to watch over care to ensure mistakes weren’t made. Taken together, these findings support the critical need for considering a broad array of patient socio-demographics, hospitalization characteristics, and institutional factors as covariates in pediatric patient safety research, especially when using parent-reported data.

As with all observational studies, certain limitations should be considered. First, as a single institution study, the findings may not generalize to children's hospitals broadly. The sample size may have underpowered some comparisons. Also, variability in the communication openness domain scores was less than for the other two domains, perhaps limiting our ability to detect significant associations. One possible explanation for the limited variability in communication openness measures may be the relatively large number of highly educated parents in our study. In addition, our population has relatively few minority families, so we may under-represent the views of those who are more likely to experience adverse events[43] and also less likely to report these.[44] Future work through a multi-institutional collaborative could examine these types of questions, as well as safety climate broadly.

Due to IRB requirements, we have limited data on the parents who refused to learn about the study or did not consent. Given that absent or sleeping parents constituted our most common reason for study exclusion, our findings could be biased toward more negative views of safety climate and greater need to watch over care (i.e., parents who felt the need to watch over care were more likely to remain with their child). However, our recruitment rate for eligible parents was high, exceeding that of the prior similar study.[33] Because of the need to limit the survey to a reasonable numbers of items, we also lack data on concepts such as general beliefs about the safety of the healthcare system broadly and on prior experiences with medical error, which could influence views about safety.

In summary, we find that parent responses to our adapted version of the AHRQ Hospital Survey on Patient Safety Culture display good model fit with the domains described in the original instrument. Understanding patient experiences with care provides additional information for improving care, as these experiences are linked to outcomes such as satisfaction.[45] Efforts are underway to understand parent experiences with their hospitalized children's healthcare, adapting the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) for use with this population, although this tool does not focus on hospital safety.[46] Having a tool to assess parent perceptions of safety climate in a children's hospital has numerous advantages and can act as a supplement to staff data. In addition, we were able to identify specific opportunities to improve our safety climate in an effort to help parents feel burden for watching over their child's care to ensure mistakes aren't made.

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References

1. Crofton C, Darby C, Farquhar M, et al. The CAHPS Hospital Survey: development, testing, and use. *Jt Comm J Qual Patient Saf.* 2005; 31(11):655–59. [PubMed: 16335067]
2. Jha AK, Orav EJ, Zheng J, et al. Patients' perception of hospital care in the United States. *N Engl J Med.* 2008; 359(18):1921–31. [PubMed: 18971493]
3. Goldstein E, Farquhar M, Crofton C, et al. Measuring hospital care from the patients' perspective: an overview of the CAHPS Hospital Survey development process. *Health Serv Res.* 2005; 40(6 Pt 2):1977–95. [PubMed: 16316434]

4. Chen AY, Elliott MN, Spritzer KL, et al. Differences in CAHPS reports and ratings of health care provided to adults and children. *Med Care*. 2012; 50 (Suppl):S35–9. [PubMed: 23064275]
5. Co JPT, Sternberg SB, Homer CJ. Measuring patient and family experiences of health care for children. *Acad Pediatr*. 2011; 11(3):S59–S67. [PubMed: 21570018]
6. Sorra JS, Dyer N. Multilevel psychometric properties of the AHRQ hospital survey on patient safety culture. *BMC Health Serv Res*. 2010; 10:199. [PubMed: 20615247]
7. Singer S, Lin S, Falwell A, et al. Relationship of safety climate and safety performance in hospitals. *Health Serv Res*. 2009; 44(2 pt 1):399–421. [PubMed: 19178583]
8. Rosen AK, Singer S, Shibe Z, et al. Hospital safety climate and safety outcomes: is there a relationship in the VA? *Med Care Res Rev*. 2010; 67(5):590–608. [PubMed: 20139397]
9. Hansen LO, Williams MV, Singer SJ. Perceptions of hospital safety climate and incidence of readmission. *Health Serv Res*. 2011; 46(2):596–616. [PubMed: 21105868]
10. Mardon RE, Khanna K, Sorra J, et al. Exploring relationships between hospital patient safety culture and adverse events. *J Patient Saf*. 2010; 6(4):226–32. [PubMed: 21099551]
11. Deilkas E, Hofoss D. Patient safety culture lives in departments and wards: Multilevel partitioning of variance in patient safety culture. *BMC Health Serv Res*. 2010; 10. [PubMed: 20064224]
12. Davis RE, Jacklin R, Sevdalis N, et al. Patient involvement in patient safety: what factors influence patient participation and engagement? *Health Expect*. 2007; 10(3):259–67. [PubMed: 17678514]
13. Hall J, Peat M, Birks Y, et al. Effectiveness of interventions designed to promote patient involvement to enhance safety: a systematic review. *Qual Saf Health Care*. 2010; 19(5)
14. Schwappach DLB. Engaging Patients as Vigilant Partners in Safety A Systematic Review. *Med Care Res Rev*. 2010; 67(2):119–48. [PubMed: 19671916]
15. Peat M, Entwistle V, Hall J, et al. Scoping review and approach to appraisal of interventions intended to involve patients in patient safety. *J Health Serv Res Policy*. 2010; 15:17–25. [PubMed: 20075123]
16. Hibbard JH, Peters E, Slovic P, et al. Can patients be part of the solution? Views on their role in preventing medical errors. *Med Care Res Rev*. 2005; 62(5):601–16. [PubMed: 16177460]
17. World Health Organization. World alliance for patient safety: forward programme 2005. Oct 1. 2004 http://www.who.int/patientsafety/en/brochure_final.pdf
18. Darzi, LA. High quality care for all: NHS next stage review final report. Jun 30. 2008 http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_085825
19. Department of Health. Equity and excellence: liberating the NHS. Jul 12. 2010 http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_117353
20. Maurer, M.; Dardess, P.; Carman, KL., et al. Guide to patient and family engagement: environmental scan report. Rockville, MD: 2012.
21. Miller MR, Takata G, Stucky ER, et al. Policy Statement-Principles of Pediatric Patient Safety: Reducing Harm Due to Medical Care. *Pediatrics*. 2011; 127(6):1199–210. [PubMed: 21624879]
22. Colla JB, Bracken AC, Kinney LM, et al. Measuring patient safety climate: a review of surveys. *Qual Saf in Health Care*. 2005; 14(5):364–66.
23. Halligan M, Zecevic A. Safety culture in healthcare: a review of concepts, dimensions, measures and progress. *BMJ Qual Saf*. 2011; 20(4):338–43.
24. Sexton JB, Berenholtz SM, Goeschel CA, et al. Assessing and improving safety climate in a large cohort of intensive care units. *Crit Care Med*. 2011; 39(5):934–39. [PubMed: 21297460]
25. Hutchinson A, Cooper KL, Dean JE, et al. Use of a safety climate questionnaire in UK health care: factor structure, reliability and usability. *Qual Saf Health Care*. 2006; 15(5):347–53. [PubMed: 17074872]
26. Singer SJ, Falwell A, Gaba DM, et al. Identifying organizational cultures that promote patient safety. *Health Care Manage Rev*. 2009; 34(4):300–11. [PubMed: 19858915]
27. Singer SJ, Hartmann CW, Hanchate A, et al. Comparing safety climate between two populations of hospitals in the United States. *Health Serv Res*. 2009; 44(5 pt 1):1563–83. [PubMed: 19619250]

28. Kaushal R, Bates DW, Landrigan C, et al. Medication errors and adverse drug events in pediatric inpatients. *JAMA*. 2001; 285(16):2114–20. [PubMed: 11311101]
29. Stucky ER. Prevention of medication errors in the pediatric inpatient setting. *Pediatrics*. 2003; 112(2):431–6. [PubMed: 12897304]
30. American Academy of Pediatrics. Family-centered care and the pediatrician's role. *Pediatrics*. 2003; 112(3):691–7. [PubMed: 12949306]
31. Accreditation Council for Graduate Medical Education. ACGME Program Requirements for Graduate Medical Education in Pediatrics. Feb 1. 2007 http://www.acgme.org/acWebsite/downloads/RRC_progReq/320_pediatrics_07012007.pdf
32. National Patient Safety Foundation. National Patient Safety Foundation homepage. Feb 19. 2013 <http://www.npsf.org/>
33. Tarini BA, Lozano P, Christakis DA. Afraid in the hospital: parental concern for errors during a child's hospitalization. *J Hosp Med*. 2009; 4(9):521–7. [PubMed: 19653281]
34. Hu LT, Bentler PM. Fit indices in covariance structure modeling: sensitivity to underparameterized model misspecification. *Psychol Methods*. 1998; 3(4):424–53.
35. Hu L, Bentler PM. Cutoff criteria for fit indexes in structure analysis: conventional criteria versus new alternatives. *Struct Equ Modeling*. 1999; 6(1):1–55.
36. Maldonado G, Greenland S. Simulation study of confounder-selection strategies. *Am J Epidemiol*. 1993; 138(11):923–36. [PubMed: 8256780]
37. Campbell EG, Singer S, Kitch BT, et al. Patient safety climate in hospitals: act locally on variation across units. *Jt Comm J Qual Patient Saf*. 2010; 36(7):319–26. [PubMed: 21226385]
38. Ginsburg L, Gilin D, Tregunno D, et al. Advancing measurement of patient safety culture. *Health Serv Res*. 2009; 44(1):205–24. [PubMed: 18823446]
39. Agency for Healthcare Research and Quality. Surveys on Patient Safety Culture. Sep 1. 2012 <http://www.ahrq.gov/qual/patientsafetyculture/>
40. Agency for Healthcare Research and Quality. Hospital survey on patient safety culture: 2011 User comparative database report. Rockville, MD: 2011. Table 6-3. Composite-level comparative results for the 2011 database.
41. Tidwell T, Edwards J, Snider E, et al. A nursing pilot study on bedside reporting to promote best practice and patient/family-centered care. *J Neurosci Nurs*. 2011; 43(4):E1–E5. [PubMed: 21796036]
42. Anderson CD, Mangino RR. Nurse shift report: who says you can't talk in front of the patient? *Nurs Adm Q*. 2006; 30(2):112–22. [PubMed: 16648723]
43. Divi C, Koss RG, Schmaltz SP, et al. Language proficiency and adverse events in US hospitals: a pilot study. *Int J Qual Health Care*. 2007; 19(2):60–67. [PubMed: 17277013]
44. Garrett PW, Dickson HG, Young L, et al. "The Happy Migrant Effect": perceptions of negative experiences of healthcare by patients with little or no English: a qualitative study across seven language groups. *Qual Saf Health Care*. 2008; 17(2):101–03. [PubMed: 18385402]
45. Bjertnaes OA, Sjetne IS, Iversen HH. Overall patient satisfaction with hospitals: effects of patient-reported experiences and fulfilment of expectations. *BMJ Qual Saf*. 2012; 21(1):39–46.
46. Center of Excellence for Pediatric Quality Measurement (CEPQM). Pediatric Hospital Consumer Assessment of Healthcare Providers and Systems Survey (Pediatric HCAHPS). http://childrenshospital.org/cfapps/research/data_admin/Site3349/mainpageS3349P3.html

Table 1

Definitions, item wordings, and factor loadings for parent perceptions of hospital safety climate domains (n=170)

	Unstandardized [†] (s.e.)	Standardized [‡]
Overall Perceptions of Safety-Procedures and systems are good at preventing errors and there is a lack of patient safety problems		
It is just by chance that more serious mistakes don't happen in this unit.	---§	0.70
Patient safety is never sacrificed to get more work done.	0.94 (0.07)	0.66
The procedures and systems in this unit are good at preventing errors from happening.	0.97 (0.07)	0.68
There are patient safety problems in this unit.	1.27 (0.09)	0.89
Staff Communication Openness-Staff will freely speak up if they see something that may negatively affect patient care and feel free to question those with more authority		
Staff will freely speak up if they see something that may negatively affect patient care.	---§	0.77
Staff feel free to question the decisions or actions of those with more authority.	0.64 (0.07)	0.50
Staff are afraid to ask questions when something does not seem right.	0.96 (0.08)	0.74
Parent Communication Openness-Parents will freely speak up if they see something that may negatively affect patient care and feel free to question those with more authority		
I will freely speak up if I see something that may negatively affect my child's care.	---§	0.84
I feel free to question the decisions or actions of healthcare providers.	0.84 (0.09)	0.70
I am afraid to ask questions when something does not seem right.	0.96 (0.10)	0.80
Handoffs and Transitions-Important patient care information is transferred across hospital units and during shift changes		
Things "fall between the cracks" when transferring patients from one unit to another.	---§	0.88
Problems often occur in the exchange of information across hospital units.	0.81 (0.06)	0.71
Shift changes are problematic for patients in this hospital.	1.03 (0.07)	0.90
Important patient care information is often lost during shift changes.	1.06 (0.08)	0.93

* All item responses on a 5-point scale (1=strongly disagree, 5=strongly agree). Negatively worded items were reverse-scored.

[†] Unstandardized factor loadings are on the original item scales, reflecting the extent to which the domain covaries with the item.

[‡] Standardized factor loadings reflect the extent to which the domain is correlated with the item.

§ The base item in the scale with a fixed value of 1.00 is indicated with ---.

Table 2

Parent, child, and hospitalization characteristics (n=172) *

	<u>Mean (sd) or % (n)</u>
Mother, % (n)	84% (144)
White, non-Hispanic, % (n)	83% (143)
Parent education, % (n)	
High school or less	19% (32)
Some college	36% (62)
Bachelor's degree or more	45% (77)
Parent age, years	35.0 (7.75)
Female child, % (n)	51% (88)
Child age, years	5.7 (5.53)
Child in excellent or good health, % (n)	86% (148)
Reason for hospitalization, % (n) †	
Breathing problem	30% (52)
Stomach or intestinal problem	20% (34)
Fever	17% (30)
Asthma	11% (18)
Cancer	11% (18)
Hematologic disease	6% (10)
Seizure or headache	5% (9)
Cystic fibrosis	5% (8)
Other	21% (37)
Length of Stay, % (n)	
One day	59% (101)
2–3 days	18% (31)
4–7 days	11% (19)
More than a week	12% (20)

* Values may not add to 100% due to rounding.

† Because parents could indicate multiple reasons for hospitalization, more than 172 reasons for hospitalization were noted.

Table 3

Mean (standard deviation (sd)) for parental perceptions of safety climate (n=172)

	<u>Mean (sd)*</u>	<u>Minimum</u>	<u>Maximum</u>
Overall perceptions of safety	4.15 (0.71)	1.0	5.0
Staff communication openness	3.97 (0.67)	2.7	5.0
Parent communication openness	4.51 (0.58)	1.7	5.0
Handoffs and transitions	3.98 (0.72)	1.0	5.0

*
5-point scale: 1=Strongly Disagree, 2=Disagree, 3=Neither Agree Nor Disagree, 4=Agree, 5=Strongly Agree

Table 4

Intercorrelations among safety climate domains (n=170)

	Overall perceptions of safety	Staff communication openness	Parent communication openness	Handoffs and transitions
Overall perceptions of safety	–			
Staff communication openness	0.69	–		
Parent communication openness	0.41	0.50	–	
Handoffs and transitions	0.83	0.66	0.40	–

Adjusted* odds ratios (OR) and 95% confidence intervals (CI) for the associations between parent need to watch over care and each of the four parental perceptions of safety climate (n=172)[†]

Table 5

	Parent need to watch over care			
	Model I	Model II	Model III	Model IV
	OR (95% CI)			
Overall perceptions of safety (model I)	0.20 (0.11, 0.37)	--	--	--
Staff communication openness (model II)	--	0.67 (0.40, 1.12)	--	--
Parent communication openness (model III)	--	--	0.83 (0.48, 1.45)	--
Handoffs and transitions (model IV)	--	--	--	0.25 (0.14, 0.46)
Parent education				
High school or less	1.11 (0.38, 3.23)	1.23 (0.47, 3.26)	1.30 (0.49, 3.42)	1.85 (0.63, 5.46)
Some college	referent	referent	referent	referent
Bachelor's degree or more	2.27 (0.98, 5.30)	2.29 (1.07, 4.88)	2.40 (1.13, 5.09)	3.01 (1.31, 6.90)
Parent age (yrs)	1.03 (0.98, 1.08)	1.02 (0.97, 1.07)	1.03 (0.98, 1.07)	1.02 (0.97, 1.07)
Female child	0.95 (0.44, 2.03)	0.85 (0.43, 1.68)	0.88 (0.45, 1.73)	0.96 (0.46, 2.01)
Reason for hospitalization				
Breathing problem	2.43 (1.07, 5.52)	2.18 (1.03, 4.63)	2.49 (1.20, 5.19)	2.47 (1.11, 5.52)

* Each of the four models was adjusted for parent education and age, child gender, and reason for hospitalization.

[†] Bolded values are significant at p<0.05.