

# Changes in Safety and Teamwork Climate After Adding Structured Observations to Patient Safety WalkRounds

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**Background:** Patient safety is essential for the reliable delivery of health care. One way to positively influence patient safety is to improve the safety and teamwork climate of a clinical area. Research shows that patient safety WalkRounds (WRs) are an appropriate and common method to improve safety culture. The aim of this study was to combine WRs with observations of specific patient safety dimensions and to measure the safety and teamwork climate.

**Methods:** In this observational study, WRs took place in eight work settings across a 770-bed university hospital in Switzerland. During rounds, health care workers (HCWs) were observed in relation to defined patient safety dimensions. In addition, HCWs were surveyed using safety and teamwork climate scales before the initial WRs and six to nine months later, and implementation of planned improvement actions following the WRs was evaluated.

**Results:** During WRs, 810 activities of HCWs were observed, of which 85.4% met the requirements for safe care. Safety and teamwork climate did not change significantly after nine months. A total of 36 action plan items were planned to address safety deficits that surfaced during WRs, but only 40.7% of the action items had been implemented after nine months.

**Conclusion:** WRs with structured in-person observations identified safe care practices and deficits in patient safety. Improvement action plans to address safety deficits were not fully implemented nine months later, and there were no significant changes in the safety and teamwork climate at that time.

Worldwide, countless efforts, initiatives, and campaigns have been launched to improve patient safety.<sup>1–6</sup> In brief, patient safety is the avoidance and prevention of adverse events (AEs) that are potentially harmful to patients. These AEs are not caused by the disease itself; rather, they result from the treatment process.<sup>7,8</sup> One widely used method to improve patient safety is establishment of a culture of safety in health care organizations. Safety culture promotes safety as “the way we do things around here,” and the most common way to measure it is through surveys.<sup>9,10</sup> Surveys of safety climate assess the shared perceptions of patient safety–related norms and behaviors in a given work setting. These norms are assessed by health care workers (HCWs) directly, and higher assessments of safety climate are associated with better patient outcomes, such as lower mortality rates and fewer AEs, including medication errors.<sup>11</sup> Similarly, teamwork climate reflects HCW assessments of local workplace norms as they relate to interpersonal functioning. Safety climate is a metric that provides a window into the safety practices in a given work setting.<sup>11–13</sup> Climate results have been used internationally to demonstrate the role and potential of patient safety WalkRounds (WRs) as a tactic to improve patient safety and other outcomes.<sup>12</sup>

WRs were established by Allan Frankel as a formal process for developing and improving safety culture.<sup>14</sup> WRs allow leaders to interact directly with HCWs about pressing local patient safety issues, thereby demonstrating their support and their willingness to dedicate time and effort to improving patient care quality. The cyclical approach (information-analysis-action-feedback) of WRs creates a predictable and continuous process of identifying and addressing patient safety hazards. As a result of WRs, practical action items can be generated and implemented to improve patient safety in any given work setting. The ultimate goal of WRs is a self-sustaining process that is continuously carried out by HCWs and leadership in a formalized conversation that cultivates awareness of quality improvement opportunities, builds psychological safety, and generates feedback about actions taken to improve deficits.<sup>9,14,15</sup>

Prior research has shown that the use of WRs is associated with better patient outcomes and fewer AEs.<sup>11,12</sup> Further benefits of WRs can be found in the exposure of HCWs to the practice of rounding, such that rounding prevalence is associated with better HCW assessments of leadership, safety climate, and teamwork climate, and even lower HCW burnout.<sup>9,11,16–18</sup> When HCWs routinely raise their patient safety concerns to leaders, it strengthens the bond of trust and psychological safety.<sup>11,19</sup> Further, WRs have been linked to higher employee satisfaction, lower HCW turnover, and fewer patient readmissions.<sup>20</sup>

A recent qualitative study in 44 Swiss work settings demonstrated that WRs were a suitable method for pro-

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viding an organizationwide overview of patient safety themes.<sup>21</sup> Although this is a good qualitative start, there were no quantitative safety and teamwork climate results and no tracking of completed activities.

The purpose of the current study was to extend the WRs, qualitative approach with quantitative observations of safe care, including administering the safety and teamwork climate scales pre and post. The current study aimed to (1) observe HCW performance with regard to specific patient safety themes, (2) survey HCWs regarding safety and teamwork climate, (3) describe planned improvement action items, and (4) evaluate the implementation of planned improvement action items and assess possible changes in safety and teamwork climate.

## METHODS

### Study Design

This observational, multiple-case study examined the patient safety practices of HCWs, as well as the safety and teamwork climate, before and after conducting WRs in a university hospital in Switzerland.

### Setting and Participants

The 770-bed University Hospital of Basel is a tertiary care center and one of five university hospitals in Switzerland. In 2018 a total of 38,000 inpatients were treated by more than 6,000 employees.<sup>22</sup> The hospital comprises four clinical departments—medicine, surgery, specialty clinics, and mixed clinical services—with additional support and service departments, including administration, research, and education. Each of the clinical departments is further divided into clinics with diagnostic and therapeutic work settings, including various nursing wards across the medical disciplines.

The study was embedded in a quality assurance project and was carried out in two work settings in each of the four clinical departments. The work settings were selected by the hospital's commission for quality and patient safety, and the patient safety office was assigned to conduct the Safety WalkRounds in both in- and outpatient work settings. The survey sample consisted of nurses, physicians, and other medical professionals in these work settings. Students were excluded.

### Variables and Measures

The data were collected using two instruments: (1) the Patient Safety Observation Protocol (PSOP) and (2) the Unit Patient Safety Questionnaire (UPSQ). The PSOP was developed and refined for the current study by incorporating patient safety themes from literature and refining them through pilot testing. During PSOP refinements, we prioritized clinical practices ahead of potential adverse patient events such as infections, medication errors, communica-

tion failures, and falls. We then generated examples of related *observable* caring and treatment behaviors and processes of HCWs using standards of clinical practice that we use for wound dressing, hand hygiene, medication administration, speaking up, information exchange among HCWs as well as with patients, care coordination, and fall prevention (to name a few). The final PSOP was composed of 33 items on six patient safety dimensions<sup>8,23</sup> (Table 1<sup>24,25</sup>). For each PSOP item, observed clinician actions are rated as requirements met, requirements partially met, or requirements not met. Each participating work setting had the option to supplement the observation protocol with specific patient safety items of their choosing. Based on the observations, each work setting compiled individual action items to address patient safety issues.

The UPSQ consists of the safety and teamwork climate scales (13 items) from the Safety Attitudes Questionnaire (SAQ).<sup>24</sup> One stand-alone item asks for the overall patient safety grade, designed to assess the overall level of patient safety within a given unit from the general viewpoint of HCWs as part of the UPSQ. For the post survey, the UPSQ has an additional item to assess changes in patient safety through the implemented WRs action items (Table 1).

### Conducting the WalkRounds

Each WR was organized and conducted by two of the three trained observers at the participating work settings by shadowing the HCWs at work. During a visit, each of the observers separately followed individual nurses, physicians, or other health professionals during their morning routine at huddles, when preparing and organizing patient diagnostics and therapies, when visiting and caring for patients, and when documenting, reporting, and coordinating care. Observers completed the PSOP checklist to capture observed patient safety behaviors. Of the three observers, one participated in all eight WRs, and the other two participated in four WRs each. All observers were experienced nurses with advanced degrees. Training for the WRs observation included information on the PSOP patient safety items and how to conduct the shadowing without interfering with HCWs' workflows. Before each WR, the two observers discussed expectations such as which HCW would be shadowed.

### WRs Observations Debriefing and Action Planning

After the WRs, the two observers debriefed by discussing their impressions and findings with each other (for example, ratings of observed activities, whether and how required standards of practice were met) without immediate feedback to the observed HCWs. Next, WRs observations and ratings, as well as the UPSQ survey results, were condensed into a draft report, which was presented within a week to the unit leadership. At these meetings, the unit leadership's perceptions and views of their workplace's patient safety were discussed.

Table 1. Items on the Patient Safety Observation Protocol and Unit Patient Safety Questionnaire		
Patient Safety Observation Protocol (PSOP)		
Dimensions	Description	Measurements
Patient identification	2 items; example: "Active patient identification (What is your name? When were you born? Comparison with patient documents)."	Rating criteria apply to all safety dimension items: 1 = Requirements met 2 = Requirements partially met 3 = Requirements not met 4 = Not observed
Infection prevention	4 items; example: "Hand hygiene according to a 3-step hospital protocol."	
Medication process	6 items; example: "The right medication, the right patient, in the right dose, the right dosage form and time, is administered."	
Communication	14 items; example: "Relevant information will be discussed during reports and visits in the care team."	
Pressure ulcer prevention	2 items; example: "Regular patient repositioning and mobilization."	
Falls prevention	5 items; example: "If the patients have sturdy shoes, walking aids are within reach or the surroundings are adapted to the patient's condition."	
Workplace-specific items	Each work setting can supplement the protocol with individual items; example: "Emergency call was explained to the patient."	
Unit Patient Safety Questionnaire (UPSQ)		
		Measurements
Safety climate	7 items from the SAQ <sup>24,25</sup> ; example: "I would feel safe being treated here as a patient."	5-point Likert-type scale from 1 = strongly disagree to 5 = strongly agree Cronbach's $\alpha = 0.754^{24}$
Teamwork climate	6 items from the SAQ <sup>24,25</sup> ; example: "Disagreements in this work setting are resolved appropriately (not who is right, but what is best for the patient)."	5-point Likert-type scale from 1 = strongly disagree to 5 = strongly agree Cronbach's $\alpha = 0.647^{24}$
Overall patient safety	Exploratory item for assessing the overall grade of patient safety within a given unit: "How do you rate overall patient safety in your work setting?"	10-point Likert-type scale from 1 = very unsafe to 10 = very safe
Extended UPSQ: perceived impact of safety measures (Survey 2 only)	Exploratory item on how HCWs assessed change in overall patient safety due to implementation of work setting safety action items following Safety WalkRounds	5-point Likert-type scale from 1 = strongly disagree to 5 = strongly agree or 6 = I don't know
SAQ, Safety Attitudes Questionnaire; HCWs, health care workers.		

During discussions of WRs findings with unit leadership (for example, chief nurse, nurse expert, senior physician), potential improvements were identified and planning of subsequent action items was discussed, as appropriate. This discussion was guided by a pragmatic project management format, WHWW (What, How, Who, When). After this debriefing, local leadership involved and engaged front-line staff in team meetings on the findings, improvement needs, and action items planning. Additional information was integrated in the WRs unit reports, which then were communicated to the whole unit staff and higher management as part of the quality assurance project.

### Data Collection

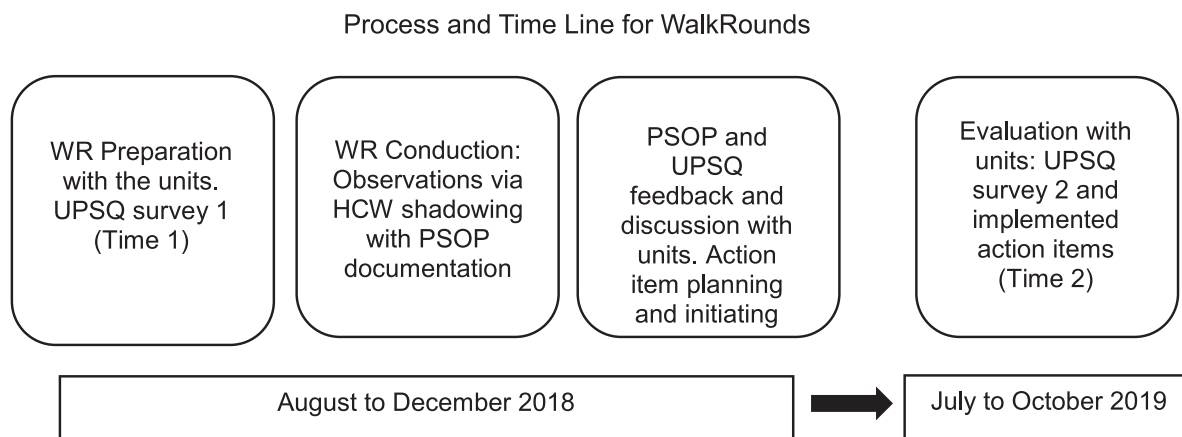
The data collection took place between August 2018 and October 2019 (Figure 1). A paper-based UPSQ survey was administered twice: the first (Time 1) before the onset of WRs in the work settings (between August and December 2018) and the second (Time 2) six to nine months after the first survey across each work setting. All eligible HCWs of the eight work settings were invited to participate. Completed UPSQs were collected by the patient safety office in a box for each work setting. UPSQ survey data were entered

into a spreadsheet by the patient safety office, and a quality check (for completeness and accuracy) of the data entries took place before the analysis.

Between August and December 2018, one week after completing the first UPSQ administration, the WRs were conducted by two trained observers from the patient safety office. The observed patient safety items were recorded and rated on the PSOP. Based on feedback from the WRs observations, the work setting leadership planned individual action items to address observed safety issues as appropriate. The planned patient safety action items were evaluated six to nine months later by the work setting leadership and the patient safety office team. Those evaluation meetings took place between July and October 2019 with reviewing the implementation status of the agreed action items (Figure 1).

### Ethical Considerations

This study is embedded in a quality assurance project, using survey and observational data from HCW assessments and patient safety-related behaviors. No patient data were used, and no informed consents were needed. The questionnaires were anonymous and confidential, and no demographic in-



**Figure 1:** Shown here is the process and time line for WalkRounds (WRs). UPSQ, Unit Patient Safety Questionnaire; HCW, health care worker; PSOP, Patient Safety Observation Protocol.

formation was collected. All study data were stored on a password-protected server located at Basel University Hospital. The Northwestern Switzerland Ethics Commission (Req-2019-00591) confirmed that the study, as a quality assurance project, does not fall under the Swiss federal act on research involving human beings, thus no informed consent procedure was required.

### Data Analysis

Descriptive data analysis was performed using frequencies, means, standard deviations (SDs), and percentages to describe various characteristics related to patient safety, including in-person observations and survey data.

To present the observed performance of the HCWs on specific patient safety themes (aim 1), the results were presented in aggregate. The observations were expressed as a ratio of the interactions between patient and HCW. To illustrate the second aim (HCW assessments of safety and teamwork climate), the number of questionnaires administered and completed was shown along with the response rate for Time 1 and Time 2. To achieve the third aim (describe planned improvement action items), the individual action items used by the work settings were analyzed descriptively and evaluated with the implementation plan. To present the last aim (evaluate changes in safety and teamwork climate and the implementation of planned improvement action items), the results of the HCW survey responses, the mean values and SD, and the percentage of positive answers were calculated. Missing data from the UPSQ at the item level have been substituted by imputation of mean values. HCW assessments of overall patient safety were reported as a percent positive, so a cut-off of 8 (out of 10) was used. A Wilcoxon signed rank test was performed with the mean values to show the change in the teamwork, safety climate, and perceived overall patient safety between the first and second surveys. The significance level was set at  $p < 0.05$ . The statistical analysis was performed with R version 3.6.2 on Windows 10.<sup>26</sup>

## RESULTS

### Patient Safety Observation Protocol

WRs each lasted on average 3 hours (range 2–4 hours) and were conducted in eight work settings including in-person observer assessments of PSOP dimensions. During the WRs, 810 (range 26–308) clinician activities, including 513 (range 25–169) HCW–patient interactions within the PSOP dimensions, were observed. HCW activities in the dimension “pressure ulcer prevention” were not observable in one of the work settings (Table 2) because no respective action took place during observer presence.

Overall, of the 810 PSOP ratings, requirements were met in 85.4%, requirements were partially met in 12.6%, and requirements were not met in 2.0%. In the dimensions “workplace specifics,” “communication,” and “pressure ulcer prevention,” *requirements met* ratings were greater than 90%, whereas the highest proportions of patient safety deficits were identified in the dimensions “infection prevention” and “patient identification” (Table 2).

### Unit Patient Safety Questionnaire

The UPSQ was completed across eight work settings by 230 HCWs in the first survey administration and 189 in the second administration, corresponding to a response rate of 53.8% (range 22.2%–94.4%), and 50.0% (range 24.2%–100%), respectively (Table 3). Safety climate did not change significantly between the two surveys administrations—before the WRs and six to nine months after the implementation of the work setting patient safety action items. The overall mean values of the safety climate remained the same: from 3.84 (SD = 0.94) pre to 3.87 (SD = 0.94) post ( $p = 0.48$ ). The surveys showed that 70.8% (range 40.1%–86.5%) and 71.1% (range 33.9%–82.3%) of the HCWs assessed the safety climate as good (4 or higher on a 5-point scale). The same was observed with the teamwork climate with overall mean values of 4.06 (SD = 0.92) and 4.02 (SD = 0.93), respectively. There was no significant change

**Table 2. In-Person Observations of Health Care Worker Patient Safety Performance\***

Dimensions of PSOP (n = number of observations)	Rating of the observations in %		
	Requirements met	Requirements partially met	Requirements not met
<b>Patient identification</b> (n = 65)	78.5	10.8	10.8
<b>Infection prevention</b> (n = 149)	58.4	38.9	2.7
<b>Medication process</b> (n = 104)	85.6	13.5	1.0
<b>Communication</b> (n = 308)	94.5	5.2	0.3
<b>Pressure ulcer prevention</b> (n = 26)	92.3	3.8	3.8
<b>Falls prevention</b> (n = 53)	88.7	7.5	3.8
<b>Workplace specifics</b> (n = 105)	98.1	1.9	–
<b>Total (n = 810)</b>	85.4	12.6	2.0

\* Presentation of the in-person observations of the clinician's patient safety performance with ratings on meeting the requirements. PSOP, Patient Safety Observation Protocol.

**Table 3. Results of the USPQ on Safety Climate, Teamwork Climate, and Overall Patient Safety Grading and Action Plan Items Implementation\***

Work setting (Response rates, surveys 1 and 2)	Safety climate (1–5) % positive Cut off 4 in %		Teamwork climate (1–5) % positive Cut off 4 in %		Overall patient safety grade (1–10), % positive Cut off 8 in %		Action plan items planned (Implemented, Partially Implemented, Not Implemented)
	Survey 1	Survey 2	Survey 1	Survey 2	Survey 1	Survey 2	
	<b>Unit 1</b> (Dialysis) (46.7%, 24.2%)	40.1	33.9	46.0	35.4	33.3	
<b>Unit 2</b> (Short-term clinic) (43.2%, 35.2%)	81.7	77.8	82.8	73.8	68.4	77.5	6 (3-1-2)
<b>Unit 3</b> (Ortho-, Trauma) (62.3%, 30.2%)	55.5	54.1	62.8	69.3	41.9	36.8	7 (2-3-2)
<b>Unit 4</b> (Uro-, Plastic) (94.4%, 73.8%)	70.6	78.3	75.0	72.2	58.8	61.3	2 (0-2-0)
<b>Unit 5</b> (Dermatology) (60.0%, 65.0%)	85.7	75.8	81.5	76.9	0†	61.3	3 (1-2-0)
<b>Unit 6</b> (Labor ward) (21.8%, 44.6%)	59.5	65.1	68.1	71.3	25.0	60.0	2 (0-1-1)
<b>Unit 7</b> (Radiology) (70.4%, 84.5%)	86.5	82.3	80.1	89.7	89.5	95.3	3 (3-0-0)
<b>Unit 8</b> (Anesthesia) (92.8%, 100.0%)	80.3	73.9	92.9	81.4	88.9	77.1	2 (1-0-1)
<b>Total</b> (53.8%, 50.0%)	<b>70.8%</b>	<b>71.1%</b>	<b>74.6%</b>	<b>74.5%</b>	<b>60.4%</b>	<b>67.2%</b>	<b>27 (11-10-6)</b>

\* Units 1 and 2 are medical department units, units 3 and 4 are surgical department units, units 5 and 6 are specialty clinics units, and units 7 and 8 are mixed services units. The safety and teamwork climate had the response options from 1 (strongly disagree) to 5 (strongly agree). The results shown here are the percentage of respondents reporting a mean score of 4 or higher, indicating percent agreement. Overall unit patient safety grade was assessed on a scale from 1 (very unsafe) to 10 (very safe). The results shown here are the percentage of respondents in a work setting with a mean score of 8 or more. The action plan items included the number of planned actions as a result of the WR and its implementation status (that is, counts of implemented, partially implemented, and not implemented action items at the time-of follow-up).  
† Not included in the survey.  
USPQ, Unit Patient Safety Questionnaire.

in the teamwork climate ( $p = 0.57$ ). The teamwork climate was assessed as good (4 or higher on a 5-point scale) by 74.6% (range 46.0%–92.9%) and 74.5% (range 35.4%–89.7%) of HCWs, respectively.

The mean values of the overall patient safety grade remained almost the same from the first survey 7.61 (SD = 1.59) to the second survey 7.74 (SD = 1.58). The overall unit patient safety did not change significantly from the first to the second survey ( $p = 0.85$ ). (For the calculation of patient safety, unit 5 was excluded because it was not recorded in the first survey.) In the first survey, 60.4% (range 25%–89.5%) of HCWs rated overall patient safety as good (cutoff 8), compared with 67.2% (range 25%–

95.3%) of HCWs in the second survey, a slight, nonsignificant increase.

Safety and teamwork climate and overall patient safety were different between work settings in the first and second administrations of the UPSQ (Table 3). In addition, HCWs assessed changes in patient safety after implementation of the action items (second survey) as *improved* (28.2%), *not changed* (32.9%), or *worsened* (3.0%), whereas the remaining clinicians (35.9%) respondent with *I don't know*.

### Individual Work Setting Action Items

For the leadership, discussed findings were mainly in line with their own everyday perceptions of weaknesses (and

PSOP dimensions (Number of action items; examples)	Implementation status of action items (%) (July–October 2019)		
	Implemented (40.7%)	Partially implemented (37.0%)	Not implemented (22.2%)
<b>Patient identification</b> (2 action items; input benefit and effect of the patient wristband)	1	1	–
<b>Infection prevention</b> (13 action items; hand hygiene and material disinfection workshops)	8	1	4
<b>Medication process</b> (2 action items; input labeling of medication)	–	2	–
<b>Communication</b> (6 action items; regular patient safety feedback sessions)	1	4	1
<b>Falls prevention</b> (1 action item; offer footwear in the absence of sturdy shoes)	1	–	–
<b>Work place specific</b> (3 action items; improving material storage)	–	2	1
<b>Total</b> (27 action items)	11	10	6

\* No action items were developed for the title “pressure ulcer prevention.” For percentage of implementation status after the feedback meetings (July–October 2019), “Implemented” = action item was fully implemented; “Partially implemented” = action item could only be partially implemented; “Not implemented” = action items were not implemented.  
PSOP, Patient Safety Observation Protocol.

strengths) of patient safety issues. In total, 27 (range 2–7) individual action items were planned by the eight work settings as a result of the WRs (Table 3). Most of the planned action items were responses to the observed safety issues intended to improve practices of care. Some safety action items were planned by the work settings even if the observers considered them to be *requirements met*. At the subsequent evaluation meetings with the work settings, 40.7% of the individual action items were reported as fully implemented, 37.0% were partially implemented, and 22.2% were not yet implemented (Table 4). At the evaluation meeting, further support possibilities were discussed for the implementation of action items that were not yet implemented. Anecdotally, all work settings commented on the WRs process as a positive experience.

## DISCUSSION

We conducted a WRs study combined with direct observation of patient safety items in eight different work settings as part of a quality assurance project in a university hospital. In-person observations gave us the opportunity to look at the internal care processes of each work setting and to observe whether defined patient safety items were met as required. HCWs were surveyed on safety and teamwork climate, along with assessments of overall patient safety. For each work setting, a follow-up evaluation of defined action items to improve safety factors was carried out.

## HCW Performance with Regard to Specific Patient Safety Themes

During the in-person observations of medical staff performance on the specific patient safety topic, we were able to evaluate three quarters of the patient safety item requirements as fulfilled or partially fulfilled. The “communication” dimension, with interactions between HCW and HCW and patients, respectively, was observed as positive, given that the majority of the safety requirements were fully met. Preexisting communication tools such as team huddles and reports were regularly used by the work settings, which may have led to the positive result. A strong relationship between communication and patient safety has been reported in the literature, underlining the importance of different communication tools as an important factor for patient safety outcomes.<sup>27</sup> Nevertheless, requirements were not fully met in nearly half of the observations in the dimension of “infection prevention.” This safety dimension also corresponded with the highest number of planned action items to address safe care deficits. This was not surprising, as infection-related AEs are quite common and reflect a constant challenge in terms of adherence to hand hygiene protocols.<sup>8</sup> Our approach is not dissimilar to others who have used a combined approach of patient safety rounds with checklists to evaluate clinicians’ compliance with patient safety strategies at care pathways. As in our study, their safety items allowed specific evaluation of HCW activities regarding patient safety, such as hand hygiene behavior for infection control.<sup>28</sup>

It would be interesting to see if the dimension of “infection prevention” has changed during the COVID-19 pan-

demographic, as the pandemic forced hospitals to be prepared for additional and extended patient safety activities such as in hand hygiene and respiratory etiquette.<sup>29</sup>

Some patient safety items could not be extensively observed (for example, “pressure ulcer prevention” and “falls prevention”) during the WRs because the observation window of three hours was simply too short, or because in some work settings these items might not be significant risk factors. For future in-person observations, the duration might be extended and carried out at different times of day.

### **HCW Assessments of Safety and Teamwork Climate**

Overall, the survey of HCW assessments of safety and teamwork climate as well as the overall rating of patient safety did not reveal significant changes. Prior research indicates that safety culture improvement takes time, and with our 6-to-9-month duration for implementing action items, we might have fallen short of the 12-month minimum recommendation.<sup>30</sup> Our results are in line with Hanskamp-Sebregts et al., who used a similar rounding approach and found only small significant changes in the teamwork climate dimension after 15 months of patient safety audits.<sup>23</sup> However, the Hanskamp-Sebregts et al. study was published after the planning of this study was finished, so unfortunately no changes were made to our timeline. Future WRs research should utilize a longer implementation runway of at least 12 months and should incorporate post observations. Although more than 70% of the surveyed HCWs assessed the safety climate as good, we observed differences in safety and teamwork climate outcomes between work settings. The work settings with the highest safety climate scores as well as 60% or higher response rates also showed higher percentages in overall patient safety grades. This seems to fit with workplace conditions showing attributes of psychological safety and communication openness of HCWs<sup>31</sup> relative to work settings with the lowest safety climate scores.

Of the eight work settings, six had safety climate scores that were 60% positive or higher, which is the threshold below which action is recommended.<sup>9,32</sup> In other words, these work settings demonstrated relatively good safety culture results before the WRs were implemented and did not necessarily need to improve significantly, given previously published recommended thresholds. Furthermore, work settings with high survey response rates, positive safety climate, and high overall patient safety scores included mixed service units such as anesthesia and imaging, representing areas with strong interprofessional teamwork and collaboration to handle their complex care situations. Work settings with relatively low survey response rates and low to moderate positive safety climate and overall patient safety scores included service units such as dialysis and obstetrics.

Within this sample of eight work settings, the safety climate, teamwork climate, and perceived overall patient safety grade were rated relatively low by the HCWs on the

surgical work settings compared to the other units. This could be related to the fact that many AEs are related to surgery.<sup>8</sup> Furthermore, the local leaders have described a large change in staffing, particularly in the nursing teams, during the implementation phase of the action items, which would make it more difficult to detect improvements. Associations between HCW turnover, safety culture, and patient safety have also been shown previously.<sup>20</sup> To better understand the influence of nurse turnover, length of employment in the work setting could also be collected in an extended questionnaire, with items indicating respondents as frontline staff or management, nursing or physicians, general work experience, and job satisfaction. Several reports have shown that HCW roles and behaviors influence safety climate, teamwork climate, and consequently patient safety.<sup>33–35</sup>

### **Planned and Evaluated Improvement Action Items**

All work settings were able to develop action items to close potential deficits in patient safety after the feedback discussion following the WRs. The most common action item was on infection prevention, such as following hand hygiene protocols. However, many of the planned action items could not be implemented within the specified time frame of nine months. These incomplete action items may have affected the HCW assessments of teamwork and safety. The effects of the action item implementations were not necessarily completed or observed by HCWs and may have needed a longer window for implementation in feedback about the implementation. Previous research into WRs suggests that the impact of conducting WRs is not as potent as the impact of conducting WRs with feedback about actions taken as a result of the WRs.<sup>9</sup> However, different and repeated action items for infection prevention have the potential to bring about positive change in the long term, meaning that regular training and feedback remain essential.<sup>36</sup> The fact that nearly half of the action items were implemented is a positive result, considering the rather short amount of time available. Yet, aside from the time factor and subsequent planning requirements, successful implementation of action items is a function of evidence, context, and facilitation.<sup>37–39</sup> In the follow-up meeting, reasons for the partial or non-implementation of the action items were discussed, and further support to the work settings was offered by the patient safety office. Here, further follow-up meetings are suggested to determine a suitable time frame for subsequent implementation of WRs with in-person observations. The implementation of action items likely should have been more closely monitored by the patient safety office to facilitate and provide structure for follow-through in the respective work settings. As the second survey showed, about one third of clinicians had difficulty assessing whether the action items developed had affected patient safety on the ward. This could be due to changes in staffing or the local HCWs not being sufficiently

involved in implementing changes, or the action items may have been weak. We would recommend that HCWs be more actively involved in the development and implementation of action items, that implemented action items be deliberately fed back to HCWs involved in the WRs, and that local patient safety office resources facilitate the structure and expectations around the process more deliberately.<sup>40</sup> This could be achieved by involving a delegation from the team of HCWs in the discussion and planning of the WRs and the resulting action items.

### Strengths and Limitations

The strength of this study is the combination of WRs with in-person observations and the development and tracking of individual work setting action items. Specific strengths included the sharing of observation results with work setting leadership for discussion and development of individual action items to address the safety issues. No top-down decisions were made for the work settings, which supported the local relevance and feasibility of the action items, along with the responsibility and empowerment of the work settings. Another strength of the study was the selection of work settings. Equal numbers of work settings were included from all four hospital departments, allowing all departments to benefit from the WRs, discussion, and action items.

In general, the safety climate, teamwork climate, and overall patient safety were perceived as rather high. These results could reflect a bias toward social desirability.<sup>41</sup> However, because the survey was conducted anonymously, we do not expect a significant response bias in these samples. More likely is that higher safety climate results meant there was less room to improve, which made it more difficult for improvements to be detected in our short study window.

During observations, we initially assumed that HCWs might behave differently under observation. However, no suspect correct performance was evident during the two-to-four-hour observations. We found that, given the busy work schedules of these units, HCWs performed their practice as usual to meet standards of care and keep up with demands.

The interval between WRs observations and action items implemented was rather short and likely insufficient. Yet at the action planning phases, the leadership teams and patient safety officers were optimistic about the implementation fidelity at the work settings, expecting palpable impact from the actions taken on the designated wards that would be perceivable by the HCWs.

One methodological limitation of the study is the response rate of less than 60% for each of the UPSQ administrations,<sup>42</sup> combined with the short duration between survey administrations, making it particularly difficult to detect changes across the eight work settings. Many of the action items were long term, and given that more than half of them were not completed between UPSQ administrations, expectations of HCWs that action items had been

implemented would not be fully reflected by the second administration of the UPSQ. Many of the measures were implemented in whole or in part, based on decisions by the unit leadership. If the action plans had been developed with more frontline staff involvement, certain issues might have been addressed differently or more sustainably. Another identifiable limitation was the study design. Observational studies are less reliable compared to randomized controlled trials (RCTs). An RCT would have shown the impact of improved patient safety in clear data, whereas the observational study only indicates an increase in patient safety. The survey was specifically developed for this study. Every observer has a subjective perception, and it is possible that there were inconsistencies between observers regarding the way action items implementation were evaluated, which may have led to observer bias. To avoid this, future assessments could be based on a predefined item response matrix for the patient safety dimensions. External factors also had a restrictive effect on the study. For example, one work setting was in a restructuring phase that involved major personnel changes (including the recruitment of new staff) during the implementation of the action items.

### CONCLUSION

Using a series of WRs with structured in-person observations of clinical practice and questionnaires from HCWs on safety and teamwork climate, we were able to identify care performances, attitudes, and deficits in patient safety across eight clinical work settings in a university hospital. The observed care practices covered relevant aspects of patient safety such as infection prevention, safe medication processes, and effective communication. Survey outcomes reflected underlying features of the work settings with regard to patient safety as perceived by the HCWs. The WRs led to 27 action items addressing specific safety deficits, of which 40.7% and 37.0% have been fully or partially implemented, respectively, by the work settings. The action items developed to improve patient safety practices should address observed deficits and actively involve the work settings in the change process. Action items that could not be implemented should be pursued further. The work settings received logistical, subject matter, and moral support from the patient safety office. However, the expansion of the WRs through direct observations and subsequent actions during the six-to-nine-month window was not associated with improvements on the UPSQ. The PSOP was piloted here as a user-friendly and well-structured tool to facilitate the assessment of WRs and has potential to be further utilized for patient safety efforts.

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