

Checklists to structure internal medicine ward rounds reduce omissions and improve adherence to standards of care: a pre-post intervention study

Sara I. Girona Cuéllar^{a, b, c, *}, David Gachoud^{a, b, d, *}, Victoria Ando^{a, b, e}, Pedro Marques Vidal^{a, b}, Anne-Hélène Colleaux^{a, b}, Virginie Renggli^{a, b, f}, Peter Vollenweider^{a, b}, Matteo Monti^{a, b, d}

a Department of Internal Medicine, Lausanne University Hospital (CHUV), Lausanne, Switzerland; b University of Lausanne, Lausanne, Switzerland; c Department of Internal Medicine, Groupement Hospitalier de l'Ouest Lémanique, Nyon, Switzerland; d Medical Education Unit, School of medicine, Faculty of Biology and Medicine, University of Lausanne, Lausanne, Switzerland; e Department of Internal Medicine, Etablissements Hospitaliers du Nord Vaudois, Yverdon-les-Bains, Switzerland; f Direction of Nursing, Centre Hospitalier du Valais Romand, Sion, Switzerland; * Equal contribution as first authors

Published

16 July 2026

doi

<https://doi.org/10.57187/5058>

Cite this as

Swiss Med Wkly. 2026;156:5058

David Gachoud, MD, MEd

Department of Internal Medicine
Lausanne University Hospital (Centre
Hospitalier Universitaire Vaudois)
Rue du Bugnon 46
CH-1011 Lausanne
[david.gachoud\[at\]chuv.ch](mailto:david.gachoud[at]chuv.ch)

Summary

BACKGROUND: Conducting ward rounds is a complex task requiring physicians and nurses to make use of a large set of competencies. The inability to conduct effective rounds can lead to errors of omission. Based on evidence gathered primarily in intensive care settings, checklists may improve the structure of ward rounds, interprofessional communication, and clinical outcomes.

OBJECTIVE: To test the hypothesis that the implementation of a checklist to structure internal medicine ward rounds reduces the omission of key clinical items.

DESIGN: This quality improvement study was designed as a prospective, monocentric, pre-post intervention study.

PARTICIPANTS: Physicians and nurses conducting ward rounds in an internal medicine division of a 1500-bed university hospital.

INTERVENTION: The implementation of a checklist with 19 key clinical items, defined as such because they are critical for patient care and must be discussed in every round for acute patients admitted to general internal medicine wards. An omission was defined as occurring when an item was not discussed. The 19 items included the patient's main diagnostics, new diagnostics or problems, orientation, sleep, pain, nutrition, bowel habits, mobility, thrombo-embolic prophylaxis, skin and risk of bedsores, the presence and local status of IV catheters, the presence of a urinary catheter, medication review, targeted patient history and clinical examination, daily and hospital goals, discharge plan, and patient understanding.

MAIN MEASURES: The primary outcome was the number of key clinical items discussed during ward rounds before and after the checklist implementation. Secondary outcomes included (a) the proportion of patients with venous or urinary catheters, (b) catheter use in accordance with guideline-based indications, (c) the proportion of patients mobilised at two predefined times, (d) ward round duration, (e) ward round location (bedside vs hallway), and (f) patients' and nurses' understanding of care goals, rated on a 0–100 visual scale.

RESULTS: The study period lasted six days before implementation, from 27 January to 3 February 2023, and six days after, from 18 to 25 April 2023. Rounds conducted by a resident and a nurse were assessed using an observation plan, which ensured an equal distribution of observations across all units in the division. In total, 56 residents and 83 nurses participated in 368 patient encounters (172 pre-intervention and 196 post-intervention). The median number of key clinical items discussed per round increased from 11 [IQR 8.5–13] to 16 [IQR 14–18] ($p < 0.01$) after the intervention. The proportion of patients with urinary catheters decreased (9% vs 4%; $p = 0.04$), as did the proportion with venous catheters in place without adequate indication (16% vs 2%; $p < 0.01$). Pa-

tient mobilisation did not improve: before the intervention, 48% of patients were found in bed, 36% were sitting in their chairs, and 12% were walking, compared with 50%, 35%, and 11% after the intervention, respectively. The understanding of care goals increased for patients (score of 85/100 [IQR 50–100] pre-intervention vs 90/100 [IQR 70–100] post-intervention; $p = 0.04$) and, to a lesser extent, for nurses (90.5/100 [IQR 80–100] pre-intervention vs 100/100 [IQR 85–100] post-intervention ($p = 0.08$)).

LIMITATIONS: This was a monocentric study involving one specific type of ward round.

CONCLUSIONS: The implementation of a checklist to structure internal medicine ward rounds reduced the omission of key clinical items and improved adherence to standard-of-care protocols, both of which are considered important mediators of clinical outcomes.

Introduction

In internal medicine hospital divisions, ward rounds are a core component of daily clinical practice, during which the clinical progress of patients is assessed and decisions regarding the next stages of care are taken [1–4]. Although ward rounds are not conducted uniformly across hospitals, the model referred to as “interprofessional bedside rounding” is becoming increasingly common [5]. Such rounds are described as being “triadic,” as the healthcare providers, typically a physician and a nurse, interact with patients at their bedside [1–3].

Conducting effective ward rounds is complex and requires a large set of skills and competencies, including teamwork, interprofessional clinical reasoning, communication, organisational skills, and professionalism [6]. Junior physicians and nurses may lack some of these skills and competencies due to a lack of training during their studies [7–9]. This lack of training is likely a consequence of the absence of standardisation in how ward rounds are conducted [2,7–10].

The inability to conduct effective ward rounds may lead to errors of omission [10, 11], which result from *actions that are not taken* [12] due to organisational difficulties or a lack of time [13]. Such errors can negatively impact patient safety [14, 15]. Moreover, ineffective ward rounds may negatively impact healthcare team communication and collaboration, as well as patients’ understanding of care goals [1, 16–18].

Checklists are a type of cognitive aid that helps promote adherence to best practices and avoid errors of omission [19]. Evidence also shows that checklists improve clinical outcomes, including reducing rates of catheter-associated infections, reducing the duration of mechanical ventilation, and reducing rates of ventilator-associated pneumonia [20]. Furthermore, they increase satisfaction among healthcare providers by fostering team communication, teamwork, and patient-centred care [21–24]. Nevertheless, most studies have been conducted in intensive care unit settings. Little is known about the effectiveness of checklists in internal medicine hospital divisions, where the proportion of elderly and multimorbid patients is higher [24–26].

Aim of the study

This study tested the following hypotheses: (1) the implementation of a checklist to structure ward rounds in an internal medicine hospital division reduces the omission of key clinical items; and (2) the reduction of omissions improves adherence to standard-of-care protocols, namely the reduction of venous and urinary catheters in place without a recognised indication.

Methods

Local context and aim

This study was conducted in the internal medicine division of Lausanne University Hospital, a tertiary teaching hospital in Western Switzerland. The division has 170 beds distributed across seven units and provides care for 6,200 patients per year. A typical unit has 24 beds and is supervised by an attending physician, a chief resident, and a head nurse. Each unit is run by three residents, four nurses, and four nursing assistants.

In our division, bedside ward rounds are conducted daily by a resident-nurse pair. Ward rounds run between 10:00 and 11:30 am. Both the resident and the nurse have dedicated time beforehand to prepare [27].

Therefore, although the daily conduct of ward rounds was structured, the content of the ward rounds was not. This resulted in substantial heterogeneity in how ward rounds were performed within the same hospital division, prompting the need to define and structure their content. We aimed to achieve this using a checklist and designed a quality improvement study following the SQUIRE guidelines [28].

Intervention

Development of a checklist

The content of the checklist was initially drafted after a literature review of published models [2, 22, 23, 29–36]. Its items were then adapted to local needs through an iterative process by an inter-professional team of nurses and physicians. The checklist was pilot tested in two different units for about 12 months to gather feedback from the teams. Based on this feedback, it was refined and approved by a local committee consisting of attending physicians, chief residents, and head nurses. The final version included 19 key items, covering the aspects of ward rounds to be addressed during each patient encounter, divided into four sections (briefing; current and new problems [2 items]; “do not forget” items [12 items]; patient time [5 items]). The checklist is presented in figure 1.

Figure 1: Internal medicine checklist (front and back). The checklist is translated into English from the original version in French.

Stage	Where	Who	What
Briefing	Outside room	Physician	Confidential information
Current clinical situation	Patient's bedside	Physician	- Explain WR process to the patient - Current problems
		Nurse	New problems & questions
«Do not forget» items	Patient's bedside	Nurse	- Orientation + Sleep + Pain - Nutrition + Bowel habit - Mobility + VTE prophylaxis - Skin and risks of bedsores - IV cannulas (indication and local status) - Urinary catheters (indication) - Medication review
Patient time	Patient's bedside	Physician	- Targeted history and examination - Goals: daily + hospitalization - Discharge: date + preparations - Patient's understanding + questions

Before WR

NURSING STAFF :

- Collects information for «Do not forget» items (verso)
- Completes treatment administration before 10 am (e.g. iv treatment administration)
- Ensures that patients are present in their room for the WR (e.g. not showering)
- Assists patients who need help getting up and sitting in a chair for WR

RESIDENT :

- Reviews files of newly admitted patients
- Establishes or confirms daily goals for each patient
- Performs discharge interview for patients leaving the hospital
- Organizes paraclinical exams and monitors exam results
- Calls the patient primary care physicians and consultants as needed
- Enables call redirection to avoid interruptions during WR

Development of recommendations for best practice

To ensure that clinicians correctly addressed the key checklist items, a document describing the intended standard of care was prepared. A best practice recommendation was included for each item of the “do not forget” section. The recommendations for best practice were based on local guidelines (e.g. indications for and surveillance of venous catheters [37]), national guidelines (e.g. indications for urinary catheters [38]), or international guidelines (e.g. thromboprophylaxis [39]), depending on availability. The checklist and best practice recommendations were printed and distributed in pocket-card format (see figure 1); they were also made available as electronic resources on the hospital intranet.

Implementation strategy

Because residents rotate every six months in our division, we focused on training senior physicians and nurses, who do not rotate and are responsible for supervising their younger colleagues. These clinical supervisors underwent a compulsory interprofessional, 3-hour session in which the rationale for the project, the checklist, and their role and responsibilities as trainers and prompters were explained. A short video illustrating how the new structured ward round should be conducted was presented and discussed (video available upon request).

These trained senior staff members were expected to be the “champions” of the new ward round structure and to prompt its use via role modelling (systematically using the checklist during each ward round). In addition, trained staff provided regular reminders during morning meetings. Residents and nurses underwent separate 1-hour information and training sessions, also using the video.

Study of the intervention

Study design

A prospective pre- and post-intervention design was used to assess the impact of the intervention as a whole, including the checklist itself and all the elements supporting its use (e.g. training, video demonstration, prompting, and reminders). The different study phases are presented in the Appendix.

Measures

Outcomes

The primary outcome was the number of key clinical items addressed during ward rounds before and after the checklist was implemented. The key clinical items are described in the Appendix (table S1).

Secondary outcomes were (a) the number of venous or urinary catheters present in hospitalised patients (i.e. the proportion of hospitalised patients with a venous or urinary catheter), (b) the number of venous or urinary catheters that complied with institutional and national guidelines in terms of indications [37,38], (c) the proportion of patients mobilised at two specific times of the day, (d) ward round duration, (e) ward round location (bedside vs hallway), and (f) patients' and nurses' perceived level of understanding of care goals, assessed using a visual analogue scale (0 to 100).

Data collection

An observation plan was designed for rounds, which were conducted by a resident and a nurse (see Appendix, figure S1). No senior physician or head nurse was present during these rounds. Observations were equally distributed across all units in the division. However, the two units where the project was piloted were excluded from the pre-implementation observations. The resident-nurse pair to be observed was informed on the same day. They were blinded to the exact type of data being collected to reduce the Hawthorne effect. Each acute inpatient seen by a resident-nurse pair during the ward round counted as a patient encounter.

Observers and observers' training

Observers were final-year medical students with several months of clinical experience who first responded to the job offer emailed to all final-year students. They were trained by the research team and performed calibration test observations as part of the training. After the test observations, observers could ask clarifying questions on how to interpret and score specific observed behaviours. This process allowed the clarification and calibration of the scoring between observers.

Observation periods

The observation of ward rounds before implementation lasted six days (27, 30, and 31 January and 1, 2, and 3 February 2023); the observation after implementation also lasted six days (18 to 21 April and 24 and 25 April 2023). A short time frame of three months was selected to avoid potential confounding factors such as physicians' rotations, seasonal differences in patients' diseases, and other quality improvement initiatives.

Data collection tool

Data were collected using two paper sheets with two data collection methods: an observation sheet and an audit sheet (available in the Appendix). The observation sheet collected dichotomous data on the discussion of each of the 19 items on the checklist (Yes/No), as well as data on ward round location and duration. These data were collected through direct observation. Ward round location was determined by the observer, based on where most of the ward round took place. Ward round duration was based on the start and end times of the ward round recorded by the observer.

The audit sheet was used to collect data on venous and urinary catheters (type and indication). First, the observers were tasked with documenting whether a urinary or venous catheter was in place by checking each patient visited. Second, the observers asked the nurse or resident in charge about the indication for the urinary or venous catheter, without discussing adequacy. Finally, based on the nurse's or resident's answer, the observer selected an option from a list of indications (see audit sheet). The audit sheet also collected data on patients' and nurses' understanding of care goals, which was assessed by questioning the nurses and the patients, typically immediately after the rounds. Rather than answering orally, nurses and patients rated their understanding on a visual analogue scale (VAS; in millimetres, from 0 to 100, with 100 representing full understanding and 0 representing no understanding at all).

Data were initially collected on paper and then transcribed into a computerised database by the observers. The first author performed quality control of the transcription process by verifying consistency between the paper forms and the computerised database.

Because sufficient mobilisation of hospitalised patients is a common concern, we sought to measure whether discussing this item during ward round would lead to a concrete impact on the rate of patient mobilisation. Therefore, a pragmatic approach was used to measure patient mobilisation. This approach was based on the behavioural mapping method, which involves patient observation at set intervals [40]. We selected two times of day during which patients in our division were the most likely to be mobilised: between 11:50 am and 12:35 pm (for lunch) and between 4:00 pm and 4:50 pm. These specific times were based on a previous study on patient mobilisation conducted in our division [41]. The members of the research team performed the mobilisation audit by visiting patients' rooms in the different units of the division, during both periods of the day, one week before and one week after implementation. The best value per patient and per day was considered (walking > sitting > in bed).

Data analysis

Sample size calculations and statistical analysis

A pilot study prior to the intervention found that, on average, 8 out of 19 checklist items were discussed during each ward round. Sample size calculations were therefore based on an expected increase in discussion from 8 to 11 out of 19 checklist items after the intervention, with a power of 80%, an alpha level of 5%, and a one-sided test. Thus, 240 observations were required (120 before and 120 after implementation). Considering a participation rate of two-thirds (to account for patients who were unavailable for the ward round), the number of required observations was increased to 360.

Descriptive statistics are presented as absolute numbers and percentages for categorical variables and as medians [interquartile range] for continuous variables. Pre- and post-intervention comparisons for primary and secondary outcomes were initially conducted using the chi-square or Fisher's exact test for categorical variables and the Kruskal-Wallis test for continuous variables. As continuous variables showed asymmetric distributions as assessed by Q-Q plots, only nonparametric statistics were applied. If an observation had missing information for one variable, it was excluded from the analyses of that specific variable but retained in the analyses of the other variables. No replacement of missing values, such as imputation or carry-forward methods, was performed. A two-sided p-value < 0.05 was considered statistically significant. All statistical analyses were conducted using Stata v.18.0 (Stata Corp, College Station, TX, USA).

Ethics

This study focused on quality improvement and thus did not fall within the Swiss human research laws according to the local ethics committee (CER-VD Req-2023-00794), which waived the need to approve the study protocol. Written consent was obtained from all physicians and nurses concerning the use of personal demographic data. All data were anonymised and managed in agreement with national laws on the protection of personal data.

This study is reported according to the Revised Standards for Quality Improvement Reporting Excellence (SQUIRE) 2.0 [28].

Results

The healthcare teams working in the internal medicine division did not change during the pre- and post-intervention phases. All residents and nurses consented to participate in the scheduled observations. Physicians' and nurses' demographic data are provided in table 1. In total, 368 nurse-physician-patient encounters were observed (172 before, 196 after).

Table 1: Residents' and nurses' demographic data.

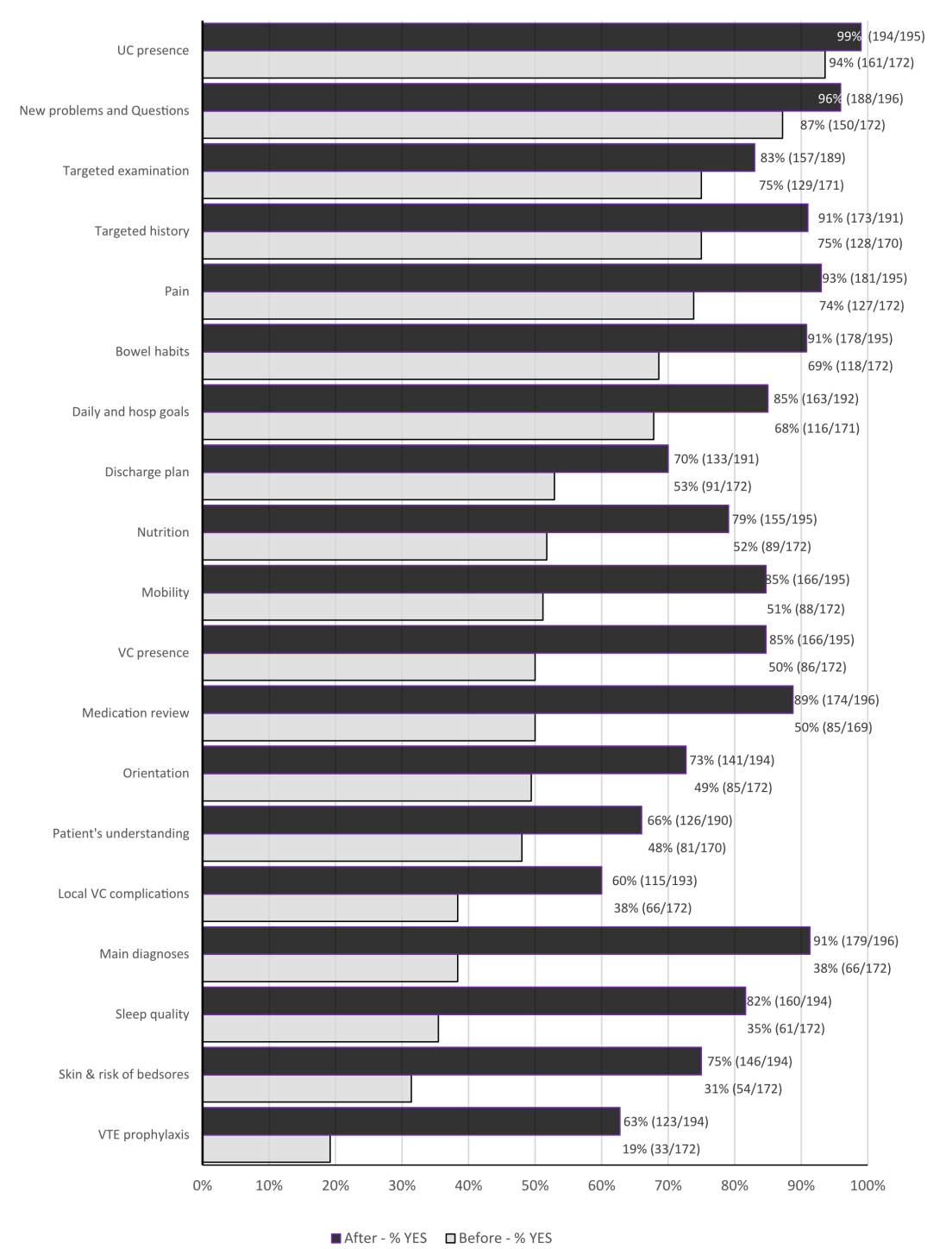
	Before	After	Total
Observations, n	172	196	368
Residents, n	27	29	56
Age, median [IQR]	29.7 [28–30]	30.5 [28.5–32]	30.1 [28.25–31]
Gender, n (%)			
Male	9 (33)	12 (41)	21 (38)
Female	18 (67)	17 (59)	35 (63)
Post-graduate years, n (%)			
<3 years	5 (19)	6 (21)	11 (20)
≥3 years	22 (82)	23 (79)	45 (80)
Nurses, n	48	35	83
Age, median [IQR]	29 [26–32.5]	29 [26–34]	29 [26–34]
Gender, n (%)			
Male	8 (17)	5 (14)	13 (16)
Female	40 (83)	30 (86)	70 (84)
Postgraduate years, n (%)			
< 3 years	17 (35)	13 (37)	30 (36)
≥ 3 years	29 (60)	21 (60)	50 (60)
Missing data	2 (4)	1 (3)	3 (4)

Primary outcome

After the ward round checklist implementation, the median number of key clinical items discussed during ward round significantly increased from 11 [IQR 8.5–13] to 16 [IQR 14–18] (p <0.001).

Figure 2 provides the proportion of ward rounds during which the key clinical items were discussed, with a before-and-after comparison. Before the intervention, most key clinical items were discussed in at most half of the ward rounds. After the intervention, all items were discussed more often (ranging from 60% to 99% of ward rounds) (figure 2). For example, the discussion of VTE prophylaxis increased from 19% of ward round before the intervention to 63% after the intervention (p <0.001), skin issues and risk of bedsores increased from 31% before the intervention to 75% after the intervention (p <0.001) and sleep quality from 35% before to 82% after (p <0.001).

Figure 2: Proportion of items of the checklist discussed before and after. VTE: venous thrombo-embolic; VC: venous catheters; UC: urinary catheters.



Secondary outcomes

Table 2 shows the results of the secondary outcomes. The proportion of patients with a venous catheter in place decreased from 71% before the intervention to 64% after the intervention ($p = 0.136$). More importantly, the proportion of patients with a venous catheter in place without a proper indication decreased from 16% before the intervention to 2% after the intervention ($p < 0.01$).

Furthermore, the proportion of patients with a urinary catheter in place decreased from 9% before the intervention to 4% after the intervention ($p = 0.044$). The proportion of urinary catheters in place without a proper indication also decreased (9%, $n = 2$ before the intervention vs 0%, $n = 0$ after the intervention), but the number of cases was very small.

Active mobilisation was assessed for 838 patients (411 before the intervention and 427 after the intervention). Before the intervention, 47.9% ($n = 197$) of patients were bedridden (no evidence of them having been moved out of their beds at two distinct times during the day), 36.0% ($n = 148$) were out of bed but sitting in a chair, and only 12.4% ($n = 51$) were walking. Our intervention did not increase the number of patients mobilised during the day (table 2).

After the intervention, the proportion of ward rounds performed at patients' bedsides increased from 45% to 60% ($p = 0.022$), while rounding time increased from a mean of 92 minutes (SD 24.0; 95% IC [88.6-95.9]) to 98 minutes (SD 24.8; 95% CI [94.6-101.7]) ($p = 0.02$).

Before the implementation of the checklist, both patients and nurses reported a high level of perceived understanding of the care goals, which increased even further in the post-implementation phase (patients: 85/100 [IQR 50-100] before implementation vs 90/100 [IQR 70-100] after implementation, $p = 0.04$; nurses: 90.5/100 [IQR 80-100] before implementation vs 100/100 [IQR 85-100] after implementation, $p = 0.08$). Before implementation, a high proportion of nurses fully understood the care goals (scores of 100/100), which also increased after implementation (47% before implementation vs 59% after implementation, $p = 0.02$) (table 2).

Table 2: Secondary outcomes.

			Before	After	P-value *
Adherence to standard-of-care procedures	Patients in ward round encounters, N		172	196	
	Venous catheters (VC)	VC in place, n (%)	122 (71)	124 (63)	0.136
		VC in place without adequate indication, n (%)	19 (16)	2 (2)	< 0.01
	Urinary catheters (UC)	UC in place, n (%)	16 (9)	8 (4)	0.044
		UC in place without adequate indication, n (%)	2 (13)	0 (0)	NA
	Patients in the mobilisation survey, N		411	427	
		In bed, n (%)	197 (47.9)	212 (49.6)	0.93
		Sitting in a chair, n (%)	148 (36.0)	150 (35.1)	
		Walking, n (%)	51 (12.4)	48 (11.2)	
Missing data, n (%)		15 (3.6)	17 (4.0)		
Ward round duration, mean (SD), minutes			92 (24.0)	98 (24.8)	0.02
Ward round location, n (%)	Patient's bedside		78 (45)	117 (60)	0.022
	Patient's room (not bedside)		15 (9)	12 (6)	
	Outside the patient's room		74 (43)	62 (32)	
	Missing data		5 (3)	5 (3)	
Goals understanding, VAS/100, median [IQR]	Patients		85 [50–100]	90 [70–100]	0.04
	Nurses		90.5 [80–100]	100 [85–100]	0.08
	Nurses with full understanding, n (%)**		81 (47)	115 (59)	0.02

* Using the chi-square for categorical variables and the Kruskal-Wallis test for continuous variables; ** proportion of understanding scores reaching 100 (out of all nurses' understanding scores; one score measured for each encounter). VAS: visual analogue scale.

Discussion

Our study shows that the implementation of a checklist to structure ward rounds in an internal medicine division led to (a) a significant increase in the number of key clinical items discussed, thereby reducing omissions; (b) better adherence to standard-of-care protocols regarding the use of venous and urinary catheters; (c) more frequent performance of ward rounds at patients' bedsides; and (d) a better understanding of care goals by both patients and nurses.

To our knowledge, this study is one of the first to use a checklist to structure ward rounds in internal medicine [42] and to show the benefits that can arise from the use of such tools in this setting. We followed an in-depth, literature-based process to develop our checklist and customise it to meet the needs of internal medicine. Therefore, we think that our checklist may be applied to

any internal medicine division using “triadic” bedside rounds [17]. Furthermore, a checklist such as ours would be beneficial as an educational tool to guide and train less experienced medical and nursing staff and students on how to best perform ward rounds.

While a checklist’s content is essential to a successful implementation, a comprehensive approach to the implementation strategy is needed to ensure adoption and ongoing use of the tool [10]. Checklists provide structure to guide healthcare teams and help prevent key items from being overlooked. However, they should not be seen as constraints on clinicians’ autonomy, reasoning, or decision-making. Flexibility should be allowed, as long as nothing essential is omitted [10].

To reduce resistance to its use, we designed the tool to avoid adding any administrative burden by not requiring a written format. To make it easily accessible, the checklist was printed as a personal pocket card for all team members, which was also laminated and visibly attached to all laptops used during rounds.

Strategies for successful implementation also include adequate preparation, pilot periods [43, 44], video training [45], team training [18, 22, 43–50], use of prompting [22, 32, 46, 51–53], and repeated assessment through continuous improvement (plan-do-study-act) [11, 43].

A pivotal component of our implementation strategy was the use of prompting during rounds by identified “champions”. Finally, throughout the implementation process, we relied on an interprofessional coordination group to follow up on each step and troubleshoot where necessary.

In terms of the primary outcome, our pre-intervention data underscore the high risk of omissions regarding the discussion of key clinical items during ward rounds conducted without the structure provided by a checklist. We found that, at most, only 12 out of 19 items in our checklist were discussed in half of ward rounds (figure 2). Our post-intervention data showed a significant increase in the number of key clinical items discussed. This can also be considered a measure of adherence to the checklist, an element often overlooked in studies examining the clinical benefits of checklists [24].

Regarding the secondary outcomes, we assessed the effects of our intervention on adherence to selected standard-of-care protocols. We found a statistically significant decrease in the number of venous catheters in place without an adequate indication and in the number of urinary catheters in place.

In terms of secondary outcomes, we also assessed whether our checklist could lead to more frequent mobilisation of patients. While the intervention encouraged the discussion of whether a patient had been appropriately mobilised (51.2% before the intervention vs. 85.1% after), actual rates of patient mobilisation did not change (over half of the patients were found in bed or sitting). This suggests that simply discussing the need to mobilise patients is not enough and that comprehensive programs targeting this specific issue are needed [54–56].

The implementation of our checklist increased the proportion of ward rounds performed at patients’ bedsides (+31%). Bedside rounding allowed patients to have more frequent access to the full rounding process and, more importantly, to the discussion between the physician–nurse pair, allowing them to be more directly involved in their care.

Our study also showed that following the introduction of our checklist, patients had a better understanding of care goals. This may be related to two factors. First, the checklist includes dedicated time with patients specifically addressing care goals and verifying patient understanding. Second, the increased proportion of ward rounds being conducted at patients’ bedsides could have played a role by giving patients access to the discussion between the physician and the nurse [16].

In parallel with better patient understanding, we also found that nurses’ understanding of care goals improved. It has been suggested that checklist use enhances interprofessional discussions during ward rounds [16, 30], leading to better communication within the team and improving nurses’ understanding of care goals.

One of the major concerns regarding the introduction of a new ward round structure was the risk of increasing ward round duration. However, previous studies have shown either a reduction in ward round duration or no significant change [57,58]. Our study showed a small increase of 6 minutes in ward round duration after checklist implementation. However, we believe this was offset by a reduced need for clarification and further discussion of management plans later in the day.

We identified some limitations in our study. First, we cannot exclude the possibility that the Hawthorne effect influenced our results [59]. This risk was partially addressed by “blinding” the observed residents and nurses regarding the nature of the data being collected. Second, we did not gather data on the concrete use of the checklist by the residents and nurses during the post-intervention phase, nor did we gather feedback on the checklist itself in terms of utility or desirability. Rather, we focused on a proxy for the checklist’s use by the staff while counting the number of checklist items being discussed. While we do not have data pertaining to our checklist’s utility and desirability, we support the idea of adapting the checklist to the local staff’s needs, as we did during our checklist’s development and pilot phase. Third, the indications for urinary or venous catheters were directly assessed by the observers. However, the adequacy of the catheters’ indications could have been assessed with more independence by external judges. Fourth, we used a pragmatic approach to gather data on patient mobilisation, but we lacked a validation process for our approach, which means that these results should be interpreted with caution. Fifth, our monocentric study was not powered to demonstrate effects on clinical outcomes and morbidity related to omissions. The complications that can be prevented by following standard-of-care protocols are potentially serious, but rare. Therefore, to demonstrate the impact of checklist-based interventions on relatively rare complications, multicentre studies with large numbers of participants conducted over prolonged periods of time are needed.

Finally, we collected the data before the checklist’s implementation and shortly after (i.e. the following month). Therefore, we cannot draw conclusions on long-term effects. Nevertheless, we chose this timeframe to prevent the before-and-after differences from being influenced by interventions other than the checklist implementation.

Conclusion

Our study demonstrates that the implementation of a checklist to structure bedside ward rounds in an internal medicine hospital division is an effective way to increase the discussion of key clinical items, as well as to improve adherence to standard-of-care protocols regarding venous and urinary catheters.

While it remains a challenge to demonstrate the impact of ward round checklists on clinical outcomes, current data support their use, as checklists can reduce omissions and improve communication with patients and among healthcare professionals.

Data availability statement

The study protocol and all collected data are available upon reasonable request from the corresponding author.

Acknowledgments

Use of AI: The authors made limited use of ChatGPT-4 to reformulate sentences in the discussion and take full responsibility for the final content.

Authors’ contributions: SGC contributed substantially to the design of the project, to the acquisition of the data, and to their analysis and interpretation. She drafted the manuscript. She gave her final approval of the version to be published. She agreed to be accountable for all aspects of the work. DG contributed substantially to the design of the project, to the acquisition of the data, and to their analysis and interpretation. He drafted the manuscript. As the corresponding author, he gave his final approval of the version to be published. He agreed to be accountable for all aspects of the work. VA contributed substantially to the acquisition of the data, and to their analysis and interpretation. She reviewed the manuscript critically for important intellectual content. She gave her final approval of the version to be published. She agreed to be accountable for all aspects of the work. PMV contributed substantially to the analysis of the data and their interpretation. He reviewed the manuscript critically for important intellectual content. He gave his final approval of the version to be published. He agreed to be accountable for all aspects of the work. AHC contributed substantially to the design of the project and to the acquisition of the data. She reviewed the manuscript critically for important intellectual content. She gave her final approval of the version to be published. She agreed to be accountable for all aspects of the work. VR contributed substantially to the design of the project and to the acquisition of the data. She reviewed the manuscript critically for important intellectual content. She gave her final approval of the version to be published. She agreed to be accountable for all aspects of the work. PV contributed substantially to the design of the project. He reviewed the manuscript critically for important intellectual content. He gave his final approval of the version to be published. He agreed to be accountable for all aspects of the work. MM contributed substan-

tially to the design of the project, to the acquisition of the data, to their analysis and interpretation. He reviewed the manuscript critically for important intellectual content. He gave his final approval of the version to be published. He agreed to be accountable for all aspects of the work.

Financial disclosure

This project was supported by a grant from the Swiss Society of General Internal Medicine Foundation.

All authors have completed and submitted the International Committee of Medical Journal Editors form for disclosure of potential conflicts of interest. No potential conflict of interest related to the content of this manuscript was disclosed.

References

- Weber H, Stöckli M, Nübling M, Langewitz WA. Communication during ward rounds in internal medicine. An analysis of patient-nurse-physician interactions using RIAS. *Patient Educ Couns*. 2007 Aug;(3):343–8. <https://doi.org/10.1016/j.pec.2007.04.011> PMID: 17553652 ISSN: 0738-3991
- Nørgaard K, Ringsted C, Dolmans D. Validation of a checklist to assess ward round performance in internal medicine. *Med Educ*. 2004 Jul;(7):700–7. <https://doi.org/10.1111/j.1365-2929.2004.01840.x> PMID: 15200394 ISSN: 0308-0110
- O'Hare JA. Anatomy of the ward round. *Eur J Intern Med*. 2008 Jul;(5):309–13. <https://doi.org/10.1016/j.ejim.2007.09.016> PMID: 18549930 ISSN: 1879-0828
- Walton V, Hogden A, Johnson J, Greenfield D. Ward rounds, participants, roles and perceptions: literature review. *Int J Health Care Qual Assur*. 2016 May;(4):364–79. <https://doi.org/10.1108/IJHCQA-04-2015-0053> PMID: 27142947 ISSN: 1758-6542
- Blakeney EA, Chu F, White AA, Smith GR Jr, Woodward K, Lavalley DC, et al. A scoping review of new implementations of interprofessional bedside rounding models to improve teamwork, care, and outcomes in hospitals. *J Interprof Care*. 2024;(3):411–26. <https://doi.org/10.1080/13561820.2021.1980379> PMID: 34632913 ISSN: 1469-9567
- Wölfel T, Beltermann E, Lottspeich C, Vietz E, Fischer MR, Schmidmaier R. Medical ward round competence in internal medicine – an interview study towards an interprofessional development of an Entrustable Professional Activity (EPA). *BMC Med Educ*. 2016 Jul;(1):174. <https://doi.org/10.1186/s12909-016-0697-y> PMID: 27401103 ISSN: 1472-6920
- Wray NP, Friedland JA, Ashton CM, Scheurich J, Zollo AJ. Characteristics of house staff work rounds on two academic general medicine services. *J Med Educ*. 1986 Nov;(11):893–900. PMID: 3772965 ISSN: 0022-2577
- Nikendei C, Kraus B, Schrauth M, Briem S, Jünger J. Ward rounds: how prepared are future doctors? *Med Teach*. 2008 Feb;(1):88–91. <https://doi.org/10.1080/01421590701753468> PMID: 18278658 ISSN: 1466-187X
- Stickrath C, Noble M, Prochazka A, Anderson M, Griffiths M, Manheim J, et al. Attending rounds in the current era: what is and is not happening. *JAMA Intern Med*. 2013 Jun;(12):1084–9. <https://doi.org/10.1001/jamainternmed.2013.6041> PMID: 23649040 ISSN: 2168-6114
- Hale G, McNab D. Developing a ward round checklist to improve patient safety. *BMJ Qual Improv Rep*. 2015;4(1):u204775.w2440. <https://doi.org/10.1136/bmjquality.u204775.w2440>
- Gilliland N, Catherwood N, Chen S, Browne P, Wilson J, Burden H. Ward round template: enhancing patient safety on ward rounds. *BMJ Open Qual*. 2018 Apr;(2):e000170. <https://doi.org/10.1136/bmjopen-2017-000170> PMID: 29719873 ISSN: 2399-6641
- Rodziewicz TL, Houseman B, Hipskind JE. Medical Error Reduction and Prevention. *StatPearls Internet*. Treasure Island (FL): StatPearls Publishing; 2024. [cited 2024 Apr 20]; Available from <http://www.ncbi.nlm.nih.gov/books/NBK499956/>
- Bodi M, Oliva I, Martín MC, Gilavert MC, Muñoz C, Olona M, et al. Impact of random safety analyses on structure, process and outcome indicators: multicentre study. *Ann Intensive Care*. 2017 Dec;(1):23. <https://doi.org/10.1186/s13613-017-0245-x> PMID: 28247300 ISSN: 2110-5820
- Khan A, Spector ND, Baird JD, Ashland M, Starmer AJ, Rosenbluth G, et al. Patient safety after implementation of a coproduced family centered communication programme: multicenter before and after intervention study. *BMJ*. 2018 Dec;(k4764). <https://doi.org/10.1136/bmj.k4764> PMID: 30518517 ISSN: 1756-1833
- Pucher PH, Aggarwal R, Darzi A. Surgical ward round quality and impact on variable patient outcomes. *Ann Surg*. 2014 Feb;(2):222–6. <https://doi.org/10.1097/SLA.0000000000000376> PMID: 24263319 ISSN: 1528-1140
- Heip T, Van Hecke A, Malfait S, Van Biesen W, Eeckloo K. The Effects of Interdisciplinary Bedside Rounds on Patient Centeredness, Quality of Care, and Team Collaboration: A Systematic Review. *J Patient Saf*. 2022 Jan;(1):e40–4. <https://doi.org/10.1097/PTS.0000000000000695> PMID: 32398542 ISSN: 1549-8425
- Blakeney EA, Chu F, White AA, et al. A scoping review of new implementations of interprofessional bedside rounding models to improve teamwork, care, and outcomes in hospitals. *J Interprof Care*. 2021;1–16. PMID: 34632913 ISSN: 1356-1820
- Trahan C, Hui AY, Binopal N. Standardization of rounds on a general paediatric ward: implementation of a checklist to improve efficiency, quality of rounds, and family satisfaction. *Paediatr Child Health*. 2021 Oct;(2):111–7. <https://doi.org/10.1093/pch/pxab080> PMID: 35599681 ISSN: 1205-7088
- Winters BD, Gurses AP, Lehmann H, Sexton JB, Rampersad CJ, Pronovost PJ. Clinical review: checklists – translating evidence into practice. *Crit Care*. 2009;(6):210. <https://doi.org/10.1186/cc7792> PMID: 20064195 ISSN: 1466-609X
- Erikson EJ, Edelman DA, Brewster FM, Marshall SD, Turner MC, Sarode VV, et al. The use of checklists in the intensive care unit: a scoping review. *Crit Care*. 2023 Nov;(1):468. <https://doi.org/10.1186/s13054-023-04758-2> PMID: 38037056 ISSN: 1466-609X
- Byrnes MC, Schuerer DJ, Schallom ME, Sona CS, Mazuski JE, Taylor BE, et al. Implementation of a mandatory checklist of protocols and objectives improves compliance with a wide range of evidence-based intensive care unit practices. *Crit Care Med*. 2009 Oct;(10):2775–81. <https://doi.org/10.1097/CCM.0b013e3181a96379> PMID: 19581803 ISSN: 1530-0293
- Cavalcanti AB, Bozza FA, Machado FR, Salluh JI, Campagnucci VP, Vendramim P, et al.; Writing Group for the CHECKLIST-ICU Investigators and the Brazilian Research in Intensive Care Network (BRICNet). Effect of a Quality Improvement Intervention With Daily Round Checklists, Goal Setting, and Clinician Prompting on Mortality of Critically Ill Patients: A Randomized Clinical Trial. *JAMA*. 2016 Apr;(14):1480–90. <https://doi.org/10.1001/jama.2016.3463> PMID: 27115264 ISSN: 1538-3598
- Agarwal S, Frankel L, Tourner S, McMillan A, Sharek PJ. Improving communication in a pediatric intensive care unit using daily patient goal sheets. *J Crit Care*. 2008 Jun;(2):227–35. <https://doi.org/10.1016/j.jcrc.2007.07.001> PMID: 18538216 ISSN: 0883-9441
- Ando V, Cavin-Trombert A, Gachoud D, Monti M. Does the use of structured interventions to guide ward rounds affect patient outcomes? A systematic review. *BMJ Qual Saf*. 2025 Dec;(1):50–62. <https://doi.org/10.1136/bmjqs-2024-018039> PMID: 40300798 ISSN: 2044-5423
- Stein J, Payne C, Methvin A, Bonsall JM, Chadwick L, Clark D, et al. Reorganizing a hospital ward as an accountable care unit. *J Hosp Med*. 2015 Jan;(1):36–40. <https://doi.org/10.1002/jhm.2284> PMID: 25399928 ISSN: 1553-5606
- Redley B, Campbell D, Stockman K, Barnes S. Mixed methods quality evaluation of structured interprofessional medical ward rounds. *Intern Med J*. 2020 Feb;(2):222–31. <https://doi.org/10.1111/imj.14330> PMID: 31069904 ISSN: 1445-5994
- Garnier A. Impact of structural and organizational reforms on resident physicians' daily work Internet. cited 2023 Nov 24. Available from: <http://www.isrcn.com/ISRCTN69703381>
- SQUIRE | SQUIRE 2.0 Guidelines Internet. cited 2025 Apr 9. Available from: <https://www.squire-statement.org/index.cfm?fuseaction=Page.ViewPage&pagel=471>
- Mohan N, Caldwell G. A Considerative Checklist to ensure safe daily patient review. *Clin Teach*. 2013 Aug;(4):209–13. <https://doi.org/10.1111/tct.12023> PMID: 23834564 ISSN: 1743-498X
- Centofanti JE, Duan EH, Hoad NC, Swinton ME, Perri D, Waugh L, et al. Use of a daily goals checklist for morning ICU rounds: a mixed-methods study. *Crit Care Med*. 2014 Aug;(8):1797–803. <https://doi.org/10.1097/CCM.0000000000000331> PMID: 24674928 ISSN: 1530-0293
- Newkirk M, Pamplin JC, Kuwamoto R, Allen DA, Chung KK. Checklists change communication about key elements of patient care. *J Trauma Acute Care Surg*. 2012 Aug;(2 Suppl 1):S75–82. <https://doi.org/10.1097/TA.0b013e3182606239> PMID: 22847100 ISSN: 2163-0763
- Weiss CH, Moazed F, McEvoy CA, Singer BD, Szeleifer I, Amaral LA, et al. Prompting physicians to address a daily checklist and process of care and clinical outcomes: a single-site study. *Am J Respir Crit Care Med*. 2011 Sep;(6):680–6. <https://doi.org/10.1164/rccm.201101-0037OC> PMID: 21616996 ISSN: 1535-4970
- Pronovost P, Berenholtz S, Dorman T, Lipsett PA, Simmonds T, Haraden C. Improving communication in the ICU using daily goals. *J Crit Care*. 2003 Jun;(2):71–5. <https://doi.org/10.1053/jcrc.2003.50008> PMID: 12800116 ISSN: 0883-9441
- Gaspoz JM. En médecine, moins peut être aussi plus. Nouvelle liste pour des décisions judiciaires dans le domaine stationnaire. Information pour médecins. Internet. 2016 cited 2023 Nov 15. Available from: https://www.smartermedicine.ch/fileadmin/user_upload/Adaptation/smartermedicine/Dokumente/Listen_Flyer_neu/SmarterMedicine_Flyer_F_web300.pdf
- Herring R, Caldwell G, Jackson S. Implementation of a considerate checklist to improve productivity and team working on medical ward rounds. *Clin Gov Int J*. 2010 Dec 16;129–136.
- Conroy KM, Elliott D, Burrell AR. Testing the implementation of an electronic process-of-care checklist for use during morning medical rounds in a tertiary intensive care unit: a prospective before-after study. *Ann Intensive Care*. 2015 Dec;(1):60. <https://doi.org/10.1186/s13613-015-0060-1> PMID: 26239145 ISSN: 2110-5820
- Assouvie L, Senn L, Monti M. Indications for and Daily Surveillance of vascular access. Internal Recommendations, Department of Medicine, Lausanne University Hospital (CHUV).
- La sécurité dans le sondage vésical - Swissnoso Internet. cited 2025 Apr 9. Available from: <https://www.swissnoso.ch/fr/recherche-developpement/projets-termes/la-securite-dans-le-sondage-vesical>

39. Barbar S, Noventa F, Rossetto V, Ferrari A, Brandolin B, Perlati M, et al. A risk assessment model for the identification of hospitalized medical patients at risk for venous thromboembolism: the Padua Prediction Score. *J Thromb Haemost*. 2010 Nov;(11):2450–7. <https://doi.org/10.1111/j.1538-7836.2010.04044.x> PMID: 20738765 ISSN: 1538-7836
40. Valkenet K, Bor P, van Delft L, Veenhof C. Measuring physical activity levels in hospitalized patients: a comparison between behavioural mapping and data from an accelerometer. *Clin Rehabil*. 2019 Jul;(7):1233–40. <https://doi.org/10.1177/0269215519836454> PMID: 30864490 ISSN: 1477-0873
41. Tasheva P, Kraege V, Vollenweider P, Roulet G, Méan M, Marques-Vidal P. Accelerometry assessed physical activity of older adults hospitalized with acute medical illness - an observational study. *BMC Geriatr*. 2020 Oct;(1):382. <https://doi.org/10.1186/s12877-020-01763-w> PMID: 33008378 ISSN: 1471-2318
42. Schwartz JI, Gonzalez-Colaso R, Gan G, Deng Y, Kaplan MH, Vakos PA, et al. Structured interdisciplinary bedside rounds improve interprofessional communication and workplace efficiency among residents and nurses on an inpatient internal medicine unit. *J Interprof Care*. 2024;(3):427–34. <https://doi.org/10.1080/13561820.2020.1863932> PMID: 33433262 ISSN: 1469-9567
43. Escamilla-Ocañas CE, Torrealba-Acosta G, Mandava P, Qasim MS, Gutiérrez-Flores B, Bershad E, et al. Implementation of systematic safety checklists in a neurocritical care unit: a quality improvement study. *BMJ Open Qual*. 2022 Dec;(4):e001824. <https://doi.org/10.1136/bmjopen-2022-001824> PMID: 36588320 ISSN: 2399-6641
44. Radhakrishnan NS, Lukose K, Cartwright R, Sleiman A, Matey N, Lim D, et al. Prospective application of the interdisciplinary bedside rounding checklist 'TEMP' is associated with reduced infections and length of hospital stay. *BMJ Open Qual*. 2022 Dec;(4):e002045. <https://doi.org/10.1136/bmjopen-2022-002045> PMID: 36588303 ISSN: 2399-6641
45. Haynes AB, Weiser TG, Berry WR, Lipsitz SR, Breizat AH, Dellinger EP, et al.; Safe Surgery Saves Lives Study Group. A surgical safety checklist to reduce morbidity and mortality in a global population. *N Engl J Med*. 2009 Jan;(5):491–9. <https://doi.org/10.1056/NEJMs0810119> PMID: 19144931 ISSN: 1533-4406
46. Pitcher M, Lin JT, Thompson G, Tayaran A, Chan S. Implementation and evaluation of a checklist to improve patient care on surgical ward rounds. *ANZ J Surg*. 2016 May;(5):356–60. <https://doi.org/10.1111/ans.13151> PMID: 25962703 ISSN: 1445-2197
47. Kashyap R, Murthy S, Arteaga GM, Dong Y, Cooper L, Kovacevic T, et al.; SCCM Discovery CERTAINp Collaborative Investigators. Effectiveness of a Daily Rounding Checklist on Processes of Care and Outcomes in Diverse Pediatric Intensive Care Units Across the World. *J Trop Pediatr*. 2021 Jul;(3):fmaa058. <https://doi.org/10.1093/tropej/fmaa058> PMID: 32853362 ISSN: 1465-3664
48. Cox ED, Jacobsohn GC, Rajamanickam VP, Carayon P, Kelly MM, Wetterneck TB, et al. A Family-Centered Rounds Checklist, Family Engagement, and Patient Safety: A Randomized Trial. *Pediatrics*. 2017 May;(5):e20161688. <https://doi.org/10.1542/peds.2016-1688> PMID: 28557720 ISSN: 1098-4275
49. Krishnamohan N, Maitra I, Shetty VD. The surgical ward round checklist: improving patient safety and clinical documentation. *J Multidiscip Healthc*. 2019 Sep;(7):789–94. <https://doi.org/10.2147/JMDH.S178896> PMID: 31571896 ISSN: 1178-2390
50. Read J, Perry W, Rossaak JI. Ward round checklist improves patient perception of care. *ANZ J Surg*. 2021 May;(5):854–9. <https://doi.org/10.1111/ans.16543> PMID: 33459481 ISSN: 1445-2197
51. Cavalcanti AB, Bozza FA, Machado FR, Salluh JI, Campagnucci VP, Vendramim P, et al.; Writing Group for the CHECKLIST-ICU Investigators and the Brazilian Research in Intensive Care Network (BRICNet). Effect of a Quality Improvement Intervention With Daily Round Checklists, Goal Setting, and Clinician Prompting on Mortality of Critically Ill Patients: A Randomized Clinical Trial. *JAMA*. 2016 Apr;(14):1480–90. <https://doi.org/10.1001/jama.2016.3463> PMID: 27115264 ISSN: 1538-3598
52. Weiss CH, Moazed F, McEvoy CA, Singer BD, Szeleifer I, Amaral LA, et al. Prompting physicians to address a daily checklist and process of care and clinical outcomes: a single-site study. *Am J Respir Crit Care Med*. 2011 Sep;(6):680–6. <https://doi.org/10.1164/rccm.201101-0037OC> PMID: 21616996 ISSN: 1535-4970
53. Idahosa O, Kahn JM. Beyond checklists: using clinician prompts to achieve meaningful ICU quality improvement. *Crit Care*. 2012 Feb;(1):305. <https://doi.org/10.1186/cc11199> PMID: 22353202 ISSN: 1466-609X
54. Brown CJ, Foley KT, Lowman JD Jr, MacLennan PA, Razjouyan J, Najafi B, et al. Comparison of Posthospitalization Function and Community Mobility in Hospital Mobility Program and Usual Care Patients: A Randomized Clinical Trial. *JAMA Intern Med*. 2016 Jul;(7):921–7. <https://doi.org/10.1001/jamainternmed.2016.1870> PMID: 27243899 ISSN: 2168-6114
55. Padula CA, Hughes C, Baumhover L. Impact of a nurse-driven mobility protocol on functional decline in hospitalized older adults. *J Nurs Care Qual*. 2009;(4):325–31. <https://doi.org/10.1097/NCQ.0b013e3181a4f79b> PMID: 19395979 ISSN: 1550-5065
56. Tucker D, Molsberger SC, Clark A. Walking for wellness: a collaborative program to maintain mobility in hospitalized older adults. *Geriatr Nurs N Y N*. 2004;25(4):242–245. <https://doi.org/10.1016/j.gerinurse.2004.06.009>
57. Lopez M, Vaks Y, Wilson M, Mitchell K, Lee C, Ejike J, et al. Impacting Satisfaction, Learning, and Efficiency Through Structured Interdisciplinary Rounding in a Pediatric Intensive Care Unit: A Quality Improvement Project. *Pediatr Qual Saf*. 2019 May;(3):e176. <https://doi.org/10.1097/pq9.000000000000176> PMID: 31579875 ISSN: 2472-0054
58. Trahan C, Hui AY, Binopal N. Standardization of rounds on a general paediatric ward: implementation of a checklist to improve efficiency, quality of rounds, and family satisfaction. *Paediatr Child Health*. 2021 Oct;(2):111–7. <https://doi.org/10.1093/pch/pxab080> PMID: 35599681 ISSN: 1205-7088
59. Gale EA. The Hawthorne studies—a fable for our times? *QJM*. 2004 Jul;(7):439–49. <https://doi.org/10.1093/qjmed/hch070> PMID: 15208432 ISSN: 1460-2725

CHECKLISTS TO STRUCTURE INTERNAL MEDICINE WARD ROUNDS REDUCE OMISSIONS AND IMPROVE ADHERENCE TO STANDARDS OF CARE: A PRE-POST INTERVENTION STUDY

Appendix

Table of contents

1. Appendix to the method

- a. Details on data collection and observers' training: p.2
- b. Study phases (detailed) p.5
- c. Checklist items definitions p.6

2. Appendix to the Results: narrative comments

- a. Secondary outcomes p.8

1. Appendix to the Method:

A. Details on data collection and observers' training

Supplement figure 1. Observations organization before and after

BEFORE	2023-01-25	2023-01-26	2023-01-27	2023-01-30	2023-01-31	2023-02-01	2023-02-02	2023-02-03
Observer 1	Observers training	Observers calibration observations	UNIT 1 - Physician 1	UNIT 3 - Physician 1	UNIT 5 - Physician 1	UNIT 2 - Physician 1	UNIT 4 - Physician 1	UNIT 6 - Physician 1
Observer 2			UNIT 1 - Physician 2	UNIT 3 - Physician 2	UNIT 5 - Physician 2	UNIT 2 - Physician 2	UNIT 4 - Physician 2	UNIT 6 - Physician 2
Observer 3			UNIT 1 - Physician 3	UNIT 3 - Physician 2	UNIT 6 - Physician 1	UNIT 2 - Physician 3	UNIT 4 - Physician 3	UNIT 6 - Physician 3
Observer 4			UNIT 2 - Physician 1	UNIT 4 - Physician 1	UNIT 6 - Physician 2	UNIT 1 - Physician 1	UNIT 3 - Physician 1	UNIT 6 - Physician 4
Observer 5			UNIT 2 - Physician 2	UNIT 4 - Physician 2	UNIT 6 - Physician 3	UNIT 1 - Physician 2	UNIT 3 - Physician 2	UNIT 5 - Physician 1
Observer 6			UNIT 2 - Physician 3	UNIT 4 - Physician 3	UNIT 6 - Physician 4	UNIT 1 - Physician 3	UNIT 3 - Physician 2	UNIT 5 - Physician 2

AFTER	2023-04-17	2023-04-18	2023-04-19	2023-04-20	2023-04-21	2023-04-24	2023-04-25
Observer 1	Observers refresh training	UNIT 1 - Physician 1	UNIT 3 - Physician 1	UNIT 5 - Physician 1	UNIT 2 - Physician 1	UNIT 4 - Physician 1	UNIT 6 - Physician 1
Observer 2		UNIT 1 - Physician 2	UNIT 3 - Physician 2	UNIT 5 - Physician 2	UNIT 2 - Physician 2	UNIT 4 - Physician 2	UNIT 6 - Physician 2
Observer 3		UNIT 1 - Physician 3	UNIT 3 - Physician 2	UNIT 6 - Physician 1	UNIT 2 - Physician 3	UNIT 4 - Physician 3	UNIT 6 - Physician 3
Observer 4		UNIT 2 - Physician 1	UNIT 4 - Physician 1	UNIT 6 - Physician 2	UNIT 1 - Physician 1	UNIT 3 - Physician 1	UNIT 6 - Physician 4
Observer 5		UNIT 2 - Physician 2	UNIT 4 - Physician 2	UNIT 6 - Physician 3	UNIT 1 - Physician 2	UNIT 3 - Physician 2	UNIT 5 - Physician 1
Observer 6		UNIT 2 - Physician 3	UNIT 4 - Physician 3	UNIT 6 - Physician 4	UNIT 1 - Physician 3	UNIT 3 - Physician 2	UNIT 5 - Physician 2

Data collection

Supplement figure 2: Observation and audit sheets

Observers ID		Date	
Observed physician ID		Beginning/End of WR	
Observed nurse ID			

Ward round (WR) location :	Outside patient's room ☐	Patient absent at the beginning of WR ☐
	Patient's room (not bedside) ☐	Patient absent before WR ending ☐
	Patient's bedside ☐	

Isolation precautions
None ☐
Respiratory ☐ (Airborne/droplets)
Contact ☐

1. Main diagnosis discussion	YES ☐	NO ☐	Yes = Main diagnoses are summed up at the beginning of the WR. No = No summary of main diagnoses or only done at the end of WR	
2. New problems and question discussion	YES ☐	NO ☐	Yes = Nurse/Physician discusses new problems or the absence of them No = Not done or new problems brought up only by the patient	
3. Orientation discussion	YES ☐	NO ☐	Yes = orientation or confusion discussed or tested on targeted examination; CAM discussed	
4. Sleep quality discussion	YES ☐	NO ☐	Yes = sleep quality (quality, difficulties, awakenings) discussed or asked to the patient	
5. Pain discussion	YES ☐	NO ☐	Yes = discussion of presence, absence of pain, painkiller prescription, or number of pain killers taken, or question asked to the patient	
6. Nutrition discussion	YES ☐	NO ☐	Yes = discussion about nutrition status, intake, regime, loss of appetite, nutritional supplementation, nutritionist consultation, or question asked to the patient. Nutrition supplements, feeding tube need or withdrawal	
7. Bowel habits discussion	YES ☐	NO ☐	Yes = discussion of frequency, absence, type, need for laxative/antidiarrheal medication or question asked to the patient	
8. Mobility discussion	YES ☐	NO ☐	Yes = discussion of mobilization limitations or capacity, time spent on armchair, ongoing physiotherapy or new prescription, or mobility aid	
9. VTE prophylaxis discussion	YES ☐	NO ☐	Yes = discussion of its need, indication, need to stop or prescribe, presence of anticoagulant therapy discussed	
10. Skin and risk of bedsores discussion	YES ☐	NO ☐	Yes = skin status discussed, presence/absence/risk of bed sore, or during targeted status bedsores are looked at or new bed sore diagnosis	
11a. Venous catheters presence discussion	YES ☐	NO ☐	Partially ☐ (if > 1 catheter and not all discussed)	No venous catheter ☐ (to be verified with nurse)
11b. Local venous catheters complications discussion	YES ☐	NO ☐	Partially ☐ (if > 1 catheter and not all discussed)	No venous catheter ☐ (to be verified with nurse)
12. Urinary catheter presence discussion	YES ☐	NO ☐	Yes = indication to keep the urinary catheter or urology consultation to come	No urinary catheter ☐ (to be verified with nurse)
13. Medication review discussion	YES ☐	NO ☐	Yes = if all medication prescribed is reviewed No = if partial or incomplete medication review	
14. Targeted history	YES ☐	NO ☐	Yes = targeted on main diagnosis and new problems or questions discussed at the beginning of WR	
15. Targeted examination	YES ☐	NO ☐	No = No examination Yes = targeted status or If patient refuses to be explored	
16. (Daily and hospitalization) care goals discussion	YES ☐	NO ☐	Yes = triadic discussion between patient, nurse and physician or only nurse and physician if patient not in position to understand	
17. Discharge plan discussion	YES ☐	NO ☐	Yes = date/estimated date and/or orientation proposed and/or discharge criteria	
18. Patient's understanding verification	YES ☐	NO ☐	Yes = Physician or Nurse asked questions to verify patient's understanding and/or asked to the patient if he/she has any questions	

AUDIT SHEET

Venous catheter	YES	NO	
	Type	Insertion Date _(dd.mm)	Ongoing indication?
Venous catheter 1	Choose one of 3 options: 1) Peripheral venous catheter 2) PICC/MID 3) Central venous catheter		IV treatment ☐ Post-op 48h ☐ Hemodynamic/metabolic instability ☐ No indication ☐ Repeated blood tests ☐
Venous catheter 2			IV treatment ☐ Post-op 48h ☐ Hemodynamic/metabolic instability ☐ No indication ☐ Repeated blood tests ☐
Venous catheter 3			IV treatment ☐ Post-op 48h ☐ Hemodynamic/metabolic instability ☐ No indication ☐ Repeated blood tests ☐

Urinary catheter YES NO

Insertion date _(dd.mm)	Indication to insertion? _(yes/no)
	Acute urinary retention ☐ Chronic symptomatic urinary retention (> 300 mL) ☐ Narrow urinalysis required ☐ Surgical and perioperative ☐ Pressure ulcer + incontinence ☐ Immobilization + pain relief goal ☐ Palliative care + patient comfort (pain relief, patient request) ☐

	Patient	Nurse
To which extent have you understood the goals of your [current] care plan or hospitalisation? 0 = not at all 100 = completely (using a Visual Analogue Scale)	(To complete – value must be between 0 et 100) + option: Not assessable (confused patient or other reason)	(To complete – value must be between 0 et 100)

Legend: translated in English from the original version in French

2. Study phases (detailed)

Our study consisted of 4 phases after the checklist's development: (1) A pilot test of the checklist for 12 months on 2 different IM units. (2) The pre-intervention phase (January-February 2023) included observer recruitment and training, then data collection in parallel to training the management teams. (3) The implementation phase (March 2023) consisted in the distribution of the checklist and pocket cards while training the healthcare staff. This phase included interprofessional prompting by the research team and management teams. (4) The post intervention phase (April 2023) included the second set of data collection of this study at the end of the month.

Supplement figure 3. Gantt's diagram

THE WARD ROUND PROJECT										
GANTT'S DIAGRAM										
	Oct-dec.21	Jan.22 - Nov.22				Dec.22	Jan.23	Feb.23	Mars.23	Apr.23
CHECKLIST'S DEVELOPMENT										
CHECKLIST'S PILOT TEST										
PRE-INTERVENTION PHASE										
Observer's recruitment										
Observer's training										
Management teams training										
Data collection (before)										
IMPLEMENTATION PHASE										
Pocket card distribution										
Healthcare staff training										
Interprofessionnal prompting										
POST INTERVENTION PHASE										
Data collection (after)										

c. Checklist items definitions

Supplement table 1: Checklist items definitions

Current clinical situation	
1. Main diagnoses	The resident explains WR process to the patient in case of new admission. Then sums up the active problems of the patient and fixes daily and hospitalization goals of each problem.
2. New problems and questions	The nurse or resident brings up new problems and questions she/he may have
Item checklist	
3. Orientation	Orientation of patient time, space and person. Can also be CAM (Confusion Assessment Method) discussion or value (positive/negative)
4. Sleep quality	Patient sleep quality description, sleeping pills utilisation or request (from the patient/nurse), nurse information on sleep previous night
5. Pain	Patient information on pain and localisation, utilisation of pain analogue visual scale (VAS), painkiller adaptation during ward round
6. Nutrition	Discussion about: weight, diet (fasting, mixed, low residue diet), calorie balance, % of meal eaten. Oral nutritional supplement. Nasogastric tube alimentation or parenteral nutrition. Dietician consultation or clinical nutrition follow-up / consultation required
7. Bowel habits	Last bowel movement. Bristol scale. Laxative use
8. Mobility	Mobilization (bed-chair transfer, mobilization in/outside the room). Walking perimeter. Walking aids (cane, rollator, walkers, taurus). Physiotherapy sessions. Mobilization chart in place (red, yellow, green). Indication for rehabilitation in hospital program after acute treatment
9. Venous thromboembolism prophylaxis	Heparin / Low molecular weight heparin at prophylactic doses. Mobilization not requiring prophylaxis. Score (Padua). If an oral anticoagulant is mentioned by the ward round team this item is noted as discussed since there is no indication for prophylaxis.
10. Skin and risk of bedsores	Pressure ulcer. Braden scale result. Adapted mattress. Do not check if dermatology issues are discussed (for example: itching, psoriasis, eczema)
11. Venous catheters (VC) - Presence	Indication of the VC, utility to maintain it, removal date if still indicated, local status of catheter

12. Venous catheters (VC) - Local complications	Evaluation of the presence or absence of local complications related to VC.
13. Urinary catheter (UC)	Indication of the UC, adequacy of the prescription, possibility of removing it
14. Medication review	Prescribed medication review. Special attention to BZD and sedative-hypnotics treatments in the elderly people. Prescription modifications. Discussions of therapeutic and treatment adherence
Patient time	
15. Targeted history	Pertinent questions regarding active problems (e.g. Trouble breathing in pneumonia or congestive heart failure, fever in infection, pain in abdominal pathologies or osteo-articular issues)
16. Targeted examination	Targeted clinical status regarding active problems and patient inquiries
17. Daily and hospitalization care goals	Non-exhaustive definition: investigations/complementary exams/scheduled appointments; weight loss (heart failure); increase of dietary intake (malnutrition); oxygen therapy withdrawal (pneumonia/heart failure); mobilization program, etc Possible date of discharge, therapy end day if known or estimated, switch to oral medication compatible with home/other hospital (heart failure diuretics, antibiotics, nutrition)
18. Discharge plan (location, date)	Orientation after acute treatment: Home, Home with aides, other hospital (surgical ward, psychiatry ward, rehabilitation stay-in program), retirement home Verbalize known or estimated discharge date (including the notion thereof: in a few days, in two or three days, by the end of the week)
19. Patient's understanding and questions	The patient is asked if he/she has any further questions regarding the ward round discussion or his/her health status

2. Appendix to the Results: narrative comments

a. Secondary outcomes

Mobilization

Our patient mobilization survey provided mobility status for 838 patients hospitalized in the IM Division (411 before and 427 after), at two peaks hours. Before our intervention, most of the patients were not moving; 48% of the patients (n=197) were found in bed and 36% (n=148) were sitting on their chairs. Only 12% of them were walking (n=51). A small proportion of patients (4%, n=15) were not in the room when our research team came to visit, which was considered as missing data. After our intervention, no change was observed regarding the proportion of patients in bed (50%, n=212), sitting on their chairs (35%, n=150) or walking (11%, n=48). Missing data were similar on the post-intervention phase (4%, n=17).

WR location and duration

The proportion of WR performed at patients' bedside increased by 31% (47% before vs 61% after; $p=0.02$). Rounding time increased from 92 minutes before our implementation (95% CI [88-95]) to 98 minutes after our implementation (95% CI [94-101]) ($p=0.02$).

Patients' and nurses' understanding

Patient level of understanding of the care goals shows a statistically significant increase from a median score of 85/100 [IQR 50-100] in the pre-implementation phase to 90/100 [IQR 70-100] ($p=0.04$) in the post-implementation. Similar results were observed in nurses' level of understanding of care goals, which increased from a median score of 90.5/100 [IQR 80-100] to 100/100 [IQR 85-100]. When taking a closer look at nurses' understanding, an important proportion of them (47.1%, n=81) had a complete understanding of goals (meaning answering 100/100 on VAS scale) before the implementation of our checklist. Despite this fact, we managed to see an increase in the proportion of nurses completely understanding care goals, from 47.1% (n=81) before to 59.3% (n=115) of nurses after checklist's implementation ($p=0.02$).