



# Green Cross method in a postanesthesia care unit: a qualitative study of the healthcare professionals' experiences after 3 years, including the COVID-19 pandemic period

Gørill Helen Birkeli <sup>1,2</sup>, Randi Ballangrud <sup>3</sup>, Hilde Kristin Jacobsen,<sup>4</sup> Ellen Catharina Tvetter Deilkas,<sup>5,6</sup> Anne Karin Lindahl<sup>1,2</sup>

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For numbered affiliations see end of article.

## Correspondence to

Mrs Gørill Helen Birkeli;  
gobi@ahus.no

## ABSTRACT

**Objectives** Unsafe medical care causes morbidity and mortality among the hospital patients. In a postanesthesia care unit (PACU), increasing patient safety is a joint effort between different professions. The Green Cross (GC) method is a user-friendly incident reporting method that incorporates daily safety briefings to support healthcare professionals in their daily patient safety work. Thus, this study aimed to describe healthcare professionals' experiences with the GC method in a PACU setting 3 years after its implementation, including the period of the coronavirus disease 2019 pandemic's three waves.

**Design** An inductive, descriptive qualitative study was conducted. The data were analysed using qualitative content analysis.

**Setting** The study was conducted at a PACU of a university hospital in South-Eastern Norway.

**Participants** Five semistructured focus group interviews were conducted in March and April 2022. The informants (n=23) were PACU nurses (n=18) and collaborative healthcare professionals (n=5) including physicians, nurses and a pharmacist.

**Results** The theme 'still active, but in need of revitalisation' was created, describing the healthcare professionals' experiences with the GC method, 3 years post implementation. The following five categories were found: 'continuing to facilitate open communication', 'expressing a desire for more interprofessional collaboration regarding improvements', 'increasing reluctance to report', 'downscaling due to the pandemic' and 'expressing a desire to share more of what went well'.

**Conclusions** This study offers information regarding the healthcare professionals' experiences with the GC method in a PACU setting; further, it deepens the understanding of the daily patient safety work using this incident reporting method.

## INTRODUCTION

Adverse events (AEs) cause morbidity and mortality. The incidence of AEs varies from 3% and 16% among hospitalised patients.<sup>1</sup> Between 34% and 83% of the AEs are considered preventable.<sup>2</sup> As anaesthesia and surgical

### WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Incident reporting methods with daily safety briefings, such as the Green Cross method, are suitable to assess the healthcare organisations' inherent patient safety risks.

### WHAT THIS STUDY ADDS

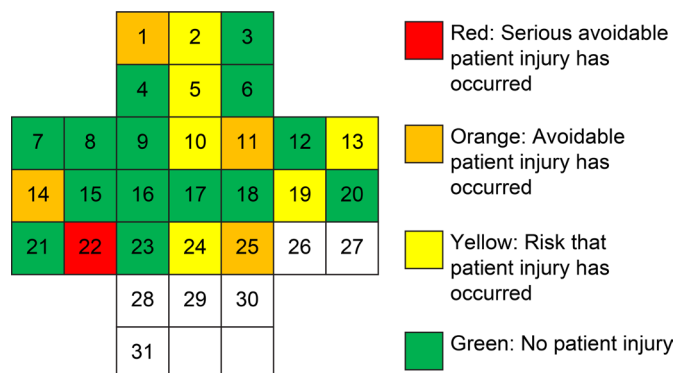
⇒ Three years post Green Cross method implementation, a systematic perspective on errors and improvements was not completely achieved. Interprofessional collaboration could be better used in such quality improvement work.

### HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Incident reporting methods may benefit from being linked to quality improvement tools and focusing on positive deviance. Facilitating a space for interprofessional improvement collaboration across the surgical care pathway is necessary to ensure organisational learning.

interventions contribute to the overall perioperative risk, patient safety in the perioperative process is a joint responsibility of the involved healthcare professionals.<sup>3-6</sup>

The complexity of the system, comprising human factors, is the major cause of injuries.<sup>7</sup> Thus, healthcare professionals need a structured method to report and discuss patient safety; accordingly, hospitals are recommended to have incident reporting systems (IRs), which provide valuable insights into patients' injuries.<sup>8-9</sup> However, an underreporting of patient safety incidents (PSIs), including injuries and risk of harm, is common; among other factors, it is linked to a blame culture, insufficient visible measures and inadequate communication about errors.<sup>10-11</sup> Established IRs alone may be ineffective for improving patient safety or



**Figure 1** The basic Green Cross template. Reproduced with permission.<sup>17</sup>

facilitating learning.<sup>12 13</sup> Therefore, adopting multiple methods is advocated to obtain a comprehensive review of the events occurring in healthcare settings.<sup>14</sup>

The Green Cross (GC) method was developed in 2011 at the Södra Älvsborg Hospital and is used internationally.<sup>15 16</sup> It is a proactive reporting method because the healthcare professionals report both risks and injuries in real time.<sup>16</sup> The month's days are visualised in a cross shape, where the degree of seriousness is symbolised using colours (figure 1). The green colour equals zero-vision, where no PSIs have occurred. The PSIs are assessed in the daily safety briefings and in the weekly quality improvement (QI) meetings where a systematic enhancement is initiated.

The GC method positively impacts patient safety culture, with organisational learning scoring significantly higher in the GC units.<sup>17</sup> Furthermore, the frequency of the reports being submitted for potential harm are higher in these units, suggesting that the method increases overall awareness of patient safety.<sup>17</sup> Participants have described the method as an approach supporting patient safety work and appreciated its simplicity, visualisation and the learning opportunities through daily safety briefings.<sup>16 18</sup> The daily safety briefings seem to be suitable for assessing an organisation's inherent safety and foster a non-punitive culture.<sup>14</sup>

Although some research is available on the GC method, a longitudinal perspective that incorporates the pandemic's influence is lacking. Therefore, it is appropriate to explore how it works from the users' perspective to propose improvements based on the current use, thereby contributing to a reality-based safety science.<sup>19</sup> This may be useful for the present and future users of this or similar reporting methods.

Accordingly, this study aimed to describe the healthcare professionals' experiences with the GC method in a postanaesthesia care unit (PACU) setting, 3 years post implementation, including the period of the coronavirus disease 2019 pandemic's three waves.

## METHODS

An inductive, descriptive qualitative study with focus group (FG) interviews was conducted.<sup>20</sup> The Consolidated

Criteria for Reporting Qualitative Research provided a useful framework for this study<sup>21</sup> (online supplemental file 1).

## The GC method implemented in the PACU

To increase incident reporting and work with QI in a Southeast Norwegian university hospital's PACU, a modified version of the GC method (table 1) was implemented in 2019.<sup>18</sup>

## Setting

The 25-bed PACU admits approximately 1000 patients per month and provides overnight care for complex patients. Annually (2021), 97 and 124 patients required non-invasive and mechanical ventilation, respectively. PACU positions comprised 80 nurses ( $M_{age}=44$  years; 12% men and 88% women).

The PACU setting included two dedicated anaesthesiologists who worked during daytime on weekdays. Nurse anaesthetists and surgical nurses worked on the premises during preoperative preparations and postoperative handoffs. A pharmacist visited two times a week and surgeons visited while checking on patients.

Across 22 weeks, 14 QI meetings were held with participation from different healthcare professionals (table 2). The reasons for cancellations were busy ward (n=5) and public holidays (n=3).

## Sampling and recruitment

A minimum of four FGs, each having five to seven informants, were planned.<sup>22</sup> Convenience sampling was used.<sup>22</sup> The healthcare professionals who partook in the PACU's QI meetings and had been working for at least 6 months on the premises were included. Overall, 58 PACU nurses satisfied these criteria along with a pharmacist, four anaesthesiologists, two nurse anaesthetists and two surgical nurses. A participation invite was presented to the PACU nurses via morning meetings and written, verbal reminders by the nurse managers and first author. The collaborative healthcare professionals were invited through emails from their respective managers.

Twenty-six informants volunteered, some directly after the morning meeting invitation, while the others wrote their names on the participant list, replied through mail or interacted face-to-face with the first author.<sup>23</sup>

The research followed the ethical guidelines for nursing research in the Nordic countries<sup>23</sup> and the World Medical Association Declaration of Helsinki.<sup>24</sup> The principles of autonomy, beneficence, justice, and non-maleficence were followed by conveying voluntariness, confidentiality, and the right to withdraw without reason or consequences; further, a written informed consent was obtained before the FGs.<sup>23</sup>

## Patient and public involvement

A user representative was involved in the study's advisory board.

**Table 1** A modified version of the step-by-step working process of the GC method described by Källman *et al*,<sup>17</sup> as implemented in the PACU

Steps	What?	Example
1. Identification of the risks or patient injuries	Risks or injuries are documented using the detailed report form by the healthcare professional who discover them. This can be anonymous or signed. The PSIs written within the last 24 hours are read aloud each morning for the nurses (daily safety briefings).	PACU nurse reports: Patient from OR wakes up at the PACU, laying on the hard transfer board. This was only discovered when the patient was sent to the ward.
2. Assessment of seriousness	The healthcare professional who discovered the PSI assesses the severity and colours it accordingly in the detailed report form: red, orange, yellow and green denote serious patient injury, patient injury (not serious), risk of patient injury and no event, respectively. The PACU staff discusses severity of the PSIs each morning (daily safety briefings). Subsequently, the severity of the most serious PSI is illustrated on the basic GC template (figure 1), with a relevant colour code for the concerned date.	The PSI is read aloud in the daily safety briefing. Manager: Does everyone agree that this is a yellow incident? Staff: Yes. This could cause pressure ulcer. The basic GC template is then coloured yellow.
3. Reporting of injuries	All patient injuries (red/orange) are reported in the hospital's electronic IRS.	Not reported in the IRS, as this is a yellow category incident.
4. Improvements of work/ interprofessional weekly QI meetings	Systematic daily work on improvements is performed using interventions to address risks once they are identified or during the weekly interprofessional QI meetings (30 min). The detailed report form becomes part of the monthly summary and raises awareness of what the PACU needs to focus on to enhance patient safety.	The PSI is discussed in the GC interprofessional QI meeting. Conclusion: This has happened several times before.
5. Follow-up and learning	Follow-ups occur in the weekly interprofessional QI meetings and in the daily work on improvements. All events noted in the detailed report form are summarised monthly to visualise the outcomes and identify the problem areas. Based on the monthly summaries, long-term measures are taken to prevent the events from repeating.	<ul style="list-style-type: none"> <li>▶ One surgical nurse brings this information back to the OR</li> <li>▶ Learning through focus on PACU staff education day</li> <li>▶ Learning through information in weekly PACU-bulletin</li> </ul>

GC, Green Cross; IRS, incident reporting system; OR, operating room; PACU, postanesthesia care unit; PSI, patient safety incidents; QI, quality improvement.

### Data collection

The data collection was based on FG interviews with a semistructured interview guide,<sup>20</sup> moderated by HKJ, a female paediatric nurse who was a trained interviewer. GHB had an observer role and took field notes during the FGs that GHB and HKJ discussed afterwards to gain a common understanding.<sup>22</sup> The interview guide was pilot tested with four nurses who were familiar with the GC method, but did not meet the inclusion criteria. The interview guide had eight open-ended questions (online

supplemental file 2). Further, one follow-up question was added: 'Can you share how it feels?'.<sup>20</sup>

From March to April 2022, five semistructured FG interviews were conducted with the healthcare professionals (n=23), of whom most were nurses (n=19), along with a nursing assistant, physicians and a pharmacist (n=4) (table 3). The FGs took place in the rooms adjacent to the PACU during the working hours with three to six informants.<sup>22</sup> After conducting four FG interviews, an additional one was held to cover the significant variations.<sup>25</sup> These interviews were performed as a dialogue between the informants;<sup>20</sup> their mean time was 1 hour and 21 min (1 hour and 13 min – 1 hour and 29 min).

**Table 2** Participation in 14 quality improvement meetings

Healthcare professionals	Participated number of times (%)
Anaesthesiologists	6 (43)
Certified nursing assistants	9 (64)
Nurse anaesthetists	0 (0)
Nurse managers	8 (57)
PACU nurses	14 (100)
Pharmacists	8 (57)
Surgical nurses	9 (64)
PACU, postanesthesia care unit.	

### Data analysis

All researchers participated in the data analysis. All FGs were audiotaped, transcribed verbatim and given pseudonyms by GHB; HKJ ensured that the transcript captured every word from the audio tape.<sup>22</sup>

A qualitative inductive content analysis was performed after the data collection.<sup>25 26</sup> The transcripts were read by all authors and, repeatedly, by GHB and HKJ to obtain an overview of the data. Subsequently, the data were structured into meaning units (n=888) and condensed, making them shorter without losing their essence. GHB

**Table 3** Participant characteristics (n=23)

Characteristic	N	%
Gender		
Female	22	96
Male	1	4
PACU nurses		
RN	7	31
CCN	6	26
CNS	2	9
CNA	1	4
Nurse manager	2	9
Collaborative healthcare professionals		
Nurse anaesthetist	1	4
Surgical nurse	1	4
Anaesthesiologist	2	9
Pharmacist	1	4
Age (in years)		
23–29	2	9
30–39	2	9
40–49	9	38
50–59	8	35
60–69	2	9
Years of experience in healthcare		
1–10	3	13
11–20	2	9
21–	18	78
Years of experience in the anaesthesia department		
1–10	14	61
11–20	4	17
21–	5	22

CCN, Critical Care Nurse (postgraduate registered nurse/Master of Science in nursing); CNA, Certified Nursing Assistant; CNS, Clinical Nurse Specialist responsible for teaching; RN, Registered Nurse (Bachelor of Science).

approached three informants to ensure a correct understanding of three unclear meaning units.<sup>22</sup> The meaning units were coded and clustered into subcategories using Microsoft Excel, with the codes describing the same or similar essences. The subcategories were combined into mutually exclusive groups describing the core and deeper meaning of the subcategories constituting each category. Finally, a latent theme, the data's underlying meaning on an interpretative level, was constructed.<sup>26</sup> Initially, GHB performed this individually; subsequently, it was performed collectively until a common understanding was reached. All five authors engaged in discussions throughout the data analysis to obtain credible findings.<sup>26</sup>

## RESULTS

### Sample characteristics

Table 3 contains the sample characteristics. Most were experienced nurses aged over 40 years.

The theme was described by five categories and 12 subcategories. Table 4 presents an overview of the themes, categories and subcategories.

### Still active, but in need of revitalisation

This theme describes the PACU culture 3 years after implementing the GC method, where the nurses were more reluctant to report due to insufficient visible changes and the pandemic. They requested more positive focus and interprofessional collaboration on the QI work.

### Continuing to facilitate open communication

Three years later, the GC method continued to facilitate open communication regarding PSIs and system enhancement.

### Contribution to increased information about the patient safety incidents

The GC method was experienced as a low-threshold reporting method, where one could report incidents that did not necessarily have consequences for the patient. The PSIs were written on a tablet computer rather than paper. This made it easier to transmit the reports to Excel. However, it did not facilitate the same easy access and overview of the PSIs for the informants as the paper registration did. Each morning, these PSIs were read aloud, providing the patient safety status' outline in the PACU and creating safety awareness among those in attendance. As a nurse commented (22):

Just hearing the unfortunate events that have happened to others in the PACU (...) raises awareness that adverse things happen; in a way, this is refreshing for patient safety, because then we know that yes, things happen; I must try to prevent serious incidents from occurring.

The weekly bulletin with the PSIs' information was found particularly useful for the new staff; moreover, the weekly interprofessional QI meeting was considerably appreciated as it provided an arena for discussing patient safety.

### Focus on improving the system

The PACU nurses agreed that it was important to identify and improve the system's weak points. This search for errors was highly encouraged by the nurse managers, who advocated this even while recruiting staff. The focus was not on blaming individuals, but rather on shared experiential learning. The especially experienced nurses were good role models for increasing the information about errors, as expressed by a nurse (21):

I think it is especially nice (...) when those with an extended experience share their own mistakes in the Green Cross (...); you observe that although you have worked for many years, you still do not know



**Table 4** Findings 3 years after the implementation of the GC method

Theme	Category	Subcategory
Still active, but in need of revitalisation	Continuing to facilitate open communication	Contribution to increased information about the patient safety incidents
		Focus on improving the system
	Expressing a desire for more interprofessional collaboration regarding improvements	Joint quality improvement meetings increase shared understanding
		A challenging collaboration among the healthcare professionals regarding the quality improvement work across units
		An untapped potential in the collaboration with the anaesthesiologists
	Increasing reluctance to report	Reduced motivation due to inadequate quality improvements in and outside the PACU
		Not all incidents need to be reported
	Downscaling due to the pandemic	Insufficient time
		Extremely exhausted
		Avoiding worsening the matters
Expressing a desire to share more of what went well	Greater focus on excellent work	
	Learning from what went well may improve patient safety	

PACU, postanesthesia care unit.

everything. Further, they are sufficiently brave and honest to write about it on the Green Cross and address it in the meeting.

#### Expressing a desire for more interprofessional collaboration regarding improvements

This category concerns an interprofessional collaboration's importance regarding QI work across units, including anaesthesiologists, although challenging to achieve.

#### *Joint quality improvement meetings increase shared understanding*

The improvements the informants mentioned were achieved through an interprofessional collaboration, such as improving the prescription of medications, identifying the best bandages and focusing on the handover communication tools. The informants highlighted that the QI meetings across the perioperative care pathways were important and helped them learn. They could ask surgery nurses or nurse anaesthetists work-related questions and receive answers immediately; moreover, the pharmacists and the anaesthesiologists could elaborate their viewpoints or ask critical questions. A nurse explained the importance of obtaining different perspectives as follows (6):

When you bring in several actors, you can mirror things from different angles and obtain others' views, and suddenly, the picture looks completely different. Thus, when we get the most participation possible, then I believe the discussions are the best; it stimulates enriched reflections and perhaps practices.

The informants appreciated the scope to learn more about each specialties' roles before and after the patient handover. This was experienced to provide an increased

mutual understanding of the perioperative period, as elaborated by a nurse (7):

The good thing with the GC method is that we may have opened a door. The watertight seal between the PACU and the operating room – that door has been left slightly more open (...) a channel for talking more together (...) I hope that we can move on from accusing to cooperating more.

#### *A challenging collaboration among the healthcare professionals regarding the quality improvement work across units*

The weekly GC bulletin was not distributed to the collaborative clinicians; instead, it was only provided to their respective managers. Many PSIs reported by the PACU nurses implied that measures were required in other units. These reports were considered as personal criticisms, as commented by a nurse (23):

Even after two years with the Green Cross method and the same people (...) from the anaesthesia department and the operating room, who have been visiting regularly, they still think that we write complaints regarding THEM.

This was frustrating for the PACU nurses, rendering it harder to report the PSIs. Nevertheless, they wanted the collaborative health professionals to report PSIs according to the GC method and attend the QI meetings. However, reporting following the GC method did not occur to collaborative health professionals; furthermore, most QI meetings were attended by the PACU nurses only.

#### *An untapped potential in the collaboration with the anaesthesiologists*

The anaesthesiologists' attendance at the QI meetings was perceived useful by them and the nurses. The PACU

nurses wanted anaesthesiologists' attendance to be a requirement, as they were their closest team members. The anaesthesiologists believed that the collaboration had an unexplored potential and wanted to participate more in the QI meetings.

However, they found that the meetings mainly concerned nursing work and consisted of listing one problem after another, without acting. Furthermore, they had no opportunities for passing on this information with the other anaesthesiologists. They hoped that the most important QI work would happen afterwards, as stated by a physician (2):

I am extremely curious as to what transpires after the GC meetings. I am confident several things happen later; however, we, the anaesthesiologists, have not been included in it. It would probably have been easier if I already knew more about the subsequent process.

#### Increasing reluctance to report

This category concerns the perceived decrease in reporting due to insufficient visible improvements and minor PSIs no longer being informed.

#### *Reduced motivation due to inadequate quality improvements in and outside the PACU*

Many reports dealt with the PSIs outside the PACU, such as an insufficient premedication involving increased postoperative pain. Although they knew that it took time to implement the changes, not seeing visible actions reduced the willingness to report to the IRS, as described by a distressed nurse (17):

If only one had received feedback that is slightly more concrete: we have registered your report and now the following is happening. I feel that nothing is happening. There is no improvement. Nevertheless, I attempt to be positive.

The informants experienced that the recurring incidents were inappropriately handled within the PACU; moreover, the aspects that they agreed to amend were not followed up on after the QI meeting, decreasing the willingness to report. However, some reported less simply because there were few things to report or they did not feel obligated to do so. The informants suggested focusing on one improvement at a time, as commented by a nurse (9):

We have talked about having an improvement board, where we could potentially focus on the minor things (...) this week or this month (...) now; this is what we must focus on to improve.

#### *Not all incidents need to be reported*

The informants expressed that they initially reported minor things that the other professionals had to improve, which was referred to as whining and picking on others; thus, they no longer wanted to report. As commented by a nurse (18):

This cannot continue. (...) THIS cannot be the primary focus. We have many other things that we need to handle.

Presently, they wanted to focus more on the PACUs' need for QIs and the more important PSIs, such as risks to patients' lives. If someone reported PSIs perceived by others as minor or insignificant, they risked being criticised, as commented by a nurse (4):

There are people who are slandered afterwards (...) my gosh, did she write this, is it possible? (...) People talk a little about it, I have heard it (...) because (...) they repeat themselves (...) and are concerned with the details.

However, patient injuries were difficult to report and discuss, because they could hurt a colleague's feelings. The informants disagreed whether this should be reported in the GC or only in the IRS. However, they all approved of everyone learning from patient injuries.

The GC method was often omitted on the weekends, although PSIs were perceived as more likely to occur on the weekends. They did not read aloud the PSIs in the mornings, and they either forgot to report them or were excessively busy to do so. They referred to it as 'being in a different mode'—working even during the weekend. However, some informants advocated increasing the focus on the weekends. In the summer, there were no QI meetings.

#### Downscaling due to the pandemic

This category concerns the reduced focus on the GC method during the pandemic.

#### *Insufficient time*

The pandemic largely affected the QI work. The nurse managers had to cancel most QI meetings due to the busy unit; moreover, the informants felt that there was insufficient time to take measures concerning the reports. This was worrisome, as explained by a nurse (3):

It was even more important to have those meetings, because for two years now, we have had considerable redeployed personnel, and thus, many unknowns, and then, (...) minor things are reported. Nevertheless, some of these insignificant things are essential to be addressed.

Furthermore, those conducting the meetings had no time to prepare, which they found to have negatively affected the discussions' quality and focus.

#### *Extremely exhausted*

During the pandemic, about 120 staff were transferred to the PACU, while many PACU nurses worked in the intensive care unit. The informants found this continuous training of new employees to be exhausting, leaving them with no energy to report. Furthermore, the reorganisation affected the reporting, as explained by a nurse (8):

We have had several relocated people who have never used it [the GC method] before; there has been less than half of the PACU staff (...) that is why the reporting is less.

#### *Avoiding worsening the matters*

The informants experienced that the perceived care quality was greatly reduced during the pandemic; thus, they could have reported the PSIs constantly. Instead, they provided individual training. They stated that the threshold for reporting was raised out of concern for the relocated staff, as explained by a nurse (10):

There were things I would have reported in other circumstances that I did not because I thought, 'What if they come to the meeting and hear about their mistakes?' I supposed it would only worsen things.

#### *Expressing a desire to share more of what went well*

This category concerns the informants' desire for a more positive focus.

#### *Greater focus on excellent work*

The GC method was perceived as concentrating solely on the errors and problems. There was no place to report excellent work. A nurse articulated this shared view (4):

This has been the challenge with the GC method personally. I observe that people do considerable excellent work, and then, I am to point out the unimportant things that they do improperly.

Although the PACU nurses experienced being better than the other professionals at praising each other for good work, all informants wanted to improve at it, both verbally and through writing on a visible board. Praises made them proud of their individual and collective work.

#### *Learning from what went well may improve patient safety*

The informants experienced that they could learn considerably from the exceptionally performing colleagues and imitate them. Furthermore, they found it useful to share the interventions' good results.

They believed that a more positive focus would render it easier to give or receive constructive criticism regarding the GC reports. It would also positively affect the working climate and improve the interprofessional collaboration due to a safer space that would more likely facilitate conversation, as elaborated by a nurse (6):

If you feel good at work and you have good cooperation with your colleagues, then it actually promotes patient safety.

## DISCUSSION

This study aimed to describe healthcare professionals' experiences with the GC method in a PACU setting 3 years post implementation, including the COVID-19 pandemic period. Our results showed that the GC method continued

to be actively used but required revitalisation. Although an open communication about the PSIs was facilitated, a more interprofessional collaboration was desired. The reluctance to report PSI was increasing; PSI reporting was downscaled due to the pandemic and a desire to share more of what went well.

The healthcare professionals found it rewarding to discuss the patient safety issues in the QI meetings, which supports the findings that from their perspectives, the opportunity to discuss patient safety is the most important part of the GC method.<sup>16</sup> Interprofessional attendance, although difficult to achieve, enhanced learning. By discussing the PSIs interprofessionally across the perioperative care pathways, they obtained different viewpoints that stimulated reflection and improved practice. They became better acquainted with each other's work tasks and resolved misunderstandings, thereby improving the shared understanding.<sup>27</sup>

The findings add to previous research that creating spaces for reflection and improved teamwork may contribute to increased staff well-being and patient outcome.<sup>28</sup> Interprofessional focus and effective communication are identified as contextual enablers for effective team interventions.<sup>29</sup> Furthermore, the importance of dialogue for developing a collaborative culture and mutual understanding are highlighted as critical for QI.<sup>30,31</sup> We argue that the GC method promotes resilience, because it facilitates the collaborative learning processes across various levels that comprise the prerequisites for resilience.<sup>32,33</sup> However, the hospital's reorganisation during the COVID-19 pandemic resulted in many new challenges and many new inexperienced staff members, so the GC method was downscaled; the perceived care quality was reduced, indicating decreased resilience. Although not causal, the findings are interesting. Additional research on how to accommodate an interprofessional collaborative learning in hospitals is needed.

The anaesthesiologist had 'untapped potential' to propose QI work and lead the QI meetings. Although anaesthesiologists' attendance was particularly desired in the QI meetings; even if they wanted to participate, they could rarely attend, which is consistent with recent studies.<sup>34,35</sup> The anaesthesiologists were discouraged by the discussions on topics that were mainly nursing-related and by not observing visible improvements. Historically, physicians have found it difficult to engage in QI work because of an insufficient improvement culture and the inconvenience of the day-time QI work, among other things.<sup>36</sup> It is suggested that the physicians' nature of work limits the use of the GC method, and that the GC method's does not affect their patient safety culture.<sup>16,17</sup> Due to the traditional culture of surgeons not participating much in the PACUs' daily life, it was not even considered feasible to include surgeons in the QI meetings. This may be an area for further exploration. Physician involvement enables effective team interventions; therefore, more innovative ways to include the physicians in the QI work is necessary.<sup>29,37,38</sup>





Insufficient visible improvements increased the PACU nurses' reluctance to report; they discussed the need for establishing a QI board and focusing on one task at the time. Contrarily, the GC method caused increased improvements in a Swedish hospital, where the QI boards were actively used.<sup>17</sup> Often data collection happens at the expense of using it for improvement.<sup>39</sup> We propose that a QI tool should be more explicitly linked to the GC method and that the healthcare professionals should be educated and assisted in using this.<sup>7 40 41</sup> A prerequisite for effective team interventions is that something can be done about the problems discovered, that is, the intervention's credibility.<sup>29</sup> We suggest agreeing on what is feasible to enhance within the PACU-setting, to avoid any discouragement. Furthermore, the managers should initiate, delegate, mandate the QI work, and follow up on the results. This has been identified as necessary to support the GC method.<sup>16</sup>

Reporting issues that needed resolution outside the PACU aroused negative comments from both PACU nurses and other professionals. This resulted in a culture where 'not all incidents need to be reported'. A totally green cross can signal insufficient trust in each other.<sup>16</sup> However, it is important to capture first-hand information from clinicians close to where the incident occurred.<sup>42</sup> Issues that need resolution outside the PACU may profit from being discussed in the QI meetings and being reported in the IRS as suggestions for improvements. This could mitigate the weaponisation of incident reporting and be an incentive for broader participation.

Additionally, during the COVID-19 pandemic, PACU nurses did not report the PSIs out of concern for the relocated staff, who more easily made mistakes due to an inadequate routine. This can be understood as a self-limiting cascade.<sup>43</sup> Optimising the healthcare professionals' emotional experience is as significant as enhancing performance for avoiding the PSIs.<sup>43 44</sup> This may be done by focusing on the positive deviants, as requested by this study's healthcare professionals, the psychological safety at work and a systems approach to improving patient safety.<sup>7 45 46</sup> Further research is needed to determine if the GC method collectively with a focus on positive performance can improve learning and the healthcare professionals' emotional experience simultaneously.

### Strengths and limitations

This longitudinal study provides an in-depth understanding of the healthcare professionals' experiences of the GC method implementation; it offers relevant knowledge for other similar healthcare settings. However, some limitations should be noted. As nurses make up most of the staff in this PACU-setting, the focus is more on the nurses' experiences compared with that of other professionals. The FG interviews might have deterred the participants from speaking openly. Furthermore, although the sample reflected the true ages and occupations of the users' of the

GC method, the limited number of male informants may have influenced the results by omission of their experiences. Healthcare professionals who did not participate in the FG interviews may have disliked the GC method, or they simply did not engage with it. However, exploring this goes beyond the scope of this study.

### CONCLUSION

The GC method was considered useful for reporting PSIs and facilitated its awareness. It laid a good fundament for further improvement; nevertheless, it is necessary for QI work to be more systematic and interprofessional. For additional learning from the GC method, we need more knowledge regarding how the interprofessional teams can learn and collaborate and how we can integrate learning from positive deviance and errors.

#### Author affiliations

<sup>1</sup>Institute of Health and Society, Department of Health Management and Health Economics, Faculty of Medicine, University of Oslo, Oslo, Norway

<sup>2</sup>Division of Surgery, Akershus University Hospital, Lorenskog, Norway

<sup>3</sup>Department of Health Sciences, Faculty of Medicine and Health Sciences, Norwegian University of Science and Technology, Gjøvik, Norway

<sup>4</sup>Institute of Basic Medical Sciences, Department of Behavioural Medicine, Faculty of Medicine, University of Oslo, Oslo, Norway

<sup>5</sup>Health Services Research Unit, Akershus University Hospital, Lorenskog, Norway

<sup>6</sup>Department of Quality Improvement and Patient Safety, Norwegian Directorate of Health, Oslo, Norway

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#### ORCID iDs

Gørill Helen Birkeli <http://orcid.org/0000-0003-4212-3802>

Randi Ballangrud <http://orcid.org/0000-0003-0403-0509>

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