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Identifying frail patients at the front door: a quality improvement project on improving identifying frailty and accuracy of Clinical Frailty Scale in the emergency department in an acute general hospital

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ABSTRACT

Background The rise in frail patients seeking care at emergency departments (ED) globally has led to an increased focus on improving the identification and care of frail patients on arrival in ED. The Clinical Frailty Scale (CFS) has been used in the ED to identify frail elderly patients and prompt the initiation of a comprehensive geriatric assessment. However, it has been noted that the CFS's accuracy was low, and training needs have been identified.

Methods To address this, a quality improvement project was carried out using the PDSA (Plan, Do, Study and Act) cycle to enhance the accuracy of frailty identification at the front door. Standards for Quality Improvement Reporting Excellence guideline is followed to report.

Intervention Based on the fishbone and driver diagram, a training programme was designed and delivered to the ED nurses in November 2023 (PDSA cycle 1) and from September to October 2024 (PDSA cycle 2). A lanyard card was developed to simplify and standardise the CFS scoring. This was disseminated to ED nurses along with 1:1 brief education in conjunction with other training activities.

Results Following the training intervention, the correct identification of CFS 6 and above improved from a baseline of around 50% to around 60% after the first cycle and to over 70% after the second cycle. While the accuracy of CFS also improved to 40%, it remains to be seen whether this change is sustainable and not just a normal variation.

Conclusion This quality improvement project, using a lanyard card, in conjunction with brief teaching and other training methods, effectively increased the rate at which moderate to very severely frail frailty was identified and subsequently referred to frailty teams.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Previous studies have demonstrated that recognising frail patients in the emergency department can facilitate the implementation of comprehensive geriatric assessments, leading to more holistic and suitable care. However, there remains a limited understanding of the feasibility and accuracy of using frailty identification tools to detect frailty at the front door.

WHAT THIS STUDY ADDS

⇒ This quality improvement project investigates the feasibility of using the Clinical Frailty Scale to identify frailty within the emergency department. It outlines the education and training programme designed for emergency department nurses and demonstrates the potential benefits of employing the Clinical Frailty Scale for frailty identification at the front door. However, it also acknowledges the limitations regarding accuracy in a fast-paced environment.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ These findings have important implications for front-door frailty services, indicating that tailored education programmes can significantly enhance the accuracy of frailty identification in the emergency department. This project informs current practices regarding the use of the clinical frailty scale for identifying frailty in emergency settings and provides guidance for future investigations into the identification of frailty at the front door.

BACKGROUND

There has been an increase in frail elderly patients attending the emergency department (ED) globally.[1] Elderly people continue to have worse outcomes in ED than other groups of patients.[2] Therefore, there are calls for safer and more effective elderly care for frail patients in ED with a focus on same-day emergency pathways, which encompass holistic components, including medical, functional, psychological and social aspects,[3 4] to provide better care to meet these rising demands and needs. NHS England[5] has included identifying and responding to frailty

in EDs as a clinical priority in Commissioning the Quality and Innovation 05 (CQUIN 05) 2023/24.

The Rockwood Clinical Frailty Scale (CFS) was introduced to summarise an older adult's overall fitness or frailty level after being evaluated by an experienced clinician.[6] It was initially designed with a scale from 1 (very fit) to 7 (severely frail) in 2005, and later subject to revision twice and became a 9-point scale including very severely frail (8) and terminally ill (9), with a further edition in 2020 for a subtle change of the labels and descriptions.[7] CFS has been noted to be associated with inpatient mortality[8] and clinical outcomes[9 10] and has been used in various clinical settings, including nursing homes, hospital settings and intensive care units.[11 12] NHS England's guideline recommends using the clinical frailty scale[5] to identify frailty in the ED in the National Health Service (NHS) in the UK. If the patient has CFS 6 and above, then a comprehensive geriatric assessment (CGA) should be initiated.[5] CGA is an interdisciplinary diagnostic process that includes medical, psychological and functional assessments to develop a coordinated and integrated plan for frail and old patients.[13]

However, CFS as a frailty assessment has its limitations. Initially designed to summarise a multidimensional assessment in an epidemiological setting, the CFS has since been widely adopted as a judgement-based tool for screening frailty and stratifying levels of fitness and frailty in clinical practice. It is not a questionnaire but rather a method for summarising information obtained during a clinical encounter with an older individual to screen for and roughly quantify their overall health status. Various scales have been developed to assist with CFS.[14 15] However, anecdotal reports suggest that using different scales may result in varying scores. Furthermore, using CFS to guide the allocation of healthcare resources may also make the decision-making susceptible to 'ableism' bias, given that it is heavily based on functional levels.[16]

Although some literature reports moderate to good inter-rater reliability when using CFS in ED,[17 18] other studies report variations in CFS operationalisation. Thorpe *et al*[19] explored the variation in CFS outcomes in frail patients. They found that factors such as mobility for walking, domestic activities of daily living (DADL), personal activities of daily living (PADL), mobility for transfers, age, history of dementia and mobility for stairs all have a significant relationship with the scoring of CFS.[19] Patients with independent PADLs, DADLs and walking mobility have a 65% probability of receiving a CFS 3. Patients with independent PADLs and walking mobility but some dependency in DADLs have an equal chance of receiving CFS 3 or 4. Whereas patients with independent PADLs and DADLs but some dependency on walking abilities have a 58% chance of receiving CFS 4, and patients who are fully dependent on PADLs and some dependence on transfers had a 38% probability of receiving CFS 6 and 30% CFS 7. Their findings[19] revealed that baseline PADL, DADL, walking and transfers were the most important CFS predictors/classifiers. Other influencing factors, including age, acuity of illness and history of dementia, are also associated with the CFS score. The study also directly connected acute illness severity and CFS score. This showed that acuity level might inflate the CFS score by influencing clinicians' clinical judgement in ED.

A systematic review by Boucher *et al*[20] supported using CFS in ED. However, they found variations in CFS operationalisation, which indicated further training. The CFS identifies frailty based on the overall impression of the patient, which might be subjective.[7 21] Dowell *et al*[22] have delivered a training programme to improve frailty accuracy in the ED of a busy district general hospital but found previous literature reporting good reliability of CFS hard to replicate. Their findings asserted that despite numerous trainings, the reliability of CFS remained low (0.31).

INTRODUCTION

The Oxford University Hospital NHS Foundation Trust has implemented a front-door frailty service at the ED in John Radcliffe (JR) Hospital in response to the CQUIN05 (2023/2024) guidelines.[5] The JR is a large acute general hospital with approximately 400 frail patients presenting to the ED monthly. The ED in the JR has a large nursing workforce (over 100 nurses) with average staff turnover and sickness. As part of the CQUIN recommendations, ED nurses are required to assess patients using the clinical frailty scale. As per the CQUIN 05 criteria, patients aged 65 and above who score 6 or above on the clinical frailty scale (indicating moderate frailty) are identified by the front-door frailty service and undergo a CGA. After the initial launch of the CFS integration into the electronic patient record (EPR) and posters in the setting to guide how to score CFS, early audits showed that CFS scores in the ED only identified 45–51% (baseline) of frailer patients (CFS≥6). It was noted that most ED nurses tend to underscore in CFS, and a training need was identified about using CFS to identify frailty.

Design

A quality improvement (QI) project was implemented from November 2023 to October 2024 to improve the correct identification of moderate frailty (CFS≥6) in the ED of JR Hospital. The Model of Improvement (Plan-Do-Study-Act cycles)[23] was used to design the QI project. PDSA cycles are implemented in continuous cycles, and data were collected through the project. The project was designed and implemented by the geriatric interface team, which included geriatric specialist registrars, a geriatric consultant and a frailty lead nurse. Standards for Quality Improvement Reporting Excellence guideline is followed for this report.

Training strategies and rationale

At the time of the QI project, the CFS had already been integrated into the workflow of the ED nurses' initial assessment process. The CFS was included in the initial adult risk assessment lists and was compulsory to complete

Box 1 Training activities: multiform via multiforum

1. Clinical Frailty Scale (CFS) training sessions in band 5 and band 6 emergency department (ED) nurses' meetings (virtual/group)
2. Handing out CFS Lanyard cards to ED nurses along with 1 min brief training talks (face-to-face/individual)
3. Posters displayed in ED bays/short messages attached by the side of computers (paper media)
4. Linking with ED frailty link nurse who promoted the CFS learning at ED nurses' handover time (opportunities group training)
5. Usage of ED newsletter as a forum to update staff about recent CFS audit outcomes (newsletter)
6. Direct email message sent via the ED clinical educator sharing the CFS training material by British Geriatric Society (email)
7. Opportunistic CFS quizzes and chocolate sharing (interactive)

as part of the initial risk assessment of triaging patients 65 years or older. When the ED nurse selects the CFS score, it will be shown on the patient's electronic record and flagged up in the frailty inbox if the CFS is 6 or above.

In the fast-paced environment of the ED, it is essential to prioritise flow and patient turnover. However, accurately scoring the CFS requires thorough assessment, which can be challenging for ED nurses with limited time and multiple competing priorities. As a result, it is crucial to develop and formulate quick indicators or identifiers for CFS to help ED nurses make rapid and accurate assessments. To accommodate the working style of the ED, the training message was designed to be simple and quick. Furthermore, considering the reported inter-rater variation in the literature, the training effort focused on correctly identifying CFS 6 and above rather than achieving exact CFS accuracy.

A fishbone diagram and a driver diagram were created following formal and informal discussions among ED nurses, ED frailty and link nurses, the geriatric registrar, ED physiotherapists and external staff, including QI project trainers. To enhance training, multimodal activities were implemented.

In the first PDSA cycle, a lanyard card was designed to simplify and standardise the CFS score, accompanied by group training and one-on-one sessions. In the second cycle, while continuing the one-on-one training, quizzes and scenarios were introduced, along with personalised feedback provided either orally or via email (see box 1 for more details).

Fishbone diagram

The fishbone diagram, also called an Ishikawa diagram or Cause-and-Effect diagram, is a visual aid used to systematically identify and analyse potential causes of a problem or effect.[24] It takes the form of a fish skeleton, with the problem or effect at the 'head' and the causes branching off like 'bones'. This tool assists teams in carefully considering the root causes of a problem, enabling them to pinpoint areas for improvement.[25] In identifying the potential causes of the inaccurate CFS, the fishbone diagram revealed that the high ED nurse

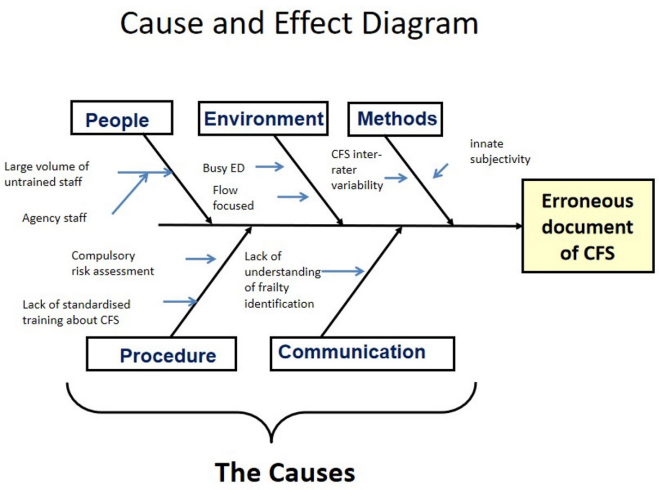

Figure 1 The fishbone diagram showing the cause and effect to the erroneous document of CFS. CFS, Clinical Frailty Scale; ED, emergency department.

workforce volume, agency staff utilisation, busy work environment and emphasis on efficient flow make the training programme challenging to target and implement. Furthermore, the inherent variability among raters and lack of standardised CFS scoring also contribute to the difficulty in achieving precise accuracy (figure 1).

Driver diagram

A driver diagram is a valuable tool for visually illustrating the key factors contributing to achieving an improvement goal.[26] In this case, the goal is to improve the identification of frail patients and enhance the accuracy of the CFS in the ED. Typically, the driver diagram comprises three components: the goal (the aim of the initiative), the primary drivers (the key factors or areas directly influencing the goal) and the secondary drivers (the detailed actions or processes supporting the primary drivers).[27] To improve the accuracy of identifying frail patients by CFS to 70% by the end of November 2024 (the SMART goal), a driver diagram (figure 2) was developed, generating ideas for action. The primary drivers identified were standardised training for ED staff, improved access to patient information and regular monitoring and feedback. van Kan *et al*[28] stress the importance of frailty assessment and emphasise the need for standardised training in frailty measures, aligning with the education and training aspect in the driver diagram. There were discussions about improved access to patient information and the inclusion of more information in the ambulance handover for the ED nurse. Then, the nurse in the assessment area will carry out the initial adult risk assessment, including CFS (figure 3). Although there are reports that having paramedics using CFS helps with the identification of vulnerable patients and may contribute to clinical outcomes,[29] concerns were raised about the potential impact on handover time (from ambulance to ED nurses) and the possibility of contributing to crowding issues in

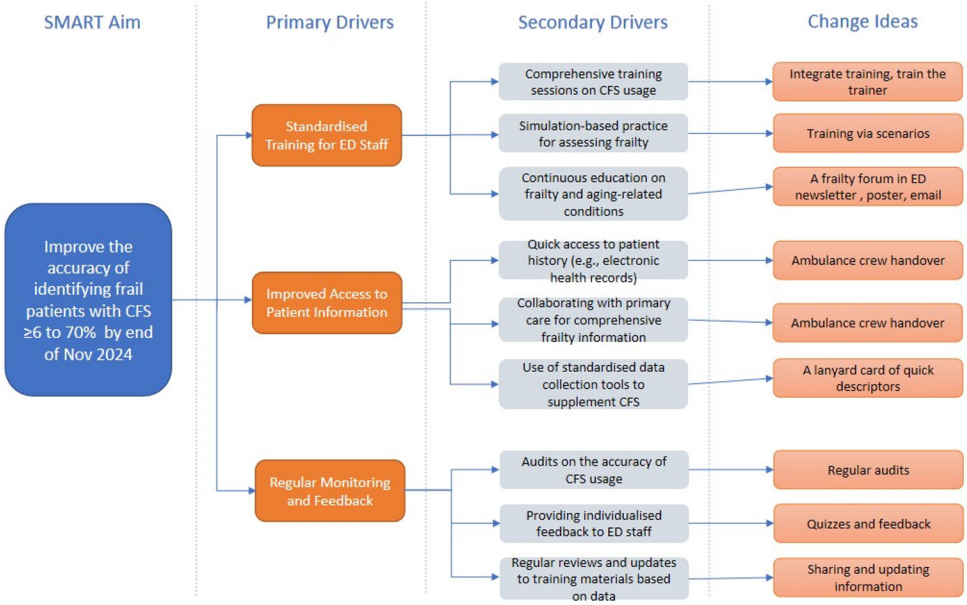

Figure 2 Driver diagram for improving the accuracy of identifying frail patients carried out in the emergency department of an acute general hospital from November 23 to October 24. CFS, Clinical Frailty Scale; ED, emergency department.

the ED.[1] Therefore, the idea of the handover from the ambulance was not explored further in this QI project.

Standardisation of CFS

As mentioned, using different supporting scales for CFS may result in varied scores. Therefore, we have developed a CFS Lanyard card (figure 4) to standardise the CFS scoring based on the consensus of local geriatricians, nurses and physiotherapists. The design of the Lanyard card was created with feedback from ED doctors, ED nurses and the geriatric consultant and adjustments were made based on their comments. It is important to note that while this guide may not guarantee exact accuracy in all cases, it aims to help obtain a more accurate CFS score, considering the limited time available for assessment by ED nurses, while balancing the need for rapid assessment and flow.

Ethical considerations

This QI project has not received any funding, and as it is a clinical education programme and an audit, no ethical approval is required.

Strategy

The Lanyard cards were used for targeted one-on-one training in the ED. We also employed regular brief educational sessions and ensured existing CFS educational posters were easily accessible in the ED. The training activities (see box 1) were conducted through various methods across different platforms from November 23 to October 24. Two PDSA cycles were implemented: the first PDSA cycle was carried out in November 2023, and the second PDSA cycle was from September 2024 to October 2024. In the first cycle, the primary strategy was lanyard

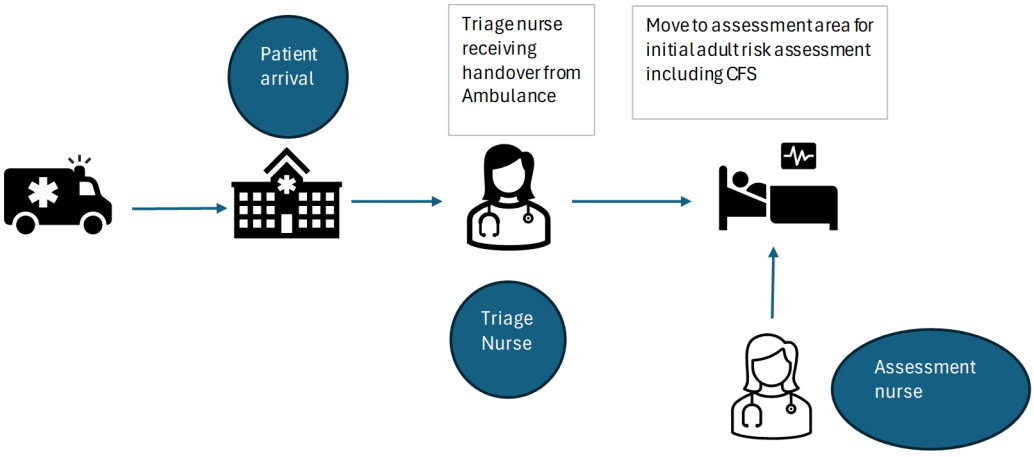

Figure 3 Flow chart for frail patients' handover and initial assessment in the emergency department. CFS, Clinical Frailty Scale.

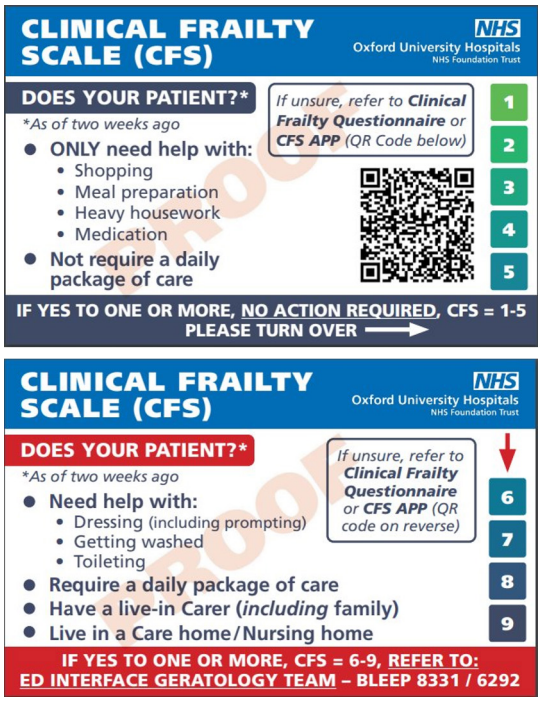

Figure 4 Lanyard card made for standardisation of CFS. ED, emergency department; NHS, National Health Service.

cards, a brief 1:1 face-to-face training and a few cohort virtual training sessions. In the second cycle, carrying on previous training activities, vignettes/scenarios were used to quiz nurses and chocolate was awarded after the quizzes. Individual feedback was also given in clinical settings. As of 20 October 2024, a total of 135 1:1 training sessions were delivered to ED nurses who have undergone CFS training. Due to the large volume of untrained staff, the 'train the trainer' approach was adopted to deliver group training in new staff induction sessions and handover time.

Measurement

In accordance with CQUIN 05 (2023/24) regulations,[5] CGA should commence when the CFS reaches 6 or higher. As a result, a frailty inbox within the electronic patient record was established to identify patients whose CFS scores, as assessed by nurses in the ED, were 6 or above. This system ensures that frail patients are correctly identified if the CFS is correctly allocated above (CFS≥6) or below 6 (CFS<6).

Given the documented inter-rater reliability as previously mentioned, pinpointing precise accuracy is challenging. In addition, retrospectively establishing the CFS score based on the limited information in the patients' notes is far from ideal. Therefore, the audit took a pragmatic approach to measure the outcomes. It used the CFS scores assigned by the frailty intervention team (FIT) as the benchmark for accuracy and compared these scores with those given by ED nurses. The FIT team are a team of physiotherapists and occupational therapists. Having more time to inquire about frailty-related issues, the FIT members often provide more accurate CFS scores. The operational measurement strategy was discussed and agreed on among the frailty team: CFS score from the ED that falls within the same range as the FIT score, that is, CFS≥6 or CFS<6, is deemed a correct identification of moderate to very severe frailty and not frail to mild frailty. Furthermore, an exact match between the CFS scores assigned by both nurses and occupational therapists/physiotherapists is documented as accurate CFS.

We retrospectively audited the CFS scores of patients seen by FIT. We compared the CFS scores with those completed by ED nurses over 3, 7 or 14-day periods from October 2023 to October 2024. We evaluated the accuracy and whether CFS was correctly scored above or below a CFS of 6.

Table 1 The percentage of correct identification of moderate frailty and the accuracy of CFS

Dates	% of correct identification of moderate frailty	% accuracy of CFS	Intervention
16–22 October 2023	51	17	
6–12 November 2023	45	17	
17 November to 3 December 2023	65	35	PDSA cycle 1: Lanyard card: group and 1:1 training sessions
11–17 December 2023	70	16	
15–21 January 2024	68	19	
7–22 February 2024	59	30	
1–13 June 2024	65	27	
1–10 September 2024	58	17	
14–17 September 2024	60	8	
18–21 September 2024	58	26	
22–25 September 2024	69	18	PDSA cycle 2: Lanyard card: group and 1:1 training sessions + Quizzes, scenarios. Individualised feedback
26–30 September 2024	65	23	
1–4 October 2024	74	26	
5–8 October 2024	74	18	
9–13 October 2024	78	42	
14–17 October 2024	75	41	
21–23 October 2024	77	29	

Data analysis

The audit outcomes, including pre-intervention and post-intervention data, were charted in statistical process control charts plotted in Microsoft Excel, with upper and lower control limits and sigma. A shift (defined as six consecutive data points above or below the median) or a trend (defined as five consecutive data points increasing or decreasing) is seen as a change.[30]

RESULTS

Before implementing intervention cycle 1, the baseline for correctly identifying frail patients was 45–51%. Following cycle 1, the percentage of correct identification

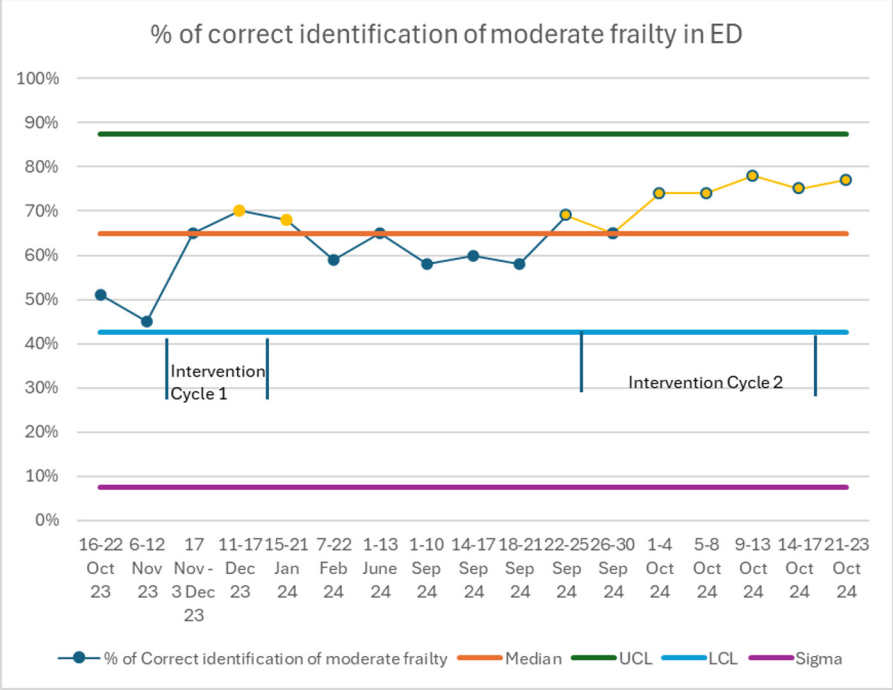

Figure 5 Statistical process control chart showing the percentage of correct identification of moderate frailty. Red solid=median; dark green solid=baseline data pre-intervention; orange solid=testing data post-intervention. ED, emergency department; LCL, lower control limit; UCL, upper control limit.

immediately increased to 70% and consistently ranged from 58% to 68% after that (table 1). When it was noted that the correct identification of moderate frailty was 58% in September 2024, PDSA cycle 2 was initiated. After intervention cycle 2, which ran from September 2024 to October 2024, there was a significant increase in the percentage of correct moderate frailty identification to 78%. There are seven data points above the median score line in figure 5, indicating a positive change likely due to the intervention, as no other changes occurred during this period. There also seems to be an improvement in score accuracy (a difference of 0 from the ED nurse and

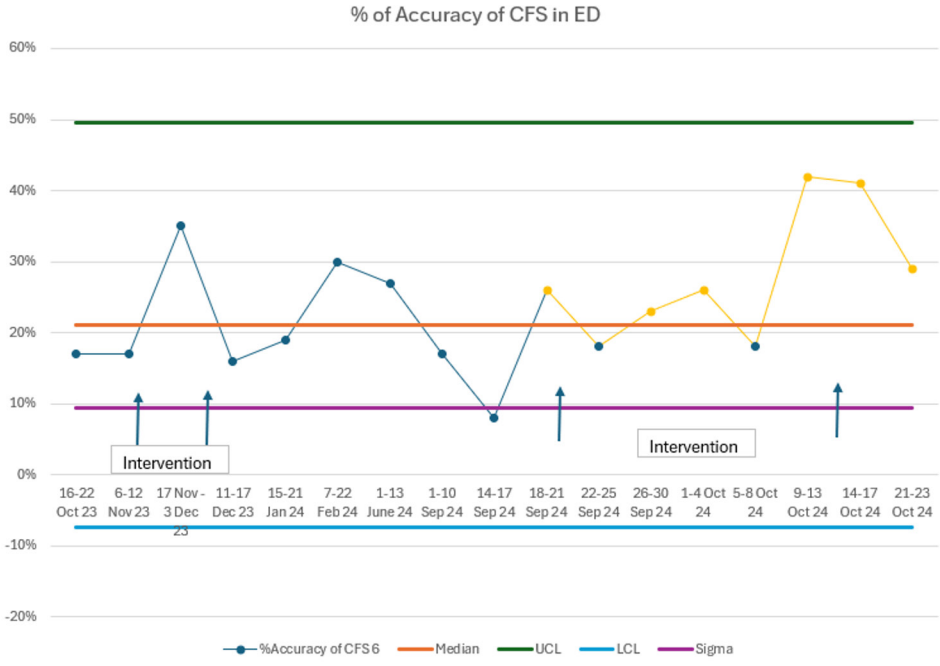

Figure 6 Statistical process control chart showing the percentage of accuracy of CFS. Red solid=mean; dark green solid=baseline data before second cycle; orange solid=post-intervention cycle 2 data. CFS, Clinical Frailty Scale; ED, emergency department; LCL, lower control limit; UCL, upper control limit.

FIT scores). The CFS accuracy increased to 30% immediately after the PDSA cycle 1. However, the effect did not last long and plummeted to 17% soon. It took longer for the CFS accuracy to respond to the second intervention, and it increased from 17%–30% to 42% after the second PDSA cycle (figure 6). However, confirming this as a definite change or shift would require more data points.

Lessons and limitations

Our findings align with previous studies,[20–22] revealing variations in CFS operationalisation. To address this, we developed a tailored training programme to improve the accurate identification of frailty in the ED in JR. Although overall identification has improved to over 70%, the exact accuracy of CFS remains at approximately 40%.

Our experience shows that ED nurses often need to assess patients under significant time pressure, making it crucial to provide a quick tool with key descriptors for identifying frailer patient groups suitable for frailty team interventions. Informal and impromptu one-to-one training sessions may have influenced the effectiveness of the training programme more than the formal and organised cohort training. Having a dedicated training time and space to provide formal training to a group of ED nurses has proved quite challenging. Similarly, ensuring that ED nurses consistently conduct comprehensive assessments of frail patients, taking into account activities such as shopping, meal preparation and medication administration, has also presented challenges. This is especially true when dealing with patients with cognitive impairments like dementia and delirium and when there is limited information available for ED assessment. In such cases, ED nurses may need to make educated guesses to avoid delaying other nursing tasks or patient flow. Therefore, developing a quick indicator or descriptor as part of the project may assist ED nurses in determining the CFS score without delving into excessive detail. Standardising the CFS scoring process helps reduce the impact of natural variability among raters when identifying frail patients at the front door. Quizzes and incentives, such as chocolate, have proven effective in reinforcing correct approaches, particularly as some ED nurses find it challenging to 'unlearn a habit' and change their approach once they have formed an incorrect impression of the CFS score. Implementing a 'train the trainer' approach can help reach a more significant number of staff members in a large workforce, such as ED nurses, and sustain the momentum of change. Innovative methods, such as using the mnemonic 'sixy (sexy) frailty' to remember a moderate frailty score of 6, have shown promise.

It is crucial to establish a realistic target when assessing the success of a training programme. In a study based on vignettes, the overall accuracy of CFS was found to be moderate at 60.6% for 56 paramedics.[29] Similarly, Dowell *et al*[22] reported a reliability of 31% when comparing nurse scores with FIT (in our case, measured as accuracy). We set the target at 70% based on the initial audit report, which indicated a 70% accuracy after the first implementation cycle. This target is considered achievable. However, we recognise that achieving 100% accuracy in CFS may not be possible due to staff turnover and agency nurses employed to cover sickness. Future studies may examine whether this 'loosely' scored CFS, that is, identifying CFS 6 and above, rather than focusing on exact CFS scoring, impacts the identification of frail patients and their care and clinical decision-making.

It is worth noting that the accuracy score appears to be highly dependent on intervention, raising questions about sustainability. Therefore, the next step for the project may be looking at the sustainability strategy.[31] It is hard to discern whether this 'stubbornness' to improving CFS accuracy is, in fact, a confirmation of the strategy rationale that it is challenging for ED nurses to arrive at the precise CFS within 5–10 min of the initial assessment, of which the main priority is the acute presentation to ED. Potential long-term solutions include mandatory e-learning or adapting the EPR system to include simple key questions for automatic calculations, ensuring accuracy and standardisation of the frailty score. For instance, one study reports using algorithm-aided scoring in a smartphone to guide CFS scoring.[17] In addition, the CFS score was compared with the scores of the FIT team, limiting this measurement to the patients seen by FIT. Potential patients, such as care home residents not routinely reviewed by FIT, may have been excluded from the audits.

CONCLUSION

In emergency care, correctly identifying groups of frailer patients rather than strictly accurate scores is the key to front-door frailty services. This ensures that this patient group is appropriately assessed by specialist frailty teams. This QI project, using a lanyard card, in conjunction with brief teaching and other training methods, effectively increased the rate at which moderate to very severe frailty was correctly identified and subsequently referred to frailty teams. Although the overall correct identification of moderate frail patients has improved to over 70%, the exact accuracy of CFS scoring remains low at just above 40% at best.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

Patient consent for publication Not applicable.

Ethics approval Not applicable.

Provenance and peer review Not commissioned; externally peer reviewed.

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