



Co-designing co-design. Shifting the culture of practice in healthcare

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Co-designing co-design. Shifting the culture of practice in healthcare

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Abstract: To date design applied in the context of health care has generally focused on the design of products. This paper describes a project 'frailsafe' and suggests that in the future design will play a new and increasingly important role in shifting the culture and the way that particular practices in health are performed. frailsafe is a project that aims to improve measured quality of care for frail older patients admitted to NHS hospitals with medical emergencies. The project provided a platform for multidisciplinary working and enhanced communication on what constitutes good care for older patients. The research exemplified the concept of 'all teach, all learn' where the design team engaged in the co-development with the frailsafe network of effective prototypes of frailsafe. Ultimately the objective was to empower hospital improvement teams to adopt a co-design culture for creative local implementation of frailsafe.

Keywords: Co-design, Design for Healthcare, Patient safety.

1. Introduction

There is increasing interest in the potential of design approaches to transform health care where we can draw on a tradition of creative and divergent thinking and technical insight to address fundamental and yet practical challenges to our societies' health. An ageing population, reduced funding and rising expectations from an increasingly informed population drive a need for health service reform. These are some of the key challenges to society today, and ones that require a new way of thinking, a radical step change and innovative approaches in the ways we deliver care. These challenges are by definition 'wicked problems', ones where there is no single true answer and where design's strength lies in creatively responding to these complex interdependencies. The value of design is generally recognised in improving safety, enhancing usability and economic viability of products for use in healthcare settings. Collaborative and participatory approaches to design are applied and recognised in the design of products but increasingly applied to situations where there is not necessarily a tangible product outcome. Services and systems also benefit from creative

divergent thinking and where design can make a valid contribution. Designers frequently facilitate participatory co-design activities in a wide range of contexts including health care to positively change practices and behaviours. However parachuting in a design team does have limitations and there is often a challenge of sustaining design engagement and establishing a lasting legacy when funding runs out and the formalities and structure of a project end.

This paper presents opportunity for design in health care beyond products and focuses on how design might help change culture and behaviour within a health care environment to improve the safety of frail older people admitted to hospital. We describe a project 'frailsafe' that explores how a check and challenge approach could be translated into the complexity of acute medical care of older patients.

The relationship between design and behaviour change has been recognised for some time. Niedderer (2014) suggest that its origins can be traced to design psychology or behavioural design (Norman 1988) which set out to understand the intuitive use of objects and our responses to them. Neidderer (2014) states, 'if in design for behaviour change we understand design as a social process we can see that at its heart are people. Therefore at the most elementary level design for behaviour change attempts to understand people, why they behave in the way they do and to use design to encourage them to 'do' or 'not do' something.'

2. Design to improve safety

There is now growing recognition that patient safety and quality is a critical dimension of universal health coverage. Since the launch of the WHO Patient Safety Programme in 2004, over 140 countries have worked to address the challenges of unsafe care. However studies indicate approximately 10% of patients admitted to hospital suffer an adverse event (AE) (Neale et al 2001) resulting in injury, prolonged admission or death. Older people living with frailty are more likely to suffer from these with increased severity and are disproportionately affected by Patient Safety Incidents (PSIs). Patient safety issues are the avoidable errors in healthcare that can cause harm to patients. People aged over 85 years make up 8.3% of admissions but 21% of PSIs.

Checklists are well established and recognised as contributing to improved safety within the airline industry (Degani et al 1993). This approach has been translated and applied into surgical operating theatres (Clay-Williams et al 2015). The World Health Organisation's (WHO) Surgical Safety Checklist was developed after extensive consultation aiming to decrease errors and adverse events, and increase teamwork and communication in surgery. The 19-item checklist has gone on to show significant reduction in both morbidity and mortality and is now used by a majority of surgical providers around the world.

However although evidence suggests checklists can make a valuable contribution to improved safety within both the aviation and health sector there are cautionary reminders of the challenges of adopting and using a check and challenge approach to safety. A report prepared for the Health Quality and Safety Commission of New Zealand in 2012 concluded the surgical checklist undermined professional judgement and there was far less of a focus on teamwork and communication. Some theatre personnel felt that the checklist has become unmanageably complex, containing too many checks that are not critical to the majority of surgical procedures conducted in New Zealand. The inclusion of non-applicable answers and spaces for comments and signatures also complicates the checklist and can make it unmanageable. Degani et al (1993) undertook an extensive human factors review of aviation checklists and concluded there are several problems associated with checklist phraseology that have led some pilots to err while conducting the checklist.

The aviation industry may have a perceived higher risk yet better safety record than health care. There is a 1 in 1,000,000 chance of a traveller being harmed while in an aircraft while in comparison, there is a 1 in 300 chance of a patient being harmed during health care (WHO). However, the health care system is more complex than aviation. For example, more professionals are involved in health care than aviation (pharmacists, physicians, different types of nurses, physical therapists, respiratory therapists, and more), and they often train and practice in their own professional “silos,” thereby making communication and cooperation challenging. These professionals also interact with a greater variety of devices than in aviation, and the object of their work, the human body, is more complex than an airplane.

So while checklists are recognised approaches to improving safety there are factors to consider in enhancing their effectiveness and when applied to differing contexts of use.

3. frailsafe

FRAILsafe was first conceived through an Institute for Healthcare Improvement (IHI) 90 day Research and Development cycle in 2010. A checklist was designed to be a ‘check and challenge’ list triggering an interaction between the senior doctor and another member of staff (e.g. nurse or junior doctor) on acute medical assessment units (AMUs).


In 2012 the British Geriatrics Society formed the FRAILsafe network – a small group of geriatricians aiming to design and improve the older patient safety checklist into a usable and effective tool. The hazards identified in FRAILsafe were initially defined by a literature search undertaken for evidence in two areas; harm to older patients in the acute setting and best care to avoid the harm. This literature review was then discussed with experts in patient safety and geriatric medicine across the USA and UK, including the British Geriatrics Society and the American Geriatrics Society.


Six versions of the checklist (fig. 1) were created by a team of enthusiastic geriatricians who identified the most common and highest-impact issues that can result in harm to patients during the first few days of acute care.


- Confusion (identifying delirium and underlying dementia)
- Equipment related
- Reduced mobility
- Falls
- Pressure ulcers
- Poor advanced care planning
- Medication: adverse drug reactions

FRAILsafe ^(v6)

Date: / /

Phase 1 – Patient Identification	
CONFUSED? REDUCED MOBILITY? CARE HOME RESIDENT?	 If the answer is YES to any of these proceed to phase 2

Phase 2: Clinical Response	Circle	Action if YES
Confusion Is there delirium? Is there a diagnosis of dementia?	Y / N Y / N	Follow local guideline Follow local guideline
Equipment Cannula Urinary Catheter Bed rail	Y / N Y / N Y / N	 Is it still required?
Reduced mobility	Y / N	Document a mobility plan for the next 24 hours
Falls risk	Y / N	Follow local guideline
Pressure sore risk	Y / N	Follow local guideline
Advance care plan Resuscitation status considered Escalation decision made	Y / N Y / N	Consider if DNAR form needs completing. Circle maximal escalation level: Ward / level 2 / level 3

 Has a medication review been completed? <input type="checkbox"/>

Phase 3 – daily monitoring	Day 1	Day 2	Day 3	Day 4	Day 5
New or worsening confusion?	Y / N	Y / N	Y / N	Y / N	Y / N
Equipment reviewed?	Y / N	Y / N	Y / N	Y / N	Y / N
Mobility plan documented?	Y / N	Y / N	Y / N	Y / N	Y / N
Signature/initials					

Figure 1. Version 6 of the FRAILsafe checklist

Further development of FRAILsafe was enabled following a competitive funding award from the Health Foundation. The authors were part of a new FRAILsafe lead team that included; the British Gerontology Society, Royal College of Physicians, Sheffield Teaching Hospitals, Nottingham University Hospitals and (CLARHC) (NIHR) North West London. The design team were invited to contribute to the project following a successful collaboration with one of the lead partners in a project that aimed to improve the self-efficacy in spinal cord injury patients through ‘design thinking’ (Wolstenholme et al 2014). FRAILsafe was supported through the Health Foundation as part of the Breakthrough Series designed to help organizations by creating a structure in which interested organizations can easily learn from each other and from recognized experts in topic areas where they want to make improvements. A Breakthrough Series Collaborative brings together a large number of teams from hospitals or clinics to seek improvement in a focused topic area. The project engaged 12 hospitals that were purposively sampled to replicate the proportion of patients in District General / Teaching and Urban / Rural settings around the UK. Hospitals were sampled in all four nations to allow understanding of institutional and local political issues that might influence broader roll-out and evaluation of the frailsafe tool.

4. Method

The Breakthrough Collaborative and the use of the FRAILsafe tool in acute settings would aim to advance multidisciplinary thinking and conversation about frailty assessment within 24 hours of patient admission, contribute to the flattening of hierarchies and improve communication at critical hand-offs. This would lead to higher awareness of harm avoidance for frail populations across specialties (particularly acute care staff) and help identify whether the clinical assessments that are currently in place in a hospital are being completed reliably and communicated adequately.

Early contribution from the Design research team was to propose a series of mnemonic devices to help support the paper checklist (tool). The FRAILsafe identity was a key factor in this and a new logo evolved (fig 2). The capital letters of FRAILsafe were replaced with lower case to suggest a softer approach and place more emphasis on safety.



Figure 2. *frailsafe* logo

The 'check list' was adopted to collect data for analysis and evaluation and intended as a transient tool that would ultimately change behaviour and culture within clinical teams. The *frailsafe* checklist was to be used on Acute Medical Units across the UK and it was important to establish an understanding of the environment that it would be used in, who would be completing the tool, and how it might fit within the initial 24 hours clerking of a patients care. Consequently the Design researchers (authors) worked with the *frailsafe* evaluation team who were from the Collaboration for Leadership in Applied Health Research and Care (CLARHC) (NIHR) North West London in observation across the 12 hospitals. Together they spent more than 100 hours shadowing different health professionals, following ward rounds, board rounds, triage meetings, handover discussions and multidisciplinary (MDT) meetings.

Site visits consisted of:

- Interviewing all relevant members of the clinical team, these included; consultant, junior Dr, nurse, pharmacist, therapist. It became clear that each site adopted different practices and therefore interviews took place with people outside these

roles. These interviews were in two parts; the first to develop insight about their role and engagement with frail patients, and secondly to discuss version 6 of the frailsafe tool (prior to Design involvement)

- Observation on Acute Medical Units
- Observing the clerking of a patient
- Collating all the notes required to clerk a patient.
- Following a patient journey (not possible on some of the visits)

Detailed ethnographic notes were kept during observation and from over 50 informal discussions which provided background to contextualise the information gained through the research and focus the enquiry.

Findings from the hospital site visits are summarised below (fig 3).

Development Area	Comments/ Feedback
Layout and Flow	Unclear how to work through the form
Phase Three section (included in version 6)	It would be difficult to follow up on and unsure of the results
Wording ambiguities/concerns	Clarity required over the definition and intention of terms such as; medication review, Resuscitation status
Yes/No options	What does a yes/no answer mean? Yes its been completed or yes I have checked to see if its been completed or yes the person has?
Signatures and dates	Accountability is important, how will we know who has done the form
Feedback and the so what? question	What are the outcomes/implications once the checklist is complete.
Patient	How can the patient be kept at the forefront of the checklist?

Figure 3. feedback from hospital site visits on frailsafe checklist version 6

Following the site visits the frailsafe team iteratively developed the checklist tool (fig 4).

The figure shows two versions of the 'frailsafe' checklist. The left version is divided into 'Phase One' and 'Phase Two'. Phase One includes 'Patient Identification' (I am confused, I am from a carehome, I have reduced mobility) and 'Assessments' (Delirium, Dementia, Mobility, Falls, Pressure ulcer). Phase Two includes 'Advance Care planning' (resuscitation status), 'Medications' (drug history, reconciliation), and 'Equipment' (cannula, catheter, bed rails). The right version is a more streamlined checklist titled 'Do you think I am frail?' with a summary question 'Am I confused? Do I live in a care home? Do I have reduced mobility?'. It includes sections for 'Assessments' (Delirium, Dementia, Mobility, Falls, Pressure ulcer), 'Equipment' (cannula, catheter, bed rails), and 'Medications' (reconciliation, review). Both versions include a 'Date of form completion' field.

Figure 4. frailsafe checklist version 7 & 8

In response to the findings from the site visits the design layout was changed with careful consideration to wording (phraseology) and hierarchy of information. Phase three was omitted and significantly questions were framed from the patient perspective. During observations in hospital wards, the team had informal discussions with members of the improvement teams and other staff involved directly or indirectly with the frailsafe project. For example a change from Confused? (version 6) to, Am I confused? (version 8). The aim was to put one of the two clinical staff who would engage in the frailsafe checklist in the situation of the patient.

The Design of the checklist was also important so that data could be easily collected by the evaluation team. Data was to be captured on each of the 11 elements on the frailsafe checklist; whether delirium, dementia, mobility, falls, and pressure ulcer assessments had been completed; whether resuscitation status had been considered; whether cannulas, catheters, and bed rails (i.e. equipment) were present and whether they were still needed; and whether medicines reconciliation and review had been completed.

Version 8 of the frailsafe tool was issued to all 12 sites for implementation with follow up visits to each site by the evaluation team as part of the evaluation.

5. Co-Design activity. Learning sessions

Beyond using the tool in clinical practice, the frailsafe project also brought together staff members from different disciplines to form local improvement teams for the Breakthrough Collaborative events. Three two-day learning sessions were scheduled over the duration of the project. The two-day residential events located away from the immediate local pressures of work provided an opportunity to update the participants on progress, share and reflect on findings from the ongoing data collection. Importantly these learning sessions offered a creative space to collaboratively engage in co-design through a series of Design activities that were developed and facilitated by the design researchers.

Three iterative cycles of co-design activities offered clinical staff (number approx. 60) from the 12 geographically diverse hospital trusts the opportunity to be integrally involved in the design and evolution of the frailsafe tool. The events included a series of creative activities to; exercise creative thinking, challenge current practices and paradigms, encourage, develop and promote the value of team working, develop the frailsafe tool, where it might fit within the admissions and care cycle and share best practice (fig 5). Data was collected through this process and included visual recordings (drawings and photographs) and verbal responses to conceptual ideas prototypes. Interviews were also undertaken throughout.



Figure 5. Breakthrough collaborative co-design event.

Between the co-design events the local improvement teams were encouraged to contact the design researchers to help realise ideas that emerged from their site teams to help customise frailsafe to integrate within their local protocols. This included for example, mugs, stickers and posters to help embed a local culture that would facilitate improved care for frail older patients in AMU (fig 6).



Figure 6. examples of mnemonic devices

The design team also produced a series of videos (fig. 7) to help the wider teams at each site understand the value of frailsafe and the ways it might be implemented.



Figure 7. stills from frailsafe videos

6. Findings

A multi-method approach involved the collection and analysis of data from 7021 completed checklists, 139 interviewees, and over 100 hours of observation across the 12 hospitals. The data collected (with help from the Design team) and analysed by the evaluation team concluded a combined overall frailsafe compliance for the whole period was 22.5% (by site Median = 7%, range: 0.2%-53.4%) (i.e. all 11 elements of checklist recorded as being delivered to local practice for a single patient, any single missed means not overall compliant). Compliance with each individual frailsafe

assessment component for all sites over the whole study period ranged from 58.4% (medicines reconciliation) to 87.6% (pressure ulcer assessment).

Feedback was also collected after the learning events, with 180 feedback forms returned and analysed (around 100% return rate).

From quantitative data collected it is difficult to establish any meaningful measures to determine a reduction in mortality, length of stay etc, etc (there are so many other factors to skew data). There were however overall direct and indirect benefits of the frailsafe project that emerged from the broader evaluation. In summary:

- Perceived value in identifying frailty and highlighting assessments requiring completion.
- Provided momentum to focus on frailty work within some of the hospitals and contributed to improvements in frailty practices related to the frailsafe checklist.
- Helped identify deficiencies in related processes including frailty assessment practices.
- Improved professional relationships and joint working within some of the site teams.
- Teams valued learning from the Breakthrough Collaborative on how to think about frailty and found it useful to benchmark what they found to be their local deficiencies against other hospitals.

People found their participation in the improvement team as one of the most rewarding aspects of the project and in some cases showed spill-over effects in the wards. The project provided a platform and protocols for increased multidisciplinary working and enhanced communication on what constitutes good care for older patients in AMU

However the evaluation concluded there were limitations. In summary;

- Lack of clarity around how the frailsafe checklist is best used including where, when and by whom. The original plan for using the checklist as part of a 'check-and-challenge' conversation directed from junior to senior members of staff rarely materialised.
- Variation from planned purpose: frailsafe was most commonly used by individual members of staff (as opposed to a conversation between two or more people). As a consequence the tool was often perceived to be part of an audit, rather than to form the core of a 'check and challenge' quality improvement process.
- Minimal engagement of NHS non care of the elderly specialists in using the tool.
- Little impact on communication across clinical teams (beyond members of the improvement initiative)
- or on flattening of hierarchies where these pre-existed.

In an effort to be flexible towards local practice, sites were asked to trial the frailsafe tool in a way that best fitted their own processes. While there were many positive aspects to this approach a consequence was most staff members diverged from the original purpose of the project which was

to initiate conversations within the ward round and used the frailsafe form as an 'another piece of paper'. The variation from the planned purpose of a conversational approach between or more people is cited as a problem in most of the aviation checklist literature but may not fully undermine the value of implementing a checklist approach. Despite minimal engagement of non care of the elderly specialists the project has raised awareness for care of the elderly in AMU. The intention to flatten hierarchies and reduce the authority gradient was not realised in sites where steep hierarchies and less collaborative relationships existed between team members and highlights the challenge of engaging management to influence sustainable cultural and behaviour changes in healthcare systems.

7. Conclusion

Extended life span will bring an increase in chronic health conditions and place significant demands on our health services. Current modes of care are unsustainable and as a consequence we will see an inexorable change in the way our future health care is delivered and received. Creative and innovative approaches are needed to enable a paradigm shift and design has an important role to play. Designers will continue to apply their skills responding to technological innovation developing safer, more efficient products enhancing usability for use in the delivery of alternative models of care. However frailsafe presents an example of how design might also be applied to empower communities and providers of healthcare through adopting a co-design culture to develop and implement local solutions.

frailsafe was created to explore whether a check and challenge approach could be translated into the complexity of acute medical care and safety of older patients. Gathering sufficient meaningful quantifiable data to establish whether frailsafe for example improves safety and reduces length of stay was not possible within the time frame and resource of the project and due to so many complex variables. However findings show that participants valued the opportunity to engage in the design process. Not only did this offer the opportunity for customisation and ownership of the frailsafe tool by staff but the process itself acted as a vehicle to build communication and improve team working – key aims of the overall study.

The process of engaging in design activities can help individuals and communities rethink and reframe current protocols. Findings demonstrate how it helped staff identify deficiencies in current related processes including frailty assessment practices. Design can facilitate and enhance communication providing alternative vehicles for understanding and translating knowledge and the frailsafe project improved professional relationships and joint working within some of the site teams. While co-design approaches have the potential for providing individuals with a voice and flatten hierarchies the frailsafe project has however demonstrated the challenge of engaging management in the process.

The frailsafe project presents an insight into ways design can contribute to shifting the culture and the way that particular practices in health are performed. Utilising design as a more traditional intervention it importantly created an identity and visibility for the frailsafe initiative. Designers worked closely with the health evaluation team helping construct and conduct interviews bringing a designers lens to the observations during the site visits. The Design team were instrumental in the design of the frailsafe checklist not only in terms of its layout but also in terms of its content. The design team also facilitated the collaborative series of learning sessions where participants

increasingly took responsibility for how the frailsafe check and challenge could be locally implemented.

Reforming health services presents a significant but inevitable challenge and design is well suited to deal with the complex interdependencies. Co-design is an increasingly familiar component to research activity where designers often play a key role. Co-design is frequently adopted to define the parameters on which designers can deploy their technical creativity to ultimately create a tangible product outcome. While we witness a radical change to our future health care we propose we will increasingly see an extension in the role of design in healthcare. There is much scope for designers to facilitate co-design that can be embedded as a lasting legacy in communities helping them to learn from each other through improved communication and empowering them to create and implement their own new ideas.

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