







OPEN ACCESS

# Sustaining interventions in care homes initiated by quality improvement projects: a qualitative study

Reena Devi <sup>1,2</sup>, Graham P Martin <sup>3</sup>, Jaydip Banerjee <sup>4</sup>,  
John RF Gladman <sup>5,6,7,8</sup>, Tom Dening <sup>5</sup>, Atena Barat <sup>9</sup>,  
Adam Lee Gordon <sup>5,8</sup>

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/bmjqs-2021-014345>).

For numbered affiliations see end of article.

## Correspondence to

Dr Reena Devi, School of Healthcare, University of Leeds, Leeds LS2 9JT, West Yorkshire, UK; [r.devi@leeds.ac.uk](mailto:r.devi@leeds.ac.uk)

Received 9 October 2021  
Accepted 2 February 2022

## ABSTRACT

**Introduction** Inadequate and varied quality of care in care homes has led to a proliferation of quality improvement (QI) projects. This study examined the sustainability of interventions initiated by such projects.

**Method** This qualitative study explored the sustainability of seven interventions initiated by three QI projects between 2016 and 2018 in UK care homes and explored the perceived influences to the sustainability of interventions. QI projects were followed up in 2019. Staff leading QI projects (n=9) and care home (n=21, from 13 care homes) and healthcare (n=2) staff took part in semi-structured interviews. Interventions were classified as sustained if the intervention was continued at the point of the study. Thematic analysis of interview data was performed, drawing on the Consolidated Framework for Sustainability (CFS), a 40-construct model of sustainability of interventions.

**Results** Three interventions were sustained and four interventions were not. Seven themes described perceptions around what influenced sustainability: monitoring outcomes and regular check-in; access to replacement intervention materials; staff willingness to dedicate time and effort towards interventions; continuity of staff and thorough handover/inductions in place for new staff; ongoing communication and awareness raising; perceived effectiveness; and addressing care home priorities. All study themes fell within 18 of the 40 CFS constructs.

**Discussion** Our findings resonate with the CFS and are also consistent with implementation theories, suggesting sustainability is best addressed during implementation rather than treated as a separate process which follows implementation. Commissioning and funding QI projects should address these considerations early on, during implementation.

## INTRODUCTION

Quality improvement (QI) involves multiple interactions between individuals and systems to develop, implement and embed change. Once improvements are achieved, a further challenge is sustaining that change.<sup>1</sup> A review in 2012 noted

## Key messages

### What is already known on this topic?

► Sustaining improvements to care is a challenge. The Consolidated Framework for Sustainability (CFS) describes factors that influence sustainability; generalisability of the CFS to care homes is not yet clear.

### What this paper adds?

► Interventions initiated in care homes by quality improvement projects are not always sustained, and 18 (out of 40) CFS constructs influenced sustainability in care home settings.

### How might this study affect research, practice or policy?

► Influences on sustainability are consistent with influences on implementation, and so those commissioning, funding and leading quality improvement projects should address sustainability during intervention implementation.

that the sustainability evidence base was underdeveloped.<sup>2</sup> Subsequently, Moore *et al*<sup>3</sup> proposed a comprehensive definition of sustainability: ‘*after a defined period of time, a programme, clinical intervention and/or implementation strategies continue to be delivered and/or individual behaviour change (ie, clinician, patient) is maintained; the programme and individual behaviour change may evolve or adapt while continuing to produce benefits for individuals/systems*’. In addition, Lennox *et al*<sup>4</sup> developed the Consolidated Framework for Sustainability (CFS), comprising



© Author(s) (or their employer(s)) 2022. Re-use permitted under CC BY-NC. No commercial re-use. See rights and permissions. Published by BMJ.

**To cite:** Devi R, Martin GP, Banerjee J, *et al*. *BMJ Qual Saf* Epub ahead of print: [please include Day Month Year]. doi:10.1136/bmjqs-2021-014345

40 constructs that influence the sustainability of interventions in healthcare settings.

Care homes are institutions providing 24-hour support to those no longer able to manage in their own homes.<sup>5</sup> Internationally, different terms are used including nursing homes, residential homes or aged care facilities. The needs of care home residents are complex and require input from multiple professionals working across various organisations.<sup>6</sup> Improving quality of care in long-term care homes is important because of increasing numbers of older people living with frailty and dependency<sup>7,8</sup> and the variable quality of existing services.<sup>9</sup> In the UK, care homes are usually run by private and third-sector organisations. They are seen as social care institutions, receiving healthcare input peripatetically from the National Health Service (NHS). Care homes are smaller, less well-resourced and less well-staffed than healthcare settings such as hospitals, and in the UK there are inconsistencies in education and training for care home staff.<sup>10</sup>

Relatively few studies on the sustainability of interventions in care homes have been conducted.<sup>11–13</sup> Studies to date have not yet reported on the sustainability of interventions implemented in care homes, and the influences on sustainability in this sector are uncertain. The CFS model, developed in healthcare, may offer a useful framework for understanding sustainability in care homes, but this is untested. This study followed recent QI projects in UK care homes and examined the sustainability of interventions, according to the concepts in Moore *et al*'s<sup>3</sup> definition of sustainability (intervention continuation, adaptation and perceived benefits). The perceived influences to sustainability were also explored and compared with the CFS<sup>4</sup> to assess its transferability to care home settings.

## METHOD

### Study design

A qualitative approach using semi-structured interviews was employed. The full study protocol is reported elsewhere.<sup>14</sup> Standards for Reporting Qualitative Research guidelines<sup>15</sup> were followed.

### Study setting

We examined seven interventions initiated by three QI projects in care homes in England between 2016 and 2018. The Proactive Healthcare of Older People in Care Homes (PEACH)<sup>16</sup> project involved four multidisciplinary NHS and care home staff teams in Nottinghamshire, and two interventions were followed-up: multidisciplinary reviews of at-risk residents and a dietician-led nutritional support programme. The Enhanced Health in Care Homes Vanguard (EHCH)<sup>17</sup> was a national project: our study followed up the Nottingham site which covered 52 care homes and included two interventions—the 'Red Bag' scheme in which key information about residents

accompanies them when transferred to hospital and a telemedicine service. The Safer Care Homes<sup>18</sup> project involved nine care homes in Salford and included three interventions: personalising mobility aids ('Pimp My Zimmer'), pressure sensor mats in fall prevention and additional lighting to aid safe toileting ('Luminous Loos'). The seven interventions are summarised using the Template for Intervention Description and Replication (TIDieR) template<sup>19</sup> in table 1. Each QI project is also summarised and presented in online supplemental tables 1–3.

### Participant recruitment and data collection

Data collection took place in 2019, 16–20 months after the PEACH project finished, 17–21 months after the Safer Care homes finished and 15–19 months after the EHCH project finished. The timing of the data collection depended on the timing of the funding and organisation of the study.

Using purposive and snowball sampling, we recruited staff who led the QI projects using contacts named in published reports. Health and care staff with experience of delivering one or more interventions in each QI project were then identified via project staff. Staff were invited to take part via email. Thirty-two participants were recruited; 9 were project staff, 21 were care home staff (recruited from 13 care homes) and 2 were NHS staff. Table 2 illustrates the split of project staff recruited across the three QI projects, the number of care homes where interventions were used and the number of frontline staff participants commenting on each intervention. Eight (out of the 13) care homes represented in the sample initiated more than one intervention, and 13 (out of the 23) frontline staff participants had experience of more than one intervention.

All interviews were carried out face-to-face. Twenty-four were one-to-one interviews and four included two interviewees; interviews lasted between 17–123 minutes. Two interview guides were used to inform data collection, one for project staff and the other for frontline care home and NHS staff. Both interview guides started with general questions about experiences of the QI project and participants' experience of the sustainability of interventions. Questions focused on understanding what influenced sustainability, and prompting questions were used to understand more about influences of sustainability. The interview guide used with care home and NHS staff included additional questions on whether or not the interventions initiated during QI projects had been sustained. These questions were shaped using Moore *et al*'s definition of sustainability,<sup>3</sup> checking whether the intervention had been maintained, whether it had evolved/adapted and whether the change continued to produce benefits. Questions were phrased using appreciative inquiry principles<sup>20</sup> to minimise participants feeling a sense of guilt or responsibility if reporting interventions to have stopped and not sustained. Throughout the interviews, prompts were used

**Table 1** Descriptions of the projects and their interventions

Interventions initiated across QI projects	Why	What (materials)	What (procedure)	Who provided	How	Where
PEACH: Multidisciplinary (MDT) review meetings for care home residents at risk of deterioration	MDT review meetings to identify and review residents at risk of deterioration.	Triage tool developed with care home staff and used to enable care home staff to describe concerns about residents in a structured way.	Care home staff complete triage tool for residents selected at risk of deterioration. Completed triage tool was reviewed by dementia outreach and care home specialist nurse with access to NHS records. Multidisciplinary team members met at the care home to discuss resident, and the team implement care plan.	Care home staff, dementia outreach and care home nurse specialist, GP, voluntary sector representative.	Face-to-face group meeting.	Care home.
PEACH: Dietician-led nutrition support to care homes	Malnutrition and undernutrition are prevalent in care homes, cause morbidity and are treatable.	Training materials for care home staff around nutrition, diabetes, the Malnutrition Universal Screening Tool (MUST) and an information pack containing a food diary, MUST protocol and homemade recipes for fortified drinks, high calorie snacks and finger foods.	A dietician visited care homes to build relationships with staff and identified specific training needs. Dietician, GP and care home staff carried out dietetic reviews on residents with high MUST scores (based on assessments performed by care home staff) and dietetic care plans developed.	Care home staff training, dietician and GP.	Face-to-face meetings at homes. Care plans were made available using existing function on GP computer system.	Care home and GP practice.
EHCH: Red Bag	Shorten hospital stays using a 'Red Bag' which contained items designed to improve communication between care home staff, paramedics and hospital staff.	Each Red Bag contained key paperwork, medication and personal belongings (eg, slippers, dentures and clothes) needed when admitted to hospital.	Care home staff provided paramedic staff with the Red Bag. The Red Bag travelled with the resident to the hospital and stayed with them throughout their hospital stay.	Each Red Bag was prepared by care home staff, and paramedic and hospital staff ensured the Red Bag travelled with the resident.	Paramedic and hospital staff had access to key information, medications and other items needed throughout the residents' hospital stay.	Care home and hospital.
EHCH: Telemedicine	To reduce number of 999 calls and provide advice to care home staff and residents using a teleconferencing service.	Teleconferencing equipment.	Health and social care teams were linked through a single point of access, and care plans and protocols were shared with these teams.	GP in-hours services, GP extended-access services, GP out-of-hours services, NHS 111 rapid-response health and care teams and the local ambulance service.	Telemedicine technology was used to exchange decision-making information between health and social care professionals and residents.	Phone calls and video-conference.
Safer Care Homes: Pimp My Zimmer	Walking aids were personalised to help residents recognise and use their own walking aid.	Decorative materials were used to personalise each resident's walking aid.	Care home organisations purchased decorative craft materials that could suitably attach to a walking aid, and residents were involved in decorating their walking aids.	Care home staff.	Walking aids were decorated with the resident, choosing decorative material which matched their interests and preferences.	Resident used walking aid in all locations of care home.
Safer Care Homes: Floor Sensor Mat	To prevent falls through alerting care home staff to the whereabouts of residents.	Floor pressure sensor mat.	When a resident stepped onto the floor an alarm alerted care home staff to provide assistance to reduce the risk of the resident falling, particularly those residents attempting to walk without aids.	Care home staff.	The floor pressure sensor mats were placed in bedrooms and positioned next to each resident's bed.	Resident bedroom.

Continued

**Table 1** Continued

Interventions initiated across QI projects	Why	What (materials)	What (procedure)	Who provided	How	Where
Safer Care Homes: Luminous Loos	Placing luminous lights on toilets to prevent falls when residents used the bathroom in the dark.	Battery-powered lights placed on toilets.	Care home staff identified residents who need this intervention and put the battery-powered light strips in place.	Care home staff	The luminous light stripes activated when movement is detected in the bathroom.	Resident bathroom.

NHS, National Health Service; QI, quality improvement.

to explore relevant issues as they emerged. All interviews were audio-recorded and transcribed verbatim.

**Researcher characteristics**

The study was conducted by researchers with expertise and experience of care home and implementation science research and qualitative research. AB conducted interviews and was not known to participants; RD joined AB when interviewing four participants who were known to RD.

**Data analysis**

Interview transcripts were analysed using thematic analysis.<sup>21</sup> One researcher (RD) coded the data (our protocol had specified double coding but resource limitations precluded this), identifying data relating to the concepts contained in Moore *et al*'s definition of sustainability (intervention continuation, adaptation and perceived benefits<sup>3</sup>). Interventions were classified as sustained if the intervention was continued at the point of the study. Data providing insight into the reasons why interventions stopped or continued were also coded: CFS constructs<sup>4</sup> were used as code labels where relevant (deductive), and new code labels were created where data did not align well with the CFS (inductive).

A coding matrix (in Microsoft Excel) was used to organise coded data in which the rows were interventions, the columns were code (and subcode) labels, and pseudonymised data excerpts were inserted into the

cells of the matrix. Organising data in this way enabled the lead researcher (RD) to identify similarities, differences and recurring patterns across the seven interventions around what participants perceived to influence the sustainability of interventions. Relevant codes were grouped and themes developed. All sustainability themes were mapped against the CFS constructs to identify which constructs closely related to each theme content, while also exploring whether themes exposed insights outside of the CFS. The study team discussed successive drafts of the analysis and interpreted the findings. Study findings were reviewed and discussed by all authors to reach consensus.

**RESULTS**

**Intervention sustainability**

According to interviewees, three interventions were sustained in at least one care home (PEACH dietician-led nutrition support, EHCH Red Bag scheme and EHCH telemedicine); the other four were not. Table 3 summarises the data presented regarding interventions' sustainability against Moore *et al*'s<sup>3</sup> indicators.

PEACH: dietician-led nutrition support

Care home staff in three (of four) homes maintained the following activities: using high-calorie recipes, providing high-calorie snacks and fortifying foods; working with a GP to determine and obtain nutritional supplements for residents; and monitoring resident

**Table 2** Participants recruited across QI projects and interventions

QI project	Number of project staff participants	Interventions initiated during QI project (N=number of care homes represented in participant sample)*	Number of frontline staff with experience of interventions†
PEACH	3	Multidisciplinary (MDT) review meetings for care home residents at risk of deterioration (1) Dietician-led nutrition support to care homes (4)	Care home staff=3 NHS staff=2 Care home staff=6
EHCH	3	Red Bag (11) Telemedicine (2)	Care home staff=19 Care home staff=5
Safer Care Homes	3	Pimp My Zimmer (1) Floor Sensor Mat (3) Luminous Loos (1)	Care home staff=1 Care home staff=4 Care home staff=1

\*8 care homes initiated more than one intervention.

†13 participants commented on more than one intervention.

NHS, National Health Service; QI, quality improvement.

**Table 3** Summary of intervention sustainability

QI project	Intervention (number of care homes represented)	Sustainability indicators (Moore <i>et al</i> 2017)		
		Number of care homes where the intervention continued to be delivered (% of care homes where intervention has continued)	Number of care homes where the intervention had evolved/adapted	Number of care homes reporting continued benefits to intervention use
PEACH	MDT review meetings (1)	0	0	N/A
PEACH	Dietician-led nutrition support (4)	3 (75)	1	3
EHCH	Red Bag (11)	6 (55)	2	5*
EHCH	Telemedicine (2)	2 (100)	0	2†
Safer Care Homes	Pimp My Zimmer (1)	0	0	N/A
Safer Care Homes	Floor sensor mats (3)	0	0	N/A
Safer Care Homes	Luminous Loos (1)	0	0	N/A

\*1 out of 6 care homes continuing to use the Red Bag described downsides to continued use.

†1 out of 2 care homes continuing to use the telemedicine intervention described both benefits and downsides to continued use.

MDT, multidisciplinary ; QI, quality improvement.

weight and food intake. In one care home, nutritional support was further enhanced by introducing specially designed plates and cutlery (eg, easy-grip cutlery and plate guards to stop food falling off plates) during mealtimes. Care home staff described continuing benefits: providing nutritional support in a person-centred way and developing strategies to identify and support residents losing weight.

#### EHCH: Red Bag

Care home staff in 6 (of 11) care homes continued to use Red Bags in the event of an emergency admission to hospital. In two care homes, the intervention had been adapted. One care home added a 'This Is Me' sheet, providing hospital staff with more personalised information; in the second care home, a member of staff accompanied the resident to the emergency department to ensure the paramedic and hospital staff used Red Bag information. Reported benefits of continued use of the Red Bag were mixed. In some instances, the Red Bag helped care home staff to feel prepared for hospital admissions, and for residents who did not own travel bags the Red Bag offered an appropriate and dignified way of taking information and personal items to hospital. However, participants reported that the Red Bag did not consistently work well at improving communication because paramedics and hospital staff did not always use the information inside the Red Bag, and the Red Bag sometimes went missing during the hospital journey.

#### EHCH: telemedicine

Care home staff in two (of two) care homes continued to use the telemedicine intervention. There were no reports of further evolution or adaptation. There were mixed findings regarding whether continued use of the telemedicine intervention brought sustained benefits. Participants reported that the intervention helped to avoid emergency admissions to hospital. In a care home without nursing, it gave care workers

the opportunity to discuss issues with a clinician, helped with organising changes to prescriptions and facilitated appropriate referrals. In a care home with nursing, one participant stated that the telemedicine intervention helped provide a second opinion and reassurance during decision making, as long as the advising clinician was supportive and did not undermine the care home nurse's viewpoint. Participants described how the virtual nature of the intervention worked well for some issues (eg, wounds and rashes), but less well for more complex issues that might require face-to-face assessment. Sometimes, the telemedicine team required clinical information that care home workers could not provide. The intervention had time and workload implications, with staff experiencing long waits before connecting to an operator, followed by lengthy discussions to provide resident details and describe the health issue. When issues could not be resolved by telemedicine, this was perceived as wasted effort. Technological problems were also described.

#### Perceived influences on sustainability

The analysis produced seven themes: monitoring outcomes and regular check-in; intervention materials; staff workload; staff continuity; ongoing communication and awareness raising; intervention effectiveness; and care home priorities.

#### Monitoring outcomes and regular check-in

Participants continuing with the three interventions had established processes to help sustain the interventions. These focused on monitoring effectiveness and on opportunities to raise and discuss issues. Participants using the telemedicine intervention described that a representative from the service regularly shared progress and outcome metrics regarding service use and number of hospital admissions avoided and those continuing with nutrition support reported ongoing monitoring of each resident's weight.

*Someone from the Telemed service comes twice a year, she went through the graph to show how many times we'd phoned them and how many times we'd avoided emergency intervention by using that service and I saw its benefit. I think sometimes you need something, maybe pictorial in front of you to demonstrate the benefits of it. I could see oh it's actually worked, we've stopped three hospital admissions by using the service. So I think when you've got something hard... hard evidence to go on it reinforces why it's good to use it. (Care home staff 12)*

Alongside monitoring effectiveness, participants also noted opportunities for staff to raise and discuss issues. Participants using the telemedicine intervention described how the service representative carried out regular connectivity checks. Participants continuing to provide nutrition support described how staff (management staff, care workers and kitchen staff) raised and discussed concerns, suggested ideas and asked questions during meetings, handovers and huddles. Project staff involved in implementing the Red Bag intervention contacted the care home regularly to check for and help find missing bags.

*Meetings, we have what we call flash meetings, daily meetings, so if there's... we discuss any things, any changes, anything that we're doing through staff meetings. And flash meetings, so heads of department, so you have kitchen staff, so if there's anything for them, dietetics, if we're worried about people losing weight or anything like that, it's discussed at those meetings every day. So it keeps it to the forefront of your mind really. (Care home staff 15)*

#### Intervention materials

Physical materials were needed for interventions to continue. A recurring insight from the Red Bag intervention was that bags were often not returned to the care home when residents were discharged. Project staff reported that because the initial project was fixed-term, with non-recurrent funding, it was not possible to replace Red Bags.

*I think sometimes with the Red Bags sometimes don't come back and we have to chase them, so sometimes they get lost in the hospital or something. So that would affect using it again. (Care home staff 10)*

Similarly, telemedicine intervention participants emphasised the need to keep all equipment (charger, web-cam and monitor) together and the need for strong Wi-Fi. If one component of the equipment was lost, or if Wi-Fi signal became poor, then it was impossible to continue using the intervention.

*The camera could be better on it instead of something that just rests on the top. It needed to be attached so it can't be lost, it needs to be able to move but things get lost, you know what care homes are like, chargers get lost and everything. That's the only thing I would*

*change, glue it all together so nobody can take anything off it. (Care home staff 7)*

#### Staff workload

Staff time and effort were also needed to sustain intervention use. Participants described the need to balance the required time and effort with the benefits to be gained and reluctance to dedicate effort to interventions perceived to lack benefits. Continuing with the Red Bag intervention created workload demands, including keeping it updated for each resident, setting up content for new residents, and reviewing and signing-off paperwork by senior staff. Staff motivation was reduced when Red Bags were lost in hospital or when hospital staff did not use the information inside the Red Bag. The telemedicine intervention was time-consuming for care home staff, but participants persevered with it because of perceived benefits (eg, avoiding emergency hospital admissions).

*So to be involved means that we've got to have more staff time. So you have to balance between what are the benefits, and what can we afford, in terms of staff and time and money. (Care home staff 21)*

#### Staff continuity

Staff continuity helped to sustain interventions; conversely, involvement of new staff or agency staff increased the risk of interventions stopping. For example, in the MDT review meeting intervention, a care home manager who had played a key role left the organisation, and the manager's replacement was simply unaware of the intervention. Similarly, participants described occasions where new staff's unfamiliarity with the Red Bag meant residents were sent to hospital without the bag. With the nutrition support intervention, low staff turnover, and thus staff continuity, meant that staff were familiar with the intervention and well acquainted with residents' individual food preferences, likes and dislikes. Although staff continuity is clearly beneficial, it cannot always be assured, so thorough staff handovers and induction training were needed for new staff.

*When staff members have changed, they need to make sure things get passed to new staff. The old manager didn't pass it onto the new manager. (Project staff 8)*

#### Ongoing communication and awareness raising

Continued input from project staff was perceived to be needed after projects completed in order to keep the interventions 'live'. This was most noteworthy in the Red Bag intervention, where continued input was needed to regularly contact hospitals to locate missing bags. Project staff also needed to maintain communication and raise awareness among other relevant staff. The intervention relied on care home staff, paramedic and hospital staff all knowing about the Red Bag. One

geographical region where the project was undertaken was extensive, containing three hospitals and thus a large workforce. Raising awareness for all relevant staff across the region and organisations was challenging, requiring persistent and ongoing communication work.

*With the Vanguard and the Red Bag, as soon as it gets to the hospital trust level, it's a massive trust – how shall we tell everybody about the Vanguard? I mean sorry you need to communicate to a whole trust of staff in a whole hospital.* (Project staff 9)

*After the project finishes people still need to talk about it and make sure it is kept 'live'.* (Project staff 8)

#### Intervention effectiveness

Sustained interventions were perceived as beneficial (but had some downsides too). The main reason given for not continuing with the Pimp My Zimmer, Floor Sensor Mat and Luminous Loos interventions was the absence of tangible benefits. Indeed, in some cases their drawbacks were more visible than their benefits. Rather than helping residents see the toilet in the dark, Luminous Loos often caused confusion, with residents wondering why the toilet was illuminated in different colours. With the Floor Sensor Mat, care home staff reported that residents would move the sensor mat aside rather than stepping onto it. Residents with dementia often removed the Pimp My Zimmer decorations from their walking aids.

*If somebody was walking into the toilet and didn't really recognise what it was, they were actually looking at the toilet because obviously it was different colours. So it was like the rim of the toilet inside would be blue, or red, so rather than sitting on the toilet they were scared of it.* (Care home staff 8)

#### Care home priorities

Interventions that addressed priorities were perceived as more likely to be sustained. Project staff commented that if the problem being addressed was not recognised as important, care home staff were unlikely to continue using the intervention. Participants continuing to use the Red Bag described that before the intervention, care home staff identified transporting resident items and information to the hospital as an important issue. Similarly, participants continuing to provide nutrition support reported that, beforehand, residents and relatives raised nutrition and meal choice as requiring attention, and care home staff also had concerns about residents losing weight. One reason for stopping the MDT review meeting intervention was the simple presence of other more pressing issues.

*It's a big priority in the care home, especially because obviously if we are monitoring them because as we know they can get secondary complications if they are starting to lose weight, if it's not monitored properly*

*because it causes a lot of other issues as in obviously more at risk of falls, more at risk of pressure ulcers etc.* (Care home staff 11)

#### Mapping study themes to the CFS

Table 4 lists the sustainability themes and indicates the CFS constructs related to each theme. Overall, the seven themes related to 18 CFS constructs. All contents of the themes could be mapped to at least one CFS construct.

#### DISCUSSION

Three of the seven interventions implemented by three QI projects were sustained 1 to 2 years after the projects completed. Seven themes outline project staff and frontline care home and NHS staff's perceptions around why interventions were sustained: monitoring outcomes and regular check-in; access to replacement intervention materials; staff willingness to dedicate time and effort towards interventions; continuity of staff and thorough handover/inductions in place for new staff; ongoing communication and awareness raising if input from a large workforce is needed; interventions perceived as effective; and interventions addressing care home priorities. The findings resonate with previous sustainability evidence generated from the care home sector,<sup>11–13</sup> and the content of these themes relate to 18 of the 40 constructs in the CFS.<sup>4</sup>

#### Implications for practice

Lennox *et al*<sup>4</sup> assert that theoretical perspectives on sustainability tend to take one of the two positions, viewing sustainability as either a linear process following implementation or a concurrent process alongside implementation. In this study, the seven sustainability themes identified are consistent not only with constructs identified in the CFS but also with theories of implementation: for example, the Consolidated Framework for Implementation Research,<sup>22</sup> Quality Implementation Framework<sup>23</sup> and Normalisation Process Theory.<sup>24</sup> These themes describing influences on sustainability are also important influences on implementation: perceived benefits to using the intervention<sup>24</sup>; fit with the goals of an organisation<sup>24</sup>; staff preparedness to invest time and energy to the intervention<sup>24</sup>; available resources<sup>22 23</sup>; feedback mechanisms<sup>22</sup>; communications<sup>22</sup>; and staff recruitment and maintenance.<sup>23</sup> For these reasons, we are inclined to infer that sustainability is best understood—and achieved—as an integral part of implementation rather than a separate process.

An implication for commissioning and funding QI projects is that plans to implement interventions (in care homes and possibly elsewhere) should include plans for their longer-term sustainability. While the fixed-term funding of QI projects cannot support long-term sustainability activity, there are care home-specific

**Original research**

**Table 4** Sustainability themes and links with the Consolidated Framework for Sustainability (CFS)

CFS constructs—bold text indicating those mapping to identified themes	Sustainability themes						
	Monitoring outcomes and regular check-in	Intervention materials	Staff workload	Staff continuity	Ongoing communication and awareness raising	Intervention effectiveness	Care home priorities
<b>Demonstrating effectiveness</b>	*		*			*	
<b>Monitoring progress over time</b>	*	*					
<b>Training and capacity building</b>				*			
<b>Evidence base for the initiative</b>						*	
Expertise							
The problem							
Project duration							
Improvement methods							
Project type							
<b>Belief in the initiative</b>			*			*	
Accountability of roles and responsibilities							
Defining aims and shared vision							
Incentives							
<b>Workload</b>			*			*	
<b>Complexity</b>					*		
Job requirements							
Stakeholder participation							
Leadership and champions							
<b>Relationships and collaboration and networks</b>					*		
Community participation							
<b>Staff involvement</b>	*						
<b>Ownership</b>	*						*
Power							
Patient involvement							
Satisfaction							
<b>General resources</b>	*	*					
<b>Funding</b>		*					
Infrastructure							
<b>Resource—staff</b>			*	*			
<b>Resource—time</b>			*	*			
<b>Integration with existing programmes and policies</b>							*
Intervention adaptation and receptivity							
<b>Organisational values and culture</b>							*
Organisational readiness and capacity							
Support available							
Opposition							
Socioeconomic and political considerations							
<b>Awareness and raising the profile</b>				*	*		
Urgency							
<b>Spread to other organisations</b>					*		

\*Cells with links.

systems that exist to support on-going QI activity and hence support the sustainability of interventions. In the East Midlands of England, for example, a tool called

the LPZ International Prevalence Measurement of Care Problems in Care Homes is an ongoing initiative which supports care homes by measuring the impact



of QI in care homes.<sup>25</sup> The Nurturing Innovation in Care Homes Excellence in Leeds (NICHE-Leeds)<sup>26</sup> initiative replicates another Dutch model called The Living Lab in Ageing and Long-Term Care<sup>27</sup> and is an ongoing partnership between the care home sector and academia, and within this model researchers are well positioned to provide support when innovating in care homes.

### Future research

The short-term focus on initial implementation of improvement interventions has arguably led to an essential aspect of implementation (sustainability) being overlooked. We advise that future implementation studies routinely include examination of sustainability. In this study, the sustainability themes are set out as individual and distinct; however, the themes are linked and interdependent, and future studies should examine the nature of interaction between themes. The study themes relate to multiple CFS constructs. For example, the *monitoring outcomes and regular check in* theme reflects participants' perception that interventions are more likely to be sustained when outcomes are monitored, and when staff have opportunities to discuss and raise issues (for instance, issues related to equipment). This theme therefore relates to the following CFS constructs: *monitoring progress over time, demonstrating effectiveness, general resources, staff involvement* and *ownership*. Other study themes also relate to these and other CFS constructs. This demonstrates that the study themes and CFS constructs are connected, interdependent and closely interact. This highlights both the complexity of sustainability and that multiple influences need to be addressed. Future studies should move this forward by examining more closely the interplay between influences and assess the combination of influences most closely associated with sustainability—this would help QI experts design effective strategies that target those influences and enhance the likelihood of sustaining interventions.

Future research might also explicitly assess other variables which might reveal other insights into other sustainability influences. Assessing organisational characteristics such as care home size (ie, bed capacity), quality rating, financial (ie, profit vs non-profit) and business model (eg, independent homes vs homes part of a larger chain) may provide insight into whether these impact on the sustainability of new interventions. For example, are interventions more likely to be sustained in larger homes part of a chain of homes as opposed to smaller independently owned homes, because chains might employ dedicated quality assurance teams who play a role in ensuring changes are sustained? Or is the opposite true? Does it become harder to sustain interventions in larger homes where there is a reliance on a larger workforce to maintain the intervention? Organisational level characteristics of this kind do not explicitly feature in the CFS and were not assessed in this study, so it is not possible to answer

these questions. We suggest future studies assess whether organisational characteristics might have explanatory value with regard to sustainability. Alongside intervention sustainability, future studies should also examine the sustainment of other broader secondary outcomes which can result from QI projects, such as sharing of best practice across individual care homes and across wider network of care homes,<sup>28</sup> continuation of the skills and capacity built,<sup>28</sup> staff engagement,<sup>16</sup> and teams developing action plans<sup>16</sup>.

### Strengths and limitations

The project staff and frontline staff delivering interventions provided insight into the operation of the interventions, but it is possible that they were unaware of or did not report matters outside their direct experience, and other influences on sustainability may have been overlooked. Our method relied on informants' recollection and perceptions. Including other data sources such as QI project evaluations, care home internal documentation/reports, and direct observations would help to address limitations of self-report data, and through data triangulation verify staff perceptions of sustainability. Our study was conducted, for practical rather than theoretical reasons, 1 to 2 years after the original QI projects were complete: our findings may not be indicative of the influences on longer-term (5-year to 10-year) sustainability, and this might form a focus for future research. Despite these limitations, we hold that our findings are trustworthy and credible and contribute to knowledge about sustaining QI interventions in care homes.

### CONCLUSION

We studied sustainability in care homes as a concept which is separate from and sequentially follows implementation. However, key components of theories of implementation also align with the influences to sustainability we identified, and thus, sustainability must be addressed alongside implementation. To improve care in the long-term and avoid wasting effort, time and resources, those funding and delivering QI projects must plan for sustainability from the start of projects and should not consider projects complete until conditions for sustainability are in place, that is, ensuring the influences on sustainability outlined in this study have been addressed. Viewing QI projects with this longer-term lens, we suggest, is critical to the longevity of impact created by QI projects in care home settings.

### Author affiliations

<sup>1</sup>School of Healthcare, Faculty of Medicine and Health, University of Leeds, Leeds, UK

<sup>2</sup>Nurturing Innovation in Care Home Excellence in Leeds (NICHE-Leeds), Leeds, UK

<sup>3</sup>Department of Public Health and Primary Care, The Healthcare Improvement Studies Institute, University of Cambridge, Cambridge, UK

<sup>4</sup>Emergency Medicine, Leicester Royal Infirmary, Leicester, UK

<sup>5</sup>Faculty of Medicine and Health Sciences, University of Nottingham, Nottingham, UK

<sup>6</sup>NIHR Nottingham Biomedical Research Centre, Nottingham, UK

<sup>7</sup>Nottingham University Hospitals NHS Trust, Nottingham, UK

<sup>8</sup>NIHR Applied Research Collaboration East Midlands, Nottingham, UK

<sup>9</sup>Centre for Primary Care, Wolfson Institute of Population Health Sciences, Faculty of Medicine and Dentistry, Queen Mary University of London, London, UK

**Twitter** Reena Devi @\_DrReenaDevi, Graham P Martin @graham\_p\_martin and Adam Lee Gordon @adamgordon1978

**Contributors** Conceptualisation: RD, GM, JB, JG, TD, ALG. Data analysis: RD. Data interpretation: RD, GM, JB, JG, TD, ALG. Writing—original draft: RD. Writing—review and editing: RD, GM, JB, JG, TD, AB, ALG. Guarantor: RD

**Funding** This study was funded by Abbeyfield Research Foundation (26). Reena Devi is a Scientific Linking Pin researcher part funded by Nurturing Innovation in Care Home Excellence in Leeds (NICHE-Leeds) initiative. GPM is based in The Healthcare Improvement Studies Institute (THIS Institute), University of Cambridge. THIS Institute is supported by the Health Foundation, an independent charity committed to bringing about better health and healthcare for people in the UK. Adam Gordon is part-funded by the NIHR East Midlands Applied Research Collaboration East Midlands (ARC-EM), The views expressed are those of the author(s) and not necessarily those of the NIHR or the Department of Health and Social Care.

**Competing interests** None declared.

**Patient consent for publication** Consent obtained directly from patient(s)

**Ethics approval** This study involves human participants and ethical approval for this study was provided by both the University of Nottingham, Faculty of Medicine and Health Sciences Research Ethics Committee (Ref: 19040) and the Health Research Authority and Health and Care Research Wales (IRAS project ID: 264342, REC reference: 19/HRA/3813). Participants gave informed consent to participate in the study before taking part.

**Provenance and peer review** Not commissioned; externally peer reviewed.

**Data availability statement** All data relevant to the study are included in the article.

**Supplemental material** This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

**Open access** This is an open access article distributed in accordance with the Creative Commons Attribution Non Commercial (CC BY-NC 4.0) license, which permits others to distribute, remix, adapt, build upon this work non-commercially, and license their derivative works on different terms, provided the original work is properly cited, appropriate credit is given, any changes made indicated, and the use is non-commercial. See: <http://creativecommons.org/licenses/by-nc/4.0/>.

#### ORCID iDs

Reena Devi <http://orcid.org/0000-0003-2834-8597>

Graham P Martin <http://orcid.org/0000-0003-1979-7577>

Jaydip Banerjee <http://orcid.org/0000-0001-9275-4755>

John RF Gladman <http://orcid.org/0000-0002-8506-7786>

Tom Dening <http://orcid.org/0000-0003-3387-4241>

Atena Barat <http://orcid.org/0000-0002-7300-805X>

Adam Lee Gordon <http://orcid.org/0000-0003-1676-9853>

## REFERENCES

- Dixon-Woods M, McNicol S, Martin G. Ten challenges in improving quality in healthcare: lessons from the health Foundation's programme evaluations and relevant literature. *BMJ Qual Saf* 2012;21:876–84.
- Wiltsey Stirman S, Kimberly J, Cook N, *et al*. The sustainability of new programs and innovations: a review of the empirical literature and recommendations for future research. *Implement Sci* 2012;7:1–19.
- Moore JE, Mascarenhas A, Bain J, *et al*. Developing a comprehensive definition of sustainability. *Implementation Science* 2017;12:1–8.
- Lennox L, Maher L, Reed J. Navigating the sustainability landscape: a systematic review of sustainability approaches in healthcare. *Implementation Science* 2018;13:1–17.
- Sanford AM, Orrell M, Tolson D, *et al*. An international definition for "nursing home". *J Am Med Dir Assoc* 2015;16:181–4.
- Gordon AL, Franklin M, Bradshaw L, *et al*. Health status of UK care home residents: a cohort study. *Age Ageing* 2014;43:97–103.
- Barker RO, Hanratty B, Kingston A, *et al*. Changes in health and functioning of care home residents over two decades: what can we learn from population-based studies? *Age Ageing* 2021;50:921–7.
- Kingston A, Comas-Herrera A, Jagger C, *et al*. Forecasting the care needs of the older population in England over the next 20 years: estimates from the population ageing and care simulation (PACSim) modelling study. *Lancet Public Health* 2018;3:e447–55.
- Care Quality Commission. The state of health care and adult social care in England 2019/20, 2020. Available: [https://www.cqc.org.uk/sites/default/files/20201016\\_stateofcare1920\\_fullreport.pdf](https://www.cqc.org.uk/sites/default/files/20201016_stateofcare1920_fullreport.pdf)
- Burger SA. *Exploring education and training in relation to older people's health and social care*. Oxford, UK: Dunhill Medical Trust, 2018.
- Cranley LA, Hoben M, Yeung J, *et al*. SCOPEOUT: sustainability and spread of quality improvement activities in long-term care- a mixed methods approach. *BMC Health Serv Res* 2018;18:1–10.
- Ballard C, Orrell M, Moniz-Cook E, *et al*. Improving mental health and reducing antipsychotic use in people with dementia in care homes: the WHELD research programme including two RCTs. *Programme Grants Appl Res* 2020;8:1–98.
- Fossey J, Garrod L, Tolbol Froiland C, *et al*. What influences the sustainability of an effective psychosocial intervention for people with dementia living in care homes? A 9 to 12-month follow-up of the perceptions of staff in care homes involved in the WHELD randomised controlled TRAIL. *Int J Geriatr Psychiatry* 2019;34:674–82.
- Barat A, Gordon AL, Gladman AL, *et al*. *Sustaining health care innovation in care homes: the SUSTAIN-CH study protocol. East Midlands research into ageing network (EMRAN) discussion paper series*. 31, 2019. <https://www.nottingham.ac.uk/emran/documents/issue-31-emran-oct-2019.pdf>
- O'Brien BC, Harris IB, Beckman TJ, *et al*. Standards for reporting qualitative research: a synthesis of recommendations. *Acad Med* 2014;89:1245–51.
- Devi R, Chadborn NH, Meyer J, *et al*. How quality improvement Collaboratives work to improve healthcare in care homes: a realist evaluation. *Age Ageing* 2021;50:1371–81.

- 17 The framework for enhanced health in care homes, 2020. NHS England and NHS improvement. Available: <https://wessexahsn.org.uk/img/projects/the-framework-for-enhanced-health-in-care-homes-v2-0.pdf> [Accessed February 2022].
- 18 Safer Salford care homes collaborative celebrations, 2018. Safer Salford. Available: <https://safersalford.org/safer-care-homes-summit-2/> [Accessed February 2022].
- 19 Hoffmann TC, Glasziou PP, Boutron I, *et al.* Better reporting of interventions: template for intervention description and replication (TIDieR) checklist and guide. *BMJ* 2014;348:g1687.
- 20 Meyer J, Heath H, Holman C, *et al.* Moving from victim blaming to an appreciative inquiry: exploring quality of life in care homes. *Qual Ageing Older Adults* 2006;7:27–36.
- 21 Braun V, Clarke V. *What can “thematic analysis” offer health and wellbeing researchers?* Taylor & Francis, 2014.
- 22 Kirk MA, Kelley C, Yankey N, *et al.* A systematic review of the use of the consolidated framework for implementation research. *Implementation Science* 2015;11:1–13.
- 23 Meyers DC, Durlak JA, Wandersman A. The quality implementation framework: a synthesis of critical steps in the implementation process. *Am J Community Psychol* 2012;50:462–80.
- 24 Murray E, Treweek S, Pope C, *et al.* Normalisation process theory: a framework for developing, evaluating and implementing complex interventions. *BMC Med* 2010;8:1–11.
- 25 Gordon AL, O'Hagan B, Riley N, *et al.* A quality improvement collaborative focussed on safety in care homes in the East Midlands: lessons learned and possible models for scale-up. *East Midlands Research into Ageing Network (EMRAN) Discussion Paper Series* 2021 [https://rdmc.nottingham.ac.uk/bitstream/handle/internal/9152/Issue41\\_EMРАН\\_June\\_2021\\_Gordon\\_A.pdf?sequence=4&isAllowed=y](https://rdmc.nottingham.ac.uk/bitstream/handle/internal/9152/Issue41_EMРАН_June_2021_Gordon_A.pdf?sequence=4&isAllowed=y)
- 26 Spilsbury K, Devi R, Thompson C. Nurturing innovation in care home excellence in Leeds (NICHE-Leeds), 2018. Available: <https://whs.leeds.ac.uk/> [Accessed February 2022].
- 27 Verbeek H, Zwakhalen SMG, Schols JMGA, *et al.* The living lab in ageing and long-term care: a sustainable model for translational research improving quality of life, quality of care and quality of work. *J Nutr Health Aging* 2020;24:43–7.
- 28 Damery S, Flanagan S, Jones J, *et al.* The effect of providing staff training and enhanced support to care homes on care processes, safety climate and avoidable harms: evaluation of a care home quality improvement programme in England. *Int J Environ Res Public Health* 2021;18:7581.