Putting Guidelines into Practice: Using Co-design to Develop a Complex Intervention Based on NG48 to Enable Care Staff to Provide Daily Oral Care to Older People Living in Care Homes

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Putting guidelines into practice: Using co-design to develop a complex intervention based on NG48 to enable care staff to provide daily oral care to older people living in care homes

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Abstract

Objectives: (1) Explore the challenges of providing daily oral care in care homes; (2) understand oral care practices provided by care home staff; (3) co-design practical resources supporting care home staff in these activities.

Methods: Three Sheffield care homes were identified via the "ENRICH Research Ready Care Home Network," and three to six staff per site were recruited as co-design partners. Design researchers led three co-design workshops exploring care home staff's experiences of providing daily oral care, including challenges, coping strategies and the role of current guidelines. New resources were prototyped to support the use of guidelines in practice. The design researchers developed final resources to enable the use of these guidelines in-practice-in-context.

Findings: Care home staff operate under time and resource constraints. The proportion of residents with dementia and other neurodegenerative conditions is rapidly increasing. Care home staff face challenges when residents adopt "refusal behaviours" and balancing daily oral care needs with resident and carer safety becomes complex. Care home staff have developed many coping strategies to navigate "refusal behaviours." Supporting resources need to "fit" within the complexities of practice-in-context.

Conclusions: The provision of daily oral care practices in care homes is complex and challenging. The co-design process revealed care home staff have a "library" of context-specific practical knowledge and coping strategies. This study offers insights into the process of making guidelines usable for professionals in their contexts of practice, exploring the agenda of implementing evidence-based guidelines.

KEYWORDS
care homes, co-design, guideline implementation, oral care

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1 | INTRODUCTION

1.1 | Care homes and oral health

Oral conditions impact the general health, diet[1,2] and quality of life[3] of older adults. Maintaining function, dignity and the fear of losing the ability to look after your own teeth have been shown to be key issues among older adults.[4] Four per cent of people aged over 65 and one-fifth of those aged over 85 live in care homes.[5] Approximately half of all care home residents now have some of their own natural teeth[6] and the oral health of these dentate residents is much worse than their community living peers.[7] Access to domiciliary services is difficult and hospital admission for dental problems can be distressing and costly[8] and with increasing age, the ability to care for one's own oral health can deteriorate.[9] People living with dementia, who comprise 69% of care home residents,[10] may not understand or readily accept oral care and have markedly worse oral hygiene than those without cognitive impairment.[11] In addition, polypharmacy can lead to xerostomia and diets can become rich in sugars either due to diminishing taste or prescribed supplements.[12]

Oral care strategies for this population are to prevent disease, reduce pain and co-morbidity.[13] However, evidence for interventions on promoting oral health among care home residents is weak.[14] Such interventions will not work in and of themselves; they will only have effects through the reasoning and reactions of their recipients.[15] How relational working is structured between health and care home staff is key to achieving health-related outcomes for residents.[16]

The National Institute for Health and Care Excellence (NICE) issued guideline NG48[17] which aims to maintain and improve the oral health of care home residents. This article refers to work within the "Improving the Oral Heal**T**h of **O**lder **P**eople **I**n **C**are Homes: A Feasibility Study ("TOPIC") study".[18] The aim of TOPIC is to determine the feasibility of a multi-centre cluster randomised controlled trial of an intervention *based on* NG48. The "based on" is important here. The team recognised the need for something more concrete to give to the various sites in the trial, something that would accommodate contextual variations between sites, to better enable uptake and adoption. Hence, the inclusion of a co-design phase of work early on within the TOPIC study to develop a refinement of NG48, focusing on the challenge of how best to sustainably action the advice and recommendations of NG48 within care home settings. The aim of this article is to present the aforementioned co-design process within the TOPIC project. This is an intervention refinement that falls within the definition of an intervention development study. However, we first discuss the challenges of implementing guidelines more generally and justify why we used a co-design process to refine NG48 and address these challenges.

1.2 | Putting guidelines into practice

Whilst the NICE implementation guidelines[19] that currently accompany NG48 are useful, they are sterilised of context and prescribed for idealised situations. There is very little in the way of concrete specified actions that staff in care homes can take. This "weakness" is not unique to NG48. The work of Gabby and le May[20,21] highlights the persistent and complex "gap" between guidelines and practices. They go on to ask what place guidelines have, and:

> how do we get from the linear rationalism of guidelines to the complex wisdom of good practice?[20]

They explain that practice is often too complex and varied for rigid adherence to guidelines and that professional practice is often guided by "mindlines." These are: "…guidelines-in-the-head of individual professionals, in which evidence from a range of sources has been melded with tacit knowledge through experience and continual learning to become internalised as a clinician's personal guide to practicing in varied contexts. They are acquired over a lifetime, informed by training, their own and each other's experiences, their interactions with colleagues and patients, by their reading, their understanding of local circumstances and systems…".

Based on lived experience, these "mindlines" continually evolve, seeking to rationalise new experiences, learning and sources of evidence with what a person already "knows." They can be defined as a form of "knowledge-in-practice-in-context." One of the many variables that impacts adoption into these personal "mindlines" is the accessibility and ease with which any guideline can be assimilated (emotionally, cognitively and practically) by the professional.

This is reinforced by the fields of Human Factors and Implementation Science that suggest context is highly significant in determining whether evidence is put into practice or not. A comprehensive framework from this literature, the Consolidated Framework for Advancing Implementation Science,[22] suggests that interventions require both "core components" (essential and indispensable elements of the intervention itself) and "adaptable peripheries" (adaptable elements, structures and systems related to the intervention and organisation into which it is being implemented). These adaptable peripheries refer to the degree to which an intervention can be tailored, refined or reinvented to meet local needs. This adaptability can reconcile the tension between healthcare interventions and context, suggesting a need for "plasticity" of intervention components and "elasticity" of contexts in the "negotiations" to translate healthcare interventions beyond the "closed systems" of evaluations into real-world "open systems."[23]

1.3 | Co-design

George Cox,[24] one-time director of the UK's Design Council, defined "**Creativity**" as the generation of new ideas, "**Innovation"** as the successful exploitation of new ideas and "**Design"** as what links the two, shaping ideas to become *practical* and *attractive* propositions to users and customers. The "**Co**" prefix refers to.

> … collective creativity as it is applied across the whole span of a design process … and …. To refer to the creativity of designers and people not trained in design working together in the design development process….[25]

Although labelled "Co-design," the processes and practises encompassed trace roots back to a previous term; "participatory" design. These early versions of participatory design espoused:

> empowerment of workers to codetermine the development of the information system and of their workplace.[26]

Whilst the imperative behind these early works was democratic, the processes led to technocratic benefits such as a greater sense of worker engagement and ownership, increased acceptance and a better understanding of system requirements. This rationale suggested the use of co-design as the method to modify NG48; the engagement with users as a route to access, capture and embody their "knowledge-in-practice-in-context" that would define the intervention's "adaptable periphery"; its ability to adapt or be adapted to flex to individual care homes, staff and residents.

This co-design process presented here aims to (1) refine the complex oral health intervention (NG48) to ensure it is practically, clinically and culturally acceptable to care home staff and residents; (2) understand the context and mechanisms for delivery by exploring the challenges of providing oral care practices in care homes; and (3) contribute to the embedment in best practice, thus translating the NG48 guideline into implementable practice.

2 | METHOD

Figure 1 illustrates the programme of work for the wider TOPIC study and magnifies the detail of the co-design processed, explained in detail below.

2.1 | Recruitment

The study received ethical approval from SHU REC (ER14289104) and from London—City & East REC (19/LO/1107). Four care homes in Sheffield within the geographical proximity to the co-design experts were identified via the "ENRICH Research Ready Care Home Network'." Recruitment in the co-design process was based on the willingness of the care homes to engage.

2.2 | Contextual familiarisation and relationship building

Limited responses to our initial call restricted us to working with all three care homes that responded. The researchers attended the care homes and a dialogue was initiated with interested care home staff. Three to six staff were recruited as co-design partners from each care home. The researchers spent approximately 2 hours at each care home, using observations and informal conversations with staff and residents. The aim of this was to establish expectations, trust and a working relationship as well as informing the co-design process, building contextual familiarity so the structure of the co-design process itself could be sensitive to the environment and needs of co-design partners.

In the course of these preliminary visits (June 2019), a BBC news article[27] and CQC report (2019)[28] were published criticising care home oral care provision with a critical focus on staff. The care homes we were collaborating with ceased communication. Weeks passed before access was regained and the process of (re)building trust could be restarted.

2.3 | Co-design process

Following a similar structure to the experience-based co-design model,[29] and based on the UK Design Councils "Double Diamond" Design process[30] of four phases of "Discover," "Define," "Develop" and "Deliver," a series of co-design workshops were run at the recruited care homes. These workshops used creative design methods[31] to elicit experiences, knowledge, ideas and tangible refinements from participants. The purpose was to explore existing practises-in-context in relation to NG48, draw upon contextual and experiential knowledge to develop practical and usable content for NG48 and consider forms in which this could be delivered, such as video, animation, leaflet or perhaps a waterproof guidebook. A design researcher (JL) experienced in co-design and knowledge mobilisation led the workshops.

2.3.1 | Co-design workshop 1: objectives 1 and 2

The first workshop addressed co-design objectives 1 (exploring the challenges of providing daily oral care in care homes) and 2 (understanding oral care practices provided by care home staff). We explored current experiences, routines and habits before introducing NG48 in its current form and exploring its utility. Two initial activities required participants to use a graphical template to map their journey to work without revealing identifiable geographical details. The first required them to reflect on the entire journey. The second required them to isolate a single element and break it down into micro details of activity, sensory and emotional recall. These activities were warm-up activities; "icebreakers," yet also demonstrators, building format familiarity for later use focused on oral care practices.

Then, a series of graphical templates depicting daily care routines were populated by the co-design partners. Additional templates depicting examples of personal hygiene and oral care practices for residents were also annotated. Participants were asked to repeat these

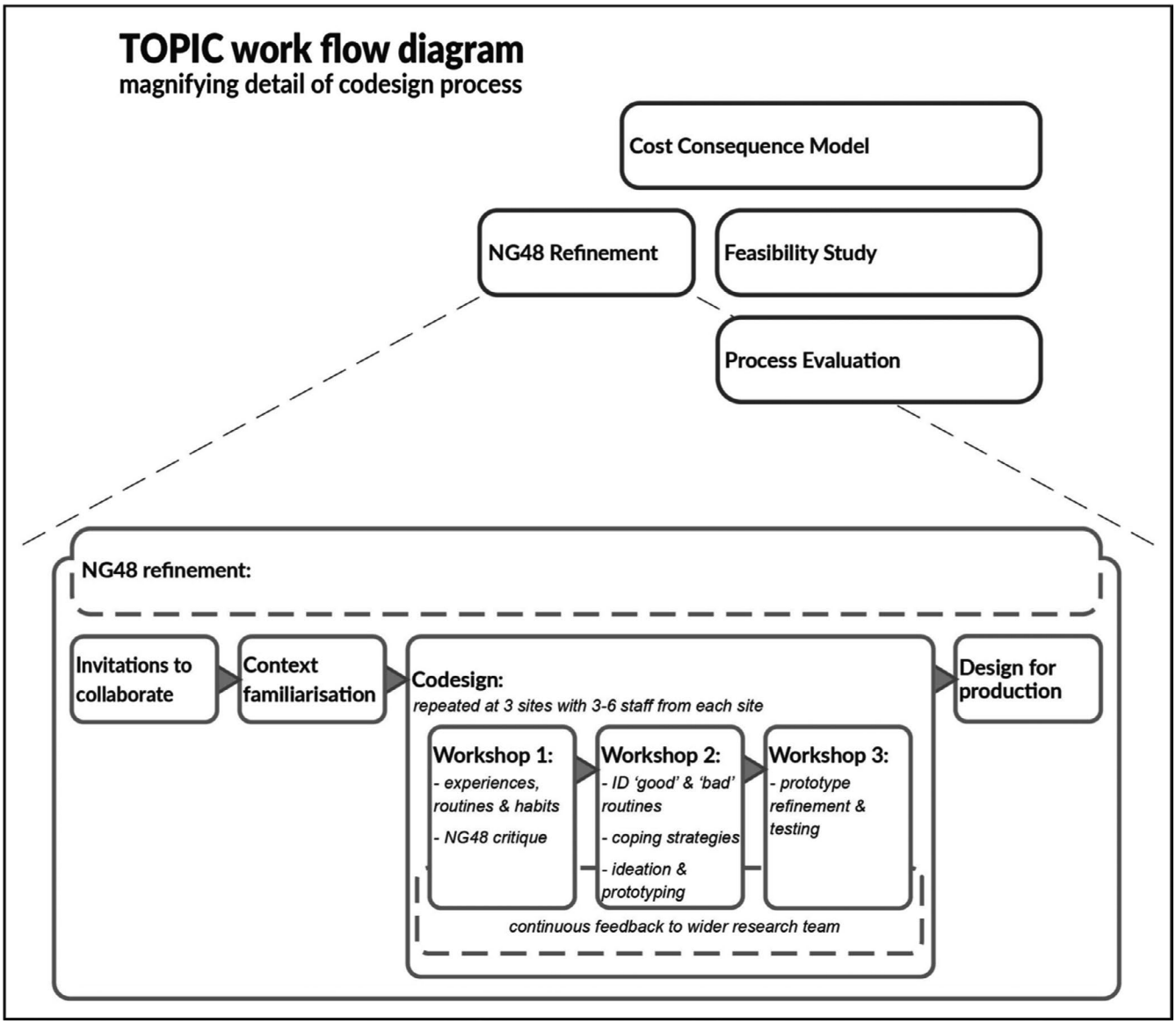

FIGURE 1 TOPIC study process and magnified co-design process

exercises showing "good" and "bad" routines. Each participant populated several of these templates individually. They were then shared with the whole group populating a larger scale version that could accommodate all idiosyncrasies and initiate a reflective discussion that helped identify convergent and divergent patterns.

For the final activity in this workshop, information relating to NG48 had been downloaded and printed from the NICE website. This was shared with staff who annotated them to frame queries, identify valuable or useful details and challenge the utility of the information within it.

2.3.2 | Co-design workshop 2: objectives 2 and 3

The second workshop addressed co-design objectives 2 (understanding oral care practices provided by care home staff) and 3 (co-design practical resources supporting care home staff in their oral care practices). Tools for NG48 were "tried out" during the workshop. The "bad" routine templates populated in the first workshop were re-visited. The participants categorised the "bad" things that caused routines to falter or change, annotating each with "coping strategies"; activities they tried to do to "correct" the intended care activity or routine back on track. An ideation and rough prototyping activity developed concepts with potential value in supporting daily oral care activities. Following this workshop, ideas were converted into prototypes by the design researchers.

2.3.3 | Feedback workshop: objective 3

A final workshop addressed co-design objective 3 (co-design practical resources supporting care home staff in their oral care practices). We brought prototypes based on the coping strategies and ideas the co-design partners had shared. These were "tested" in the workshop

as role playing activities between the co-design partners and design researchers.

2.4 | Data

The format of the workshops was such that data, in the form of professional experiences, theories and ideas, was offered by individual co-design partners. These were then analysed and synthesised in real time with data of all co-design partners in each workshop, using a form of live participatory thematic analysis.

In addition, field notes from each workshop provided data that were analysed by the design team and incorporated into preparation for the next workshop. At design team meetings, these data were analysed by JL and RRW (occasionally drawing on the wider TOPIC research team members) using both Mindlines and the Consolidated Framework for Implementation[22] as an implementation lens. Through this perspective, they considered how the evidence from care home professionals correlated with wider literature, how easily these ideas might transfer to other care homes or the degree of tailoring to suit other care homes. Within this was a continual balance between the level of personalisation embodied within the refined NG48 against the benefits of uniformity for evaluation purposes in the TOPIC feasibility study. The resulting considerations were built into the next workshop plan and feedback to the care home co-design partners in an iterative format. The notes in Table 1 include direct quotes from workshop participants, field notes made during workshops and themes agreed by the co-design partners and design team.

After the last workshop, based on all the prototypes of the co-design partners and the research team, the design researchers generated a final "package" that would be distributed to all care homes. This implementation package included leaflets, process guides, reminders and memory joggers and posters (Figures 3 and 4).

3 | FINDINGS

This co-design process led to in-depth understanding of the (1) time and resources constraints that care home staff operate under; (2) rapidly growing care home population with dementia and other neurodegenerative conditions; (3) challenges of, and dangers to, care home staff when residents display "refusal behaviours" and the need to balance residents' oral care needs with patient and carer safety; and (4) wide range of operational "coping" strategies developed by care home staff to overcome "refusal" behaviours. Table 1 presents the key findings and indicates how they relate to specific aspects of the design process and design response.

3.1 | Co-design learning

Here, we take the four main learning points one by one and expand on each. The first three findings correspond to objective 1. All four learning points at the co-design outputs correspond with objective 2. Learning point four and the co-design outputs correspond with objective 3. Figure 2 provides a summary of the key findings and their relationship with the objectives.

3.1.1 | Time and resources constraints that care home staff operate under

For oral care, staff are aware of the need to cater to personal preferences of cleaning products (eg toothpaste and toothbrush). Yet, personal preferences are not always compatible with care home budgets nor with good oral care. What is more, personal preferences and personal needs (two distinctive specifications) can change very rapidly for older people with dementia and other health needs. This continuous evolution adds additional cost, time and judgement about what is in their best interest when weighing up any contrast between health needs and personal preferences.

Time is the biggest constraint. Staff typically spoke of a 20-minute window of time for morning personal hygiene routines for each resident; waking, washing, dressing, hair, teeth, shaving and any specific care/hygiene needs. Also, doing all this at a pace that was considerate to the resident as a person and in a way that builds a relationship with them regardless of how they might behave towards the carer.

3.1.2 | Rapidly growing care home population with dementia and other neurodegenerative conditions

People with dementia require more time for adequate oral health care. And the care model needs to be flexible and adaptive to their changing needs and preferences which may not be compatible. Judgement is often needed on a day-to-day basis as to what is in the resident's best interest considering the potential contrast between what they need and what they prefer. Finding an effective and achievable middle ground requires time, care and investment in knowing the person and iteration.

3.1.3 | Challenges of, and dangers to, care home staff when residents display "refusal behaviours" and the need to balance residents' oral care needs with patient and carer safety

Alongside balancing a resident's oral care needs with their oral care preferences, it is also important to balance their safety and that of carers themselves. Refusal can often be associated with aggressive behaviours and carers highlighted instances of blows, scratches and even bites. This is by no means a justification for poor care but needs to be openly acknowledged as a challenge. Whilst applicable to all aspects of care, the care staff co-design partners highlighted that this does feature very prominently in oral care. The invasive nature of another person sticking something in their mouth is one that quite naturally triggers

TABLE 1 Key co-design findings

Co-design activity	Data/Responses/Themes	Relationship to design response/Stage of Double Diamond Design Process (DDDP)
Workshop 1: Current experiences, routines and habits (Findings points 1, 2 and 3)	Visual maps of "good" and "bad" daily care routines including scheduled handovers at beginning and end of shifts and unscheduled handovers within shifts highlighted specific challenges: • Time pressure (20 mins/person, for all morning personal care, including shaving, washing, dressing) • Interruptions (by residents or colleagues) • Limited resources • Changing personal preferences • Resident refusal behaviours • Dementia-related behaviours • Personal safety (eg bites, blows and scratches) • (Un)/Familiarity with residents	This information relates directly to the "Discovery" phase of the DDDP by exploring the wider "system" within which the people (staff and residents) experience oral health care, and the constraints and opportunities within this system This process helps to build a relationship with the staff and residents in the co-design process and acknowledge systemic and institutional constraints The "discovery" phase is supported by asking: What is going wrong? When do people need help? What are they doing when they need help? Where are they when they need help? How does the need for help change as residents health status changes?
NG48 critique (Annotated and commented on printouts of NG48 guidance) (Findings point 3)	Participants' views of NG48: • "Patronising; we know it is important to clean teeth twice a day"—care home staff. • "Does not address refusal"—care home staff. • "Assessment tool is rubbish, no nuance. Score 0 is fine, everything else (1-16) is call a dentist, so we might as well not bother and just book the dentist full stop"—care home staff. "We need things that help us when things do not work or go wrong. This guidance does none of that."—care home staff	These data begin to specify what is "missing" from the current guidance for care home staff—and by inference what they feel they need. It relates to both "Discovery" and "Define" phases of the DDDP Headline point: • guidance and tools for when things did not go to plan were missing
Workshop 2 Categorisations of "bad" oral care routines (Findings points 1, 2 and 3)	The staff described when things "go wrong": • Interruptions • Refusal • Progressive decline, changing needs and evolving behaviours; what works 1 month may not work the next • Contrasting personal preferences and health needs • Limited opportunity for knowledge sharing between carers	These data corresponded with the "Definition" phase of the DDDP process yet inherently began to overlap with the "Develop" phase as the co-design partners began to share ideas
Coping strategies for "Bad" routines (Findings point 4)	Examples of staff coping strategies: • distraction • substitution • imitation/mirroring • hand-over-hand • reward/"bribery"	These data supported the "Definition" and "Develop" phases of the DDDP. Refusal behaviours were the point of most concern, where there were current solutions and where either most time was consumed in addressing refusal behaviours or where care was subsequently compromised
Ideation and early prototyping (Findings point 4)	Examples of the ideas generated by staff: • library of carers' coping strategies • personal care plans, including current personal coping adaptations • tools to support iteration of coping strategies • mechanisms to avoid interruptions	These data fell into the "Develop" phase of the DDDP
Workshop 3: Refinements of prototypes	The staff "tried" out the design prototypes, pointed out where they could be improved or did not work and suggested amendments	These data overlapped between the "Develop" and "Deliver" phases of the DDDP design process

defensive behaviours by the residents which frequently turn into aggressive behaviours. The 37 pages of the current NG48 references the word "refusal" once and then only to say that a care home should have a policy (with plans and actions) for this situation, without providing advice or guidance on what those plans or actions might be; on *how* to deal with it. As the co-design partners continuously pointed out, the best and most useful guidance they need is not for ideal situations when things are working well but for when things do not work well.

3.1.4 | Wide range of operational "coping" strategies developed by care home staff to overcome "refusal" behaviours

As the co-design work moved into the ideation phase and we explored the coping strategies the co-design partners applied in various challenging circumstances, it very quickly became apparent that individually they had each developed a suite of specific

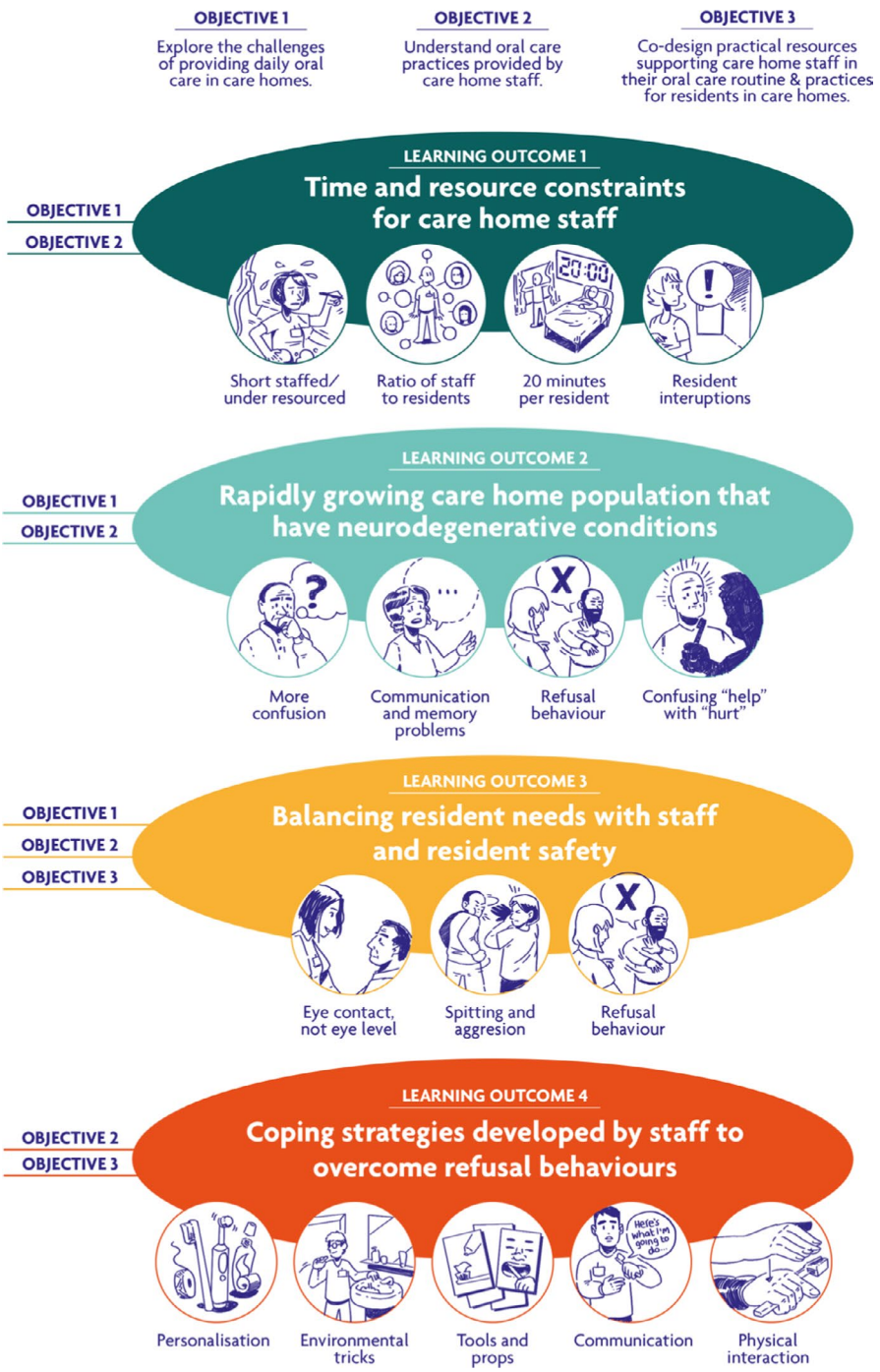

FIGURE 2 Visual summary of the key findings and their relationship to the co-design objectives

coping strategies. Some of these had been informally shared but with no previous explicit attention to sharing and learning about these from each other. As they documented and captured these, the co-design partners began to share an ever-expanding library of "coping" strategies and discuss minor variations in the way similar strategies were enacted. At the last workshop, unprompted, they discussed how they had tried each other's approaches with different residents. They discussed the need to iterate different strategies with residents to find the ones that worked best for each resident, yet also acknowledged the temporal nature of these successes. The nature of ageing and dementia progression often demands further cycles of iteration as the strategies that previously worked, sometimes stop working.

3.2 | Co-design response

The co-design process led to the development of the "Care Home Oral Care Toolkit," a set of resources aimed at supporting care home staff in enacting NG48 and overcoming the challenges in providing oral care to care home residents (www.topic-oralhealth.co.uk and Appendix). These resources embody the principles of NG48 and the contextual

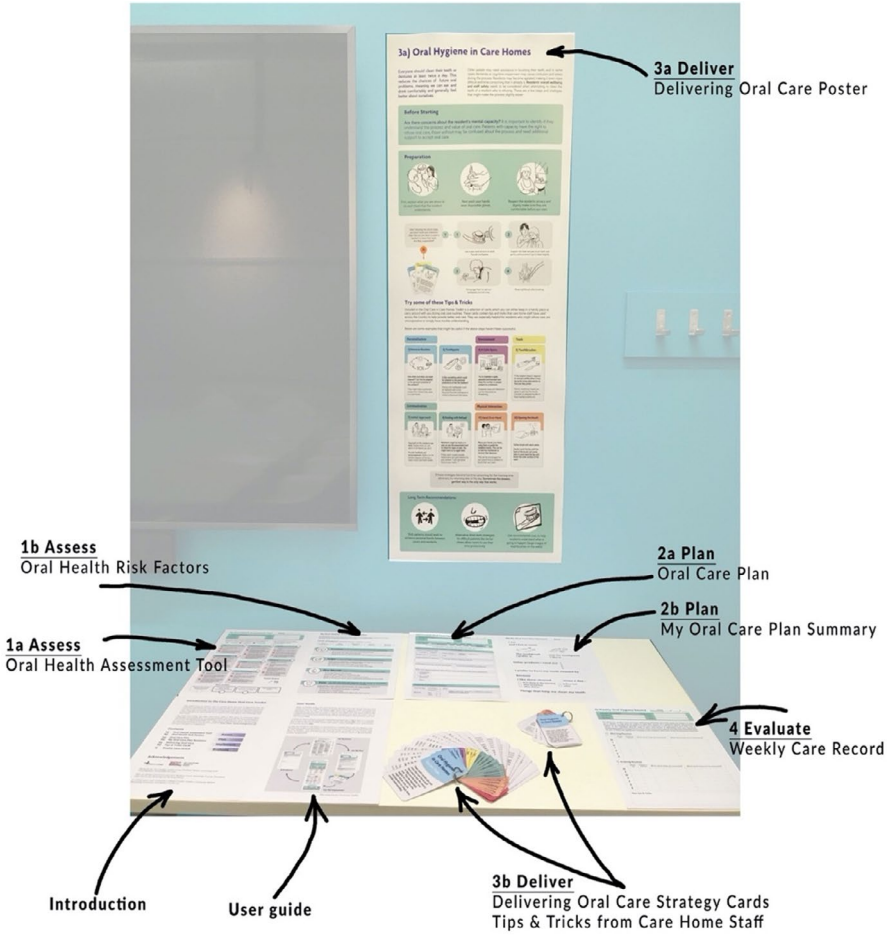

FIGURE 3 Image of the components of the "Care Home Oral Care Toolkit." Detailed images can be found in the Appendix

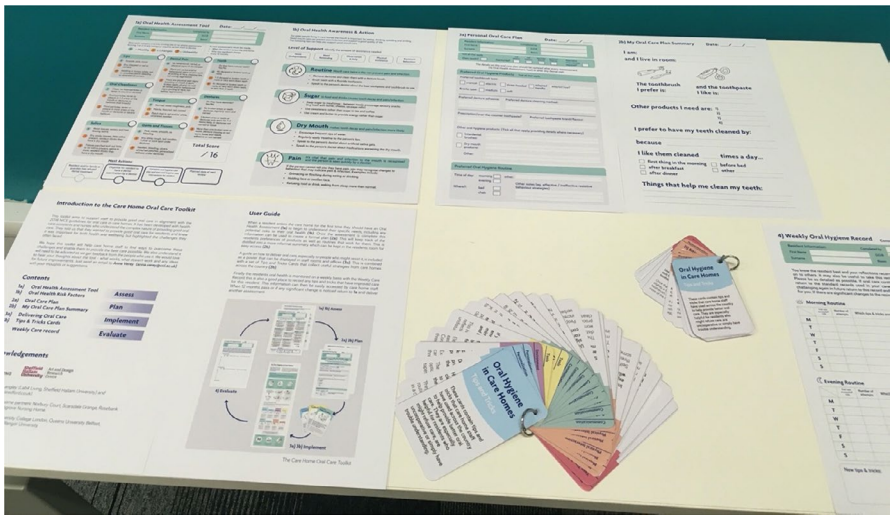

FIGURE 4 Image showing more detail of the "Care Home Oral Care Toolkit" components excluding component 3b

"knowing" of care home staff including specific tried and tested strategies for navigating "refusal behaviours." The toolkit comprises of seven components, representing four themes: assessment, planning, implementation and evaluation. Whilst this may give the impression of a linear process, it is not intended to be used in a linear fashion. As a whole, the process is envisaged as being iterative and cyclical. Yet the emphasis is on the implementation theme; the actual practices of daily oral care. The primary component of this theme was designed by staff to be accessible at all times, even in the midst of their working practices, supporting rapid reflection *in* practice.

The "Care Home Oral Care Toolkit" includes seven components covering a range of functions (Figures 3 and 4).

When a resident initially enters a care home, the Oral Health Assessment Tool[32] (OHAT, 1a) supports staff to understand their specific needs, preferences and any potential risks to their oral health (1b) in dialogue with the residents and their family or informal carers. The first part of the OHAT was included in the NG48 suggestions and the numerical scoring system was roundly criticised by care staff. Despite this, there was a perceived value in holistic approach to prompting consideration of all parts of the mouth. This aspect has been maintained so as to not deviate too far from the originally approved NICE guideline. However, it was felt that this holistic approach could be extended. An additional feature of the assessment designed here, prompts care home staff to consider not just the different areas of the mouth but behavioural factors that will also impact oral health. This will raise oral health literacy and understanding within care home staff about the role of behaviours for good oral health as well as supporting better oral care.

Once this assessment is complete, this information leads to the specification of care actions in the oral care plan (2a); this includes a record of a resident's oral care products and routine preferences, determined from the dialogue with the resident and their family in 1b. The oral care plan is translated into an informal summary (2b), designed to be kept in an accessible place, for example, a resident's bathroom. This supports variations in care staff who might be providing oral care and can also be useful to share with dental professionals when there is a need to escalate the provision of oral care. A guide on how to deliver oral care practices, especially to residents who might resist it, is included as a poster that can be displayed in staff rooms and offices (3a) and also included in staff training. In addition, there is a series of "Tips and Tricks" cards (3b) which feature useful strategies for care home staff when challenges to daily practices arise. These are purposefully small enough to fit into a pocket of a tunic commonly worn by care home staff. One strategy is outlined on each individual card, all are contained on a keyring and they are colour coded into categories such as environmental strategies, tools, personalisation's and physical interventions. Finally, residents' oral health can be recorded using the Weekly Care Record (4), which should be easily accessible by care home staff. Again, this serves as a valuable tool for sharing with dental professionals when oral care is escalated.

4 | STUDY LIMITATIONS

The primary limitation of this study is the lack of involvement of residents and family as partners in the co-design process. The decision to do this was based on the scale of resources allocated to the co-design process. We acknowledge that this was very much "Codesign-on-a-budget," for time and all other resources, and would encourage others seeking to apply similar methods to allocate more in the way of resources. A substantial proportion of these should be allocated to building and sustaining relationships with all co-design partners.

5 | DISCUSSION

NICE issued guideline NG48[19] to help maintain and improve the oral health of care home residents. However, in its original format it was perceived to be of little practical value to care home staff we collaborated with on this project. We worked with these staff members to co-design a range of tools based on their collective experiential knowledge and the evidence from NG48. These tools are intended to support care home staff in enacting the guidance of NG48 in the complex reality of daily practice as well as filling in some guidance gaps in NG48—the most challenging aspects of oral care provision in care homes that the experts who developed NG48 felt unwilling or unable to address.

The co-design process led to an appreciation of the challenges faced by care home staff in maintaining the oral health of residents. Care home staff face temporal (eg interruptions) and behavioural (eg coping with "refusal behaviours") challenges, often simultaneously, compounded by lack of resources. The co-design process also led to the development of the "Care Home Oral Care Toolkit"—a set of materials aimed at supporting care home staff in overcoming the challenges presented to them in providing oral care to care home residents. It is not anticipated that these are used rigidly or even in a uniform or linear manner, but that care homes and care home staff have flexibility to select and adapt elements from this toolkit and for multiple purposes; for example, the co-designed materials could be used by care home staff to provide or facilitate oral care to residents and for training care home staff for that role.

5.1 | From guidelines to practice

The NICE guideline (NG48) was perceived as too general, passive, idealised and even patronising. Care home staff already know the importance of brushing a resident's teeth twice a day. What they felt they needed is practical suggestions about what to do when things do not work smoothly and in this aspect NG48 failed them, diverting responsibility for solving this challenge to the local (and supposedly less expert) level. NG48 does not reflect the contextual reality of the practice of daily oral care within care homes. It contains one supposedly practical element; an initial assessment for new residents when they enter a care home to determine their oral health. Yet, this had questionable value for care home staff. A critique related to the practical usefulness of a scale where the total score ranges between 0 and 16, but anything other than a 0 would recommend seeking professional dental services.

This highlights an inherent tension between research findings and practice; between the general and the specific.[33] Broadly speaking, research seeks to produce generalisable findings, theory or models that can describe a population. Yet, practitioners need specific application. Bridging this gap between the general and the specific is left to professional judgement and wisdom.[34] Guidelines need to go further in supporting clinicians and other care professionals in this process through the provision of "tools" that can be used to

support reflection and judgement in practice-in-context, rather than at organisational policy levels.

Literature on implementation context suggests that there are two different context conceptualisations: context as something concrete and passive, for example, the physical environment in which implementation occurs; and context as something abstract but potentially dynamic, for example, active support from colleagues and management. Within this dynamic conceptualisation of context, patients, organisational culture and climate, organisational readiness to change, organisational support, organisational structures, wider environment, social relations and support, financial resources, leadership, time availability, feedback and physical environment are all identified as important dimensions.[35]

Referring back to the work of Gabbay and le May,[20] it is not context alone that presents a challenge for implementation or adoption. It is the nuances of **practice-*in*-context**. This creates overlapping challenges for adoption of guidelines between the "mindlines" of the practitioner (ie how the professionals assimilate new practices) and the dynamic dimensions of context (ie how the environment, organisation, relationships and resources surrounding the practitioner support them to assimilate ***and*** enact new practices).

Co-design does not seek to exhaustively understand all this complexity. This would be an impossible task, as this complexity is dynamic and already changed after the point of observation. Instead, it iteratively explores this complexity with key stakeholders who bring knowledge and experience of practices-in-context.[25] It uses propositions of new concepts, realised in mock-ups and prototypes to learn more about this complexity for all the stakeholders, what works and what does not, revealing hidden practices, habits, rituals and tacit behaviours, anticipating how these new concepts may impact practices-in-context.[31,36] As such, the co-design process can act as a bridge between guidance, practice and context. In this study, the co-design workshops took place in the care homes. This was important from a practical perspective (staff would not be released for co-design off site), but also symbolically (care home staff are a disempowered stakeholder) and it also addressed the need to explore and uncover the situated practices-in-context.

The "Tips and Tricks" cards are an example of this practical "fit" to practice-in-context. The delivery of oral care practices is a time pressured and often interrupted practice-in-context. This made it essential that the intervention had realistically small "chunks" of knowledge or information that could be looked up and absorbed whilst in the whirlwind of care activities. Hence, the physical size and shape of the Tips and Tricks cards, the "size" of knowledge each card conveys and the medium through which it is conveyed (illustration + text).

This relates to Gabbay and le May's notions of "mindlines" and contextual "adroitness" of practitioners.[20] It points to the need to gain some understanding of the needs and preferences of care home staff within these moments, places and activities; something practical, relevant, useful that they could easily look up, digest and put into action—something that could relate to the complex wisdom of their practice, help them to narrow down (consciously and unconsciously) options or courses of action.[34] There is no single right answer to this and as such presents a "wicked problem" that cannot be adequately addressed through text based "guidance" on a website or in a document. In the midst of their practice, they are thinking with their whole bodies not just their minds, taking in and processing information from a variety of sources through a form of extended cognition, whereby they convert these information inputs and processes into actions that are constantly being subtly adapted in real time due to the multisensory inputs of their interactions with the care home residents. The support they require in these moments should not interrupt this whole-body interaction but instead try to work with it. As such, the cards, their size, shape and mixed media attempt to latch onto physical, visual and cognitive forms of engagement and even present an opportunity for interaction with the resident, for example, going through the cards with the resident to either find a solution or as a distraction. In this form, the cards become more than just words or images on a page. They become a "prop," tool or instrument that gives the user something to act with and encourages a specific type of action. This introduces properties from the world of design or material culture called "material agency" or "material affordance"[37] which relates to the ability of material objects to influence human agency; people are able to act in, and on, the world in very specific ways, through objects or tools. Guidance or advice, particularly when in a formal structure as a guideline, perhaps does not facilitate the same agency. A document guiding someone about how to hammer in a nail does not give them the agency to hammer in a nail. Yet, a hammer designed for this purpose, through its physical form and properties provides this agency and, in contrast to any other hard and heavy object that might serve as a "hammer," the designed hammer goes further—its very shape and form gives the person prompts and clues about *how* to *optimally* hammer in the nail.

What is more, the resources as a whole also represent a "fit" to practice-in-context with respect to provision of professional dental care practice. The co-design work highlighted that when a resident does require dental professional care, it is usually not the carer who knows the resident best that supports this appointment irrespective if it is a domiciliary visit in the care home or an appointment at a dental surgery. It is the member of staff who will be least missed from current care home duties and often knows little about the individual resident that accompanies them to the dental appointment. This presents a knowledge gap in the dialogue with the dental professional. Collectively the resources create personal records that support the sharing and communication of information or knowledge across different settings[38] when a residents' oral care requires escalating to dental professionals, thus facilitating strong relational strategies between health and care home staff. Interventions have to be adopted by professionals through their "mindlines" and have to "fit" with their embodied forms of knowing within the dynamic context of practice delivery. Translating research evidence into guidelines without accommodating these, erects barriers to the use of the very same evidence.

The development of a "guideline" is viewed as indicative of "impact" in the academic world and implies the work is relevant *and*

useful. At the same time, it can be used as a powerful controlling mechanism by policy makers and commissioners over care homes and care home staff. Care home staff are an undervalued, disempowered and marginalised stakeholder group within our social structures and the development of "guidelines" without them and their practical knowledge makes their implementation even more challenging. We would suggest that the very concept of "guidelines" needs to be (re)examined with a focus on how they are created and how usable they are. In the specific field of care homes, the process of creating guidelines should consider the importance of strategies that build relational working between health care professionals and care home staff.[16] Perhaps the process ought to include a stage of "Spending a week in the real world,"[39] using the draft guideline (in context) before it can be formally signed off as being *useful*. Furthermore, the equal participation of the affected workforce or people (not just managerial representatives) in the creation of any guideline, should be mandatory along with an intention to make enabling resources that support the practical, active and adaptable application within context. We would suggest that co-design offers one possible route to do this.

The driving imperatives of co-design are egalitarian and inclusive, starting with valuing the input of stakeholders in the working environment, holding their ways of knowing of equal value to that of researchers, managers, commissioners or other so called "experts." Regardless of economic or practical value, this is morally the right thing to do. Yet it also has practical benefits in terms of developing interventions that "fit" with professional practice-in-context; that are more easily assimilated, enabling the practical use and adaptation of general guidelines to specific actions in the midst of surrounding contextual "noise."

6 | CONCLUSIONS

This innovative co-design process revealed weaknesses in the practical utility of NICE guideline NG48 as it currently stands and delivered an enabling set of resources to support its adoption. The development of more practical tools that can exist within the workplace and the care setting and even within the actions of care delivery, shift the guidance from merely cognitive and advisory to practical and actionable in the moment. These props or tools afford the care staff more agency in delivering care in line with the guideline and could well support better its implementation. Work within the TOPIC programme of study is ongoing to assess whether these resources make any difference to practice and the oral health of residents in care homes.

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CONFLICT OF INTEREST

The authors declare that they have no competing interests.

AUTHOR CONTRIBUTIONS

PRB, JL and RRW conceived the idea for this co-design research project and together with GT, GMK, VA and SW were responsible for the study design. JL and RRW led the delivery of the research with input from GT, GMK, PRB, VA, SW and AG-R. The first draft of the manuscript was prepared by JL, VA and RRW with input from GT, GMK, PRB, SW and AG-R. Successive drafting of the manuscript was done by JL and RRW with remaining authors commenting on and contributing to successive drafts. All authors were involved in reading, critically revising, editing and approving the final manuscript.

ETHICAL APPROVAL

SHU REC approval reference ER14289104; London—City & East REC approval reference 19/LO/1107.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions. Material developed as part of this co-design research are now all available online at the following two websites produced for the wider research project: https://www.ucl.ac.uk/epidemiology-health-care/research/epidemiology-and-public-health/research/dental-public-health/research/topic-oral-health https://www.qub.ac.uk/research-centres/CentreforPublicHealth/Research/HealthServicesGlobalHealth/OralHealthCare/TOPIC/AboutTOPIC/.

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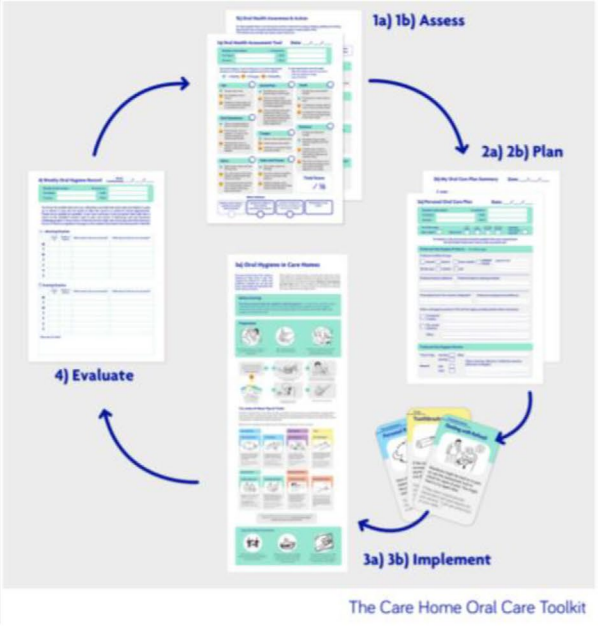
APPENDIX

Introduction to the Care Home Oral Care Toolkit

This toolkit aims to support staff to provide good oral care in alignment with the 2018 NICE guidelines for oral care in care homes. It has been developed with health care assistants and nurses who understand the complex nature of providing good oral care. They told us that they wanted to provide good oral care for residents and knew it was important for both health and wellbeing but highlighted the challenges they often faced.

We hope this toolkit will help care home staff to find ways to overcome these challenges and enable them to provide the best care possible. We also understand it will need to be adjusted as we get feedback from the people who use it. We would love to hear your thoughts about the tool - what works, what doesn't work and any ideas for future improvements. Just send an email to **Anna Verey (anna.verey@ucl.ac.uk)** with your thoughts or suggestions.

Contents



1a) Oral Health Assessment Tool Date: ___/___/___

Resident Information: Completed by

First Name D.O.B

Surname Room

Give each category a score, circling yes or no where appropriate. Scoring 1 or 2 in any category requires action from a dentist.

0 = Healthy 1 = Changes 2 = Unhealthy

A new assessment must be made:
- When the resident enters the care home
- After any significant change
- Every 12 months

Lips
- 0 Smooth, pink, moist
- 1 Dry, chapped or red at corners
- 2 Swelling or lumps, white, red or ulcerated patch, bleeding or ulcerated at corners

Dental Pain
- 0 No behavioural, verbal, or physical signs of dental pain
- 1 There are verbal and/or behavioural signs of pain such as pulling at face, chewing lips, not eating, aggression
- 2 There are physical pain signs (swelling of cheek or gum, broken teeth, ulcers), as well as verbal and/or behavioural signs (pulling at face, not eating, aggression)

Teeth

Do they have natural teeth? Yes/No
- 0 No decayed or broken teeth or roots
- 1 1-3 decayed or broken teeth or roots or very worn down teeth
- 2 4+ decayed or broken teeth or roots, or very worn down teeth, or less than 4 teeth

Oral Cleanliness
- 0 Clean, no food particles or tartar in mouth or denture
- 1 Food particles, tartar or plaque in 1-2 areas of the mouth or dentures or halitosis (bad breath)
- 2 Food particles, tartar or plaque in most areas of the mouth or dentures or severe halitosis

Tongue
- 0 Normal, moist roughness, pink
- 1 Patchy, fissured, red, coated
- 2 Patch that is red and/or white, ulcerated, swollen

Dentures

Do they have dentures? Yes/No
- 0 No broken areas or teeth, dentures regularly worn and named
- 1 1 broken area or tooth or dentures only worn for 1-2 hours daily, or dentures not named or loose
- 2 More than one broken area or tooth, denture missing or not worn, loose and needs adhesive or not named

Saliva
- 0 Moist tissues, watery and free flowing saliva
- 1 Dry, sticky tissues, little saliva present, resident thinks they have a dry mouth
- 2 Tissues parched and red, little or no saliva present, saliva is thick, resident thinks they have a dry mouth

Gums and Tissues
- 0 Pink, moist, smooth, no bleeding
- 1 Dry, shiny, rough, red, swollen, 1 ulcer or sore spot under dentures
- 2 Swollen, bleeding, ulcers, white/red patches, generalised redness under dentures

Total Score / 16

Next Actions:

Resident and/or family or guardian has refused dental treatment

Organise for resident to have a dental examination by a dentist

Complete oral hygiene care plan and start oral hygiene care interventions for resident

Planned date of next review:

1b) Oral Health Awareness & Action

For older people living in care homes the mouth is important for eating, drinking, speaking and smiling. Good mouth care can prevent pain/infection and support a good quality of life. The following tips can help you support good mouth care.

Level of Support Identify the amount of assistance needed.

None (Independent) | Need Reminding | Observation & Help | Physical Assistance | Resistant Behaviour

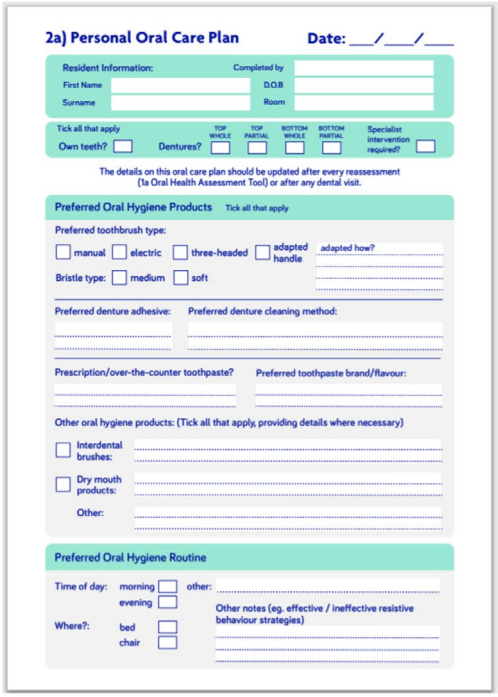
Routine Mouth care twice a day can prevent pain and infection.
- Remove dentures and clean them with a denture brush.
- Brush teeth with a fluoride toothpaste.
- Speak to the person's dentist about the best toothpaste and toothbrush to use.

Sugar in food and drinks causes tooth decay and pain/infection.
- Keep sugar to mealtimes - between meals encourage savoury snacks (e.g toast with butter, cheese, sausage rolls).
- Use sweeteners rather than sugar in tea and coffee.
- Use cream and butter to provide energy rather than sugar.

Dry Mouth makes tooth decay and pain/infection more likely.
- Encourage frequent sips of water.
- Regularly apply Vaseline to the person's lips.
- Speak to the person's dentist about artificial saliva gels.
- Speak to the person's doctor about medications worsening the dry mouth.

Pain It's vital that pain and infection in the mouth is recognised and the person is seen quickly by a dentist.

If the person cannot tell you they have pain, you may recognise changes to behaviour that may indicate pain & infection. Examples include:
- Grimacing or flinching during eating or drinking.
- Holding face or swollen face.
- Refusing food or drink, waking from sleep more than normal.



2a) Personal Oral Care Plan

Date: ___/___/___

Resident Information: Completed by

First Name D.O.B

Surname Room

Tick all that apply — Own teeth? Dentures? (Top Whole, Top Partial, Bottom Whole, Bottom Partial) Specialist intervention required?

The details on this oral care plan should be updated after every reassessment (1a Oral Health Assessment Tool) or after any dental visit.

Preferred Oral Hygiene Products Tick all that apply

Preferred toothbrush type:

manual electric three-headed adapted handle — adapted how?

Bristle type: medium soft

Preferred denture adhesive: Preferred denture cleaning method:

Prescription/over-the-counter toothpaste? Preferred toothpaste brand/flavour:

Other oral hygiene products: (Tick all that apply, providing details where necessary)

Interdental brushes:

Dry mouth products:

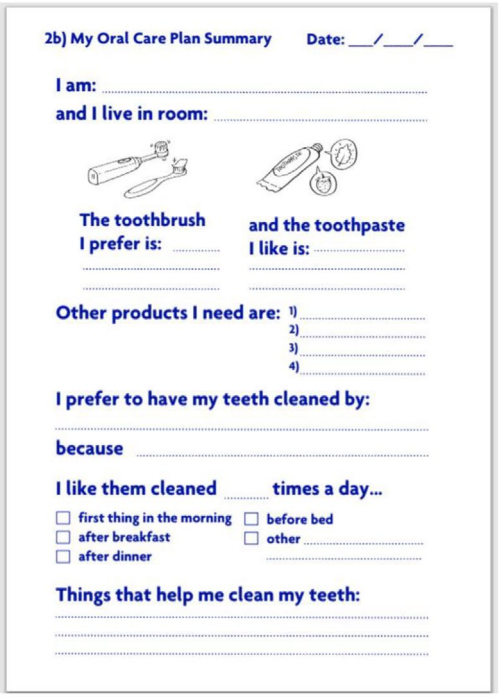
Other:

Preferred Oral Hygiene Routine

Time of day: morning evening other:

Where?: bed chair

Other notes (eg. effective / ineffective resistive behaviour strategies)



2b) My Oral Care Plan Summary

Date: ___/___/___

I am:

and I live in room:

The toothbrush I prefer is:

and the toothpaste I like is:

Other products I need are: 1) 2) 3) 4)

I prefer to have my teeth cleaned by:

because

I like them cleaned ____ times a day...

- first thing in the morning
- after breakfast
- after dinner
- before bed
- other

Things that help me clean my teeth:

3a) Oral Hygiene in Care Homes

Everyone should clean their teeth or dentures at least twice a day. This reduces the chances of future oral problems, meaning we can eat and drink comfortably and generally feel better about ourselves.

Older people may need assistance in brushing their teeth, and in some cases dementia or cognitive impairment may cause confusion and stress during the process. Residents may become agitated, making it even more difficult and time consuming than it already is. **Residents' overall wellbeing and staff safety** needs to be considered when attempting to clean the teeth of a resident who is refusing. These are a few steps and strategies that might make the process slightly easier:

Before Starting

Are there concerns about the resident's mental capacity? It is important to identify if they understand the process and value of oral care. Patients with capacity have the right to refuse oral care, those without may be confused about the process and need additional support to accept oral care.

Preparation

First, explain what you are about to do and check that the resident understands.

Next wash your hands wear disposable gloves.

Respect the residents privacy and dignity, make sure they are comfortable before you start.

After following the above steps, you have made your intentions clear, that you are there to assist a resident to clean their teeth. **Are they cooperative?**

Y → 1 Use a pea sized amount of adult fluoride toothpaste.

2 Support the head and jaw, brush teeth and gums, continue even if gums bleed slightly.

N

3 Encourage them to spit out toothpaste, but not rinse.

4 Rinse toothbrush after brushing.

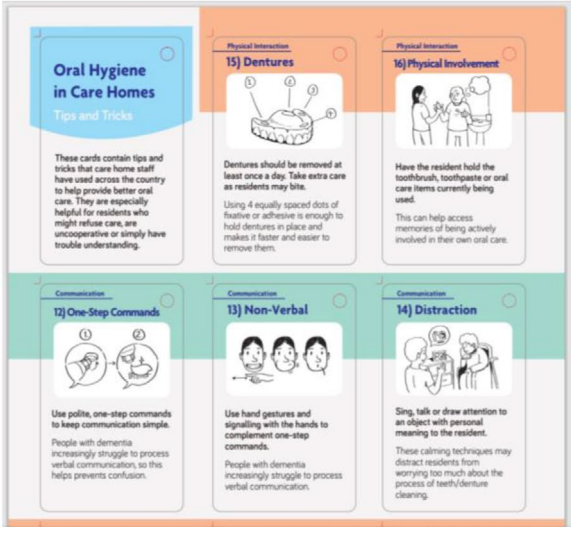
If these strategies become too time consuming for the morning time allotment, try returning later in the day. **Sometimes the slowest, gentlest way is the only way that works.**

Long Term Recommendations:

Shift patterns should work to enhance personal bonds between carers and residents.

Alternative short-term strategies for difficult patients like dental chews allow carers to use their time productively.

Use environmental cues to help residents understand what is going to happen (large images of toothbrushes on the walls).



Oral Hygiene in Care Homes

Tips and Tricks

These cards contain tips and tricks that care home staff have used across the country to help provide better oral care. They are especially helpful for residents who might refuse care, are uncooperative or simply have trouble understanding.

Physical Interaction

15) Dentures

Dentures should be removed at least once a day. Take extra care as residents may bite.

Using 4 equally spaced dots of fixative or adhesive is enough to hold dentures in place and makes it faster and easier to remove them.

Physical Interaction

16) Physical Involvement

Have the resident hold the toothbrush, toothpaste or oral care items currently being used.

This can help access memories of being actively involved in their own oral care.

Communication

12) One-Step Commands

Use polite, one-step commands to keep communication simple.

People with dementia increasingly struggle to process verbal communication, so this helps prevents confusion.

Communication

13) Non-Verbal

Use hand gestures and signalling with the hands to complement one-step commands.

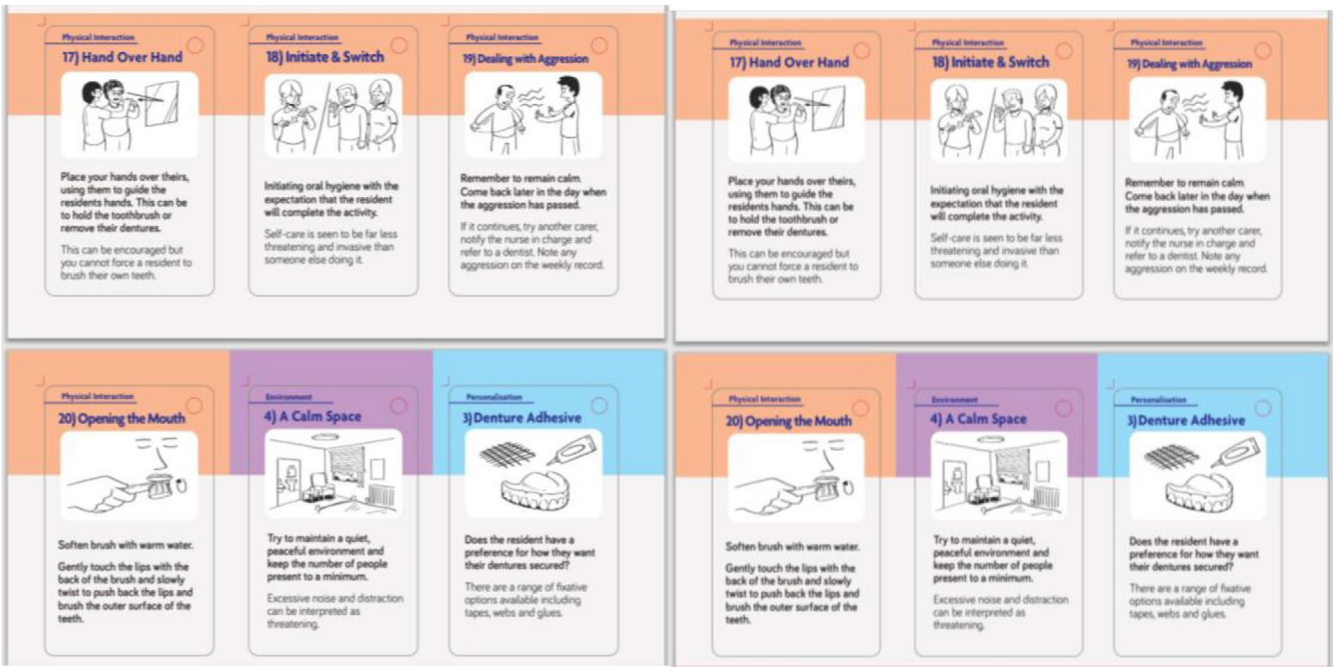
People with dementia increasingly struggle to process verbal communication.

Communication

14) Distraction

Sing, talk or draw attention to an object with personal meaning to the resident.

These calming techniques may distract residents from worrying too much about the process of teeth/denture cleaning.


Physical Interaction
17) Hand Over Hand
Place your hands over theirs, using them to guide the residents hands. This can be to hold the toothbrush or remove their dentures.
This can be encouraged but you cannot force a resident to brush their own teeth.
Physical Interaction
18) Initiate & Switch
Initiating oral hygiene with the expectation that the resident will complete the activity.
Self-care is seen to be far less threatening and invasive than someone else doing it.
Physical Interaction
19) Dealing with Aggression
Remember to remain calm. Come back later in the day when the aggression has passed.
If it continues, try another carer, notify the nurse in charge and refer to a dentist. Note any aggression on the weekly record.
Physical Interaction
20) Opening the Mouth
Soften brush with warm water.
Gently touch the lips with the back of the brush and slowly twist to push back the lips and brush the outer surface of the teeth.
Environment
4) A Calm Space
Try to maintain a quiet, peaceful environment and keep the number of people present to a minimum.
Excessive noise and distraction can be interpreted as threatening.
Personalisation
3) Denture Adhesive
Does the resident have a preference for how they want their dentures secured?
There are a range of fixative options available including tapes, webs and glues.

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