

**Innovation to enhance health in care homes: Rapid evidence synthesis**  
**NIHR HS&DR 15/77/05**

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## Scientific Summary

### Background

Flexible, integrated models of service delivery are being developed to meet the changing demands of an ageing population. To underpin the spread of innovative models of care across the NHS, summaries of the current research evidence were commissioned.

### Objectives

The aim of this work was to conduct a rapid synthesis of evidence relating to enhancing health in care homes across four key areas, technology, workforce, communication and engagement, and evaluation.

The objectives were to map the published literature on:

- uses, benefits and challenges of technology in care homes;
- flexible and innovative uses of the nursing and support workforce to benefit resident care;
- communication and engagement between care homes, communities and health related organisations;
- approaches to evaluation of new models of care in care homes.

To conduct rapid, systematic syntheses of evidence to answer the following questions

- Which technologies have a positive impact on resident health and well-being?
- How should care homes and the NHS communicate to enhance resident, family and staff outcomes and experiences?
- Which measurement tools have been validated for use in UK care homes?
- What is the evidence that staffing levels (i.e. ratio of registered nurses and support staff or different levels of support staff) influence resident outcomes?

### Setting

Care homes with and without nursing, high income countries.

### Review methods

For each of the four themes the evidence synthesis comprised two stages: 1) a broad mapping review of published material within the theme 2) a systematic review that addressed a specific question. The methods were tailored to each specific theme.

## **Literature searches**

Search strategies were developed by two information scientists. They combined relevant search terms with indexed keywords (such as Medical Subject Headings, MeSH) and text terms that appeared in the titles and/or abstracts of database records. The searches were applied to selected, specific databases for each topic, in addition to a common set of databases that included MEDLINE, CINAHL, the Science Citation Index, the Cochrane Database of Systematic Reviews, Abstracts of Reviews of Effects (DARE), and the Index to Theses. Searches were restricted to studies published in English between 2000 and 2016 in high income countries. Grey literature and unpublished studies were sought via Google, and websites of organisations relevant to each search. References and abstracts of journal articles and grey literature were downloaded into an EndNote X7 library and deduplication undertaken. Two researchers screened titles and abstracts for initial inclusion. The criteria used across all four mapping reviews were inclusive. By allowing any study design or outcome the review team were able to fully scope the available evidence base. Full papers were retrieved for all studies that met the broad criteria and were of potential relevance to the mapping review. All papers retrieved were further scrutinised to obtain a final set of papers for inclusion in the mapping.

## **Mapping review - Broad inclusion criteria**

**Technology:** any study concerning the use of novel digital technology to enhance health and wellbeing in care homes, encompassing novel technologies, as well as established technologies that are new to the care home setting, which reported staff, resident or service outcomes and/or barriers and facilitators.

**Communication and Engagement:** the focus of eligible studies was communication or engagement between more than one care home, or between care homes and communities or health related organisations. Studies also needed to report one of the following outcomes:

- A measure of communication or engagement external to the care home (i.e. studies of communication between patients and/or staff only within a care home were not included);
- Resident outcomes: e.g. quality of care, health and safety, clinical outcomes;
- Staff outcomes: e.g. wellbeing, safety, satisfaction.

**Evaluation:** studies including tools for measuring quality of care, or aspects of patient health or quality of life, validated in a UK care home, which reported any of the following outcomes:

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(i) resident outcomes: health status, improvement or maintenance of functional ability, activities of daily living, falls, mortality, quality of life or wellbeing measures, (ii) methods of care quality assessment.

Workforce: studies which report on new staff roles (e.g. an NHS 'in reach' role in care home or enhanced role for support workers in the home) OR report on staffing levels in care homes. Studies were also required to report one or more of the following outcomes:

- resident outcomes: health status, improvement or maintenance of functional ability, activities of daily living, falls, mortality, quality of life or wellbeing measures;
- staff outcomes: wellbeing, satisfaction, recruitment and retention;
- service use outcomes: on use of external NHS and social care, or other, services, care home organisation and profits/commercial success;
- impacts on relationships OR integration between care homes and partner organisations.

### **Mapping review - Data extraction**

Information was extracted from each study into a Microsoft Excel spreadsheet. These data were modified for each topic, but included: citation, location (country) of study, study design, target population, name and brief details of the intervention. Mapping data extraction was conducted by one reviewer and checked by a second reviewer. Mapping findings were tabulated in tables and narratively. These results were presented to the vanguard group and used to help formulate the potential review questions for each theme.

### **Systematic evidence syntheses**

The systematic evidence syntheses were conducted according to the principles outlined in Centre for Reviews and Dissemination's guidance on the conduct of systematic reviews and reported following the guidance of the PRISMA statement. The protocols were written in accordance with the new PRISMA-P initiative and registered on PROSPERO; the international database of prospectively registered systematic reviews in health and social care. (Study registration: PROSPERO 2016:CRD42016052933; 2016:CRD42016052933; 2016:CRD42016052937; 2016:CRD42016052938)

### **Inclusion and exclusion criteria**

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After being mapped, papers were screened once more (independently by two reviewers) to identify those which met the criteria for inclusion for each systematic review. For three of the themes (communication and engagement, evaluation and workforce), additional focussed searches were conducted to ensure that the material included in the review was comprehensive. Detailed inclusion criteria were developed for each systematic review.

### **Data extraction and quality assessment**

For all reviews, data extraction was conducted by one researcher and checked by a second researcher for accuracy, with any discrepancies resolved by discussion, or consultation with a third researcher, where necessary. A standardised data extraction form for each review was developed, piloted on an initial sample of papers and refined as necessary. Data extracted included: study citation, country of origin; design; sample size; sample characteristics; description of the intervention and control comparator conditions; outcomes and outcome measures used, findings. All data extraction was undertaken in Microsoft Excel. Quality assessment was undertaken alongside the data extraction. The quality of randomised controlled trials was assessed using the Cochrane Risk of Bias tool. All and non-randomised controlled trials (observational studies) were assessed using the ROBINS-I tool.

### **Data synthesis**

Data from the individual studies were tabulated and discussed in a narrative overview. Due to the nature of the available evidence, a quantitative analysis of the results, including a meta-analysis, was not appropriate. There was extensive heterogeneity in study design, settings and outcome measures across the included studies.

### **Findings**

Seven hundred and sixty-one studies were mapped, and 65 included in the four systematic evidence syntheses. Overall, this work identified a paucity of large, high quality research studies, particularly from the United Kingdom.

#### **Digital technology**

Digital technology has multiple potential applications in care homes, and researchers have investigated a range of interventions using experimental study designs. However, a majority

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of studies are pilot or feasibility trials, of insufficient size to detect clinically significant outcomes. Cost, ease of use and staff demands are frequently identified as both barriers and facilitators to the implementation and use of technology. There is limited evidence that games that promote activity, and robotic interventions may have some benefits for residents' mental wellbeing. However, these interventions are more likely to have been evaluated, and it is not clear that they are superior to non-technological solutions. Digital records, monitoring technologies and telehealth may also have positive impacts, but the evidence base does not allow firm conclusions to be drawn.

#### Communication and engagement

The evidence base for communication interventions was weak. However, the use of standardised data collection forms appears to promote the transfer of vital information with residents who are referred to hospital. The studies reviewed provided no data on the impact of transfer forms on patient outcomes. Tools to structure communication, such as the Situation, Background, Assessment, Recommendation (SBAR) approach, have been evaluated outside of the UK and appear to have the potential to enhance clinical outcomes for care home residents. Complex interventions to improve communication may also improve resident clinical outcomes, and reduce hospital transfers, but the evidence is limited. There was, as anticipated, a paucity of research into how care homes engage with their local communities.

#### Evaluation

There are many measurement tools that have been used in care homes and described in the English language literature. Only six of the recently used tools had undergone any validation in a UK setting. This does not mean that other tools are not useful, but if they are introduced into routine use, some work is needed to explore their measurement properties and to ensure that they are appropriate for this context. The two general measures of care outcomes that had undergone some validation for use in UK care homes, have different origins. We found no data to enable us to recommend one over the other. None of the included tools scored highly in our assessment of methodological quality.

#### Workforce

The literature relevant to care home staffing is extensive, but much of it has limited relevance to the UK context. Initiatives in flexible deployment of staff, or new roles were

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difficult to identify in the published literature. However, interventions that promote joint working within and beyond the care home, multidisciplinary teams, primary nursing and a focus on specific care tasks all appear to have merit. There is no strong evidence of a relationship between the numbers of staff, staff resident ratios, staff skill mix or nursing care models and any resident outcomes. There is limited evidence to suggest that the number of staff without nursing qualifications may influence residents' quality of life.

## **Recommendations for research**

### Technology

1. There is a general need for appropriately powered experimental studies in this area, and to address the paucity of economic evaluations.
2. Greater focus on interventions with practical applications to health care, such as the use of digital records and telehealth interventions is needed. Their use and benefits could be addressed with mixed methods and quasi-experimental designs.
3. The burden on care home staff of new interventions is another important topic for future research. In addition, the impact of technology on families appears to have been neglected in this research area, and this should be rectified in future studies.
4. Joint working between care homes, researchers and the manufacturers of new technologies may be helpful to generate robust evidence of effectiveness from multiple sites.
5. Resident and family participation is essential in future research on the need for, design and implementation of technological interventions.

### Communication and engagement

1. Formal evaluation in a UK setting of the use of transfer forms and tools such as SBAR would be valuable, before, or as, they are introduced across the NHS.
2. If the complex, multifaceted interventions that have been used in US settings are introduced to the UK, they require multi-method, long term evaluation to produce evidence that would support wider implementation.
3. Investigation is needed into the most effective and appropriate ways for care homes to engage with local communities, and the long-term impact on residents and the



public perception of care homes. This is an area that would benefit from ethnographic and other qualitative approaches.

#### Evaluation

1. Care home commissioners and providers would benefit from an easy to administer, robust measure of care outcomes. The two general measures of care outcomes that we discussed, CARE profiles and ASCOT, have had some validation for UK use. However, our assessment of methodological quality suggests that publication of further validation work would be helpful to promote their use.
2. The burden on residents, staff and care homes, the training needed and the costs involved in administering and analysing data from outcome measures, all merit closer scrutiny before they are implemented across the NHS.
3. There are many measurement tools developed elsewhere, and our mapping review provides some evaluative work to select candidate tools for testing in the UK.

#### Workforce

1. The evidence base on the care home workforce needs to be supplemented with robust, large scale research that is specific to the UK. Future work could usefully consider the experiences and perceptions of staff and residents, and the qualities and values that would promote high quality care.
2. Further measurement or analysis of the number of staff and a search for associations with resident outcomes cannot be justified. The impact of staffing practices on staff outcomes, particularly health, may be informative.