A systematic review of integrated working between care homes and health care services

Sue L Davies¹, Claire Goodman¹*, Frances Bunn¹, Christina Victor², Angela Dickinson¹, Steve Iliffe³, Heather Gage⁴, Wendy Martin² and Katherine Froggatt⁵

Abstract

Background: In the UK there are almost three times as many beds in care homes as in National Health Service (NHS) hospitals. Care homes rely on primary health care for access to medical care and specialist services. Repeated policy documents and government reviews register concern about how health care works with independent providers, and the need to increase the equity, continuity and quality of medical care for care homes. Despite multiple initiatives, it is not known if some approaches to service delivery are more effective in promoting integrated working between the NHS and care homes. This study aims to evaluate the different integrated approaches to health care services supporting older people in care homes, and identify barriers and facilitators to integrated working.

Methods: A systematic review was conducted using Medline (PubMed), CINAHL, BNI, EMBASE, PsycInfo, DH Data, Kings Fund, Web of Science (WoS incl. SCI, SSCI, HCI) and the Cochrane Library incl. DARE. Studies were included if they evaluated the effectiveness of integrated working between primary health care professionals and care homes, or identified barriers and facilitators to integrated working. Studies were quality assessed; data was extracted on health, service use, cost and process related outcomes. A modified narrative synthesis approach was used to compare and contrast integration using the principles of framework analysis.

Results: Seventeen studies were included; 10 quantitative studies, two process evaluations, one mixed methods study and four qualitative. The majority were carried out in nursing homes. They were characterised by heterogeneity of topic, interventions, methodology and outcomes. Most quantitative studies reported limited effects of the intervention; there was insufficient information to evaluate cost. Facilitators to integrated working included care home managers’ support and protected time for staff training. Studies with the potential for integrated working were longer in duration.

Conclusions: Despite evidence about what inhibits and facilitates integrated working there was limited evidence about what the outcomes of different approaches to integrated care between health service and care homes might be. The majority of studies only achieved integrated working at the patient level of care and the focus on health service defined problems and outcome measures did not incorporate the priorities of residents or acknowledge the skills of care home staff. There is a need for more research to understand how integrated working is achieved and to test the effect of different approaches on cost, staff satisfaction and resident outcomes.

Background

In the UK care homes are the major provider of long term and intermediate care for older people [1-3]. There are 18, 255 care homes providing 459, 448 beds, almost three times as many as the 167, 000 hospital beds available [4]. Although people living in care homes have complex needs and represent the oldest and most frail of the older population in the UK, research consistently demonstrates that they have erratic access to NHS services, particularly those that offer specialist expertise in areas such as dementia and end of life care [5-9]. Inappropriate and unplanned hospital admissions, recognition of unmet health needs, concerns about supporting patient dignity, end of life care and access to health services have triggered multiple care home specific policy initiatives and interventions [10,11].
consultation event that involved care home and health care representatives identified multiple examples of the NHS working with care homes to improve information exchange, palliative care, reduce falls, and unplanned admissions to hospital [12]. These interventions often involve the introduction of specialist health workers and teams or problem specific workers to achieve the desired outcomes [13,14].

Primary health care services in England spend significant amounts of time providing care for older people resident in these settings [15,16,7,8] (Goodman, C et al: Can clinical benchmarking improve bowel care in care homes for older people? Final report submitted to the DoH Nursing Quality Research Initiative PRP, Centre for Research in Primary and Community Care, University of Hertfordshire, 2007). However, relatively little is known about how health care services work with the (largely unqualified) workforce to provide care to a population that has complex physical and medication needs, experiences high level of cognitive impairment, depression and is in the last few years of life [17,18]. The involvement of health care services in care home settings is often defined by what care home staff are not allowed to do rather than a clear understanding of how the two sectors complement each other, or work together [19]. In addition, it cannot be assumed that health service definitions of problems and services reflect how older people and care home staff define health needs and the types of health care they would like (Evans, C: The analysis of experiences and representations of older people’s health in care homes to develop primary care nursing practice, unpublished PhD King’s College London, 2008).

Initiatives that support continuity and integration of care for older people with complex needs across health and social care with public and private providers are increasingly recognised as important for continuity and quality of care [20,21]. Integration of service provision can be defined as ‘a single system of needs assessment, commissioning and/or service provision that aims to promote alignment and collaboration between the cure and care sectors [22]. There are different levels of integration between health care services [23]. In the context of integrated working with care homes, these can be summarised as:

**Patient/Micro level**
Close collaboration between different health care professionals and care home staff e.g. for the benefit of individual patients.

**Organisational/Meso level**
Organisational or clinical structures and processes designed to enable teams and/or organisations to work collaboratively towards common goals (e.g. integrated health and social care teams).

**Strategic/Macro level**
Integration of structures and processes that link organisations and support shared strategic planning and development for example, when health care services jointly fund initiatives in care homes [24,25].

To understand the evidence for the benefits of different approaches to health care services supporting older people in care homes, we conducted a systematic review to identify studies using integrated working between primary health care professionals and care homes for older people; evaluated their impact on the health and well being of older people in care homes, and identified barriers and facilitators to integrated working.

**Methods**
The review was conducted according to inclusion criteria and methods pre-specified in a protocol developed by the authors before the review began.

**Inclusion criteria**
We included interventions designed to develop, promote or facilitate integrated working between care home or nursing home staff and health care practitioners. Interventions that involved staff going in to provide education or training to care home/nursing home staff were included as long as there was some description of joint working or collaboration. We excluded studies where staff were employed specifically for the purpose of the research without consideration of how the findings might be integrated into ongoing practice (i.e. project staff introduced for a limited time to deliver a specific intervention). For a study to be included there had to be evidence of at least one of the following:

- Clear evidence of joint working
- Joint goals or care planning
- Joint arrangements covering operational and strategic issues
- Shared or single management arrangements
- Joint commissioning at macro and micro levels

Studies also had to report at least one of the following outcomes:

- Health and well being of older people (e.g. changes in health status, quality of life)
- Service use (e.g. number of GP visits, hospital admissions)
- Cost such as savings due to avoided hospitalisations
- Process related outcomes (such as changes in quality of care, increased staff knowledge, uptake of training and education and professional satisfaction)

As the literature in this area is limited we included all studies that involved an element of evaluation. This
included controlled and uncontrolled studies. However, because they are more susceptible to bias, studies without a control were used to describe and catalogue interventions rather than evaluate effectiveness. Process evaluations and qualitative studies including those using action research methodologies were included in order to identify facilitators and barriers to integrated working.

Identification of studies
The electronic search strategy was conducted in February 2009. We searched the following electronic databases: Medline (PubMed), CINAHL, BNI, EMBASE, PsycInfo, DH Data, Kings Fund, Web of Science (WoS incl. SCI, SSCI, HCl) and the Cochrane Library incl. DARE. In addition, we contacted care home related interest groups and used lateral search techniques, such as checking reference lists of relevant papers, and using the ‘Cited by’ option on WoS, Google Scholar and Scopus, and the ‘Related articles’ option on PubMed and WoS. We applied no restrictions by date or country but included English language papers only. Details of the search terms used can be seen in Table 1.

Data extraction and synthesis
Electronic search results were downloaded into EndNote bibliographic software. Two reviewers independently (SD, FB) screened all titles and abstracts of citations identified by the electronic search, applied the selection criteria to potentially relevant papers, and extracted data from included studies using a standardised form. Any disagreements concerning studies to be included were resolved by consensus or by discussion with a third reviewer (CG).

Due to substantial heterogeneity in study design, interventions, participants and outcomes we did not pool studies in a meta-analysis. Instead a narrative summary of findings is presented and where possible we have reported dichotomous outcomes as relative risks (RR) and continuous data as mean differences (MD) (with 95% confidence intervals). Data in the evidence tables is presented with an indication of whether the intervention had a positive effect (+), a negative effect (-), or no statistically significant effect (0). The qualitative studies were used to generate a list of potential barriers and facilitators to integrated working. Each paper was systematically read by two researchers (SD, CV) to highlight any factors that may have impacted on the process, both those that were explicitly referred to by the authors and those identified by the reviewers within the papers’ narratives.

The quality of the included studies was assessed using design assessment checklists informed by the Cochrane

| Table 1 Search terms on PubMed (search terms were suitably adapted for other databases) |
| Component 1 |
| Search "Delivery of Health Care, Integrated"[Mesh] OR integrated[ti] OR interdisciplinary[ti] OR integration[ti] OR integral[ti] OR integrat*[ti] OR seamless[ti] OR continuity[ti] OR interface[ti] OR multidisciplinary[ti] OR multiprofessional[ti] OR multiagency[ti] OR interprofessional [ti] OR multi sector[ti] OR model*[ti] OR coordinat*[ti] OR partnership[ti] OR tuft OR continu*[ti] OR interagency*[ti] OR stakeholder*[ti] OR network*[ti] OR systems [ti] OR team*[ti] OR shared[ti] OR joined-up[ti] OR pooling[ti] OR vertical*[ti] OR horizontal*[ti] OR collaborat*[ti] OR cross organ*[ti] OR multi-professional[ti] OR intermediate care[ti] OR multi agency[ti] OR multiagency[ti] OR managed care[ti] OR joint care[ti] OR (individual[ti] OR separate[ti]) AND budget OR partner*[ti] OR all-inclusive[ti] OR in-reach[ti] OR chain[ti] OR comprehensive[ti] OR total care[ti] OR interface[ti] OR "service interaction" OR seamless[ti] OR interagency[ti] OR "Patient Care Team"[MAJR] AND Search Family Physicians OR general pract*[ti] OR general physician*[ti] OR family doctor*[ti] OR general medicine*[ti] OR Primary Health Care OR Continuity of Patient Care OR "primary care" OR continuity of care OR physician*[ti] OR "Physicians"[MajrNoExp] OR "Physicians, Family"[Majr] OR "Physician Assistants"[MeSH Terms] OR "Nurse Practitioners"[MeSH Terms] OR "Physician's Practice Patterns"[MAJR] OR physician*[ti] OR practitioner*[ti] AND Search Nursing Homes OR nursing home*[ti] OR "nursing home" OR long-term care[ti] OR long term care[ti] OR nursing facilit*[ti] OR residential[ti] OR institutional care[ti] OR resident*[ti] OR continuing[ti] OR respite care OR nightingale home OR nightingale homes OR care home*[ti] OR long-term[ti] OR long-term[ti] AND Search geriatrics OR elderly OR older OR middle age OR middle-age OR senior OR frail OR care of elderly OR geriatric nursing OR geriatric assessment OR "Aged"[Mesh] OR "Health Services for the Aged"[Mesh] OR "Middle Aged"[Mesh] OR "Homes for the Aged"[Mesh] OR "Aged, 80 and over"[Mesh] OR senior*[ti] OR pensioner*[ti] OR retire*[ti]

| Component 2: Simplified, focused searches involving two aspects of the subject: |
| NHS/Primary Care/Nursing homes |
| Search "Physicians"[MajrNoExp] OR "Physicians, Family"[Majr] OR "Physician Assistants"[MeSH Terms] OR "Nurse Practitioners"[MeSH Terms] OR "Physician's Practice Patterns"[MAJR] OR physician*[ti] OR practitioner*[ti] OR specialty*[ti] OR primary care[ti] OR nursing home*[ti] OR residential care[ti] OR care home*[ti] OR residential home*[ti]

Nursing homes/Integrated Care
Search (nursing home*[ti] OR residential care[ti] OR care home*[ti] OR residential home*[ti]) (integrate*[ti] OR team*[ti] OR cooperation[ti] OR multidisciplinary[ti])

Elderly/Integrated Care
Search elderly[ti] OR older[ti] OR geriatric*[ti] OR senior[ti] (integrate*[ti] OR team*[ti]) AND (community OR nursing homes)
Collaboration risk of bias tool [26] and Spencer et al’s quality assessment checklist for qualitative studies [27]. The core quality-assessment domains are summarised in Table 2. As other non controlled studies were used to inform contextual understanding rather than evaluate effectiveness they were not formally quality assessed.

Data were extracted from each study on methodology, type of intervention, outcomes, participants, and location. In addition, an interpretive approach based on Kodner and Spreeuwenberg’s (2002) work on integrated working, was used to compare and contrast the nature and level of integration across the studies using the principles of framework analysis [28]. Each study was categorised in terms of the degree of integration and the complexity classified as micro, meso and or macro. In addition, based on the assumption that care homes with a higher level of integration would show evidence of correspondingly greater levels of support and contact with health care professionals, each study was analysed to identify the amount of contact, support and training given by the health professionals involved in the study.

**Results**

Figure 1 shows the flow of studies through the selection process. Seventeen studies (reported in 18 papers) met our inclusion criteria.

**Table 2 Quality assessment criteria by study type**

| Criteria                                      | Randomised controlled trials | Controlled studies (without randomisation) | Qualitative studies |
|-----------------------------------------------|------------------------------|-------------------------------------------|---------------------|
| Sequence generation                           | Yes/No/Unclear                 | Yes/No/Unclear                          | Scored as fully or mostly, partly or not at all |
| Allocation concealment                        | Was the allocation sequence adequately generated? | Were baseline results reported for each group? | Scope and purpose: e.g. clearly stated question, clear outline of theoretical framework |
| Blinding                                      | Was allocation adequately concealed?     | Were there any significant differences in the groups at baseline?           | Design: e.g. discussion of why particular approach/methods chosen |
| Incomplete outcome data                       | Was knowledge of the allocation intervention adequately concealed from outcome assessors? | Was knowledge of the allocation intervention adequately concealed from outcome assessors? | Sample: e.g. adequate description of sample used and how sample identified and recruited |
| Selective outcome reporting                   | Was this adequately addressed for each outcome? | Was this adequately addressed for each outcome? | Data collection: e.g. systematic documentation of tools/guides/researcher role, recording methods explicit |
|                                              | Are reports of the study free of suggestion of selective outcome reporting? | Are reports of the study free of suggestion of selective outcome reporting? | Analysis: e.g. documentation of analytic tools/methods used, evidence of rigorous/systematic analysis |
|                                              |                                |                                          | Reliability and validity: e.g. presentation of original data, how categories/concepts/themes developed and were they checked by more than one author, interpretation, how theories developed |
|                                              |                                |                                          | Generalisability: e.g. sufficient evidence for generalisability or limits made clear by author |
|                                              |                                |                                          | Credibility/plausibility: e.g. provides evidence that resonates with other knowledge, results/conclusions supported by evidence |

**Description of studies**

Ten studies were quantitative, (four of which were RCTs), one used mixed methods, two were process evaluations, three were qualitative and one was action research (see Table 3). Nine were conducted in the UK, five in Australia, two in the USA and one in Sweden. Eleven (65%) studies were conducted in nursing homes, five in residential homes and one in a combination of both. Study participants included residents, relatives, care home staff both residential and nursing, and health professionals including general practitioners, district nurses, nurse specialists, pharmacists, psychiatrists and psychologists.

Seven studies were focused on individual care, for example, specific health care needs such as end of life [29-33] or wound care [34] and dementia [35]. Six studies focused on residents’ needs as a group, such as detection and treatment of depression [36], bowel related problems (Goodman, C. et al: Can clinical benchmarking improve bowel care in care homes for older people? Final report submitted to the DoH Nursing Quality Research Initiative PRP, Centre for Research in Primary and Community Care, University of Hertfordshire, 2007.) and or supporting the care home staff interactions with residents through training [37] and improved prescribing [38-40]. A further four papers were service evaluations such as an in-reach...
team for care homes [41], a care home support team [42], and nurse practitioners [43,44]. End of life care accounted for five papers [29-33], three of which focused on care pathways [30-32].

Risk of bias
There were seven controlled studies of which four were RCTs. Although the RCTs could be expected to be less susceptible to bias than the non randomised studies the

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Figure 1 PRISMA Flow Diagram. Systematic review process from electronic searching to study inclusion.

From: Moher D, Liberati A, Tetzlaff J, Altman DG. The PRISMA Group (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. PLoS Med 6(6): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.
Table 3 Studies included in the systematic review of integrated working between care homes and health care services:

| First Author, Year Title |
|--------------------------|
| **Multidisciplinary case conference reviews: improving outcomes for nursing home residents, carers and health professionals** |
| **Controlled study** |
| **Research Question/aims and objectives** |
| To determine whether multidisciplinary case conference reviews improved outcomes for nursing home residents and its impact on care staff. |
| **Study population, setting and country of study** |
| Population: Older people in nursing homes |
| Setting: 3 nursing homes |
| Country: Australia |
| **Sample size/number of participants: Include power calculation if available** |
| Population: 245 older people |
| But only 75 residents were reviewed |
| **Description of intervention/Study design** |
| Weekly case conference reviews, one review per resident, over 8 months attended by GPs, clinical pharmacist, senior nursing staff and other health professionals. Multidisciplinary discussion of all aspects of a resident’s care to make recommendations and devise a management plan for the resident. Reviews were led by GPs with data collection by the pharmacist. Baseline and endpoint comparisons were made between residents who were reviewed and those who were not. |
| **Main outcome variable(s)/Areas of focus for qualitative studies** |
| Resident outcomes included: medication use, administered medications and weekly cost, health status and quality of life. Carer outcomes were based on resident interaction, workload or personal/professional satisfaction. |
| **Main findings/Conclusions** |
| • There were no significant reductions in medications orders, cost and mortality. 40% of the recommendations benefited residents, measured through their health status and quality of life. 26% of the recommendations benefited care staff, but no details were given. Multidisciplinary case conferences were seen as beneficial to patients and carers. Their future use was recommended. |

| **Llewellyn-Jones, 1999** |
| **Multifaceted shared care intervention for late life depression in residential care: randomised controlled trial** |
| **RCT** |
| **Research Question/aims and objectives** |
| To evaluate the effectiveness of a population based multifaceted shared care intervention for late life depression in residential care. |
| **Study population, setting and country of study** |
| Population: Older people 65 years + with depression and no or low cognitive impairment |
| Setting: Residential facility living in self care units and hostels not nursing homes (equivalent to residential care in UK) |
| Residents were stratified and randomised to intervention or control |
| Country: Australia |
| **Sample size/number of participants: Include power calculation if available** |
| Population: 220 older people |
| No power calculation |
| **Description of intervention/Study design** |
| The shared care intervention included: 1. Multidisciplinary consultation and collaboration 2. Training of gps and carers in detection and management of depression 3. Depression related health education and activity programmes for residents. The control group received routine care. |
| **Main outcome variable(s)/Areas of focus for qualitative studies** |
| Geriatric Depression Scale |
| **Main findings/Conclusions** |
| There was a significant reduction in adjusted depression scores for residents in the intervention group. Multidisciplinary collaboration, staff education, health education and activity programmes can improve depression in older people in residential care. |
3. Opie, 2002  
Challenging behaviours in nursing home residents with dementia: a randomised controlled trial of multidisciplinary interventions.  
RCT  
To test whether individually tailored psychosocial, nursing and medical interventions to nursing home residents with dementia will reduce the frequency and severity of behavioural symptoms.  
**Population:** Nursing home residents with severe dementia rated by staff as having frequent, severe behavioural disturbances.  
**Setting:** 42 Nursing homes  
**Country:** Australia  
102 older people entered the study, (99 completed the 4 week trial, 2 RIPs 1 hospitalisation)  
Residents selected on basis of CMAI scores and assigned to early or late intervention groups. Consultancy team with training in psychiatry, psychology and nursing met weekly for 30 minutes, to discuss referrals and formulate individualised care plans which were presented to nursing home staff to implement. Plans were reviewed at one week. 3 categories: medical, based on medication review, nursing, based on ADLs, and psychosocial including environment, sensory stimulation. The control was normal care, residents acted as their own controls by being in the early or late intervention groups.  
**Frequency and severity of disruptive behaviours and assessment of change** by senior nursing staff. Tools included: Cohen-Mansfield Agitation Inventory (CMAI) which assesses frequency of 30 behaviours over previous 14 days Behaviour Assessment Graphical System (BAGS) which records a combined frequency and disruption score every hour for 24 hours.  
There was a slight reduction in the daily observed counts of challenging behaviours. Individualised, multidisciplinary interventions appear to reduce the frequency and severity of challenging behaviours in nursing homes.

4. Schmidt, 1998  
The Impact of Regular Multidisciplinary Team Interventions on Psychotropic Prescribing in Swedish Nursing Homes  
RCT  
To evaluate the impact of regular multidisciplinary team interventions on the quantity and quality of psychotropic drug prescribing in nursing homes  
Aim was to improve prescribing through better teamwork amongst physicians, pharmacists, nurses and nursing assistants  
**Population:** Long term residents, 42% dementia, 5% psychotic disorder, 7% depression  
**Setting:** 33 Nursing homes  
**Country:** Sweden  
1854 residents in 15 experimental homes and 18 control homes  
Regular multidisciplinary team meetings over 12 months to discuss individual residents drug use. Training was provided for pharmacists but not for other staff. Control homes provided normal care.  
Baseline and 12 month post resident medications  
After 12 months the intervention group showed an improvement in the prescribing of hypnotics only. Prescribing practices can be improved through better teamwork between health care and nursing home staff using clinical guidelines.
| Study | Title | Design | Population | Setting | Country | Description |
|-------|-------|--------|------------|---------|---------|-------------|
| 5. Vu, 2007 | Cost-effectiveness of multidisciplinary wound care in nursing homes: a pseudo-randomized pragmatic cluster trial | Pseudo RCT | 176 residents with leg or pressure wounds | 44 high care nursing homes | Australia | Based on an assumed improvement in the healing rate from 15% to 30%, 108 wounds per arm were required to have a 80% chance of detecting a two-fold increase in healing rates at a significance level of 5%. To adjust for clustering this number was increased to 151 in each group. Residents in the intervention arm received standardised treatment from a wound care team comprised of trained community pharmacists and nurses. A standard treatment protocol was developed based on the colour, depth and exudate method for assessing wounds and the group's clinical and academic experience. They met weekly to discuss any new wounds and treatment options within the protocol. Both nurses and pharmacists received training on wound healing and management. Treatment recommendations, frequency and detail of dressing changes, measurement and photos of wounds, SF36, Assessment of Quality of Life index, Brief Pain Inventory - measures wound pain, total estimated cost of treatment per wound including, staff time, training, wound care products and waste disposal. During the trial more wounds healed in the intervention than in the control group but this was not significant. The mean treatment cost of wound healing was significantly less in the intervention group. Standardised treatment by a multidisciplinary wound care team cut costs and improved chronic wound healing in nursing homes. |
| 6. Crotty 2004 | An outreach geriatric medication advisory service in residential aged care: a randomised controlled trial of case conferencing | Cluster RCT | 154 residents recruited with 54 in control, 50 in intervention, 50 in within facility control group | 10 high level aged care facilities | Australia | An effect size based on patients aged 65 + with polypharmacy of 0.9 in the MAI between the intervention and control groups (power 0.9, type 1 error of 0.05) would be detected with 28 residents in each group. Multidisciplinary case conferences chaired by the resident's GP, a geriatrician, pharmacist and residential care staff held at the nursing home for each resident. All facilities received a half day workshop on using the toolkit for challenging behaviour. All residents had their medication chart reviewed pre and post intervention by an independent pharmacist using the MAI. There was a significant improvement in appropriate medication in the intervention group compared with the control group. Resident behaviours were unchanged after the intervention. |
| Study | Title | Study Design | Objective | Population | Setting | Intervention | Outcome Measures | Key Findings |
|-------|-------|--------------|-----------|------------|---------|--------------|-----------------|-------------|
| 7. Joseph 1998 | Managed Primary Care of Nursing Home Residents | Cohort study | To measure the rates of hospital use and mortality of nursing home residents who received their primary care from practitioner-physician teams. | 307 nursing home residents | 30 nursing homes in Southern California | Primary care by accessible interdisciplinary team including physicians, nurse practitioners, and nursing home staff supported by clinical guidelines, continuous improvement techniques and increased availability of clinical services at the nursing homes. | Demographics, mortality, hospital days, minimum data sets | Integrated working between doctors, nurse practitioners and nursing home staff can reduce nursing home resident’s hospital use. |
| 8. Kane 2004 | Effect of an Innovative Medicare Managed Care Program on the Quality of Care for Nursing Home Residents | Controlled study | To assess the quality of care provided by Medicare HMO targeted specifically at nursing home residents, employing nurse practitioners to provide additional primary care to the physicians. | 44 Evercare homes, 44 control homes | Evercare model of managed care using nurse practitioners to provide additional primary care over and above that provided by physicians. | 4 aspects of quality: mortality, preventable hospitalisations, quality indicators, derived from the Minimum Data set and changes in functioning. | The Evercare mortality rate was significantly lower than the control-in group but not the control-out group. The Evercare residents had fewer preventable hospitalisations than the control-out group. |
| 9. Goodman 2007 | Controlled study | To assess whether clinical benchmarking can be incorporated into care homes for older people with the support of NHS primary care nursing staff. | Older people in residential care homes | 46 Care home staff and 154 older people from 6 residential care homes | 12 district nurses from 6 district nursing teams in 3 PCTs. | Main outcome variables were bowel related problems captured in a bowel diary recorded for residents pre and post intervention and related hospital admissions, medication and continence product use, time spent on bowel related activities, staff satisfaction and turnover. | Clinical benchmarking could be utilised in care homes as part of everyday working with district nurses and used few resources. However, commitment by both parties and mutual trust was necessary for the process to be successful. Bowel care was complex and challenging for care staff especially where older people were cognitively impaired. There was no significant reduction in bowel related problems but some evidence of improved documentation and appropriate prescribing. |
| Study Reference | Study Title | Study Details |
|----------------|-------------|---------------|
| 10. Szczepura, 2008 | In-reach specialist nursing teams for residential care homes: uptake of services, impact on care provision and cost-effectiveness | Evaluation of a dedicated nursing and physiotherapy in-reach team (IRT)  
Population: older people in care homes  
Setting: 4 residential care homes  
Country: UK  
IRT gives 24 hour cover 7 days a week - a specialist team offers support and onsite care for up to 15 beds for specialist nursing care to prevent transfer to hospital or nursing home. It also supports care home staff through health training up to NVQ level 3.  
Cost of the service  
Number of referrals to the service  
Reasons for referral/visits by team  
Hospitalisations and nursing home transfers avoided  
IRT resulted in savings through reduced hospitalisations, early discharges, delayed transfers to nursing homes and illness recognition. Introduction of an in-reach team was at least cost neutral. It also benefited the care home staff through training which enhanced the quality of care and reduced the transfer of residents to other care facilities. |
| 11. Proctor, 1998 | An observational study to evaluate the impact of a specialist outreach team on the quality of care in nursing and residential homes | To assess the applicability of a training and support programme for care staff in nursing and residential homes on the quality of staff-resident interaction  
Population: Older people considered by staff to have problems in terms of behaviour, social functioning or psychiatric symptoms  
Setting: 5 residential homes, 1 nursing home  
Country: UK  
12 residents - 2 from each home  
51 care home staff  
1. Staff training over 6 months included Seminars provided by a multidisciplinary team including old age psychiatrists, nurses, doctors and OTs. A behavioural approach to care planning to help staff plan and implement care plans for individual residents. Training was given by a psychiatric nurse with weekly visits to staff  
Resident behaviour and staff contact was recorded through non-participant observation prior to the training, 3 and 6 months post. Activities recorded were based on QUIS - Quality of Interactions Schedule (Dean et al, 1993)  
There was a significant increase in the proportion of time that staff spent in positive interactions with residents (direct care p < 0.002, social contact p < 0.05) and levels of resident activity increased (p < 0.001). |
| 12. Knight, 2007 | All-Wales integrated care pathway project for care homes | To facilitate the implementation of ICP into care homes through negotiation with local palliative care providers to improve the care for dying patients  
Population: Older people in nursing homes  
Setting: 29 nursing homes in Wales  
Country: UK  
130 older people pre-intervention, 133 post intervention  
Introduction of an integrated care pathway for dying patients in care homes. Other support:  
- Education subgroup  
- ICP education pack  
- Teaching sessions  
- Syringe driver training  
- Matron forums  
- Informal training/support  
Pre and post ICP audit of dying patient’s notes to measure their quality. Pre-audit highlighted poor communication, symptom control, and lack of staff end of life care education. The re-audit indicated an improvement in recording end of life care. ICP use in the care homes had increased from 3 to 31% in one year. Recording of events and documentation remained poor. |
| 13. Mathews, 2006 | Using the Liverpool Care Pathway in a nursing home | Aim to illustrate how collaborative working in a nursing home using the Liverpool Care Pathway (LCP) can enhance end of life patient care and improve palliative care education  
Population: Older people resident in a nursing home  
Setting: a nursing home  
Country: UK  
150 residents with 50 bed contracted out to the NHS for end of life care  
Pilot study to introduce LCP into a nursing home. LCP discussed with GPs, pharmacist and ambulance service. Trained nursing staff received 3 hours of palliative care training including using LCP. Followed by implementation of the LCP for patients.  
Focus on improving documentation and symptom control of patients  
An audit of the first 10 patients on the LCP showed an improvement in documentation and assessment of symptoms. Staff felt that the training should be extended to health care assistants. A steering group was also set up to discuss the pathway and training needs. |
| Study | Title | Year | Methodology | Population | Setting | Country |
|-------|-------|------|-------------|------------|---------|---------|
| 14. Doherty, 2008 | Examining the impact of a specialist care homes support team | Qualitative | To examine the work and perceived impact of a dedicated care homes support team | Older people in care homes | 29 Care homes | UK |
| 15. Hasson, 2008 | The palliative care link nurse role in nursing homes: barriers and facilitators | Qualitative | To explore link nurses' views and experiences regarding the development, barriers and facilitators to the implementation of the role in palliative care in the nursing home | Older people in nursing homes | 33 nursing homes | UK |
| 16. Avis 1999 | Evaluation of a project providing community palliative care support to nursing homes | Qualitative | Evaluation of project to extend 'hospice standards' of palliative care to nursing homes | 231 Nursing home residents with registered palliative care beds | UK |

**Table 3 Studies included in the systematic review of integrated working between care homes and health care services:** (Continued)
Table 3 Studies included in the systematic review of integrated working between care homes and health care services: (Continued)

| Study Reference | Title | Population | Setting | Country | Methodology | Study Aim | Findings |
|-----------------|-------|------------|---------|---------|-------------|-----------|----------|
| Hockley 2005    | Promoting end of life care in nursing homes using an integrated care pathway for the last days of life | Older people in nursing homes | 8 independent nursing homes | UK | Action research | To promote quality end of life care in nursing homes using an integrated care pathway document. Explores the barriers that needed to be overcome during the implementation of an integrated care pathway for end of life care | Dying became more central to nursing home work. Five main themes emerged: a greater openness to death, recognition of dying, better teamwork, using palliative care knowledge to influence practice and better communication. |
| Watson 2006     | Barriers to implementing an integrated care pathway for the last days of life in nursing homes |  |  |  |  | Use of action research to promote collaboration between staff in nursing homes and the research team, empower staff in practice of end of life care and promote sustainable end of life care once study complete. Core research team of 3 nurses with palliative care and action research experience, + 2 champions were identified in each care home. Facilitation to implement ICP: Monthly action learning sets for champions, monthly collaborative learning groups for all staff to reflect on end of life care and ICP documents of residents who had died, clinical support from nurse specialist researcher. |  |

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potential for bias in both groups of studies appeared to be high (see Tables 4 and 5).

A number of the studies appeared underpowered and for many follow up was short. The qualitative studies employed a range of methodologies including action research, interviews, focus groups and questionnaires. As with the quantitative studies, the quality was low, only two out of four [30,33] had a clearly defined purpose and design. With one exception [33] descriptions of the study sample, data collection and analysis were inadequate and evidence of their credibility and transferability was limited (see Table 6).

Effectiveness
The heterogeneity of outcomes and, in particular, the interventions meant that making comparisons between studies was problematic. Three studies looked at the effect on prescribing [38-40], three included mortality as an outcome [39,40,44] and two looked at disruptive behaviour [35,39]. The remaining outcomes, only included in single studies, were depression [36], hospital admissions [40], functional status [40], wound healing [34], and bowel related problems (Goodman, C et al: Can clinical benchmarking improve bowel care in care homes for older people? Final report submitted to the DoH Nursing Quality Research Initiative PRP, Centre for Research in Primary and Community Care, University of Hertfordshire, 2007). All the studies showed that the intervention had either mixed effects (that is improvement in one outcome but no effect or negative effect in another outcome), or no effect when compared with the control group. Insufficient information was available to evaluate the cost of integrated working between care homes and primary health care professionals.

The nature of integrated working
There was a great deal of variation in how health care services and care homes worked together and the frequency of contact. For example, whilst some studies involved weekly multidisciplinary team meetings [43], monthly meetings were more common (Goodman, C et al: Can clinical benchmarking improve bowel care in care homes for older people? Final report submitted to the DoH Nursing Quality Research Initiative PRP, Centre for Research in Primary and Community Care, University of Hertfordshire, 2007). The range of training input varied from as little as three hours [31] to seven seminars [37] or continuous training and support [43,44].

The level of integration for all studies and the degree of support and training provided by NHS staff for care home is reported in Table 8. The majority of studies showed micro integration at the clinical level involving close collaboration between care home staff and health care professionals to achieve specific outcomes (12 out of the 17) e.g. wound care techniques and wound healing. The remaining five studies were integrated at the clinical level but also showed greater complexity of integration in terms of funding and organisation or strategy, one at the meso level [42] and four at the macro level [31,41,43,44]. In service delivery, four studies used dedicated multidisciplinary teams to support staff and residents in care homes [42], three of which achieved their remit of avoiding unnecessary hospitalisation [41,43,44]. Two UK studies also had health service funded beds within care homes, one for use by a specialist health care nursing team [41] the other to provide end of life care [31]. A distinguishing feature of four out of the five studies classified at higher levels of integration was that care home staff received support and or training which was ongoing, as opposed to being offered at discrete time periods during the intervention. For example, nursing home staff were facilitated to recognise and manage acute conditions [43], to improve residents’ overall care [44].

Table 4 RCTs Quality assessment results

| Study              | Sequence generation adequate | Allocation concealment adequate | Blinding of outcome assessment | Incomplete outcome data assessed? | Free from selective reporting? |
|--------------------|------------------------------|---------------------------------|-------------------------------|-----------------------------------|--------------------------------|
| Crotty 2004        | Y                            | Y                               | N                             | Y                                 | Y                              |
| Llewellyn Jones 1999 | Y                            | U                               | Y                             | N                                 | Y                              |
| Opie 2002          | Y                            | U                               | N                             | Y                                 | Y                              |
| Schmidt 1998       | U                            | U                               | U                             | Y                                 | Y                              |
A number of cross cutting themes that influenced the achievement of integrated working were identified (See Tables 9 and 10). These included, care home access to services and the different working cultures of care home staff and health care professionals that acted as barriers and facilitators. Care home staff identified a lack of support from health care professionals and a failure to recognise their knowledge and skills [29,33,42]. There were negative perceptions on both sides with care home staff feeling that health care professionals were sometimes acting in a ‘policing’ rather than an advisory capacity [29,42] and health care professionals perceiving care home staff as lacking in knowledge and expertise, and unwilling to change their practice [30].

Whilst input and training from health care staff was valued, for care home staff to access it, dedicated time and finance from care home managers was necessary. Holding sessions within the care home and setting up a learning contract with the staff could facilitate training [32]. Examples of positive interactions included one care home support team described as acting as a link to ‘the outside world’ by the care home, and supporting clinical decision making across the multi disciplinary team [42]. Difficulty in maintaining levels of staff skills and knowledge were exacerbated by the high staff turnover experienced by care homes [29,32,33]. However, one study found a higher rate of staff turnover amongst the health care professionals involved in the intervention than the senior staff in the care homes (Goodman, C et al: Can clinical benchmarking improve bowel care in care homes for older people? Final report submitted to the DoH Nursing Quality Research Initiative PRP, Centre for Research in Primary and Community Care, University of Hertfordshire, 2007). Consistency of care home managers was identified as an important factor in building collaborative working with health care professionals [32].

Discussion
We found 17 studies, eight of which were controlled evaluations. Although some of the studies reported positive outcomes most interventions had mixed or no effects when compared with the control group. There was insufficient information available to evaluate the cost of integrated working between care homes and primary health care professionals. Some of the qualitative studies suggested that integrated working had the potential to improve the quality of life for older people in care homes through increased support for care home staff and increased access to health care services. A small number of studies which were integrated at the macro or meso level, involved care homes that were supported by dedicated health service teams and health service funded beds or managed care, showed more positive outcomes such as avoidance of hospitalisation. They also differed from the micro integrated studies in their capacity to give ongoing support and training for care home staff, which had the potential to address one of the main identified barriers to integrated working and ultimately improve resident’s care. This indicates that

Table 5 Non randomised controlled studies quality assessment results

| Study   | Baseline results reported? | Groups balanced at baseline? | Blinding of outcome assessment | Incomplete outcome data assessed? | Free from selective reporting? |
|---------|---------------------------|------------------------------|-------------------------------|----------------------------------|--------------------------------|
| Goodman 2007 | Y                         | Y                            | N                             | N                                | Y                              |
| King 2001 | Y                         | N                            | N                             | Y                                | Y                              |
| Kane 2004 | N                         | N                            | Y                             | N                                | Y                              |
| Vu 2007  | Y                         | N                            | N                             | Y                                | Y                              |

Table 6 Quality review scores for qualitative papers.

| Study    | Scope/ purpose | Design | Sample size | Data collection | Analysis | Reliability/ validity | Generalisability/ transferability | Credibility/integrity/ plausibility | Ethics approval |
|----------|----------------|--------|-------------|-----------------|----------|------------------------|------------------------------------|-------------------------------------|-----------------|
| Anon 1999 | ~              | -      | -           | -               | -        | -                      | +                                  | +                                   | ~               |
| Doherty 2008 | ~              | +      | ~           | ~               | -        | -                      | +                                  | +                                   | +               |
| Hasson 2008 | +              | +      | +           | +               | +        | +                      | ~                                  | +                                   | +               |
| Hockley 2005 | +              | +      | ~           | ~               | ~        | ~                      | +                                  | +                                   | +               |

Scoring key:
+ Fully or mostly scores 1
- Not at all
~ Partly scores 0.
| Study ID         | Outcome                                                                 | Main results at follow up                                                                 |
|-----------------|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------|
| Crotty 2004     | Appropriate prescribing (medication appropriateness index)               | Follow up at 3 months (NB - two control groups - one external and one within the facility (results presented for external control grp only)) |
|                 |                                                                          | Change MAI score (+) Mean score (95% CI) Intervention 4.10 (2.11-6.10), Control 0.41 (-0.42-1.23), Difference p = 0.004 |
|                 | Nursing home behaviour problem                                           | Change NIHPS (0), Mean score (95% CI) Intervention 3.9 (-2.7-10.5), Control 1.2 (-9.1-11.6), P = 0.440 |
|                 | Mortality                                                                | Mortality (0) No differences between groups (p = 0.304) |
| Goodman 2007    | Bowel related problems                                                   | Follow up at 6 months Normal bowel patterns (+) Intervention - significant increase in normal bowel patterns, control grp - little change |
| Non randomised  | Medication and continence related product use                           | Prescription of laxatives (0) Increase in both groups but no statistically significant differences between groups p = 0.159 |
| study          | Dependency (Barthel index)                                               | Dependency (+) Mean change score p = 0.002 Intervention -0.02 (SD 3.1), Control -1.84 (SD 3.7) |
|                 | Bowel related hospital admission                                         | 1 admission in intervention grp, none in control (n = 120) |
| King 2001       | Medication prescribed                                                   | Follow up at 1 month. Data collected on 184 residents (75 reviewed, 109 not reviewed) |
| Non randomised  | Medication administered                                                  | Changes in medication prescribed - mean (SD) (0) Intervention -0.35 (2.56), Control -0.03 (1.90) P = 0.37 |
| study          | Weekly Cost ($) - authors say study underpowered for this outcome        | Changes in medication administered - mean (SD) (0) Intervention -0.44 (2.45), Control 0.12 (1.84), P = 0.16 |
|                 | Mortality (adjusted for length of time in home)                          | Weekly cost (0) Intervention -0.29 (10.80), Control 0.43 (12.16), P = 0.75 |
| Kane 2004       | Mortality                                                                | Follow up at 18 months 2 control groups a) other residents in same homes not enrolled in Evercare b) residents in homes in same geographical area that did not participate in Evercare Assessments at 6,12, 18 months (within 30 days) |
| Evercare        | Mortality                                                                | Evercare rate significantly less than for control-in group but was slightly higher than control-out group (non significant) |
|                 | Preventable hospitalizations                                             | Rates of preventable admissions lower in Evercare than for either control but only significant when compared to control-out. No differences in hospitalization rates overall. (0) |
|                 | Functional change                                                        | No significant differences in ADLs between Evercare and either control. (0) |
| Llewellyn-Jones | Geriatric depression scale (score of ≥ 10 defined as depressed)          | Follow up after 9.5 months Depression Unadjusted MD (0) -0.76 (-2.09, 0.57) Adjusted difference in change score (+) |
| RCT             |                                                                          | Multiple linear regression analysis Intervention group 1.87 improvement on scale compared to control group (95% CI 0.76, 2.97) p = 0.0011 |
| Opie 2002       | Frequency & severity of disruptive behaviours (Behaviour Assessment Graphical System and counts of certain behaviours) | Follow up at one month Frequency of disruptive behaviour (0) ANOVA revealed no statistically significant changes BAGS scores (0) No significant between group differences |
for integrated working to be successful, formal structures may need to be in place for health service delivery and organisation of care for care homes.

Despite the lack of evidence on effectiveness, studies consistently demonstrated key issues that supported or militated against integrated working. These findings are significant for future research and the development of interventions that rely on integrated working between health care services and care home staff. Barriers to integrated working included a failure to acknowledge the expertise of care home staff, their lack of access to health care services, as well as high care home staff turnover and limited availability of training. Facilitators to integrated working were the care home manager’s support for the intervention, protected time and the inclusion of all levels of care home staff for training and support by health care professionals.

A common feature of the interventions was the use of multidisciplinary teams to improve one or more aspect of older people’s health care. However, all the studies were led and conducted by health care professionals. There was no evidence of care home staff being involved in the definition or focus of the studies and some evidence that care home staff felt that their knowledge and views were not valued. Seven studies employed external project staff in some capacity, which implies that integrated working may require some external facilitation.

Three studies used integrated care pathways as a means of improving the quality of end of life care for older people resident in care homes. Care pathways may increase integrated working for the individual older people who have them, but this will not necessarily extend to the care home residents as a whole. The use of a shared assessment and care framework and
### Table 8 Level of integration, care home staff support and training

| Study       | Model                          | 1. Care staff involved in team meetings/joint working | 2. Level of care home staff support | 3. Training for care home staff | Training details | Level and features of integration |
|-------------|--------------------------------|------------------------------------------------------|------------------------------------|---------------------------------|------------------|-----------------------------------|
| Llewellyn-Jones, 1999 | Multidisciplinary case conferences | √                                                   | Duration of intervention only - no information on length | √                               | Duration of intervention only - no information on length | Micro Close collaboration between health care professionals and care home staff |
| King, 2001 | Multidisciplinary consultation & collaboration | √ Senior nursing staff only | Duration of intervention only - 8 months | ×                               | ×                | Micro Close collaboration between health care professionals and care home staff |
| Opie, 2002 | Multidisciplinary consultation & collaboration | ×                                                   | Duration of intervention Only - 4 weeks | ×                               | ×                | Micro Close collaboration between health care professionals and care home staff |
| Schmidt, 1998 | Multidisciplinary team meetings | √                                                   | Duration of intervention only 1 year | ×                               | ×                | Micro Close collaboration between health care professionals and care home staff |
| Vu, 2007 | Multidisciplinary consultation & collaboration | √                                                   | Duration of intervention only1 year | √                               | Training wound management. No details | Micro Close collaboration between health care professionals and care home staff |
| Crotty, 2004 | Multidisciplinary case conferences | √                                                   | Duration of intervention only 1 year | √                               | Half day workshop on managing challenging behaviours | Micro Close collaboration between health care professionals and care home staff |
| Joseph, 1998 | Multidisciplinary care | √                                                   | Ongoing weekly meetings to discuss deaths, hospitalisations and complications | √                               | 6 hours of seminars every year. Ongoing training and feedback in the management of acute conditions | Macro Nurse practitioners employed to provide additional primary care Managed care Hospital avoidance |
| Kane, 2004 | Multidisciplinary care | No information | Ongoing support but no details | √                               | Ongoing no information on the amount. Focus on training care home staff to improve resident's care | Macro Nurse practitioners employed to provide additional primary care Managed care Hospital avoidance |
| Goodman, 2007 | Multidisciplinary consultation & collaboration | √                                                   | Duration of intervention only approximately monthly over 6 months | √                               | Duration of intervention One training session for care home staff in one care home | Micro Close collaboration between health care professionals and care home staff |
| Szczepura, 2008 | Multidisciplinary care | √                                                   | Ongoing over 2 years | √                               | Ongoing over 2 years | Macro Dedicated nursing and physiotherapy In-reach team Dedicated care home beds Hospital avoidance Joint NHS - local authority initiative |
Limitations of existing evidence

Given the limited number of studies in the review, their heterogeneity, poor quality, small size, and low level of detail, the scope for discussion of integrated working between care homes and primary health care professionals is limited and firm conclusions cannot be reached. Only five studies were conducted in residential care homes which reinforced previous findings that the majority of research is carried out in nursing homes, even though this is not where most older people in long term care live [14]. The absence of older people’s views and resident centred outcomes from the studies was notable.

Moreover the majority of studies were only integrated at the micro level that is, close collaboration between care home staff and professionals, so little information was available on the impact of integration at meso and macro levels. There was wide variation amongst the studies in terms of their level of care home staff support and training, and the involvement of older people. Care home staff training and support ranged between those studies where it was ongoing and those where it was provided only on one occasion. Where there was support and training of care home staff it was not clear if the ultimate aim was to train staff to a level of expertise so that health services could withdraw.

Implications for research

There is a need for more research that addresses how integrated working can best be achieved and that evaluates the effect of integrated working on the health and wellbeing of older people, service use and cost. Research with care homes should reflect the context and constraints of working across public and independent services, and involve
Table 9 Barriers to integrated working

| Barriers to integrated working                                                                 |
|-----------------------------------------------------------------------------------------------|
| 1. Difficulty of NHS staff gaining the trust of care homes and NHS cynicism of care home expertise |
| 2. Lack of access to NHS services                                                                |
| 3. High staff turnover and lack of access to training                                            |
| 4. Lack of staff knowledge and confidence                                                         |
| 5. Care homes were professionally isolated                                                       |
| 6. Lack of teamwork in care homes                                                                |

Table 10 Facilitators to integrated working

| Facilitators to integrated working                                                                 |
|--------------------------------------------------------------------------------------------------|
| 1. Care homes valued NHS input and training                                                      |
| 2. ‘Bottom up’ approach to train staff so that all levels of staff are involved                  |
| 3. Health care professionals acting as a advocate for care homes in relation to care             |
| 4. Health care professionals acting as facilitators for sharing good practice and enabling care home staff to network |
| 5. Health care professionals promoting better access to services for the care home               |
| 6. Care home managers supporting staff access to training for example, through establishing learning contracts. |
Disclaimer
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Author details
1Centre for Research in Primary and Community Care, University of Hertfordshire, Hatfield, AL10 9AB, UK. 2School of Health Sciences and Social Care, Brunel University, Middlesex UB8 3PH, UK. 3Department of Primary Care and Population Sciences, University College London, NW3 2PF, UK. 4Department of Economics, University of Surrey, GU2 7XH, UK. 5Institute of Health Research, Lancaster University, LA1 4YF, UK.

Authors’ contributions
CG, FB, SL, KF designed the protocol, SD, FB, CG, CV, KF screened literature, reviewed papers for inclusion, extracted data and wrote the paper. All authors interpreted data, critically reviewed the paper and have approved the final manuscript.

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