



Reducing unplanned hospital admissions

What does the literature tell us?

Reducing unplanned hospital admissions

EXECUTIVE SUMMARY

Birmingham and Black Country Strategic Health Authority and local primary care trusts have launched a range of initiatives to enhance the quality and consistency of healthcare, and to reduce unscheduled admissions to hospital, especially for the frail elderly and people with long-term conditions.

The government aims to reduce the number of unscheduled days spent in hospital by 5% between 2005 and 2008. But which initiatives are most effective for reducing unscheduled admissions and the number of unplanned days in hospital? To answer this question, Birmingham and Black Country Strategic Health Authority commissioned a review of readily available evidence.

The review aimed to identify initiatives that may reduce unscheduled admissions and to suggest any gaps in current local strategies. Because up to 80% of primary care consultations and two thirds of emergency hospital admissions in Britain involve people with long-term conditions, we focussed on initiatives to reduce unscheduled admissions and days in hospital for people with long-term conditions, the frail elderly, and those at high risk of hospitalisation.

Reviewing the evidence

To compile this rapid review, we searched 17 literature databases, the reference lists of identified articles and reviews, and the websites of relevant agencies for published and unpublished primary and secondary research. We contacted experts in the field and searched relevant journals manually for additional studies.

In total, we assessed 65,812 studies. One-hundred and eighty-six studies met our inclusion criteria and are summarised in this review. Evidence was drawn mainly from systematic reviews and randomised trials, although we included other types of studies when more rigorous comparisons were not available.

The review focused on interventions targeting four main areas:

- the way care is organised,
- specific programmes or methods of care,
- tools to facilitate more effective care,
- and strategies for involving people in their own care.

The way care is organised

In recent years, the way care is organised has been evolving from a focus on acute episodic care to more integrated care. We found evidence about the effects on unscheduled admissions and days in hospital of the following ways to organise care:

- broad managed care programmes,
- shared or integrated care,
- multidisciplinary teams,
- nurse-led interventions,
- and targeting people at high risk.

Broad managed care programmes

Managed care involves co-ordinating a range of services in the community and in hospital. We found evidence that managed care can reduce unplanned admissions. All but one of the five reviews and three additional trials we identified found that managed care reduced unplanned admissions. One additional review suggested that managed care reduced the average length of hospital stay.

Shared care

Shared care is provided by family doctors, hospitals, and community groups in partnership.

We found little evidence that shared care between GPs and hospitals reduces unplanned admissions. Three reviews and three trials found no evidence that shared care impacts on unplanned admissions or readmission rates. One trial suggested that shared care may reduce the length of subsequent hospital stays, however.

There is limited evidence about the effect of integrating health and social care. One trial and one controlled cohort study found that integrated social and healthcare reduced unplanned admissions. We identified no high quality evidence about the effect on length of hospital stay.

There is insufficient evidence about the effects of working with the voluntary sector and the best methods for community outreach. One trial suggested that working with community groups reduced unplanned admissions. We identified no high quality evidence about the effect on length of hospital stay.

Multidisciplinary teams

We identified studies about multidisciplinary teams in primary care, in hospital, and spanning primary and secondary care.

There is little evidence about the effect on unplanned admissions of adding pharmacists or mental health workers to primary care teams. Two trials found that pharmacist reviews had limited effects on hospitalisations.

There is inconsistent evidence about multidisciplinary teams in hospital. Two reviews and one additional trial found that multidisciplinary hospital teams could reduce people's length of stay in hospital, and three trials suggested reduced days in hospital during subsequent admissions. However, two further trials found no evidence to support this. Four randomised trials found that multidisciplinary hospital teams helped to avoid readmissions, but two trials found no evidence to support this.

There is limited evidence about the effect of primary and secondary care teams working together in hospital. One trial suggested reduced length of hospital stay. This was supported by one cost-effectiveness analysis, which also found a lower readmission rate.

Evidence about the effects of multidisciplinary teams after discharge is generally positive, although there are some dissenting views. Two reviews and five additional trials found that multidisciplinary follow-up reduced subsequent unplanned admissions. However, three trials found no benefits. Three trials suggested reduced length of subsequent hospital stay, but another trial found no benefit.

Nurse-led care

A range of programmes include nurse-led care as one component of multifaceted interventions, but few studies have examined the specific impact of nurse-led care on unplanned admissions. Those studies that have examined the specific benefits of care from nurses rather than other professionals have focussed on the role of specialist nurses, nurse-led clinics, and nurse-led follow up.

One trial found that specialist nurses reduced initial unplanned admissions, but a review and additional trial did not support this. Two trials suggested lower readmission rates, but there is limited evidence about effects on days in hospital.

There is insufficient evidence about the effects of nurse-led clinics. One review suggested that nurse-led clinics reduced rehospitalisation and subsequent days in hospital. Other studies have assessed nurse-led clinics as part of broader interventions.

There is insufficient evidence about the effects of nurse-led follow-up after discharge. One trial found that nurse follow-up reduced rehospitalisation, but another trial found no evidence to support this. Two trials suggested that nurse-led follow-up reduced subsequent days in hospital.

Other studies have assessed nurse-led follow-up as part of broader interventions, particularly case management.

Targeting people at high risk

Another way to organise care involves targeting services at people at high risk of hospitalisation. We identified one randomised trial suggesting that targeting people at high risk could reduce length of hospital stay.

Other observational studies have suggested that targeted programmes reduce unscheduled admissions, but there is little high quality evidence to support this.

Specific ways of providing care

In addition to examining different ways to organise care, we reviewed evidence about specific programmes or services. We found evidence about:

- case management,
- telephone support,
- telemonitoring,
- group visits to primary practice,
- specialist clinics in primary care,
- hospital clinics and units,
- discharge planning,
- home hospitalisation,
- intermediate care,
- home visits,
- and rehabilitation services.

Case management

'Case management' involves a professional or team of professionals organising and following-up an individual's care, acting as a central contact point or 'manager' to help co-ordinate primary, secondary, and social care services. There is conflicting evidence about the effects of case management, which might have some benefits for people at greatest risk of hospitalisation, but might not always be worthwhile for other people with long-term conditions. Developing systems to target people at 'high risk' of complications or health service use may help to use resources most cost-effectively.

We identified studies about case management undertaken by primary care nurses, by hospital nurses, and by multidisciplinary teams.

Two trials found that case management by primary care nurses reduced unplanned readmissions, but three reviews and seven additional trials found no effect. One trial suggested that case management increased unplanned admissions.

One trial found that case management by primary care nurses reduced subsequent length of stay in hospital, but one review and two additional trials found no effect. One trial found that case management may increase length of hospital stay.

There is insufficient evidence about the effects of case management in hospital. Two trials found case management in hospital had no effect on the length of hospital stay. One trial found no effect on subsequent readmissions.

Assertive case management is provided by proactive multidisciplinary teams rather than individual professionals. Assertive case management may reduce unplanned admissions and length of stay in the field of mental health. Evidence in other fields is lacking.

Telephone information and support

There is inconsistent evidence about providing information and support by telephone, or case management solely by telephone.

Five trials found telephone support helped reduce unplanned admissions, but one trial found no effect. Two trials suggested telephone support reduced the number of days in hospital, but one trial found no effect.

There is limited evidence about substituting telephone calls for routine clinic visits. One trial found reduced unplanned admissions and days in hospital, but another trial found no effect.

Telemonitoring

Telemonitoring involves transmitting information about clinical indicator such as blood pressure by telephone or modem. Most evidence about the effect of telemonitoring on unplanned admissions is positive. Two reviews and two additional trials found that telemonitoring reduced unplanned admissions. One trial found no effect.

One review and two additional trials suggested that telemonitoring reduced unplanned days in hospital.

Group visits to primary care

There is limited evidence about the effect on unscheduled admissions of group visits to primary care (chronic care clinics). Two trials suggested group visits reduced unplanned admissions. One trial found no impact on days in hospital.

Specialist clinics in primary care

There is little evidence to suggest that clinics run by specialists in primary care venues reduce unplanned admissions. One review and one additional trial found no effect on unplanned admissions. One trial found no impact on days in hospital.

Hospital clinics

There is inconsistent evidence about the effect on unscheduled admissions of hospital clinics held before or after discharge. One review and two additional trials suggested that hospital clinics could reduce unplanned admissions, but one review and one additional trial found no effect. One review suggested hospital clinics could reduce days in hospital, but two additional trials found no effect.

Discharge planning

There is limited evidence about the impact of discharge planning on unplanned readmissions or subsequent days in hospital. One trial suggested that discharge planning could reduce the length of hospital stay. One review suggested that discharge planning could reduce the rate of unplanned admissions.

Home hospitalisation

There is limited evidence about the effect of home hospitalisation on unplanned admissions. One review found that home hospitalisation reduced the length of hospital stay. One trial found home hospitalisation had no effect on rehospitalisations.

Intermediate care

There is little good quality evidence about the effect of intermediate care on unplanned admissions. Most available evidence is negative. Five studies found the intermediate care had no effect on unplanned readmissions.

Home visits

There is evidence to suggest that home visits following hospital discharge may reduce subsequent unplanned admissions and days in hospital. Five trials found that home visits reduced unplanned admissions. Two trials found no effect. One review and three additional trials found that home visits following discharge could reduce subsequent days spent in hospital.

Rehabilitation

Evidence about the effects of rehabilitation programmes is inconsistent, reflecting the heterogeneity of the initiatives themselves.

Two reviews and one additional trial found that rehabilitation programmes could reduce the number of days in hospital during the index visit. One trial found no benefit.

Two trials suggested rehabilitation programmes could reduce subsequent admissions.

One trial suggested that rehabilitation could reduce the subsequent length of stay in hospital, but one trial found no effect.

Tools to facilitate better care

We examined evidence about the following tools to facilitate improved care:

- disease registries,
- decision support tools for professionals,
- care pathways,
- and educating professionals.

Registries and decision support tools

We found insufficient evidence about disease registries and decision support tools to draw conclusions about impacts on unplanned admissions.

Care pathways

Care pathways are guidelines or protocols to help people move through different parts of the healthcare system smoothly, based on evidence from high quality research.

There is limited evidence about the effect of care pathways on unplanned admissions and length of hospital stay. One trial suggested care pathways can reduce length of hospital stay during the index visit, but one review and one additional trial found no effect. We found no high quality evidence about the impact of care pathways on subsequent unplanned admissions.

Educating professionals

We found insufficient evidence to draw conclusions about the effect on unplanned admissions or length of stay in hospital of the following interventions for professionals:

- group or individual education,
- multidisciplinary training,
- reminders and prompts,
- audit and feedback,
- and guidelines.

Two studies suggested that group education sessions for professionals, especially hospital professionals, may reduce length of hospital stay.

Involving people in their care

We also examined strategies to involve people more in their own care. We found evidence about the effect on unplanned admissions and length of hospital stay of the following initiatives:

- involving people in decision-making,
- providing accessible information,
- self-management education,
- and self-monitoring.

Involving people in decision-making

Involving people with long-term conditions in decision-making can improve their satisfaction with care, but there is no clear evidence about the 'best way' to involve people with long-term conditions and the frail elderly in decision-making and planning. There is little evidence about the effect of involving service users in decision-making on unplanned admissions or length of hospital stay.

Written information for service users

There is inconsistent evidence about the effects of written information for service users on unplanned admissions.

One trial suggested that written information could reduce unplanned admissions. Two additional trials suggested reduced readmission rates. But one review and one additional trial found that written resources had no effect on readmissions.

Education for service users

We identified information about both group educational sessions and one-to-one education for service users.

There is insufficient evidence about the effects of group education on unplanned admissions and length of hospital stay.

There is inconsistent evidence about the effects of one-to-one education sessions on hospitalisation. One trial suggested that one-to-one sessions in hospital could reduce the length of hospital stay. One review and one additional trial suggested reduced readmissions. Two further trials found no effect.

There is insufficient evidence to draw conclusions about the effects of video and computer education on hospitalisation. One trial suggested that video education could reduce unplanned admissions. One review suggested internet support had no effect on unplanned admissions.

Self-management education

There is evidence to suggest that self-management education may reduce unplanned admissions and length of hospital stay. Seven trials found that self-management education reduced unplanned readmissions. One review found no effect. Two trials found self-management education reduced the length of hospital stay.

Self-monitoring

Self-monitoring involves routine measurement of clinical indicators such as blood pressure or cholesterol levels. It can also refer to the use of written plans.

There is insufficient evidence about the effect of self-monitoring on unplanned admissions and length of hospital stay. One review and one trial suggested that self-monitoring using electronic devices or written plans reduced hospitalisation. One review found no effect. One review found no effect on length of hospital stay.

Patient-held records

There is no evidence to suggest that patient-held records reduce unplanned admissions. We found no high quality information about the effect of patient-held records on length of stay in hospital.

Summary

Birmingham and Black Country Strategic Health Authority and local primary care trusts have launched a range of initiatives to help reduce unscheduled hospital admissions. This rapid review of 186 studies collated evidence about these and other initiatives to reduce unscheduled hospitalisations and the number of unplanned days in hospital.

There is some evidence to suggest that the following initiatives may reduce unplanned hospitalisations and readmissions:

- self-management education,
- self-monitoring,
- group visits to primary care,
- broad managed care programmes,
- integrating social and health care,
- multidisciplinary teams in hospital,
- discharge planning,
- multidisciplinary teams after discharge,
- care from specialist nurses,
- nurse-led clinics,
- telecare,
- telemonitoring.

There is some evidence that the following may reduce length of stay in hospital:

- self-management education,
- telecare,
- multidisciplinary teams in hospital,
- discharge planning,
- home hospitalisation,
- educating professionals.

And these interventions may reduce length of *subsequent* hospital stays:

- targeting people at high risk,
- self-management education,
- telemonitoring,
- multidisciplinary teams in hospital,
- multidisciplinary teams after discharge,
- nurse-led clinics and nurse-led follow-up,
- assertive case management,
- home visits.

Given the paucity of high quality evidence about which interventions reduce unscheduled admissions most effectively, it is important that organisations in the Birmingham and Black Country area implement a strategy to evaluate all current and future initiatives fully. Such evaluation should be co-ordinated and consistent, so that each organisation in the Strategic Health Authority area is using a similar conceptual and methodological framework.

Overall the review suggests that:

Some of the initiatives being implemented in the Birmingham and Black Country area have a sound research base and may be likely to change unscheduled admission rates. Currently running programmes supported by evidence include:

- self-management education programmes,
- risk stratification,
- interface between primary and tertiary care,
- assertive case management,
- specialist teams,
- and rehabilitation.

There is less evidence that the following activities underway in the Birmingham and Black Country area will reduce unplanned admissions or length of stay in hospital:

- group education sessions for service users,
- clinician education / guidelines about tests,
- care pathways,
- patient telephone support care management,
- surveys of patient views of quality of care.

There is little high quality evidence available about the effect on unplanned admissions of the other interventions currently being implemented in the Birmingham and Black Country area. These unresearched initiatives include:

- prompt availability of scans and tests,
- recall system for diagnostic tests,
- telephone support for clinicians,
- alerting case managers to admissions,
- early discharge, with social care,
- and palliative care and hospices.

There are promising findings about other strategies that the Strategic Health Authority and local PCTs are not yet implementing, which the NHS may wish to consider further. These include:

- self-monitoring,
- group visits to primary care,
- broad managed care programmes,
- integrating social and health care further,
- multidisciplinary teams in hospital,
- enhanced discharge planning,
- multidisciplinary teams after discharge,
- care from specialist nurses,
- nurse-led clinics,
- telecare,
- telemonitoring,
- and home visits.

CONTENTS

Introductory overview	1
Collating available evidence	1
Caveats	3
The way care is provided	4
Managed care programmes	4
Targeting people at 'high risk'	5
Shared care	6
Shared care between GPs and hospitals	6
Integrating social and healthcare	7
Working with community groups	7
Multidisciplinary teams	7
Multidisciplinary primary care teams	7
Hospital teams	8
Primary care workers in hospital	9
Multidisciplinary teams after discharge	9
Nurse-led interventions	10
Specialist nurses	10
Nurse-led clinics	11
Nurse follow-up after discharge	11
The type of care provided	12
Case management	13
Case management by primary care nurses	13
Case management in hospital	14
Assertive case management	15
Telecare	16
Providing information and support	16
Substituting telephone calls for clinic visits	17
Telemonitoring	17
Clinics in primary care	18
Chronic care clinics	18
Specialist clinics in primary care	18
Hospital clinics and units	19
Discharge planning	19
Home hospitalisation	20
Intermediate care	20
Home visits	21
Rehabilitation programmes	22
In-hospital rehabilitation	22
Early supported discharge	22
Geriatric assessment	22
Home-based rehabilitation	22

Tools to facilitate better care	23
Registries and decision-support tools	23
Registries	23
Decision-support tools	23
Care pathways	24
Sharing skills and knowledge	24
Educational sessions	24
Individual education	25
Multidisciplinary training	25
Reminders	25
Audit and feedback	25
Guidelines	25
Initiatives to support self-care	26
Patient involvement in decisions	26
Providing accessible information	26
Written information	27
Group education	27
Individual education ("counselling")	28
Technology	28
Self-management education	29
Self-monitoring	30
Monitoring clinical indicators	30
Written plans	30
Patient-held records	31
Summary of trends	32
Implications	32
Things to bear in mind	35
References	36

REDUCING UNPLANNED HOSPITAL ADMISSIONS

What does the literature tell us?

Introductory overview

Birmingham and Black Country Strategic Health Authority and local primary care trusts have launched a range of initiatives to enhance the quality and consistency of local healthcare, and to reduce unscheduled admissions to hospital (see Box 1).

The government and National Health Service aim to reduce the number of unplanned days that people spend in hospital by 5% between 2005 and 2008. Birmingham and Black Country Strategic Health Authority therefore commissioned a review of readily available evidence to help assess the most effective initiatives to help meet this target.

Because up to 80% of primary care consultations and two thirds of unscheduled hospital admissions in Britain involve people with long-term conditions,¹ the review focussed on initiatives to reduce unscheduled admissions and the number of unplanned days in hospital for people with long-term conditions, the frail elderly, and those at high risk of hospitalisation.

The review focuses on interventions targeting four main areas:

- the way care is organised,
- specific services to deliver care,
- tools to facilitate more effective care,
- and strategies to involve people in their care.

Box 1: Examples of initiatives in the Birmingham and Black Country area

- Patient group education sessions
- Expert Patient Programme
- Prompt availability of scans and tests
- Recall system for diagnostic tests
- Clinician education and guidelines about tests
- Phone support for clinicians to prevent admission
- Risk stratification
- Care pathways
- Interface between community and tertiary care
- Electronic alerts to case managers on admission
- Earlier discharge in partnership with social care
- Assertive case management
- Care management by telephone for service users
- Surveys of users' views of the quality of care
- Specialist teams
- Rehabilitation programmes
- Palliative care and hospices

Collating available evidence

This overview summarises the main trends from high quality studies about interventions which may have an impact on unscheduled care. In particular, the focus is on:

- interventions to reduce unplanned admissions,
- interventions to reduce the number of unplanned days spent in hospital,
- interventions currently being implemented in the Birmingham and Black Country Strategic Health Authority area (see Box 1).

The review did not set out to be an exhaustive overview of all evidence — it does not attempt to systematically review research about every type of intervention for people with long-term conditions or the frail elderly, or to cover all long-term conditions or reasons for unscheduled admissions. Instead, we used a rapid review process to assess the impact of selected initiatives.

To collate evidence for this overview, one reviewer searched 17 electronic databases for published and unpublished reports of any initiative which reported on reduced unscheduled hospitalisations or unplanned days in hospital.

The reviewer searched MEDLINE, Embase, ERIC, Ovid, Cinahl, the Science Citation Index, the Cochrane Library and Controlled Trials Register, PsychLit, HealthStar, the WHO library, Health Management Information Consortium, Sigal, ReFeR, Dissertation Abstracts, NRR Research Registers, ASSIA and HMIC for information available as at January 2006.

Search terms included combinations of:

- generic terms (chronic care; long-term condition; multidisciplinary, unplanned admissions, length of stay, disease management, pathways, etc);
- methods (systematic review, controlled trial);
- service delivery methods (case management, care pathways, patient education, etc);
- and conditions (asthma; diabetes; hypertension; arthritis; heart failure; stroke; cardiac; dementia; mental health; depression and so on).

Mesh terms and expanded keyword searches were used where available.

Experts in the field were contacted and relevant journals were hand searched for additional studies, as were bibliographies of identified studies and the websites of relevant agencies. There were no language restrictions.

In total, summaries of 65,812 studies were assessed independently by two reviewers. After discarding repeated reports of the same trials and papers that did not contain primary or secondary research, the full text of 15,602 studies was checked for validity and relevance by two reviewers independently, using the methodology of the Cochrane Collaboration and the NHS Centre for Reviews and Dissemination.

Any documents in a language other than English were translated, by the original authors where possible.

To be eligible for inclusion in the review, studies had to:

- be primary research or systematic reviews,
- assess at least one component being implemented in the Birmingham and Black Country area (see Box 1) or an intervention that aimed to reduce hospitalisations,
- include adults with long-term conditions, the frail elderly, or adults at high risk of hospitalisation,
- provide data about unscheduled hospital admissions or number of days in hospital during or following an unplanned admission,
- be published within the past ten years.

One-hundred and eighty-six studies met these criteria and are summarised in this overview.

Priority was given to randomised trials or systematic reviews. Less rigorous designs were only included if no randomised trials or systematic reviews were available on a certain topic. A large number of descriptive reports, before and after studies, and cohort studies were identified which examined hospitalisation outcomes, however, these were omitted unless more rigorous studies were not available.

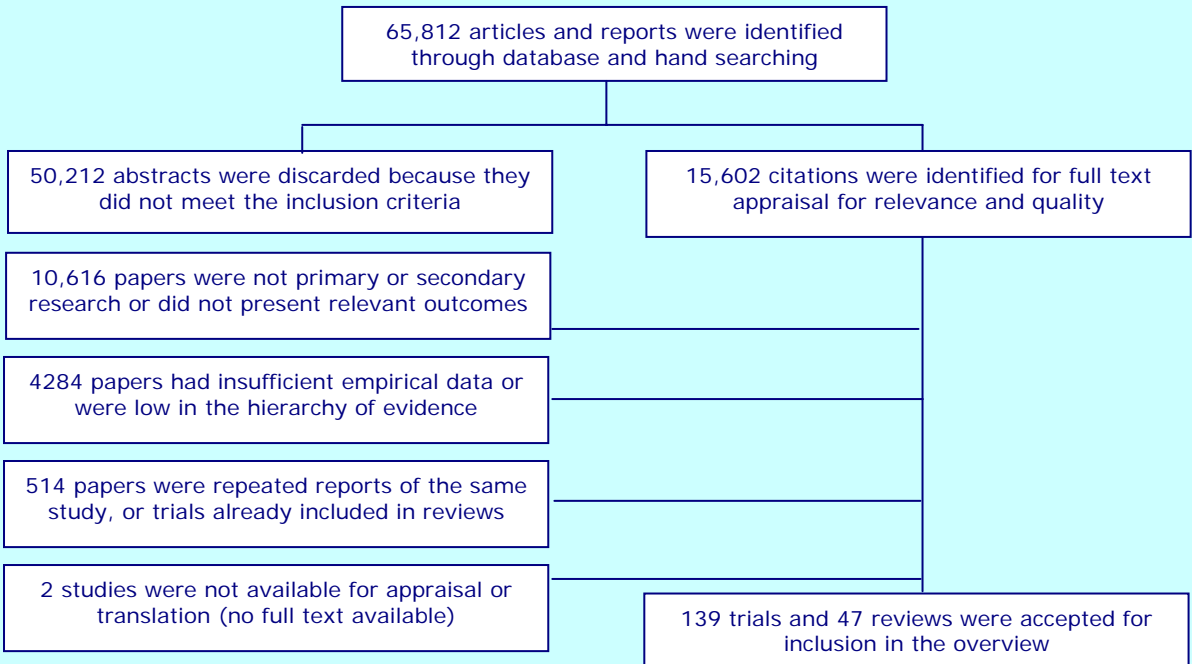
One reviewer extracted data about interventions, origin, participant and disease characteristics, and outcomes from all included studies. Ten percent of studies were checked for accuracy by a second independent reviewer. Disagreements were resolved by consensus.

The studies were heterogeneous in design, participants, and intervention types, so a meta-analysis quantifying the impacts of different interventions was not possible. Instead, the key findings were synthesised in narrative form.

A summary of the evidence is presented overleaf. As many studies examined impacts on both admission avoidance and reducing the number of days spent in hospital, the review is organised by type of intervention, rather than type of outcome. Evidence about different ways to organise care is summarised first, followed by information about specific interventions and tools, and finally evidence about initiatives to involve people in their own care.

The findings of selected studies are used as examples to illustrate general themes. The review examined interventions that may work well across a range of long-term conditions, rather than focussing solely on disease-specific interventions, but studies of people with particular types of conditions are provided as examples.

Box 2: Studies included in the overview



Caveats

Before summarising the evidence, it is important to raise the following caveats:

- The review focused solely on the impact of interventions on unplanned hospital admissions and length of hospital stay. If there is no evidence that an initiative impacts on these outcomes, this does not mean that an intervention has no merit. It may have beneficial effects on clinical symptoms, quality of life, overall healthcare resource use, emergency department visits, self-efficacy or many other important outcomes.
- Many of the studies we included focussed on length of hospital stay in subsequent admissions, rather than assessing ways to reduce hospital stay while people were currently in hospital. In other words, many reports described length of hospital stay in future, rather than interventions to reduce hospital stay during the index or baseline visit to hospital.
- A lack of comparative evidence does not mean that there are no differences between interventions or that an initiative has no impact. It merely means that there is insufficient evidence to draw any conclusions, positive or negative.
- Many of the studies included complex interventions with multiple interventions. It is difficult to isolate which components of these interventions may have affected hospitalisation rates.
- It is also important to emphasise that the context in which initiatives are implemented has an impact on outcomes. Much of the available evidence is sourced from the United States or Europe, which have very different healthcare economies and styles of working to the United Kingdom. This means that while we can draw inferences about the merits of different initiatives from the evidence summarised overleaf, we cannot assume that outcomes would be the same when transferred to a local context.
- On a related note, some studies compare an intervention with 'usual care.' What comprises 'usual care' in one country or location may be very different from 'usual care' in another context. Often studies do not define the components of usual care in any detail, however.

Readers should bear these points in mind when interpreting the findings of the review.

THE WAY CARE IS PROVIDED

This section outlines the effects of different ways of organising care on unscheduled hospital admissions and length of hospital stay. The different ways of organising care reviewed are:

- broad managed care programmes,
- targeting people at high risk of hospitalisation,
- integrated or shared care,
- multidisciplinary teams,
- nurse-led interventions.

Readers should bear in mind that the interventions outlined below were implemented in a range of different health and social care economies, and changes to the way that systems are funded and structured can may influence outcomes. We found few high quality studies comparing the varying financial systems for organising care in different countries. However, one systematic review suggested that any form of fund-holding or capitation could reduce days in hospital by up to 80% compared with fee-for-service models.²

Managed care programmes

In England, the Department of Health's strategy for reducing unscheduled hospital admissions draws heavily on the principles of broad chronic care programmes.³ The terms 'disease management' and 'managed care' are commonly used to refer to multi-component interventions providing integrated social and medical support.

There are many different definitions of managed care, but this term has come to refer to co-ordinating and monitoring care through an entire spectrum of services (home care, primary / community care, and hospital care). Care is 'managed' to help frail elderly people and those with long-term conditions receive the most appropriate care in the most suitable settings for their individual needs.

Some programmes have developed into formal named 'models' of managed care and other strategies are known more generically as 'disease management.' Many broad programmes are based on the *Chronic Care Model*, originally developed in the United States. Programmes based on this model aim to redevelop chronic care by focusing on six main elements:⁴

- using community resources to meet people's needs,
- creating an organisational culture and mechanisms to promote safe high quality care,
- empowering and preparing people to manage their health and healthcare,
- delivering effective, efficient care and self-management support,
- promoting care that is consistent with research evidence and service users' preferences,
- and organising data to facilitate better care.

There is evidence that broad managed care programmes may reduce healthcare resource use, including unplanned hospital admissions and length of stay in hospital.

We identified one review of randomised trials that focused on length of stay in hospital. Multi-component interventions to reduce functional decline in older people tended to reduce the length of stay in hospital or nursing homes.⁵

There is much more evidence about the effects of managed care programmes on hospital admissions, particular readmission rates. A review found that in 18 out of 27 studies of people with long-term conditions such as congestive heart failure, asthma, and diabetes, components of the *Chronic Care Model* were associated with reduced healthcare costs or reduced use of healthcare services, including hospitalisation.⁶

These broad programmes have been trialled for people with specific long-term conditions, especially heart disease. For instance, a meta-analysis of 12 randomised trials with 9803 people with heart disease found that disease management reduced unplanned hospital admissions.⁷

Another systematic review of multi-component programmes for people with heart failure included seven studies with 3927 participants. Key components included joint working by cardiologists and nurses; patient education; lifestyle changes; exercise; home visits; nurse case managers; a multidisciplinary team; weekly mailings and telephone calls; home monitoring; and intensive outpatient primary care. Six of the seven studies reported a 50% to 85% reduction in the risk of hospital admission.⁸

Similarly, a meta-analysis of 54 disease management programmes for elderly people with heart failure found that, compared to usual care, disease management programmes reduced hospital readmissions for heart failure or heart disease by 30%.⁹ Another review supported these findings.¹⁰

An additional randomised trial of a disease management programme in the US targeted elderly people who had been hospitalised for heart failure, had a prior history of heart failure, had four or more hospitalisations within 5 years, or had heart failure complications associated with a heart attack or high blood pressure. The programme was associated with reduced unscheduled hospitalisations and reduced cost of care.¹¹

Another trial in the US examined providing people with heart failure with education from a geriatric cardiac nurse, medications review by a geriatric cardiologist, early consultation with social services to support discharge planning, dietary advice from a hospital dietician, and follow-up after discharge by a home care team. The programme reduced readmissions.¹²

On the other hand, a randomised trial in ten US community hospitals found that regional collaboration with quality improvement and disease management programmes had no significant effect on hospitalisation or healthcare resource use.¹³

Similarly, a review found that while programmes based on the *Chronic Care Model* may reduce healthcare resource use, including unplanned admissions, it was difficult to distinguish which components of these programmes may be most effective.¹⁴

Much research about the effects of multi-component managed care programmes is not 'high quality' evidence. There are randomised trials of specific components of the *Chronic Care Model*, such as self-management or risk stratification (summarised in separate sections overleaf), but there have been relatively few high quality studies assessing the impact of broad managed care programmes on unscheduled hospital admissions, particularly index hospitalisations, or length of stay. Those studies that do exist tend to have relatively small samples, be sponsored by industry, or to be observational studies rather than trials.

There is evidence that managed care can reduce unplanned admissions. All but one of the five reviews and three additional trials we identified found that managed care reduced unplanned admissions.

One additional review suggested that managed care reduced the average length of hospital stay.

Targeting people at 'high risk'

The Kaiser approach from the US, the *Chronic Care Model*, and the Department of Health in England all emphasise the importance of targeting people at highest risk of hospitalisation for more intensive interventions.

Much of the evidence about targeting people at high risk focuses on case management. A case manager is a person or small team assigned to organise, integrate, and review care for an individual patient. A summary of the evidence about case management is presented overleaf. This section focuses only on studies which specifically evaluated risk assessment and targeting.

Studies have assessed the clinical benefits of targeting people at high risk,^{15,16} but there is less evidence about whether this reduces unscheduled admissions and length of hospital stay.

We identified just one randomised trial assessing whether focussing services on people at 'high risk' would make case management more effective in the US. Case management had no effect on the length of hospital stay or service use following discharge overall, however, the findings differed when people were divided according to whether they were at 'high risk' of using healthcare services after discharge. People at high risk receiving case management had a significantly shorter stay in hospital (three days less than usual care).¹⁷

Observational studies often suggest that targeting those at high risk can reduce unscheduled hospitalisations and length of stay,^{18,19} but this data should be treated with caution as it is not necessarily robust or generalisable.

A detailed discussion of different risk assessment tools is outside the scope of this overview. However, a number of tools have been developed and validated, including risk stratification tools to help identify people at 'high risk' and assessment tools to help organisations and health professionals assess their chronic care programmes.^{20,21}

We identified one randomised trial suggesting that targeting people at high risk of hospitalisation could reduce length of hospital stay.

Other observational studies have suggested that targeted programmes reduce hospitalisations, but there is little rigorous trial or review evidence to support this.

Shared care

Relationships between and within health and social care teams can affect the quality and efficiency of care.²² 'Integrated' or 'shared care' is a term used to describe collaborative working, commonly spanning community (primary care) and hospital (secondary) care. The term can also be used to refer to involving health specialists, social care, and voluntary organisations in care processes.

Shared care between GPs and hospitals

Integrating GP and hospital care has been promoted to improve efficiency in healthcare delivery and reduce perceived fragmentation of services. This may be done to prevent initial hospitalisation, or as part of after-hospital care. We found inconsistent evidence about the impact of shared care on unplanned admissions and days in hospital.

Some cost analyses suggest that shared care between GPs and hospitals can reduce rehospitalisation. For instance, a comparison of the cost-effectiveness of the Kaiser Permanente model of integrated care in the US versus NHS models found that integrated care was associated with more comprehensive and convenient primary care and more rapid access to specialist services and hospital admissions. Age-adjusted rates of acute hospital use were one third of service use in the NHS.²³

A similar cost analysis found that the Kaiser model reduced days in hospital compared to the NHS. The authors argued that the major reason was integrated care. The Kaiser model has integrated inpatient and outpatient care which enables people with long-term conditions to move between hospitals and the community, or into nursing facilities if needed. Medical specialists work alongside general practitioners in multidisciplinary medical groups, rather than being 'tied' to specific hospitals. The Kaiser model also integrates prevention, diagnosis, and treatment. Doctors have rapid access to diagnostic services in the outpatient setting, so many patients do not need to stay in hospital.²⁴

Other studies have less favourable findings about the effects of shared care. For example, a Cochrane review assessed the effect of integrating primary healthcare services on cost, outcomes, and user acceptability. There was no consistent pattern of benefits in the four studies included. In two studies, integrated services were associated with less positive outcomes than usual care.²⁵

Another systematic review of formal liaison between GPs and specialist service providers included seven randomised trials with 1862 participants. There was no improvement in readmission rates or time to readmission.²⁶

A systematic review of different ways to organise asthma care included 27 studies of integrating services across the primary and secondary sectors, including shared care, general practice asthma clinics, outpatient programmes, inpatient admissions policies, and use of specialists. There was no evidence to favour one strategy over another, and no difference in unplanned admissions. Shared care was generally as effective as hospital-led care.²⁷

A randomised trial in the US found that collaborative primary care reduced mortality for older people living in the community, but did not reduce hospitalisations, length of hospital stay, or cost of care.²⁸

A randomised trial in the UK found no significant differences in unplanned admissions between integrated care and usual hospital care for people with diabetes. The integrated care group was seen in general practice every three or four months for two years and at a hospital clinic annually.²⁹

Other studies have suggested that shared care may not reduce unplanned readmissions, but may reduce the number of repeated admissions in any one year. For instance, a randomised trial of integrated primary and secondary care after being discharged from hospital involved review at a hospital heart failure clinic, individual and group education sessions, personal diaries to record medication and body weight, booklets, and follow-up alternating between the hospital and GP. There was no significant difference between integrated and usual care in death or readmission after one year, but the integrated programme reduced multiple hospital admissions.³⁰

Few studies have assessed the benefits of sharing records between primary and secondary care, but those that do exist have inconsistent findings. For example, a randomised trial in the US assessed giving emergency department doctors access to computer-based historical patient records. Sharing information had no effect on admission rates or repeat visits to the emergency department.³¹

There is little evidence that shared care between GPs and hospitals reduces unplanned admissions. Three reviews and three trials found no evidence that shared care impacts on unplanned admissions or readmission rates.

One trial suggested that shared care may reduce the length of subsequent hospital stays.

Integrating social and healthcare

We found limited evidence about the effect of integrating social and healthcare on unplanned admissions or length of stay.

In Italy, a randomised trial of integrated social and medical care for frail elderly people living in the community found that integrated care was associated with fewer admissions to hospital or nursing homes. The estimated financial savings were about £1125 per year of follow-up.³²

A controlled study of elderly people with long-term conditions in the US compared usual care from a GP versus shared care between GPs, nurses, and social workers. Over a one year period, people receiving shared social and health care had fewer unplanned hospital admissions than those receiving usual care.³³

There is limited evidence about the effect of integrating health and social care on admissions and length of stay in hospital.

One trial and one controlled cohort study found reduced unplanned admissions.

We identified no high quality evidence about the effect on length of hospital stay.

Working with community groups

Another method for integrating care involves making links with community organisations or the voluntary sector, or delivering services in community venues. A number of authors have suggested potential advantages with this approach or described their attempts to use community centres, schools, churches, and voluntary organisations.^{34,35,36,37,38,39,40,41}

However, few randomised trials or systematic reviews have investigated the effects of partnerships with the voluntary sector on unplanned admissions or length of hospital stay.

We found just one randomised trial on this topic focussed on unplanned admissions. The trial found that providing services in community venues may reduce unplanned admissions. The initiative involved running a disability prevention and self-management programme at a community seniors centre in the US with eight nurse-led sessions over a one year period.⁴²

There is limited evidence about the effect of working with community groups, although one trial found reduced unplanned admissions. We identified no high quality evidence about the effect on length of hospital stay.

Multidisciplinary teams

Multidisciplinary teams are often a component of integrated care strategies. There is evidence about multidisciplinary teams in primary care, in hospital, and teams that span primary and secondary care.

Multidisciplinary primary care teams

We found studies about including both pharmacists and mental health workers in traditional primary care teams made up of practice nurses and GPs.

Pharmacists are increasingly becoming involved in primary care teams. In England, the *Medicines Management Collaborative* aims to help people get the right medicines, in the right quantities, at the right time. Preliminary data suggest that such integrated programmes increase reviews of people's medicines and ensure they receive help when they need it.⁴³ This approach is supported by other evidence.^{44,45,46,47,48,49,50,51} However, we found no evidence to directly link expanding the role of pharmacists with reduced unscheduled admissions or length of hospital stay.

One randomised trial in the United Kingdom assessed home-based medication review by pharmacists. Participants were aged over 80 years with an unplanned admission from any cause. Rather than reducing admission rates, pharmacist medication reviews were associated with a significantly higher rate of unscheduled admissions.⁵²

Another trial in The Netherlands found that monthly consultations from a community pharmacist had no effect on unplanned admissions in people with heart failure.⁵³

We identified a number of studies suggesting that including mental health workers within primary care teams could increase communication, improve perceived quality of care, and improve some symptoms.^{54,55,56,57} On the other hand, a Cochrane review of 38 studies assessed the effects of on-site mental health workers in primary care. There was no evidence that adding mental health workers to primary care provider teams in 'replacement' models promoted a significant change in the behaviour of primary care staff. 'Consultation-liaison' interventions where primary care and mental health providers worked together may lead to changes in prescribing, but these appeared to be short-term.⁵⁸ We did not identify any high quality study assessing impacts on unscheduled admissions or length of hospital stay.

There is little evidence about the effect on hospitalisations of adding pharmacists or mental health workers to primary care teams.

Two trials found that pharmacist reviews had no or negative effects on hospitalisations.

Hospital teams

A number of studies have assessed multidisciplinary care in hospital. Findings are inconsistent. For instance, a randomised trial found that multidisciplinary care by nurses and dieticians in hospital significantly reduced hospital readmission among with elderly people with heart failure and high rates of hospital admission.⁵⁹

Other trials in the US have assessed multidisciplinary teams for elderly people hospitalised with heart failure. One intervention included education by an experienced cardiovascular nurse; individualised dietary assessment and instruction by a registered dietician; consultation with social service personnel to facilitate discharge planning and care; an analysis of medications by a geriatric cardiologist; and follow-up after discharge with individual home visits and telephone contact. Multidisciplinary care reduced hospital readmissions⁶⁰ and days in hospital.⁶¹

Similarly, a randomised trial in The Netherlands found that multidisciplinary hospital care reduced readmissions and length of hospital stay compared to usual hospital care for elderly people.⁶²

A US trial of people with diabetes found that adding a diabetes nurse educator and an endocrinologist to the usual hospital team made no difference to the length of stay in hospital, but reduced readmissions after three months.⁶³

A randomised trial of combined medical, physiotherapy, and occupational therapy assessment for elderly people attending a UK emergency department found that multidisciplinary assessment did not reduce future hospital admissions, but did reduce the length of hospital stay.⁶⁴

There is also evidence about multidisciplinary hospital teams for people who have suffered a stroke. A meta-analysis of 19 trials examined the effects of organised inpatient (stroke unit) care compared with conventional care. Specialist stroke unit interventions were defined as either a ward or team exclusively managing stroke (dedicated stroke unit) or a ward or team specialising in the management of disabling illnesses, including stroke. Care involved coordinated multidisciplinary rehabilitation, education programmes, and specialised medical and nursing staff. Stroke unit care reduced the number of days people spent in hospital compared to usual care.⁶⁵ For example, one UK trial found that people with very severe stroke recovering in stroke rehabilitation wards had a median length of hospital stay of 43 days compared with 59 days for those in regular wards.⁶⁶

A Cochrane review of interventions designed to improve collaboration between nurses and doctors included two trials with 1945 people. One trial found that daily, structured, team ward rounds, in which nurses, doctors and other professionals made care decisions jointly, shortened the average length of hospital stay and reduced hospital costs. The other trial evaluated combined nurse-doctor ward rounds four times per week. There were no significant differences between groups in length of hospital stay.⁶⁷

On a different note, a randomised assessment in the UK evaluated adding an 'Accident and Emergency Physician' to the usual emergency department team. The Accident and Emergency Physician was trained in both general medicine and emergency medicine. Their role was to review people referred from the emergency department for medical admission and divert people away from admission when appropriate. All people presenting to the emergency department were referred, not just those with certain conditions. This role did not reduce unscheduled admissions.⁶⁸

A randomised trial in the US found no evidence that incorporating the suggestions of hospital pharmacists into treatment plans had any impact on length of stay or readmissions, but pharmacists' suggestions did save money.⁶⁹

There is inconsistent evidence about multidisciplinary teams in hospital, though there seems to be a positive trend.

Two reviews and one additional trial found that multidisciplinary hospital teams could reduce people's length of stay in hospital during their initial visit. However, two further trials found no evidence to support this.

Four randomised trials found that multidisciplinary hospital teams helped to avoid readmissions, but two trials found no evidence to support this.

Three trials contained information about the effect of multidisciplinary hospital teams on the length of subsequent hospital stays. All found that multidisciplinary teams were associated with reduced length of subsequent stay.

Primary care workers in hospital

There is limited evidence about integrating primary and secondary care teams in hospital.

Hospitalists are general physicians who specialise in inpatient medical care, predominantly in the US. A cost-effectiveness analysis of hospitalists versus other physicians included almost 10,000 people in the US. Hospitalists were associated with a shorter length of stay and a lower readmission rate.⁷⁰

A meta-analysis of intensive care unit physician staffing examined using different types of staff for critically ill adults and children in the US. Twenty-seven studies with 23,569 participants were included. Greater use of primary care physicians in intensive care units led to significant reductions in the length of hospital stay.⁷¹ This is very specific to the US style of healthcare.

There is limited evidence about the effect of primary and secondary care teams in hospital.

One trial suggested reduced length of hospital stay. This was supported by one cost-effectiveness analysis, which also found a lower readmission rate.

Multidisciplinary care teams after discharge

There is evidence that multidisciplinary follow-up after discharge can reduce unplanned readmissions, particularly for people with heart failure.

A systematic review of 11 randomised trials with 2067 people with heart failure found that multidisciplinary programmes reduced admission to hospital compared with conventional care.⁷²

Another meta-analysis of multidisciplinary follow-up programmes for people with heart failure included 11 randomised trials of joint work by family doctors, heart specialists, nurses, pharmacists, dieticians, physical therapists, and social workers. Multidisciplinary follow-up programmes were associated with fewer hospital admissions.⁷³

An additional randomised trial compared a multidisciplinary team programme at a day hospital with a cardiologist, nurses, physiotherapist and individualised care plan versus usual care after hospital discharge for people with heart failure. At one year, the multidisciplinary programme significantly reduced hospital readmissions compared to usual care.⁷⁴

Another trial of multidisciplinary care for people with heart failure in the US found the programme reduced hospitalisations.⁷⁵

In New Zealand, people with heart failure were randomly assigned to usual care or integrated primary and secondary care comprising clinical review at a hospital-based heart failure clinic early after discharge, individual and group education sessions, a personal diary to record medication and body weight, information booklets and regular clinical follow-up alternating between the general practitioner and hospital clinic. Integrated care reduced total hospital admissions and total days spent in hospital.⁷⁶

In Ireland, nurse-led education plus specialist dietician advice for people with heart failure reduced hospital readmission compared with usual care at 12 weeks (2% versus 23% usual care).^{77,78}

On the other hand, a US trial in people with heart failure assessed multidisciplinary teams with pharmacists, dieticians, social workers, heart failure specialty nurses and registered nurses. Multidisciplinary care did not reduce hospitalisations.⁷⁹

Similarly, a trial in the US assessed a six month multidisciplinary outpatient programme for people with heart failure. The team comprised a telephone nurse coordinator, a specialist nurse, a cardiologist, and a GP. The programme had no effect on hospital readmissions.⁸⁰

There is evidence relating to other types of long-term conditions as well. For instance, a trial in the US assessed care coordination, family support, teaching, and monitoring from a team of advanced practice nurses, a geriatrician, and a pulmonologist for two months after hospital discharge in people who were chronically critically ill. The programme did not reduce readmissions, but was associated with reduced length of stay for people who were readmitted.⁸¹

A study in New Zealand focused on people with moderate to severe chronic obstructive pulmonary disease. The programme included management guidelines, individual care plans, and collaboration between patients, general practitioners, practice nurses, hospital physicians and nurse specialists. People receiving collaborative primary and secondary care had reduced hospitalisations and days in hospital compared to usual care.⁸²

A randomised trial in the US examined multidisciplinary team assessment for frail older people. Compared to usual care, multidisciplinary teams were associated with fewer days in hospital and less hospital costs.⁸³

A randomised trial in Australia evaluated geriatric assessment and multidisciplinary follow-up for elderly people sent home from the emergency department. The multidisciplinary assessment and follow-up group had fewer hospital admissions compared to people receiving usual care.⁸⁴

However a trial of a multidisciplinary case management programme for people with chronic renal insufficiency in the US comprised consultations for primary care patients in a hospital outpatient clinic staffed by two nephrologists, a renal nurse, a renal dietician, and a social worker. There were no differences between groups in use of health services for up to five years.⁸⁵

Similarly, a randomised trial in 106 general practices in the UK compared universal versus targeted assessment of elderly people and management by hospital outpatient geriatric teams versus primary care teams. There was no difference between groups in hospital or institutional admissions.⁸⁶

Evidence about the effects of multidisciplinary teams after discharge is generally positive.

Two reviews and five additional trials found that multidisciplinary follow-up reduced subsequent unplanned admissions. However, three trials found no benefits.

Three trials suggested reduced length of subsequent hospital stay. One trial found no benefit.

Nurse-led interventions

A number of interventions have redesigned the way care is organised or delivered by expanding the role of nurses. We reviewed studies about:

- specialist nurses,
- nurse-led clinics,
- and nurse-led follow up after discharge.

There are many other studies of nurse-led interventions throughout this review, described in the sections focussing on different service delivery initiatives.

Specialist nurses

Specialist nurses are trained to provide detailed care for people with a particular condition. There is inconsistent evidence about the benefits of specialist nurses, either used alone or as part of a multidisciplinary team.

A Cochrane review compared specialist nurse care for people with diabetes versus usual care in hospital clinics or primary care. The review included six trials with 1382 participants followed for six to 12 months. There was no difference in unplanned hospital admissions.⁸⁷

Similarly, a trial comparing specialist nurse care, in-patient team care, or day patient team care in people with arthritis found no significant differences in hospitalisations after two years.⁸⁸

Other studies have more positive findings. A randomised trial found that specialist asthma nurses in general practices in the UK reduced unscheduled visits for asthma compared to usual care.⁸⁹ Similarly adults in the US receiving education and follow-up from a specialist asthma nurse after hospitalisation had a 60% reduction in total hospitalisations after six months.

In Scotland, people hospitalised with heart failure received care from a specialist nurse. The intervention started before discharge and continued after people left hospital, with home visits for up to one year. People who received support from a specialist nurse were less likely to be readmitted to hospital.⁹⁰

Many studies of specialist nurses focus on case management, nurse-led clinics, or nurse follow-up. These studies are reported in separate sections of the review.

One trial found that specialist nurses reduced initial unplanned admissions, but a review and additional trial disagreed.

Two trials suggested lower readmission rates, but there is limited evidence about effects on days in hospital.

Nurse-led clinics

A number of countries have begun using nurse-led clinics to help manage long-term conditions in primary care. Reviews and randomised trials suggest that nurse-led clinics may improve the quality of care.^{91,92} Research from Sweden, The Netherlands, and the UK^{93,94} suggests that nurse-led clinics are effective for managing chronic obstructive airways disease and asthma,⁹⁵ heart failure,⁹⁶ diabetes,^{97,98} and people receiving anticoagulant therapy.⁹⁹ But we identified few high quality studies suggesting any impact on hospitalisations.

A systematic review of 18 randomised trials of heart failure clinics relying, at least in part, on specially trained nurses found that nurse-led clinics are associated with reduced hospital readmissions and fewer days in hospital compared to usual care.¹⁰⁰ However, the importance of the 'nurse-led' factor here remains uncertain.

There is insufficient evidence about the effects of nurse-led clinics on unplanned admissions and length of hospital stay.

One review suggested that nurse-led clinics reduced rehospitalisation and subsequent days in hospital.

Other studies have assessed nurse-led clinics as part of broader interventions.

Nurse follow-up after discharge

There is some evidence about follow-up from nurses following hospital discharge.

A randomised trial in the US found that intensive nurse follow-up of older people at high risk for poor outcomes reduced readmissions and days in hospital.¹⁰¹

Another trial with people hospitalised for heart failure in Canada assessed a support programme comprising education, self-monitoring, educational aids, a telephone hotline, and nurse follow-up at two weeks, then monthly for six months after discharge. Compared to usual care, the group receiving nurse follow-up had fewer subsequent days in hospital.¹⁰²

Another randomised trial with elderly people with heart failure in Sweden found that follow-up by nurses after hospital discharge was more effective for optimising medication compared to follow-up in primary care clinics. However, nurse follow-up did not improve hospital readmission rates.¹⁰³

There is insufficient evidence about the effects of nurse-led follow-up after discharge.

One trial found that nurse follow-up reduced rehospitalisation, but another trial dissented.

Two trials suggested that nurse-led follow-up reduced subsequent days in hospital.

Other studies have assessed nurse-led follow-up as part of broader interventions, particularly case management (see overleaf).

THE TYPE OF CARE PROVIDED

As well as reviewing evidence about different methods to provide or manage care in order to reduce hospitalisations and length of stay, we examined evidence about the specific services provided.

We searched for evidence about initiatives in each of the following areas:

- Prevention
- Diagnosis
- Primary care
- Hospital care
- Care after discharge

However, we identified no high quality evidence in the fields of prevention or diagnosis.

We found one systematic review specifically focussed on the most effective initiatives for reducing unplanned hospital use. The focus was on the emergency department, but similar trends may be true for general unscheduled admissions. The most effective strategies for reducing hospital use included improving access to primary care clinics or providers; asking primary care providers to pre-approve specialist care; educating patients about when to use specialist services and the benefits of continuous primary care; and referring non-urgent situations to other care settings. Triage training and telephone helplines were also beneficial.¹⁰⁴

Some of these strategies, and others, are explored in more detail below, including:

Primary care

Case management
Chronic care clinics
Specialist clinics
Telecare
Telemonitoring

Hospital care

Observation units
Hospital clinics
Discharge planning

Care after discharge

Intermediate care
Home visits
Telephone follow-up after discharge
Rehabilitation programmes

Case management

Case management (also known as care management) is a way of co-ordinating services for people with long-term conditions or complex social and medical needs. There are many different models of case management. However, the broad principle is to assign each person a 'case manager' or small team of managers to assess the patient's needs; develop a care plan; arrange suitable care; monitor the quality of care; and maintain contact with the service user and their family.

Studies focussed solely on case management by telephone after discharge are reported separately overleaf.

Case management by primary care nurses

A great deal has been written about case management for the frail elderly and people with long-term conditions, yet the evidence of its effect on clinical outcomes and resource use remains inconsistent.¹⁰⁵ For instance, a systematic review found no strong evidence that case management improved clinical outcomes for people with long-term conditions, although there were benefits for patient satisfaction and for people with certain types of diseases. Differences in case management models make it difficult to compare findings between trials.¹⁰⁶

The effects on unscheduled admissions and length of hospital stay are also unclear. Several reviews have found inconsistent evidence. For instance, a systematic review of case management included 4890 participants. Case management was defined as 'a programme that uses physician or non-physician providers to maintain continuous contact with patients via telephone or home visits in order to prevent disease exacerbation through intensive assessment and education techniques.' Two of the seven studies examining the impact of case management on hospitalisations and hospital days reported significant reductions in healthcare use. The other studies found no significant changes, or increased hospital use.¹⁰⁷

The Kings Fund reviewed 19 studies of case management for people older than 65 years in Europe and North America, 14 of which were randomised trials. The reviewers found inconsistent evidence about the effectiveness of case management for preventing hospital admission, reducing use of the emergency department, and decreasing length of hospital stay. Only five out of the 19 included studies found significant reductions in hospital admissions.¹⁰⁸

Others have concluded that case management has limited effects on hospitalisation. For instance, a systematic review assessed 17 trials of multidisciplinary teams, case management, and outreach or home care combined or in isolation, compared to conventional care for particularly vulnerable people. The reviewers found no benefits from case management in health service use or processes.¹⁰⁹

Similarly, a small randomised trial of nurse-led case management for people with chronic obstructive pulmonary disease in Australia found little difference between groups in unplanned readmissions.¹¹⁰

Another randomised trial of nurse-led case management for people with chronic obstructive pulmonary disease, their caregivers, and nursing and medical staff in Australia found little difference in unplanned readmissions.¹¹¹

Similarly a trial of case management and hospital discharge planning for older people in Australia found no effect on unplanned readmissions.¹¹²

Another trial of case management for people with heart failure included four components: early discharge planning, patient and family education, 12 weeks of telephone follow-up, and promoting optimal medications. There was no difference between case management and controls in 90 day readmission rates.¹¹³

A randomised trial in the US assessing the effects of case management among 'high risk' older people found no evidence that case management reduced the use or the cost of healthcare.¹¹⁴

Another large randomised trial assessed preventive case management among older people in the US. There were no differences from usual care in hospitalisation, emergency department use, days in hospital, hospital costs, or nursing home use.¹¹⁵

Some studies suggest that case management may even increase unscheduled hospitalisations. A randomised trial compared nurse case management with usual care for community-dwelling frail older people in Canada. There were no significant differences in admission to hospital or length of hospital stay. Case-managed people were readmitted to the emergency department significantly more often than the usual care group.¹¹⁶

Another large trial in the US included people hospitalised with diabetes, chronic obstructive pulmonary disease, or congestive heart failure. The intervention involved close follow-up by a nurse and a primary care physician, beginning before discharge and continuing for the next six months. Follow-up occurred both by telephone and in person. Although they received more intensive primary care than the control group, people receiving enhanced primary care follow-up had significantly *higher* rates of readmission and more days of rehospitalisation.¹¹⁷

Other studies suggest more positive outcomes. A small randomised trial of team-based case management for people with asthma found that case management reduced emergency department visits and hospitalisations. The authors concluded that case management could reduce resource use by between 57% and 75%.¹¹⁸

Another study in the US found that case managed chronically ill older adults had reduced emergency department visits, hospital admissions, length of hospital stay, and primary care visits compared to usual care.¹¹⁹

There is inconsistent evidence about the effects of case management on unplanned admissions and length of stay, though most evidence is negative.

Two trials found that case management reduced unplanned readmissions, but three reviews and seven additional trials found no effect. One trial suggested that case management increased unplanned admissions.

One trial found that case management reduced subsequent length of stay in hospital, but one review and two additional trials found no effect. One trial found that case management may increase length of hospital stay.

Case management in hospital

Some primary care nurses provide case management in hospital. In Denmark, hospitalised people aged over 65 years were randomised to usual care or nurse-led case management. A nurse visited the hospital daily, liaised with the primary care sector, discussed discharge with the patient and hospital staff, coordinated home care, and visited participants at home after discharge. There were no differences between groups in average length of stay in hospital.¹²⁰

Hospital nurses may act as case managers after discharge, especially in North America. For example, in the US, people admitted to hospital were assigned a nurse case manager to provide discharge planning and to arrange for postdischarge outpatient follow-up. Those who received case management discharge planning had improved continuity of care, but there was no difference in readmissions.¹²¹

Another trial in the US compared nurse case management in a special care hospital unit with traditional nursing care. Participants were critically ill with long-term conditions. There were no significant differences in length of stay. However, the case management group had significant cost savings.¹²²

There is insufficient evidence about the effects of case management in hospital. Those trials that do exist found no effect.

Two trials found case management in hospital had no effect on the length of hospital stay.

One trial found no effect on subsequent readmissions.

Assertive case management

Assertive case management or Assertive Community Treatment (ACT) is distinguished from more traditional case management by several features. Rather than a case manager coordinating services, a multi-disciplinary team provides services tailored to meet an individual's needs. Often team members collaborate to deliver integrated services of the recipients' choice, monitor progress towards goals, and adjust services to meet the recipient's changing needs. The staff-to-service user ratio is generally small (one provider for every ten recipients versus one provider for every 30-50 recipients in traditional case management), and services are provided 24-hours a day, seven days a week, for as long as they are needed. As with other forms of case management, this description is just a guide, and individual programmes are likely to differ widely.

Assertive case management has been most extensively trialled in the field of mental health.¹²³ Indeed, many hundreds of studies of both traditional and assertive case management have been undertaken in mental health, including chronic conditions such as dementia. A Cochrane review found that case management in mental health resulted in more people remaining in contact with health services. One extra person remained in contact for every 15 people who received case management. Unscheduled hospital admissions also increased.¹²⁴

In contrast, an older systematic review of case management in mental health divided case management into simple and more complex approaches. Brokerage case management is the most simple. It focuses on organising and coordinating services on behalf of the user. Clinical case management is more complex, and includes programmes such as Assertive Community Treatment (ACT), the Psychosocial Rehabilitation Model, and the Strengths Model. The reviewers included 23 studies with 3,803 participants. Overall, case management was associated with reduced days in hospital in 11 out of 21 studies that reported this outcome. Seven studies found a reduced number of hospital admissions with case management. Seven out of nine studies found an increase in the use of other services such as social services and aftercare services.¹²⁵

Another meta-analysis of 44 controlled trials assessed different types of case management in mental health. Thirty-five studies compared assertive community treatment or clinical case management with usual care, and nine studies compared assertive community treatment with clinical case management. The total number of admissions and the proportion of people hospitalised reduced with assertive community treatment, but increased with clinical case management. Assertive community treatment was more effective than clinical case management for reducing days in hospital.¹²⁶

Similarly, a meta-analysis of 44 studies assessing the cost-effectiveness of assertive community treatment in mental health suggested that assertive case management approaches could reduce hospitalisation by up to 78% compared to usual care.¹²⁷ An additional randomised trial in the Netherlands supported this, with a reduction in bed days of 66%.¹²⁸

However, a more recent review focused on people with severe comorbid mental health conditions suggested that while assertive case management approaches reduced in-patient care, they sometimes did so at the expense of increasing social dysfunction and behavioural disturbance.¹²⁹

A related trial in the UK found that small savings on in-patient and day-hospital service costs from assertive case management were counterbalanced by increased costs of outpatient and community care.¹³⁰

Other trials have found no benefits from assertive case management regarding unplanned admissions or length of stay in hospital.¹³¹

All of these studies are in the field of mental health. We identified no high quality studies of the impact of assertive case management on unplanned hospitalisations and days in hospital in other fields.

Assertive case management by multidisciplinary teams may reduce unplanned admissions and length of stay in the field of mental health. Evidence in other fields is lacking.

Three reviews suggested that assertive case management reduced unplanned admissions, but one additional trial did not support this. One review suggested that assertive case management may increase unscheduled admissions.

Two reviews and one additional trial found that assertive case management reduced the length of subsequent hospital stay. One additional trial found no evidence of a benefit.

Telecare

Telecare involves providing information and care to people by telephone, internet, or other telecommunications devices, or monitoring clinical indicators. Case management completed exclusively by telephone is also reported in this section.

Providing information and support

Most evidence about the impact of telecare on unplanned admissions and length of hospital stay focuses on people with heart failure, diabetes, or asthma. For instance, a trial in Japan assessed telephone calls from nurses to monitor the status of people with asthma and help them manage exacerbations. After six months, unplanned hospitalisation was reduced by 83% in those receiving telecare.^{132,133}

The evidence about the impact of providing information and follow-up by telephone for people with heart failure is mixed. A large randomised trial in Argentina found that education and monitoring by nurses through frequent telephone follow-up in addition to usual care, delivered from a single centre, significantly reduced unplanned admissions for people with heart failure.¹³⁴

A randomised trial in the US evaluated whether six months of standardised telephone case management reduced resource use among people with heart failure. Telephone case management was associated with 48% less admissions compared to controls. Days in hospital and multiple readmissions were also fewer in the case management group.¹³⁵

A randomised trial in the US evaluated targeted telephone education and support to prevent readmission in people with heart failure aged over 50 years. A face-to-face interview was followed by ongoing telephone follow-up. The intervention reduced readmission or death at one year (57% versus 82% controls). The overall cost of care in the intervention group was almost US\$7000 less than for controls due to lower costs for rehospitalisation.¹³⁶

Another US trial found that scheduled telephone calls by specially trained nurses promoting self-management and screening people for heart failure exacerbations reduced unplanned admissions and length of stay in hospital at six months, but the effect did not last after one year.¹³⁷

Studies of videophones and similar devices are also available. A randomised trial in the US compared home telecare using a video-conference device with an integrated electronic stethoscope; nurse telephone calls; or usual outpatient care for people with heart failure. Video conferencing was associated with significant reductions in unplanned admissions.^{138,139}

On the other hand, a US trial assessed nurse case management by telephone for people with heart failure. The programme involved structured telephone surveillance and coordination of care with primary care physicians. Nurse case management by telephone had no effect on hospital readmissions.¹⁴⁰

In another trial of case management for older people in the US, case managers posted educational materials within 24 hours of hospital discharge and telephoned within five days to review needs, early warning signs, and barriers to keeping appointments. Case managers contacted patients if they made no visits for 30 days. Over one year, case managed people were more likely to use primary care services, but there were no significant differences in readmissions or the number of days in hospital.¹⁴¹

There is inconsistent evidence about providing information and support by telephone, or case management solely by telephone.

Five trials found telephone support was associated with fewer unplanned admissions, but one trial found no effect.

Two trials suggested telephone support reduced the number of days in hospital, but one trial found no effect.

Substituting telephone calls for clinic visits

Studies have also assessed the benefit of substituting telephone calls for some routine visits to health professionals. For instance, a randomised trial assessed clinician-initiated telephone calls instead of selected primary care visits for men in the US. Over a two year period, men receiving telephone calls had fewer hospital admissions, shorter stays in hospital, and fewer intensive care unit days. Healthcare expenditure was 28% less for men receiving telephone care over the two year period (saving US\$1656 per person). Savings were greater for men with poorer health at the beginning of the study (US\$1976 per person). The authors concluded that substituting telephone monitoring for some clinic visits reduces the use of medical services and associated costs.¹⁴²

But a trial of nurse telephone consultations using decision support software for out of hours primary care found that telephone support did not affect unplanned hospital admissions in a general population group.¹⁴³ However, an economic analysis suggested that the number of admissions avoided made out of hours nurse telephone support cost-effective overall.¹⁴⁴

There is limited evidence about the effect on unplanned admissions and days in hospital of substituting telephone calls for routine clinic visits.

One trial found that substituting telephone calls for visits reduced unplanned admissions and days in hospital, but another trial found no effect.

Telemonitoring

Initiatives that use telecommunications systems such as the internet or telephone lines to transfer or record clinical information are often referred to as 'telemonitoring.' Telemonitoring can take a wide variety of forms, for example sending blood pressure readings by modem.

Reviews suggest that telemonitoring may reduce the use of hospital beds.¹⁴⁵ For instance, a systematic review of 19 studies found that telemonitoring of vital signs and symptoms may reduce readmission rates and length of hospital stay in people with heart failure.¹⁴⁶

A randomised trial in the US compared home visits by nurses versus telemanagement with a home monitoring device for people with heart failure. The home monitoring device transmitted data daily to a secure internet site for review by a nurse. Telemonitoring significantly reduced heart failure readmissions and length of hospital stay after three months.¹⁴⁷

A similar trial in the UK compared home telemonitoring versus nurse telephone support or usual care for people with heart failure at high risk of hospitalisation or death. Telemonitoring did not reduce unplanned admissions, but reduced the length of subsequent hospital stay by an average of six days compared to nurse telephone support.¹⁴⁸

Similarly, a trial in Italy assessed telephone electrocardiogram (ECG) monitoring, followed by visits from the paramedical and medical team, for people with heart failure. An ECG recording was transmitted to a receiving station, where a nurse was available for reporting and interactive teleconsultation. The patient could call the centre when they needed help and the team could call the patient for scheduled appointments. After one year, people receiving telemonitoring had a significant reduction in rehospitalisations.¹⁴⁹

Most evidence about telemonitoring is positive.

Two reviews and two additional trials found that telemonitoring reduced unplanned admissions. One trial found no effect.

One review and two additional trials suggested that telemonitoring reduced unplanned days in hospital.

Clinics in primary care

There are two main clinic initiatives in primary care that aim to reduce unplanned admissions.

- Chronic care clinics are group visits to primary care. During group visits people may participate in routine check ups, multidisciplinary discussions, and education sessions.
- Specialist clinics can be based in primary care, with multidisciplinary input, such as hospital specialists attending primary care. These specialist 'outreach clinics' are usually visited by individual patients rather than involving group sessions.

Chronic care clinics in primary care

Evidence about the effect on hospitalisations of primary care group sessions is mixed.

A trial of chronic care clinics for frail older adults in the US comprised half day clinics every three to four months. These clinics included an extended visit with a physician and nurse dedicated to chronic disease management; a pharmacist visit to reduce multiple prescribing and high risk medications; and a support group. After two years, although participants were highly satisfied with their care, there was no change in the frequency of hospitalisation or the number of days spent in hospital.¹⁵⁰ However, similar trials suggest that group visits may reduce visits to emergency departments.^{151,152}

In another randomised trial, monthly visits to GPs and nurses by groups of chronically ill elderly people reduced repeat hospital admissions and emergency care. Clinic visits included health education, prevention, opportunities to socialise, mutual support, and one-to-one consultations with the physician if needed.¹⁵³

A randomised trial in the US assessed monthly primary care group clinics for chronically ill older people. People attending group visits had fewer hospital admissions and emergency department visits, and lower healthcare costs compared to those receiving usual care.¹⁵⁴

There is limited evidence about the effect on hospitalisation of group visits to primary care.

Two trials suggested group visits reduced unplanned admissions.

One trial found no impact on days in hospital.

Specialist clinics in primary care

In many countries, specialist (hospital) practitioners conduct clinics in primary care and rural hospital settings with the aim of increasing access to specialist services and integration with primary care. A Cochrane review included nine studies of outreach clinics run by specialists in primary care and community settings. Simple 'shifted outpatients' styles of specialist outreach were found to improve access, but there was no impact on health outcomes or hospitalisation. Specialist outreach as part of more complex multifaceted interventions involving collaboration with primary care, education, or other services was associated with improved health outcomes and less use of hospital services.¹⁵⁵

Clinics for asthma in primary care are becoming widespread in the UK. A Cochrane review found only one relevant trial, with limited evidence of the effectiveness of specialist asthma primary care clinics. There was no difference between groups in nine out of the eleven outcomes in the trial.¹⁵⁶

Open access clinics that link primary and secondary care have been used to follow up people with long-term conditions who traditionally require long-term hospital monitoring. A randomised trial in Wales assessed open access clinics for adults with inflammatory bowel disease. Open access clinics involved encouraging people to attend clinics when they wished rather than scheduling routine follow-up appointments. Open access clinics were associated with fewer hospital day visits and outpatient visits, but some people had difficulty obtaining an urgent appointment. There were no significant differences in days in hospital.¹⁵⁷

There is little evidence to suggest that specialist clinics reduce hospitalisation.

One review and one additional trial found no effect on unplanned admissions.

One trial found no impact on days in hospital.

Hospital clinics

Other studies have focused on specialist clinics or assessment units run in hospital settings, both before and after discharge.

Observation wards or units are sometimes used when people present to hospital, as an alternative to immediately admitting people to hospital. A systematic review found that observation units generally reduce unnecessary hospital admissions and decrease the length of stay in hospital.¹⁵⁸

All of the other studies we identified about hospital clinics focused on care during or after discharge. For instance, a systematic review of 26 randomised trials of geriatric services found that specialist geriatric units and day hospitals did not improve rates of institutionalisation.¹⁵⁹

In additional trial of a US hospital geriatric assessment unit following discharge found the unit had no effect on the average number of days in hospital.¹⁶⁰

Similarly, a trial of a hospital discharge clinic in the US found no effect on readmissions or length of stay. At once weekly discharge clinics, doctors saw all eligible patients that they had recently discharged from hospital.¹⁶¹

In contrast, a randomised trial with people hospitalised for heart failure in Spain assessed comprehensive hospital discharge planning and follow-up at a specialist heart failure clinic. Discharge planning and specialist outpatient management reduced hospital readmissions and reduced the cost of care.¹⁶²

Another randomised trial in the US included adults hospitalised many times for asthma. One group attended an intensive specialist outpatient treatment clinic with self-management education and the other group received usual outpatient care. The outpatient clinic reduced hospital readmissions threefold.¹⁶³

There is inconsistent evidence about the effect on unplanned admissions and length of stay of hospital clinics before or after discharge.

One review and two additional trials suggested that hospital clinics could reduce unplanned admissions, but one review and one additional trial found no effect.

One review suggested hospital clinics could reduce days in hospital, but two additional trials found no effect.

Discharge planning

Discharge planning involves assessing where a service user will go and what their immediate needs will be following hospital discharge. It involves considering the type of care that people need and options for releasing them from hospital without a prolonged stay.

In addition to studies incorporating discharge planning that we've summarised in other sections of the report, we found two further studies that assessed the impact of co-ordinating discharge on subsequent hospitalisations.

A systematic review of discharge planning plus postdischarge support included 18 studies with 3304 older people with heart failure. Discharge planning reduced unplanned readmissions in the eight months following discharge.¹⁶⁴

An additional randomised trial in Canada examined the effects of a nurse medical team coordinator whose role was to facilitate administrative tasks such as discharge planning, to coordinate tests and procedures, and to collect and collate patient information. Having a dedicated discharge planner reduced the average length of stay by about two days compared with usual care.¹⁶⁵

There is limited evidence about the impact of discharge planning on unplanned readmissions or subsequent days in hospital.

One trial suggested that discharge planning could reduce the length of hospital stay on the index visit.

One review suggested that discharge planning could reduce the rate of unplanned readmissions.

Home hospitalisation

The “hospital at home” concept involves people being discharged earlier than would otherwise have been the case, with enhanced home support. Outcomes have been mixed. A Cochrane review found that the reduced length of stay in hospital associated with home hospitalisation may be offset by costs incurred in the community. Patient satisfaction may increase, but carer satisfaction tends to decrease.¹⁶⁶

An additional randomised trial with people with chronic obstructive pulmonary disease evaluated whether home hospitalisation could improve outcomes compared to conventional hospitalisation. During home hospitalisation, integrated care was delivered by a specialised nurse and participants had free-phone access to nurses for an eight week follow-up period. There was no difference between groups in hospital readmissions, but home hospitalisation reduced the overall cost of care by 38% compared to conventional hospitalisation.¹⁶⁷

There is limited evidence about the effect of home hospitalisation on unplanned admissions.

One review found that home hospitalisation reduced the length of hospital stay. One trial found home hospitalisation had no effect on unplanned readmissions.

Intermediate care

Intermediate care has been introduced in England to help reduce the use of acute services. Most intermediate care services involve some type of follow-up after hospital discharge, but some intermediate care focuses on preventing admissions in those older than 75, whether or not they have been admitted before. The exact interventions can take various forms. There is limited high quality evidence about the effect of intermediate care on unscheduled admissions.

A randomised trial assessed transitional nurse care at home for two weeks following discharge. At 6 and 12 weeks the transitional care group had better reported physical and emotional outcomes compared to usual care, although there was no difference in hospital readmissions.¹⁶⁸

A quasi-experimental study compared matched groups of elderly people before and after the introduction of an intermediate care service in the UK. A multi-agency, multi-disciplinary team assessed people's need and enlisted support and rehabilitation from sector-based intermediate care teams. Intermediate care had no significant effect on readmissions.¹⁶⁹

Another quasi-experimental controlled trial in Australia examined ‘transitional care’ after hospital discharge for elderly people with a history of hospital readmissions or multiple medical comorbidities. There was no difference in readmission rates.¹⁷⁰

A cohort study in the UK focussed on preventive intermediate care to avoid unscheduled admissions in the elderly, whether or not they had been admitted before. The programme involved a screening process and a home visit by a community nurse. Over a three year period intermediate care did not reduce unplanned admissions.¹⁷¹

In the US, a type of intermediate care was trialled with elderly people visiting the emergency department. The randomised trial comprised comprehensive geriatric assessment by an advanced practice nurse in the emergency department and referral to a community or social care agency, primary care provider, or geriatric clinic. This transitional model of care reduced subsequent nursing home admissions but did not decrease hospital admissions.¹⁷²

There is little good quality evidence about the effect of intermediate care on unplanned admissions. Most available evidence is negative.

Five studies found that intermediate care had no effect on unplanned readmissions. No studies focussed on length of stay.

Home visits

Systematic reviews suggest visiting elderly people at home, either as a preventative measure or as follow-up after hospital discharge, has positive effects on physical, social, and mental health, knowledge, and service use.^{173,174}

There may also be benefits for unplanned admissions. A meta-analysis of 22 studies assessed the impact of home care on days in hospital among elderly chronically ill and terminally ill people. Home care was associated with a significant reduction in days in hospital.¹⁷⁵

A randomised trial in the UK assessed a community support scheme for people aged over 75 years. The intervention involved support and practical help from care attendants on the first day following hospital discharge and for up to 12 hours per week for two weeks. Hospital readmission rates within 18 months of discharge were significantly less in the group who received home care. Benefits were particularly high among people living alone. The authors concluded that if home care was provided to everyone discharged from hospital over the age of 75 living alone, an average health district might expect to save about 23 hospital beds at a net annual saving of £220,000 in the short-term.¹⁷⁶

Similarly, a randomised trial in the US focused on people with long-term conditions with three or more admissions to hospital. Participants were visited by a nurse within seven days of discharge, and for a total of nine times over the next three months. Compared to usual care, home visits by nurses reduced readmission rates.¹⁷⁷

Another randomised trial with older people who had been hospitalised and were at high risk for poor outcomes found that home visits by nurses reduced readmissions and days in hospital.¹⁷⁸

A randomised trial in Canada found that six home visits by a cardiac-trained nurse coupled with a standardised checklist for nurses, referral criteria for specialty care, and liaison with family doctors reduced readmission rates in people with heart disease.¹⁷⁹

A similar trial with people with heart disease in the UK assessed nurse home visits at 1-2 and 6-8 weeks after hospital discharge. Compared to those receiving usual care, people visited at home by nurses had fewer hospital readmissions and an average of two fewer days of hospitalisation after initial discharge.¹⁸⁰

Home visits may also reduce other types of institutionalisation. For instance, in Denmark, people aged 75 or older discharged from hospital were randomly assigned to usual care or a home visit from a district nurse on the day after discharge and a home visit from their GP two weeks later. Not all had long-term conditions. After one year, those receiving home visits were less likely to be admitted to a nursing home and spent fewer days in institutions (including hospital).¹⁸¹

But not all evidence is supportive. In Australia, a randomised trial evaluated home visits by a community nurse for people with chronic obstructive pulmonary disease discharged from hospital. There were no differences between groups in GP visits or hospital admissions.¹⁸² Another similar trial in Australia with people with severe chronic obstructive pulmonary disease found that home visits did not improve hospital admissions, length of stay, or the number of outpatient or emergency department visits.¹⁸³

There is evidence to suggest that home visits following hospital discharge may reduce subsequent unplanned admissions and days in hospital.

Five trials found that home visits reduced unplanned admissions. Two trials found no effect.

One review and three additional trials found that home visits following discharge could reduce subsequent days spent in hospital.

It is important to note that home visits may be done as part of a broader care programme, such as case management.

Rehabilitation programmes

A great deal has been written about rehabilitation programmes for people with various conditions. Only a sample are summarised here, as examples of key trends in the literature.

In-hospital rehabilitation

We identified various studies of rehabilitation in hospital, but few impacted on the length of hospital stay. For instance, a randomised trial of people hospitalised for chronic obstructive pulmonary disease in the UK found that early rehabilitation with walking aids made no difference to the average length of stay.¹⁸⁴

Early supported discharge

Some rehabilitation programmes focus on early discharge from hospital, with supportive home care. A Cochrane review of 11 trials with 1579 participants found that early supported discharge plus home-based rehabilitation for people with stroke reduced the average length of hospital stay by eight days.^{185,186}

A similar review of seven studies found that early hospital discharge plus home-based rehabilitation reduced total length of stay by 13 days for people recovering from stroke.¹⁸⁷

However, a randomised trial found that while early hospital discharge plus home-based rehabilitation reduced length of hospital stay from an average of 30 down to 15 days in Australia, this impacted negatively on the caregivers of people recovering from stroke.¹⁸⁸

Geriatric assessment

Geriatric assessment is often used within rehabilitation programmes. This involves assessing people's needs and providing them with rehabilitation and ongoing care. A randomised trial in the US examined a geriatric assessment unit in a community rehabilitation hospital for elderly people. The geriatric unit had no significant effect on the average number of days in health care facilities (acute hospitals, nursing homes, or rehabilitation hospitals).¹⁸⁹ However, another similar trial of outpatient geriatric assessment in the US found a trend towards reduced unplanned readmissions.¹⁹⁰

A randomised trial in Canada examined in-home assessment, an individualised treatment plan, and an exercise programme for elderly people who had fallen within the past three months. The rehabilitation programme did not reduce unscheduled admissions or subsequent falls.¹⁹¹

Home-based rehabilitation

The most effective rehabilitation environments remain uncertain. A Cochrane review comparing the effects of nursing homes, residential care homes, and nursing facilities versus hospital environments and own home environments in the rehabilitation of older people identified 19,457 studies during the initial search strategy, but concluded that none met the inclusion criteria. The authors suggested that there is insufficient evidence to compare the effects of different environments on rehabilitation in older people.¹⁹²

Another Cochrane review found insufficient evidence to estimate the likely benefits, harms, and costs of institutional or at-home care for functionally dependent older people.¹⁹³

A randomised trial assessed a rehabilitation service based in Social Services older people's homes in the UK. Participants were elderly and disabled hospitalised patients who wished to go home but were at high risk of institutionalisation. The rehabilitation programme was associated with significantly fewer days in hospital over the next 12 months, but participants spent an average of 36 days in a care home rehabilitation facility.¹⁹⁴

Evidence about the effects of rehabilitation programmes is inconsistent, reflecting the heterogeneity of the initiatives themselves.

Two reviews and one additional trial found that rehabilitation programmes could reduce the number of days in hospital during the index visit. One trial found no effect.

Two trials suggested rehabilitation programmes could reduce subsequent admissions.

One trial suggested that rehabilitation could reduce the subsequent length of stay in hospital, but one trial found no effect.

TOOLS TO FACILITATE BETTER CARE

As well as broad initiatives to manage and provide care in different ways, we found evidence about specific tools, systems, and processes that have been trialled to facilitate more effective care. This section summarises research about tools such as:

- disease registries and decision-support software,
- evidence-based care pathways,
- and strategies to inform and educate professionals.

Registries and decision-support tools

In order to identify people most at risk of clinical deterioration and hospitalisation, routine monitoring and data collection strategies are needed. A variety of tools have been developed in the UK and abroad.^{195,196}

While there are numerous descriptions of monitoring and data collection strategies and of system assessment tools, we found limited comparative evidence about the effects of different routine monitoring systems. Those studies that do exist tend to focus on disease registries and decision support tools.

Registries

There is some evidence that disease registries, whereby information is compiled centrally and used to identify and track people with long-term conditions or those at high risk of hospitalisation, may have positive impacts on quality of care and clinical outcomes.^{197,198,199,200} Registry data may also be used to send reminders to patients and physicians about routine check-ups or medication reviews.

However, we identified no high quality evidence that disease registries alone had an impact on unplanned admissions or length of stay in hospital.

We found insufficient evidence about disease registries to draw conclusions about impacts on unplanned admissions.

Decision-support tools

A number of studies have assessed tools to help professionals and patients make decisions, including standardised record forms and web-based decision support systems.^{201,202,203} However, there is limited evidence about the effect of different monitoring and decision-support strategies on admission rates and length of hospital stay.

A study of nine primary care practices in the US found that as overall system support for chronic care in diabetes and heart disease increases, providers are more likely to achieve recommended care guidelines and patient outcomes improve. However, this does not necessarily translate into reduced admissions.²⁰⁴

In the UK, a randomised trial in 17 general practices found that computer decision-support software that highlights guidelines during patient consultations improved quality of care and clinical outcomes for adults with asthma, but no information about admissions was reported.²⁰⁵

Sixty general practices in North-East England participated in a randomised trial of computerised evidence-based clinical guidelines for managing asthma and angina in primary care. The computerised decision-support system had no significant effect on consultation rates, process of care, prescribing, or any patient reported outcomes. However, use of the software was limited.²⁰⁶

On the other hand, a randomised trial in the US found that adding symptom information to computer-generated care suggestions for people with heart failure did not affect physician treatment decisions or improve outcomes.²⁰⁷

We found insufficient evidence about decision-support tools to draw conclusions about impacts on unplanned admissions.

Care pathways

Care pathways aim to provide guidelines about how people should progress through health and social care systems, and what services and medications they should be accessing at various points along the 'pathway.' They also aim to help service providers work together using a 'whole systems' approach.

National Service Frameworks (NSF) are a type of care pathway, developed to help practitioners apply guidelines and high quality evidence. In England, NSFs are available for long-term conditions generally, as well as specific conditions such as diabetes and heart disease. However, NSFs tend to focus on single diseases or groups of diseases. They generally do not focus on managing comorbidities.

There is limited evidence about the effects of care pathways and clinical guidance frameworks on unscheduled hospital admissions and days in hospital. The evidence that does exist is somewhat conflicting.

For instance, a Cochrane review of ten studies assessed the effects of care pathways compared to standard medical care among 2013 participants. There was no difference between groups in days spent in hospital.²⁰⁸

An additional trial in the UK found that care pathways had no effect on length of hospital stay compared to usual multidisciplinary care in a stroke rehabilitation unit.^{209,210}

But there are some positive trends. A randomised trial in New Zealand assessed a programme with a chronic obstructive pulmonary disease management guideline, a patient-specific care plan and collaboration between patients and their general practitioners, practice nurses, hospital physicians and nurse specialists. The care plan, guideline, and collaboration programme reduced the average length of stay in hospital.²¹¹

There is limited evidence about the effect of care pathways on unplanned hospitalisations and length of hospital stay.

One trial suggested care pathways can reduce length of hospital stay during the index visit, but one review and one additional trial found no effect.

We found no high quality evidence about the impact of care pathways on subsequent unplanned admissions.

Sharing skills and knowledge

Many broad quality improvement programmes include different strategies for health professionals to share skills and knowledge.

A number of systematic reviews have suggested that it is difficult to change health professionals' behaviour through educational strategies alone. Education sessions or written materials such as guidelines are generally insufficient to sustain changes if used in isolation. Chart audit and feedback of results, reminder systems, and local opinion leaders have had variable effects. Multifactorial interventions that address different barriers to change simultaneously tend to be more successful than single initiatives. Reviews suggest that written materials and practice guidelines should be accompanied by more intensive educational and behavioural interventions to maximise the chances of helping health professionals learn new skills and behaviours.^{212,213,214}

We identified studies about ways for health professionals to share ideas and upgrade their skills focused on the following areas:

- group education sessions,
- individual, one-to-one, education,
- joint (multidisciplinary) training,
- reminders,
- audit and feedback,
- and guidelines.

Educational sessions

There is little evidence about the effects of educational sessions for health professionals on hospitalisations and length of stay. Numerous reviews suggest that interactive educational sessions that provide an opportunity to practice skills can change professional practice and, on occasion, healthcare outcomes.^{215,216,217,218,219,220} But the impacts on hospitalisation are less clear.

In the US, teaching physicians communication and management skills was associated with a 41% reduction in visits to the emergency department by people with asthma.²²¹

A randomised trial in the US assessed a programme of lectures, group discussions, chart review, and feedback for hospital doctors. Educating interns was associated with reduced length of hospital stay. There was no effect on readmission rates.²²²

There is limited evidence about the effect of education sessions for professionals. Two studies suggest reduced length of hospital stay.

Individual education

In addition to the reviews above, we identified studies about individual education or opportunities for health professionals to share their ideas one-to-one. Although a number of studies and reviews suggest that one-to-one educational visits can modify health professionals' behaviour,^{223,224,225} we found no high quality evidence about the effects on hospitalisations or length of hospital stay.

Multidisciplinary training

Some planners and managers advocate joint training between different groups of workers, including nurses, doctors, and those in professions allied to medicine. The aim is to produce an integrated workforce of multidisciplinary teams. A UK review suggested that there is little high quality evidence to support training different types of workers side by side. The reviewers concluded that while many studies have evaluated interprofessional education, these studies generally lack the methodological quality needed to assess the impact of such initiatives on professional practice and clinical outcomes.²²⁶ Nor is there evidence that collaborative training reduces unplanned admissions or length of hospital stay.

Reminders

A number of systematic reviews suggest that reminders for clinicians, including electronic prompts and alert systems, may improve care processes and clinical outcomes.^{227,228,229,230,231} However, these reviews contain little evidence about the effects of clinician reminder systems on hospitalisations.

Audit and feedback

Audit and feedback involves assessing the extent to which professionals are meeting accepted guidelines or standard practice, often by reviewing patients' charts. Systematic reviews suggest that audit and feedback can have a slight effect on professionals' behaviour,^{232,233} especially when combined with a broader strategy of education and quality improvement.²³⁴ However we identified no evidence of the direct impacts of audit processes on hospitalisation rates or length of stay.

Guidelines

An evidence review found strong evidence that the following interventions improve professionals' adherence to guidelines:²³⁵

- multifactorial interventions that address different barriers to behavioural change,
- multidisciplinary care for people at high risk,
- academic detailing or educational outreach.

The reviewers found some evidence that the following improve adherence to guidelines:

- chart audit and feedback of results,
- reminder systems,
- local opinion leaders.

However, they found little evidence to support:

- disease management for people at low risk,
- dissemination of guidelines alone,
- basic provider education alone.

Other randomised trials suggest that providing guidelines and written and verbal reminders about recommended actions may not change how care is provided – and therefore not have an impact on length of stay or hospitalisation.^{236,237,238,239,240,241}

We found insufficient evidence to draw conclusions about the effect on unplanned admissions or length of hospital stay of the following interventions for professionals:

- group or individual education,
- multidisciplinary training,
- reminders and prompts,
- audit and feedback,
- guidelines.

INITIATIVES TO SUPPORT SELF-CARE

In addition to interventions to improve health and social care, we investigated programmes to involve people in their own care and self-management. Interventions included:

- ways to involve people in decisions about their care,
- providing accessible information,
- self-management education,
- self-monitoring,
- and patient-held records.

Patient involvement in decisions

Involving service users in healthcare decision-making may:

- encourage people and their families to take more responsibility for their care,^{242,243,244,245,246}
- help people feel more in control,^{247,248,249}
- encourage health professionals to follow recommended care protocols,^{250,251}
- and have some impacts on quality of life.²⁵²

However, we found no studies that suggested that involving people in making decisions about their care had an impact on hospital admissions or length of hospital stay.

We found insufficient evidence to draw conclusions about the effect on unplanned admissions of involving service users in decision making.

Providing accessible information

In order to make informed choices in healthcare, people must have, and use, easily available, accurate, and timely information. A great deal has been written about different ways to provide information to elderly people and those with long-term conditions.

It appears that merely providing information is not enough to ensure that people feel informed and 'educated.' A literature review found that having an abundance of information does not mean that information is used to inform choices. The authors concluded that information must be presented in a way that is easily accessible, inviting, and encourages people to apply it in practice.²⁵³

Written information

A number of written information materials have been evaluated, including decision aids, guidebooks, and printed educational materials. Systematic reviews and trials suggest that decision aids and educational materials may improve people's knowledge and attitudes, but used alone, they may have little effect on behaviours.^{254,255,256,257} Some studies of providing educational materials and reminders suggest that these can alter people's adherence to treatment.^{258,259,260} There is much less information about the effect of decision aids and educational materials on unscheduled admissions.

We found a small number of studies assessing the impacts of written information on hospitalisation. For instance, a Cochrane review included 12 trials of the effects of limited 'information only' education on health outcomes in adults with asthma. Limited asthma education did not effect unplanned admissions for asthma.²⁶¹

A randomised trial in the US examined providing individualised written materials during hospitalisation and one week and one month after discharge for people with heart failure. Providing tailored messages changed people's knowledge and beliefs, but had no effect on readmission rates.²⁶²

A similar trial in the US assessed mailing people health risk assessments at six or 12-month intervals, with individualised reports and recommendation letters, self-management materials, and quarterly newsletters. Posting written educational materials to a general population group did not reduce unscheduled hospitalisation.²⁶³

On the other hand, a randomised trial of adults in Scotland compared posting four asthma education booklets personalised by computer versus conventional oral education at outpatient or surgery visits. The authors found that personalised booklets may reduce hospital admissions among outpatients.²⁶⁴

Similarly, a randomised trial in Canada found that a mailed health promotion programme with individualised educational letters reduced the number of days in hospital for people with Parkinson's disease.²⁶⁵

There is inconsistent evidence about the effects of written information on hospitalisation.

One trial suggested that written information could reduce unplanned admissions. Two additional trials suggested reduced subsequent readmission rates. But one review and one additional trial found no effect on readmissions.

Group education

Group education involves courses or workshops detailing information about specific long-term conditions. There is evidence that group educational sessions may improve people's satisfaction and feelings of wellbeing,^{266,267,268} adherence to treatment and quality of care,^{269,270} and clinical outcomes.^{271,272,273,274,275,276,277}

However, we identified no evidence about the effect of group education on hospital admissions or days in hospital. (Evidence about self-management education sessions is reported separately overleaf).

A meta-analysis of 72 studies of patient education strategies found that the most effective methods were structured sessions, reinforcement, independent study, and use of multiple interventions.²⁷⁸ However a review of 12 meta-analyses of education for people with long-term conditions identified many gaps in existing knowledge. The quantitative effects of patient education and the most effective processes remain uncertain. Even where randomised trials are available, most found small effects, included no more than six months follow-up, and did not describe the interventions in any detail.²⁷⁹

There is insufficient evidence about the effects of group education on unplanned admissions and length of hospital stay.

Studies of self-management education are reported separately overleaf.

Individual education (“counselling”)

Some studies have assessed the impacts of individual, one-to-one, education sessions on healthcare outcomes. Generally, research suggests that while one-to-one education sessions may increase people’s knowledge, it is unlikely to have greater impacts unless it is targeted, specific, and long-term.^{280,281,282} These trends tend to hold for a wide range of conditions including diabetes,²⁸³ arthritis,²⁸⁴ asthma,²⁸⁵ and heart failure.

There is conflicting evidence about the effect of one-to-one education on unplanned admissions. One review found that individual counselling and education for people with heart failure improved clinical outcomes and reduced unnecessary hospitalisations.²⁸⁶

On the other hand, a randomised trial compared a workbook and one-to-one education versus standard asthma pamphlets for adults with asthma. There was no difference between groups in hospital or emergency department visits.²⁸⁷

A number of studies have assessed individual education while people are in hospital. For instance, a randomised trial in the UK assessed whether specialist asthma nurses could increase knowledge and improve self-management during one-to-one sessions in hospital. One-to-one education by a nurse increased people’s knowledge about asthma management, but did not reduce readmissions to hospital.²⁸⁸

Similarly, a randomised trial in Australia evaluated individualised advice from a nurse for hospitalised older people with confusion and behavioural problems. Individual education had no significant effect on length of hospital stay.²⁸⁹

Another randomised trial in the UK assessed medication and information discharge summaries plus pharmaceutical counselling in hospital and at home for elderly people prescribed more than four items. Medication plans plus counselling reduced unplanned GP visits and readmissions.²⁹⁰

There is inconsistent evidence about the effects of one-to-one education sessions on hospitalisation.

One trial suggested that one-to-one sessions in hospital could reduce length of hospital stay.

One review and one additional trial suggested reduced readmissions. Two further trials found no effect.

Technology

Educational interventions can be delivered using technology such as video, computers, and the mass media. Some studies have suggested benefits from these strategies on care processes and patient experiences,^{291,292,293,294,295,296} but we found limited evidence about the effect on hospitalisations.

One randomised trial in Malta evaluated a community-based programme for people with asthma. The intervention group received verbal counselling, an educational video, an information leaflet, and monitoring with reinforcement. After one year, the intervention group had fewer unplanned admissions compared to people receiving usual care.²⁹⁷

On the other hand, a systematic review of the effects of computer-based peer-to-peer communities and electronic support groups included 38 studies. Six studies assessed peer electronic support alone, the rest included more complex interventions such as internet support groups plus educational programmes or one-to-one support from healthcare professionals. There was no evidence of either positive or harmful effects, and no evidence about the impacts on hospitalisation.²⁹⁸

There is insufficient evidence to draw conclusions about the effects of video and computer education on hospitalisation.

One trial suggested that video education could reduce unplanned admissions.

One review suggested internet support had no effect on unplanned admissions.

Self-management education

The Department of Health's strategy for improving the lives of people with long-term conditions is based on the principle that these people know as much or more about their illness and their needs as health and social care professionals.²⁹⁹

About three quarters of people with long-term conditions do not need specialist one-to-one management from health and social care professionals on an ongoing basis. Instead, they manage their conditions themselves, perhaps with annual reviews from their general practitioner.³⁰⁰

There are a range of ways that health and social services can help people manage their own conditions including providing written, verbal and online information; teaching people to manage their own care; and providing equipment to help people monitor and identify their symptoms. The Department of Health drew together examples of a range of self-management support services in England and concluded that these initiatives can make a real difference to people's physical and mental wellbeing.³⁰¹

Educational sessions to help people with long-term conditions learn about their condition and how to manage it better have gained increasing popularity in recent years. Some educational programmes provide information about long-term conditions themselves (as summarised in the preceding section). Other programmes aim to help people learn how to manage their care more effectively, including when to use different healthcare services and how to communicate with professionals. This type of education is generally known as 'self-management education.'

Self-management education can be provided either by professionals or, as is increasingly common, by service users themselves.

The *Expert Patient Programme* is based on the concept that people with long-term conditions often understand their condition as well or better than healthcare professionals. The programme involves a self-management course facilitated by lay people with long-term conditions, using a structured manual. Courses usually comprise a 2.5 hour session for 8 to 16 participants weekly for six weeks. Topics include 'breaking the symptom cycle,' diet, exercise, communication, medication, and pain management. The programme is being used extensively in England, but there is no specific data about the effect on unscheduled hospital admissions or days spent in hospital.³⁰²

The *Expert Patient Programme* is based on a course developed by Stanford University Medical School in California for people with arthritis. This programme was developed into the *Chronic Disease Self-management Course*, a generic educational programme for people with long-term conditions (rather than being specific to a particular type of condition). More than 100 studies of variations of this course have been undertaken throughout the world, primarily in the US. These studies suggest that self-management education programmes can improve how people feel about their condition^{303,304} and some clinical outcomes, particularly in arthritis,^{305,306,307,308,309,310} diabetes,^{311,312,313,314,315} heart disease,^{316,317} hypertension,³¹⁸ asthma,^{319,320,321} chronic obstructive pulmonary disease,³²² and stroke.³²³

Self-management education may also reduce hospital admissions. For instance, it has been suggested that self-management education programmes may reduce visits to health professionals by up to 80%.^{324,325} Visits to general practitioners may decrease by up to two fifths.^{326,327,328,329} Studies in the US suggest that significant cost savings can be made by using lay tutors, rather than health professionals, to deliver educational interventions.³³⁰ However, a recent review by the UK Health Development Agency / National Institute for Health and Clinical Excellence found that there is very little quantifiable evidence about the impact of lay-led courses on unplanned admissions or length of hospital stay.³³¹

But some empirical information is available. In a five-year randomised trial with more than 1000 people in the UK, the *Chronic Disease Self-management Programme* was associated with reduced days in hospital.³³²

A randomised trial in the UK assigned people with ulcerative colitis undergoing hospital follow-up to patient-centred self-management training and follow-up on request, or usual care. Self-management training was associated with faster access to treatment when needed, reduced hospital visits (0.9 versus 2.9 per person per year), and fewer GP visits (0.3 versus 0.9 per person per year).^{333,334}

Another randomised trial in 19 hospitals in North West England examined whether a 'whole systems' approach to self-management improved clinical outcomes and cost-effective use of services. Consultants were trained to provide a patient-centred approach to care and guidebooks about ulcerative colitis and Crohn's disease were developed with service users. Patients prepared written self-management plans and referred themselves to health services based on their own evaluation of their need for advice. After one year, the self-management group had fewer hospital admissions, but there was no change in the number of primary care visits.³³⁵

A randomised trial in the UK found that a brief self-management programme while in hospital for asthma reduced readmissions.³³⁶

A randomised trial in seven hospitals in Canada evaluated self-management education, specific to chronic obstructive pulmonary disease, among people with moderate to severe disease who had been hospitalised within the past year. The self-management education programme involved weekly visits by health professionals over two months, with monthly telephone follow-up. Self-management education was associated with 40% less hospital visits for chronic obstructive pulmonary disease and 57% less hospital admissions for other problems.³³⁷

A randomised trial in six US hospitals examined self-management education for older women with heart disease. Days in hospital reduced by 46% and in-patient costs were 49% lower than usual care. Hospital cost savings exceeded the cost of self-management education by 5 to 1.³³⁸

Studies in other parts of the world have similar results. An evaluation of self-management education in Hong Kong found that education programmes for asthma reduced hospitalisations and reduced the length of hospital stay by up to half.³³⁹

Similarly, a large randomised trial in China assessed self-management education for people with hypertension, heart disease, chronic lung disease, arthritis, stroke, or diabetes. The self-management initiative comprised education from a lay-led course and a copy of a self-help book. Self-management education improved participants' health behaviour, self-efficacy, and health status and reduced the number of hospitalisations six months after the course.³⁴⁰

However other evidence is contradictory. A systemic review in chronic obstructive pulmonary disease included nine trials of self-management education versus usual care. Self-management education had no effect on hospital admissions.³⁴¹

There is evidence to suggest self-management education may reduce unplanned admissions and length of hospital stay.

Seven trials found that self-management education reduced unplanned readmissions. One review found no effect.

Two trials found reduced length of hospital stay.

Self-monitoring

Closely linked to self-management education is self-monitoring, whereby people with long-term conditions monitor their symptoms in order to track their progress, modify their behaviours or medications accordingly, or assess when to seek help from health professionals. Self-monitoring is often associated with electronic monitoring devices, but this term can also refer to written management plans and referral systems to help people self-refer to health services.

Monitoring clinical indicators

Self monitoring of factors such as blood pressure and blood glucose may improve clinical indicators in people with high blood pressure, diabetes, and asthma.^{342,343,344,345,346,347,348} However we identified no high quality study that made a direct link between self-monitoring of clinical indicators and reduced unplanned hospitalisation.

One case control study in Australia found that early identification of adverse trends in clinical signs recorded electronically at home may help avoid hospital readmission and reduce the length of hospital stay in people with long-term conditions.³⁴⁹

Studies about telemonitoring, where clinical indicators are monitored and fed back to professionals by telephone or modem, were reported in a previous section of the review.

Written plans

A Cochrane review assessed the effects of asthma self-management coupled with regular health practitioner review in 36 randomised trials. They found that self-monitoring by either peak expiratory flow or symptoms coupled with regular medical review and a written action plan improved health outcomes for adults with asthma. Combining self-monitoring and written plans reduced hospitalisations.³⁵⁰

A Cochrane review of individual discharge plans for people in hospital included 11 randomised trials. Individual discharge plans had no effect on length of hospital stay or readmission rates³⁵¹

There is insufficient evidence about the effect of self-monitoring on unplanned admissions and length of hospital stay.

One review and one trial suggested that self-monitoring using electronic devices or written plans reduced hospitalisation. One review found no effect.

One review found no effect on length of hospital stay.

Patient-held records

Sometimes service users are given their medical records to keep and bring to each consultation. However, there is no evidence this reduces unscheduled admissions or length of stay in hospital.

A Cochrane review with eight trials and 1497 participants found no overall positive or negative effects from patient-held records. Computerised systems did not improve clinical outcomes.³⁵²

A US trial of patient-held records for people who had suffered stroke found that while participants were pleased to have a copy of their records, took them when they visited doctors, and reported learning more about their strokes, there was no difference in health practices or behaviours compared to usual care.³⁵³

A randomised trial in 28 general practices in the UK found that patient-held records did not improve health service use for people with long-term mental illness.³⁵⁴

There is no evidence to suggest that patient-held records reduce unplanned admissions.

We found no high quality information about the effect of patient-held records on length of stay in hospital.

SUMMARY OF TRENDS

Implications

This rapid review has identified a great deal of information about initiatives to reduce unscheduled hospital admissions and length of hospital stay in the frail elderly, people with long-term conditions, and those at high risk of hospitalisation.

However, perhaps the most striking finding is that there is no clear evidence about the interventions that work best, across many different disease types, to reduce unscheduled admissions and hospital stays.

The evidence that does exist tends to be conflicting. While some trials and reviews support the benefits of specific interventions, other studies of the exact same interventions have found less positive trends.

In general though, there is some evidence to suggest that the following initiatives may reduce unplanned hospitalisations and readmissions:

- self-management education,
- self-monitoring,
- group visits to primary care,
- broad managed care programmes,
- integrating social and health care,
- multidisciplinary teams in hospital,
- discharge planning,
- multidisciplinary teams after discharge,
- care from specialist nurses,
- nurse-led clinics,
- telecare,
- and telemonitoring.

There is some evidence that the following interventions may reduce length of stay in hospital:

- self-management education,
- telecare,
- multidisciplinary teams in hospital,
- discharge planning,
- home hospitalisation,
- and educating professionals.

And these interventions may reduce length of *subsequent* hospital stays:

- targeting people at high risk,
- self-management education,
- telemonitoring,
- multidisciplinary teams in hospital,
- multidisciplinary teams after discharge,
- nurse-led clinics and nurse-led follow-up,
- targeted assertive case management,
- and home visits.

It seems that combining many different interventions is more likely to have an impact on unplanned admissions than implementing single interventions. Good leadership and a strong culture of quality improvement also appear to be important ingredients in efforts to reduce unscheduled admissions and days in hospital.^{355,356}

The implications of the evidence for interventions currently being trialled in the Birmingham and Black Country area are outlined in Box 3.

Box 3: How does the evidence relate to work in Birmingham and Black Country?

There is evidence that the following activities may reduce unplanned admissions or length of stay in hospital:

- Self-management education (eg EPP)
- Risk stratification
- Interface between community and tertiary care
- Assertive case management, if well targeted
- Specialist teams
- Rehabilitation programmes

There is less evidence that the following activities will reduce unplanned admissions or length of stay in hospital:

- Patient group education
- Clinician education and guidelines about tests
- Care pathways
- Care management by telephone
- Surveys of service users' views

There is insufficient evidence to draw conclusions about the following initiatives currently being implemented:

- Prompt availability of scans and tests
- Recall system for diagnostic tests
- Telephone support for clinicians
- Alerting case managers to hospital admissions
- Earlier discharge in partnership with social care
- Palliative care and hospices

Summary of evidence about interventions to reduce unplanned admissions and length of stay

Effect on admissions			Effect on length of stay	
Intervention	Admissions	Readmissions	Initial length of stay	Subsequent stay
<i>Way care is organised</i>				
Managed care	1 trial found no effect	5 reviews and 2 trials found effect		1 review found effect
Targeting high risk				1 trial found effect
Shared care from GP and hospital	3 trials found no effect	3 reviews and 1 trial found no effect		1 trial found effect
Social care and health	2 studies found effect			
Community venues	1 trial found effect			
Multidisciplinary primary care teams	2 trials found no effect			
Multidisciplinary teams in hospital		4 trials found effect, 2 trials found no effect	2 reviews and 1 trial found effect, 2 trials found no effect	3 trials found effect
Primary care staff in hospital			1 review and 1 other study found effect	
Multidisciplinary teams after discharge		2 reviews and 5 trials found effect, 3 trials found no effect		3 trials found effect, 1 trial found no effect
Specialist nurses	1 trial found effect, 1 review and 1 trial found no effect	2 trials found effect		
Nurse-led clinics		1 review found effect		1 review found effect
Nurse follow-up		1 trial found effect, 1 trial found no effect		2 trials found effect
<i>Different services</i>				
Case management		2 trials found effect, 3 reviews and 7 trials found no effect, 1 trial found negative effect		1 trial found effect, 1 review and 2 trials found no effect, 1 trial found negative effect
Assertive case management	1 trial found no effect, 1 trial found negative effect	3 reviews found effect	1 trial found no effect	2 reviews and 1 trial found effect
Case management in hospital		1 trial found no effect	2 trials found no effect	
Telecare	4 trials found effect	1 trial found effect	2 trials found effect	1 trial found no effect
Substituting calls for visits	1 trial found effect	2 trials found no effect	1 trial found effect	
Telemonitoring	1 trial found no effect		2 reviews and 2 trials found effect, 1 trial found no effect	2 reviews and 2 trials found effect
Chronic care clinics		2 trials found effect	1 trial found no effect	
Specialist clinics in primary care		1 review and 1 trial found no effect		1 trial found no effect
Hospitals clinics	1 review found effect	2 trials found effect, 1 review and 1 trial found no effect	1 review found effect, 1 trial found no effect	1 trial found no effect
Discharge planning		1 review found effect	1 trial found no effect	
Home hospitalisation		1 trial found no effect	1 review found effect	
Intermediate care		5 studies found no effect		
Home visits		5 trials found effect, 2 trials found no effect		1 review and 3 trials found effect
Rehabilitation		1 trial found effect, 2 trials found no effect	2 reviews and 1 trial found effect	1 trial found effect, 1 trial found no effect
<i>Tools to facilitate care</i>				
Registries and decision support				
Care pathways			1 trial found effect, 1 review and 1 trial found no effect	
Educating professionals			2 studies found effect	
Patient-held records	1 review and 2 trials found no effect			
<i>Facilitating self-care</i>				
Involving users				
Written info for users	1 trial found no effect	2 trials found effect, 1 review and 1 trial found no effect		
Individual education		1 review and 1 trial found effect, 2 trials found no effect	1 trial found no effect	
Internet and video		1 trial found effect, 1 review found no effect		
Group education				
Self-management education		7 trials found effect, 1 review found no effect	1 trial found effect	1 trial found effect
Self monitoring	1 review found effect	1 trial found effect, 1 review found no effect	1 review found no effect	

Blank cells indicate a lack of evidence

Furthermore, the review suggests that:

Involving people with long-term conditions in their care, especially through self-management education, may have significant benefits for reducing hospital admissions. Organisations in the Birmingham and Black Country area have some focus on patient involvement through the *Expert Patients Programme*, but it may be worthwhile investigating whether broader involvement initiatives could also be implemented.

Extending the type and range of care provided by different health and social care staff roles may help to develop innovative solutions to reduce unplanned admissions. For instance, there is evidence that nurses have a central role to play in initiatives to improve care for people with long-term conditions, whether in primary or secondary care, as case managers, or as specialist nurses.

Case managers aim to co-ordinate services and to provide an interface between primary and secondary care, and between health and social services. The majority of evidence does not focus on the extent to which case managers, often nurses based in primary care, have achieved this interface. Nor is the evidence about the benefits of case management unequivocal. There is more evidence to support Assertive Case Management, such as that being implemented in the Birmingham and Black Country area, compared to more simplistic forms of case management. However, evidence about Assertive Case Management is drawn primarily from the mental health field.

The evidence supports the Birmingham and Black Country position of adopting case management as just one component of a broader disease management strategy. There is evidence that many initiatives other than case management can reduce unplanned admissions. Staff could be trained in these other initiatives as well, rather than focusing on case management alone.

There is little evidence to suggest that one type of staff or professional group is more effective at reducing unplanned admissions and length of stay compared to other staff groups. Upskilling a wide variety of staff such as nurses, health visitors, social workers, and mental health workers may be a feasible way of expanding the chronic care workforce and providing more scope to address unplanned admission rates.

It appears that broad integrated systems of care are more effective than single episodic-type approaches. However, there is insufficient evidence about the best strategies to foster collaboration between health and social services, or about staff roles that may facilitate these links. A number of joint working initiatives are currently underway, so more evaluation of the processes involved in these initiatives may be warranted.

Indeed, given the paucity of high quality evidence about what works to reduce unscheduled admissions, it is important that organisations in the Birmingham and Black Country area implement a strategy to evaluate all initiatives fully. Such evaluation should be co-ordinated and consistent, so that each organisation in the Strategic Health Authority area is using a similar conceptual and methodological framework.

Things to bear in mind

When interpreting the findings of this overview, it is important to bear in mind that this is not an exhaustive review. We did not aim to summarise every high quality study, but rather to provide a general summary of major trends relating to unplanned hospitalisations.

We identified little high quality information about the impacts of some interventions on unplanned hospitalisations and even less information on length of hospital stay. However, this does not mean that there is not evidence that certain initiatives may improve other outcomes such as emergency department visits, self-efficacy, symptoms, or overall costs of care. Information about these and other outcomes has been previously reviewed.³⁵⁷

There are also some difficulties with the indicators used. Many of the studies we included focussed on length of hospital stay in subsequent admissions, rather than assessing ways to reduce hospital stay while people were currently in hospital.

Even where good quality evidence is available about the effects of interventions on unscheduled hospitalisation and days in hospital, it is difficult to assess exactly which components of these interventions are worthwhile or how various components may interact. For example, a nurse-led home visiting programme providing feedback to patients, GPs, and hospital specialists might reduce unplanned admissions, but we cannot be sure whether it is the 'nurse-led' component of the intervention that is effective, the 'home visiting' component, the interface between primary and hospital care, or a combination of all factors. These complexities must be considered when trying to replicate or transfer interventions in different sites.

It is also true that much of the research base is drawn from countries other than the UK. While some programme components are likely to be transferable to the UK, other components may be less generalisable. It is also important to note that specific interventions may be most effective for people with particular conditions. For instance, what works well in diabetes may work less well in people with heart disease.

Bearing these caveats in mind, this review suggests that there is some evidence to support the new initiatives in the Birmingham and Black Country area, but that there is less evidence for other current initiatives (see Box 3). A lack of evidence does not mean that an initiative is not worthwhile however, just that others have not yet studied such interventions fully.

A UK analysis of hospital data suggests that, among people admitted to hospital, men; people older than 75 years; people with four or more comorbidities; those admitted through their GP; those with a primary diagnosis of heart failure, asthma, or chronic obstructive pulmonary disease; and people with higher levels of deprivation are most likely to have unscheduled admissions within the year after discharge.³⁵⁸ Therefore some targeted work with these groups might also be useful.

The review also suggests that the following interventions, not currently being implemented in the Birmingham and Black Country area, might be worth considering further:

- self-monitoring,
- group visits to primary care,
- broad managed care programmes,
- integrating social and health care further,
- multidisciplinary teams in hospital,
- enhanced discharge planning,
- multidisciplinary teams after discharge,
- care from specialist nurses,
- nurse-led clinics,
- telecare,
- telemonitoring,
- and home visits.

References

- 1 *Improving Chronic Disease Management*. London: Department of Health, 2004.
- 2 Chaix-Couturier C, Durand-Zaleski I, Jolly D, Durieux P. Effects of financial incentives on medical practice: results from a systematic review of the literature and methodological issues. *Int J Qual Health Care* 2000; 12(2): 133-42.
- 3 *Supporting People with Long-term Conditions. An NHS and Social Care Model to Support Local Innovation and Integration*. London: The Stationery Office, 2005.
- 4 Wagner EH. Chronic disease management: what will it take to improve care for chronic illness? *Eff Clin Pract* 1998; 1: 2-4.
- 5 Wagner E. Preventing decline in function: evidence from randomized trials around the world. *West J Med* 1997; 167(4): 295-8.
- 6 Bodenheimer T, Wagner EH, Grumbach K. Improving primary care for patients with chronic illness: the Chronic Care Model, Part 2. *JAMA* 2002; 288(15): 1909-14.
- 7 McAlister FA, Lawson FM, Teo KK, Armstrong PW. Randomised trials of secondary prevention programmes in coronary heart disease: systematic review. *BMJ* 2001; 323(7319): 957-62.
- 8 Philbin EF. Comprehensive multidisciplinary programs for the management of patients with congestive heart failure. *J Gen Int Med* 1999; 14(2): 130-5.
- 9 Gonseth J, Guallar-Castillon P, Banegas JR, Rodriguez-Artalejo F. The effectiveness of disease management programmes in reducing hospital re-admission in older patients with heart failure: a systematic review and meta-analysis of published reports. *Eur Heart J* 2004; 25(18): 1570-95.
- 10 Rich MW. Heart failure disease management: a critical review. *J Card Fail* 1999; 5: 64-75.
- 11 Rich MW, Beckham V, Wittenberg C et al. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *N Engl J Med* 1995; 333: 1190-5.
- 12 Rich MW, Vinson JM, Sperry JC et al. Prevention of readmission in elderly patients with congestive heart failure: results of a prospective, randomized pilot study. *J Gen Intern Med* 1993; 8(11): 585-90.
- 13 Philbin EF, Rocco TA, Lindenmuth NW, et al. The results of a randomized trial of a quality improvement intervention in the care of patients with heart failure. *Am J Med* 2000; 109(6): 443-9.
- 14 Bodenheimer T. Interventions to improve chronic illness care: evaluating their effectiveness. *Dis Manag* 2003; 6(2): 63-71.
- 15 Stanley E (ed). *Managing chronic disease What can we learn from the US experience?* London: Kings Fund, 2004.
- 16 Stuck AE, Siu AL, Whieland GD et al. Comprehensive geriatric assessment: a meta-analysis of controlled trials. *Lancet* 1993; 342: 1032-6.
- 17 Hickey ML, Cook EF, Rossi LP et al. Effect of case managers with a general medical patient population. *J Eval Clinical Practice* 2000; 6(1): 23-9.
- 18 www.hda-online.org.uk/hdt/1101/local.html
- 19 MULTIFIT Program from Cardiac Solutions (unpublished data). <http://www.ralinmed.com>
- 20 Pacala J, Boulton C, Reed R, Aliberti E. Predictive validity of the PRA instrument among older recipients of managed care. *J Am Geriatr Soc* 1997; 45(5): 614-7.
- 21 Johnston M, Pollard B. *Measuring Emotional, Disability, Handicap and Quality of Life Outcomes of Chronic Disease*. 2002.
- 22 Andreason LE, Coriat B, den Hertog F, Kaplinsky R (eds). *Europe's next step: organisational innovation, competition and employment*. Essex: Frank Cass, 1995.
- 23 Feachem RGA, Sekhri NK, White KL. Getting more for their dollar: a comparison of the NHS with California's Kaiser Permanente. *BMJ* 2002; 324: 135-43.
- 24 Ham C, York N, Sutch S, Shaw R. Hospital bed utilisation in the NHS, Kaiser Permanente, and the US Medicare programme: analysis of routine data. *BMJ* 2003; 327.
- 25 Briggs CJ, Capdegelle P, Garner P. Strategies for integrating primary health services in middle- and low-income countries: effects on performance, costs and patient outcomes. In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 26 Mitchell G, Del Mar C, Francis D. Does primary medical practitioner involvement with a specialist team improve patient outcomes: a systematic review. *Brit J Gen Pract* 2002; 52(484): 934-9.
- 27 Eastwood AJ, Sheldon TA. Organisation of asthma care: what difference does it make? A systematic review of the literature. *Qual Health Care* 1996; 5(3): 134-43.
- 28 Schraeder C, Shelton P, Sager M. The effects of a collaborative model of primary care on the mortality and hospital use of community-dwelling older adults. *J Gerontol A Biol Sci Med Sci* 2001; 56(2): 106-12.
- 29 Naji S, Cameron I, Russell I et al. Integrated care for diabetes: Clinical, psychosocial, and economic evaluation. *BMJ* 1994; 308(6938): 1208-1212.
- 30 Doughty RN, Wright SP, Pearl A, et al. Randomized, controlled trial of integrated heart failure management: The Auckland Heart Failure Management Study. *Eur Heart J* 2002; 23: 139-46.
- 31 Overhage JM, Dexter PR, Perkins SM, et al. A randomized, controlled trial of clinical information shared from another institution. *Ann Emerg Med* 2002; 39(1): 14-23.
- 32 Bernabei R, Landi F, Gambassi G et al. Randomised trial of impact of model of integrated care and case management for older people living in the community. *BMJ* 1998; 316 (7141): 1348-51.
- 33 Sommers LS, Marton KI, Barbaccia JC, Randolph J. Physician, nurse, and social worker collaboration in primary care for chronically ill seniors. *Arch Intern Med* 2000; 160(12): 1825-33.
- 34 Lasater TM, Wells BL, Carleton RA, Elder JP. The role of churches in disease prevention research studies. *Public Health Rep* 1986; 101(2): 125-31.
- 35 Lefebvre RC, Lasater TM, Assaf AR, Carleton RA. Pawtucket Heart Health Program: the process of stimulating community change. *Scand J Prim Health Care* 1988; Sup 1: 31-7.
- 36 Demark-Wahnefried W, McClelland JW, Jackson B et al. Partnering with African American churches to achieve better health: lessons learned during the Black Churches United for Better Health 5 a day project. *J Cancer Educ* 2000; 15(3): 164-7.
- 37 Wells BL, DePue JD, Buehler CJ et al. Characteristics of volunteers who deliver health education and promotion: a comparison with organization members and program participants. *Health Educ Q* 1990; 17(1): 23-35.
- 38 Nader PR, Sallis JF, Rupp J et al. San Diego family health project: reaching families through the schools. *J Sch Health* 1986; 56(6): 227-31.
- 39 Hanlon JT, Lindblad CI, Gray SL. Can clinical pharmacy services have a positive impact on drug-related problems and health outcomes in community-based older adults? *Am J Geriatr Pharmacother* 2004; 2(1): 3-13.
- 40 Yanek LR, Becker DM, Moy TF, et al. Project Joy: faith based cardiovascular health promotion for African American women. *Public Health Rep* 2001; 116 Suppl 1: 68-81.
- 41 Campbell MK, Motsinger BM, Ingram A, et al. The North Carolina Black Churches United for Better Health Project: intervention and process evaluation. *Health Educ Behav* 2000; 27(2): 241-53.
- 42 Leveille SG, Wagner EH, Davis C et al. Preventing disability and managing chronic illness in frail older adults: a randomized trial of a community-based partnership with primary care. *J Am Geriatr Soc* 1998; 46(10): 1191-8.
- 43 *Chronic disease management and self-care*. Department of Health, 2002.
- 44 Beney J, Bero LA, Bond C. Expanding the roles of outpatient pharmacists: effects on health services utilisation, costs, and patient outcomes (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 45 Gattis WA, Hasselblad V, Whellan DJ, O'Connor CM. Reduction in heart failure events by the addition of a clinical pharmacist to the heart failure management team: results of the Pharmacist in Heart Failure Assessment Recommendation and Monitoring (PHARM) Study. *Arch Intern Med* 1999; 159(16): 1939-45.
- 46 Hanlon JT, Weinberger M, Samsa GP et al. A randomized, controlled trial of a clinical pharmacist intervention to improve inappropriate prescribing in elderly outpatients with polypharmacy. *Am J Med* 1996; 100(4): 428-37.
- 47 Borenstein JE, Graber G, Saltiel E et al. Physician-pharmacist comanagement of hypertension: a randomized, comparative trial. *Pharmacotherapy* 2003; 23(2): 209-16.

- 48 Bogden PE, Abbott RD, Williamson P et al. Comparing standard care with a physician and pharmacist team approach for uncontrolled hypertension. *J Gen Int Med* 1998; 13(11): 740-5.
- 49 Taylor CT, Byrd DC, Krueger K. Improving primary care in rural Alabama with a pharmacy initiative. *Am J Health Syst Pharm* 2003; 60(11): 1123-9.
- 50 Bucci C, Jackevicius C, McFarlane K, Liu P. Pharmacist's contribution in a heart function clinic: patient perception and medication appropriateness. *Can J Cardiol* 2003; 19(4): 391-6.
- 51 Lipton HL, Bero LA, Bird JA, McPhee SJ. The impact of clinical pharmacists' consultations on physicians' geriatric drug prescribing. A randomized controlled trial. *Med Care*. 1992 Jul; 30(7):646-58.
- 52 Holland R, Lenaghan E, Harvey I et al. Does home based medication review keep older people out of hospital? The HOMER randomised controlled trial. *BMJ* 2005; 330(7486): 293.
- 53 Bouvy ML, Heerdink ER, Urquhart J et al. Effect of a pharmacist-led intervention on diuretic compliance in heart failure patients: a randomized controlled study. *J Card Fail* 2003; 9(5): 404-11.
- 54 *Clinical Evidence*. London: BMJ Publishing Group, 2004.
- 55 Opie J, Doyle C, O'Connor DW. Challenging behaviours in nursing home residents with dementia: a randomized controlled trial of multidisciplinary interventions. *Int J Geriatr Psychiatry* 2002; 17(1):6-13.
- 56 Simon GE, Von Korff M, Ludman EJ et al. Cost-effectiveness of a program to prevent depression relapse in primary care. *Med Care* 2002; 40(10): 941-50.
- 57 Katon W, Russo J, Von Korff M et al. Long-term effects of a collaborative care intervention in persistently depressed primary care patients. *J Gen Intern Med* 2002; 17(10): 741-8.
- 58 Bower P, Sibbald B. On-site mental health workers in primary care: effects on professional practice (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 59 McDonald K, Ledwidge M, Cahill J, et al. Elimination of early rehospitalization in a randomized, controlled trial of multidisciplinary care in a high-risk, elderly heart failure population: the potential contributions of specialist care, clinical stability and optimal angiotensin-converting enzyme inhibitor dose at discharge. *Eur J Heart Fail* 2001; 3(2):209-15.
- 60 Rich M W, Beckham V, Wittenberg C et al. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *NEJM* 1995; 333(18): 1190-5.
- 61 Rich MW, Vinson JM, Sperry JC, et al. Prevention of readmission in elderly patients with congestive heart failure: results of a prospective, randomized pilot study. *J Gen Intern Med* 1993; 8(11): 585-90.
- 62 Slaets JP, Kauffmann RH, Duivenvoorden HJ, et al. A randomized trial of geriatric liaison intervention in elderly medical inpatients. *Psychosom Med* 1997; 59(6): 585-91.
- 63 Koproski J, Pretto Z, Poretsky L. Effects of an intervention by a diabetes team in hospitalized patients with diabetes. *Diabetes Care* 1997; 20(10): 1553-5.
- 64 Davison J, Bond J, Dawson P et al. Patients with recurrent falls attending Accident & Emergency benefit from multifactorial intervention - a randomised controlled trial. *Age Ageing* 2005; 34(2): 162-8.
- 65 Stroke Unit Trialists' Collaboration. Collaborative systematic review of the randomised trials of organised inpatient (stroke unit) care after stroke. *BMJ* 1997; 314(7088): 1151-9.
- 66 Kalra L, Eade J. Role of stroke rehabilitation units in managing severe disability after stroke. *Stroke* 1995; 26(11): 2031-4.
- 67 Zwarenstein M, Bryant W. Interventions to promote collaboration between nurses and doctors (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 68 Goodacre S, Mason S, Kersh R et al. Can additional experienced staff reduce emergency medical admissions? *Emerg Med J* 2004; 21(1): 51-3.
- 69 McMullin ST, Hennenfent JA, Ritchie DJ et al. A prospective, randomized trial to assess the cost impact of pharmacist-initiated interventions. *Arch Intern Med* 1999; 159(19): 2306-9.
- 70 Diamond HS, Goldberg D, Janosky JE. The effect of full-time faculty hospitalists on the efficiency of care at a community teaching hospital. *Ann Int Med* 1998; 129(3): 197-203.
- 71 Pronovost PJ, Angus DC, Dorman T et al. Physician staffing patterns and clinical outcomes in critically ill patients. *JAMA* 2002; 288(17): 2151-62.
- 72 McAlister FA, Lawson FME, Teo KK et al. A systematic review of randomized trials of disease management programs in heart failure. *Am J Med* 2001; 110: 378-84.
- 73 Ahmed A. Quality and outcomes of heart failure care in older adults: role of multidisciplinary disease-management programs. *J Am Geriatr Soc* 2002; 50(9): 1590-3.
- 74 Capomolla S, Febo O, Ceresa M et al. Cost/utility ratio in chronic heart failure: comparison between heart failure management program delivered by day-hospital and usual care. *J Am Coll Cardiol* 2002; 40: 1259-66.
- 75 Rauh RA, Schwabauer NJ, Enger EL, Moran JF. A community hospital-based congestive heart failure program: impact on length of stay, admission and readmission rates, and cost. *Am J Managed Care* 1999; 5 (1): 37-43.
- 76 Doughty RN, Wright SP, Pearl A et al. Randomized, controlled trial of integrated heart failure management: The Auckland Heart Failure Management Study. *Eur Heart J* 2002; 23(2): 139-46.
- 77 McDonald K, Ledwidge M, Cahill J, et al. Heart failure management: multidisciplinary care has intrinsic benefit above the optimization of medical care. *J Card Fail* 2002; 8: 142-8.
- 78 Ledwidge M, Barry M, Cahill J, et al. Is multidisciplinary care of heart failure cost-beneficial when combined with optimal medical care? *Eur J Heart Fail* 2003; 5(3): 381-9.
- 79 Riegel B, Carlson B, Glaser D, Hoagland P. Which patients with heart failure respond best to multidisciplinary disease management? *J Cardiac Failure* 2000; 6(4): 290-9.
- 80 Kasper EK, Gerstenblith G, Hefter G et al. A randomized trial of the efficacy of multidisciplinary care in heart failure outpatients at high risk of hospital readmission. *J Am Coll Cardiol* 2002; 39(3): 471-80.
- 81 Daly BJ, Douglas SL, Kelley CG et al. Trial of a disease management program to reduce hospital readmissions of the chronically critically ill. *Chest* 2005; 128(2): 507-17.
- 82 Rea H, McAuley S, Stewart A et al. A chronic disease management programme can reduce days in hospital for patients with chronic obstructive pulmonary disease. *Intern Med J* 2004; 34(11): 608-14.
- 83 Williams ME, Williams TF, Zimmer JG, et al. How does the team approach to outpatient geriatric evaluation compare with traditional care: a report of a randomized controlled trial. *J Am Geriatr Soc* 1987; 35(12): 1071-8.
- 84 Caplan GA, Williams AJ, Daly B, Abraham K. A randomized, controlled trial of comprehensive geriatric assessment and multidisciplinary intervention after discharge of elderly from the emergency department - the DEED II study. *J Am Geriatr Soc* 2004; 52(9): 1417-23.
- 85 Harris LE, Luft FC, Rudy DW, et al. Effects of multidisciplinary case management in patients with chronic renal insufficiency. *Am J Med* 1998; 105(6): 464-71.
- 86 Fletcher AE, Price GM, Ng ES, et al. Population-based multidimensional assessment of older people in UK general practice: a cluster-randomised factorial trial. *Lancet* 2004; 364(9446): 1667-77.
- 87 Loveman E, Royle P, Waugh N. Specialist nurses in diabetes mellitus (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 88 Tijhuis GJ, Zwiderman AH, Hazes JM, et al. Two-year follow-up of a randomized controlled trial of a clinical nurse specialist intervention, inpatient, and day patient team care in rheumatoid arthritis. *J Adv Nurs* 2003; 41(1): 34-43.
- 89 Griffiths C, Foster G, Barnes N, et al. Specialist nurse intervention to reduce unscheduled asthma care in a deprived multiethnic area: the east London randomised controlled trial for high risk asthma (ELECTRA). *BMJ* 2004; 328(7432): 144.
- 90 Blue L, Lang E, McMurray JJ et al. Randomised controlled trial of specialist nurse intervention in heart failure. *BMJ* 2001; 323(7315): 715-8.
- 91 Vrijhoef HJ, Diederiks JP, Spreeuwenberg C. Effects on quality of care for patients with NIDDM or COPD when the specialised nurse has a central role: a literature review. *Patient Educ Couns* 2000; 41: 243-50.
- 92 Vrijhoef HJ, Diederiks JP, Spreeuwenberg C. Effects on quality of care for patients with NIDDM or COPD when the specialised nurse has a central role: a literature review. *Patient Educ Couns* 2000; 41: 243-50.

- 93 Salisbury C, Francis C, Rogers C, et al. A randomised controlled trial of clinics in secondary schools for adolescents with asthma. *Br J Gen Pract* 2002; 52(485): 988-96.
- 94 Murchie P, Campbell NC, Ritchie LD, et al. Secondary prevention clinics for coronary heart disease: four year follow up of a randomised controlled trial in primary care. *BMJ* 2003; 326(7380): 84.
- 95 Vrijhoef HJ, Diederiks JP, Wesseling GJ et al. Undiagnosed patients and patients at risk for COPD in primary health care: early detection with the support of non-physicians. *J Clin Nurs* 2003; 12: 366-73.
- 96 Stromberg A, Martensson J, Fridlund B, Levin LA, Karlsson JE, Dahlstrom U. Nurse-led heart failure clinics improve survival and self-care behaviour in patients with heart failure. Results from a prospective, randomised trial. *Eur Heart J* 2003; 24: 1014-23.
- 97 Vrijhoef HJ, Diederiks JP, Spreeuwenberg C, Wolffenbuttel BH. Substitution model with central role for nurse specialist in the care for stable type 2 diabetic outpatients. *J Adv Nurs* 2001; 36: 546-55.
- 98 New JP, Mason JM, Freemantle N, et al. Specialist nurse-led intervention to treat and control hypertension and hyperlipidemia in diabetes (SPLINT): a randomized controlled trial. *Diabetes Care* 2003; 26(8): 2250-5.
- 99 Connor CA, Wright CC, Fegan CD. The safety and effectiveness of a nurse-led anticoagulant service. *J Adv Nurs* 2002; 38: 407-15.
- 100 Gustafsson F, Arnold JM. Heart failure clinics and outpatient management: review of the evidence and call for quality assurance. *Eur Heart J* 2004; 25(18): 1596-604.
- 101 Naylor MD, Brooten D, Campbell R et al. Comprehensive discharge planning and home follow-up of hospitalized elders: a randomized clinical trial. *JAMA* 1999; 281(7): 613-20.
- 102 Tsuyuki RT, Fradette M, Johnson JA et al. A multicenter disease management program for hospitalized patients with heart failure. *J Card Fail* 2004; 10(6): 473-80.
- 103 Mejhert M, Kahan T, Persson H, Edner M. Limited long-term effects of a management programme for heart failure. *Heart* 2004; 90(9): 1010-5.
- 104 Health Services Utilization and Research Committee. *Reducing non-urgent use of the emergency department: a review of strategies and guide for future research*. Canadian Health Services Utilization and Research Committee, 1997.
- 105 Norris SL, Nichols PJ, Caspersen CJ, et al. The effectiveness of disease and case management for people with diabetes. A systematic review. *Am J Prev Med* 2002; 22(4 Suppl): 15-38.
- 106 Technology Assessment Unit, US Department of Veterans Affairs. *Impact of case management programs*. Boston: US Department of Veterans Affairs, 2000.
- 107 Ferguson JA, Weinberger M. Case management programs in primary care. *J Gen Int Med* 1998; 13(2): 123-6.
- 108 Hutt R, Rosen R, McCauley J. Case managing long-term conditions. What impact does it have in the treatment of older people? London: Kings Fund, 2004.
- 109 Wadhwa S, Lavizzo-Mourey R. Do innovative models of health care delivery improve quality of care for selected vulnerable populations: a systematic review. *Joint Commission J Quality Imp* 1999; 25(8): 408-21.
- 110 Egan E, Clavarino A, Burrridge L et al. A randomized control trial of nursing-based case management for patients with chronic obstructive pulmonary disease. *Lippincott's Case Management* 2002; 7(5): 170-9.
- 111 Egan E, Clavarino A, Burrridge L, et al. A randomized control trial of nursing-based case management for patients with chronic obstructive pulmonary disease. *Lippincott's Case Manag* 2002; 7(5): 170-9.
- 112 Lim WK, Lambert SF, Gray LC. Effectiveness of case management and post-acute services in older people after hospital discharge. *Med J Aust* 2003; 178(6): 262-6.
- 113 Laramée AS, Levinsky SK, Sargent J et al. Case management in a heterogeneous congestive heart failure population: a randomized controlled trial. *Arc Int Med* 2003; 163(7): 809-17.
- 114 Boulton C, Rassen J, Rassen A et al. The effect of case management on the costs of health care for enrollees in Medicare Plus Choice plans: a randomized trial. *J Am Geriatrics Soc* 2000; 48(8): 996-1001.
- 115 Newcomer R, Maravilla V, Faculjak P, Graves MT. Outcomes of preventive case management among high-risk elderly in three medical groups: a randomized clinical trial. *Eval Health Prof* 2004; 27(4): 323-48.
- 116 Gagnon AJ, Schein C, McVey L, Bergman H. Randomized controlled trial of nurse case management of frail older people. *J Am Geriatrics Soc* 1999; 47(9): 1118-24.
- 117 Weinberger M, Oddone EZ, Henderson WG. Does increased access to primary care reduce hospital readmissions? Veterans Affairs Cooperative Study Group on Primary Care and Hospital Readmission. *N Engl J Med* 1996; 334(22): 1441-7.
- 118 Greineder DK, Loane KC, Parks P. A randomized controlled trial of a pediatric asthma outreach program. *J Allergy Clin Immunology* 1999; 103(3): 436-40.
- 119 Boyd ML, Fisher B, Davidson AW, Neilsen CA. Community-based case management for chronically ill older adults. *Nursing Manag* 1996; 27(11): 31-2.
- 120 Hendriksen C, Stromgard E, Sorensen KH. Cooperation concerning admission to and discharge of elderly people from the hospital. 1. The coordinated contributions of home care personnel. [Article in Danish] *Ugeskr Laeger* 1989; 151(24): 1531-4.
- 121 Einstadter D, Cebul RD, Franta PR. Effect of a nurse case manager on postdischarge follow-up. *J Gen Intern Med* 1996; 11(11): 684-8.
- 122 Rudy EB, Daly BJ, Douglas S et al. Patient outcomes for the chronically critically ill: special care unit versus intensive care unit. *Nurs Res* 1995; 44(6): 324-31.
- 123 Phillips SD, Burns BJ, Edgar ER et al. Moving assertive community treatment into standard practice. *Psychiatric Services* 2001; 52(6): 771-9.
- 124 Marshall M, Gray A, Lockwood A, Green R. Case management for people with severe mental disorders (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 125 Holloway F, Oliver N, Collins E, Carson J. Case management: a critical review of the outcome literature. *Euro Psychiatry* 1995; 10(3): 113-28.
- 126 Ziguras SJ, Stuart GW. A meta-analysis of the effectiveness of mental health case management over 20 years. *Psychiatr Serv* 2000; 51(11): 1410-21.
- 127 Latimer EA. Economic impacts of assertive community treatment: a review of the literature. *Can J Psychiatry* 1999; 44(5): 443-54.
- 128 Dekker J, Wijdenes W, Koning YA et al. Assertive community treatment in Amsterdam. *Community Ment Health J* 2002; 38(5): 425-34.
- 129 Tyrer P, Simmonds S. Treatment models for those with severe mental illness and comorbid personality disorder. *Br J Psychiatry Suppl* 2003; 44: S15-8.
- 130 Harrison-Read P, Lucas B, Tyrer P et al. Heavy users of acute psychiatric beds: randomized controlled trial of enhanced community management in an outer London borough. *Psychol Med* 2002; 32(3): 403-16.
- 131 Drake RE, McHugo GJ, Clark RE et al. Assertive community treatment for patients with co-occurring severe mental illness and substance use disorder: a clinical trial. *Am J Orthopsychiatry* 1998; 68(2): 201-15.
- 132 Kokubu F, Nakajima S, Ito K et al. Hospitalization reduction by an asthma tele-medicine system. *Alerugi* 2000; 49(1): 19-31.
- 133 Kokubu F, Suzuki H, Sano Y et al. Tele-medicine system for high-risk asthmatic patients. *Alerugi* 1999; 48(7): 700-12.
- 134 GESICA Investigators. Randomised trial of telephone intervention in chronic heart failure: DIAL trial. *BMJ* 2005; 331(7514): 425.
- 135 Riegel B, Carlson B, Kopp Z et al. Effect of a standardized nurse case-management telephone intervention on resource use in patients with chronic heart failure. *Arch Int Med* 2002; 162(6): 705-12.
- 136 Krumholz HM, Amatruda J, Smith GL. Randomized trial of an education and support intervention to prevent readmission of patients with heart failure. *J Am Coll Cardio* 2002; 39(1): 83-9.
- 137 Dunagan WC, Littenberg B, Ewald GA et al. Randomized trial of a nurse-administered, telephone-based disease management program for patients with heart failure. *J Card Fail* 2005; 11(5): 358-65.
- 138 Jerant AF, Azari R, Nesbitt TS. Reducing the cost of frequent hospital admissions for congestive heart failure: a randomized trial of a home telecare intervention. *Med Care* 2001; 39(11): 1234-45.

- 139 Jerant AF, Azari R, Martinez C, Nesbitt TS. A randomized trial of telenursing to reduce hospitalization for heart failure: patient-centered outcomes and nursing indicators. *Home Health Care Serv Q* 2003; 22(1): 1-20.
- 140 DeBusk RF, Miller NH, Parker KM, et al. Care management for low-risk patients with heart failure: a randomized, controlled trial. *Ann Intern Med* 2004; 141(8): 606-13.
- 141 Fitzgerald JF, Smith DM, Martin DK et al. A case manager intervention to reduce readmissions. *Arch Int Med* 1994; 154(15): 1721-9.
- 142 Wasson J, Gaudette C, Whaley F. Telephone care as a substitute for routine clinic follow-up. *JAMA* 1992; 267: 1788-93.
- 143 Lattimer V, George S, Thompson F et al. Safety and effectiveness of nurse telephone consultation in out of hours primary care: randomised controlled trial. The South Wiltshire Out of Hours Project (SWOOP) Group. *BMJ* 1998; 317(7165): 1054-9.
- 144 Lattimer V, Sassi F, George S et al. Cost analysis of nurse telephone consultation in out of hours primary care: evidence from a randomised controlled trial. *BMJ* 2000; 320(7241): 1053-7.
- 145 Meystre S. The current state of telemonitoring: a comment on the literature. *Telemed J E Health* 2005; 11(1): 63-9.
- 146 Louis AA, Turner T, Gretton M et al. A systematic review of telemonitoring for the management of heart failure. *Eur J Heart Fail* 2003; 5(5): 583-90.
- 147 Benatar D, Bondmass M, Ghitelman J et al. Outcomes of chronic heart failure. *Arch Intern Med* 2003; 163: 347-52.
- 148 Cleland JG, Louis AA, Rigby AS et al. Noninvasive home telemonitoring for patients with heart failure at high risk of recurrent admission and death: the Trans-European Network-Home-Care Management System (TEN-HMS) study. *J Am Coll Cardiol* 2005; 45(10): 1654-64.
- 149 Scalvini S, Capomolla S, Zanelli E et al. Effect of home-based telecardiology on chronic heart failure: costs and outcomes. *J Telemed Telecare* 2005; 11 Suppl 1: 16-8.
- 150 Coleman EA, Grothaus LC, Sandhu N, Wagner EH. Chronic care clinics: a randomized controlled trial of a new model of primary care for frail older adults. *J Am Geriatr Soc* 1999; 47(7): 775-83.
- 151 Wagner EH, Grothaus LC, Sandhu N et al. Chronic care clinics for diabetes in primary care: a system-wide randomized trial. *Diabetes Care* 2001; 24: 695-700.
- 152 Coleman EA, Eilertsen TB, Kramer AM et al. Reducing emergency visits in older adults with chronic illness. A randomized, controlled trial of group visits. *Eff Clin Pract* 2001; 4(2): 49-57.
- 153 Beck A, Scott J, Williams P et al. A randomized trial of group outpatient visits for chronically ill older HMO members: the cooperative health care clinic. *J Am Geriatr Soc* 1997; 45(5): 543-9.
- 154 Scott JC, Conner DA, Venohr I, et al. Effectiveness of a group outpatient visit model for chronically ill older health maintenance organization members: a 2-year randomized trial of the cooperative health care clinic. *J Am Geriatr Soc* 2004; 52(9): 1463-70.
- 155 Gruen RL, Weeramanthri TS, Knight SE, Bailie RS. Specialist outreach clinics in primary care and rural hospital settings. (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 156 Ram FSF, Jones A, Fay JK. Primary care based clinics for asthma (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 157 Williams JG, Cheung WY, Russell IT et al. Open access follow up for inflammatory bowel disease: pragmatic randomised trial and cost effectiveness study. *BMJ* 2000; 320: 544-8.
- 158 Cooke MW, Higgins J, Kidd P. Use of emergency observation and assessment wards: a systematic literature review. *Emerg Med J* 2003; 20(2): 138-42.
- 159 Scott I. Optimising care of the hospitalised elderly: a literature review and suggestions for future research. *Aust NZ J Med* 1999; 29(2): 254-64.
- 160 Applegate WB, Miller ST, Graney MJ et al. A randomized, controlled trial of a geriatric assessment unit in a community rehabilitation hospital. *N Engl J Med* 1990; 322(22): 1572-8.
- 161 Diem SJ, Prochazka AV, Meyer TJ, Fryer GE. Effects of a postdischarge clinic on housestaff satisfaction and utilization of hospital services. *J Gen Intern Med* 1996; 11(3): 179-81.
- 162 Atienza F, Anguita M, Martinez-Alzamora N, et al. Multicenter randomized trial of a comprehensive hospital discharge and outpatient heart failure management program. *Eur J Heart Fail* 2004; 6(5): 643-52.
- 163 Mayo PH, Richman J, Harris HW. Results of a program to reduce admissions for adult asthma. *Ann Intern Med* 1990; 112(11): 864-71.
- 164 Phillips CO, Wright SM, Kern DE et al. Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure: a meta-analysis. *JAMA* 2004; 291(11): 1358-67.
- 165 Moher D, Weinberg A, Hanlon R, Runnalls K. Effects of a medical team coordinator on length of hospital stay. *CMAJ* 1992; 146(4): 511-5.
- 166 Shepperd S, Iliffe S. Hospital at home versus in-patient hospital care. *Cochrane Database Syst Rev* 2001; (3): CD000356.
- 167 Hernandez C, Casas A, Escarrabill J et al. Home hospitalisation of exacerbated chronic obstructive pulmonary disease patients. *Euro Respiratory J* 2003; 21(1): 58-67.
- 168 Harrison MB, Browne GB, Roberts J et al. Quality of life of individuals with heart failure: a randomized trial of the effectiveness of two models of hospital-to-home transition. *Medical Care* 2002; 40(4): 271-82.
- 169 Young JB, Robinson M, Chell S et al. A whole system study of intermediate care services for older people. *Age Ageing* 2005; 34(6): 577-83.
- 170 Brand CA, Jones CT, Lowe AJ et al. A transitional care service for elderly chronic disease patients at risk of readmission. *Aust Health Rev* 2004; 28(3): 275-84.
- 171 Walker L, Jamrozik K. Effectiveness of screening for risk of medical emergencies in the elderly. *Age Ageing* 2005; 34(3): 238-42.
- 172 Mion LC, Palmer RM, Meldon SW et al. Case finding and referral model for emergency department elders: a randomized clinical trial. *Ann Emerg Med* 2003; 41(1): 57-68.
- 173 Stuck AE, Egger M, Hammer A et al. Home visits to prevent nursing home admission and functional decline in elderly people: systematic review and meta-regression analysis. *JAMA* 2002; 287: 1022-8.
- 174 Ciliska D, Hayward S, Thomas H et al. *The effectiveness of home visiting as a delivery strategy for public health nursing interventions: a systematic overview*. Canada: McMaster University and University of Toronto, 1994.
- 175 Hughes SL, Ulasevich A, Weaver FM et al. Impact of home care on hospital days: a meta analysis. *Health Services Res* 1997; 32(4): 415-32.
- 176 Townsend J, Piper M, Frank AO et al. Reduction in hospital readmission stay of elderly patients by a community based hospital discharge scheme: a randomised controlled trial. *BMJ* 1988; 297: 544-8.
- 177 Williams H, Blue B, Langlois PF. Do follow-up home visits by military nurses of chronically ill medical patients reduce readmissions? *Mil Med* 1994; 159(2): 141-4.
- 178 Naylor MD, Brooten D, Campbell R et al. Comprehensive discharge planning and home follow-up of hospitalized elders: a randomized clinical trial. *JAMA* 1999; 281(7): 613-20.
- 179 Young W, Rewa G, Goodman SG et al. Evaluation of a community-based inner-city disease management program for postmyocardial infarction patients: a randomized controlled trial. *CMAJ* 2003; 169(9): 905-10.
- 180 Sinclair AJ, Conroy SP, Davies M, Bayer AJ. Post-discharge home-based support for older cardiac patients: a randomised controlled trial. *Age Ageing* 2005; 34(4): 338-43.
- 181 Hansen FR, Spedtsberg K, Schroll M. Follow-up home visits to elderly patients after hospitalization. A randomized controlled study. *Ugeskr Laeger* 1994; 156(22): 3305-7, 3310-1.
- 182 Hermiz O, Comino E, Marks G, et al. Randomised controlled trial of home based care of patients with chronic obstructive pulmonary disease. *BMJ* 2002; 325(7370): 938.
- 183 Smith BJ, Appleton SL, Bennett PW, et al. The effect of a respiratory home nurse intervention in patients with chronic obstructive pulmonary disease (COPD). *Aust NZ J Med* 1999; 29(5): 718-25.
- 184 Yohannes AM, Connolly MJ. Early mobilization with walking aids following hospital admission with acute exacerbation of chronic obstructive pulmonary disease. *Clin Rehabil* 2003; 17(5): 465-71.

- 185 Langhorne P, Taylor G, Murray G et al. Early supported discharge services for stroke patients: a meta-analysis of individual patients' data. *Lancet* 2005; 365(9458): 501-6.
- 186 Early Supported Discharge Trialists. Services for reducing duration of hospital care for acute stroke patients. *Cochrane Database Syst Rev* 2005; (2): CD000443.
- 187 Anderson C, Ni Mhurchu C, Brown PM, Carter K. Stroke rehabilitation services to accelerate hospital discharge and provide home-based care: an overview and cost analysis. *Pharmacoeconomics* 2002; 20(8): 537-52.
- 188 Anderson C, Rubenach S, Mhurchu CN et al. Home or hospital for stroke rehabilitation? results of a randomized controlled trial: health outcomes at 6 months. *Stroke* 2000; 31(5): 1024-31.
- 189 Applegate WB, Miller ST, Graney MJ et al. A randomized, controlled trial of a geriatric assessment unit in a community rehabilitation hospital. *N Engl J Med* 1990; 322(22): 1572-8.
- 190 Engelhardt JB, Toseland RW, O'Donnell JC et al. The effectiveness and efficiency of outpatient geriatric evaluation and management. *J Am Geriatr Soc* 1996; 44(7): 847-56.
- 191 Hogan DB, MacDonald FA, Betts J et al. A randomized controlled trial of a community-based consultation service to prevent falls. *CMAJ* 2001; 165(5): 537-43.
- 192 Ward D, Severs M, Dean T, Brooks N. Care home versus hospital and own home environments for rehabilitation of older people (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 193 Mottram P, Pitkala K, Lees C. Institutional versus at-home long-termcare for functionally dependent older people (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 194 Fleming SA, Blake H, Gladman JR et al. A randomised controlled trial of a care home rehabilitation service to reduce long-term institutionalisation for elderly people. *Age Ageing* 2004; 33(4): 384-90.
- 195 Bonomi AE, Wagner EH, Glasgow R, VonKorff M. Assessment of Chronic Illness Care: A practical tool for quality improvement. *Health Services Res* 2002; 37(3): 791-820.
- 196 www.natpact.nhs.uk/uploads/cdm_matrix_selfassessment
- 197 Renders CM, Valk GD, Griffin S et al. Interventions to improve the management of diabetes mellitus in primary care, outpatient and community settings (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 198 Sadur CN et al. Diabetes management in a health maintenance organization: efficacy of care management using cluster visits. *Diabetes Care* 1999; 22(12): 2011-7.
- 199 Gohdes D, Rith-Najarian S, Acot K, Shields R. Improving diabetes care in the primary health setting: The Indian Health Service experience. *Ann Intern Med*. 1996; 124 (1 Pt 2): 149-52.
- 200 Stroebel RJ, Scheitel SM, Fitz JS et al. A randomized trial of three diabetes registry implementation strategies in a community internal medicine practice. *Jt Comm J Qual Imp* 2002; 28(8): 441-50.
- 201 Meigs JB, Cagliero E, Dubey A, et al. A controlled trial of web-based diabetes disease management: the MGH diabetes primary care improvement project. *Diabetes Care* 2003; 26(3): 750-7.
- 202 Tamblyn R, Huang A, Perreault R, et al. The medical office of the 21st century: effectiveness of computerized decision-making support in reducing inappropriate prescribing in primary care. *CMAJ* 2003; 169(6): 549-56.
- 203 Monane M, Matthias D, Nagle B, Kelly M. Improving prescribing patterns for the elderly through an online drug utilization review intervention: a system linking the physician, pharmacist and computer. *JAMA* 1998; 280(14): 1249-52.
- 204 Feifer C, Ornstein SM, Nietert PJ, Jenkins RG. System supports for chronic illness care and their relationship to clinical outcomes. *Top Health Inf Manage* 2001; 22(2): 65-72.
- 205 McCowan C, Neville RG, Ricketts IW, et al. Lessons from a randomized controlled trial designed to evaluate computer decision support software to improve the management of asthma. *Med Inform Internet Med* 2001; 26(3): 191-201.
- 206 Eccles M, McColl E, Steen N et al. Effect of computerised evidence based guidelines on management of asthma and angina in adults in primary care: cluster randomised controlled trial. *BMJ* 2002; 325(7370): 941.
- 207 Subramanian U, Fihn SD, Weinberger M, et al. A controlled trial of including symptom data in computer-based care suggestions for managing patients with chronic heart failure. *Am J Med* 2004; 116(6):375-84.
- 208 Kwan J, Sandercock P. In-hospital care pathways for stroke (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 209 Sulch D, Perez I, Melbourn A, Kalra L. Randomized controlled trial of integrated (managed) care pathway for stroke rehabilitation. *Stroke* 2000; 31(8): 1929-34.
- 210 Sulch D, Evans A, Melbourn A, Kalra L. Does an integrated care pathway improve processes of care in stroke rehabilitation? A randomized controlled trial. *Age Ageing* 2002; 31(3): 175-9.
- 211 Rea H, McAuley S, Stewart A et al. A chronic disease management programme can reduce days in hospital for patients with chronic obstructive pulmonary disease. *Intern Med J* 2004; 34(11): 608-14.
- 212 NHS Centre for Reviews and Dissemination. *Effective health care: getting evidence into practice*. London, UK: Royal Society of Medicine Press, 1999: 1-16.
- 213 Oxman AD, Thomson MA, Davis DA, Haynes RB. No magic bullets: a systematic review of 102 trials of interventions to improve professional practice. *CMAJ* 1995; 153: 1423-31.
- 214 Bero LA, Grilli R, Grimshaw JM et al. Closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. *The Cochrane Effective Practice and Organization of Care Review Group. BMJ* 1998; 317: 465-8.
- 215 Davis D, O'Brien MA, Freemantle N et al. Impact of formal continuing medical education: do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *JAMA* 1999; 282(9): 867-74.
- 216 Robertson MK, Umble KE, Cervero RM. Impact studies in continuing education for health professions: update. *J Contin Educ Health Prof* 2003; 23(3): 146-56.
- 217 Lewin SA, Skea ZC, Entwistle V et al. Interventions for providers to promote a patient-centred approach in clinical consultations (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 218 Davis DA, Thomson MA, Oxman AD, Haynes RB. Evidence for the effectiveness of CME. A review of 50 randomized controlled trials. *JAMA* 1992; 268: 1111-7.
- 219 Waddell DL. The effects of continuing education on nursing practice: a meta-analysis. *J Contin Educ Nurs* 1991; 22(3): 113-8.
- 220 Weingarten SR, Henning JM, Badamgarav E et al. Interventions used in disease management programmes for patients with chronic illness - which ones work? Meta-analysis of published reports. *BMJ* 2002; 325 (7370): 925-32.
- 221 Rossiter LF, Whitehurst-Cook MY, Small RE et al. The impact of disease management on outcomes and cost of care: a study of low-income asthma patients. *Inquiry* 2000; 37(2): 188-202.
- 222 Manheim LM, Feinglass J, Hughes R et al. Training house officers to be cost conscious. Effects of an educational intervention on charges and length of stay. *Med Care* 1990; 28(1): 29-42.
- 223 Thomson O'Brien MA, Oxman AD, Davis DA et al. Educational outreach visits: effects on professional practice and health care outcomes (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 224 Ilett KF, Johnson S, Greenhill G et al. Modification of general practitioner prescribing of antibiotics by use of a therapeutics adviser (academic detailer). *Brit J Clin Pharmacol* 2000; 49(2): 168-73.
- 225 Lobo CM, Frijling BD, Hulscher ME, et al. Effect of a comprehensive intervention program targeting general practice staff on quality of life in patients at high cardiovascular risk: a randomized controlled trial. *Qual Life Res* 2004; 13(1): 73-80.
- 226 Munro N, Felton A, McIntosh C. Is multidisciplinary learning effective among those caring for people with diabetes? *Diabet Med* 2002; 19(10): 799-803.
- 227 Davis DA, Thomson MA, Oxman AD, Haynes RB. Changing physician performance. A systematic review of the effect of continuing medical education strategies. *JAMA* 1995; 274(9): 700-5.

- 228 Hulscher MEJL, Wensing M, van der Weijden T, Grol R. Interventions to implement prevention in primary care (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 229 Balas EA, Krishna S, Kretschmer RA, et al. Computerized knowledge management in diabetes care. *Med Care* 2004; 42(6): 610-21.
- 230 Balas EA, Weingarten S, Garb CT, et al. Improving preventive care by prompting physicians. *Arch Intern Med* 2000; 160(3): 301-8.
- 231 Johnston ME, Langton KB, Haynes RB, Mathieu A. Effects of computer-based clinical decision support systems on clinician performance and patient outcome. A critical appraisal of research. *Ann Intern Med* 1994; 120(2): 135-42.
- 232 Jamtvedt G, Young JM, Kristoffersen DT et al. Audit and feedback: effects on professional practice and health care outcomes (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 233 Johnston G, Crombie IK, Davies HT et al. Reviewing audit: barriers and facilitating factors for effective clinical audit. *Qual Health Care* 2000; 9(1): 23-36.
- 234 Mugford M, Banfield P, O'Hanlon M. Effects of feedback of information on clinical practice: a review. *BMJ* 1991; 303: 398-402.
- 235 ACC/AHA Guidelines for the Evaluation and Management of Chronic Heart Failure in the Adult. www.acc.org/clinical/guidelines/failure/hf_index.htm
- 236 Weingarten S, Riedinger M, Conner L et al. Reducing lengths of stay in the coronary care unit with a practice guideline for patients with congestive heart failure: insights from a controlled clinical trial. *Med Care* 1994; 32: 1232-43.
- 237 Ansari M, Shlipak MG, Heidenreich PA et al. Improving guideline adherence: a randomized trial evaluating strategies to increase beta-blocker use in heart failure. *Circulation* 2003; 107(22): 2799-804.
- 238 Feldman PH, Peng TR, Murtaugh CM, et al. A randomized intervention to improve heart failure outcomes in community-based home health care. *Home Health Care Serv Q* 2004; 23(1): 1-23.
- 239 Hetlevik I, Holmen J, Kruger O, et al. Implementing clinical guidelines in the treatment of hypertension in general practice. *Blood Press* 1998; 7(5-6): 270-6.
- 240 Hetlevik I, Holmen J, Kruger O. Implementing clinical guidelines in the treatment of hypertension in general practice. Evaluation of patient outcome related to implementation of a computer-based clinical decision support system. *Scand J Prim Health Care* 1999; 17(1): 35-40.
- 241 Hetlevik I, Holmen J, Kruger O, et al. Implementing clinical guidelines in the treatment of diabetes mellitus in general practice. Evaluation of effort, process, and patient outcome related to implementation of a computer-based decision support system. *Int J Technol Assess Health Care* 2000; 16(1): 210-27.
- 242 Giloth BE. Promoting patient involvement: educational, organizational, and environmental strategies. *Patient Educ Couns* 1990; 15(1): 29-38.
- 243 Simpson EL, House AO. Involving users in the delivery and evaluation of mental health services: a systematic review. *BMJ* 2002; 325: 1265-8.
- 244 Laffel LM, Vangsness L, Connell A et al. Impact of ambulatory, family-focused teamwork intervention on glycemic control in youth with type 1 diabetes. *J Pediatrics* 2003; 142(4): 409-16.
- 245 Seltzer MM, Litchfield LC, Kapust LR, Mayer JB. Professional and family collaboration in case management: a hospital-based replication of a community-based study. *Social Work in Health Care* 1992; 17(1): 1-22.
- 246 Ross SE, Moore LA, Earnest MA, et al. Providing a web-based online medical record with electronic communication capabilities to patients with congestive heart failure: randomized trial. *J Med Internet Res* 2004; 6(2): e12.
- 247 Anderson RM, Funnell MM, Butler PM et al. Patient empowerment. Results of a randomized controlled trial. *Diabetes Care*. 1995; 18: 943-49.
- 248 Fleissig A, Glasser B, Lloyd M. Encouraging out-patients to make the most of their first hospital appointment: to what extent can a written prompt help patients get the information they want? *Patient Educ Couns* 1999; 38(1): 69-79.
- 249 Kennedy AP, Rogers AE. Improving patient involvement in chronic disease management: the views of patients, GPs and specialists on a guidebook for ulcerative colitis. *Patient Educ Couns* 2002; 47(3): 257-63.
- 250 Tobacman JK, Kissinger P, Wells M, et al. Implementation of personal health records by case managers in a VAMC general medicine clinic. *Patient Educ Couns* 2004; 54(1): 27-33.
- 251 Cohen D, Longo MF, Hood K, et al. Resource effects of training general practitioners in risk communication skills and shared decision making competences. *J Eval Clin Pract* 2004; 10(3): 439-45.
- 252 Rotherth ML, O'Connor AM. Health decisions and decision support for women. *Annu Rev Nurs Res* 2001; 19: 307-24.
- 253 Hibbard JH, Peters E. Supporting informed consumer health care decisions: data presentation approaches that facilitate the use of information in choice. *Annu Rev Public Health* 2003; 24: 413-33.
- 254 Estabrooks C, Goel V, Thiel E et al. Decision aids: are they worth it? A systematic review. *J Health Serv Res Policy* 2001; 6(3): 170-82.
- 255 Morrison A. Effectiveness of printed patient educational materials in chronic illness: a systematic review of controlled trials. *J Manag Pharm Care* 2001; 1(1): 51-62.
- 256 Forster A, Smith J, Young J et al. Information provision for stroke patients and their caregivers (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 257 Kennedy A, Robinson A, Hann M et al. A cluster-randomised controlled trial of a patient-centred guidebook for patients with ulcerative colitis: effect on knowledge, anxiety and quality of life. *Health Soc Care Community* 2003; 11(1): 64-72.
- 258 Seals TD, Keith MR. Influence of patient information leaflets on anticonvulsant drug compliance in prison. *Am J Health Syst Pharm* 1997; 54(22): 2585-7.
- 259 Lafata JE, Baker AM, Divine GW et al. The use of computerized birthday greeting reminders in the management of diabetes. *J Gen Intern Med* 2002; 17(7): 521-30.
- 260 Azrin NH, Teichner G. Evaluation of an instructional program for improving medication compliance for chronically mentally ill outpatients. *Behav Res Ther* 1998; 36(9): 849-61.
- 261 Gibson PG, Powell H, Coughlan J et al. Limited (information only) patient education programs for adults with asthma (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 262 Sethares KA, Elliott K. The effect of a tailored message intervention on heart failure readmission rates, quality of life, and benefit and barrier beliefs in persons with heart failure. *Heart Lung* 2004; 33(4): 249-60.
- 263 Fries JF, Harrington H, Edwards R et al. Randomized controlled trial of cost reductions from a health education program: the California Public Employees' Retirement System (PERS) study. *Am J Health Promot* 1994; 8(3): 216-23.
- 264 Osman LM, Abdalla MI, Beattie JAG et al. Reducing hospital admission through computer supported education for asthma patients. *BMJ* 1994; 308(6928): 568-71.
- 265 Montgomery EB Jr, Lieberman A, Singh G, Fries JF. Patient education and health promotion can be effective in Parkinson's disease: a randomized controlled trial. PROPATH Advisory Board. *Am J Med* 1994; 97(5): 429-35.
- 266 Mullen PD, Green LW, Persinger GS. Clinical trials of patient education for chronic conditions: a comparative meta-analysis of intervention types. *Prev Med* 1985; 14(6): 753-81.
- 267 Anderson CS, Hackett ML, House AO. Interventions for preventing depression after stroke (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 268 de Ridder D, Schreurs K. Developing interventions for chronically ill patients: is coping a helpful concept?. *Clin Psychol Rev* 2001; 21(2): 205-40.
- 269 Mazzuca SA. Does patient education in chronic disease have therapeutic value? *J Chronic Dis* 1982; 35(7): 521-9.
- 270 Jessop DJ, Stein RE. Providing comprehensive health care to children with chronic illness. *Pediatrics* 1994; 93(4): 602-7.
- 271 Linden W, Stossel C, Maurice J. Psychosocial interventions for patients with coronary artery disease: a meta-analysis. *Arch Intern Med* 1996; 156: 745-52.

- 272 Kibby MY, Tyc VL, Mulhern RK. Effectiveness of psychological intervention for children and adolescents with chronic medical illness: a meta-analysis. *Clin Psychol Rev* 1998; 18(1): 103-17.
- 273 Rybarczyk B, DeMarco G, DeLaCruz M et al. A classroom mind/body wellness intervention for older adults with chronic illness: comparing immediate and 1-year benefits. *Beh Med* 2001; 27(1): 15-27.
- 274 Scholten C, Brodowicz T, Graninger W, et al. Persistent functional and social benefit 5 years after a multidisciplinary arthritis training program. *Arch Phys Med Rehabil* 1999; 80(10): 1282-7.
- 275 Padgett D, Mumford E, Hynes M, Carter R. Meta-analysis of the effects of educational and psychosocial interventions on management of diabetes mellitus. *J Clin Epidemiol* 1988; 41(10): 1007-30.
- 276 Ellis SE, Speroff T, Dittus RS, et al. Diabetes patient education: a meta-analysis and meta-regression. *Patient Educ Couns* 2004; 52(1): 97-105.
- 277 Gary TL, Genkinger JM, Guallar E et al. Meta-analysis of randomized educational and behavioral interventions in type 2 diabetes. *Diabetes Educ* 2003; 29(3): 488-501.
- 278 Theis SL, Johnson JH. Strategies for teaching patients: a meta-analysis. *Clin Nurse Spec* 1995; 9(2): 100-5.
- 279 Cooper H, Booth K, Fear S, Gill G. Chronic disease patient education: lessons from meta-analyses. *Patient Educ Couns* 2001; 44(2): 107-17.
- 280 Wagner EH, LaCroix AZ, Grothaus L et al. Preventing disability and falls in older adults: A population-based randomized trial. *Am J Public Health*. 1994; 84(11): 1800-6.
- 281 Gani F, Pozzi E, Crivellaro MA, et al. The role of patient training in the management of seasonal rhinitis and asthma: clinical implications. *Allergy* 2001; 56(1): 65-8.
- 282 Boulware LE, Daumit GL, Frick KD et al. An evidence-based review of patient-centered behavioral interventions for hypertension. *Am J Prev Med* 2001; 21(3): 221-32.
- 283 Goudswaard AN, Stolk RP, Zuithoff NP, et al. Long-term effects of self-management education for patients with Type 2 diabetes taking maximal oral hypoglycaemic therapy: a randomized trial in primary care. *Diabet Med* 2004; 21(5): 491-6.
- 284 Superio-Cabuslay E, Ward MM, Lorig KR. Patient education interventions in osteoarthritis and rheumatoid arthritis: a meta-analytic comparison with nonsteroidal antiinflammatory drug treatment. *Arthritis Care Res* 1996; 9(4): 292-301.
- 285 Evans R 3rd, Gergen PJ, Mitchell H et al. A randomized clinical trial to reduce asthma morbidity among inner-city children: results of the National Cooperative Inner-City Asthma Study. *J Pediatr* 1999; 135(3): 332-8.
- 286 Dracup K, Baker DW, Dunbar SB, et al. Management of heart failure. II. Counseling, education, and lifestyle modifications. *JAMA* 1994; 272(18): 1442-6.
- 287 Bailey WC, Richards JM Jr, Brooks CM. A randomized trial to improve self-management practices of adults with asthma. *Arch Intern Med* 1990; 150(8): 1664-8.
- 288 Morice AH, Wrench C. The role of the asthma nurse in treatment compliance and self-management following hospital admission. *Respir Med* 2001; 95(11): 851-6.
- 289 Mador JE, Giles L, Whitehead C, Crotty M. A randomized controlled trial of a behavior advisory service for hospitalized older patients with confusion. *Int J Geriatr Psychiatry* 2004; 19(9): 858-63.
- 290 Al-Rashed SA, Wright DJ, Roebuck N, et al. Use of inpatient pharmaceutical counselling to elderly patients prior to discharge. *Br J Clin Pharmacol* 2002; 54(6): 657-64.
- 291 Schaffer SD, Tian L. Promoting adherence: effects of theory-based asthma education. *Clin Nurs Res* 2004; 13(1): 69-89.
- 292 Rybarczyk B, DeMarco G, DeLaCruz M, Lapidus S. Comparing mind-body wellness interventions for older adults with chronic illness: classroom versus home instruction. *Beh Med* 1999; 24(4): 181-90.
- 293 Glasgow RE, La Chance PA, Toobert DJ et al. Long-term effects and costs of brief behavioural dietary intervention for patients with diabetes delivered from the medical office. *Patient Educ Couns* 1997; 32(3): 175-84.
- 294 Savage I, Goodyer L. Providing information on metered dose inhaler technique: is multimedia as effective as print? *Fam Pract* 2003; 20(5): 552-7.
- 295 Oermann MH, Webb SA, Ashare JA. Outcomes of videotape instruction in clinic waiting area. *Orthopaedic Nurs* 2003; 22(2): 102-5.
- 296 Krishna S, Balas EA, Spencer DC, et al. Clinical trials of interactive computerized patient education: implications for family practice. *J Fam Pract* 1997; 45(1): 25-33.
- 297 Cordina M, McElnay JC, Hughes CM. Assessment of a community pharmacy-based program for patients with asthma. *Pharmacotherapy* 2001; 21(10): 1196-203.
- 298 Eysenbach G, Powell J, Englesakis M et al. Health related virtual communities and electronic support groups: systematic review of the effects of online peer to peer interactions. *BMJ* 2004; 328(7449): 1166.
- 299 *Improving Chronic Disease Management*. London: Department of Health, 2004.
- 300 *Supporting People with Long-term Conditions. An NHS and Social Care Model to Support Local Innovation and Integration*. London: The Stationery Office, 2005.
- 301 *Self Care Support: A Compendium of Practical Examples Across the Whole System of Health and Social Care*. Department of Health, 2005.
- 302 <http://www.dh.gov.uk/>
- 303 Barlow JH, Wright CC, Sheasby et al. Self-management approaches for people with chronic conditions: a review. *Patient Educ Couns* 2002; 48: 177-87.
- 304 Warsi A, Wang PS, LaValley MP, et al. Self-management education programs in chronic disease: a systematic review and methodological critique of the literature. *Arch Intern Med* 2004; 164(15): 1641-9.
- 305 Barlow JH, Turner, Wright. Sharing, caring and learning to take control: self-management training for people with arthritis. *Psy, Health Med* 1998; 3(4): 387-93.
- 306 Barlow JH, Turner, Wright. Long-term outcomes of an arthritis self-management programme. *Brit J Rheumatology* 1998; 37: 1315-9.
- 307 Barlow JH, Turner, Wright. A randomised controlled study of the arthritis self-management programme in the UK. *Health Ed Res* 2000; 15(6): 665-80.
- 308 Barlow JH, Turner, Wright. Patient education for people with arthritis in rural communities: the UK experience. *Patient Educ Couns* 2001; 44: 205-14.
- 309 Lorig K. and Holman H. Arthritis self-management studies. A twelve year review. *Health Ed Quart* 1993; 20: 17-28.
- 310 Warsi A, LaValley MP, Wang PS, et al. Arthritis self-management education programs: a meta-analysis of the effect on pain and disability. *Arthritis Rheum* 2003; 48(8): 2207-13.
- 311 *The Expert Patient: A New Approach to Chronic Disease Management for the 21st Century*. London: Department of Health, 2001.
- 312 Brown SA. Studies of educational interventions and outcomes in diabetic adults: a meta-analysis revisited. *Patient Educ Couns* 1990; 16(3): 189-215.
- 313 Norris SL, Lau J, Smith SJ, et al. Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. *Diabetes Care* 2002; 25(7): 1159-71.
- 314 Norris SL, Nichols PJ, Caspersen CJ et al. Increasing diabetes self-management education in community settings. A systematic review. *Am J Prev Med* 2002; 22 (4 Suppl): 39-66.
- 315 Norris SL, Lau J, Smith SJ et al. Self-management education for adults with type 2 diabetes: a meta-analysis of the effect on glycemic control. *Diabetes Care* 2002; 25(7): 1159-71.
- 316 Clark NM, Janz NK, Dodge JA, et al. Changes in functional health status of older women with heart disease: evaluation of a program based on self-regulation. *J Gerontol B Psychol Sci Soc Sci* 2000; 55(2): S117-26.
- 317 Wright SP, Walsh H, Ingley KM et al. Uptake of self-management strategies in a heart failure management programme. *Eur J Heart Fail* 2003; 5(3): 371-80.
- 318 Yu PL, Ye W, Liu XR, et al. Evaluation on the effectiveness for self-management of hypertensive patients in a community. *Zhonghua Liu Xing Bing Xue Za Zhi* 2003; 24(9): 790-3.
- 319 Chiang LC, Huang JL, Yeh KW, Lu CM. Effects of a self-management asthma educational program in Taiwan based on PRECEDE-PROCEED model for parents with asthmatic children. *J Asthma* 2004; 41(2): 205-15.
- 320 Bodenheimer T, Lorig K, Holman H, Grumbach K. Patient self-management of chronic disease in primary care. *JAMA* 2002; 288(19): 2469-75.

- 321 Guevara JP, Wolf FM, Grum CM, Clark NM. Effects of educational interventions for self management of asthma in children and adolescents: systematic review and meta-analysis. *BMJ* 2003; 326(7402): 1308-9.
- 322 Brough FK, Schmidt CD, Rasmussen T, Boyer M. Comparison of two teaching methods for self-care training for patients with chronic obstructive pulmonary disease. *Patient Couns Health Educ* 1982; 4(2): 111-6.
- 323 Lorig KR, Sobel DS, Stewart AL, et al. Evidence suggesting that a chronic disease self-management program can improve health status while reducing utilization and costs: A randomized trial. *Med Care* 1999; 37(1): 5-14.
- 324 Barlow JH, Williams B, Wright CC. Instilling the strength to fight the pain and get on with life: learning to become an arthritis self-manager through an adult education programme. *Health Ed Res* 1999; 14(4): 533-44.
- 325 Cole JD. Psychotherapy with the chronic pain patient using coping skills development: outcome study. *J Occ Health Psy* 1998; 3(3): 217-26.
- 326 Lorig K, Holman HR. Long-term outcomes of an arthritis self-management study: effects of reinforcement efforts. *Soc Sci Med* 1989; 29(2): 221-4.
- 327 Charlton I, Charlton G, Broomfield J, Mullee MA. Evaluation of peak flow and symptoms only self management plans for control of asthma in general practice. *BMJ* 1990; 301(6765): 1355-9.
- 328 Lorig KR, Mazonson PD, Holman HR. Evidence suggesting that health education for self management in patients with chronic arthritis has sustained health benefits while reducing health care costs. *Arth Rheum* 1993; 36(4): 439-46.
- 329 Fries JF, Carey C, McShane DJ. Patient education in arthritis: randomized controlled trial of a mail-delivered program. *J Rheumatology* 1997; 24(7): 1378-83.
- 330 *The Expert Patient: A New Approach to Chronic Disease Management for the 21st Century*. London: Department of Health, 2001.
- 331 Bury M, Newbould J, Taylor D. A rapid review of the current state of knowledge regarding lay-led self-management of chronic illness. UK: NICE, 2005.
- 332 The British Liver Trust. *Living a Healthy Life with Long-term Illness*. Leland Stanford Junior University, 1999.
- 333 Rogers A, Robinson A, Thompson D. *Randomised controlled trial of guided self management for patients with ulcerative colitis*. Year unknown. The National Primary Care Research and Development Centre. <http://www.npcrdc.man.ac.uk/research.cfm>
- 334 Robinson A, Thompson DG, Wilkin D, Roberts C et al. Guided self-management and patient-directed follow-up of ulcerative colitis: a randomised trial. *Lancet* 2001; 358(9286): 976-81.
- 335 Kennedy A, Nelson E, Reeves D et al. A randomised controlled trial to assess the impact of a package comprising a patient-orientated, evidence-based self-help guidebook and patient-centred consultations on disease management and satisfaction in inflammatory bowel disease. *Health Technol Assess* 2003; 7(28): 1-113.
- 336 Osman LM, Calder C, Godden DJ, et al. A randomised trial of self-management planning for adult patients admitted to hospital with acute asthma. *Thorax* 2002; 57(10): 869-74.
- 337 Bourbeau J, Julien M, Maltais F, et al. Reduction of hospital utilization in patients with chronic obstructive pulmonary disease: a disease-specific self-management intervention. *Arch Intern Med* 2003; 163(5): 585-91.
- 338 Wheeler JR, Janz NK, Dodge JA. Can a disease self-management program reduce health care costs? The case of older women with heart disease. *Med Care* 2003; 41(6): 706-15.
- 339 Choy DK, Tong M, Ko F et al. Evaluation of the efficacy of a hospital-based asthma education programme in patients of low socio-economic status in Hong Kong. *Clin Exp Allergy* 1999; 29(1): 84-90.
- 340 Fu D, Fu H, McGowan P et al. Implementation and quantitative evaluation of chronic disease self-management programme in Shanghai, China: randomized controlled trial. *Bull World Health Organ* 2003; 81(3): 174-82.
- 341 Monninkhof E, van der Valk P, van der Palen J et al. Self-management education for patients with chronic obstructive pulmonary disease: a systematic review. *Thorax* 2003; 58(5): 394-8.
- 342 Guerci B, Drouin P, Grange V et al. Self-monitoring of blood glucose significantly improves metabolic control in patients with type 2 diabetes mellitus: the Auto-Surveillance Intervention Active (ASIA) study. *Diabetes Metab* 2003; 29(6): 587-94.
- 343 Schwedes U, Siebolds M, Mertes G. Meal-related structured self-monitoring of blood glucose: effect on diabetes control in non-insulin-treated type 2 diabetic patients. *Diabetes Care* 2002; 25(11): 1928-32.
- 344 Cappuccio FP, Kerry SM, Forbes L, Donald A. Blood pressure control by home monitoring: meta-analysis of randomised trials. *BMJ* 2004; 329(7458): 145.
- 345 Chase HP, Roberts MD, Wightman C et al. Use of the GlucoWatch biographer in children with type 1 diabetes. *Pediatrics* 2003; 111(4): 790-4.
- 346 Thoonen BP, Schermer TR, Van Den Boom G et al. Self-management of asthma in general practice, asthma control and quality of life: a randomised controlled trial. *Thorax* 2003; 58(1): 30-6.
- 347 Ignacio-Garcia JM, Gonzalez-Santos P. Asthma self-management education program by home monitoring of peak expiratory flow. *Am J Respir Crit Care Med* 1995; 151(2 Pt 1): 353-9.
- 348 Staessen JA, Den Hond E, Celis H et al. Antihypertensive treatment based on blood pressure measurement at home or in the physician's office: a randomized controlled trial. *JAMA* 2004; 291(8): 955-64.
- 349 Celler BG, Lovell NH, Basilakis J. Using information technology to improve the management of chronic disease. *Med J Aust* 2003; 179(5): 242-6.
- 350 Gibson PG, Powell H, Coughlan J et al. Self-management education and regular practitioner review for adults with asthma (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 351 Shepperd S, Parkes J, McClaren J, Phillips C. Discharge planning from hospital to home (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 352 Currell R, Urquhart C. Nursing record systems: effects on nursing practice and health care outcomes (Cochrane Review). In *The Cochrane Library*, Issue 2, 2004. Chichester, UK: John Wiley & Sons.
- 353 Banet GA, Felchli MA. The potential utility of a shared medical record in a "first-time" stroke population. *J Vasc Nurs* 1997; 15(1): 29-33.
- 354 Warner JP, King M, Blizard R, et al. Patient-held shared care records for individuals with mental illness. Randomised controlled evaluation. *Br J Psychiatry* 2000; 177: 319-24.
- 355 Wang A, Wolf M, Carlyle R, et al. The North Carolina experience with the diabetes health disparities collaboratives. *Jt Comm J Qual Saf* 2004; 30(7): 396-404.
- 356 Bodenheimer T, Wang MC, Rundall TG, et al. What are the facilitators and barriers in physician organizations' use of care management processes? *Jt Comm J Qual Saf* 2004; 30(9): 505-14.
- 357 Singh D. *Transforming Chronic Care: Evidence About Improving Care for People with Long-term Conditions*. Birmingham: University of Birmingham Health Services Management Centre, 2005.
- 358 Lyratzopoulos G, Havelly D, Gemmell I, Cook GA. Factors influencing emergency medical readmission risk in a UK district general hospital: A prospective study. *BMC Emerg Med* 2005; 5(1): 1.