Transforming Chronic Care

Evidence about improving care for people with long-term conditions

Debbie Singh
PREFACE

Medical advances and population ageing have combined to make long-term medical conditions one of the major challenges for healthcare systems, now and in future.

Medical advances have provided new possibilities for the diagnosis and treatment of illnesses such as heart disease and stroke that in the past were fatal or life threatening. Many people with these illnesses now receive treatments that enable them to survive for a considerable period of time. These people cannot be cured, but they can be helped to live longer and to enjoy a higher quality of life than would previously have been possible.

People are now living longer lives. However, the number of years of healthy life has not increased at the same rate as overall life expectancy. This means that people are living more years in poor health or with a limiting long-term illness. Conditions like arthritis, diabetes, and depression affect a large number of people and are more common in older than younger age groups. People with more than one condition are at greater risk of becoming heavy users of health services and consuming a disproportionate share of healthcare resources.

As the World Health Organisation highlighted in 2002, all healthcare systems face the challenge of preventing long-term medical conditions and treating people who are diagnosed with one or more of these conditions. This means we need to move away from episodic treatment in hospital when people become seriously ill towards continuous, high quality care delivered by teams combining specialist expertise and generalist capabilities. It is also important to involve patients and their families more directly in the provision of care.

The NHS Improvement Plan and Supporting People with Long-term Conditions, published in June 2004 and January 2005 respectively, set out the government's plans to help people with chronic conditions live healthy lives. These documents describe how the Expert Patient Programme will be rolled out in the NHS in England, how the new contract for general practitioners will reward doctors who deliver higher standards of care, and how people with complex conditions will be supported by specialist nurses known as community matrons. These plans mark an important shift in emphasis by the government, away from a focus on improving access to elective care towards more commitment to meeting the needs of people with long-term conditions.

The government’s commitment has been widely welcomed in the NHS, and has stimulated strategic health authorities, NHS trusts, and primary care trusts to explore what action is needed to build on existing services for people with long-term conditions and their families. This report draws together research from diverse sources about the types of interventions available for people with long-term conditions and the areas in which evidence for action is strongest. It is based on a review commissioned by the Surrey and Sussex health community which was used to inform planning discussions between NHS agencies in Surrey and Sussex that HSMC helped to facilitate.

The report’s author, Dr Debbie Singh, has identified and analysed research from different healthcare systems on a wide range of interventions. As she suggests, the evidence for action is strong in some areas, inconsistent in others, and limited in yet others. In summarising what is known about this topic, and in presenting the results cogently and clearly for those not familiar with the intricacies of systematic reviews, Singh has produced a report that will be an invaluable resource for NHS agencies beyond Surrey and Sussex who are taking on board the challenges of long-term conditions. For this reason, HSMC is pleased to collaborate with the Surrey and Sussex health community in making the report available to all those involved in this critical area of policy and service development.

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In June 2004, an alliance of fifteen Primary Care Trusts in Surrey and Sussex funded a review of the evidence to guide local initiatives to transform chronic care. The review was updated in January 2005 for publication by the University of Birmingham Health Services Management Centre.

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EXECUTIVE SUMMARY

Long-term conditions are chronic illnesses, such as diabetes, heart failure, and asthma, which cannot currently be cured. According to the Department of Health, six out of ten adults in England have a long-term condition. These conditions can reduce people’s quality of life and physical wellbeing. As a result, people with long-term conditions are often frequent users of health services. In fact, up to 80% of primary care consultations and two thirds of emergency hospital admissions in Britain involve people with long-term conditions.

Improving chronic care is a priority for the National Health Service (NHS). The Government have launched National Service Frameworks to enhance the quality and consistency of care in the areas of diabetes, heart disease, mental health, older people, and long-term conditions and have set a target to reduce the number of unplanned days that people spend in hospital by 5% over the next three years. Given these targets and the growing number of people with long-term conditions, healthcare planners and practitioners have become particularly keen to provide chronic care in a more effective and integrated manner. But which initiatives are most effective for improving the quality and cost-effectiveness of care for people with long-term conditions? This review assesses evidence about interventions to improve chronic care.

We searched ten 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 35,520 studies about care for people with long-term conditions. 560 studies met our inclusion criteria and are summarised in this rapid 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 three main areas:

- the way care for people with long-term conditions is organised,
- the systems used to provide chronic care,
- and strategies for involving people with long-term conditions in their own care.

Organisation of care

Broad managed care programmes

The review found that broad ‘managed care’ programmes may improve how people with long-term conditions feel, their quality of care, and how often they visit doctors and hospitals. These programmes have many different components, but it is not clear which features are most effective or transferable.

- There is some evidence that multifaceted managed care programmes tend to improve the quality of care for people with long-term conditions, but it remains uncertain which components of these programmes are most effective.

- There is some evidence that broad managed care programmes tend to improve clinical outcomes, but this evidence is not of the highest quality.

- There is evidence that broad managed care programmes tend to reduce the use of healthcare resources and healthcare costs, although most available evidence is of limited quality. Findings about managed care programmes appear to hold in different countries, although most evidence is from the United States.

Integrated care

The review found that linking the care provided by family doctors, hospitals, and community groups and using teams of different professionals could improve quality of care, symptoms, and costs.

- There is some evidence that integrating the care provided in the community and in hospital can improve healthcare resource use and reduce costs.

- There is some evidence that integrating care may improve certain clinical outcomes, although few studies in the UK support this. There is inconsistent evidence about the effect of integrating care on the quality of care provided.

- There is some evidence that multidisciplinary teams may improve patient satisfaction and reduce healthcare costs.

- There is inconsistent evidence about the effects of multidisciplinary teams on clinical outcomes.

- There is evidence that care led by nurses usually has similar clinical outcomes and quality to physician-led strategies.
Greater use of primary and community care

Family doctors, nurses, and community workers may be able to provide services for people with long-term conditions as effectively as hospital teams and specialists if they get enough support.

- There is evidence that providing some care in the homes of people with chronic conditions may reduce healthcare costs, but there is insufficient evidence about the effect on quality of care.

- There is insufficient evidence about chronic care clinics (group visits to primary care practices), although these may reduce healthcare resource use and improve satisfaction with care.

- There is insufficient evidence to draw conclusions about the effects of working with the voluntary sector and the best methods for community outreach in chronic care. There is some evidence that providing health services in community venues and working alongside other organisations may increase access to care.

Interventions targeting care systems

Evidence-based 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 inconsistent information about the benefits of care pathways and clinical guidelines for people with long-term conditions.

- There is evidence that written care plans that help people make decisions about what type of care they need at different times may improve care processes and reduce healthcare resource use in respiratory disease. There is limited high quality evidence about written care plans for people with other chronic conditions.

Case management for the most vulnerable

- ‘Case management’ is when a professional or team of professionals organise and follow-up a patient’s care, even if patients are receiving care from many different specialists. 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.

Appropriate data collection and targeting

Collecting information about people with long-term conditions and monitoring their progress over time may improve the quality of care they receive.

- There is some evidence that disease registries may improve the quality of care provided for people with long-term conditions.

- There is evidence that sending reminders to health professionals may influence the quality of care provided.

- There is insufficient evidence about the effectiveness of decision support systems and other assessment tools.

- Developing systems to target people at ‘high risk’ of complications or health service use may help to use resources most cost-effectively.

Shared learning for health professionals

There is some evidence that encouraging health professionals to share their experiences with others may improve their skills and empathy.

- There is evidence that group educational sessions encourage healthcare professionals to share their ideas and learn new skills.

- Active educational sessions appear to have some impact on health professionals’ skills, but the effects of educational sessions on clinical outcomes and patient satisfaction remains uncertain.

- There is insufficient evidence about the impact of collaborative training and sharing practice on quality of care and clinical outcomes.

- There is evidence that specialists visiting health professionals one-to-one may have some impact on health professionals’ attitudes and behaviours, but perhaps only if accompanied by other strategies.

- Checking and providing feedback about health professionals’ work using audit techniques can have small effects on quality of care if implemented as part of a broader strategy.
Interventions targeting patients

Involving people in decision-making

The review found evidence that involving people with long-term conditions in decision-making can improve their satisfaction with care, but some people are more likely to want to be involved than others. There is no clear evidence about the 'best way' to involve people with long-term conditions in decision-making and planning.

- There is evidence that involving patients in decision-making can be empowering and can help people with long-term conditions take control of their care.

- There is little evidence about the effect of involving patients in decision-making on clinical outcomes or on healthcare resource use.

- There is no strong evidence about which methods work best to encourage patient involvement in decision-making.

Providing accessible structured information

There is good evidence that providing accessible information can improve people’s knowledge about their condition and care, and this may affect their symptoms. It is unclear how best to provide information for people with long-term conditions and their families.

- Written information: There is evidence that written information such as letters, leaflets, and booklets may improve people's knowledge, but when used alone, written information will not usually affect behaviours, quality of life, or clinical outcomes. There is some evidence that combining written materials with other strategies may be more effective.

- Individual education sessions: There is inconsistent evidence about the effects of one-to-one educational sessions for people with long-term conditions.

- Group education sessions: There is strong evidence that group educational sessions may improve people’s knowledge and satisfaction, use of medication, and have smaller benefits for symptoms and clinical outcomes. A wide variety of educational sessions have been evaluated, but there is insufficient evidence to suggest that one particular strategy would be universally effective for people with varying conditions.

Lay educators: There is some evidence that educational sessions facilitated by lay people or peers may improve access to care and encourage behaviour change among people with long-term conditions.

- Technology: There is inconsistent evidence about the impacts of providing information using the internet or video.

Self-management education

There is good evidence that education programmes that help people learn to manage their conditions can improve knowledge and self care. Self-management education programmes may also be associated with fewer symptoms and less visits to doctors and hospitals. There is not enough research to conclude that one particular type of education programme works better than others.

- There is strong evidence that education programmes can improve self-management of long-term conditions.

- There is evidence that self-management education may improve some clinical outcomes and reduce healthcare resource use and expenditure, but these findings are not universal.

Self-monitoring and telemonitoring

Helping people to monitor their own symptoms may affect the quality of care they receive. The effects of electronic monitoring devices, telephone monitoring, and written care plans on symptoms and health service use is unclear.

- There is some evidence that self-monitoring may improve clinical outcomes for people with some types of long-term conditions.

- There is insufficient evidence about the impacts of self-monitoring on healthcare costs or resource use.

- There is evidence that monitoring using computers and telecommunications systems may improve care processes and may be associated with improved clinical outcomes, especially for people with diabetes.

- There is insufficient evidence to draw conclusions about the impact of computerised systems and telemonitoring on healthcare costs and patient satisfaction.
Summary

This rapid review of 560 studies suggests that initiatives to improve the care of people with long-term conditions can enhance satisfaction with care, quality of life, and in some cases, use of health services.

There is evidence to support the following initiatives:

- Broad chronic care management models
- Integrated community and hospital care
- Greater reliance on primary care
- Identifying people at greatest risk of complications and hospitalisation
- Involving people with long-term conditions in decision-making
- Providing accessible structured information for people with long-term conditions and their families
- Self-management education
- Self-monitoring and referral systems
- Electronic monitoring and telemonitoring
- Using nurse-led strategies, where appropriate

There is less evidence to support the following initiatives:

- Case management
- Evidence-based care pathways
- Shared learning among health professionals

There is limited information about:

- New models of commissioning services
- Appropriate data collection and monitoring
- Linking health services with voluntary and community sectors

There is little high quality evidence available about some of the interventions currently being implemented. There is also limited evidence about combining different strategies into a broad programme of care; whether international programmes can be replicated in the United Kingdom; and the effects of initiatives on clinical outcomes and healthcare costs.

Summary of evidence about initiatives to transform chronic care

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TRANSFORMING CHRONIC CARE

Evidence about improving care for people with long-term conditions

Introductory overview

Long-term conditions are illnesses such as diabetes, heart failure, and asthma which cannot currently be cured. The terms ‘chronic disease,’ ‘life-long disease,’ ‘long-term disease,’ and ‘non-communicable condition’ are used interchangeably to describe these conditions.

In Britain, the Department of Health estimates that 17.5 million adults may be living with one or more long-term conditions. In fact, 60% of adults in England report having at least one long-term condition. This number will likely continue to grow, due to an aging population and escalating risk factors such as obesity. This is a worldwide trend, with long-term conditions rising in both the developed and developing worlds.

Chronic conditions need long-term management (‘chronic care’) which can be resource intensive. The World Health Organisation estimates that long-term conditions account for most of the disease burden in Europe and the United States (US). In Britain, the Department of Health estimates that 80% of primary care consultations and two thirds of emergency hospital admissions are related to chronic conditions. People with long-term conditions often suffer from more than one condition, making their care even more complex.

Given the increasing number of people with long-term conditions and the impact that this has on healthcare resources, initiatives to improve chronic care are being implemented throughout the developed world. In Britain initiatives include the development of National Service Frameworks and plans to support people with long-term conditions, trials of new care management strategies, and Public Service Agreement targets to reduce healthcare resource use.

Optimising care for people with long-term conditions may have positive impacts on the symptoms, quality of life, and satisfaction of patients and their families; on the quality of care available; and on healthcare expenditure and resource use. However, exactly how to ‘optimise’ care remains a matter of debate.

This rapid review investigates evidence about initiatives to improve chronic care. It focuses on interventions targeting three main areas:

- the organisation of care for people with long-term conditions,
- the systems used to provide long-term care,
- and strategies for involving people with long-term conditions in their own care.

Collating available evidence

A number of strategies have been developed to improve care for people with long-term conditions, but there is little high quality comparative research about systems of care. Individual components of care have been evaluated, as have broader systems of care. However, most studies do not compare programmes in different countries, populations or disease groups, or provide information about what ‘works’ and in what circumstances.

Therefore this overview summarises the main trends from high quality studies of chronic care initiatives. It is not an exhaustive review of all evidence — it does not attempt to systematically review research about every type of intervention for people with long-term conditions or to cover all chronic conditions. Instead, we used a rapid review process to assess the impact of selected initiatives on patient satisfaction, quality of care, clinical outcomes, and healthcare resource use. The interventions were selected based on an innovative programme planned by 15 primary care trusts in Surrey and Sussex (southeast England) to provide more integrated and cost-effective care for people with long-term conditions. This review was commissioned by the primary care trusts leading the programme, to establish whether there was evidence to support their planned initiatives (see Box 1).

Chronic disease represents a significant and exciting challenge for the NHS. Good chronic disease management offers real opportunities for improvements in patient care and service quality, and reductions in costs.

4 Are Disease Management Programmes (DMPs) Effective in Improving Quality of Care for People with Chronic Conditions? WHO Regional Office for Europe’s Health Evidence Network, 2003.
To collate evidence for this overview, one reviewer searched MEDLINE, Embase, ERIC, the Science Citation Index, the Cochrane Controlled Trials Register, DARE, NHS Health Technology Assessment and Economic Assessment databases, PsychLit, the WHO library, reference lists of identified articles and reviews, and the websites of relevant agencies for information available at January 2005. Experts in the field were contacted and relevant journals were hand searched for additional studies. There were no language restrictions. Box 2 contains definitions of the types of studies prioritised for inclusion in this overview.

In total, summaries of 35,520 articles about chronic care 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 6900 papers was assessed by two independent reviewers for relevance and quality using a validated scale (see Box 3).

Inclusion criteria were:

- primary research or systematic reviews,
- assessing at least one component of the Transforming Chronic Care programme (see Box 1),
- providing data on outcomes relating to patient experiences, provider experiences, quality of care, clinical outcomes, or resource impacts,
- readily available published or unpublished documents,
- randomised trials or systematic reviews (less rigorous designs were only included if no randomised trials or systematic reviews were available on a certain topic),
- priority was given to studies focusing on those long-term conditions of greatest concern to the Transforming Chronic Care programme, including people at ‘high risk’ of using healthcare services,
- priority was given to studies published within the past ten years, although older studies were included where no more recent research or reviews were available.

In international literature there is a trend towards assessing factors that work well across a range of long-term conditions, rather than focusing solely on disease-specific interventions. This overview takes a similar approach, outlining the evidence for chronic care generally, rather than evidence about approaches to specific conditions. Studies of people with particular types of conditions are provided as examples, however.

**Box 1: Key components of the Transforming Chronic Care programme**

The Surrey and Sussex PCT Alliance are implementing a programme to improve care for people with long-term conditions between 2005 and 2008. Initially the programme will focus on improving care for people with diabetes, heart failure, respiratory disease, dementia, stroke, and the 5% of people with long-term conditions who use 42% of healthcare resources.1

The key components of the programme are:

- patient involvement in decision-making and planning,
- accessible structured information for patients and carers,
- self management education, such as the Expert Patient Programme,
- self-monitoring and referral systems to help patients manage their own care,
- risk stratification tools, to help identify those most at risk and assist in decision-making,
- appropriate data collection and monitoring,
- case management for the most vulnerable people,
- integrated care, with health professionals working across disciplines and organisational boundaries,
- greater reliance on primary and community care, where appropriate,
- new models of commissioning,
- evidence-based care pathways,
- and opportunities for health professionals to share learning and develop skills.

560 studies met these criteria and are summarised in this overview. The evidence collated is mainly from systematic reviews and randomised trials, although other types of studies were included where controlled comparisons were not available, including cost-effectiveness analyses based on cohort studies. A large number of descriptive reports, before and after studies, and cohort studies were identified about different approaches to chronic care. However, these were omitted from the overview unless more rigorous studies were not available.

One reviewer extracted data on intervention type, country of origin, participant and disease characteristics, outcomes, and publication details. Ten percent of studies were checked for consistency and accuracy by a second independent reviewer. Disagreements were resolved by consensus.

A summary of the evidence is presented overleaf. Information about ways to organise chronic care is summarised first, followed by evidence about different systems of care, and finally evidence about initiatives to involve people with long-term conditions in their care.
Box 2: Basic definitions of the types of studies prioritised for this overview

In **randomised trials** participants are randomly assigned to different groups. One group (or groups) receive an intervention, such as an educational leaflet or computer training. The other group, known as ‘controls,’ receive no intervention, ‘usual care,’ or another treatment for comparison. Randomised trials are thought to provide high quality evidence about the effects of an intervention because the people in each comparison group are likely to be similar apart from the intervention they receive.

A **systematic review** involves systematically searching databases and sometimes unpublished sources in order to collate evidence about interventions. Systematic reviews, especially those containing randomised trials, are usually thought to provide higher quality evidence than a single study because they collate evidence from many different settings and participants. ‘Cochrane reviews’ are systematic reviews undertaken according to the criteria of the international Cochrane Collaboration and are thought to be of high quality. In this overview the term ‘literature review’ is used when the search strategy for identifying articles was not described or was selective.

Some systematic reviews include **meta-analyses** whereby the results of different studies are combined numerically to provide overall summary statistics about the effects of an intervention.

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**Box 3: Studies included in the overview**

- 35,520 articles and reports were identified through database and hand searching
- 6900 citations were identified for full text appraisal for relevance and quality
- 28,620 abstracts were discarded because they did not meet the inclusion criteria
- 3579 papers were not primary or secondary research or did not present detailed outcomes
- 1431 were of limited quality or did not clearly include people with long-term conditions
- 1321 papers were repeated reports of the same study, or trials included in reviews
- 9 studies were not available for appraisal (no full text available)
- 560 papers were accepted for inclusion in the overview, and data were extracted from each

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**Box 4: Components of chronic care summarised in this overview**

- **Patient involvement**
  - Decision-making
  - Accessible info
  - Self-care education
  - Self-monitoring
  - Case management
    - Case managers
    - Risk stratification
  
- **Multifaceted programmes**
  - Integrated care
    - Primary / secondary care
    - Home care
    - Care pathways
  - Voluntary sector
  
- **Commissioning**
  - Health professionals
    - Education & outreach
    - Joint working
    - Audit & feedback
  - Data collection
    - Monitoring
    - Registries
**INTERVENTIONS TARGETING ORGANISATION OF CARE**

**Broad chronic care programmes**

In England, the Department of Health’s strategy for supporting people with long-term conditions draws heavily on the principles of broad chronic care programmes. The terms ‘disease management’ and ‘managed care’ are commonly used to refer to multi-component interventions providing integrated social and medical support for people with long-term conditions.

The disease management approach views heart failure as a chronic illness that spans the home as well as outpatient and inpatient settings. Most patients have multiple medical, social, and behavioral challenges, and effective care requires a multidisciplinary systems approach that addresses these various difficulties. Disease-management programmes vary in their content, but in general, they include intensive patient education, encouragement of patients to be more aggressive participants in their care, close monitoring of patients through telephone follow-up or home nursing, careful review of medications to improve adherence to evidence-based guidelines, and multidisciplinary care with nurse-led case management directed by a physician.

Many of these 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:

- mobilising community resources to meet the needs of those with chronic conditions,
- creating a culture, organisation, and mechanisms that 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 patient preferences,
- and organising data to facilitate efficient and effective care.

This section summarises evidence about broad care management programmes based on the principles of the *Chronic Care Model* and describes some approaches to implementing these models in the United Kingdom. We found 13 systematic reviews, three additional randomised trials, and seven other high quality studies about the effects of broad care management programmes.

Evidence about the effectiveness of both generic and disease-specific programmes is mixed. Some randomised trials and systematic reviews suggest that multifaceted care programmes reduce healthcare resource costs and improve patient outcomes. Other trials and reviews have found no evidence, or limited evidence, of an effect.

**Managed care**

There are many different definitions of managed care. Most simply, ‘managed care’ is any care organised or assisted by professionals. In more complex manifestations, ‘managed care’ involves coordinating and monitoring care through an entire range of services (home care, primary / community care, and hospital care). Care is ‘managed’ to help people with long-term conditions receive the most appropriate care in the most suitable setting for their individual needs. In recent years, the term ‘managed care’ has become closely associated with models developed by Health Management Organisations (HMOs) in the US to promote cost-effective use of healthcare resources.

Some programmes have developed into formal models of managed care (such as the ‘Evercare model’) and other strategies are known more generically as ‘disease management.’ Broadly speaking, the two most common approaches are i) system-wide integration of services based on the *Chronic Care Model*, and ii) targeting specific system components or those people at greatest risk of hospitalisation.

In the UK, the three most commonly discussed frameworks for managing long-term conditions are the Kaiser, Evercare, and Pfizer approaches. The key principles of each model are presented in Box 5. These approaches are not mutually exclusive. All share a proactive approach to managing care for people with long-term conditions. Their major distinguishing features are that the Kaiser model focuses on integrating services and removing distinctions between primary and secondary care for people at all stages of the ‘kaiser pyramid’ (see Box 6) The Evercare model targets people at highest risk using Advanced Primary Nurses as case managers. Here the focus is on integrating social and health care to best meet an individual’s needs. The Pfizer approach also targets those at highest risk, using telephone case management to supplement existing services.

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Box 5: Key characteristics of different approaches to managed care

<table>
<thead>
<tr>
<th>Overall essence</th>
<th>Kaiser approach</th>
<th>Evercare approach</th>
<th>Pfizer approach</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses a wide mix of strategies to target the whole care continuum, focussing on integrated services</td>
<td>Uses specialised nurses to individually support those people at highest risk of hospital admission</td>
<td>Uses telephone system to monitor and refer people at highest risk</td>
<td></td>
</tr>
</tbody>
</table>

**Key principles**

- Kaiser approach:
  - Unplanned hospital use is an indicator of system failure
  - Align care to the needs of the client
  - No boundary between primary and secondary care
  - Patients are ‘partners’ in care
  - Patients are providers of care
  - Information is essential
  - Improvement occurs through commitment and shared vision, not through coercion

- Evercare approach:
  - Individualised whole person approach
  - Care provided in least invasive manner in the least intensive setting
  - Primary care is the central organising force for all care
  - Decisions based on data and population evaluation
  - Avoid adverse effects of medications and poly-pharmacy

- Pfizer approach:
  - Proactive contact with patients at highest risk to assess, refer, educate, and monitor
  - Supplement to existing services (not substitute)
  - Encourage self-treatment and behaviour modification

**Key strategies**

- Education
  - Kaiser approach: Patient education, including using the internet and during hospital stay
  - Evercare approach: Focused education and follow-up mentoring
  - Pfizer approach: Patient education through telephone support

- Target
  - Kaiser approach: Whole spectrum of chronic care
  - Evercare approach: Identifying people at high risk using ‘Hospital Analysis Tool’
  - Pfizer approach: Identifying people at high risk

- Care planning
  - Kaiser approach: Proactive management
  - Evercare approach: Proactive management of people at high risk
  - Pfizer approach: Case finding

- Staff
  - Kaiser approach: Developing partnerships between clinicians and managers
  - Evercare approach: Individualised care plan
  - Pfizer approach: Proactive assessment

- Tools
  - Kaiser approach: Developing integrated care pathways to reduce inappropriate referrals to services
  - Evercare approach: Medicines management for co-morbidities
  - Pfizer approach: Case management by specialised nurses

- Discharge
  - Kaiser approach: Information systems such as reminders on patient notes and monitoring systems
  - Evercare approach: IT risk assessment
  - Pfizer approach: Dedicated telephone support staff (nurses)

**Examples**

- Kaiser approach: This model is being formally trialled in nine PCTs in England
- Evercare approach: This model is being formally trialled in nine PCTs in England
- Pfizer approach: This model is being formally trialled by one PCT in England

Box 6: The 'Kaiser Triangle' illustrating different levels of chronic care
Adaptations of the Kaiser, Evercare, and Pfizer models are all being trialed in England. For example, nine primary care trusts are applying the Kaiser model, focussing on reducing hospital admissions by integrating services. Nine other primary care trusts are working with United Healthcare to implement their EverCare programme, focussing on ‘proactive care for the most vulnerable.’ This programme aims to avoid hospital admissions for older people by providing an integrated primary care service with advanced nurses working collaboratively with GPs. Another primary care trust is working with Pfizer to implement their InformaCare® approach for chronic disease management. This approach uses evidence-based clinical guidelines to encourage patients to engage with the most appropriate health services and be better informed about how to deal with their condition.

The Evercare project is being evaluated at a national level to measure the overall effects of the programme. A report detailing the implementation of the Evercare model in nine primary care trusts was released in February 2004, but outcomes data will not be available until early 2005. The Pfizer and Kaiser approaches are being evaluated locally, with the help of external evaluators.

No detailed information about the impacts of these programmes in England is currently available, but evidence about similar models implemented in other countries is outlined below.

**Impact on quality of care**

More than 500 large organisations in the US have implemented broad managed care programmes, and the number continues to grow. A review of interventions including components of the *Chronic Care Model* found that in 32 out of 39 studies the programmes improved at least one process or outcome for people with diabetes. The model was associated with improved quality of care across many US healthcare centres.

A literature review found that programmes based on the *Chronic Care Model* may improve patient and staff satisfaction, quality of care, clinical outcomes, and reduce resource use in some cases. However, the reviewers concluded that it was difficult to distinguish which components of these programmes may be most effective.

A systematic review of 39 randomised trials of multifaceted interventions to improve adherence to drug prescriptions found that half of the interventions were associated with increased medication adherence and four out of ten reported significant improvements in treatment outcomes. Almost all effective interventions combined more convenient care, information, counselling, reminders, self-monitoring, reinforcement, family therapy, and other forms of supervision or attention. However, even the most effective interventions had modest effects.

These broad programmes have been trialled for people with specific long-term conditions. For instance, a meta-analysis of 12 randomised trials with 9803 people with heart found that disease management improved processes of care and prescribing, reduced hospital admissions, and enhanced quality of life and functional status.

Another review found that disease management programmes improve the quality of care for people with chronic obstructive pulmonary disease. The most effective models included risk identification and stratification; education and self-monitoring; lifestyle modification; communication and collaboration between patients and professionals; after hours support; and monitoring outcomes.

A meta-analysis of randomised trials assessed disease management programmes with evidence-based guidelines, patient and provider education, collaborative care, reminder systems, and monitoring for adults with depression. These programmes improved quality of care, reduced the severity of symptoms, and cost within the same range as other healthcare initiatives.

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15 McDonald HP, Garg AX, Haynes RB. Interventions to enhance patient adherence to medication prescriptions: scientific review. *JAMA* 2002; 288(22): 2868-79.
Many studies have focussed on people with diabetes. For instance, processes of care improved in 19 primary care centres in the US who implemented continuous quality improvement; self-management; delivery system redesign; decision support; clinical information systems; leadership; health system organisation; community outreach; and collaborative learning sessions. There was some evidence of improved clinical outcomes, including average blood glucose levels.\(^\text{19}\)

On the other hand, a literature review for the World Health Organisation (WHO) found that while multidisciplinary chronic care programmes improve health professionals’ adherence to evidence-based standards of care, there was no strong evidence about which components of these programmes may impact on the quality of care provided. Nor did WHO find evidence of a direct link between broad chronic care programmes and reductions in mortality, improvements in quality of life, or cost-effectiveness.\(^\text{20}\) The authors concluded:

There is no evidence available about long-term health outcomes, impact on quality of life or relative cost-effectiveness of DMPs [disease management programmes]. Therefore, in considering DMPs as a strategy to improve quality of care and to tackle unacceptable variations in practice, such programmes should be introduced only in controlled settings where it is possible to evaluate their costs and benefits.\(^\text{21}\)

Overall, evidence from seven reviews and one additional study suggests that broad managed care programmes may improve quality of care for people with many different long-term conditions, but it remains uncertain which components are most effective or transferable. Most available evidence is drawn from the US.\(^\text{22}\)

Impact on clinical outcomes

The effects of managed care programmes on clinical outcomes are less certain. A systematic review of multidisciplinary 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. Five of the seven studies reported improved functional status, aerobic capacity, or patient satisfaction. Six of the studies reported a 50% to 85% reduction in the risk of hospital admission.\(^\text{23}\)

On the other hand, a meta-analysis of 11 studies found limited evidence about whether disease management programmes improve functional status for people with rheumatoid arthritis. About half of the studies found improved functional status, but the effect was small.\(^\text{24}\)

Much research about the effects of broad chronic care programmes on clinical outcomes is not ‘high quality’ evidence. There are randomised trials of specific components of the Chronic Care Model, such as patient education or self-management, but apart from the material outlined in other sections of this report, there have been few high quality studies assessing the impact of broad managed care programmes on clinical outcomes.

Those studies that do exist tend to have relatively small samples, be sponsored by industry, or to be observational studies rather than randomised trials. For example, an observational study of diabetes management in the US found that a programme of practice guidelines, reports to physicians, patient education, reminder systems, focused diabetes clinic visits, and ‘Diabetes Days’ improved blood glucose values, increased eye examination rates, and increased access to educational materials.\(^\text{25}\)

Similarly, a before and after study of 18 primary care clinics serving about seven thousand adults with diabetes assessed an intervention to encourage self-management and team decision-making, redesign office systems, and use information technology. Over one year, the programme was associated with improved glycaemic control and reduced cardiovascular risk in adults with diabetes.\(^\text{26}\)

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\(^\text{20}\) Are disease management programmes (DMPs) effective in improving quality of care for people with chronic conditions? WHO Regional Office for Europe’s Health Evidence Network (HENV), 2003.

\(^\text{21}\) Ibid p11.

\(^\text{22}\) Phibbin EF. Comprehensive multidisciplinary programs for the management of patients with congestive heart failure. J General Internal Medicine 1999; 14(2): 130-5.


An observational study of 17 US clinics using the Chronic Care Model to improve diabetes found that delivery system redesign was the only factor linked to improved clinical outcomes. In this study, self-management support and clinical information systems had no significant impact on clinical outcomes.26

Another before and after study with nine primary care practices in the US found that disease management programmes were associated with improved cholesterol levels, exercise, and use of appropriate medication among 586 people with heart disease. There were no significant improvements in smoking cessation, body mass index, or blood pressure or glycaemic control among people with diabetes.27

Overall, there is slight evidence from two reviews and four observational studies that broad care management programmes may have some impact on clinical outcomes, but evidence is not of the highest quality. Most studies focus on diabetes or heart disease.

Impact on healthcare resource use

There is evidence that managed care programmes may reduce healthcare resource use. A review found that in 18 out of 27 studies of 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.28

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%.29 Another review also found that disease management programmes can reduce the frequency of hospitalisation and improve quality of life and functional status in heart failure.30

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 hospitalisations and reduced cost of care.31

A review of randomised trials found that multi-component interventions which aim to reduce functional decline in older people tend to have a positive effect on health and functional status and reduce the length of stay in hospital or nursing homes.32 On the other hand, another review of organisational interventions to improve the care of older people found inconsistent evidence about their effectiveness. The reviewers argued that these interventions rarely reduce healthcare costs.33

An evaluation of the Evercare programme in the US found that active disease management with nurse follow-up had overall net savings of £78,000 per year per nurse employed. A nurse practitioner saw patients with long-term conditions regularly and liaised with patients’ families and primary care doctors. Doctors were paid to spend more time with families and to attend case conferences.34 The Evercare programme reduced hospitalisations by focusing resources on those most at risk of hospitalisation.35

A chronic care management programme in New Zealand included components such as targeting people at high risk, organising cost-effective interventions into a system of care, and using an integrated data server to provide care reminders. There were potential savings of between NZ$277 to $980 per person per annum.36

Another cost-effectiveness analysis of diabetes self-management education, patient-held records, access to medical supplies, a diabetes helpline, home care, regular peer support groups, and care standards in the US found that these interventions could reduce overall healthcare costs.37

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 clinical outcomes or healthcare resource use.38

Overall, there is evidence from three reviews, two additional randomised trials, and two cost analyses that broad managed care programmes have the potential to reduce healthcare resource use and costs. These findings appear to hold in different countries and health systems, although most evidence is drawn from the US and is not of the highest quality.

More detailed descriptions of the outcomes associated with different programmes, and their individual components, are provided overleaf.

**New models of commissioning**

Most broad managed care programmes encourage different models of commissioning services in order to promote integration, care pathways, and multidisciplinary working across organisational boundaries. While there is much descriptive material available about ways to plan and purchase healthcare services, we found little research directly comparing the effects of different commissioning models on patient outcomes. The material that does exist tends to focus on commissioning in the US,29 which has a very different healthcare context than the state-funded NHS system.

In the US, Health Management Organisations provide healthcare for a fixed capitation payment (a per patient insurance premium). Therefore, these organisations have a vested interest in reducing healthcare costs. Kaiser Permanente in California and United Healthcare in Minnesota have developed integrated care programmes to address costs and quality in chronic care. As described previously, initiatives inspired by these programmes are being piloted in England. However, there is limited understanding of exactly which features of these programmes may be most worthwhile, which might be adapted to the NHS context, and what trade-offs might be involved in applying lessons from market-driven organisations in the US within the UK.

The Kings Fund assessed five US organisations provided managed care using interviews and reviews of unpublished literature. They found that some competition could be helpful, but that excessive competition between providers could reduce the quality of care provided. They suggested that better financial incentives are needed for UK primary and secondary providers to encourage integrated care and to keep people with chronic conditions well enough not to be hospitalised. The Kings Fund concluded that current financial incentives for hospitals in the UK do not promote good chronic disease management.40

A systematic review including qualitative studies assessed effective models of healthcare commissioning in the UK. The review highlighted changing patterns of service delivery and differences in efficiency, equity, responsiveness and partnership, suggesting that new models of primary care-led commissioning are needed.41 Giving staff and institutions financial and other incentives to improve care may be an important component of new commissioning models. The new general practice contract introduces specific financial incentives to improve care for people with chronic conditions.42

A Cochrane review evaluated the effect of different methods of payment (capitation, salary, fee-for-service and mixed systems of payment) on the clinical behaviour of primary care physicians. The review included four studies with 640 primary care physicians and more than 6400 patients. Fee-for-service schemes were associated with more primary care visits and contacts, more visits to specialists and diagnostic and curative services, but fewer hospital referrals and repeat prescriptions compared to capitation. Compliance with a recommended number of visits was higher under fee-for-service schemes compared to capitation payment. Fee-for-service resulted in greater continuity of care and higher compliance with a recommended number of visits, but patients were less satisfied with access to their physician compared with salaried payment schemes.43

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A randomised trial of new ways to purchase care services in the US included 451 elderly people receiving care from Kaiser Permanente. One model involved purchasing care services from community agencies. However, it was difficult to establish contractual agreements between Kaiser Permanente and private and community agencies and to locate sufficient community groups to provide appropriate services for older people.44

A case study in the US explored outcomes-based commissioning, whereby payments are linked to achieving mutually agreed upon results. Outcomes are based on the impact of what has been achieved, rather than the tasks performed. Interviews with providers operating under this system suggest that it may foster collaboration, improve accountability, and help use funding more effectively by linking it with other community investments.45

Further work is needed to collate information about models of commissioning that may facilitate improved care for people with long-term conditions. It is worth noting that there may be little evidence upon which to base decisions about commissioning and higher-level service delivery frameworks. A descriptive study of purchasing and policy decisions by a health authority in England found that of 124 service delivery decisions made during one year, only 20% were readily supported with evidence from randomised trials or systematic reviews. Even fewer decisions had sufficient economic data to support decision-making.46 This may be partially because many of the decisions being made had not been investigated by, and may not be appropriate to examine with, quantitative research evidence.

Integrated care

Organisational theory suggests that ineffective team relationships can affect the quality and efficiency of processes. In healthcare, the efficiency and quality of care may depend on the degree to which interprofessional relationships are collaborative.47 ‘Integrated’ or ‘shared care’ is a term used to describe collaborative working, commonly across care in the community (primary care) and hospital (secondary care). However, the term can also be used to refer to multidisciplinary working, and involving health specialists, social care, and voluntary organisations in care processes.

We found evidence from 34 systematic reviews, 103 further randomised trials, and 21 other studies about the following components of integrated care:

- integrating primary and secondary care across organisational boundaries,
- multidisciplinary teams,
- involving nurses in care management,
- chronic care clinics,
- community outreach programmes,
- and integrated home care.

Evidence for each of these components of integrated care is presented below. Related research about integrated care pathways is presented separately overleaf.

Integrating primary and secondary care

Impact on patient experiences

There is some evidence that integrating community and hospital care may improve patients’ knowledge and satisfaction with care. An assessment of 72 disease management programmes in the US found that programmes were more effective if they had strong linkages to primary care and included population-based approaches rather than relying on referrals.48 Patient satisfaction was higher with integrated approaches.

In the US, 200 primary care providers treating about 15,000 people with diabetes introduced a new system with a continually updated on-line registry of people with diabetes; evidence-based guidelines on screening and foot care; improved support for self-management; practice redesign to encourage group visits in primary care; and a diabetes expert care team seeing patients jointly with primary care teams. Patient and provider satisfaction improved, as did use of electronic data and rates of screening and testing. The authors concluded that providing integrated support to primary care teams can improve satisfaction with diabetes care and make better use of healthcare resources.49

In the UK, a randomised trial with 1939 ‘high risk’ people with diabetes found that integrated foot care had a positive impact on primary care staffs’ knowledge and patients’ attitudes about foot care and increased the number of appropriate referrals to specialist services.50

Another randomised trial in the UK evaluated Mental Health Link, a programme designed to improve communication between the teams and systems of care for people with long-term mental illness in general practice. Participants were 335 patients from 23 urban general practices and associated community mental health teams. The integrated system did not improve patients’ perceptions of their unmet need, satisfaction, or general health, however, practitioners were more satisfied with the services provided.51

Impact on quality of care

Health service integration has been promoted to improve efficiency in healthcare delivery and reduce perceived fragmentation of services. Evidence about the impact of integrated care on the quality of care processes is inconsistent, but there appears to be a trend towards improved quality of care in integrated systems.

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.52

A systematic review of 36 studies found that the most effective interventions to improve the management of depression in primary care tended to include clinician education, nurse case management, and enhanced integration between primary and secondary care.53

A review of five randomised trials found that the effectiveness of antidepressant treatments in adults may be improved by collaborative working between primary care clinicians and psychiatrists plus intensive patient education, case management, telephone support, and relapse prevention programmes.54

Collaboration between health professionals may help professionals feel more confident about their decisions and care processes. A study in Europe compared asthma care by GPs alone, care shared between GPs and hospital clinics, and conventional specialist care. Integrated care helped GPs care for people with asthma who they might otherwise have referred for specialist review.55

A meta-analysis of five randomised trials compared GP or hospital care alone or shared GP and hospital care for 1058 people with diabetes. Shared care programmes with a computerised prompting system for GPs and patients had better attendance rates and better glycaemic control compared to hospital care. However, shared care programmes with less well developed support for GPs had more adverse outcomes for patients.56

An additional randomised trial with 206 people with diabetes found that shared GP and hospital care was as effective as hospital-based care. The authors concluded that with adequate support from hospital-based diabetes services, GPs are capable of providing appropriate care for people with uncomplicated diabetes.57

Another randomised trial in 30 general practices in Ireland assessed shared care for 183 people with diabetes. The intervention included practitioner education, community-based diabetes nurse specialists, clinical protocols, and structured communication between primary and secondary care. There were significant improvements in diabetes care delivery, psychosocial outcomes, and information exchange between primary and secondary care, but no clinical benefits for patients.58


A systematic review of different ways to organise asthma care included 27 studies of ways to integrate 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, but shared care was generally as effective as hospital-led care.\(^{59}\)

In the US, follow-up with a primary care provider is recommended after children visit a hospital emergency department for asthma. A randomised trial found that scheduling a primary care appointment at the time of an emergency department visit increased the follow-up rate. However, it was difficult to integrate care, and most children could not obtain a primary care appointment during their hospital visit.\(^{60}\)

Data about self-management interventions tend to be drawn from single programmes rather than efforts to integrate self-management into routine medical care. However, we found one study about integrating self-management support into broader changes in 21 healthcare systems in the US. The study focussed on diabetes and heart failure care over a 13 month period. The quality of care and support provided for self-management improved when healthcare organisations worked together.\(^{61}\)

In England, the Medicines Management Collaborative aims to help people get the right medicines, in the right quantities, at the right time. Sixty-six centres are currently piloting collaborative working strategies such as community pharmacists working with GPs to review medicines. Preliminary data suggest that these integrated programmes increase reviews of patients’ medicines and ensure patients receive help when they need it.\(^{62}\)

In the US, a randomised trial assessed the effect of meeting with a clinical pharmacist during all scheduled primary care visits for older people taking five or more medications for long-term conditions. Over a one year period, this integrated programme reduced inappropriate prescribing and adverse drug events for 208 people. There was no impact on quality of life.\(^{63}\)

In Scotland, an internet-based information management strategy has been developed to give primary and secondary care clinicians access to core clinical information.\(^{64}\) Few studies have been conducted into the benefits of sharing records between primary and secondary care, but those that do exist have inconsistent findings. A randomised trial in the US assessed giving emergency department doctors access to computer-based historical patient records, but sharing information had no effect on admission rates or repeat visits to the emergency department.\(^{65}\)

A case study of electronic messaging about diabetes between hospital consultants and GPs found that GPs did not always integrate consultant feedback into electronic medical records.\(^{66}\) However, in New Zealand, a database was set up to help integrate primary and secondary care services in one area. Data from many different sources were compiled successfully to identify people at high risk of hospitalisation and to examine primary care strategies to reduce the use of specialist services.\(^{67}\)

**Impact on clinical outcomes**

While evidence about the effects of integrated care on patient experiences and quality of care is inconsistent, a number of studies suggest that shared primary and secondary care may improve some clinical outcomes. However, most studies in the UK have found few differences between integrated care and usual care.

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.\(^{68}\)

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Another randomised trial with 363 elderly people in the US found that a single outpatient geriatric assessment (linking services together) plus follow-up strategies prevented functional decline and improved health-related quality of life.\(^69\)

A randomised trial in the US compared comanagement of people with high blood pressure by primary care physicians and clinical pharmacists. Comanagement improved blood pressure control and reduced average visit costs per patient.\(^70\)

Another randomised trial of physicians and pharmacists working together included 95 adults with high blood pressure. People participating in the integrated team approach were more than twice as likely to meet blood pressure targets compared to those receiving usual care (55% versus 20% controls).\(^71\)

A randomised trial of integrated primary and secondary care after hospital discharge involved review at a hospital heart failure clinic, individual and group education sessions, personal diary to record medication and body weight, booklets, and follow-up alternating between the hospital and GP for 197 people with heart failure. 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.\(^72\)

A randomised trial in Australia found that shared care reduced depression among 220 elderly people in residential care. Shared care involved multidisciplinary consultation and collaboration, training GPs and carers to detect and manage depression, and education and activities for residents.\(^73\)

Another randomised trial of collaborative primary care for people with depression in the US included patient education, appointments with a specialist, shared decision-making, and telephone and postal monitoring of medication adherence and symptoms. The authors found that collaborative care reduced symptoms and was cost effective.\(^74\)

A similar trial assessed collaborative care for chronic depression comprising patient education, consultation with a psychiatrist, shared care by a psychiatrist and GP, and monitoring of follow-up visits and adherence to medication. Collaborative care improved quality of care at moderate cost.\(^75\)

Another similar randomised trial in 18 primary care clinics in the US evaluated shared GP and specialist care for 1801 older people with depression. Shared care included a depression care manager supervised by a psychiatrist, a primary care manager who provided education and case management, and brief psychotherapy interventions. Compared to usual care, shared care reduced depressive symptoms and severity, improved treatment adherence, increased satisfaction with care, and improved perceived quality of life.\(^76\) The effects were sustained after two and a half years.\(^77\)

A small, controlled trial of joint primary care treatment of childhood asthma by a doctor, a physiotherapist, a psychologist, and a social worker found improved ventilatory capacity in children receiving integrated care.\(^78\)

Twenty-three health centres in the US participated in a 13 month intervention to improve diabetes care, based on collaborative working between organisations and between patients and providers. Chart review and self-report data suggested improved care processes and clinical outcomes. The model is now being trialled in 50 US healthcare systems for diabetes, congestive heart failure, depression, and asthma.\(^79\)


A Cochrane review compared routine review and surveillance for complications in diabetes by primary care professionals versus secondary care specialists. Five randomised trials with 1058 people were included. In programmes with intensive support such as a prompting system for GPs and patients, there was no difference in mortality between hospital and general practice care. Blood glucose levels tended to be lower in the primary care group. However, schemes with less well-developed support for family doctors were associated with adverse outcomes for patients. The reviewers concluded that unstructured care in the community is associated with poorer follow-up, greater mortality and worse glycaemic control than hospital care. Integrated or supported care may work better. The reviewers found evidence that computerised central recall by GPs, with prompting for patients and doctors, can achieve standards of care as good or better than hospital outpatient care.80

On the other hand, a randomised trial in the UK with 274 adults with diabetes found no significant differences between integrated care and usual hospital care. The integrated care group was seen in general practice every three or four months and in the hospital clinic annually. GPs were given written guidelines for integrated care. After two years there were no significant differences between groups in metabolic control, psychosocial status, knowledge, beliefs about control, satisfaction with treatment, unscheduled admissions, or disruption of normal activities. People receiving integrated care had more visits and greater numbers of examinations at slightly lower cost.81

A randomised trial with 329 people with depression and diabetes in the US found that an integrated primary care education programme which addressed both depression and diabetes improved clinical outcomes in depression but not diabetes. The authors concluded that collaborative care models can improve selected outcomes in people with comorbidities.82

A randomised trial in the US assessed the effect of nurse case management and community health worker interventions on diabetes control for inner city African Americans. Improvements in clinical outcomes were greatest when nurse case managers and community health workers worked together.83

Another randomised trial in the US assessed an integrated programme of care for 167 people with diabetes and poor glycaemic control. The intervention involved group education; daily medical management in primary care; and case management for six months. The integrated care group had improved outcomes compared to usual care. The more contacts participants had with nurse case managers, the more glycaemic control improved. The authors noted that while this programme improved clinical outcomes, it needed significant time, commitment, and careful coordination with many healthcare professionals.84

A randomised trial of integrated care in Scotland included 712 adults attending hospital outpatient clinics with asthma. The intervention included formal assessment, planned visits, and decision support. After one year there were no significant differences between people receiving integrated asthma care and those receiving conventional outpatient care for any clinical or psychosocial outcome.85

**Impact on healthcare resource use**

There is evidence that integrating services between primary and secondary care may improve health resource use and reduce costs. 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. The authors suggested that the Kaiser model performed better at about the same cost as the NHS because of integration throughout the system, efficient management of hospital use, competition, and greater investment in information technology.86

Another 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.  

A systematic review found that strategies targeting patient behaviour change could reduce non-urgent use of the hospital emergency department. Strategies included improving access to primary care clinics or providers; getting 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 found to be beneficial. In the US, applying fees or service charges for emergency department visits (cost-sharing) decreases emergency department use.  

In Italy, a randomised trial of integrated social and medical care included 200 frail elderly people living in the community. Integrated care was associated with fewer admissions to hospital or nursing homes, fewer home visits from GPs, and improved physical and mental status. The estimated financial savings were about £1125 per year of follow-up. The authors concluded that integrated social and medical care may be a cost-effective way to reduce admission to institutions and functional decline in older people living in the community.  

A randomised trial in Scotland examined a computerised model of shared care between general practitioners and hospital specialists caring for 554 people with high blood pressure. Shared care was more cost-effective than either conventional care or follow-up in nurse-led clinics.  

A cost-effectiveness analysis of a paediatric day programme involving intensive medical, nursing, psychosocial, and rehabilitation interventions for children with severe asthma found that outpatient day treatment could cost-effectively reduce asthma severity and improve quality of life for both caregivers and asthmatic children in the US.  

We found evidence from 14 systematic reviews, 29 additional randomised trials, and 10 other studies about sharing care between the primary and secondary sectors. There is some evidence that integrated care can improve healthcare resource use and reduce costs. There is also evidence that integrating care may improve selected clinical outcomes, although few studies in the UK support this. There was inconsistent evidence about impacts on quality of care.  

**Multidisciplinary teams**  

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

**Impact on patient experiences**  

Most of the evidence about impacts on patient experiences focuses on out of hospital care. For example, a systematic review of multidisciplinary team follow-up and regular visits from a nurse, homecare aide, or volunteer following discharge of the elderly from hospital included 11 randomised trials with 3814 participants. Eight out of 11 trials found no effect of multidisciplinary follow-up on emotional state or self perceived health.  

A randomised trial of a multidisciplinary team approach to home-based primary care targeted 647 people at ‘high risk’ in 16 centres in the US. Multidisciplinary home visits did not alter functional status, but were associated with improved quality of life. The initial costs of the programme were higher compared to usual care, but after one year there was no significant difference in overall costs.  

A small randomised trial found that people with type 2 diabetes in Canada favoured usual care plus home visits from a nurse and consultations with exercise specialists and nutritionists over usual care alone, saying they felt more empowered and self-efficacious with the collaborative approach.  

However, a randomised trial of a combined primary-secondary care education package found multidisciplinary teams did not improve diabetes knowledge, awareness, or self-management for people from South Asia living in the UK. Participants were invited to four or more rotating visits per year by a diabetes specialist nurse, dietician, or chiroprist working with general practice staff. A randomised trial in the US assessed a six month multidisciplinary outpatient programme for people with chronic heart failure. The team comprised a telephone nurse coordinator, a specialist nurse, a cardiologist, and a GP. A nurse telephone patients within 72 hours of hospital discharge, then weekly for a month, twice in the second month, and monthly thereafter. Patients had at least monthly follow-up visits with specialist nurses and close interaction with primary care physicians. The programme was associated with significant improvements in quality of life and diet compliance compared to usual care. There was no difference in survival, hospital admissions, or resource use.

A randomised trial examined combined treatment by primary care physicians and psychiatrists for 217 people with depression. The programme improved adherence to antidepressant medication. For those with major depression, but not minor depression, the programme was associated with improved satisfaction with care and reduced symptoms.

On the other hand, a randomised trial with 205 elderly people in the US found that outpatient care in a geriatric clinic with a multidisciplinary team had no benefits for quality of life, depression, or satisfaction compared to usual care.

Impact on quality of care

There is also inconsistent evidence about the impact of multidisciplinary teams on quality of care.

A Cochrane review examined the effect of expanding outpatient pharmacists' roles on health service use, costs, and patient outcomes. Twenty-five studies involving more than 40 pharmacists and 16,000 patients were included. There was some evidence that pharmacist involvement improved patient and physician education.

Another Cochrane review assessed the effects of on-site mental health workers in primary care on the clinical behaviour of primary care providers. Thirty-eight studies were included with more than 460 primary care workers and 3880 patients. There was no evidence that adding mental health workers to primary care provider teams in 'replacement' models promoted a significant or enduring change in the behaviour of primary care workers. 'Consultation-liaison' interventions where primary care and mental health providers work together may lead to changes in prescribing, but these appear to be short-term and limited.

Impact on health professionals

There is some evidence that multidisciplinary teams can benefit healthcare professionals, particularly regarding ongoing professional development. However, the evidence is inconsistent.

Studies in the US suggest better outcomes in people with heart failure cared for by cardiologists rather than generalist physicians, although this can be more costly.

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. There were no significant differences in mortality. 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 or mortality. The reviewers concluded that increasing collaboration between doctors and nurses in hospital improved healthcare processes moderately, but had limited effects on outcomes.

On the other hand, a randomised trial in Thailand found that physician-nurse collaboration and a multidisciplinary team approach in hospital improved quality of care.

A number of US trials suggest that incorporating pharmacists into multidisciplinary teams can improve quality of care. For instance, a randomised trial with 181 people with heart failure found that care from a pharmacist as part of a multidisciplinary team reduced mortality and heart failure events over a six month period. Pharmacist care included medication evaluation, recommendations to the physician, patient education, and follow-up telephone calls.

A similar randomised trial in Canada found that including pharmacists in multidisciplinary care improved the quality of care and prescribing for 80 people with heart failure.

A randomised trial of multidisciplinary team meetings in 33 nursing homes in Sweden included 1854 elderly people, many with dementia or depression. The authors found that improved teamwork among caregivers can improve prescribing as defined by clinical guidelines.

A randomised trial found that integration of pharmacy care helped to reduce inappropriate prescribing, enhance disease management, and improve medication compliance and knowledge in high-risk patients in a rural community in the US.

In contrast, a randomised trial of structured pharmaceutical care provided to 1627 elderly people by community pharmacists in Europe found that while patients rated the intervention positively, there were no improvements in clinical outcomes, quality of life, or cost.

Impact on clinical outcomes

There is inconsistent evidence about the effect of multidisciplinary teams on clinical outcomes. There is also great variation between the types of multidisciplinary programmes and settings assessed. Some take place in hospital, others focus on primary care, others focus on home care, and others assess integrated care across these different settings.

A number of studies have assessed multidisciplinary care in hospital. A Cochrane review of 23 trials of multidisciplinary teams in dedicated stroke wards found that people who received multidisciplinary care were more likely to be alive, independent, and living at home one year after their stroke. The benefits were most apparent in units based in a separate ward. A meta-analysis of multidisciplinary physical rehabilitation programmes versus standard hospital care for stroke and geriatric patients included 11 trials with 2183 participants. Multidisciplinary programmes were associated with improved in-hospital survival and functional ability at discharge, but these effects did not remain at follow-up. More patients receiving multidisciplinary care returned to their home at discharge and remained there during follow-up compared to people receiving usual care. The authors argued that a lack of long-term benefits may indicate that multidisciplinary therapy should be extended to home or primary care settings rather than being discontinued at hospital discharge.

A randomised trial in The Netherlands compared 11 days of inpatient multidisciplinary team care with routine outpatient care in 80 people with rheumatoid arthritis. Those who received multidisciplinary inpatient care had greater improvements in clinical outcomes.

A randomised trial with 70 elderly people with heart failure and high rates of hospital admission found that multidisciplinary care in hospital significantly reduced hospital readmission rates.

In contrast, another randomised trial with 200 people admitted to hospital with chronic heart failure found no significant difference in mortality at six months between multidisciplinary support and nurse management versus usual care. Multidisciplinary support was associated with improved quality of life at six months.

A meta-analysis of intensive care unit physician staffing on patient outcomes compared the use of 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 mortality and length of hospital stay.

Other studies have examined multidisciplinary teams out of hospital. A systematic review of 35 trials of multidisciplinary teams in rheumatoid arthritis found that multidisciplinary care had favourable short-term effects on disease outcomes compared with usual outpatient care. There was insufficient evidence about longer-term outcomes.

A systematic review of multidisciplinary programmes for people with chronic pain collated information from five previous systematic reviews. Multidisciplinary programmes were effective for some types of chronic pain, but not others. There was insufficient evidence about whether multidisciplinary programmes are cost effective.

A systematic review of non-pharmaceutical strategies for elderly people with dementia found insufficient evidence in two studies to support multidisciplinary teams.

A randomised trial of 59 women with rheumatoid arthritis in Sweden found that, compared to usual hospital outpatient clinics, care from a multidisciplinary team improved health status and mental wellbeing. There were no differences in use of medications or specialist consultations.

A randomised trial in the Northern Ireland compared a community-based multidisciplinary stroke team with hospital-based rehabilitation for 113 people. There were no significant differences between groups in clinical outcomes.


A randomised trial with 234 people with heart failure compared a multidisciplinary team programme at a day hospital with a cardiologist, nurses, physiotherapist and individualised care plan versus usual care after hospital discharge. At one year, the multidisciplinary programme significantly reduced hospital readmissions and cardiac death compared to usual care.123

A randomised trial of multidisciplinary care by a psychiatrist, psychologist, and nurses in Australia found that multidisciplinary care improved symptoms and behaviours more than usual care in 99 nursing home residents with advanced dementia.124

A randomised trial of a home-based interdisciplinary team programme for 219 chronically ill children found that multidisciplinary home care improved satisfaction with care, but had no impact on functional status.125

**Impact on healthcare resource use**

There is some evidence that multidisciplinary team approaches may reduce healthcare resource use.

There is evidence about multidisciplinary care within and outside of hospital. For instance, a randomised trial in the US assessed a multidisciplinary intervention in high risk adults hospitalised with heart failure. Participants were 282 people aged over 70 years. The intervention included education about heart failure and its treatment by an experienced cardiovascular research nurse; individualised dietary assessment and instruction by a registered dietitian; 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. The intervention reduced hospital readmissions compared to usual care. The overall cost of care was higher in the control group by US$460 per person.126

A similar randomised trial in the US examined multidisciplinary assessment in hospital for 98 elderly people with heart failure. The intervention involved education by a geriatric cardiac nurse, medication review by a geriatric cardiologist, consultation with social services to facilitate discharge planning, dietary teaching by a dietician, and follow-up after discharge by a home care team. The multidisciplinary strategy reduced readmissions and days in hospital, particularly among those at moderate risk for early rehospitalisation.127

Similarly, a randomised trial in The Netherlands found that multidisciplinary treatment of 237 elderly people in hospital improved physical functioning and reduced readmissions and length of hospital stay compared to usual care.128

Regarding out of hospital care, 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, but had no impact on mortality.129

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 cost-effective and were associated with fewer hospital admissions. There was no strong evidence that multidisciplinary programmes improved quality of care or mortality.130

A randomised trial in Ireland found that multidisciplinary care for 98 people with heart failure was cost-effective compared to usual care.131 Nurse-led education plus specialist dietician advice significantly reduced hospital readmission compared with usual care at 12 weeks (2% versus 23% usual care).132


Another trial of multidisciplinary care for 754 people with heart failure in the US found the programme reduced hospitalisations, improved functional capacity, and reduced costs to both the patient and the institution.\textsuperscript{133}

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. The intervention included educational materials, counselling, discharge assessment, outpatient support groups, physician collaboration, home visits by specialist nurses, and telephone case management. The authors found that multidisciplinary disease management for unselected patients with chronic heart failure did not have an effect on the use or costs of acute health care. The intervention increased the use of healthcare and costs in patients who were fully functional before hospital admission. The intervention was most beneficial for people at low risk or with less severe difficulties.\textsuperscript{134}

A randomised trial with 309 people in the US compared referral to an asthma specialist when people presented to the emergency department with asthma versus outpatient management from general physicians. Referral to a specialist improved asthma symptoms and reduced return visits to the emergency department by almost half.\textsuperscript{135}

A randomised trial of a multidisciplinary case management programme for people with chronic renal insufficiency in the US included 437 participants. The two-year intervention 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 renal function, health services or medication use, or mortality for up to five years. The direct costs of the intervention were US$484 per participant.\textsuperscript{136}

A cost-effectiveness analysis of a team-based case management programme in Sweden found that multidisciplinary case management for vocational rehabilitation of 239 people with minor chronic conditions had a positive cost-benefit ratio. The authors suggested that cross-boundary awareness and interdisciplinary working was important.\textsuperscript{137}

A randomised case control study in Hong Kong evaluated a protocol for nurse follow-up of elderly people with chronic obstructive pulmonary disease in 45 nursing homes. Community nurse visits to support nursing home staff enhanced older residents’ psychological wellbeing, but had no impact on functional and respiratory outcomes or hospital service use.\textsuperscript{138}

A randomised trial in the US examined multidisciplinary team assessment for 117 frail older people. Compared to usual care, multidisciplinary teams were associated with fewer days in hospital and less hospital costs.\textsuperscript{139}

A randomised trial in Australia evaluated geriatric assessment and multidisciplinary follow-up for 739 elderly people sent home from the emergency department. Compared to usual care, the multidisciplinary assessment and follow-up team had fewer hospital admissions. There was no difference in admission to nursing homes or mortality.\textsuperscript{140}

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. Management by a multidisciplinary geriatric team improved mobility and social interaction compared to primary care alone. There was no difference between groups in mortality or hospital or institutional admissions.\textsuperscript{141}


Hospitalists are general physicians who specialise in inpatient medical care, predominantly in the US. A cost-effectiveness analysis of hospitalists versus primary care physicians in the US with almost 10,000 patients found that hospitalists were associated with a shorter length of stay and a lower readmission rate. The average cost of care from hospitalists was approximately US$1000 lower per person compared to traditional care. There was no difference in morbidity or mortality.  

Evidence from 14 systematic reviews, 33 additional randomised trials, and six other studies found inconsistent evidence about the benefits of multidisciplinary teams on clinical outcomes. There is some evidence that multidisciplinary teams may improve patient satisfaction and reduce healthcare resource use.

**Increased use of nurse practitioners**

A number of trials and reviews have considered using the skills of nurses more fully within integrated or multidisciplinary chronic care programmes. For example, a randomised trial compared care by a GP plus a nurse practitioner or care by a GP alone for 157 people with hypertension and diabetes in the US. While the personnel costs were slightly higher in the nurse group, patients had improved clinical outcomes and satisfaction after one year.  

The most common strategies for expanding the role of nurses include:

- care by specialist nurses,
- nurse-led clinics,
- and nurse-led outpatient follow-up.

Many studies of nurse-led care focus on case management. These are reported in another section of the review.

**Specialist nurses**

There is inconsistent evidence about the benefits of care by specialist nurses, trained to care for people with a particular condition. Only a small number of examples are presented here.

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. Two trials were with adolescents. There was no difference between groups in blood glucose levels at 12 months, emergency hospital admissions, or quality of life.  

In contrast, a randomised trial assessed the cost-effectiveness of nurse specialist care, in-patient team care, or day patient team care in 210 people with rheumatoid arthritis. Compared with inpatient and day patient team care, care from nurse specialists resulted in equivalent quality of life and functional status, at lower cost. However, there were no significant differences in medical treatment, clinical outcomes, or hospitalisations at two-year follow-up.  

A randomised trial of specialist asthma nurses included 324 people aged between 4 and 60 years from 44 general practices in the UK. Specialist nurses reviewed patients in nurse-led clinics and provided educational outreach, guidelines, and ongoing clinical support for GPs and practice nurses. This model reduced unscheduled visits for asthma compared to usual care.  

Another randomised trial with 74 children in The Netherlands found that nurse-led outpatient management of childhood asthma was clinically comparable to management by a paediatrician. Healthcare costs and outpatient visits reduced with nurse-led care.

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Nurse-led clinics

In a number of European countries there has been a shift towards using nurse-led clinics to manage chronic conditions in primary care. A review of the literature and an additional randomised trial suggested that nurse-led clinics may provide better quality care compared to traditional physician-led care.\(^{149,150}\) Research from Sweden, The Netherlands, and the UK suggests that nurse-led clinics are effective for managing chronic obstructive Airways disease and asthma,\(^{151}\) heart failure,\(^{152}\) diabetes,\(^{153}\) and people receiving anticoagulant therapy.\(^{154}\)

For instance, in a randomised trial with 1407 people with diabetes in the UK, monthly nurse-led clinics improved clinical outcomes more than usual care.\(^{155}\) Another randomised trial in the UK found that school-based nurse-led clinics for adolescents with asthma increased uptake of asthma reviews, but did not improve clinical outcomes compared to usual GP care.\(^{156}\)

In Scotland, a randomised trial of preventive nurse-led primary care clinics included 1343 people with heart disease. Nurse-led clinics improved risk factors and reduced deaths after one year. Effects were sustained after four years.\(^{157}\)

However, other studies have found conflicting results. A Cochrane review suggested that nurse-led management of chronic Airways disease is associated with improved outcomes when the disease is moderate, but not when it is severe.\(^{158}\)

A randomised trial in the US compared care processes and outcomes of nurse practitioners versus primary care physicians for adults with type 2 diabetes. Nurse practitioners documented the provision of diabetes education and selected monitoring tests more frequently than doctors, but these differences had no effect on patient outcomes at six months.\(^{159}\)

Nurse-led follow-up

There is insufficient evidence about the effects of nurse-led follow-up, by telephone or in person, for people with long-term conditions.

A systematic review found that nurse-led interventions for people with long-term conditions tend to be most effective with people who are not too elderly, or if the intervention is tailored to older people with specific health problems. Effectiveness depended on the duration of follow-up, number of follow-up visits, and personality and training of the nurse.\(^{160}\)


A randomised trial with 74 children in the US compared nurse-led outpatient management of childhood asthma versus follow-up by a paediatrician. After one year, there were no significant differences between groups in symptom-free days, health status, quality of life of patients, or quality of life of caregivers. The authors concluded that following initial assessment in a multidisciplinary clinic, childhood asthma can be successfully managed by an asthma nurse in close cooperation with a paediatrician.\(^{161}\)

Another randomised trial in the US found that intensive nurse follow-up of 363 hospitalised older people at high risk for poor outcomes reduced readmissions and days in hospital. There were no significant differences in post-discharge care visits, functional status, depression, or patient satisfaction.\(^{162}\)

A randomised trial of nurse-led telephone education and follow-up included 275 people with diabetes in the US. Nurses telephoned participants in between visits to the doctor to monitor health status and provide education. The intervention was associated with improved glycaemic control, but not quality of life or diabetes-related symptoms.\(^{163}\)

A randomised trial with 208 elderly people with heart failure in Sweden found that follow-up by nurses after hospital discharge was more effective than follow-up in primary care clinics for optimising medication. However, nurse follow-up did not improve quality of life or hospital readmission rates.\(^{164}\)

However, a cost analysis in Korea found that nurse visits for low-income older people with long-term conditions was more cost-effective than outpatient visits or residential care.\(^{165}\)

**Chronic care clinics**

Chronic care clinics are another intervention for integrating primary and secondary care. ‘Chronic care clinics’ have been defined in two differing ways:

- Group visits to primary care for people with chronic conditions. During group visits patients may participate in routine check ups, multidisciplinary discussions, and education sessions.
- Clinics based in primary or specialist care that have multidisciplinary input, such as hospital specialists attending primary care. These specialist ‘outreach clinics’ are usually visited by individual patients rather than involving group sessions.

This section describes evidence about group visits to primary care practices for chronic care. The next section focuses on specialist outreach clinics.

**Impact on quality of care**

A randomised trial assessed primary care group visits for people with diabetes in the US. Groups of about eight people took part in half day chronic care clinics comprising standardised assessments; visits with the primary care physician, nurse, and clinical pharmacist; and a group education / peer support meeting. After two years, those attending chronic care clinics had received more recommended preventive procedures and patient education, had better general health, and had fewer days of disability. People attending clinics had slightly more primary care visits, but fewer visits to specialists and emergency departments. The more chronic care clinics people attended, the better their satisfaction and clinical outcomes tended to be.\(^{166}\)

A randomised trial in the US found that providing care for people with uncontrolled diabetes in group visits improved standards of care, satisfaction with care, reported coordination of care, and cultural appropriateness of care.\(^{167}\)

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Impact on clinical outcomes

Another trial of chronic care clinics for frail older adults included 169 patients at nine primary care practices in the US. Intervention practices held half day clinics every 3 to 4 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 patient support group. After two years, although patients expressed high levels of satisfaction with their care, there was no change in clinical outcomes. There were no differences in the costs of medical care between groups, including frequency of hospitalisation, days in hospital, emergency and ambulatory visits, and total costs of care.168

Impact on healthcare resource use

A randomised trial in the US assessed primary care group visits for 295 chronically ill older adults. Group visits involved a small number of patients meeting together with health professionals every month. After two years, people attending primary care group sessions had less emergency department visits compared to controls.169

In another randomised trial, monthly group visits to GPs and nurses reduced repeat hospital admissions and emergency care use, delivered some preventive services more effectively, and increased physician and patient satisfaction among for 321 chronically ill elderly people. The total cost of care over one year was slightly less in the chronic care clinic group (US$279 per patient versus $294 controls).170

A randomised trial in the US assessed monthly primary care group clinics for 294 chronically ill older people. People attending group visits had fewer hospital admissions and emergency department visits, and lower healthcare costs compared to usual care. The clinic group had better reported quality of life, satisfaction with care, and self-efficacy. There was no difference between groups in health status, outpatient and pharmacy services, or home healthcare.171

We found insufficient evidence to draw conclusions about chronic care clinics (group visits to GP practices). In six randomised trials there was a trend towards reduced healthcare resource use and improved patient satisfaction with care.

Specialist clinics

Impact on clinical outcomes

Open access clinics which link primary and secondary care have been used to follow up people with chronic conditions who traditionally require long-term hospital monitoring. A randomised trial in Wales assessed open access clinics for 180 adults with inflammatory bowel disease. ‘Open access clinics’ involved encouraging patients 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 patients had difficulty obtaining an urgent appointment. There were no significant differences in specific investigations undertaken, inpatient days, GP clinic or home visits, drugs prescribed, patient costs, or quality of life. The average total cost in secondary care was lower for open access patients, but when primary care and patient costs were added there were no significant differences in total NHS or societal costs. GPs and patients both preferred the open access model. The authors concluded that open access follow-up of patients with chronic inflammatory bowel disease is better than follow-up using routine booked appointments. Open access clinics use fewer acute sector resources, result in the same quality of life for patients, and are preferred by patients and GPs.172

In the UK, people with rheumatoid arthritis are traditionally seen regularly as outpatients, regardless of perceived need. A randomised trial compared routine outpatient review (usual care) versus no routine follow-up, but access to rapid review on request (direct access). There were no clinical differences between groups at two or four years. People in the self-referral group had higher self-efficacy and greater satisfaction and confidence than the usual care group.173

An observational study in the UK assessed 30 people's views about open access to appointments rather than fixed outpatient appointments as part of a guided self-management intervention for inflammatory bowel disease. These patients preferred open access rather than fixed appointments because they felt more in control of their care and thought that care fitted in better with their everyday routines. However, some people preferred fixed appointment systems so they didn't have to explicitly ask for help.  

A systematic review of 26 randomised trials of geriatric services found that specialist geriatric units and day hospitals did not improve mortality or rates of institutionalisation.  

Another attempt to bridge the gap between hospital and community care for people with long-term conditions is ‘Transmural Care’ developed in The Netherlands. Here, hospital care and community care are provided by different organisations. Transmural Nurse Clinics provide a link between primary and hospital care. An evaluation in rheumatology found that attendance at a Transmural Clinic led to increased attendances with specialists and therapists, but no significant improvement in functioning or use of appliances. Another study of Transmural Clinics for children with asthma found that parents felt more informed using this model.  

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 primary care clinics. There was no difference between groups in 9 out of the 11 outcomes in the trial.  

Impact on healthcare resource use  

In many countries, specialist medical 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. Specialist outreach as part of more complex multifaceted interventions involving collaboration with primary care, education, or other services was associated with improved health outcomes, more efficient and guideline-consistent care, and less use of hospital services. The reviewers concluded that the additional costs of outreach clinics may be balanced by improved health outcomes.  

A randomised trial with 338 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, improved survival and quality of life, and reduced the cost of care.  

We found inconsistent evidence about specialist clinics for chronic conditions from three systematic reviews, three additional trials, and three other studies.  

Integrated community outreach  

Another method for integrating care involves delivering services in venues such as community centres or making links with community organisations or the voluntary sector. A number of authors have suggested potential advantages with this approach or described their attempts to use community centres, schools, churches, and voluntary organisations (mostly for health promotion rather than chronic care).  

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However, few randomised trials or systematic reviews have investigated the effects on quality of care or patient outcomes of partnerships with the public and voluntary sectors.186

**Impact on quality of care**

A randomised trial found that co-ordinating care between community groups and healthcare providers can improve service use and increase satisfaction. The US Alzheimer’s Association integrated their care consultation service with the services offered by a managed care system for people with dementia and their caregivers, resulting in improved access to services.187

Another randomised trial of 5307 people with Alzheimer’s disease in the US found that providing care in the community was associated with greater use of community services, but no difference in clinical outcomes.188

A controlled trial trained staff in 22 community child health clinics in the US to diagnose and manage asthma. Offering care in the community helped improve the quality and quantity of services accessed by children from minority ethnic groups.189

A randomised trial in the UK compared rehabilitation for 105 older people in a day hospital and in social services day centres with visiting therapists. The authors found that using centres in the community helped share skills and resources, but there were problems with the acceptability of facilities and attitudes of staff and regular attendees.190

Another study of care in the community for over 65 year olds has recently been conducted across 11 European countries. The study found that community care services vary widely between countries and that the structure, quantity, and targeting of community care all make a difference to patient outcomes.191

**Impact on clinical outcomes**

A systematic review of 14 randomised trials examined whether providing clinical pharmacy services for the elderly in community-based settings reduced drug-related problems and improved health. Five of the trials involved interventions in the home, three began at hospital discharge with home follow-up, three were clinic-based, one was conducted in the community pharmacy setting, and two were conducted in long-term care facilities. The reviewers found that community pharmacy interventions reduced the incidence of drug-related problems but there was limited evidence of an effect on morbidity, mortality, or healthcare costs.192

A randomised trial of a disability prevention and self-management programme at a community seniors centre in the US included 201 chronically ill adults aged 70 years or older. Participants met with a nurse up to eight times over the course of a year. These people had fewer declines in function and higher levels of physical activity compared to controls. The authors concluded that community-based collaboration with primary care providers can improve function and reduce hospitalisation in older adults with long-term conditions.193

A randomised trial in the US found that a six-week community-based programme for 551 Spanish speaking people with chronic conditions improved health status, health behaviours, and self efficacy and reduced emergency department visits. Improvements remained after one year.194

A randomised trial compared centralised case management versus neighbourhood team case managers. Community team case managers had much smaller caseloads and were assigned a specific local catchment area. Community teams cost less than individual case management, due to reductions in hospital days and home care. There was no difference in mortality during the first year, but mortality was lower for the community team group during the second year.195

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A number of studies suggest that using community-based volunteers to support people with long-term conditions can have some benefits. For instance, a randomised trial in London found that volunteers ‘befriending’ women with chronic depression improved clinical outcomes.  

Similarly, a randomised trial in Canada found that community-based volunteers were just as effective as health providers at reducing alcohol consumption among 106 people with chronic alcohol problems.  

A number of randomised trials in the US suggest that church-based prevention programmes can improve health outcomes.  

We found insufficient evidence to draw conclusions about community outreach and collaboration with the voluntary sector in chronic care. Evidence from one systematic review, 11 randomised trials, and one other study suggested a trend towards increased access to care and some improved clinical outcomes with community outreach models.  

Integrated home care

Impact on quality of care

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 reduced hospital stay may be offset by costs incurred in the community. Patient satisfaction may increase, but carer satisfaction tends to decrease.  

Another systematic review of 13 studies found that there is insufficient evidence about factors influencing whether people with long-term conditions use professional home care.  

In some areas children newly diagnosed with diabetes are admitted to hospital for stabilisation and training, even if they are not ill. A Cochrane review of six studies of outpatient or home-based programmes for these children found that home management did not have any negative effects on metabolic control, diabetic complications and hospitalisations, psychosocial variables and behaviour, or total costs. However, the reviewers noted the poor quality of available evidence.  

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 care home environments, hospital environments, and own home environments on rehabilitation in older people.  

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.  

A systematic review of nurse home visiting included interventions with the elderly, family support, and health information, among others. The review included 11 studies with 4434 participants. Home visiting was associated with positive effects on physical, mental and social health, knowledge, and service use. However the interventions and their effects were disparate.  

In Australia, a randomised trial evaluated home visits by a community nurse for 177 people with chronic obstructive pulmonary disease after discharge from hospital. Those receiving home care were more satisfied with their care and more knowledgeable about their condition. There were no differences between groups in GP visits, hospital admissions, or functional status.  

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**Impact on clinical outcomes**

A Cochrane review found improved clinical outcomes from nurse-led home visiting in moderate chronic airways disease, but not severe disease.\textsuperscript{207}

A systematic review of 18 trials with 13,447 people aged over 65 years found that home visits may prevent functional decline in older people provided the interventions are based on multidimensional geriatric assessment, include multiple follow-up home visits, and target people at lower risk for death. The reviewers found that the more frequently home visits occurred, the greater the benefits.\textsuperscript{208}

188 people aged 75 years or older who were physically frail and living at home participated in a six month randomised trial of home-based physical therapy. The programme reduced progression of functional decline. It was most useful for those with moderate, but not severe frailty.\textsuperscript{209} An additional randomised trial in Germany found that multidisciplinary home care reduced falls in 360 frail older people compared to usual care.\textsuperscript{210}

A randomised trial in Turkey compared stroke rehabilitation in hospital or at home. Those who received multidisciplinary care in hospital had better clinical outcomes than those who received care at home.\textsuperscript{211} On the other hand, in New Zealand, a randomised trial with 100 people found a supervised home-based programme was as effective as outpatient or day hospital therapy following stroke.\textsuperscript{212}

A cohort study targeting ‘high risk’ people with heart failure found that a home visit and ongoing follow-up was associated with fewer unplanned readmissions and out of hospital deaths within six months of hospital discharge.\textsuperscript{213}

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**Impact on healthcare resource use**

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, with a trend towards reduced overall healthcare costs.\textsuperscript{214}

A randomised trial with 222 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 patients had free-phone access to nurses for an eight week follow-up period. There was no difference between groups in mortality and hospital readmissions. Home care patients had fewer emergency department visits, improved quality of life, improved knowledge of their condition, better self-management, and greater satisfaction. Home hospitalisation reduced the overall cost of care by 38% compared to conventional hospitalisation.\textsuperscript{215}

On the other hand, a randomised trial in Australia assessed home visits by a nurse, with collaboration between general practitioners and hospital services, for 96 people with severe chronic obstructive pulmonary disease. Home visits were no different from usual care in mortality, hospital admissions, length of stay, or number of outpatient or emergency department visits.\textsuperscript{216}

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 overall quality of life or hospital readmissions. Transitional care was associated with fewer emergency department visits at 12 weeks (29% versus 46% usual care).\textsuperscript{217}

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A randomised trial in the UK found that multidisciplinary home-based care for people aged 17-64 with severe mental illness facing emergency hospital admission was cost-effective compared to usual care.218

Another randomised trial in the UK assessed a community support scheme for 903 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 a week for two weeks. Three months after initial discharge, there were no significant differences between groups in physical independence, morale, or death. However, 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.219

A cost-effectiveness analysis in Canada assessed home care as a substitute for long-term institutional services for older people. Costs were significantly lower for people receiving integrated care at home compared to institutional care.220

A cost-effectiveness study in Korea with 99 people who had a stroke found that integrated home care was more cost-effective for people who had relatively high levels of physical and cognitive functioning. Care in institutions such as nursing homes was more cost-effective for people with higher levels of dependency.221

We found evidence from nine systematic reviews, nine additional randomised trials, and three other studies suggesting that integrated home care may reduce healthcare costs, but there is insufficient evidence about impacts on quality of care.

**INTERVENTIONS TARGETING SYSTEMS OF CARE**

As well as broad initiatives to manage care for people with long-term conditions in different ways, we found evidence about specific tools, systems, and processes that have been trialled in chronic care. This section summarises research about systems such as evidence-based care pathways, risk stratification and data monitoring tools, and staff educational strategies.

**Evidence-based care pathways**

Evidence-based care pathways are a tool to help provide more integrated and continuous care. Care pathways aim to provide guidelines about how patients should progress through healthcare systems, and what services and medications they should be accessing at various times. They also aim to help providers work together using a ‘whole systems’ approach. Care pathways developed based on high quality research evidence are termed ‘evidence-based pathways’.222

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 chronic conditions such as diabetes and heart disease, and also specifically on long-term conditions. However, NSFs tend to focus on single diseases or groups of diseases. They do not focus on managing comorbidities.

We found four systematic reviews, 12 additional randomised trials, and four other studies about care pathways or ways to integrate clinical guidelines into everyday practice.

**Impact on quality of care**

There is little evidence about the impact of care pathways on quality of care for people with long-term conditions. A randomised trial of integrated care pathways following stroke included 152 people in the UK. The care pathway was a goal-orientated time-managed plan that aimed to facilitate interdisciplinary coordination, improve discharge planning, and reduce length of hospital stay. However, the care pathway had no benefits over usual multidisciplinary care in a stroke rehabilitation unit.222,223

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Impact on clinical outcomes

There is inconsistent evidence about the effects of care pathways on clinical outcomes. A Cochrane review of ten studies assessed the effects of care pathways compared to standard medical care among 132 participants. There was no difference between care pathway and control groups in death, dependency, or discharge destination. There was some evidence that patient satisfaction and quality of life may be lower in the care pathway group.224

A randomised trial compared integrated care pathways with conventional care for stroke rehabilitation among 152 people. Conventional care was associated with better quality of life and functioning compared to integrated care pathways.225

A Cochrane review of clinical practice guidelines and care pathways in nursing included 18 studies with 467 healthcare professionals. Three out of five studies found that clinical guidelines improved processes of care. Six out of eight studies found that guidelines improved clinical outcomes. Six studies suggested that there was no difference between care given by nurses using guidelines and physician care.226

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. Use of the software was limited.227

A trial with 312 people with diabetes assessed a quality improvement programme consisting of clinical practice guidelines and care pathways, postgraduate education, audit and feedback, templates to register diabetes care, and a recall system. The intervention group received care more in accordance with guidelines, but there were no effects on clinical outcomes.228

A cohort study in Hong Kong compared protocol-driven care with usual outpatient care for people with type 2 diabetes. Over a seven year period, protocol-driven care improved survival and clinical outcomes.229

Impact on healthcare resource use

A randomised trial assessed care pathways for 110 under 18 year olds hospitalised with asthma in the US. The care pathway group had shorter hospital stay and less medication use. There were no differences in health service use following discharge.230

A cost-effectiveness analysis of a critical pathway approach to treating diabetics with pedal infections was conducted in the US, using a multidisciplinary team and written protocols to progress patients between departments. The authors concluded that, over an 18-month period, the critical pathway decreased length of hospital stay, rates of amputation above the ankle, and costs compared to usual care.231

We identified little evidence about the effects of evidence-based care pathways in chronic care. Two systematic reviews, five additional randomised trials, and two other analyses had inconsistent findings.

Methods to integrate guidelines

Practice guidelines are systematically developed statements to help patients and health professionals make decisions about appropriate healthcare. A number of studies have assessed methods to integrate clinical guidelines into everyday care for people with long-term conditions.

A systematic review by the NHS Centre for Reviews and Dissemination examined whether practice guidelines can change the behaviour of health professionals and, if so, how best to introduce them into clinical practice. The reviewers concluded that introducing guidelines can change clinical practice and improve patient outcomes. The reviewers found that guidelines are more likely to be effective if they take into account local circumstances, are linked explicitly to evidence, are disseminated by an active educational intervention, and use patient-specific reminders.232

An evidence review conducted for the American College of Cardiology and American Heart Association found strong evidence that the following interventions improve adherence to guidelines: 233

- 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.


A randomised trial in the US found that giving a heart failure guideline to physicians and following up with written and verbal reminders about recommended actions did not change how heart failure was treated in the intensive care unit.234

Another randomised trial in the US included 169 people with heart failure receiving provider education only; a group where both providers and patients were notified of care guidelines; and a group where a nurse facilitated the use of appropriate medication. People in the nurse-facilitated group were more likely to receive appropriate medication compared to other groups. There were no significant differences between groups in adverse events. The authors concluded that using provider education, clinical reminders and guidelines, and patient education was of limited value in ensuring that people received appropriate medication.235

A randomised trial with 371 people receiving nurse-led home care for heart failure found that an evidence-based nursing protocol and training to improve nurses' teaching and support skills did not improve patient outcomes.236

In Norway, a randomised trial found that a computer-based clinical decision support system did not improve implementation of guidelines among 53 GPs.237,238 Nor did computer systems change doctors' behaviour or in outcomes for people with diabetes.239

One the other hand, a randomised trial in the UK found that practice-based education about guidelines improved diabetes management, but had less effect in asthma.240


A before and after study in the US assessed whether a computer system providing data related to clinical guidelines and reminders affected adherence to clinical guidelines in primary care. Over an 18 month period the authors found that the availability of practice-based data and computerised clinical guidelines was associated with significant improvements in physician adherence to guidelines.241

Another before and after study in the US found that inserting an asthma guidelines flow sheet into patient notes improved physicians’ adherence to guidelines.242

In contrast, another before and after study found that a diabetes management flow sheet inserted into patient charts with or without quarterly provider feedback about compliance levels had limited impact on physicians’ behaviours. However health professionals believed that using the flow sheet and feedback increased their awareness of diabetes management guidelines, even if it did not alter their behaviours.243

We found two systematic reviews, five additional randomised trials, and three other studies about implementing guidelines in chronic care. Active, targeted, educational methods appear to work best to encourage health professionals to follow guidelines.

Targeting people at ‘high risk’

The Kaiser approach from the US, the Chronic Care Model, and the Department of Health all emphasise the importance of targeting people at greatest risk of using healthcare resources for more intensive interventions.

Much of the evidence about targeting people at high risk focuses on case management. A case manager is a person assigned to organise, integrate, and review care for an individual patient. One case manager may be responsible for managing the care of many tens of patients. A more detailed summary of the evidence about case management is presented overleaf. This section focuses on studies which specifically evaluated risk assessment and targeting.

We found two systematic reviews, six additional randomised trials, and eight other studies (mainly cost-effectiveness analyses) about targeting people at high risk and risk stratification tools.

Impact on quality of care

A Kings Fund assessment of five ‘high performing’ organisations running managed care programmes in the US found that four out of five organisations used risk stratification techniques to identify people at high risk and targeted these people for intensive case management (nurse-led follow-up).244

Specialist geriatric management programmes involve targeting people at high risk for focused assessment. A randomised trial of inpatient and outpatient geriatric management included 834 frail elderly people in 11 US hospitals. Compared to usual care, outpatient geriatric evaluation and management reduced serious adverse drug reactions. Both inpatient and outpatient geriatric management reduced suboptimal prescribing.245

Impact on clinical outcomes

There is some evidence that targeting those at greatest risk of hospitalisation or frequent visits to health professionals may improve clinical outcomes. For instance, a meta-analysis of 28 controlled trials with 9871 patients evaluated inpatient geriatric units, inpatient consultation services, outpatient geriatric consultation services and home assessment for elderly people discharged from hospital. Enhanced targeted assessment was associated with improved mortality and physical function at one year.246

A meta-analysis of studies to increase activity among aging adults found that the most effective programmes were group-delivered interventions which incorporated self-monitoring, included specific activities rather than general health education, and targeted specific ‘high risk’ groups or people with particular diseases.247

A randomised trial of integrated stroke care with 249 elderly people in hospital found that, when targeted towards those at highest risk, integrated care increased survival and reduced the need for institutional care.248

Impact on healthcare resource use

There is some evidence that targeting people at high risk may make most efficient use of healthcare resources. A randomised trial assessed whether focussing services on people at ‘high risk’ would make case management more effective among 302 people in the US. There was no difference overall between case management and usual care in length of hospital stay, service use following discharge, or patient satisfaction. However, the findings differed when people where 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 (3 days less than usual care). The authors concluded that case management was most effective among people at high risk.249

In England, a health centre in Cheshire has trialled a case management approach targeting high risk patients over the age of 65 years. People were visited at home by a nurse for an initial assessment. The nurse then coordinated care and facilitated patient education. There was a 15% reduction in admissions and 31% reduction in length of hospital stay.250

Evaluation of a programme developed in the US for ‘high cost’ patients found a 60% reduction in total hospitalisations, a 15% increase in functional status, and a 55% decrease in total costs among 1915 people with heart failure over a 13 month period. The programme used standardised, disease-specific protocols and case managers to support self-management.251

A cost analysis emphasised the importance of adequate screening for case management programmes. The authors developed a 5-question screening tool based on US Medicare data. The authors found that using screening tools, even those with low predictive value, can help to ensure case management is correctly targeted and more cost-effective.252

Similarly, a cost-effectiveness analysis found that people at high risk of clinical deterioration or hospitalisation were most likely to benefit from disease management programmes.253

An analysis of eye examinations in people with diabetes also found that targeting people at high risk may be most cost-effective.254

We found evidence from two meta-analyses, three additional randomised trials, and six other studies that targeting ‘high risk’ patients most likely to use health services or people with the most serious or complex disease profile may be most cost-effective in chronic care.

Assessment tools

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.

For instance, the PRA is one of the most widely used screening tools for older adults at risk of increased healthcare use in the US. A cohort study with 6802 older adults in the US found that using screening tools can help predict people at high risk of service use and hospitalisation.255

A small randomised trial in the US assessed the benefits of providing 24 case managers with information about the risks and potential benefits of different types of care for their patients. The authors concluded that providing case managers with risk assessment tools can improve targeting of services for people long-term conditions.256

Another study in the US found that predictive modelling and simple databases could improve the quality and integration of care for people with diabetes.257

In England, the Department of Health have funded several investigations of monitoring tools and risk stratification methods, including the development of new indicators and assessment techniques.258

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 in chronic care. However, as described above, the broad principle is to assign each person a ‘case manager’ or small team to assess the patient’s needs; develop a care plan; arrange suitable care; monitor the quality of care; and maintain contact with the patient and their family.

A great deal has been written about case management for people with long-term conditions, yet the evidence of it’s effect on clinical outcomes and resource use remains inconsistent. We found 11 systematic reviews, 19 additional randomised trials, and four other studies about the effects of case management for people with long-term conditions.

Impact on quality of care

There is inconsistent evidence about the effect of case management programmes on quality of care.

A systematic review found that for people with diabetes, case management may help to improve glycaemic control and provide monitoring of glycaemic control, but evidence was drawn primarily from the US. The reviewers suggested that case management is effective when delivered in conjunction with broad disease management programmes and when delivered with one or more additional educational, reminder, or support interventions.259

Another 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 populations, including the chronically ill. The reviewers found no benefits from case management in processes of care, functioning, quality of life, or symptom control.260

A small randomised trial of nurse-led case management for people with chronic obstructive pulmonary disease found little difference between groups in unplanned readmissions, depression, symptoms, support, and perceived wellbeing. However, according to patients and caregivers, case management improved access to resources and communication between patients and staff. Nursing and medical staff thought that case management improved communication between staff and enhanced patient care.261

A review of eight other published reviews of case management in mental health found some evidence that paraprofessionals and peer-assisted models could have benefits in case management, but emphasised the need for further research in this area.262

Impact on clinical outcomes

There is inconsistent evidence about the effect of case management on clinical outcomes.

A systematic review included 27 studies of general disease management programmes and 15 studies of case management with at least 15,000 people with diabetes. Both general disease management programmes and case management were associated with improved glycaemic control.263

A meta-analysis of 24 studies of case management for people with severe and persistent mental illness found that overall, case management interventions are effective. Seventy-five percent of people who participated in these programmes did better than the average person who had not been case managed. The reviewers found no differences in the effectiveness of different types of case management models in mental health.264

A randomised trial compared diabetes control in 298 people receiving nurse case management versus usual care in the US. Nurse case management was associated with greater reductions in blood glucose and fasting glucose levels compared to usual care. There were no differences in medication type or dose, body weight, blood pressure, or adverse events.265

Another randomised trial in the US with 299 diabetics aged 7 to 16 years compared a case manager alone, case manager plus psychoeducational modules, and standard diabetes care. Case management plus education was associated with reduced rates of short-term adverse outcomes compared with the other two groups. Case management plus education was particularly beneficial for youth at ‘high risk’.266

Another randomised trial of case management in the US included 362 Medicaid recipients with type 2 diabetes, 55% of whom were from ethnic minority groups. Diabetes case management, added to primary care, improved glycaemic control compared with usual care. The authors concluded that case management can help reduce disparities in diabetes health status among ethnic minorities and people with low-incomes.267

In a randomised trial with 228 adults with heart disease, nurse case management was associated with improved clinical outcomes such as lower cholesterol and enhanced diet and exercise.268

On the other hand, 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. The reviewers suggested that while trials in Italy, Australia and the UK have found benefits from case management, trials in the US often find no positive effects overall. The reviewers suggest that case management may work best with older people and immediately following hospitalisation. Differences in case management models make it difficult to compare findings between trials.269

Similarly, a randomised trial of collaborative case management in two US centres included 246 people with poorly controlled diabetes. Nurse case managers worked with patients and their primary care providers, monitoring and coordinating care using telephone contacts, collaborative goal setting, and treatment plans. The control group received educational materials and usual care. Case management did not improve key clinical outcomes for high-risk people with type 2 diabetes, although participants were more satisfied with their diabetes care.270

A randomised trial in Australia found no difference in clinical outcomes from case management by a specialist; GP care with specialist consultations; and usual care for 86 people with complicated dementia living in nursing homes.271

Another randomised trial of nurse-led case management for people with chronic obstructive pulmonary disease, their caregivers, and nursing and medical staff in Australia included 132 people. There was little difference between those receiving case management and usual care regarding unplanned readmissions, depression, symptoms, support, and subjective well-being.272

A randomised trial of 201 people in Switzerland found that hospital-based case management involving counselling by a clinician did not improve cardiovascular risk factors or symptoms among people hospitalised for coronary events.273

Impact on healthcare resource use

There is inconsistent evidence about the effect of case management on healthcare costs and resource use. Some case management programmes are based in hospital and others are based in primary care.

Many hundreds of case management studies have been undertaken in the field of mental health, including chronic conditions such as dementia. A Cochrane review found that case management in mental health meant more people remain in contact with health services (one extra person remains in contact for every 15 people who receive case management), but hospital admission rates also increased. There was some evidence that case management improved adherence to treatment, but the reviewers found that case management did not generally improve clinical outcomes, social functioning, or quality of life in people with mental illness. Case management may also increase costs. The reviewers concluded that case management is of questionable value in mental health.274

In contrast, an older systematic review of case management in mental health divided case management approaches into simple and more complex types. Brokerage case management is the most simple. It focuses on organising and coordinating services on behalf of the patient. 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. Six out of nine studies found improved adherence to treatment. Seven out of nine studies found an increase in the use of other services such as social services and aftercare services. Four out of five studies found improved social networks and relationships in the case management group. Four studies found no significant difference between groups in symptoms and four studies found a decrease in symptoms in people receiving case management. Ten studies in this review reported the costs of case management. The overall cost was dependent on the cost of hospital care. The shorter the hospital stay, the lower the total cost. Three studies included comprehensive economic evaluation, two of which found a decrease in costs using case management. The reviewers concluded that case management can have some impact on use of services (including reduced hospital stay), satisfaction with services, engagement with services, and social networks and relationships, when delivered as a direct service with high staff / patient ratios.275

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 compared assertive community treatment with clinical case management. Both types of case management were more effective than usual care for family burden, family satisfaction with services, and cost of care. 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.276

A cost-effectiveness analysis found that having a care manager to coordinate services benefited older people with dementia and their carers in the UK. Since there was no difference in the overall costs, the authors concluded that intensive care management can be a cost-effective intervention for people with dementia.277

A systematic review of nine randomised trials of case management in primary care focused predominantly on chronic care among 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. Two studies examining the impact of case management on clinical outcomes reported benefits. The six studies examining outcomes related to patient satisfaction, quality of life, or functional status reported improved outcomes. Three studies investigated the impact of case management on healthcare costs, but none reported significant cost-savings.278

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.

There was no clear evidence that case management reduced healthcare resource use, although it was generally associated with improved or stable functional status in elderly people. The reviewers could not compare costs between studies because there were differences in what was costed and itemised in each trial.  

A randomised trial in the US compared case management alone; case management plus educational modules; and standard diabetes care for 299 7 to 16 year olds with type 1 diabetes. Compared to the other groups, those receiving case management plus education had 60% fewer severe hypoglycaemic events and 40% fewer hospitalisations and emergency department visits. Those at high risk were particularly likely to benefit from case management plus education.

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%, achieving substantial cost savings.

In contrast, a randomised trial with 427 community dwelling frail older people compared nurse case management with usual care in Canada. There were no significant differences in quality of life, satisfaction with care, functional status, admission to hospital, or length of hospital stay. Case-managed older adults were readmitted to the emergency department significantly more often than the usual care group.

Another randomised trial assessed preventive case management among 3079 older people in the US. There were no differences from usual care in physical and mental health, primary care visits, hospitalisation, emergency department use, days in hospital, hospital costs, or nursing home use.

A randomised trial in the US evaluated whether six months of standardised telephone case management reduced resource use among 358 people with chronic heart failure. Telephone case management was associated with 48% less hospitalisation compared to controls. Days in hospital and multiple readmissions were also fewer in the case management group. Inpatient heart failure costs were 45% lower at six months. There was no evidence of cost shifting to the outpatient setting. Patient satisfaction with care was higher in the case management group.

Another randomised trial of case management with 287 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.

A randomised trial with 462 people with heart failure in the US assessed nurse case management by telephone. 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. The authors concluded that telephone case management programmes may be less effective for people at low risk than those at high risk.

A 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. Care management was found to reduce overall healthcare costs.

In contrast, another randomised trial in the US assessing the effects of case management among ‘high risk’ older people found no evidence that a case management approach reduced the use or the cost of healthcare.

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A randomised trial with 2742 people in Australia evaluated co-ordinated care for people who used hospital in-patient services frequently. The intervention involved care planning by a general practitioner and graduated case management depending on the participants’ health status. There were no significant differences in quality of life or mortality between the case management and usual care groups. However, those receiving case management had substantially higher resource use, largely due to the extra costs for care planning and case management.  

In a randomised trial of case management for 668 older people in the US, case managers posted educational materials within 24 hours of hospital discharge and telephone 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 between groups in readmissions or the number of days in hospital. 

A randomised trial in the US compared nurse case management in a special care hospital unit with traditional nursing care in the intensive care unit. Participants were 220 critically ill people with long-term conditions. There were no significant differences between groups in length of stay, mortality, or complications. However, the case management group had significant cost savings. The average total cost of delivering care was US$5,000 less per person in the case managed group compared to the traditional intensive care unit. 

A randomised trial of case management and hospital discharge planning for 598 older people in Australia found no difference in mortality or readmissions between groups. However, the case management group had higher overall quality of life. Total healthcare costs, including hospitalisation, community services and the intervention, were lower in the case management group compared to controls (average difference A$1545). 

A case control study with 331 disabled elderly people in China found that hospital-based case management reduced medical care expenditure, although there was no effect on self-rated health. 

A cost-effectiveness analysis of case management for elderly, functionally impaired people in US managed care programmes found that although average costs for the case managed group were greater than the cost of usual care, people in the case managed group lived an average of 106 days longer. The cost per additional day of life was US$40.

We found inconsistent evidence of the effects of case management on quality of care, clinical outcomes, and healthcare resource use from 11 systematic reviews, 19 additional randomised trials, and four other studies. 

Data collection and monitoring

In order to identify people most at risk of clinical deterioration and hospitalisation, routine monitoring and data collection strategies are needed. The US ‘Improving Chronic Illness Care’ group (ICIC) offers training, tools, and support for organisations involved in regional collaboratives and those wishing to improve chronic care management. Their website contains an archive of tools such as worksheets to help clinicians and patients develop self-management plans and starter kits for planning primary care group visits. Their Assessment of Chronic Illness Care (ACIC) tool was developed to help US organisations evaluate the strengths and weaknesses of the way they deliver chronic care. The tool focuses on the how well systems of care are addressing each of the six broad components of the Chronic Care Model: community linkages, self-management support, decision support, delivery system design, information systems, and organisation of care. A 13 month before and after study in the US found that the ACIC could identify system changes in the delivery of care. The authors suggested that this may be a useful tool to guide quality improvement in chronic care and to track progress over time. A similar assessment tool has been produced for NatPaCT in the UK.

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295 www.improvingchroniccare.org
297 www.natpact.nhs.uk/uploads/cdm_matrix_selfassessment
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, follow-up systems with prompts, 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 chronic conditions, may have positive impacts on quality of care and clinical outcomes. Registry data may be used to send reminders to patients and physicians about routine check ups or medication reviews.

**Impact on quality of care**

A Cochrane review of strategies targeted at primary care professionals or the structure in which they deliver care included 41 studies with more than 200 practices and 48,000 patients. In 12 studies the interventions were targeted at health professionals, in nine they targeted the way care was organised, and 20 studies targeted professionals and processes. Multifaceted interventions improved the way health professionals cared for people with diabetes. Interventions that improved regular recall and review of patients such as central computerised tracking systems and disease registries also improved diabetes management.298

A US study of an online registry of patients and evidence-based guidelines for routine diabetes care found improved retinal and renal screening rates and foot examination rates.299

A registry study in India found that standard, ongoing monitoring of key data is associated with improved diabetes care. The system involved simple, reliable methods of defining metabolic control combined with a feedback system to primary care.300

A study in the US evaluated the accuracy of administrative data for identifying complications and comorbidities in diabetes. The authors reviewed chart data for 471 randomly selected people with diabetes. They concluded that automated registry-type data are useful for identifying some potential diabetic complications but that confirmatory evidence is required.301

In the UK, some general practices are taking part in the 'CHD Collaborative' (part of the NHS Modernisation Agency's service improvement agenda). Validated heart disease registers with proactive recall strategies have improved the quality of care provided, including a 20% increase from baseline in people with heart disease taking aspirin, a 60% increase in people taking statins, a 60% increase in people taking beta-blockers one year after heart attack, and 25% with reduced blood pressure.302

**Impact on clinical outcomes**

A randomised trial in the US found that disease registries can improve outcomes in people with diabetes and other long-term conditions. People who received reminder letters based on registry-generated data had better clinical outcomes.303

A comparative study of 20 centres in the US involved creating a patient registry to track clinical measures and generate performance reports; a referral mechanism to facilitate more frequent use of diabetes educators; monthly reports; sharing results and updated clinical information from consulting specialists; a self-management toolkit; and patient goal setting and group visits. Seven of 12 patient outcomes were significantly better for centres using the tracking and monitoring systems for diabetes, including eye examinations and lower blood pressure.304

We found evidence from one systematic review, one additional randomised trial, and five other studies that disease registries may improve the quality of care provided for people with chronic conditions.

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Monitoring and decision support

A number of studies have assessed monitoring strategies and tools to help health professionals and patients make decisions. There is limited evidence about the effectiveness of different monitoring and decision support strategies.

Decision support tools

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. Enhancing systems for provider decision support was most strongly correlated with clinical outcomes.305

Guidelines and checklists may help focus professionals' attention on the long-term adverse effects of medications in chronic conditions. A small randomised trial found that evaluation checklists helped nurses detect problems for those receiving medications for chronic mental health conditions.306

A number of randomised trials in the US have assessed different electronic decision support tools. For instance, one randomised trial found that providing feedback and treatment advice to GPs using an electronic medical record had little effect on quality of care for people with major depression.307

On the other hand, a randomised trial in the US found that a web-based decision support tool improved evidence-based management of type 2 diabetes in a hospital clinic.308

A randomised trial of 107 GPs in the US found that computer-based access to information about all prescriptions dispensed and automated alerts for potential prescribing problems reduced potentially inappropriate prescriptions for older people.309

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 447 adults with asthma.310

On the other hand, a randomised trial in the US found that adding symptom information to computer-generated care suggestions for 720 people with heart failure did not affect physician treatment decisions or improve outcomes.311

Another study compared self-report data versus automated data about dose and duration of antidepressant treatment. The authors concluded that automated monitoring systems, including pharmacy data, may be a feasible way to monitor treatment adequacy and quality of care.312

Follow up systems

In a cohort study, pharmacists with special training telephoned physicians about modifying potentially adverse drug regimens detected using a computerised surveillance system. The study included 23,269 older people in the US. The system improved prescribing patterns and quality of care.313

A randomised trial with 613 people beginning antidepressant treatment in the US compared usual care, feedback to doctors based on computerised records, and feedback plus individualised telephone follow-up for patients. Feedback to doctors alone had no effect on the treatment provided or patient outcomes. Physician feedback plus patient telephone follow-up was associated with more appropriate care and improved symptoms. The incremental cost of feedback plus routine monitoring was about £50 per person. The authors concluded that monitoring and feedback to doctors had no significant benefits for people starting antidepressant treatment, but a programme of systematic follow-up by telephone significantly improved outcomes at modest cost.314

We found insufficient evidence from seven randomised trials and three other studies to draw conclusions about routine monitoring and decision support systems in chronic care.

Sharing skills and knowledge

Many broad chronic care 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.315,316,317

We found 21 reviews, 19 additional randomised trials, and six other studies about ways for health professionals to share ideas and upgrade their skills in chronic care. These focused on:

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

Educational sessions

A US survey evaluated 1236 physicians’ perceptions of the adequacy of their training about long-term conditions. Most physicians thought that their training was less than adequate. Family doctors (GPs) were more likely to report adequate training compared to internists, paediatricians, non-surgical specialists, and surgeons. Eight out of ten doctors said that additional training had a positive effect on their attitudes toward care of people with long-term conditions, including their ability to make a difference in their lives.318

Impact on patient experiences

There is inconsistent evidence about the benefits of educational sessions for health professionals on patient satisfaction with care. In a randomised trial with 160 doctors from 34 UK cancer centres, a communication skills training course had no significant effect on patient satisfaction with consultations.319

However, another randomised trial in cancer care found that giving medical students an opportunity to learn from patients during communication skills training made physicians more knowledgeable about patient values and more willing to listen, discuss difficult topics, and help people make decisions.320

A case control study in the UK found that training practice nurses and general practitioners in patient-centred care for people with newly diagnosed type 2 diabetes improved communication skills, patient satisfaction, and perceived wellbeing.321

Impact on health professionals

A meta-analysis of the effect of continuing education among healthcare professionals included randomised trials of 17 interventions. There was evidence that interactive educational sessions which provide an opportunity to practice skills can change professional practice and, on occasion, healthcare outcomes. Didactic sessions did not appear effective for changing physicians’ behaviours.322

A review of 15 research syntheses of continuing education for health professionals suggested that continuing education can improve knowledge, skills, attitudes, behaviour, and patient health outcomes. Continuing education which is ongoing, interactive, contextually relevant, and based on needs assessment is especially worthwhile.323

On the other hand, a review of controlled evaluation studies found limited evidence that problem-based learning in continuing medical education improved health professionals’ knowledge and performance or patients’ health. There was moderate evidence that doctors are more satisfied with problem-based learning compared to traditional learning.324

Healthcare providers may sometimes focus on diseases and their management, rather than people, their lives, and their health problems. Patient-centred approaches to care are increasingly advocated by people with long-term conditions and clinicians. A Cochrane review defined patient-centred care as a philosophy of care that encourages shared control of the consultation, decisions about interventions or management of the health problems with the patient, or a focus on the patient as a whole person who has individual, socially situated, preferences. Ten studies evaluated training for providers only, while the remaining studies included training for providers as one of several components. The healthcare professionals involved were mainly primary care physicians practising in community or hospital outpatient settings. In two studies, the providers also included nurses. Twelve of the 14 studies that assessed consultation processes found that provider education improved patient-centred care. There was also evidence that training healthcare professionals in patient-centred approaches may impact positively on patient satisfaction with care. Few studies examined healthcare behaviour or clinical outcomes.325

A randomised trial in the US with 70 nurses and 123 people with diabetes found that short specific training significantly improved nurses’ skills in blood glucose monitoring. Improvements lasted over time.326

Impact on quality of care

A systematic review found that educational interventions improved physician performance and may improve patient outcomes.327 Another meta-analysis found that continuing education positively affects nursing practice.328

A randomised trial in the US evaluated clinician and patient education by local experts and nurse specialists. Quality of care and mental health outcomes improved over a one-year period.329

Impact on clinical outcomes

A meta-analysis of 118 studies of disease management programmes found that provider education, feedback, and reminders were associated with improved provider adherence to guidelines and improved disease control. Patient education, reminders, and financial incentives were also associated with improved clinical outcomes.330

An additional randomised trial with 74 US paediatricians and 637 children with asthma found that a brief physician education programme improved asthma outcomes in low-income families.331

Impact on use of healthcare resources

The World Health Organisation suggests that healthcare professionals need to be taught how to educate their patients and improve self-management. A selective review conducted by WHO found that educating providers using principles of their systematic ‘therapeutic patient education’ programme may reduce use of healthcare resources and ultimately costs.332

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. A cost-effectiveness analysis found that the government healthcare fund (Medicaid) saved US$3 to $4 for every dollar spent educating and supporting physicians.  

A randomised trial with 46 primary care practices and 1356 patients with depression assessed training for physicians and nurses, educational and assessment materials, and follow-up for patients in the US. Two years after participation, people whose healthcare professionals took part in educational sessions had fewer days with significant depressive symptoms and were employed for more days than those receiving usual care. However, relative to usual care, the overall cost of care increased.

We found evidence from six reviews, six additional randomised trials, and two other studies about educational sessions to encourage healthcare professionals to share their ideas and learn new skills. Active educational sessions appear to have some impact on providers’ skills, but the effects on clinical outcomes and patient satisfaction remains uncertain.

### Individual education

In addition to the reviews above, we found nine further studies about individual education or opportunities for health professionals to share their ideas one-to-one. Educational outreach visits to healthcare professionals have been referred to as 'university-based educational detailing,' 'public interest detailing,' and 'academic detailing.'

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335 Soumerai SB, Avorn J. Principles of educational outreach (‘academic detailing’) to improve clinical decision making. *JAMA* 1990; 263: 549-56.


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### Impact on healthcare professionals

‘Academic detailing,’ which involves educational outreach visits to individual health providers, is commonly used by pharmaceutical companies to influence prescribing behaviours. Few UK studies have investigated the best methods to influence prescribing on a large scale in primary care. One randomised trial compared active versus passive prescribing feedback. The active group received visits and feedback about prescribing in addition to written information. The passive group received only written feedback and workbooks. The authors argued that the high resource intensiveness of practice visits leads many health authorities to rely on less effective methods such as bulletins. Active feedback was more effective at changing prescribing habits than passive feedback. Both approaches had more impact than no intervention.

### Impact on quality of care

A Cochrane review examined the effects of outreach visits by trained people on health professionals’ practice and patient outcomes. Eighteen randomised trials with more than 1896 physicians were included. All of the outreach visit interventions consisted of several components, including written materials and conferences. Reminders or audit and feedback complemented some visits. The reviewers concluded that educational outreach visits appear to modify health professionals’ behaviour (including prescribing), particularly when combined with social marketing. The cost-effectiveness of outreach visits is not well evaluated.

A trial with 112 UK general practitioners assessed using a clinical pharmacist as a therapeutics adviser (academic detailer) to modify antibiotic prescribing. Academic detailing helped decrease prescription numbers and costs.

In The Netherlands, a randomised trial found that outreach visits to general practice staff over 21 months improved clinical decision-making and quality of life for people with diabetes and heart disease.
As described above, clinical guidelines alone generally do not facilitate change in clinical practice. A randomised trial in the US examined academic detailing (personal visits to practitioners) and continuous quality improvement teams, alone or combined, to improve adherence to guidelines for high blood pressure and depression. Ninety-five providers and 4995 patients took part. Academic detailing and continuous quality improvement were generally ineffective in improving adherence to guidelines or clinical outcomes.440

Similarly, a randomised trial in Denmark found that a one-off educational outreach visit had no effect on prescribing for asthma in 100 general practices.341

A randomised trial in 18 general practices in the UK found that individual education visits are more successful if they address the barriers preventing practitioners from changing their behaviour.342

Impact on clinical outcomes

In the UK, a randomised trial in 44 general practices found that educational outreach by specialist nurses did not improve clinical outcomes for people with diabetes.343

We found evidence from one systematic review, seven additional randomised trials, and one other study about individual educational visits to health professionals. Individual outreach visits may have some impact on health professionals’ attitudes and behaviours, but perhaps only if accompanied by other interventions. Most studies focused on physicians.


Reminders

Impact on quality of care

A systematic review of the effectiveness of education strategies designed to change physician performance and healthcare outcomes included randomised trials of 160 interventions. Strategies included educational materials; formal continuing medical education activities; outreach visits such as academic detailing; opinion leaders; audit with feedback; and reminders. Seventy percent of educational interventions were associated with a change in physician performance, and 48% of interventions targeting healthcare outcomes produced a positive change. The most effective strategies were reminders, outreach visits, opinion leaders, and multifaceted activities. Audit with feedback and educational materials were less effective, and formal continuing medical education conferences or activities, without strategies to reinforce practice, had little impact.344

A Cochrane review of interventions to improve the delivery of preventive services in primary care included 55 studies with more than 2000 health professionals and 99,000 patients. The reviewers found considerable variation in the level of change achieved by different interventions. Most effects were small or moderate. Physician reminders and multifaceted interventions may be more effective than single interventions, because more barriers to change can be addressed. There were inconsistent findings about the effects of group education.345

A systematic review of 40 randomised trials of computer-assisted interventions to improve diabetes care found that computerised reminders for physicians, home glucose monitoring, and computer-assisted diabetes patient education all improve clinical outcomes.346 A similar systematic review of 33 randomised trials with 1547 clinicians found that prompts, alerts, and reminders could improve preventive care.347

A systematic review of 28 controlled trials found evidence that some computer-based clinical decision support systems could improve physician performance, but there was less evidence about impacts on patient outcomes and cost-effectiveness.348

A randomised trial in the US found that chart-based reminders did not improve physician adherence to clinical guidelines. 349

**Impact on clinical outcomes**

A randomised trial in Denmark provided GPs with feedback about their performance, patient and physician reminders about regular diabetes visits, and decision support. After six years, patients in the intervention group had significantly better glucose and cholesterol levels compared to controls. 350

On the other hand, a randomised trial in the US assessed whether regular feedback to primary care providers with information about patients’ health, function, and satisfaction would improve outcomes for their patients with diabetes. Self-reported information was collected from patients by post and then collated with data from clinical, pharmacy, and laboratory sources. Providers received reports before patients’ visits. There were no differences in outcomes between the intervention and usual care groups. 351

We found evidence from four systematic reviews and three additional trials that sending reminders or using prompts for health professionals may influence the quality of care they provide.

**Audit and feedback**

**Impact on quality of care**

Audit and feedback involves assessing how well healthcare professionals are meeting accepted guidelines or standard practice, often by reviewing patients’ charts. A Cochrane review of 85 studies with over 3500 health professionals compared audit and feedback versus no intervention. Effects varied between a 9% absolute increase in non-compliance with guidelines to a 71% increase in compliance. The reviewers concluded that audit and feedback can improve professional practice, but the effects tend to be moderate. The effects are likely to be greater among professionals who do not adhere well to recommended practice. 352

A systematic review of audit strategies included 93 studies, most of low quality. Audit was associated with improved patient care, satisfaction, and patient feedback. Benefits to clinicians included improved communication between professional groups and increased professional satisfaction and knowledge. Perceived disadvantages of audit among health professionals were diminished clinical ownership, fear of litigation, suspicion of reviewers, and professional isolation. Perceived barriers to implementing audit were lack of resources, lack of expertise or advice in design and analysis, and organisational impediments. The reviewers concluded that key factors to promote successful audit include a supportive organisational environment, sound leadership of audit programmes, strategy and planning, resources and support, monitoring and reporting of audit activity, and being involving and relevant to participants. 353

A review of providing feedback to health professionals found this could change physicians’ attitudes and behaviours if combined with a broader strategy of education and quality improvement. 354

A randomised trial with 124 GP practices and 185 GPs in The Netherlands found that feedback reports for GPs improved some decision-making in diabetes care. 355 However, a randomised trial in the US found that feedback using report cards may not improve the quality of care provided by hospital staff. 356

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A randomised trial with 185 GPs in The Netherlands found that feedback and support from trained non-physicians can improve GPs clinical decision-making in cardiovascular care. However, another randomised trial of 90 GPs in The Netherlands found that behaviour change was more likely following mutual practice visits and feedback from peers rather than visits and feedback from a non-physician observer.

We found evidence from two systematic reviews and four additional trials that audit and feedback can have small effects on the quality of care for people with long-term conditions if implemented as part of a broader strategy.

Collaborative training and working

Impact on health professionals

Some planners have advocated 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.

Impact on clinical outcomes

In 1995 the US Institute for Healthcare Improvement developed the ‘Breakthrough Series’ concept, based on continuous quality improvement ‘plan, do, study, act’ cycles. The Breakthrough Series aimed to bring together groups of healthcare organisations (collaboratives) that share a commitment to making system changes within their organisations. Collaboratives work together to improve a specific clinical or operational area over a 6 to 13 month period. In the US, trials suggest that the Breakthrough model of sharing practice between professionals can improve clinical outcomes, particularly in people with diabetes.

We found insufficient evidence about the impact of collaborative training and sharing practice on quality of care and clinical outcomes for people with long-term conditions.

Other interventions

Videoing consultations

WHO suggest that effective communication between doctors and patients is associated with improved health outcomes, including better psychological health, symptoms, function, control of pain, blood pressure, and blood glucose. Patients and their families are more likely to be satisfied with care if health professionals are able to communicate effectively and involve them in decision-making. WHO found some evidence that videotaping consultations can help improve health professionals’ communication skills.

Teleconferences

A randomised trial in the US found that combining interactive audio-conferences and chart reminders improved chronic disease management among GPs.


Patient involvement in decisions

We found six systematic reviews, 16 additional randomised trials, and 10 other high quality studies about patient involvement in decision-making in chronic care. Studies of self-monitoring and self-management are summarised separately overleaf.

Effects of patient involvement

Involving people with long-term conditions in healthcare decision-making may:

- encourage patients and their carers to take more responsibility for their care,
- help people with long-term conditions feel more in control,
- encourage health professionals to follow recommended care protocols,
- and have some impacts on quality of life.

A literature review found that involving patients and their families in ongoing health decision-making and self-management can increase patient and family responsibility for the delivery of chronic care, and help people adapt care regimens to their own lifestyles.\(^{363}\)

A systematic review of involving users in the delivery and evaluation of mental health services included eight studies of involving users as service providers, two studies of involving users as trainers, and two studies of involving users as interviewers. The reviewers found that users can be involved as employees, trainers, or researchers without detrimental effect to their health or that of others.\(^{364}\)

A randomised trial of a patient empowerment programme for people with diabetes comprised one educational session per week for six weeks. People attending the programme said they felt more empowered and in control. They also had improved blood glucose levels.\(^{365}\)

A survey of 87 primary care doctors in the US found that patient behaviour was one of the strongest determinants of physician compliance with recommended care. When patients requested that a care recommendation be implemented, physicians were likely to comply.\(^{366}\)

Studies have also assessed interventions involving the family members or carers of people with long-term conditions. A randomised trial with 105 children with diabetes aged 8 to 17 years compared a family-focused teamwork intervention versus standard diabetes care. The family teamwork intervention prevented deterioration in glycaemic control. The authors concluded that family involvement may assist in preserving health and preventing long-term complications in young people with diabetes.\(^{367}\)

Another randomised trial evaluated training family members as case managers for their elderly relatives. Trained family members assumed more responsibility for organising care, but the authors did not report any impact on clinical outcomes.\(^{368}\)

A report by the Kings Fund highlighted that patient involvement in decision-making is not without cost.\(^{369}\)

We found evidence from two reviews and three additional randomised trials that involving people with long-term conditions in decision-making can be empowering and can help patients take control of their care. However, there is little evidence about any effects on clinical outcomes or healthcare resource use.


Involvement preferences

Observational studies suggest that different types of people may be more or less motivated to be involved in decisions about their healthcare. For example, postal surveys with 10,000 randomly selected adults, many with long-term conditions, found that well-educated people and those who use health services frequently feel more involved in their care than others. Feeling involved was associated with improved satisfaction with care. The authors concluded that efforts to increase patient involvement should be directed particularly towards those with poor education, emotional distress, and long-term conditions.370

A study in Australia assessed if, and how, people prefer to be involved in improving the quality of hospital services and in health decision-making. The authors collated feedback from 2131 people. They found that patients and members of the public prefer to be involved in ‘passive’ ways such as postal and telephone surveys rather than ongoing commitment and discussions. There were considerable differences in preferred levels of involvement among people of different age groups and educational status. The authors suggested that it is important, therefore, to use a range of methods to encourage participation in healthcare decision-making.371

Seven out of ten of the 2,197 people with long-term conditions participating in a four year US study on healthcare decision-making preferred to leave medical decisions to their physicians rather than being actively involved. Those who were younger and more educated wanted to be more involved. Those with severe diabetes and non-severe heart disease were least likely of all those studied to prefer an active role. The authors concluded that approaches to enhancing patient involvement need to be flexible and accommodate individual preferences.372

A survey in the US assessed the degree to which 731 elderly people wanted to be involved and in control of their care. There were significant differences in the amount of involvement and control desired by different ethnic groups. Older people generally wanted control over some service areas but not others.373

Interviews with 100 residents of long-term care facilities in Canada found that people with higher levels of formal education, a greater number of chronic conditions, and greater confidence about the worth of their input tend to prefer more active involvement in decision-making.374

We found evidence from five observational studies that some people may be more likely to want to be involved in healthcare decision-making than others. All of the studies concluded that a variety of methods should be used to involve different patients and to accommodate individual preferences.

Encouraging involvement

A number of strategies have been trialled to increase patients’ involvement in healthcare processes and decision-making. These strategies include information sheets and leaflets; decision aids; patient-held records; and electronic systems.

Written encouragement

A randomised trial in the UK assessed leaflets encouraging patients to raise concerns and to discuss symptoms or other health issues in primary care consultations. Participants were 636 patients from five primary care practices. The leaflet increased patient satisfaction with care. There was no change in prescribing or referral, but people who received the leaflet had more investigations during the consultation. Most extra investigations were thought to be unnecessary by the doctor and by the patient.375

A randomised trial in London evaluated a card and letter encouraging people to prepare questions to ask at a hospital consultation. Half of those sent a card said they got more out of their consultation as a result, but there were no significant differences in outcomes.376

In Australia, a randomised trial of reminders to visit GPs found that proactive asthma care improved primary care visits and reduced emergency department visits in 174 children with asthma.377

**Decision aids**

A review found that decision aids specifically for women, developed in conjunction with women with long-term conditions, may help improve satisfaction with care.378

As part of a randomised trial in the UK, 136 people with ulcerative colitis managing their own care completed a survey about a patient-centred guidebook. The survey found that including layperson knowledge and clarifying treatment decision processes increased people’s perception of their involvement in disease management.379

**Patient-held records**

Sometimes patients are given their medical records to keep and bring to each consultation. 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.380

A trial of patient-held records for people who had suffered stroke in the US 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.381

A randomised trial in 28 general practices in the UK found that patient-held records did not improve mental state, health service use, or satisfaction for people with long-term mental illness.382 Similarly, a randomised trial in 74 general practices in the UK found no evidence to support introducing patient-held records routinely as part of shared care in community mental health.383

**Electronic systems**

A case control study in the US found that personal health records improved 150 people’s access to basic health information and communication between patients and professionals.384

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 groups plus educational programmes or one-to-one support from healthcare professionals. There was no evidence of either positive or harmful effects. The reviewers suggested that further research is required given the abundance of unarbitrated peer support groups on the internet.385

A randomised trial in the US assessed whether making patient records accessible to 107 people with heart failure using the internet affected patient care. After one year, those who had access to their records online were more likely to adhere to treatment, but there were no differences in self-efficacy or satisfaction with care.386

**GP training**

If people with long-term conditions are to be more involved in decisions about their care, doctors need to be able to communicate information effectively and to consider what level of involvement is appropriate for different people. A randomised trial found that training GPs about risk communication tools and shared decision-making for people with long-term conditions could improve prescribing and was unlikely to have major impacts on the cost of care in the UK.387 However another UK study found that while GPs appear receptive to patient involvement, training in shared decision-making and risk communication did not help them achieve this or improve patient outcomes.388,389

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We found three reviews, eight additional randomised trials, and two other studies about different ways to encourage patient involvement in decision-making. There is no clear evidence about which methods work best to encourage people with long-term conditions to get more involved in healthcare decision-making.

**Attitudes of healthcare providers**

A UK Health Technology Assessment review examined ways of involving patients in research and decision-making. The authors concluded that effective methods for involving consumers require appropriate skills, resources, and time to develop and follow good working practices.\(^\text{390}\) The skills and attitudes of healthcare providers may therefore be important in increasing patient involvement.

A randomised trial in The Netherlands examined the response of general practitioners (GPs) to patient evaluations of healthcare. GPs who received feedback reports from patients had less favourable views of the relevance of patient feedback for their practice compared to GPs who received no feedback. GPs who received feedback felt that gathering feedback required considerable time and energy and most saw little reason to change their behaviour as a result.\(^\text{391}\)

An international comparative study based on interviews with 233 GPs in 11 European countries found that most GPs thought that involving older patients in healthcare decisions had positive outcomes. However, GPs saw patient involvement as a process taking place solely during consultations. The main barrier for GPs wanting to involve patients was lack of time. The authors suggested that it will only be possible to increase the involvement of older people in healthcare decision-making when GPs adopt a more developed concept of patient involvement and receive help to achieve this.\(^\text{392}\)

We found evidence from one review, one additional randomised trial, and one other study that healthcare providers’ attitudes may be an important factor in involving patients in decision-making. There is little evidence about the best ways to target healthcare providers’ attitudes and behaviours.

**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 people with chronic conditions. We found 25 systematic reviews, 41 additional randomised trials, and four other studies about providing accessible information and patient education. The main ways of providing information that we assessed were:

- written materials,
- educational sessions in groups,
- individual educational sessions, and
- technologies such as the internet and video.

The evidence about each of these strategies is described below.

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.\(^\text{393}\)

**Written information**

**Impact on patient experiences**

A number of written information materials have been evaluated, including decision aids, guidebooks, and printed educational materials. For example, a systematic review assessed whether decision aids had any effect on patient outcomes. Twelve studies with about 5000 participants were included. Structured decision aids did not influence patients’ treatment preferences or decisions. Only two out of seven studies that assessed treatment preferences reported that decision aids affected preferences. Decision aids were associated with improved patient knowledge, but it was unclear whether they were more beneficial than good quality educational materials. The reviewers concluded that decision aids generally affect attitudes and knowledge rather than behaviours.\(^\text{394}\)

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\(^{393}\) 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.

A systematic review of printed educational materials used alone included eight studies with 4047 people with long-term conditions. In arthritis and back pain, printed educational materials used alone were associated with small improvements in patients’ knowledge. In hypertension, printed educational materials had no effect on patient knowledge or adherence to treatment.395

A systematic review with nine trials assessed strategies for providing information for patients and their carers after stroke. Three trials evaluated educational lectures. The rest focussed on providing written information. There was some evidence that written information combined with educational sessions improved knowledge and was more effective than providing written information alone. Written information alone had no effect on mood, perceived health status, or quality of life for patients or carers.396

In the UK, a randomised trial with 240 people with long-term ulcerative colitis assessed an evidence-based guidebook developed with patients and focusing on their needs. The guidebook helped to increase people’s knowledge without affecting anxiety or quality of life. The authors suggested that patient-centred written information increases knowledge without increasing anxiety.397

A randomised trial in the US examined the benefits of providing individualised educational messages during hospitalisation and one week and one month after discharge. Participants were 70 people with heart failure. Providing tailored messages changed the beliefs of the people with heart failure regarding the benefits and barriers of taking medications, following a sodium-restricted diet, and self-monitoring. There were no differences from usual care in readmission rates or quality of life.398

Impact on quality of care

In the US, healthcare quality data have been released using ‘health report cards.’ These aim to educate patients, improve quality of care, and increase competition in the healthcare marketplace. A systematic review found that health report cards do not make a difference in decision-making, quality of care, or competition.399

A trial in 18 prison units in the US found that patient information leaflets increased adherence to medication, especially in prisons where patients also received counselling in pharmacist-operated chronic care clinics.400

A randomised trial of 3309 people with diabetes in the US evaluated annual mailed educational reminders for improving diabetes management. The reminder included a letter from the person’s GP, a self-care handbook, a preventive care checklist, and specific recommendations regarding routine monitoring and screening. The reminder group were more likely to attend examinations and tests and to have improved blood glucose control.401

A randomised trial in the US assessed different strategies to improve adherence to medication among 39 people with chronic mental illness. Interventions were a single information session about medication and its benefits; providing participants with guidelines about taking medication; or providing guidelines in the presence of a family member. Providing guidelines improved adherence to medication, but a single information session did not.402

Impact on clinical outcomes

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 hospitalisation for asthma, visits to the doctor, lung function, or medication use. The effects on asthma symptoms were variable. The reviewers concluded that written information alone does not improve health outcomes in adults with asthma, although perceived symptoms may improve.403

On the other hand, a randomised trial of 801 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 and improve morbidity among hospital outpatients.404

**Impact on healthcare resource use**

A randomised trial in the US assessed whether posted health promotion materials reduced outpatient visits and improved the health of 593 people aged between 18 and 64 years with hypertension, diabetes, or arthritis who used health services frequently. The intervention decreased clinic visits for people with arthritis, increased visits for people with hypertension, and had no effect on people with diabetes. People with arthritis had improved overall health, but there was no change in those with diabetes or hypertension. The authors concluded that mailed health promotion programmes might only benefit people with certain long-term conditions.405

We found evidence from five reviews and seven additional randomised trials that written information may improve people’s knowledge, but when used alone, will not usually affect behaviours, quality of life, or clinical outcomes. There is some evidence that combining written materials with other strategies may be more effective.

**Group education**

**Impact on patient experiences**

There is strong evidence that educational sessions in groups or classes may improve patient satisfaction and feelings of wellbeing. The types of educational sessions assessed vary widely. For example, a meta-analysis of 70 educational programmes for people with long-term conditions found that patients’ knowledge increased using one-to-one counselling, group education, or education combined with audiovisual materials.406

A Cochrane review of 12 trials with 1245 people who had suffered a stroke found a small but significant effect of psychotherapy educational interventions on improving mood, but no effect on preventing depressive illness, disability, or other outcomes.407

A systematic review of approaches to improve coping among people with long-term conditions included 35 controlled trials of behavioural therapy, cognitive behavioural therapy, psychotherapy, support groups, and multi-component interventions with 3277 participants. All of the interventions had positive effects on coping. All five studies that included an assessment of clinical outcomes suggested small positive benefits.408

**Impact on quality of care**

There is some evidence that educational sessions may improve adherence to treatment and quality of care. A meta-analysis of 30 studies found that patient education improved adherence to treatment in people with long-term conditions, and had smaller effects on health outcomes. Efforts to improve health by increasing patient knowledge alone were rarely successful. Behaviourally-oriented programmes had more effect on clinical outcomes.409

On the other hand, a meta-analysis of seven randomised trials found that behavioural and educational interventions had little impact on adherence to medication for 3077 people with high cholesterol.410

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.411 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.412

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The National Institute for Clinical Excellence (NICE) has developed guidelines about patient education models for people with diabetes. Following a systematic review, NICE concluded that structured patient education should be made available to all people with diabetes at the time of initial diagnosis and on an ongoing basis, based on regular needs assessment. NICE concluded that there is insufficient evidence to recommend specific education types or frequencies. However, they suggested that educational interventions should be provided by a trained multidisciplinary team to groups of people with diabetes, unless group work is considered unsuitable for an individual. Educational programmes should use a variety of techniques to promote active learning (engaging individuals and relating the content to personal experience), and should be integrated into routine diabetes care.\textsuperscript{413}

A randomised trial with 219 mothers of children with long-term conditions compared an outreach education programme with usual care. The outreach programme was associated with improved access to care and more comprehensive care.\textsuperscript{414}

Some studies suggest that combining group educational sessions with individualised sessions (‘counselling’) may improve adherence to treatment. For instance, a randomised trial examined the effectiveness of group education in primary care plus individual counselling for 153 people with depression. After four months, group education plus counselling was associated with improved adherence to medication and improved perceptions of the quality of care. Combined group and individual education was most effective for people with major depression.\textsuperscript{415}

Similarly, a case control study in the US found that school-based small-group education for children with asthma and home-based education for their parents improved asthma management, especially amongst the poorest families.\textsuperscript{416}

**Impact on clinical outcomes**

There is evidence that education sessions may improve clinical outcomes. A meta-analysis of 42 studies of psychological interventions for children with chronic conditions divided the interventions into four categories: disease management; emotional / behavioural strategies, health promotion; and prevention. Educational interventions had a small positive effect on clinical outcomes for about one year after treatment. Behavioural interventions had similar effects to disease management programmes. There was insufficient evidence about health promotion and prevention approaches. Disease type, severity, and duration did not alter the effectiveness of interventions, although the reviewers suggested that some interventions may work best with certain age and gender groups.\textsuperscript{417}

A meta-analysis of behavioural or psychosocial educational sessions for 3180 people with heart disease found that educational sessions were linked to greater reductions in blood pressure, heart rate, and cholesterol compared to usual care. The usual care group had more than one and a half times greater risk of death or recurrence.\textsuperscript{418}

A randomised trial assigned 243 people with long-term conditions to education sessions or a control group. The educational sessions included discussions of mind / body relationships; relaxation training; cognitive restructuring; problem-solving; communication; and behavioural treatment for insomnia, nutrition, and exercise. The education group reported significant reductions in sleep difficulties, pain, anxiety, and depression symptoms compared to controls. Many of these changes remained after one year.\textsuperscript{419}

A randomised trial of a multidisciplinary education programme for 68 people with rheumatoid arthritis found significant improvements in clinical outcomes at one year follow-up.\textsuperscript{420} On the other hand, a randomised trial in Sweden found that group education sessions for 77 people with diabetes led by a pharmacist improved risk factors and clinical outcomes in the short-term, but these benefits did not last.\textsuperscript{421}


Much research as been conducted about educational strategies in diabetes. A meta-analysis of controlled studies of educational and psychosocial interventions identified 93 studies with 7451 people with diabetes. Eight intervention types were assessed, including group educational sessions. Educational and psychological interventions tended to have a moderate effect on outcomes. Physical outcomes and knowledge were most affected, followed by psychological status and adherence. Diet instruction and social learning interventions had the greatest impacts and relaxation training had the weakest effects. A meta-analysis of 28 educational interventions found that patient education could modestly improve glycaemic control in people with diabetes. The most effective interventions included face-to-face delivery, cognitive methods, and an exercise component.

A meta-analysis of 18 studies with 2720 participants assessed the effect of educational and behavioural interventions on body weight and glycaemic control in people with type 2 diabetes. The interventions ranged from 1 to 19 months in duration. Educational interventions helped reduce blood glucose moderately.

A trial in the US compared a structured educational curriculum for diabetics involving 3.5 days of sessions with a physician, nurse, nutritionist, pharmacist, exercise physiologist, and a social worker versus written materials posted every three months. Both active and passive education groups had significantly better glycaemic control compared to a group who received no education.

A randomised trial in Italy compared group educational visits versus individual clinic consultations and education for 112 people with diabetes. After two years, people receiving group education had better knowledge about diabetes, quality of life, health behaviours, and metabolic control compared to controls. Physicians spent less time seeing 9 to 10 patients as a group than individually, and participants had longer interactions with healthcare providers. These results were maintained after five years. Managing routine follow-up with interactive group visits meant each person was seen for an average of 196 minutes over four years, at a cost of US$757. Controls were seen for an average of 150 minutes over four years, at a cost of US$666.

A small randomised trial with 75 people with diabetes in Costa Rica examined community-based group education for people with diabetes. Participants attended 11 weekly nutrition classes, each of 90 minutes duration. Community education was associated with improved weight and glucose control.

A randomised trial with 352 people with diabetes found that a patient education session about foot care plus patient reminders and prompts to healthcare providers reduced serious foot lesions compared with usual care after 12 months.

On the other hand, a systematic review with four studies found insufficient evidence of the effects of education programmes for preventing diabetic foot ulcers.

Similarly, a randomised trial with 266 people with diabetes compared nine educational sessions on foot care and skin hygiene, diabetes, risk factors, diet, and weight management versus usual primary care. There were no significant differences in ulcer and amputation rates after 1.5 years.

A Cochrane review assessing patient education interventions for people with rheumatoid arthritis included 31 randomised trials. Patient education had positive short-term effects on disability, joint counts, psychological status, and depression. There was no evidence of long-term benefits.433

Another meta-analysis of 25 randomised trials in rheumatoid arthritis found that educational interventions improved pain, functional disability, psychological status, coping, and self-efficacy. The authors suggested that interventions may be more effective for people who have had the condition for a shorter period.434

A small randomised trial of five educational sessions for adults with moderate to severe asthma in France found no difference between groups in symptom-free days.435

We found evidence from 13 systematic reviews, 10 additional randomised trials, and one other study that education sessions may improve people’s knowledge and satisfaction, adherence to medication, and have smaller impacts on clinical outcomes. Many different types of educational sessions have been evaluated, but there is insufficient evidence to conclude that a particular strategy would be most effective for people with different long-term conditions.

Evidence about self-management education sessions is reported separately overleaf.

Lay educators

There is some evidence that using peers or laypeople (not health providers or professional educators) to facilitate educational sessions or act as mentors can be beneficial. This links with the NHS’ Expert Patient Programme which uses trained peer tutors to facilitate educational sessions for people with long-term conditions (a fuller description of the Expert Patient Programme is provided overleaf).

A systematic review of 19 studies found that health education by lay people improved access to care and promoted behaviour change. Eight out of ten studies where lay people helped to manage healthcare found improved access to care.436

A randomised trial with 136 families with children with long-term conditions assessed lay person support via telephone contacts, face-to-face visits, and family events. The family support intervention moderately improved children’s self-esteem and adjustment. The intervention had similar outcomes for different types of long-term conditions.437

A randomised trial in China included 954 people with high blood pressure, heart disease, chronic lung disease, arthritis, stroke, or diabetes. One group received a self-help book and participated in a course led by a layperson. The other group received usual care. Those in the lay education group had improved levels of aerobic exercise, symptom management, and efficacy to manage their own symptoms compared with controls. They also had improved health status and fewer hospitalisations after six months.438

A three-month randomised trial of peer supporters trained to mentor people with heart failure in the US found that peer supporters improved the level of self-care. There were no differences from usual care in hospital admissions for heart failure, length of stay, or cost. The authors concluded that including additional self-care education by a professional, rather than leaving all the education to a lay person mentor could strengthen the benefits of peer support.439

A randomised trial assessed peer-led strategies and organisational change in 42 primary care paediatric practices in the US. Participants were 638 children aged 3 to 17 years with mild to moderate persistent asthma. Interventions included teaching physicians how to train peer educators, nurse-led visits, care planning, and self-management support. Those receiving peer-led education alone did not have significant clinical improvements compared to usual care. Those receiving peer-led education plus nurse-led strategies had fewer symptom days annually and reduced use of medication.440

We found evidence from one systematic review and four additional randomised trials that educational sessions facilitated by laypeople may improve access to care and promote behaviour change.

Individual education (“counselling”)

Impact on patient experiences

Some studies have assessed the impacts of individual, one-to-one, education sessions for people with long-term conditions. Generally, studies suggest that while individual education may increase people’s knowledge, it is unlikely to have greater impacts unless it is targeted, specific, and long-term.

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. People receiving individual education had increased knowledge and less emergency GP call-outs in the four months after hospital discharge. Hospital readmission rates were similar between groups. The authors concluded that one-to-one education by a nurse increased people’s knowledge about asthma management, but did not reduce readmissions to hospital.441

A randomised trial of 1559 people aged 65 years or older compared a nurse visit with targeted education; a general health promotion visit; and usual care in the US. After one year, people receiving targeted education were less likely to have declined and had fewer falls compared to the usual care group. Benefits were less evident after two years. The authors concluded that a one-off individual education programme can have short-term health benefits for older people, but that programmes may need to last longer in order to maintain benefits.442

Another randomised trial compared individual problem-solving education versus telephone support provided by nurses to 293 outpatients with long-term conditions. Telephone support reduced psychological distress. Problem-solving counselling was most effective for people living alone, who infrequently use problem-solving coping skills, or who use avoidance strategies to cope with problems.443

On the other hand, a randomised trial of social work support and counselling for 345 children with long-term conditions found no effect on maladjustment among children, self-esteem, maternal psychological function, or on the impact of the child’s illness on the family.444

A randomised trial of sustained primary care feedback for people with long-term conditions in the US found no overall impact on patient outcomes or satisfaction.445

Impact on quality of care

There is less evidence about whether individual education sessions impact on quality of care. A systematic review included eight studies of ways physicians could communicate evidence to people in order to improve their understanding, involvement in decisions, and outcomes. The reviewers found little evidence about how physicians can best share clinical evidence with people facing healthcare decisions. No studies examined clinical outcomes following one-to-one discussions about clinical evidence.446

A randomised trial with 101 people with respiratory conditions in Italy found that one-to-one training of patients improved adherence to treatment, reduced symptoms, and reduced medication use.447

A randomised trial in the UK assessed medication and information discharge summaries plus pharmaceutical counselling in hospital and at home for 83 elderly people prescribed more than four items. Medication plans plus counselling improved adherence to medication and reduced unplanned GP visits and readmissions.448


A randomised trial compared a workbook and one-to-one education versus standard asthma pamphlets for adults with asthma. The education and workbook group had better adherence to medication and improved functional status. There was no difference between groups in hospital or emergency department visits.449

In contrast, individual education increased fluid and fibre intake, improved toilet habits, improved regular exercise, and reduced laxative use in a US chronic care hospital.450

Impact on clinical outcomes

Some one-to-one education strategies have been associated with improved clinical outcomes, but the evidence is mixed. A meta-analysis of 15 studies with 4072 people with high blood pressure assessed individual education, self blood pressure monitoring, and structured courses. Individual education was the most effective single strategy for improving blood pressure control, but combining individual education and group sessions was even more effective. There was insufficient evidence about self-monitoring of blood pressure.451

A review found that individual counselling and education for people with heart failure improved clinical outcomes and reduced unnecessary hospitalisations.452

A meta-analysis of 19 studies found that education interventions for people with arthritis provide additional benefits in pain relief and symptom improvement over those achieved with medication.453

In The Netherlands, a randomised trial found that nurse-led education for people with diabetes improved glycaemic control in the short-term, but the effect did not last after the programme ended. The authors concluded that regular reinforcement should be into integrated into standard diabetes care.454

A randomised trial in the US evaluated targeted education and support to prevent readmission in people with heart failure aged over 50 years. A face-to-face interview was followed by telemonitoring (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.455

A randomised trial found that personalised family counselling carried out by masters-level social workers trained in asthma management reduced asthma symptoms among children aged 5 to 11 years in the inner city.456

In contrast, a randomised trial in Canada compared usual care to a 'stage of change' intervention for 1029 people with diabetes. The intervention included personalised assessment, self-help manuals, newsletters, and individual telephone counselling. The personalised programme was associated with some behaviour changes, but there were no significant improvements in clinical outcomes.457

A randomised trial with 530 people with diabetes who had no obvious need for foot care compared education from a podiatrist plus podiatric visits of 30 to 60 minutes' duration for one year versus written foot care instructions. There was no significant difference in amputation and ulcer rates after 7 years.458

We found inconsistent evidence about the effects of one-to-one educational interventions from four systematic reviews and 15 additional randomised trials.

Technology

Educational interventions can be delivered using technology such as video, computers, and the mass media. Some studies have assessed the effects of these strategies on care processes and patient experiences, but few have examined the effect on clinical outcomes for people with long-term conditions.

Impact on quality of care

A randomised trial in the US found that audiotaped information plus an asthma management booklet improved adherence to medication in 46 adults. The effect was sustained after six months.459

A randomised trial with 179 adults taking three or more long-term medications in Australia found that providing patients with medication timetables and computer generated product information did not improve drug adherence in primary care.460

In contrast, a randomised trial with 178 older adults with long-term conditions compared classroom education, a home study intervention using videotapes and readings, and a control group. Compared with controls, both educational interventions were associated with reduced pain, sleep difficulties, and symptoms of depression and anxiety. The video course was also associated with reduced reporting of symptoms. The authors concluded that lower cost, more accessible home study education using video tapes may be an effective alternative to group instruction for people with long-term conditions.461

A randomised trial in the US assessed the cost-effectiveness of a brief dietary intervention for 206 adults with diabetes. The intervention included touchscreen computer-assisted assessment, goal setting, and follow-up calls and videotape intervention at regular intervals. The intervention improved dietary behaviours, cholesterol levels, and satisfaction at one year follow-up. The incremental costs of the intervention were modest (US$137 per patient).462

Another randomised trial found that a multimedia touchscreen computer programme improved inhaler technique more than an information leaflet for 105 people with respiratory conditions in the UK.463

A randomised trial in the US assessed focused videotape instruction in clinic waiting rooms among 215 people. Patients who viewed videotapes in waiting rooms had improved knowledge and increased satisfaction with care compared to those who did not view tapes.464

A multimedia computer program aimed at children with arthritis has been evaluated in the UK. The program provides information about arthritis, its treatment and its consequences in an interactive, activity-based format. The developers suggest that understanding more about a long-term condition leads to greater compliance with treatment and to improved prognosis, but no evidence was provided.465

A survey with 753 patients in Manchester found that access to technology, demographic factors, motivational factors, context, and attitudes to medicine all influence people’s interest in using the internet as a health resource. In order to encourage use of digital health information in chronic care, planners need to take account of this complexity and not focus on access issues alone.466

The media is sometimes used as an educational tool in disease prevention and management strategies. A Cochrane review examined the effects of mass media strategies on the use of health services. Twenty studies were included. Fifteen evaluated formal mass media campaigns, and five assessed media coverage of health-related issues. Nineteen studies found that the mass media influences use of healthcare interventions. The authors concluded that the media could be used as a tool to encourage people to use effective services and discourage unproven strategies.467 This review did not focus explicitly on chronic care.


**Impact on clinical outcomes**

A systematic review of 22 randomised trials found that computerised patient education improved health status in several conditions, including among people with diabetes.\(^{468}\)

A 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. At one year, the intervention group had better health-related quality of life and inhaler technique and significantly fewer hospitalisations compared to people receiving usual care.\(^{469}\)

We found inconsistent evidence about the impacts of educational interventions delivered using different technologies from two systematic reviews, seven additional randomised trials, and two other studies.

**Self-management education**

Some educational programmes provide general or disease-specific information for people with long-term conditions. Other programmes aim to help people learn how to manage their own care more effectively, including when to use different healthcare services and resources. This type of education is generally known as ‘self-management education.’ This section summarises evidence about different self-management education programmes. Evidence about the impacts of self-monitoring is presented in the following section.

We found 18 reviews, 27 further randomised trials, and seven other high quality studies about self-management education.

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**Impact on patient experiences**

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 currently being piloted in England. One hundred and forty-four primary care trusts have joined the **Expert Patient Programme** to date. It is estimated that up to 20,000 patients will receive training during the pilot phase. If successful, the programme will be rolled out across the NHS over the next few years.\(^{470}\)

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 disease). More than 100 studies of variations of this course have been undertaken throughout the world, primarily in the US.

There is evidence that self-management education programmes improve how patients feel about their condition and their ability to cope on a day-to-day basis. In a five-year randomised trial with more than 1000 people in the UK, the **Chronic Disease Self-management Programme** was associated with improved healthy behaviours, coping, communication with physicians, self-reported health status, and days in hospital.\(^{471}\)

UK studies suggest that people with arthritis taking part in self-management programmes feel more confident in their abilities to manage and control their symptoms, feel less anxious about their disease, and may visit the doctor less frequently, regardless of whether they live in rural or urban areas.\(^{472,473,474,475}\) For example, ‘Challenging Arthritis’ is a self-management course used by UK’s Arthritis Care. In this user-led programme, all senior staff, self-management trainers, and volunteer course leaders are people with arthritis.

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A randomised trial based on the *Chronic Disease Self-management Programme* included 952 people aged over 40 years with heart disease, lung disease, stroke, or arthritis. Participants took part in community-based self-management education sessions in the US. Self-management education was associated with increased exercise and symptom management, improved communication with physicians and self reported health, and fewer hospitalisations and days in hospital. There were no differences in pain, physical discomfort, or psychological wellbeing.\(^{476}\)

There are many different types of self-management education programmes. Not all are based on the *Chronic Disease Self-management / Expert Patient Programme* model. Some programmes target particular long-term conditions, rather than incorporating people with a wide variety of conditions. For instance, DAFNE (Dose Adjustment For Normal Eating) is a self-management education programme specifically for people with diabetes. DAFNE involves structured training in intensive insulin therapy and self-management. People with type 1 diabetes are taught to match their insulin dose to food intake on a meal-by-meal basis. Initial evidence suggests that this self-management programme is associated with improved quality of life, satisfaction with treatment, and reduced blood glucose levels.\(^{477}\)

We found little research assessing whether one type of self-management programme was more effective or better received than another. However, reviews of the evidence-base generally support the conclusion that self-management programmes, in whatever form, have positive effects on patient satisfaction and feelings of control. For instance, a general review of self-management programmes for the Department of Health found that people participating in self-management programmes tended to report reduced severity of symptoms and pain, and improved life control, activity, resourcefulness, and life satisfaction.\(^{478}\)

A review of randomised trials found that self-management courses increase participants’ self efficacy, knowledge, symptom management, use of self-management behaviours, and aspects of health status (such as depression). However, the reviewers reported that the effects of self-management for children, young adults, and carers remains uncertain.\(^{479}\)

Another meta-analysis of 82 studies found that self-management education improved knowledge, self-care behaviour, and metabolic control in adults with diabetes.\(^{480}\)

An additional randomised trial with 106 people with diabetes in Germany found that a self-management programme for people with reduced cognitive function improved self-management and satisfaction with care.\(^{481}\)

Evidence about the benefits of self-management education programmes is relatively consistent throughout the developed world. For example, a randomised trial of a self-management programme for children with asthma in Taiwan found that at three months, the self-management group had better knowledge, adherence, and self-management behaviours compared to controls. There was a trend towards reduced effects at six months. The authors concluded that in order to maintain the effects of self-management education among children with asthma, further education may be required every six months.\(^{482}\)

A trial in China found that self-management for people with hypertension was associated with improved awareness about the condition, reduced risk factors, reduced visits to the doctor, and improved health status.\(^{483}\)

Studies have also assessed different methods to deliver self management education programmes. For instance, a case control study compared group instruction in self-management and a self-teaching module for people with chronic obstructive pulmonary disease. The self-teaching module was as effective as group sessions for improving knowledge and skills.\(^{484}\)

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A randomised trial in the US tested an asthma education video game as part of a self-management programme for 199 high-risk 5 to 12 year olds with asthma. The video game was associated with improved quality of life and asthma knowledge compared to controls.  

A randomised trial of an asthma self-management protocol for parents of under 5 year olds with asthma delivered by GPs, community nurses, asthma nurses, and doctors in child health centres found that parents had more knowledge, a more favourable attitude toward asthma, higher competence in asthma self-management, and less doctor visits after the programme.  

**Impact on quality of care**

A literature review found evidence from controlled trials that (1) programmes teaching self-management skills improve clinical outcomes more than information-only education; (2) in some circumstances self-management education improves outcomes and can reduce costs for adults with arthritis and asthma; and (3) self-management programmes bringing together patients with a variety of chronic conditions may improve outcomes and reduce costs.  

A small randomised trial of self-management counselling with a follow-up telephone call and newsletters found that self-management improved the use of community resources, physical activity, and adherence to medication.  

**Impact on clinical outcomes**

There is evidence that self-management education may improve some clinical outcomes, although findings are inconsistent. A systematic review collated 71 trials of self-management education for people with long-term conditions. The reviewers found that people with diabetes participating in self-management education had improved glycaemic control and blood pressure. People with asthma experienced fewer attacks after self-management education. Arthritis self-management education programmes had no significant effects. The authors concluded that self-management education programmes may have small to moderate effects for people with selected long-term conditions. They noted, however, that study methods varied widely and were suboptimal.  

Another meta-analysis assessed the effectiveness of self-management education in children and adolescents with asthma. The reviewers included 32 randomised trials with 3706 children aged between 2 and 18 years. Self-management education was associated with improved lung function and self-efficacy and reduced absenteeism from school, days of restricted activity, and visits to an emergency department. Programmes based on peak flow monitoring, targeted interventions, and interventions with children with severe asthma had the most effect on clinical outcomes.  

A meta-analysis of randomised trials found that self-management education did not reduce morbidity in childhood asthma. On the other hand, a more recent Cochrane review of 32 controlled trials in 2 to 18 year olds with asthma found that self-management education improved clinical outcomes and reduced emergency department visits. There was insufficient evidence about the relative effectiveness of different types of programmes or their various components.

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A meta-analysis of 31 randomised controlled trials evaluated the effects of self-management education on glycaemic control in adults with type 2 diabetes. Self-management education improved glycaemic control more than usual care, with effects lasting at least four months. Self-management education worked best when participants and educators spent longer with each other. The effect began to decline one to three months after education sessions ended.493

A systematic review for a US Taskforce assessed self-management education interventions for people with diabetes. The reviewers concluded that self-management education improved glycaemic control when undertaken in community venues for adults with type 2 diabetes and in the home for adolescents with type 1 diabetes. The reviewers concluded that there is insufficient evidence to assess the effectiveness of self-management education at work or in summer camps for either type 1 or type 2 diabetes or in the home for type 2 diabetes. There is also insufficient evidence about the effect of educating coworkers and school staff about diabetes.494

A meta-analysis of 31 randomised trials of self-management education for adults with type 2 diabetes found that education slightly improved glycaemic control at immediate follow-up, but this effect did not last over time. Longer educational interventions increased the effect on glycaemic control.495

A review of self-management education in arthritis found reductions in pain and fatigue, improved activity levels, aerobic capacity and exercise endurance, reduced levels of disability and functional limitations, and improved self-reported health status.496

Similarly, a meta-analysis of 17 studies found that arthritis self-management education programmes may result in small reductions in pain and disability.497

A randomised trial in the US found that the Chronic Disease Self-management Programme was associated with improved clinical outcomes for people with many types of long-term conditions. After one year, participants had improved health status and fewer visits to the emergency department. Programme costs were estimated to be about US$200 per participant.498

A randomised trial in New Zealand assessed a heart failure management programme among 197 people. The management group received a heart failure diary for recording daily weights, attended a heart failure clinic, and were encouraged to attend three education sessions about self-management. After one year, those in the management group were more likely to have better self-management knowledge and behaviours compared to the usual care group. Patients who did not adopt self-management strategies were at high risk of death or readmission to hospital.499

A randomised trial of a community-based nursing educational intervention in Canada found that self-help programmes can improve disability, resourcefulness, self-efficacy, behaviour, and life satisfaction among people with chronic pain.500

Self-management education can be delivered using many different methods. For instance, a randomised trial with 228 children with asthma examined self-management education using an interactive multimedia program. The computer program was associated with increased asthma knowledge among children and caregivers, decreased asthma symptom days, fewer emergency department visits, and lower average daily doses of inhaled corticosteroids. Increased asthma knowledge was associated with fewer urgent physician visits and less frequent use of quick-relief medicines.501

A randomised trial in the US found that an arthritis self-management programme delivered by post was as effective for improving symptoms and self-efficacy as group sessions.502

A randomised trial found that a weekly self-management education programme led by a health educator and peer tutor improved physical functioning and symptoms for 570 older women with heart disease in the US. 503

Impact on healthcare resource use

There is evidence that self-management education programmes can improve the use of healthcare resources and subsequent healthcare costs. For instance, it has been suggested that self-management education programmes may reduce visits to health professionals by up to 80%. 504,505 Visits to general practitioners may decrease by up to two fifths. 506,507,508,509 Studies in the US suggest that significant cost savings can be made by using lay tutors, rather than health professionals, to deliver educational interventions. 510

A randomised trial in the UK assigned 203 people with ulcerative colitis undergoing hospital follow-up to patient-centred self-management training and follow-up on request, or usual care and follow-up. Self-management training was associated with faster access to treatment when needed, reduced hospital visits (0.9 versus 2.9 per patient per year), and fewer GP visits (0.3 versus 0.9 per patient per year). The authors concluded that this approach may be feasible in the long-term management of many other chronic conditions to improve health service provision and to reduce costs. 511,512

Another randomised trial in 19 hospitals in northwest England examined whether a ‘whole systems’ approach to self-management improved clinical outcomes and cost-effective use of services among 700 people. Consultants were trained to provide a patient-centred approach to care. Guidebooks on ulcerative colitis and Crohn’s disease were developed with patients prior to the study. 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 visits, but there was no change in the number of primary care visits. Patients felt more able to cope with their condition. Cost-effectiveness analyses favoured self-management over usual care. 513

A randomised trial in the UK found that a brief self-management programme while in hospital for asthma reduced readmissions and morbidity for 280 adults. 514

A randomised trial with 62 people with mild to moderate chronic obstructive pulmonary disease assessed self-management education in Norway. The programme involved four hours of group education followed by up to two individual sessions with a nurse and physiotherapist. Self-management education reduced GP visits by 85%, reduced reliever medication use, improved patient satisfaction with the care provided by their GP, and reduced the overall cost of care over a 12 month period. 515


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. Emergency department visits reduced by 41% and unscheduled physician visits by 60%.516

A randomised trial assigned 363 people with long-term conditions to social support; self-management education; a combination of both; or to a control group. Social support and self-management education were associated with reduced feelings of helplessness, increased self efficacy, and increased overall health status. Education and social support reduced healthcare costs relative to controls. The authors concluded that monetary savings from the interventions greatly outweighed their cost.517

A trial in the US assessed seven weekly sessions of peer facilitated self-management education, each of 2.5 hours duration, provided in community settings with groups of 15 to 20 participants. The programme reduced emergency department and outpatient visits, improved health behaviours, reduced symptoms, and improved health status. Reductions in service use and emotional distress were evident two years after the programme.518

Another randomised trial in the US included 104 adults hospitalised many times for asthma. One group attended an intensive outpatient treatment clinic with self-management education and the other group received usual outpatient care. Self-management education reduced hospital readmissions threefold.519

A randomised trial in the US assessed a six-week community-based self-management programme for 551 Spanish speakers with heart disease, lung disease, or type 2 diabetes. At four months, participants had better health status, health behaviours, and self-efficacy, and fewer emergency department visits compared to those receiving usual care. These improvements were maintained after one year.520

A randomised trial in six US hospitals examined self-management education for 452 older women with heart disease. Days in hospital reduced by 46% and in-patient costs were 49% lower than usual care. There were no significant differences between groups in emergency department use. Hospital cost savings exceeded the cost of self-management education by 5 to 1.521

Studies in other parts of the world have similar results. A randomised trial in India found four brief training sessions on self-management improved health status for people with chronic asthma, reduced hospital outpatient and emergency department use, and reduced total annual costs.522

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.523

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 reduced the need for rescue medication and increased courses of oral steroids and antibiotics for respiratory symptoms, but had no effect on hospital admissions, emergency department visits, days lost from work, or lung function.524

Self-monitoring and telemonitoring

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 patients self-refer to health services.

We found nine systematic reviews, 33 additional randomised trials, and four other studies about self-monitoring, written management plans, and computerised monitoring or telemonitoring.

Self-monitoring

Impact on patient experiences

A randomised trial in Europe assessed whether self-monitoring psychological wellbeing in 461 outpatients with diabetes improves mood, glycaemic control, and the patient’s evaluation of the quality of diabetes care. The monitoring group reported better mood, higher levels of energy, and better general wellbeing and mental health compared to usual care. There was no difference in blood glucose or perceived quality of diabetes care.

Impact on clinical outcomes

A meta-analysis of four randomised trials of blood or urine glucose self-monitoring in diabetes found insufficient evidence that self-monitoring improved clinical outcomes. However, randomised trials published more recently suggest that self-monitoring may have some clinical benefits. For instance, a trial in Germany found that a self-monitoring blood glucose device used at meal-times significantly improved glycaemic control and general wellbeing compared to usual care. Another randomised trial in Europe found that self-monitoring of blood glucose was associated with better quality of metabolic control compared to usual care in 689 people with type 2 diabetes.

Another meta-analysis of 18 randomised trials found that home blood pressure monitoring slightly improved blood pressure control over clinic-based monitoring.

A small randomised trial tested a wearable glucose monitor for children with diabetes. Median blood glucose was significantly lower in the self-monitoring group after three months.


A randomised trial of asthma self-monitoring involved 19 general practices and 214 patients in Holland. The authors found that self-monitoring was associated with improved symptoms and reduced medication use.\textsuperscript{532}

In contrast, a randomised trial of self-monitoring in Scotland concluded that prescribing peak flow meters and giving self-management guidelines to everyone with asthma is unlikely to improve mortality or morbidity, but that people whose asthma is severe may benefit.\textsuperscript{533}

Another randomised trial in the UK found that self-monitoring did not improve self-management or symptoms in 90 children with moderate asthma.\textsuperscript{534}

A randomised trial of home monitoring of peak expiratory flow rate included 70 adults with asthma. After six months, the monitoring group had significantly decreased use of medications and fewer days lost from work, acute asthma attacks, days receiving antibiotic therapy, physician consultations, and emergency department visits.\textsuperscript{535}

A randomised trial at 59 centres in Europe assessed blood pressure monitoring at home versus clinic measurements in 400 people. Home blood pressure monitoring was associated with less intensive drug treatment and marginally lower costs, but also with less blood pressure control.\textsuperscript{536}

A 24-year longitudinal study found that people receiving hemodialysis monitoring at home had better survival than clinic-based treatment, even after accounting for the younger age and less comorbidity of the home care group.\textsuperscript{537}

Impact on healthcare resource use

Although there is evidence that self-monitoring can have some impacts on clinical outcomes, there is limited evidence about the effect of self-monitoring on healthcare resource use.

A cost analysis in the US found that self-monitoring and self-care significantly reduced monthly Medicare expenditures over a one year period.\textsuperscript{538}

A case control study in Australia found that early identification of adverse trends in clinical signs recorded electronically at home can help avoid hospital readmission and reduce the length of hospital stay in people with long-term conditions.\textsuperscript{539}

We found evidence from three reviews, eight additional randomised trials, and three other studies about self-monitoring. There is some evidence that self-monitoring may improve clinical indicators in specific conditions, but insufficient evidence about the impacts on healthcare costs or resource use.

Telemonitoring

As well as information about self-monitoring, a number of studies have been published about electronic monitoring systems which integrate home monitoring and clinical monitoring. This is not always strictly ‘self-monitoring’ as it may involve interaction between patients and health professionals. Schemes which use telecommunications systems such as the internet or telephone lines to transfer or record monitoring information are often referred to as ‘telemedicine’ or ‘telemonitoring’. However, telemonitoring can take a wide variety of forms.

Impact on patient experiences

A randomised trial of computer-assisted, client-centred strategies for community-based long-term care included 1006 aged and disabled people in the US. Over two years, using computerised systems was associated with improved patient satisfaction, but no differences in clinical outcomes.\textsuperscript{540}


\textsuperscript{534} Wensley D, Silverman M. Peak flow monitoring for guided self-management in childhood asthma: a randomized controlled trial. \textit{Am J Respir Crit Care Med} 2004; 170(6): 606-12.


\textsuperscript{536} 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. \textit{JAMA} 2004; 291(8): 955-64.


\textsuperscript{540} Kinney ED, Kennedy J, Cook CA et al. A randomized trial of two quality improvement strategies implemented in a statewide public community-based, long-term care program. \textit{Medical Care} 2003; 41(9): 1048-57.
A small randomised trial in the UK examined the acceptability, effectiveness, and reliability of home telemonitoring in heart failure. The telemonitoring group had better compliance with prescriptions, but no difference in quality of life after one year. Video consulting over ordinary telephone lines did not have a sustained benefit, and was not complied with.541

A randomised trial of modem versus telephone transmission of blood glucose data for people with diabetes found no significant differences in telephone consultation time, clinic work-flow efficiency, or accuracy between groups. Both people with diabetes and clinic staff were highly satisfied with using computer modems to transmit blood glucose data.542

Impact on quality of care

Studies have assessed the impacts of a variety of different types of computerised and telephone monitoring systems in chronic care. For instance, a small randomised trial in Germany assessed a telemedicine system for transmitting self-monitoring blood glucose values from the patients' home to a diabetes centre using a modem. Data were processed by computer and advice given by telephone. The authors concluded that telemangement of people with diabetes requiring insulin is a cost- and time-saving procedure for patients and results in comparable metabolic control to conventional outpatient management.543

An evaluation of an electronic health record system in The Netherlands found that health professionals and patients thought that the system improved quality of care. People with diabetes used the web-based system at home. Both health professionals and patients entered data. The system then provided feedback to patients on the basis of the data entered and clinical guidelines.544

Other studies have assessed the benefits of substituting telephone follow-up for routine clinical monitoring and review. A randomised trial compared routine review of 278 people with asthma by telephone versus usual face-to-face reviews in four general practices in England. The authors found that telephone consultations enable more people with asthma to be reviewed, without clinical disadvantage or loss of satisfaction.545

Similarly, a small randomised trial found that nurse telephone calls, self-monitoring, and self-management logs improved blood glucose control for people with diabetes in Korea.546

A randomised trial in the US found that telephone calls by nurses and physicians were as effective as standard outpatient care for promoting self-management in 28 people with diabetes.547

A randomised trial with 272 people with diabetes evaluated automated telephone monitoring with nurse follow-up in the US. At 12 months, the intervention group reported more frequent glucose self-monitoring, foot inspections, and visits to specialty clinics, greater satisfaction with care, and fewer symptoms compared to usual care.548

A literature review assessed the feasibility and effects of interactive voice response systems for managing long-term conditions. The reviewers found that information reported by patients during interactive monitoring assessments is at least as reliable as information obtained in clinical interviews or medical reviews. Patients may be more inclined to report health problems to an automated system than directly to a clinician. The reviewers found few outcome evaluations of interactive automated systems for long-term conditions, but those that do exist suggest that automated systems may have a moderate impact on health status and behaviours.549

A randomised trial with 90 people assessed the feasibility of providing a heart failure disease management programme using an in-home telehealth communication device. The telehealth device was as effective as traditional methods.550

Similarly, a randomised trial in the US found that automated telephone calls could be used to collect health information from people with diabetes. 252 adults with low incomes received automated calls for 12 months and responded to queries using their touch-tone telephones.\textsuperscript{551}

**Impact on clinical outcomes**

Most high quality information about the effect of telemedicine on clinical outcomes in chronic care focuses on people with diabetes. A systematic review of patient-computer interaction in diabetes included 15 randomised trials of glucometer data transmission; network data transmission; computerised insulin dosage; computerised diet assessment; computerised diet counselling; and computerised data management. Participants were 502 adults and 259 children with diabetes. Twelve out of the 15 studies found that computerised information had a significant effect on clinical outcomes. Six studies reported lower blood glucose levels in the computerised group compared to controls.\textsuperscript{552}

A meta-analysis of seven randomised trials found that using a modem to transmit glucometer data and clinician feedback had small benefits for glycaemic control in people with type 1 diabetes.\textsuperscript{553} A similar meta-analysis of 13 studies also found that computer-based systems improved metabolic control in people with diabetes.\textsuperscript{554}

A small trial found that transferring home monitoring results to health care professionals improved serum glucose control for people with diabetes. Patients sent information electronically from a glucometer to health clinics weekly over a 15 month period. A computer program downloaded the data and performed trend analysis, providing a report for use by the health professional during an outpatient visit.\textsuperscript{555}

A trial of computer assisted self-management of diabetes found reduced symptom severity among adolescents.\textsuperscript{556}

A randomised trial with 280 ‘high risk’ people with diabetes found that automated educational calls with telephone follow-up by nurses may improve self-care behaviour, glycaemic control, and symptoms among vulnerable people.\textsuperscript{557}

A randomised trial with 110 people with diabetes in Korea found that an internet-based blood glucose monitoring system improved diabetes control.\textsuperscript{558} A similar randomised trial in Korea assessed the effect of a telephone intervention on glycaemic control and body mass index in people with type 2 diabetes. The telephone group received 12 weeks of telephone education and reinforcement of diet, exercise and medication adjustment, as well as frequent self-monitoring of blood glucose levels. The intervention reduced blood glucose compared to usual care, but had no effect on body mass index.\textsuperscript{559}

A randomised trial of an interactive device for asthma self-management included 134 US children aged 8 to 16 years. The computerised self-management programme improved functional outcomes and self-care behaviours and reduced urgent calls to the hospital.\textsuperscript{560}

There is also evidence about the benefits of case management via telephone (see section on case management for further details). A randomised trial in the US evaluated six months of standardised telephone case management for 358 people with heart failure. Telephone case management was associated with about half as many hospitalisations for heart failure, less days in hospital, fewer multiple readmissions, and lower inpatient costs after six months. There was no evidence of cost-shifting to the outpatient setting.\textsuperscript{561}

Another randomised trial in the US evaluated a telephone-based disease management programme for 97 people with depression or at-risk drinking. The authors concluded that telephone monitoring can improve outcomes for people with behavioural health problems, especially depression.\textsuperscript{562}


Impact on healthcare resource use

There is little high quality evidence about the impact of telemonitoring on healthcare resource use specifically focussed on long-term conditions.

A randomised trial compared nurse home visits versus a telemanagement programme with a home monitoring device for 216 people with heart failure. The home monitoring device transmitted data daily to a secure internet site for review by a nurse. The programme significantly reduced heart failure readmissions and length of hospital stay after three months. The authors concluded that using computerised technology to monitor patients with heart failure alongside care from advanced practice nurses improves heat failure management and reduces the cost of care.  

Studies have also assessed the benefit of substituting telephone calls for some routine visits to health professionals. For instance, a randomised trial with 497 men older than 54 years assessed clinician-initiated telephone calls instead of selected primary care visits in the US. Over a two year period, men receiving telephone monitoring had fewer total clinic visits, less medication use, 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.

We found evidence from three systematic reviews, 19 randomised trials, and one additional study that computerised monitoring and telemonitoring has the potential to improve care processes and may be associated with improved clinical outcomes, especially in diabetes. There is insufficient evidence about impacts on healthcare costs and patient satisfaction.

Written plans

Impact on quality of care

There is a small amount of evidence that written care plans may improve quality of care. A Cochrane review included 15 trials assessing self-management programmes for adults with asthma. The reviewers concluded that self-adjustment of medications with the aid of a written action plan or by regular medical review is an important component of optimal self-management: programmes.

A randomised trial of 140 adults with asthma or chronic obstructive pulmonary disease assessed developing a written self-management plan in group and individual educational sessions. The plans were associated with improved medication compliance among people with asthma, but not chronic obstructive pulmonary disease.

Impact on clinical outcomes

A Cochrane review with seven randomised trials examined whether a written asthma self-management plan increased adherence to medications and improved clinical outcomes. There was no strong evidence that written plans improved patient outcomes. One type of plan was not consistently more effective than another. The reviewers suggested that no firm conclusions can be drawn about the benefits of including written self-management plans in comprehensive asthma care programmes.

A review found that adding written self-treatment guidelines to self-management programmes may improve health outcomes, although the only two controlled studies on this topic found no effect.

A small randomised trial in the US found no difference in outcomes from computerised and written care plans in a long-term care facility.

Impact on healthcare resource use

A Cochrane review assessed the effects of asthma self-management programmes coupled with regular health practitioner review. The reviewers included 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, emergency department visits, unscheduled visits to the doctor, days off work or school, and nocturnal asthma. The reviewers concluded that programmes that enable people to adjust their medication using a written action plan appear to be more effective than other forms of asthma self-management.  

A Cochrane review of individual discharge plans for people in hospital included 11 randomised trials. Individual discharge plans had no effect on mortality, length of hospital stay, readmission rates, being discharged from hospital to home, or overall healthcare costs. Two trials suggested increased satisfaction compared to routine discharge.  

A randomised trial in New Zealand found that written self-management plans were associated with reduced use of asthma medication by children with asthma.  

On the other hand, a randomised trial in the US found that individualised patient care plans and multidisciplinary case management did not reduce emergency department use for frequent users of the emergency department.  

We found evidence from five systematic reviews and three additional trials that written plans may improve care processes and reduce healthcare resource use in respiratory disease, but are not consistently associated with better clinical outcomes. We found limited high quality evidence about written plans for other long-term conditions.


SUMMARY OF TRENDS

Implications

This rapid review has identified a great deal of information about components of programmes to improve care for people with long-term conditions, such as self-management and patient education. However, we identified less high quality evidence about the impacts on patient outcomes of programmes with many different components. Those trials and reviews that do exist are often based in the United States, although a larger evidence-base from the UK and Europe is beginning to emerge.

There is currently limited evidence about the transferability of some US models to the UK, although new trials and evaluations are underway. However there is strong evidence for some individual systems and initiatives, especially regarding perceived quality of care (see Box 7).

We found evidence to support:
- Broad chronic care management models
- Involving patients in decision-making
- Providing accessible structured information
- Self-management education
- Self-monitoring and referral systems
- Electronic monitoring and telemonitoring
- Identifying people at high risk of hospitalisation
- Integrated community and hospital care
- Greater reliance on primary care
- Using nurse-led strategies, where appropriate

We found less evidence to support:
- Case management
- Evidence-based care pathways
- Shared learning among health professionals

We found limited information about:
- New models of commissioning services
- Appropriate data collection and monitoring
- Linking with voluntary and community sectors

Good leadership and a strong culture of quality improvement also appear to be important ingredients in efforts to transform chronic care. A number of studies have recently begun to assess what makes some transformation programmes work better than others. A study of implementing the Chronic Care Model and quality improvement methods for diabetes care in the US found that key factors influencing the success of the programmes were senior leadership support, physician champions, multidisciplinary teams, and prioritising collaborative activities. Barriers were staff turnover and low priority in strategic planning.574

In another study, 158 leaders of US organisations were interviewed about the barriers and facilitators for implementing initiatives such as disease registries, reminder systems, performance feedback, case management, and self-management education. The two most commonly mentioned facilitators for transforming chronic care were strong leadership and an organisational culture valuing quality. The top five barriers were lack of finances, reimbursement that does not reward high quality, inadequate information technology, physician resistance, and physicians being too busy.575

Caveats

When interpreting the findings of this overview, it is important to bear in mind the following caveats:

- This is not an exhaustive review. We did not aim to summarise every high quality study about chronic care, but rather to provide a general summary of major trends relating to planned components of a programme currently being implemented in southeast England.

- There is little high quality information about the impacts of some interventions on resource use or on health professionals’ training, skills, and satisfaction. Major gaps in the evidence are identified in Box 8.

- Some studies suggest that specific interventions work best for people with particular conditions. For instance, what works well in diabetes may work less well in heart disease.

- Even where good quality evidence is available about the benefits of chronic care interventions, 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 improve medication adherence in diabetes, 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.

- 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.


Box 7: Key findings of this evidence overview

Interventions targeting organisation of care

Broad chronic care management models
We found evidence that broad management programmes such as those based on the Chronic Care Model and initiatives developed by Health Management Organisations in the US may improve some clinical outcomes and healthcare resource use. The most beneficial components of programmes and their transferability to the UK remain uncertain.

Integrated care
We found evidence that integrated primary and secondary care, working across organisational boundaries, and multidisciplinary team approaches could have some impacts on quality of care, clinical outcomes, and healthcare costs. The best strategies for promoting integrated working remain uncertain.

Greater reliance on primary and community care
There is some evidence that primary care teams, nurses, and community and voluntary sector workers may be able provide services as effectively as hospital specialists if they receive adequate support and form part of an integrated team approach.

New models of commissioning
We found no high quality evidence comparing different models of commissioning healthcare services for people with long-term conditions.

Interventions targeting systems of care

Evidence-based care pathways
We found inconsistent evidence about the benefits of care pathways and clinical guidelines in chronic care.

Appropriate data collection and monitoring
We found evidence that collating data about people with long-term conditions using disease registries can improve the quality of care provided. Further work is needed to identify the most effective monitoring and reminder strategies for healthcare organisations in the UK.

Identifying those most at risk
We found some evidence that certain care strategies work better for ‘high risk’ patients. Further work is needed to assess the best tools for identifying those most at risk.

Case management for the most vulnerable people
We found conflicting evidence about the effects of case management, varying somewhat for people with different long-term conditions. Case management may have some benefits for those most at risk of complications and hospitalisation, although there is insufficient high quality evidence on this topic.

Learning and sharing among health professionals
We found some evidence that group education and reminder systems could help health professionals learn new skills and share their experiences with others. We found inconsistent evidence about one-to-one education and audit and feedback strategies for health professionals.

Interventions targeting patient self care

Involving patients in decision-making
We found some evidence that involving people with long-term conditions in decision-making can improve satisfaction with care, but some people are more likely to want to be involved than others. There is inconsistent evidence about the best ways to involve people with chronic conditions in healthcare decision-making and planning.

Providing accessible structured information
We found strong evidence that providing accessible information can improve patient knowledge, and may have some impacts on clinical outcomes. The best strategies for providing information remain uncertain. It appears that written information alone is likely to have little effect.

Self-management education
We found strong evidence that self-management education programmes such as the Expert Patient Programme can improve patient knowledge and efficacy, and may help to improve clinical outcomes and reduce healthcare resource use. There is insufficient comparative information to assess whether some types of self-management education programmes work better than others.

Self-monitoring and referral systems
We found some evidence that self-monitoring, computerised monitoring and telemonitoring, and written care referral plans can impact on the quality of care patients receive. Effects on clinical outcomes and healthcare resource use are inconsistent.
### Box 8: Summary of evidence about different types of outcomes

<table>
<thead>
<tr>
<th>Initiatives</th>
<th>Impact on patient experiences</th>
<th>Impact on quality of care</th>
<th>Impact on clinical outcomes</th>
<th>Impact on resource use</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Interventions targeting organisation of care</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Broad chronic care models</td>
<td>Some evidence of improved satisfaction</td>
<td>Good evidence of improved quality of care</td>
<td>Some evidence of improved clinical outcomes</td>
<td>Some evidence of reduced costs</td>
</tr>
<tr>
<td>Integrated care</td>
<td>Some evidence of improved satisfaction with multidisciplinary teams</td>
<td>Inconsistent evidence, with a trend towards improved care</td>
<td></td>
<td>Evidence of reduced resource use and cost</td>
</tr>
<tr>
<td>Greater reliance on primary and community care</td>
<td></td>
<td></td>
<td></td>
<td>May reduce overall healthcare costs, although evidence is inconsistent</td>
</tr>
<tr>
<td>New models of commissioning</td>
<td></td>
<td></td>
<td></td>
<td>Evidence that different models affect the cost of care</td>
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<tr>
<td><strong>Interventions targeting systems of care</strong></td>
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<tr>
<td>Identifying those most at risk</td>
<td></td>
<td>Some evidence of improved outcomes</td>
<td>Some evidence of reduced resource use</td>
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<tr>
<td>Case management for the most vulnerable people</td>
<td>Some evidence of improved satisfaction</td>
<td>Some evidence that targeting those at high risk improves outcomes</td>
<td>Some evidence that targeting those at high risk reduces resource use</td>
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<tr>
<td>Evidence-based care pathways</td>
<td></td>
<td>Some evidence of improved quality of care</td>
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<tr>
<td>Appropriate data collection and monitoring</td>
<td>Some evidence that disease registries improve quality of care</td>
<td>Some evidence that disease registries improve clinical outcomes</td>
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<tr>
<td>Learning and sharing among health professionals</td>
<td>Active strategies appear more effective</td>
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<tr>
<td><strong>Interventions targeting patient self care</strong></td>
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<tr>
<td>Involving patients in decision making</td>
<td>Some evidence of improved satisfaction</td>
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<td>No strong evidence of an effect on clinical outcomes</td>
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<tr>
<td>Providing accessible structured information</td>
<td>Evidence that written information and group sessions improve knowledge</td>
<td>Evidence that educational sessions improve adherence</td>
<td>No evidence that written information alone improves outcomes</td>
<td></td>
</tr>
<tr>
<td>Self-management education</td>
<td>Good evidence of improved self care and satisfaction</td>
<td>Some evidence of improved quality of care</td>
<td>Some evidence of improved clinical outcomes</td>
<td>Evidence of reduced resource use</td>
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<tr>
<td>Self-monitoring and referral systems</td>
<td>Some evidence of improved quality of care</td>
<td>Some evidence of improved clinical outcomes</td>
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Note: Blank cells in the table indicate that we found insufficient evidence to draw conclusions.