What is the evidence for the Effectiveness, Appropriateness, and Feasibility of group clinics for patients with chronic conditions?

A systematic review.

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Abstract

Background

Group clinics are a form of delivering specialist-led care in groups rather than individual consultations.

Objective(s)

To examine evidence for the use of group clinics in patients with chronic health conditions.

Design

Systematic review of evidence from randomised controlled trials (RCTs) supplemented by qualitative studies, cost studies and UK initiatives.

Data sources

We searched MEDLINE, EMBASE, the Cochrane Library, Web of Science and CINAHL from 1999 to 2014. Systematic reviews and randomised controlled trials were eligible for inclusion. Additional searches were performed to identify qualitative studies, studies reporting costs and evidence specific to UK settings.

Review methods

Data was extracted for all included systematic reviews, RCTs and qualitative studies using a standardised form. Quality assessment was performed for systematic reviews, RCTs and qualitative studies. UK studies were included regardless of quality or level of reporting.

Tabulation of extracted data informed a narrative synthesis. We did not attempt to synthesise quantitative data through formal meta-analysis. However, given the predominance of studies of group clinics for diabetes, using common biomedical outcomes, this subset was subject to quantitative analysis.

Results

Thirteen systematic reviews and 22 RCT studies met the inclusion criteria. These were supplemented by 12 qualitative papers (10 studies), 4 surveys and 8 papers examining costs. Thirteen papers reported on 12 UK initiatives. With 82 papers covering 69 different studies this constituted the most comprehensive coverage of the evidence base to date.

Disease specific outcomes

The large majority of RCTs examined group clinic approaches to diabetes. Other conditions included hypertension/heart failure and neuromuscular conditions. The most commonly measured outcomes for diabetes included glycated haemoglobin A1c (HbA1c); blood pressure; and cholesterol. Group clinic approaches improved HbA1c; improved systolic blood pressure but did not improve LDL cholesterol. A significant effect was found for disease-specific quality of life in a few studies. No other outcome measure showed a consistent effect in favour of group clinics. Recent RCTs largely confirm previous findings.

Health Services Outcomes

Evidence on costs and feasibility was equivocal. No rigorous evaluation of group clinics has been conducted in a UK setting. A good quality qualitative study from the UK highlighted factors such as physical space and a flexible appointment system. The views and attitudes of those who dislike group clinic provision are poorly represented. Little attention has been directed at the needs of ethnic minorities.

The review team identified significant weaknesses in the included research. Potential selection bias limits the generalizability of results. Many potentially includable patients do not consent to the group approach. Attendance is often interpreted liberally.

Conclusions

Although there is consistent and promising evidence for an effect of group clinics for some biomedical measures, this effect does not extend across all outcomes. Much evidence was derived from the USA. It is important to engage with UK stakeholders to identify NHS considerations relating to implementation of group clinic approaches.

Future work

The review team identified three research priorities:

(i) More UK-centred evaluations using rigorous research designs and economic models with robust components;

(ii) Clearer delineation of individual components within different models of group clinic delivery;

(iii) Clarification of circumstances under which group clinics present an appropriate alternative to an individual consultation.

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List of Abbreviations

ADL	activities of daily living
APCC	Adult Primary Care Centre
BP	blood pressure
CADTH	Canadian Agency for Drugs and Technologies in Health
CASP	Critical Appraisal Skills Programme
CCM	Chronic Care Model
CG	Control Group
CHCC	Cooperative Health Care Clinic
CHGVM	Chinese hypertension group visits model
CHW	Community Health Worker
CI	confidence interval
CINAHL	Cumulative Index to Nursing and Allied Health Literature
CKD	chronic kidney disease
CRAMP	Computer Registry of all Myopathies and Polyneuropathies
COPD	chronic obstructive pulmonary disease
CRD	Centre for Reviews and Dissemination
CTVHCS	Central Texas Veterans' Health Care System
CUS	continuous usual session
CV	cluster visit
DCCC	diabetes co-operative care clinic
DIGMA	drop-in group medical appointment
DM	diabetes mellitus
DMARD	disease-modifying anti-rheumatic drug
DSM	Diagnostic and Statistical Manual of Mental Disorders
ED/ER	emergency department/emergency room
EPIC	Empowering Patients in Care
FAME	Feasibility, Appropriateness, Meaningfulness, Effectiveness
FBG	fasting blood glucose

GHC	Group Health Cooperative
GINA	Global Initiative for Asthma
G(M)C	group (medical) clinic
GMA	group medical appointment
GMV	group medical visit
GV	group visit
Hb	haemoglobin
HbA1c	glycated haemoglobin
HCP	healthcare professional
HF	heart failure
HIPAA	Health Insurance Portability and Accountability Act of 1996
HIV/AIDS	human immunodeficiency virus/acquired immune deficiency syndrome
HMO	health maintenance organisation
HS&DR	Health Services and Delivery Research
IADL	instrumental activities of daily living
IFG	impaired fasting glucose
IG	intervention group
IMA	individual medical appointment
INR	international normalized ratio
IQR	inter-quartile range
IS	intensive session
JBI	Joanna Briggs Institute
KQ	key question
LDL	low-density lipoprotein
MA	Medical Assistant
MAGIC	Metabolic Assistance Group Intervention Clinic
MD	mean difference
MUS	medically unexplained symptoms
MeSH	medical subject headings
MOVE	Managing Overweight/ Obesity For Veterans Everywhere
NA	not applicable

NHS	National Health Service
NIHR	National Institute for Health Research
NNT	number needed to treat
NR	not reported
OFG	online focus group
OS	observational study
PCP	primary care physician
PHC	primary health care
PICO	participants, intervention(s), comparator(s), outcome(s)
QALY	quality-adjusted life year
QoL	quality of life
RCT	randomized controlled trial
RD	risk difference
RDie	Registered Dietitian
RR	risk ratio
ScHARR	School for Health and Related Research
SCT	social cognitive theory
SMA	shared medical appointment
SMD	standardized mean difference
SOE	strength of evidence
T1/T2DM	type 1/type 2 diabetes mellitus
UC	usual care
UK	United Kingdom
US	United States
VA	Department of Veterans Affairs

Scientific Summary

Background

Group clinics are a form of delivering specialist-led care in groups rather than individual consultations. They may include aspects of clinical management as well as patient education and support. Group clinics have been suggested as a way to replace individual patient consultations with a group session, focused on management of an ongoing condition and advice. Synonyms for group clinics include group medical appointments, drop-in group medical appointments, shared medical appointments, group visits, cluster visits etc. In the UK, interest in group clinics is linked to a wider concern to modernise outpatient services, which account for over ninety million episodes every year and increase year on year.

Theoretical considerations

We found supporting evidence for many candidate programme theories to explain how and why patients might benefit by attending group clinics. Particularly influential high-level theories reflected in the published accounts included Social Cognitive Theory, Social Comparison Theory and Social Learning Theory. Of particular value to understanding group clinic dynamics were theories relating to the core components of chronic disease self-management developed by Corbin and Strauss and the five core self-management skills identified by Lorig and Holman: problem solving, decision making, appropriate resource utilisation, forming a partnership with a healthcare provider and taking necessary actions. Opportunities for a partnership of clinician and patient to use all of these skills are evidenced within the standard group clinic format.

In the UK, there is little published evidence on impact and a lack of good quality information on the range and scale of group clinic activity in different specialties. A systematic review is needed to combine published evidence of different types, including descriptive or qualitative studies, with grey literature.

Objective(s)

To examine the evidence for the use of group clinics in patients who have chronic health conditions.

The review question is:

What is the current evidence for the feasibility, appropriateness, meaningfulness, effectiveness and cost effectiveness of group clinics/group medical visits for patients with chronic conditions?

Specifically:

- What different models of group clinic exist (in the UK and internationally)?
- What evidence exists about the outcomes and cost-effectiveness of these clinics?
- What evidence exists about patient experience of these clinics?
- What are the possible explanatory mechanisms for any reported improvements in outcomes?

Methods

Data sources

We searched MEDLINE, EMBASE, the Cochrane Library, Web of Science and CINAHL from 1999 to 2014. Systematic reviews and randomised controlled trials (RCTs) were eligible for inclusion. Additional searches were performed to identify qualitative studies, studies reporting on costs and evidence specific to UK settings. UK studies were included regardless of quality or level of reporting.

Study selection

We sought to differentiate a group clinic from group educational interventions that are common in chronic disease management. To define inclusion in our review we required that a participating clinician do more than simply fill an educational or facilitative role. Our focus on chronic disease meant that we excluded numerous studies of group clinics for pregnant

women and for smoking cessation. We included group clinics for inherited metabolic disease because of their long-term disease management implications. Detailed inclusion and exclusion criteria for the review were as follows:

Population: Adults and/or children receiving health care services for one or more chronic health condition. We excluded visits for healthy patient groups (i.e. those without an indication related to a chronic health condition). This exclusion covers: Pregnant women or those planning a pregnancy (unless they also have a chronic health condition such as diabetes); and smoking cessation or other health promotion clinics.

Intervention: Delivery of one or more services to a small group of patients (typically 8-10 patients) simultaneously. Only studies including the delivery of the intervention by one or more specialist health care professionals met the inclusion criteria of the review. We excluded delivery of intervention by peers or non-specialist HCPs. We also excluded peer facilitated support groups since the intervention is not principally delivered by health care professionals (although they may contribute).

Comparator: Other methods of organisation of treatment (with the exception of qualitative research and surveys, only studies with a comparator group are included)..

Outcomes: Patient outcomes; health services outcomes; patient and carer satisfaction; resource use.

Search results were sifted and studies selected for inclusion by one reviewer. Where there was doubt about inclusion, a second reviewer independently examined the full text.

Data extraction

Formal data extraction was employed for all included systematic reviews, RCTs and qualitative studies. Data extraction was undertaken by three reviewers using a standardised form. Quality assessment was performed for randomised controlled trials and qualitative studies. For the Randomised Controlled Trials we used the CASP checklist for RCTs and the Cochrane Risk of Bias Tables and for the Qualitative Research we used the CASP Checklist for Qualitative Studies. Assessment of the limitations of included studies was also undertaken using the limitations reported by study authors in the included studies.

Data synthesis

Data were extracted and tabulated. This tabulation was used to inform a narrative synthesis. There was no attempt to synthesise quantitative data through formal meta-analysis given the heterogeneity of disease conditions and models of service delivery for group clinics. However, given the predominance of studies of group clinics in the context of diabetes and the use of common biomedical outcomes this large group of studies was subject to quantitative analysis. For literature that made a conceptual contribution a method known as best fit framework synthesis was used which involved extraction of data against a pre-existing framework. The review provides an analysis of the quality of evidence, and the strength of conclusions which can be drawn from existing studies.

Results

Effectiveness

Thirteen systematic reviews and 22 RCTs (32 papers) met the inclusion criteria. This evidence base was supplemented by 12 qualitative studies, 4 surveys and 8 papers examining costs and other economic issues. Thirteen papers reported on 12 UK initiatives.

Thirteen systematic reviews reported on multiple variations of group medical visits. Twelve reviews were analysed in detail and one was only available in summary form. A further review is only at the protocol stage The majority of reviews were disease-specific, primarily with a focus on diabetes. Most included studies were performed in the USA. Reviews of diabetes reported a consistent effect of group clinics in improving glycated haemoglobin A1c (HbA1c) and systolic blood pressure. A significant effect was also found for disease-specific quality of life in a few studies. No other outcome measure showed a significant and consistent effect in favour of group clinics. Many reviews commented that the heterogeneity of group clinic interventions made it problematic to classify such initiatives, to isolate the effects of specific intervention components and consequently to evaluate the intervention's effects.

Recent RCTs supplementing published systematic reviews largely confirm previous findings. Eight reports of 7 RCTs have been published between 2012 and 2014 to add to 15 RCTs (24 reports) previously available in existing reviews making this the largest review to date focused on group clinics.. Three of these reports supplement existing meta-analyses. Two of these reports confirm previous findings of a significant effect for improved glycated haemoglobin A1c (HbA1c) and systolic blood pressure associated with the use of group clinics in diabetes. One new trial found a significant effect for total cholesterol and LDL cholesterol but this was not consistent with previous meta-analyses and unlikely to overturn the finding of no overall significant effect.

Qualitative studies

Qualitative research found that patients appreciate many features of group clinics, including socialisation, normalisation and information sharing. Clinicians appreciated the opportunity to informally monitor patients and to gain a better understanding of practical threats to treatment adherence. Again, studies from the USA were dominant with other studies being conducted in Canada, the Netherlands and the UK (1 study, 2 papers). Generally the qualitative studies were of low quality, with only 5 of the 12 studies using recognised methods of both qualitative data collection and analysis.

Costs and cost-effectiveness

Of 8 papers that provided evidence on costs, 7 reported studies performed in the USA and 1 in Italy. Conditions covered were diabetes, comorbid diabetes with hypertension and complex behavioural health and medical needs. This heterogeneous set of studies showed mixed effects of group clinic interventions on costs. Furthermore, certain costs were not explicitly identified within the included studies, For example, it is likely that a group clinic intervention may require specialist training of healthcare staff, particularly in relation to facilitation skills.

Evidence from the UK

Of the 13 papers describing group clinic initiatives in the UK, none represented evidence from rigorously conducted experimental studies. Descriptions of several initiatives were only available as abstracts. One study found that acceptability of group clinics was high among patients undergoing acupuncture for knee osteoarthritis. However, the sensitivity of health and lifestyle topics is not a key issue for this particular population. Even within this context there was an expressed demand for single-sex sessions, including in a Muslim population.

A good quality qualitative study from the UK highlighted the importance of factors such as physical space and a flexible appointment system. The views and attitudes of those who feel that group clinic provision is unacceptable, inappropriate or not feasible were relatively poorly represented and little attention has been directed at the specific needs of those from ethnic minorities. Patients for whom group clinic sessions may not be appropriate include those with complex conditions or those with severe pain.

Conclusions

Although there is consistent and promising evidence for an effect of group clinics for some biomedical measures, this evidence does not extend to other measures such as control of cholesterol. Disease-specific quality of life improved significantly in a small number of studies but effects were less marked for generic health-related quality of life. Much of the evidence was derived from the USA and it will be important to engage with UK stakeholders and identify specific NHS considerations when considering issues relating to implementation of the group clinic model.

Recommendations for research

A full economic evaluation of group clinics is recommended. This should accommodate data such as the type of clinician delivering the intervention and how long each clinic lasts to derive a richer picture of the costs of group clinics. Primary research that gathers information on the running of group clinics and potential cost savings in the UK NHS context would be particularly valuable.

Plain English Summary

Group clinics deliver care to small groups of patients with the same condition at the same time rather than each patient meeting a doctor on a one to one basis. We wanted to find out whether group clinics worked better and were a better use of resources compared to one-to-one appointments. We also wanted to find out what patients and health professionals thought about group clinics.

We have assembled the largest number of relevant studies to date (82 papers reporting 69 research projects). We only looked at research about people with long-term conditions (e.g. diabetes or heart disease). We focused on how people manage their condition, not on using a group setting for teaching.

Most research focused on people with diabetes. We found that group clinics were better than individual appointments for improving some measures of how well diabetes is controlled. Group clinics also improved the quality of life of patients. However, we did not find any other improvements for patients. Patients and health professionals tend to view group clinics positively. However, the research did not tell us much about the views of people who disliked group clinics. Several studies looked at whether group clinics save money but the results were unclear. Although we were interested in group clinics as an alternative to one-to-one appointments most studies combined group approaches with an individual consultation. Most studies took place in the USA. More research is needed to see whether group clinics are acceptable and good value for money in the NHS.

Chapter 1 - Background

Chronic Disease in the United Kingdom

Chronic conditions and diseases are the leading cause of mortality and morbidity in Europe. Complex conditions, such as diabetes and depression, continue to impose an ever increasing health burden on societies across Europe. The World Health Organization 'Global Burden of Disease' study estimated that, as of 2002, chronic or non-communicable conditions accounted for 87% of deaths in high income countries [1].

More than 15.4 million people in England are living with one or more long term conditions [2]. Research by the King's Fund estimates the average cost per year of treatment for a person with a single long-term condition in the health and social care system is £1000 and this rises to £ 3000 and £ 8000 for those with two or three conditions respectively [3]. By 2018 the number of people with three or more long-term conditions is predicted to rise from 1.9 million (2008) to 2.9 million (2018) [3]. People with long term conditions account for 50% of all GP appointments, 64% of outpatient appointments and 70% of all inpatient bed days [3]. In total around 70% of the total health and care spend in England (£7 out of every £10) is attributed to caring for people with LTCs. The prevalence, morbidity, and mortality from chronic diseases are expected to rise especially in countries with rapidly aging populations [4].

Patients with chronic diseases require intense patient education, counselling, lifestyle modification, and complicated pharmacological management; all of which consume a significant amount of service delivery time. These interventions are difficult to achieve in the current healthcare system where less time per patient visit is a result of increasing numbers of patients seen per day. Historically, the medical model is focused on the treatment of acute episodic health problems and hospital facilities are correspondingly poorer equipped to handle chronically ill patients who require complex services [5].

Chronic care was explicitly recognised as a priority in 2004 in the NHS Improvement Plan [6]. The Plan set out the government's priority to improve care for people with long-term

conditions by moving from reactive care towards a systematic, patient centred approach. *Supporting People with Long-Term Conditions* (2005), outlined a new NHS and Social Care Model for the care of people with long-term conditions [7]. It aimed to match support with need, providing personalised, yet systematic health and social care to people with chronic conditions. The model categorises patients according to their level of need:

Supported self-care for the 80 per cent of patients with a long-term condition who, given sufficient support, can care for themselves and their condition effectively.

Disease-specific care management for patients with a complex single need or multiple conditions which require responsive, specialist services using multi-disciplinary teams and disease-specific protocols and pathways.

Case management for the most vulnerable people, who have highly complex, multiple long-term conditions and who require coordinated health and social care provision.

What are Group Clinic approaches?

Group clinics are a form of delivering specialist-led care in groups rather than individual consultations. They may include aspects of clinical management (for instance, adjusting medication in light of health status information) as well as patient education and support. The innovative nature of group clinics, particularly as a potential vehicle for improving the maintenance and care of patients with chronic conditions (e.g. diabetes, asthma, urological conditions, and coronary disease), coupled with a need to use available resources more efficiently and the perception that the organisation of group clinics requires only modest scale redesign [8], have stimulated much evaluation activity. Over the past decade, several models for group medical visits have emerged, mainly in managed care environments. Some of these models originated in the care of the frail elderly, a population that suffers from many chronic illnesses and co-morbidities. These have been widely used in the US, largely for people with long term conditions. Early findings suggested potential for considerable cost savings, equivalent or improved outcomes and higher levels of patient/staff satisfaction. Later studies have not always replicated these effects. The terminology of group clinic approaches includes "group visits," "shared medical appointments," "cluster visits" and "problem-solving DIGMA (drop-in group medical appointments)" [9 10]. The four principal conceptual models of

group clinic approaches are reviewed later in this chapter alongside a variety of terms and variants.

Although the literature reflects considerable variation, both in what is understood by a "group clinic" and in the terminology associated with such initiatives, the following vignette (Box 1) seeks to broadly characterise how group clinics are depicted in the professional literature:

Box 1 - Vignette characterising group clinic approaches

For a group clinic approach, between 3 and 20 patients with a chronic medical condition get together with one or more clinicians to share information about how to manage their disease. Typically led by a physician and/or a specialist nurse, group clinics are often supported by the involvement of a medical assistant or nurse. Other participating professionals may include a social worker, pharmacist, or mental health professional. Patients typically learn together; so, for example, diabetics could learn together how to conduct a foot check correctly and heart patients might take their own blood pressure readings. Educational sessions may follow a set session schedule or may be offered in response to previously identified needs as expressed by the group. Typically there is an opportunity to review current medication. Patients often have the additional opportunity to meet individually with a consultant for a one-to-one consultation. Patients thus feel that they are receiving appropriate care and attention within the group appointment setting. In turn, nurses value the chance to spend more time with their patients and the apparent efficiency of being able to reach several patients at once. A typical group clinic session lasts somewhere between 60 and 150 minutes.

Most group clinic approaches include an element of between-visit care coordination and case management, typically provided by a nurse or nurse practitioner. Setting up a limited element of care coordination for attendees of group visits may trigger distal benefits in relation to improved record-keeping and coordination of care.

Group clinic approaches may either replace or supplement usual one-on-one care.. Group clinic approaches should be distinguished from more narrowly defined group education

classes, which address self-management skills, exercise, and nutrition but do not provide medical evaluation, medication adjustment, or the coordination and delivery of preventive services. Group clinic approaches typically include group education, shared problem-solving, focused private or semi-private medical evaluations that allow individualized medication adjustment, and ordering of preventive services and referrals. One attraction for patients lies in the potential for group visits to improve access, interaction with clinicians, between-patient learning, and self-efficacy.

A group clinic appointment therefore differs from an individual consultation in that some information giving, that would typically take place within the consultation, is activated within a group setting. In addition the group context may facilitate collective problem solving, peer support and the identification of positive, or at the very least realistic, role models. Peer support may be instrumental (in providing practical tips and resources), cognitive (in addressing individual uncertainties) and/or affective (in providing reassurance and a sense of solidarity and mutual support).

Based on Davis et al [8]

The above vignette embodies several assumptions, articulated within the literature, that are to be tested within this review, most notably in relation to patient and staff satisfaction and efficiency. The attractiveness of group clinics as a viable service delivery option is also founded on implicit assumptions of acceptability and feasibility.

Potential Drivers for Group Clinics

We have identified four principal drivers for the introduction of group clinic type interventions:

- A **substitution** argument maintains that group clinics may be used to mitigate supply of and demand for individual consultations without compromising continuity of care;
- A **quality of care** argument claims that group clinics result in better self management behaviours, particularly with regard to the management of chronic symptoms.

- An **acceptability** argument affirms that patients are at least as likely to be satisfied with care provided via group clinic arrangements as they will be with individualised consultations.
- An **enhancement** model rehearses the benefits of integrating group clinic type approaches into existing group educational provision for chronic disease where this is currently taking place.

Group clinics are used to replace either an individual patient consultation or, more commonly, pre-identified components of the consultation such as education and information-giving, with a group session, focused on management of an ongoing condition and advice. Much outpatient activity centres on monitoring and management of people with long term conditions, such as arthritis or diabetes. Questions have been raised concerning the appropriateness of outpatient appointments. Two thirds of missed appointments are for follow-up appointments, suggesting scope for improved efficiency. The group clinic represents one suggested initiative to improve efficiency and enhance patient satisfaction.

In the UK, there is little published evidence on impact and a lack of good quality information on the range and scale of group clinic activity in different specialties. A systematic review is needed to combine published evidence of different types, including descriptive or qualitative studies, with grey literature.

For the potential of group clinic type interventions to be explored fully, with a view to their possible increased utilisation within a UK National Health Service context, requires a systematic investigation of research evaluating their usefulness and costs, not only financially, but in terms of professional training, patient satisfaction, and clinical and health service outcomes.

Hypotheses tested in the review (Review Questions)

Purpose of review

The purpose of this systematic review is to examine the available evidence for use of group clinics with patients who have chronic health conditions.

Review question

The review question is as follows:

> What is the current evidence for the feasibility, appropriateness, meaningfulness, effectiveness and cost effectiveness of group clinics/group medical visits for patients with chronic conditions?

Specifically:

- What different models of group clinic exist (in the UK and internationally)?
- What evidence exists about the outcomes and cost-effectiveness of these clinics?
- What evidence exists about patient experience of these clinics?
- What are the possible explanatory mechanisms for any reported improvements in outcomes?

Objectives

The Primary Objective of this review is to

- Identify evidence of effectiveness, or likely effectiveness, of group clinics and where this is identified, to review evidence of impact, in particular cost-effectiveness of group clinics. This might include measures of efficiencies and clinic/staff time, use of services (hospitalisation rates), patient outcome (and surrogate clinical measures), behaviour, self-efficacy, quality of life and other patient and staff satisfaction indices

Additional Objectives include:

- To understand how group clinics have been conceptualised and to identify different models of use from a review of academic and grey literature

- To relate emerging findings on what works to current practice
- To identify research gaps for funding bodies and researchers

Scope

This review covers all group clinics which include a component of clinical advice and management, as well as peer learning and support, for chronic health conditions. Terms (largely US) include: group medical visits, cluster visits, shared medical appointments, cooperative health care clinics. The focus is on specialist-led services (i.e. replacing hospital outpatient appointments). Patient education and support groups (including expert patient groups) focused on self-management with no clinical advice or input, are not the main focus of this review although there may be some overlap in activity. (See Chapter 2 for Inclusion and Exclusion Criteria)

In seeking to inform the review from as holistic a perspective as possible the team decided to examine the available evidence against the FAME framework. FAME is a mnemonic for the aspects of Feasibility, Appropriateness, Meaningfulness and Effectiveness and was devised at the Joanna Briggs Institute [11]. Appendix 1 sets out the FAME framework as used to guide the review process. This framework allows us to:

1. Define the scope of the search strategy
2. Define inclusion and exclusion criteria to specify types of studies to be included in the final report
3. Construct summary tables of all included studies to present key information and findings
4. Synthesise the evidence from the included studies

It should be noted, however, that the FAME framework was principally selected to facilitate the synthesis process. In the interests of brevity we have subsumed considerations of Feasibility, Appropriateness and Meaningfulness elsewhere under "Appropriateness" as an umbrella term, as in the report title.

What are the existing models of Group Clinics?

This Section starts with a brief consideration of the main models of group clinic and attempts to outline a workable typology with which to inform the subsequent analysis. Essentially there are four principal models of group clinic approaches:

1. The Cooperative Health Care Clinic Model
2. The Specialty Cooperative Health Care Clinic Model
3. The Drop-In Group Medical Appointment (DIGMA) Model
4. Shared Medical Appointment Model

The Cooperative Health Care Clinic model (CHCC).

Overview:

The CHCC model, developed by Kaiser Permanente in 1990, is designed to provide physicians with adequate time to deliver quality care.

Designed for:

Generally used to provide care to patients over the age of 65 with chronic conditions or who frequently utilize medical resources. The main objective of the CHCC model is to facilitate self-management of patients' chronic condition(s) through enhanced education, encouragement of self-care, peer and professional support, and attention to the psychosocial aspects of living with chronic disease [12]. Specific to the CHCC model, are regular scheduled visits with the same group cohort over extended periods of time.

Duration:

CHCCs generally last from two to 2.5 hours and include no more than 20 patients at a time.

Content:

Individualized medical care usually takes place in a private room near the meeting site. A physician encounters patients individually, allowing up to five minutes per patient, while a nurse takes vital signs and other measurements for the rest of the participants. Approximately 30 minutes is allocated for collecting patient data and conducting individual sessions; the rest of the time is spent addressing group concerns, providing educational material and answering participants' questions [13]. Groups may

meet monthly or quarterly, according to need. Group time is structured and includes set intervals of socializing, education, and medical interaction. Medical interaction may include an overview of the patient‘s medications, laboratory results, immunization, or any other primary care need identified at the time of meeting [14].

The Specialty Cooperative Health Care Clinic Model.

Overview

The Specialty Cooperative Healthcare Clinic Model is similar to the regular CHCC model from which it later evolved, but focuses on a specific disease. A later variation of this model, the high-risk cohort model, targets patients of all ages with similar chronic problems, such as diabetes or coronary artery disease [13.]

Designed For:

Offering a foundation upon which to base high-risk patient population management programs (i.e., diabetes, hypertension, hyperlipidaemia, depression, etc.) thereby assisting patients and care providers to follow clinical-based practice guidelines.

The Drop-in-group medical appointment model (DIGMA).

Overview:

The drop-in group medical appointment model (DIGMA) was created in 1996 to improve access to care and enable physicians to better manage their large patient panels.

Designed For:

Drop-in group medical appointments (DIGMAs) are composed of different patients from meeting to meeting who “drop in” when they have a specific medical need. These groups may focus on a specific diagnosis, or they may target all chronically ill patients within a given practice. DIGMAs are customized to the needs, goals, practice style, and patient panel constituency of the individual physician [14]. DIGMAs have been utilised in a variety of specialties, including oncology, rheumatology, and neurology [15]. DIGMAs can be designed as heterogeneous, mixed, or homogeneous; typically, they are heterogeneous in terms of age, sex, diagnosis, marital status, race, and utilization behaviour.

In a heterogeneous DIGMA, patients with any diagnosis can attend the group session, and patients may vary by age and sex. In the mixed DIGMA model, the physician will chose a different health concern or disease each week. Those attending will vary according to the topic. For example, the physician may hold a DIGMA on chronic pain one week, and then focus on hypertension and diet at the next weekly session. Different patients may attend their physician's DIGMA depending on their questions, needs, or diagnosis [15].

Duration:

DIGMAs typically last for 90 minutes and involve 10 to 15 patients.

Content:

DIGMAs often include a behaviourist who facilitates group processes and addresses each patient's psychosocial concerns. The physician conducts individual medical sessions within the group setting instead of in a separate space and often engages the group in providing solutions to patient problems; by doing so, the physician provides education throughout the visit, rather than a formal lecture. After the educational session, patients who need to see their doctor privately can do so.

Shared Medical Appointment (SMA) Model

Overview

The Shared Medical Appointment (SMA) was conceived by Noffsinger in 2002 [16] as an effective and efficient method for physicians and specialists to increase their efficiency at providing physical examinations. Noffsinger identified that the majority of time spent performing a physical examination was devoted to answering questions and exchanging information [16]. Noffsinger coined the term "shared medical appointment" to describe models where several patients meet with the same physician at the same time [16]. SMAs have been described "as a form of medical appointment with varying medical staff and patient populations and have been utilized for patients with chronic illnesses for whom education, self-management, and problem-solving skills are essential" [17]. Shared medical appointments (SMAs), a subgroup of group medical visits, may also be called group visits, cluster visits, or chronic healthcare clinics. However, unlike group visits, SMAs are not intended to substitute for the individual consultation.

Designed For:

"Groups of patients meeting over time for comprehensive care, usually involving a practitioner with prescribing privileges, for a defining chronic condition or health care state" [18]. Most SMA are homogenous regarding age and sex.

Duration:

SMAs are regularly scheduled and typically last ninety minutes.

Content:

In the SMA, physical examinations are provided privately, but have a group component whereby an interactive group discussion answers patient questions and provides patients with information. Two weeks prior to the session, patients receive an information package that includes history forms, laboratory requisitions, screening tests, and handouts. Patients complete the required procedures before the SMA. Individual examinations occur during the first thirty to forty-five minutes of the session, with the remaining time reserved for group discussion. Questions that do not lend themselves to group discussion are addressed during a private examination. Components of SMAs include educational and/or self-management enhancement strategies, paired with medication management, in an effort to achieve improved disease outcomes. The prescriber usually performs the medication changes, often in one-on-one "breakouts".

Additional terminology and definitions

Additional terms are encountered throughout the relevant literature adding to the terminological confusion and further dissipating the distinctiveness of individual models of group clinic.. Existing definitions are reproduced below for the sake of completeness.

Chronic Care Clinics are based on a chronic disease approach to illness that recognizes the need for active patient participation and supports patients' confidence and skills in managing their illness [19]. Chronic care clinic visits involve approximately eight patients at a time. They consist of a standardized assessment, and individual (not group) appointments with the primary care physician, nurse, and clinical pharmacist, followed by group education and support. Typically, the chronic care clinic replaces a formal educational component with interactive discussions related to patient self-management [12].

Cluster visits are monthly 2-hour group visits with a multidisciplinary team led by a nurse educator and including a dietitian, a pharmacist, and a behavioural therapist [20]. Cluster visits typically involve 10–18 patients.

Group clinics are a potential method of integrating self management support with routine clinical care. The term is sometimes used synonymously with Shared Medical Appointments. Group clinics are an alternative model of care to 1:1 clinic appointments, having a higher ratio of patients to health professionals and a longer duration, compared to 1:1 appointments. .

Group medical appointments (GMAs) are a series of one-to-one patient-clinician contacts, in the presence of a group of at least two voluntary attending patients. Usually the clinician is supported by a group facilitator. A GMA generally takes 1 to 2 hours and is a substitute for a clinician's individual appointments with the attending patients at a primary care clinic, specialty clinic or hospital outpatient setting. The same items the clinician attends to in a one-to-one appointment are attended to during the GMA. Patients can ask questions of their fellow patients, and patients and clinicians can learn from the other attending patients and their carers [21].

Group medical visits are defined as multiple patients seen together while in the same clinical setting. Group visits include not only group education and interaction but also most elements of an individual patient visit, such as the collection of vital signs, history taking and physical examination. As Weinger acknowledges "Some confusion exists regarding the term "group medical visit." Currently, no single definition of a group medical appointment is universally accepted" [22]. This confusion exists among the other related terminologies. She highlights how most group medical visit models include a group education component taught by a nurse, psychologist, or other health professional. In her view the main difference among models is that "some include only individual visits with the physician, whereas others include group visits through which several patients meet with the same physician at the same time. The latter typically allowed for individual appointments if necessary or if requested by a patient" [22].

Group visits (GVs) Jaber defines group visits as a cohort visit of 20 patients that meet monthly or quarterly during a two hour multidisciplinary session that includes individual provider time, data collection similar to an individual visit, and group discussion or education to foster self-management [23]. Clinicians are able to answer questions and meet the medical needs of patients who need the same education and assistance with lifestyle issues. Patients have improved access to their clinician and are able to share experiences with other patients through peer support. Two models of group visit are a scheduled high needs group (cp. The Specialty Cooperative Health Care Clinic Model) and a drop-in arrangement (cp. DIGMA) above [23]. Scheduled high needs groups include patients with similar medical conditions who commit to meet regularly over time. Drop-in models allow patients to schedule in advance for a group appointment. They typically include fewer patients and are shorter in duration. These models were developed to improve patient access by offering education and support.

The above descriptions reveal considerable overlap between the purpose and content of the different models. Indeed several models share common origins in the writings of Noffsinger [9 14 15]. Typical duration across the models is somewhere in the region of 90-120 minutes (Table 1). Several models have social, medical and behavioural components. At the same time there is considerable variation in terms of group size, composition and target group. The driver for several models is improved efficiency and claims for improved patient and provider satisfaction are common. These claims are examined through the remainder of this report.

Table 1 - Typical configurations of different group clinic approaches

Model	Duration	No of Patients	Consultation Type	Other Components
Cooperative Health Care Clinic Model	120-150 minutes	15-20 Patients	Individual	Socialization Group Discussion Education Question Answering

Specialty Cooperative Healthcare Clinic Model	120-150 minutes	15-20 Patients	Individual	Socialization Group Discussion Education Question Answering
DIGMAs	90 minutes	10-15 patients	Individual (But conducted in group setting)	Problem solving Education Private follow up if required
Shared Medical Appointments	90 minutes	4-8 patients	Individual	Education Self management Medication management
Chronic Care Clinics	60 minutes	Approx 8 patients	Individual	Peer Support Interactive Group Education
Cluster Visits	120 minutes	10-18 patients	Group with individual on request	Behavioural sessions Medication review Group Education
Group Clinics	60 minutes (plus 10 min individual sessions)	5-7 Patients	Group followed by Individual session	Goal Setting Self Management Support
Group Medical Appointments	60-120 minutes	At least 2 patients	Group	Peer Support

				Group Discussion Question Answering
Group Medical Visits	90 minutes	12-15 patients	Group/ Individual by Appointment	Group Education
Group Visit	120 minutes	20 patients	Individual	Group Discussion Group Education

Towards a Theoretical Understanding of How Group Clinics Work

The team began by examining explicit pre-existing theory relating to the group clinic/ shared medical appointment/ group medical visit approach. This not only provides a backdrop against which the systematic reviews, randomised controlled trials and qualitative research studies may be considered but also acted as preparation for the subsequent realist synthesis phase (See Chapter 4 - Realist Synthesis).

The review team's initial conceptual framework centred on four principal drivers for the group clinic model:

1. Perceived and actual benefits and disadvantages of a group consultation when compared with an individual consultation
2. The value of group education
3. The value of synchronicity of clinical and group activities
4. The value of multiprofessional approaches resulting from simultaneous clinical involvement

A Conceptual Model of Group Medical Appointments

In order to initiate thinking around the elements of group clinics the team accessed a conceptual framework from the Cochrane Group Medical Appointments Protocol [21] (Table 2). This identified key structural elements for consideration within any group clinic based intervention. This conceptual framework helped to identify key differences with regard to the intensity of the intervention (number of GMAs x frequency interval x duration) plus the qualitative consideration of the number of patients per GMA (and by implication the staff – patient ratio). The issue of continuity helped to distinguish between drop in type appointments, those with a cohort of members progressing together and those with more fluid membership. Linked to this is the issue of heterogeneity as explored in issues relating to age, gender, ethnicity and experience of the condition. As our review addresses only chronic conditions the chronic versus non-chronic was not pertinent except in considering why chronic diseases might be more amenable to a group clinic approach. The children, adults, elderly distinction served as a reminder that, typically for children and adolescents and occasionally for adults and older people the perspective of family members (e.g. parents or carers) may be an additional factor in assessing the acceptability of group clinics. Finally the team considerations from the Cochrane GMA conceptual framework highlight the requirement for group facilitation and team training as a resource issue.

Table 2 - Conceptual framework for GMAs (from Cochrane GMA Protocol) [21]

Design		**Patient Group**		**Team**
Number of GMAs offered		Continuity versus non-continuity		Type of clinician
Time between successive GMAs		Heterogenous versus homogenous		Presence of group facilitator
Duration of GMA		Chronic versus non-chronic		Training of team
Number of patients per GMA		Children, adults, elderly		

High Level Theory relating to Social Support

In order to bridge the often-reported dislocation of empirical intervention studies from their underlying or implicit theory we conducted a brief literature survey to identify the prevalence of high

level theory in relation to group clinics. Particularly influential high level theories reflected in the published accounts included Social Cognitive Theory, Social Comparison Theory, Social Learning Theory [24] and Social Support Theory (See Table 3). In addition, from the perspective of staff delivering the intervention, Shared Medical Appointments may access theories in relation to shared learning and inter-professional working [25]. When introducing group clinics, therefore, attention should thus be directed to the impact of the programme on staff interaction and interprofessional learning.

Table 3 - Theories relevant to group clinic interventions

Theory	**Brief explanation**
Patient	
Social Cognitive Theory	Highlights importance of self efficacy – the belief of an individual that they are able to achieve something such as a change in health behaviour, including self management [26].
Social Comparison Theory	Proposes that "conformity within a group is dependent on three main motivations: dependence on others for information to self-evaluate; achieving group goals and the need for approval and a desire not to seem different" [27].
Social Learning Theory	Emphasises "learning through observation and modelling behaviour" and is particularly relevant to "behaviours involving action or performing" [27] .
Social Support Theory	Proposes that "information is disseminated more effectively between networks of people with strong social ties and this confers health benefits" [27].
Staff	
Social Identity Theory	Argues that the social group to which someone belongs at times determines both relationships and interactions between individuals. May result in changed perceptions and challenge of stereotypes [25].

Social Practice Theory	Highlights the importance of situated learning and practice on identity and includes an enhanced appreciation for the perspective of others [25].

Theory relating to Group Interventions

Hoddinott and colleagues offer a useful generic framework against which to examine group interventions [27]. Interventions delivered to patient groups are addressed by their framework which includes:

- the Place, setting and context of the intervention
- the Design of the intervention, the theory underlying the choice of intervention, the target population and choosing the relevant behavioural outcome to measure
- Membership of the group
- How the group will influence people
- Intended health outcomes and target populations
- What happens within the group

Theory relating to Chronic Disease Self Management

Theories relating to the core components of chronic disease self-management, namely the tasks of medical, role and emotional management [28] are particularly pertinent to the operation of group clinic approaches. These are highlighted in the rapid review, *A rapid synthesis of the evidence on interventions supporting self management for people with long-term conditions*, commissioned by the HS&DR Programme [29]. In their review the authors [29] highlight the key role of self-efficacy in relation to self-management behaviours [30]. This resonates with Knowles' Theory of Andragogy, cited in the trial by Yehle and colleagues [31], which proposes that adults are self-directed and that they expect to take responsibility for decisions.

Lorig & Holman [32] identify five core self-management skills which can be seen to be accessed within a group clinic approach, that is problem solving; decision making; appropriate resource utilisation; forming a partnership with a healthcare provider; and taking necessary actions. The standard group

clinic format may be seen as an opportunity for the clinician and patient to harness all of these skills as targeted by individual components of the intervention.

Theory relating to Monitoring

Finally, as highlighted by Taylor et al [29], we can better understand the role of regular group clinic meetings by examining the complementary and evolving roles of periodic professional reviews and on-going patient self-monitoring [33]. Group clinics could be conceived as a forum for juxtaposing bringing these two roles in a potentially helpful synergy.

A Symbolic Role for Group Clinics?

Group clinic approaches may also fulfil a symbolic or emblematic role by instilling in the patients a hope and belief in the treatments being offered [34]. Social interchange in a group setting may emphasise the universality of the condition along with recognition that one is not alone in suffering or healing. Instrumentally, the group clinic setting offers an opportunity both to impart information through instruction or dialogue and to clarify any distorted or misleading information [34]. A sense of community may develop over time with individuals beginning to display altruism and to derive a sense of usefulness from contributing to the group.

The group may provide patients with potential role models in the form of other group members who are better able to manage their condition and thus to function more effectively [34]. This may in turn stimulate imitative behaviour. Socialisation may offer potential catharsis through sharing and the destigmatizing of chronic medical conditions as well as fulfilling a more pragmatic role as a source of direct advice and sharing of coping strategies [34]. As a forum for interpersonal learning the group may encourage the sharing of experiences with others and problem solving as a group. These resources may be more plentiful and more creative than may be offered by an individual clinician with no direct experience of living with a chronic condition. Peer pressure, in its positive sense and as an antidote to the unequal clinician-patient relationship, may encourage patients to become more empowered and thus more involved in their care [34].

Chapter 2 - Review methods

This systematic review was conducted within an abbreviated (seven month) timescale and therefore did not attempt to identify **all** relevant evidence or to search **exhaustively** for all evidence that meets the inclusion criteria; instead the search approach sought to identify the key evidence of most relevance to the review question by focusing on randomised controlled trial designs. Relevance may be interpreted in multiple ways; in this particular context we sought to address a narrow and tightly defined question, as captured by an appropriate Population-Intervention-Comparison-Outcome (PICO) formulation. The PICO formulation is an accepted mechanism used in systematic reviews to frame a review question about an intervention programme; in this case group clinic approaches [35]. Outlining inclusion and exclusion criteria in terms of the PICO format helps to operationalise systematic and consistent approaches to selection of items for inclusion independent of either the direction or nature of results and of factors empirically known to influence the direction or interpretation of results (e.g. sample size, funding source, etcetera).

For logistic reasons this review examined the evidence through the "lens" of evidence from existing systematic reviews and randomised controlled trials. Data extraction and quality assessment was performed on the randomised controlled trials and interventions demonstrated as actually, or potentially, effective are then investigated in further detail with regard to feasibility, acceptability, meaningfulness and cost effectiveness. In addition, where gaps in the randomised controlled trial evidence are specifically identified, we examine indicative evidence from qualitative research and cost studies to indicate the extent to which candidate interventions are likely to be feasible, appropriate and meaningful if subsequently demonstrated to be effective by future trial evidence.

Protocol development

The protocol for the review was developed iteratively between ScHARR and the NIHR HS&DR Programme. A copy of the study protocol is available on the project website.

Literature searching

The review incorporated a range of search methods, as outlined below, to identify evidence to address the review research questions.

- Stage One – Search for reviews on group clinics
- Stage Two - Search of health and medical databases.
- Stage Three – Search for qualitative studies
- Stage Four – Search for cost studies
- Stage Five – Search for UK studies

The search process was undertaken with reference to the protocol.

Stage One – Search for reviews on group clinics

Our initial approach was to scope the literature around group clinics by searching for recent relevant reviews. All studies included in reviews were then scrutinised for inclusion in the review. Relevant terms for the search were found during the scoping exercise. Systematic Reviews were identified from the following sources: PubMed Clinical Queries, Epistemonikos (http://www.epistemonikos.org/), Cochrane Library, Database of Abstracts of Reviews of Effects (DARE) and Google Scholar combining "systematic review" with terms relating to Group Clinics, Shared Medical Appointments etcetera (See Appendix 2).

Stage Two- Search of health and medical databases

The search

The search strategy used a combination of free-text and Medical Subject Headings (MeSH) and can be found in Appendix 2.

We searched MEDLINE and EMBASE via OVID SP, Cochrane Library via Wiley Interscience, Web of Science via Web of Knowledge and CINAHL via EBSCO. MEDLINE, EMBASE, CINAHL and the Cochrane Library are commonly considered the core databases for identifying evidence relating to clinical topics.

The search strategy was limited to 1999-2014. Bibliometric analysis identified the sudden appearance of group visit studies at around 2000. Evidence was included if it was published between 1999 and 2014 and written in English.

The search results were downloaded into Reference Manager where duplicates were removed before sifting for inclusion in the review was undertaken.

Stage Three – Search for qualitative papers

A three part search strategy was used to identify papers reporting qualitative research:

- Stage 1 - During screening and data extraction, any papers that were relevant and included qualitative data were tagged accordingly in Reference Manager
- Stage 2 - A search of our Reference Manager database for relevant studies was undertaken using the keywords "qualitative", "interview*" or "findings" in the title and abstract of the records. These terms have been found to have acceptable sensitivity for retrieval of qualitative research [36 37].
- Stage 3 – Cited records for all included trials were searched on Google Scholar using the keywords "qualitative", "interview*" or "findings" using the "search within citing articles" checkbox function. This would enable retrieval of "sibling" studies associated with the trials as well as more distant "kinship" studies citing those trials for reasons of topical relevance [38].

Stage Four –Search for costs papers

Three separate methods were used to identify studies for the assessment of costs and feasibility, as follows:

- Stage 1 - During screening and data extraction, any papers that were relevant and included costs data were tagged accordingly in Reference Manager
- Stage 2 - A search of our Reference Manager database for the study was undertaken using the keywords cost*, economic*, charg*, expens*, reimburse* in the title and abstract of the records
- Stage 3 - A targeted search of Medline and Embase was undertaken, with no date or language restrictions, using the following search strategy: ((((shared or group) adj

medical adj (visit or appointment or clinic or care)) OR (group adj (visit or appointment or clinic or care))) AND (economic* or cost* or charg* or expens* or reimburs*)).ti,ab.

Stage Five – Search for UK studies

Studies conducted in the United Kingdom were identified in two ways:

(i) Geographical terms for "united kingdom", "uk", "britain", "England", "Scotland", Wales, Ireland were used to retrieve records from the Reference Manager database.

(ii) Similarly geographical terms for "united kingdom", "uk", "britain", "England", "Scotland", Wales, Ireland were used to retrieve items from Google Scholar in conjunction with the most common terms used for the intervention i.e. "shared medical appointments", "group medical clinic", "group medical visit" and "group visit". This search approach harnessed full text retrieval and so added value over the title and abstract based approach listed above.

Sifting

References identified from Stages One and Two were downloaded into Reference Manager Version 12 to be sifted for inclusion in the review. 4176 of the potential titles were examined for inclusion by one reviewer. Any titles that did not meet the inclusion criteria were excluded. Following the title sift, any remaining references were scrutinised at abstract level. For any references where possible inclusion was unclear a second reviewer independently examined the corresponding full-text.

Progressive Fraction Method

Following the sifting of 4176 titles and abstracts a further 1212 search results were scrutinised using a method of "progressive fractions". Progressive fractions is a method developed in-house by the ScHARR team for undertaking systematic reviews within a time constrained period. Essentially it involves conducting a sensitive search strategy in order to populate a project reference management database. This database then becomes the data set that is progressively "mined" for articles for potential inclusion. Essentially titles and abstracts are reviewed in decreasing relevance order until no further unique relevant

references are retrieved. This method also minimises the likelihood of missing relevant references through being submerged by excessive quantities of irrelevant noise.

Instead of the "big bang" approach that typifies systematic review methods and which conflates terms of low specificity alongside terms of high specificity the progressive fractions method involves using single string strategies e.g. "group medical visit*" in decreasing likelihood of unique retrieval with the team evaluating retrieval results at each point. As each progressive fraction is executed attention is focused on the identification of unique results. When an additional relevant reference is retrieved this yields additional search terms. Quantitative results for the new search terms are used to evaluate whether it will be time effective to sift new results taking into account the number of relevant studies already identified by the combined search strategy and the number of additional records to be sifted. Progressive fractions allows a review team to make iterative and informed judgements about the optimal sensitivity for a systematic review search. After precise search terms were used we had scanned 11% of our sensitive database and retrieved 89.7% of our randomised trials. The remaining 4 trial citations were identified by citation searching and checking existing systematic reviews. The same precise search sets were also scanned for qualitative studies.

Table 4 - Progressive Fractions for Group Clinic Review

Retrieval Term	No of Records	No of Unique Records (i.e. not already retrieved)	Cumulative Number of References screened	Cumulative percentage of records Screened (from 10880)	Number of Gold Standard Trials in this set	% of Gold Standard Trials in this Set	Cumulative Number of Gold Standard Trials	Cumulative % of Gold Standard Trials
"group clinic\" *in All NonIndexed Fields OR "group clinic\" in All Indexed Fields*	696	696	696	6.4%	1	2.6%	1	2.6%
"group medical clinic" *in All NonIndexed Fields OR "group clinic\" in All Indexed Fields*	7	6	702	6.5%	3	7.8%	4	10.4%
"group medical visit"	60	59	761	7.0%	5	12.8%	9	23.4%
Group visit	315	299	1060	9.7%	13	33.4%	22	56.8%
Group appointment	32	32	1092	10%	0	0	22	56.8%
Group medical appointment	32	26	1118	10.3%	2	5.2%	23	62%
Shared medical appointment	102	84	1202	11.0%	7	17.9	31	79.4%

Group office visit	3	1	1203	11.0%	0	0	31	79.4%
Shared consultation	0	0	1203	11.0%	0	0	31	79.4%
Group consultation	5	0	1203	11.0%	0	0	31	79.4%
Group outpatient visit	2	0	1203	11.0%	1	2.6%	32	82%
Shared medical visit	12	5	1208	11.1%	1	2.6%	33	84.6%
Cluster visit	4	4	1212	11.1%	1	2.6%	34	87.1%
Group patient visit	1	1	1213	11.1%	1	2.6%	35	89.7%
					4	10.3%	39 of which 32 were included	100%

Inclusion/Exclusion Criteria

The inclusion of studies in the review was according to Table 5.

Table 5 - Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Population	Adults and/or children receiving health care services for one or more chronic health condition	Group visits for healthy patient groups (i.e. those without an indication related to a chronic health condition) This exclusion covers: 1. Pregnant women or those planning a pregnancy (unless they also have a chronic health condition such as diabetes) 2. Smoking cessation and other health promotion clinics
Intervention	Delivery of one or more services to a small group of patients (typically 8-10 patients) simultaneously. Only studies including the delivery of the intervention by one or more specialist health care professionals met the inclusion criteria of the review.	Delivery of intervention by peers or non-specialist HCPs - We also exclude peer facilitated support groups since the intervention is not principally delivered by health care professionals (although they may contribute).
Outcome	Patient outcomes; health services outcomes; patient and carer satisfaction; resource use.	

Criteria	Inclusion	Exclusion
Comparator	Other methods of organisation of treatment (with the exception of qualitative research and surveys, only studies with a comparator group are included.	
Date	Cut-off date limits of 1999-2014 was applied in recognition of the distribution of the literature as identified from the scoping searches (See above)	
Language	Only studies written in English Language were included	

Setting of intervention

Interventions are not initially excluded on the basis of the setting for the group intervention, given the potential for very similar interventions to be delivered in the community or primary care setting as well as in hospital/outpatient settings. Although the review team has justifiable concerns about the additional literature likely to be identified if group approaches in primary care are included within the review scope we cannot identify a sound justification for excluding such studies on conceptual grounds particularly given that the setting for interventions and definitions of "specialist" care may cover a wide range of different settings.

Data extraction including development of the data extraction tool

Formal data extraction was employed for all included systematic reviews, randomised controlled trials and qualitative studies. Data extraction was undertaken by one of three reviewers (AB, AC, LP). Due to the time constraints of the review a model of single data extraction with verification by a second reviewer was used for all included studies (See *Limitations of the Review*) Empirical evidence demonstrates that single data extraction results

in an acceptably low rate of additional errors, when compared to optimal double data extraction. In particular the likelihood of error relating to primary outcomes, as opposed to minor data inconsistencies, has been found to be low [39].

A standardised data extraction form was designed using Google Forms to capture relevant information from the studies on a broad range of factors related to group clinics and their outcomes. The form was piloted by all three reviewers and then minor changes were made before full data extraction was undertaken. The output from Google Forms was imported into Microsoft Excel to facilitate manipulation and production of tables.

For literature that made a conceptual contribution a method known as best fit framework synthesis [40 41] was used which involved extraction of data against a pre-existing framework. Any data not explained by the initial framework was then coded inductively. We identified a framework from a review entitled *Group Visits Focusing on Education for the Management of Chronic Conditions in Adults: A Systematic Review* [42]. This review was intended as a "companion piece" to a shared medical appointments review conducted by the Durham Evidence-based Synthesis Program led by Edelman [18]. The shared medical appointments review focuses on visits led by a physician or other prescribing provider during which individual-level changes in management plan can be made and thus fully corresponds to the scope of our own review. In contrast the review from which we derived the best fit framework "focuses exclusively on literature that tests the effectiveness of group visits that have an emphasis on health education and are led by facilitators, including but not limited to non-prescribing health professionals such as nurses, dietitians, and physical therapists" [42]. Nevertheless it fulfils the forgiving selection criterion for identifying a conceptual framework as specified by the "best fit" method. A sample data extraction form is available in Appendix 7. Cost data were extracted into a separate purpose-created MSWord.

Quality Assessment

Systematic Reviews

Systematic Reviews were appraised using the guidelines employed by the Centre for Reviews and Dissemination when populating their Database of Reviews of Effects (DARE) [43]. This method was employed to ensure consistency of approach between our assessments and existing assessments of published reviews.

Randomized Controlled Trials

Randomised Controlled Trials were formally assessed for quality using questions from the CASP checklist *10 questions to help you make sense of a trial* [44] in order to explore study limitations qualitatively and the Cochrane Risk of Bias Tables in order to identify likely sources of bias [45]. Assessment of the limitations of included studies was also undertaken using the limitations reported by study authors in the included studies.

Qualitative Research

Qualitative Studies were formally assessed for quality using questions from the CASP *10 questions to help you make sense of qualitative research* checklist [46]. Surveys were not formally appraised and, therefore, were only used to validate findings from qualitative research.

Costs

We undertook an assessment of relevance of evidence to the study objectives by answering three questions about each paper: the currency of the data, the quality of the data sources and the relevance to a UK Setting.

UK Initiatives

Research studies reporting UK initiatives were not formally assessed given the heterogeneity of study types, making comparability problematic. Nevertheless all reports of initiatives were reviewed for any identifiable or acknowledged limitations.

Synthesis

Data were extracted and tabulated. This tabulation was used to inform the narrative synthesis in the Results section. There was no attempt to synthesise quantitative data through formal meta-analysis given the heterogeneity of disease conditions and models of service delivery for group clinics. However where previous review teams had attempted to undertake meta-analysis these analyses were used as a frame of reference when assessing the likely contribution of newly-appeared evidence. The review provides an analysis of the quality of evidence, and the strength of conclusions which can be drawn from existing studies.

Involvement of clinical advisers

As it emerged that there were no trials from a UK context, and the UK studies correspondingly lacked rigour, the review team identified a need to access contextual data to aid translation to a national health service context. The review was neither resourced to conduct a rigorous consensus process nor were there sufficient numbers and diversity of informants. The clinical advisers were selected on the basis of their knowledge of group approaches within a diabetes context (the most frequently researched condition) or because of their experience of running group clinic approaches.

It was recognised that this was neither a representative nor a valid sample. The review team therefore put in place various protections to ensure that the review findings were not overly influenced by these otherwise valuable clinical opinions. Clinical advisers were presented with a summary of the review findings, so had no influence on the selection of studies or outcomes. Their comments were elicited around a series of prespecified questions independently identified by the review team. In this way their contribution was “ring-fenced” from overly influencing the review but was considered invaluable, particularly given the absence of `hard' data relevant to UK.

Five potential informants were initially identified; three from a group clinic setting and two from diabetes. Due to resource and timing constraints only four informants were interviewed (via telephone and/or email). These constituted two representing diabetes and two from group clinic approaches.

Chapter 3 - Results

3a Overview of studies included in the review

This review is comprised of six principal components informed by five different types of data (See Table 6). The realist synthesis was populated by data from the systematic reviews, RCTs, qualitative studies and UK initiatives.

Systematic Reviews

Literature searches retrieved 13 Systematic Reviews and 1 Review Protocol. This evidence was reviewed in Section 3b **– Results of the Review of Reviews.**

Randomised Controlled Trials

We retrieved 32 papers representing 22 different Randomised Controlled Trials. These trials were reviewed in Section 3c **– Results of the Review of Effectiveness.**

Qualitative Studies and Surveys

We identified 12 qualitative papers reporting 10 different qualitative studies. In addition we identified four surveys that were used to triangulate qualitative research findings. These qualitative studies and surveys are explored in Section 3d **– Results of the qualitative synthesis.**

UK Initiatives

We identified 15 papers reporting 12 UK group clinic initiatives. This review of current practice is examined in Section 3e **– Results of the Review of UK Evidence**.

Realist Synthesis

Data from the 13 systematic reviews, 22 different RCTs, 10 qualitative studies and 12 UK initiatives was used to inform Chapter 4 - **the Realist Review of Quantitative and Qualitative Evidence** (Total of 75 papers)

Cost Studies

We identified 8 cost studies either nested within randomised controlled trials or reported as separate cost effectiveness or cost utilisation analyses. These cost studies are analysed in Chapter 5 – **Brief Overview of Cost and Feasibility Issues.**

Table 6 - Summary of Included Studies

Study Type	Papers	Studies	Other Items
Systematic Reviews	13 Papers	13	1 Review Protocol
Randomised Controlled Trials	32 Papers	22	
Qualitative Studies	12 Papers	10	
Surveys	4 Papers	4	
UK Initiatives	15 Papers	12	Conference Abstracts
Realist Synthesis includes four study types(excluding surveys) above	*72 Papers*	*57*	
Cost Studies	8 Papers	8	
Total	82 Papers	69 Studies	

From Table 7 it can be seen that Group Clinics is the most frequently mentioned model with 19 of the 82 papers. Other frequently used labels are Shared Medical Appointments (n = 12) and Cooperative Health Care Clinics (n=10). A further nine labels are used in the 82 papers included in this review with even greater variation in the non-empirical literature.

Table 7 - Models of Group Clinics as represented by the retrieved literature

	Effectiveness Review		Qualitative Review	Economic Studies	UK Studies		
Model	**No of Studies**	**No of Papers**	**No of Studies**	**No of Studies**	**No of Studies**	**No of Papers**	**Total Papers**
Group Clinics	3	5	2	1	9	11	19
Shared Medical Appointments	5	6	5	0	1	1	12
Cooperative Health Care Clinic Model	6	10	0	0	0	0	10
Group Medical Visits	3	4	4	1	0	0	9
Group Visit	3	5	0	**4**	0	0	9
DIGMAs	0	0	2	1	0	0	3
Chronic Care Clinics	1	1	0	1	0	0	2
Group Medical Appointments	0	0	2	0	0	0	2
Cluster Visits	1	1	0	0	0	0	1
Shared Medical Visit	1	1	0	0	0	0	1
Specialty Cooperative	0	0	0	0	0	0	0

Healthcare Clinic Model							
Other Models	1	1	0	0	1	1	2

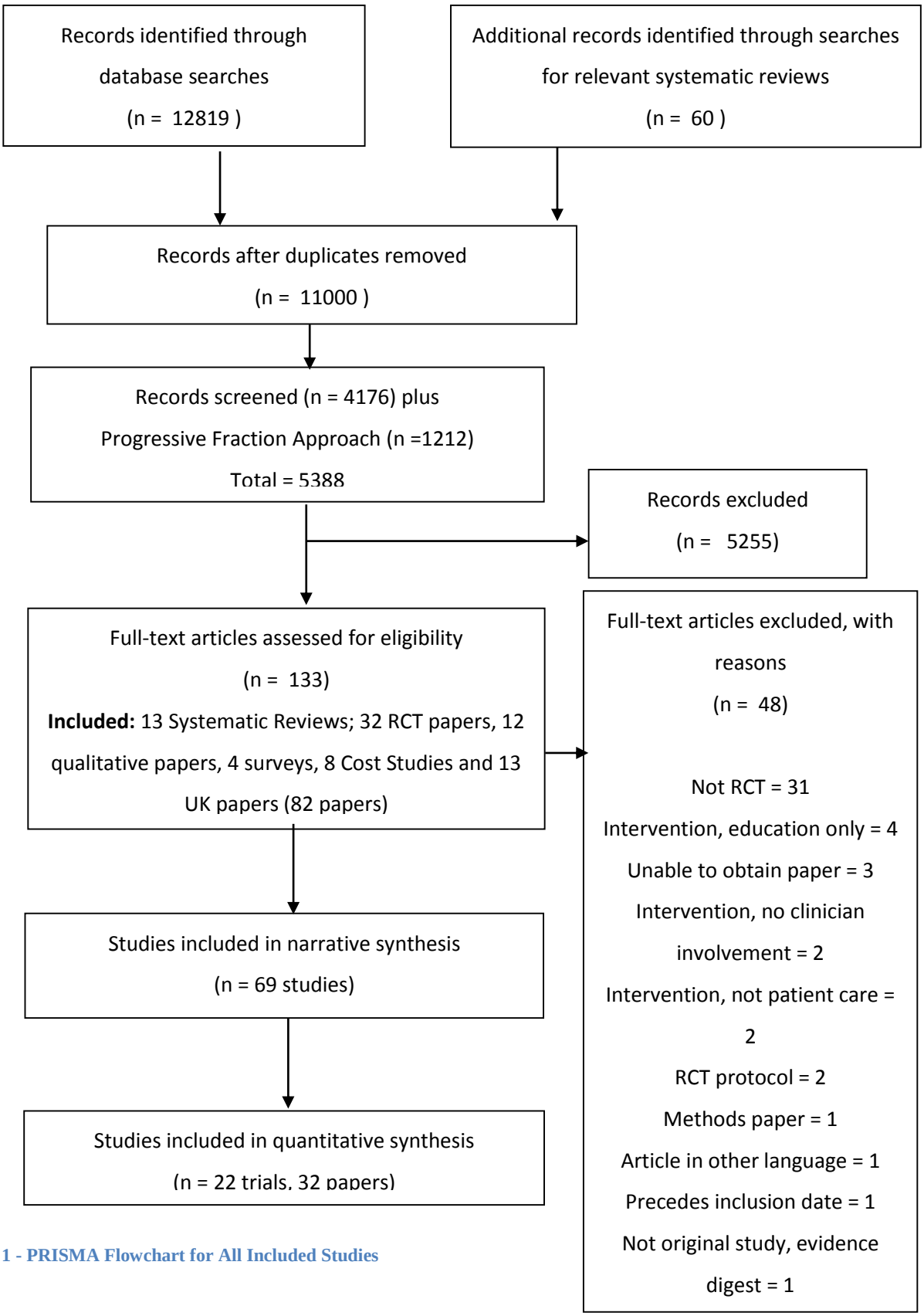

Figure 1 - PRISMA Flowchart for All Included Studies

3b Results of the review of Reviews

The team started by identifying existing reviews that had examined aspects of the review question. No single existing review offered a complete match to the scope covered by this systematic review. Reasons for this were: review focused on a single condition, review included only RCT evidence, review included general group care, review included group education etcetera. A summary of the congruity of this review with other published reviews is given below.

A total of 13 reviews involving a total of 92 trials (including duplicates) were identified for inclusion in the review (Table 8). No unpublished relevant reviews were obtained. However we identified one review protocol for a Cochrane Review in progress [21].

Table 8 shows coverage of studies by the existing reviews. The main contribution of our review would be to provide unique coverage of trials published over the period 2012-2014. Ultimately we would be including 32 papers whereas the previous most comprehensive review covered either 18 papers, through secondary analysis or 17 studies in primary analysis.

Table 8 - Coverage of Studies in Existing Reviews

Study Date Ref Id	Deakin (2005) [77]	Jaber (2006) [78]	Riley (2010) [79]	Brennan (2010) [80]	Steinsbekk (2012) [81]	Edelman (2012) [18]	CADTH (2013) [82]	Housden (2013) [83]	Slyer (2013) [84]	Edelman (2014) [85]	Rolfe (2014) [86]
1. Clancy (2003) [47]		✓		✓			+	✓		✓	
2. Clancy (2003) [48]		✓		✓			+	✓			✓
3. Clancy (2003) [49]		✓		✓		✓	+	✓			
4. Clancy (2007) [50]				✓			+	✓		✓	✓
5. Clancy (2007) [51]				✓	✓	✓	+	✓			
6. Clancy (2008) [52]			✓				+	✓			
7. Cohen (2011) [53]						✓	+	✓		✓	
8. Cole (2013) [54]											
9. Coleman (2001) [55]		✓		✓							
10. Crowley (2014) [56]											
11. Crowley (2013) [57]											
12. Dorsey (2011) [58]											
13. Edelman (2010) [59]						✓	+	✓		✓	
14. Graue (2005) [60]			✓								
15. Griffin (2009) [61]											
16. Gutierrez (2011) [62]										✓	
17. Junling (2012) [63]											
18. Liu (2012) [64]											
19. Naik (2011) [65]						✓	+	✓		✓	
20. Ratanawongsa (2012) [66]											
21. Sadur (1999) [20]		✓		✓		✓	+	✓		✓	

22. Schillinger (2008) [67]											
23. Schillinger (2009) [68]											
24. Scott (2004) [69]		✓		✓		✓	+				
25. Taveira (2010) [70]						✓	+	✓		✓	
26. Taveira (2011) [71]						✓	+	✓		✓	
27. Trento (2001) [72]	✓			✓	✓	✓	+	✓		✓	
28. Trento (2002) [73]	✓	✓		✓	✓		+	✓			
29. Trento (2004) [74]		✓		✓	✓		+	✓			
30. Trento (2005) [75]				✓		✓	+	✓		✓	
31. Wagner (2001) [76]		✓		✓		✓	+			✓	
32. Yehle (2009) [31]									✓		
TOTAL	2	9	2	13	4	12	18	17	1	12	2

+ Only Reviewed Studies as contained in three previous reviews. *Review by Burke* [87] *excluded from Table because not in public domain.*

Review characteristics and review strategy

As a precursor to our own review of Group Clinics the review team identified 13 reviews which either matched or overlapped the scope of the planned review. Another review, *The effectiveness of group visits for patients with heart failure on knowledge, quality of life, self-care, and readmissions: a systematic review*[84] is only available on private subscription from the Joanna Briggs Institute Library and so a summary, commissioned on request from the CRD, was used in assessing the evidence. One Cochrane Review entitled *Group medical appointments for people with physical illness* is currently in progress [21].

Characteristics of Previous Reviews

An initial task was to seek to characterise existing reviews in terms of their congruity, or otherwise, with regard to the Population-Intervention-Study Type elements. In Table 9 total congruity with a particular element is indicated by +++ notation. Close congruity is correspondingly indicated by ++ while a narrow specific focus is assigned a + notation. In

this way key reviews with the greatest potential to inform our review question are clearly identified.

Only one of the thirteen reviews [18] was congruous with our review when matched against both population and intervention characteristics (Table 9). We therefore decided to undertake our review as a more comprehensive update of this systematic review by Edelman [18]. Three further reviews [83 85 87] articulated the intervention of interest to our review, although not employing the precise terminology of "group clinics", but only in one specific disease/condition. We therefore decided to prioritise these three reviews as sources of potential studies for inclusion. The remaining reviews would be checked for their coverage of included studies and for suggestions of further studies for inclusion.

Table 9 - Relationship between existing reviews and this Review

Review (Date)	**Population**	**Intervention**	**Included Study Types**
Deakin (2005) [77]	Type II Diabetes Mellitus [Narrow] +	Group Based Self Management Education +	RCTs
Jaber (2006) [78]	All Populations [Broad] ++	Group Visits [Broad] ++	Research studies
Brennan (2010) [80]	Chronic Disease Management in Adults [Narrow] ++	Group Visits [Broad] ++	RCTs and other experimental designs
Riley (2010) [79]	Diabetes Care [Narrow] +	Group Visits [Broad] ++	Review articles and original research articles
Burke (2011) [87, 88]	Diabetes Care [Narrow] +	Group Medical Visits +++	RCTs and quasi-experimental studies
Edelman (2012) [18]	Chronic Medical Conditions +++	Shared Medical Appointments +++	RCTs and Observational Studies

Quinones (2012) [42]	Chronic Disease Management in Adults [Narrow] ++	Group Visits focusing on education [Narrow] +	RCTs
Steinsbekk (2012) [81]	Type II Diabetes Mellitus [Narrow] +	Group Based Self Management Education +	RCTs
CADTH (2013) [82]	Chronic Disease Management +++	Group Care [Broad] +	Health technology assessments, systematic reviews, meta-analyses, RCTs, non-randomized studies, economic studies and guidelines.
Housden (2013) [83]	Diabetes Mellitus +	Group Medical Visits +++	RCTs and observational studies
Slyer (2013) [84]	Heart Failure +	Group Visits ++	RCTs, non-randomized controlled trials, and quasi-experimental trials. Qualitative study designs also considered
Edelman (2014) [85]	Diabetes Mellitus +	Shared Medical Appointments +++	RCTs and Observational Studies
Rolfe (2014) [86]	All Populations +++	Interventions for improving patients' trust in doctors and groups of doctors +	RCTs

Key = +++ represents congruity of a review with this review ++ represents a partial match whereas + indicates a significant departure from our scope. An exact match of scope would therefore be represented by +++/+++ representing congruity of both population and intervention.

Populations

Two of the included reviews [78 86] examined all populations resulting in a focus wider than determined for this review. A further seven reviews [77 79 81 83-85 87] focused on one specific condition (in all bar one instance this condition was diabetes with the exception being the review by Slyer [84] (heart failure)). Two of the remaining reviews [80 42] were broadly co-terminous with our own review, focusing on chronic disease in adults (however, we also included children and adolescents). Only two reviews [18 82] covered the exact same population as our review – that is patients of any age group with chronic disease/chronic medical conditions.

Interventions

Three reviews demonstrated a specific group education focus [77 42 81]. A further 5 reviews had a scope for the intervention that was broader than group clinics, for 4 of these reviews [78 79 80 84] this focus was labelled "group visits" and for the remaining review [82] this was "group care". Two reviews [18 85] focused on Shared Medical Appointments and two reviews targeted Group Medical Visits [83 87]– both these labels were considered co-terminous with our own. The Cochrane review by Rolfe covered a heterogenous mix of interventions for improving patient trust; one intervention of which was a group clinic approach [86].

This important review mapping phase has established the potential of our review to become the most comprehensive and most up-to-date coverage of the topic of group clinics for chronic medical conditions to be found in the published literature. Review Quality
In addition to mapping all thirteen of the existing reviews against the Population, Intervention and Study Type characteristics (Table 10) we decided to produce a brief summary of the quality of the four key reviews [18 83 85 87] in order to assess any uncertainties underpinning their results (Table 11).

Table 10 - Characteristics of Key Reviews

Review	Type of Review	Group Intervention	Condition	Type of Included Studies	No of Included Studies	No of Overlapping Studies	Reasons for Mismatch
Housden (2013) [83]	Systematic Review & Meta-analysis	Group Medical Visit	Diabetes	RCTs & OS	26 studies (13 RCTs)	17	Disease-Specific
Jaber (2006) [78]	Qualitative Review	Group Visit	Any	RCTs & OS	16 studies with 18 publications	9	Includes Non-RCTs
Riley (2010) [79] (Includes 3 general reviews [8 22 90] and one specific review [78])	Systematic Review	Group Visit	Diabetes	Review articles & Original studies	12 publications (4 review articles which contained 75 publications & 8 additional articles)	2	Disease-Specific. Broad scope including group education)
Rolfe (2014) [86]	Systematic Review & Meta-analysis	Any (interventions to improve trust)	Any	RCTs, quasi-RCTs, controlled before and after studies, and interrupted time series of interventions	10 studies with 10 publications	2	Not Intervention Specific
Slyer (2013) [84]	Systematic Review	Group Visit	Heart Failure	RCTs, non-randomized CTs, and quasi-experimental trials	2 studies with 3 publications	1	Disease-Specific

Steinsbekk (2012) [81]	Systematic Review & Meta-analysis	Group Education (self management)	Diabetes	RCTs	21 studies with 26 publications	4	Disease-Specific

Key: GCa = Group Care, GCl = Group Clinics, GE = Group Education, GMA = Group Medical Appointments, GMV = Group Medical Visit, GV = Group Visit, OS = Observational Studies, SMA = Shared Medical Appointments

Table 11 – Review Quality for the Four Key Reviews

	Burke (2011) +/+++ [87, 88]	**Edelman (2012)** +++/+++ [18]	**Housden (2013)** +/+++ [83]	**Edelman (2014)** +/+++ [85]
OVERALL REVIEW QUALITY	**HIGH**	**HIGH**	**HIGH**	**HIGH**
• Was review question clearly defined in terms of population, interventions, comparators, outcomes and study designs (PICOS)?	Review question clear. Inclusion criteria reported.	Review question clear. Inclusion criteria reported.	Review question clear. Inclusion criteria reported.	Review question clear. Inclusion criteria reported.
• Was search strategy adequate and appropriate? Were there any restrictions	Three-step literature search for English language studies (1990-2010) using (a) primary	Searched multiple databases (MEDLINE via PubMed), Embase,	Relevant sources searched, but only for published studies.	Used multiple databases (DATA SOURCES: MEDLINE, EMBASE,

on language, publication status or publication date?	search of Medline, CINAHL, PsycINFO and Cochrane Central Register of Controlled Trials, (b) secondary search of non-indexed databases, and (c) search of grey literature. Manual review of reference lists.	CINAHL, PsycINFO and Web of Science (Jan 1996 - Sept 2011). Limited to English language. Full search strategy provided. Updated search in PubMed conducted in April 2012. Developed search strategy with experienced librarian. Supplemented electronic searches with citation searches for key primary articles.	Authors excluded two studies not in English. Language and publication bias may be present.	CINAHL, PsycINFO, and Web of Science (Jan 1996-Apr 2012). Search updated June 2013. Selected: English-language peer-reviewed publications of randomized controlled trials (RCTs), nonrandomized cluster controlled trials, controlled before-and-after studies, or interrupted time-series designs conducted among adult patients with diabetes.
• Were preventative steps taken to minimize bias and errors in study selection process?	Eligible articles reviewed by two independent reviewers. Disagreements between reviewers resolved by	Two reviewers assessed titles and abstracts for relevance against prespecified inclusion and	Attempts to minimise reviewer error and bias, for much of review.	Two independent reviewers used pre-specified criteria to screen titles and abstracts for full

	discussion, or with third reviewer.	exclusion criteria. Full-text articles identified by either reviewer as potentially relevant retrieved for further review. Each article examined by two reviewers against eligibility criteria. Disagreements resolved by discussion or third reviewer.		text review. Disagreements reconciled through discussion or by a third reviewer.
• Were appropriate criteria used to assess quality of primary studies, and were preventative steps taken to minimize bias and errors in the quality assessment process?	Studies meeting inclusion criteria assessed for methodological quality using JBI standardized critical appraisal tools.	Assessed quality and applicability using AHRQ's Methods Guide. Quality criteria: (1) adequacy of randomization and allocation concealment,	Appropriate quality assessment tool used. Assessment informed synthesis.	Assessed quality using Agency for Healthcare Research and Quality's Methods Guide. Specifically addressed methodological quality; assessed specific

		(2) comparability of groups at baseline, (3) blinding, (4) completeness and differential loss to follow up, (5) whether incomplete data addressed appropriately, (6) validity of outcome measures, and (7) conflicts of interest. Assigned summary quality score (good, fair, poor) to individual RCTs		categories of bias; included validity and reliability of outcome measurement [detection bias]; and allowed for different bias ratings for different outcomes within same study. Assessments of bias performed by two reviewers. Disagreements reconciled through discussion or by a third reviewer.
• Were preventative steps taken to minimize bias and errors in the data extraction process?	Data extraction undertaken using standardised data extraction tool (JBI-MAStARI).	One investigator abstracted data. Second reviewed completed extraction form alongside original article to check for accuracy and	Attempts to minimise reviewer error and bias, for much of review.	Two different reviewers abstracted data and rated study quality and strength of evidence.

		completeness. Disagreements resolved by consensus or by third investigator. Contacted authors for missing information.		
• Were adequate details presented for each of the primary studies?	Adequate details of all studies presented	Adequate details of all studies presented	Adequate details of all studies presented	Adequate details of all studies presented
• Were appropriate methods used for data synthesis? Were differences between studies assessed? Were the studies pooled, and if so was it appropriate and meaningful to do so?	Studies pooled quantitatively. Limited details on synthesis. No sensitivity analysis.	Used random-effects models to synthesize available evidence quantitatively. Other outcomes analyzed qualitatively.	Appropriate methods used for pooling data, performing sensitivity analyses and meta-regression. Authors included observational studies, but did not use these studies in synthesis.	Used random-effects models to synthesize effects quantitatively, reporting by a weighted difference of means or standardized mean difference. Measured heterogeneity in study effects using Forest Plots, Cochran's Q, and I

				squared. Explored heterogeneity using subgroup analyses and meta-regression analyses. Outcomes not suitable to meta-analysis summarized qualitatively.
• Do the authors' conclusions accurately reflect the evidence that was reviewed?	Conclusions reflect evidence but do not convey associated uncertainties around results. Limited discussion of heterogeneity.	Conclusions reflect evidence. Significant heterogeneity between trials. Long-term outcome data lacking. Reliability of conclusions uncertain.	Conclusions reflect evidence, from reasonable number of small-to-medium-sized trials, many with unclear risks of bias. Significant clinical/ statistical variation between trials. Long-term outcome data lacking. Reliability of conclusions uncertain.	Conclusions reflect evidence, Significant heterogeneity between trials. Long-term outcome data lacking. Reliability of conclusions uncertain.

Findings from Four Key Reviews

Edelman (2012) [+++/+++][18]

In a review of 19 papers (including 15 RCTs) Edelman investigated the effects of shared medical appointments on a variety of clinical and health service outcomes [18]. 13 trials investigated diabetes mellitus and 2 trials evaluated group clinic interventions for older adults with high utilization of health services.

Diabetes

Of the 13 RCTs evaluating clinical outcomes for patients with diabetes, ten examined type 2 diabetes only, one examined type 1 only, and two examined a mixed patient population. He detected statistically significant changes for glycated haemoglobin A1c (HbA1c) and systolic blood pressure (5 studies). However, effects varied significantly across studies and this was not explained by study quality. Effects on hospital admissions and emergency department visits were explored in five studies. These showed substantial variation; In three of these, admission rates were lower with SMAs, but the result was statistically significant in only one study. Two studies found emergency department visits decreased significantly with SMAs. Four studies reported effects on total costs, but results were mixed. In one, total costs were significantly higher; in another, total costs were significantly lower; in a third, results did not differ significantly; and the fourth was conducted in Europe.

Older Adults

Edelman retrieved three studies (two trials and one observational study) that evaluated the effects of group clinic approaches on older adults with high health care service utilization rates[18]. All studies reported positive effects on patient experience with SMAs compared with usual care. Both trials reported effects on overall health status and functional status, but there was no difference compared with usual care for either of these measures. Biophysical outcomes were not reported. All three studies showed fewer hospital admissions in the SMA groups, and both trials reported a statistically significant decrease in emergency department visits with SMAs compared with usual care. Total costs also were lower for the SMA group

in each study but varied substantially across studies. In no study did the difference in total costs reach statistical significance.

Due to limitations in reporting Edelman[18] was unable to establish whether any specific patient characteristics might lead to a better response to SMAs. Furthermore the review team evaluated whether baseline glycated haemoglobin A1c (HbA1c) was associated with response to SMAs; it was not. None of the studies permitted the team to identify specific intervention components, or intensity, associated with the effects of SMAs. Exploration of whether robustness was associated with effect size; demonstrated that it was not. Edelman concluded that the evidence synthesis had found no data to assess cost-effectiveness, there was no definitive evidence of non-patient benefits, such as improved access or staff satisfaction [18]. The review team were unable to isolate key elements to successful implementation. They observed that the studies were unrepresentative of a "real world setting" in that the research was either conducted within academic health systems or within independent clinical units that lacked dependencies on other clinical units (i.e. these were "vertically integrated systems") as would be more typically be the case in a non-experimental environment.

Burke (2011) [+/+++][87/88]

Burke's review of 11 RCTs and 4 quasi-experimental trials (2240 patients) performed for the JBI found clear benefits of GMVs for patients' glycated haemoglobin A1c (HbA1c) levels which are consistent in the post-intervention and change from baseline effect sizes [87]. The most significant effect observed is with the change from baseline results. Some evidence suggests post-intervention and change from baseline systolic blood pressure improvement at the nine to twelve month interval and change from baseline improvement at the 4 year timeframe. The review found no evidence that group visits improve LDL cholesterol values of GMV participants. The review concluded that "GMVs should be considered by clinicians as an effective non-pharmacologic intervention that can have a positive impact on biologic markers such as glycated haemoglobin A1c (HbA1c) and systolic blood pressure" [87].

Housden (2013) [+/+++][83]

In a review of 26 studies including 13 RCTs Housden [83] reported a positive effect for group medical appointments on clinical and patient-reported outcomes, with significant reductions in glycated haemoglobin (HbA1c) reduction. However the team were unable to assess the effect of group medical visits on processes of care because of an insufficient number of RCTs reporting this outcome.

Edelman (2014) [+/+++][85]

In the most recent review identified for this project Edelman [85] identified 25 articles representing 17 unique studies that compared SMA interventions for diabetes with usual care. They report that SMAs improved glycated haemoglobin A1c (HbA1c); improved systolic blood pressure; and did not improve LDL cholesterol. Non-biophysical outcomes, including economic outcomes, were reported too infrequently to meta-analyze. This meant that it was not possible to draw conclusions for non-biophysical outcomes. The glycated haemoglobin A1c (HbA1c) result revealed significant heterogeneity among studies, likely secondary to the heterogeneity among included SMA interventions.

Summary of Findings from Other Reviews

The CADTH health technology assessment group [82] conducted a review of the clinical effectiveness, cost-effectiveness, and guidelines of group care across all aspects of chronic disease management. They identified 8 studies meeting the criteria for inclusion in their review: 3 systematic reviews, 2 RCTs, 2 non-randomized studies, and 1 evidence-based guideline. They concluded that there was evidence for improved glycaemic control for diabetes group care (versus usual care) and an isolated study in favour of better blood pressure control for group care of hypertension. However they had been unable to find any information on effectiveness of group care for either COPD or HIV/AIDS. A significant observation related to the fact that variations in the structure of group care, together with inadequate detail of reporting for the usual care meant that the group felt unable to draw meaningful conclusions.

Steinsbekk [81] reviewed 21 studies, reported in 26 publications, involving a total of 2833 participants. For the main clinical outcomes, HbA1c was significantly reduced at 6 months, 12 months and 2 years and fasting blood glucose levels were also significantly reduced at 12 months but not at 6 months. For the main lifestyle outcomes, diabetes knowledge was improved significantly at 6 months, 12 months and 2 years and self-management skills also improved significantly at 6 months. For the main psychosocial outcomes, there were significant improvement for empowerment/self-efficacy after 6 months. For quality of life the authors were unable to draw any conclusion due to high heterogeneity. For the secondary outcomes there were significant improvements in patient satisfaction and body weight at 12 months for the intervention group. The review team found no differences between the groups in mortality rate, body mass index, blood pressure and lipid profile.

In a Cochrane review of group based education for diabetes Deakin [77] identified 8 RCTs (n=1260) and 3 observational studies (n=272). Random effects meta-analyses showed that glycated haemoglobin A1c (HbA1c) and fasting glucose concentrations were lower in the intervention group than in the control group (at 4-6 months (1.4%; 95% confidence interval (CI) 0.8 to 1.9; P < 0.00001), at 12-14 months (0.8%; 95% CI 0.7 to 1.0; P < 0.00001) and two years (1.0%; 95% CI 0.5 to 1.4; P < 0.00001)). Diabetes knowledge scores were greater in the intervention group than in the control group (standardised mean difference 0.95, 95% CI 0.72 to 1.18) (3 trials, n=432), yet not statistically significantly so. More patients in the intervention group than in the control group reduced their use of diabetes medication over 12–14 months (relative benefit increase 825%, CI 202 to 2738) (5 trials, n=654). 1 RCT (n=314) assessing empowerment and psychosocial self efficacy reported greater total empowerment scores in the intervention group than in the control group throughout follow up (p value <0.05). This indicates that the group education element of the group clinic intervention may, in itself, be efficacious. A key issue is the added benefit, if any, that is accrued from employing other supplemental non-group education-based features of the intervention within a group clinic framework.

Two reviews fall short of current practice for systematic reviews. In a narrative review without meta-analysis Jaber[78] concluded that there is sufficient data to support the effectiveness of group visits in improving patient and physician satisfaction, quality of care, quality of life, and in decreasing emergency department and specialist visits. Significantly Jaber highlighted a need to abandon old nomenclatures and to clearly define the structure, processes of care, content of visits, and appropriate outcome measures [78].

Riley [79] produced a review of existing reviews including three general reviews [22 8 90] as well as the previously mentioned specific review by Jaber [78]). He observed that, although "a variety of successes are evident from the entire group visit approach, results are inconclusive regarding any specific model for group visits and inconsistent regarding improvement of important patient outcomes" [79]. Nevertheless Riley concluded that there was evidence that "group visits may reduce costs, physiological outcomes may be improved, and patient and clinician satisfaction may be enhanced" [79]. They cautioned, however, that "The group visit model needs further testing to determine the most effective approach, and the most effective health care provider team to facilitate the group visit, along with standardization and application across a variety of situations" [79].

In a review tangentially related to the topic, looking at interventions for building up trust between patients and clinicians, Rolfe identified three studies that had a group visit component [86]. However one of these studies was excluded from our review because it involved an induction visit as part of joining a health maintenance organisation. The remaining two interventions were included. The focus on trust is, however, important as this represents one mechanism by which the group clinic interaction is hypothesised to work.

Overall Summary of findings from reviews

All the reviews of group clinic type approaches exhibit methodological challenges with regard to the inconsistent use of labels and definitions for the intervention and a lack of detail relating to the intervention components. Mechanisms for action are poorly theorised and variability in outcomes and in subsequent effect sizes makes attribution of effect problematic. Having sensitised the review team to the topic via existing reviews we attempted to examine

the evidence base for effectiveness by bringing together previously identified trials with new studies identified via sensitive search strategies.

3c Results of the review of effectiveness

Study Characteristics

A total of 32 papers involving 22 trials were identified for inclusion in the review. The search of MEDLINE, EMBASE, the Cochrane Library, Web of Science and CINAHL databases yielded a total of 12819 citations. After adjusting for duplicates 11000 remained. Of these, 5255 studies were discarded because after reviewing the abstracts it appeared that these papers clearly did not meet the inclusion criteria. The full text of the remaining 133 citations was examined in more detail from which the 32 papers were selected and included in the systematic review (Tables 12-13). No unpublished relevant studies were obtained. No conference abstracts were identified that met our inclusion criteria and contained sufficient information to address the review question

Table 12 - Study Characteristics – RCTs

STUDY IDENTIFIER	Included Papers	Country	Study Design	Sample Size	Number in intervention group	Number in control group
CLANCY 2003	1. Clancy (2003) [48] 2. Clancy (2003) [47] 3. Clancy (2003) [49]	USA	RCT	120	59	61
CLANCY 2006	4. Clancy (2006) [50] 5. Clancy (2007) [51] 6. Clancy (2008) [52] ♦	USA	RCT	186	96	90
	7. Cohen (2011) [53]	USA	RCT	99	50	49
	8. Cole (2013) [54]	USA	RCT	65	34	31

	9. Coleman (2001) [55]	USA	RCT	295	146	149
	10. Dorsey (2011) [58]*	USA	RCT	58	15 patients and 14 caregivers	15 and 13
EDELMAN 2010	1. Crowley (2014) [56] 2. Crowley (2013) [57] 3. Edelman (2010) [59]	USA	RCT	239	133	106
	4. Graue (2005) [60]	Norway	RCT	116	62	54
	5. Griffin (2009) [61]	USA	RCT	153	45	108
	6. Gutierrez (2011) [62]	USA	RCT	103	50	53
	7. Junling (2012) [63]	China	RCT	1346	692	654
	8. Liu (2012) [64]	China	RCT	208	119	89
	9. Naik (2011) [65]	USA	RCT	87	45	42
	10. **Ratanawongsa (2012) [66]	USA	RCT	245	0.32	0.34
	11. Sadur (1999) [20]	USA	RCT	185	97	88
SCHILLINGER 2008	12. ***Schillinger (2008) [67] 13. ***Schillinger (2009) [68]	USA	RCT	339	112	115
	14. Scott (2004) [69]	USA	RCT	294	145	149
TAVEIRA 2010 (same intervention, different population)	15. Taveira (2010) [70]	USA	RCT	118	58	60
	16. Taveira (2011) [71]	USA	RCT	88	44	44

TRENTO 2002	17. Trento (2001) [72] 18. Trento (2002) [73] 19. Trento (2004) [74]	Italy	RCT	112	56	56
	20. Trento (2005) [75]	Italy	RCT	62	31	31
	21. Wagner (2001) [76]	USA	RCT	708	278	429
	22. Yehle (2009) [31]	USA	RCT	52	26	26

♦Economic evaluation alongside RCT

* Subgroups by insulin regimen - No insulin (oral diabetes medications only) n=98, basal insulin and oral medications n=62 and complex medications n=79.

** 3 arm RCT, 34% in weekly automated telephone self-management

*** 112 in 3rd arm weekly automated telephone disease management (ATDM)

Table 13 - Population Characteristics – RCTs

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
CLANCY (2003) [47] [48] [49]	Type II Diabetes	HbA 1c > 8.5%	18 years or older. Average age was 54.0 (Range 22-83). 77.5% were African American	Primary diagnosis of substance abuse or dependence, current pregnancy, dementia, or inability to speak English.	
CLANCY (2006) [50] [51] [52]	Type II Diabetes	Poorly controlled diabetes (HBA 1c>8.0%)	18 years or older.	Mean age, y: 56.1	Adjusted for age, gender, race, education level, reading level, baseline clinical outcome measures and insurance type.

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
Cohen (2011) [53]	Type II Diabetes	HbA 1c 7.0%, LDL > 100mg.dL (2.5 mmol/L) or LDL > 70mg/dl (1.81 mmol/L) for those with coronary artery disease, and blood pressure > 130/80 mm Hg, each documented at least once in medical records 6 months before enrolment.	Veterans Age: Intervention group: 69.8. ± 10.7, Control group 67.2 ± 9.4		Intervention group had lower baseline levels of LDL cholesterol and total cholesterol compared to control group.
Cole (2013) [54]	Diabetes	Prediabetes as defined by American Diabetes Association diagnostic	Minimum age of 18 years, fluent in English	Diagnosis of diabetes and those not attending initial	Significant difference in age at baseline

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
		criteria for impaired fasting glucose (IFG; FBG of 100-125 mg/dL).		prediabetes education class.	
Coleman (2001) [55]	Chronic conditions	One or more self-reported chronic conditions (e.g., asthma, chronic obstructive pulmonary disease, congestive heart failure, diabetes, and heart disease)	60 years and older 11 or more outpatient clinic visits in past 18 months. Nearly all patients selected using these criteria had at least one hospitalization in the past 18 months	Ineligible patients had lower self-reported health status (P =0.01) and took fewer medications per day (P <0.01) than eligible patients Physician-determined significant functional impairment or	Intervention and control groups similar with respect to age, gender, marital status, self-rated health status, and functional disability as measured by ADLs and IADLs. Prevalence of chronic

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
				dementia precluding participation in GV format.	obstructive pulmonary disease may have differed.
Dorsey (2011) [58]	Parkinson's Disease	Clinical diagnosis of idiopathic Parkinson's disease	Patients over 30	Patients not willing and able to provide informed consent and participate fully in group patient visits.	
EDELMAN (2010) [56] [57] [59]	Type II diabetes and hypertension	Poorly controlled diabetes (HbA1c greater than or equal to 7.5%) and hypertension. (systolic blood pressure greater than or equal to	Aged population Ethnic minority population	Veterans from 2 Veterans Affairs Medical Centers, North Carolina and Virginia. Suboptimal lipid control not a	Patients similar at baseline. Patients at Durham VAMC were slightly younger and heavier and had higher HbA1c levels

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
		140 mm Hg or diastolic blood pressure greater than or equal to 90mmHg) AND on medication for diabetes and hypertension.	96.9% male, mean age 62.0 years, 57.1% African American, 56.1% married, 38.8% high school or less/37.8% some college, Financial Burden (Can pay bills without cutting spending) 69.9%	criterion for study entry	and systolic blood pressure. Randomisation stratified by site, baseline HbA1c (≥ vs <9.0%) and systolic BP (≥ vs <150mmHg)
Graue (2005) [60]	Type I diabetes	Mean HbA1c 9.3%. mean diabetes duration 6.5 years.	Adolescents. Mean age 14.2 years. Age of adolescents group		

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
			split into younger (11-13 years) and older (14-17 years)		
Griffin (2009) [61]	Heart Disease/ Hypertension	On warfarin therapy for at least 30 days, with goal INR range supported by current guidelines.		Excluded if warfarin therapy anticipated to be discontinued less than two months from start of study.	
Gutierrez (2011) [62]	Diabetes	HbA1c 7% or higher	Hispanic patients aged 18 or over		
Junling (2012) [63]	Hypertension	.	Older adults Patients from 4 community health		

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
			care centres of 2 districts in Shanghai, China		
Liu (2012) [64]	Type II Diabetes		Aged 35-80 years living in rural communities in Shanghai		
Naik (2011) [65]	Type II Diabetes	Mean HbA 1c level of at least 7.5% on all measurements in 6 months prior to study entry.	50 to 90 years old. Have a PCP Consistent with older US veteran population, sample	Patients excluded if they had a diagnosis of dementia or a serum creatinine level of at least 2.5 mg/dL.	Participants similar at baseline across socio-demographic and clinical variables, including HbA1c level, systolic blood pressure, body mass

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
			overwhelmingly male, multiple morbidities, and of heterogeneous race.		index, and duration of DM. No differences noted
Ratanawongsa (2012) [66]	Type II Diabetes	Adults with type 2 diabetes. Most recent glycated haemoglobin A1c (HbA1c) ≥ 8.0% Had ≥ 1 primary care visit at one of four participating clinics.	English-, Spanish (44%)-, or Cantonese speaking.		
Sadur (1999) [20]	Type I and Type II Diabetes	Recent glycated haemoglobin A1c	Patients between 16 and 75 years of age	Current pregnancy, dementia, inability to	

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
		(HbA1c) concentration >8.5% or not had glycated haemoglobin A1c (HbA1c) concentration measured during previous year.		speak English, or inability to attend monthly meetings.	
SCHILLINGER (2008) [67 68]	Type II Diabetes	Type 2 diabetes that is poorly controlled - suboptimal glycaemic control, having recent HbA1C ≥8.0%	Older than 17. English-, Spanish-, or Cantonese speaking Patients had more than 1 primary care visit in last year	Ethnic minority population	

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
Scott (2004) [69]	Chronic Conditions	Patients with arthritis, hypertension, difficulty hearing, heart disease, liver disease, and bladder/kidney disease.	Adult patients aged over 60 with 11 or more outpatient visits in 18 months. Health Maintenance Organisation Patients.		
Seesing (2014) [91]	Chronic neuromuscular disorders	Patients identified through CRAMP (Computer Registry of All Myopathies and Polyneuropathies), Dutch neuromuscular database,	Older than 18 years, currently in care of department, and had not seen their neurologist 6 months	Severe hearing problems or insufficient command of the Dutch language.	In SMA group, slightly more patients diagnosed with myotonic dystrophy type 1 and fewer

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
		recruited from March 2009 - March 2011. Eligible if diagnosis of one of selected chronic neuromuscular disorders,	before study commencement.		patients seen by their own neurologist.
TAVEIRA (2010) [70]	Type II Diabetes	HbA1c between 7% and 9% within the previous 6 months.	18 years or older	Unable to attend group sessions Psychiatric instability (acutely suicidal, psychotic) or organic brain injury.	Intervention group younger and had greater tobacco use at baseline than usual care but similar in other cardiovascular risk factors.

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
Taveira (2011) [71]	Type II Diabetes	Diagnosis and HbA1c>6.5% within previous six months AND Diagnosis of Depression (ICD 9 311, 296.2, 296.3)	Intervention - Gender (100% Male), Age (60.2 mean, 9.3 SD). White (97.7%)		
TRENTO (2002) [72 73 74]	Type II diabetes	Treated either with diet alone or with diet and oral administration of hypoglycemic agents	Age <80 and had attended diabetes clinic for at least 1 year	Sex (men/women) 27/29 34/22 NS	
Trento (2005) [75]	Type I diabetes	Onset before age 30 and insulin treatment started within 1 year of diagnosis; 4-daily insulin	Age < 70 and at least 1 year previous attendance at clinic.		Control patients had different schooling levels ($p < 0.05$) and higher HbA1c levels

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
		injections and self-monitoring of blood glucose.			at baseline (P = 0.015).
Wagner (2001) [76]	Type I and II diabetes	Receiving insulin or oral hypoglycaemic therapy.	>30 years	Terminally ill, demented or psychotic, ineligible due to communication problems and HMO disenrollment	
Yehle (2009) [31]	Heart Failure (HF)	Community-living adults with established diagnosis of HF.		Cognitive impairment or inability to read or speak English, or if participant resided in	No difference in attrition between intervention and control groups when

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Differences between intervention and control group (confounding variables)
				nursing home. Patients with cognitive impairment identified by physician/nurse practitioner. Patients residing in nursing home unable to participate in clinic visit.	compared according to age, gender, insurance, hospitalization during study, HFKT, or SCHFI.

Setting Characteristics

17 of the 22 trials were conducted in the USA. Of the remaining RCTs two were conducted in China, two in Italy and 1 in Norway. Not a single RCT was conducted in a UK setting.

Intervention Characteristics

Included studies comprised a total of nine different interventions. Of these the Cooperative Health Care Clinic (6 studies) and Shared Medical Appointment (5 studies) models featured most frequently. Shared Medical Appointments were represented by trials that have occurred during the comparatively recent period 2010-2014 while the Cooperative Health Care Clinic studies occurred during the period 2001-2004 with the exception of two recent non-US studies reflecting a resurgence of interest. There were no RCTs for two of the models, the Specialty Cooperative Healthcare Clinic Model and DIGMAs.

Table 14 - Prevalence of group clinic approaches by no. of studies and no. of papers

Model (Studies)	**No of Studies**	**No of Papers**
Cooperative Health Care Clinic Model [47 -52 55 63 64 69]	6	10
Shared Medical Appointments [53 54 62 70 71 91]	5	6
Group Clinics [56 57 59 61 65]	3	5
Group Medical Visits [58 66 67 68]	3	4
Group Visit [60 72 73 74 75]	3	5
Chronic Care Clinics [76]	1	1
Cluster Visits [20]	1	1
Shared Medical Visit [31]	1	1
NB. Specialty Cooperative Healthcare Clinic Model; DIGMAs; Group Medical Appointments received no mentions		

Intervention Components

Edelman [18] has characterised the main features of Shared Medical Appointment interventions. Almost 90% of such interventions had an educational component and nearly 65% are

delivered by multidisciplinary teams. A behavioural intervention is a feature of exactly half of the SMA interventions. A focus on medicine management is evidenced in the fact that 55% of interventions include medication adjustment. Almost 90% of interventions include peer-to-peer support and just over 40% include clinician training. We did not find it possible to distinguish intervention content for studies not included by Edelman from those studies included in his review, implying that findings from his review are generalisable to a wider population of group clinic approaches [18]. As seen in Appendix 4 our review has completed a very detailed data extraction of intervention components from RCTs. However the facility to synthesise and analyse this data is constrained by the fact that this data captures (i) the completeness of reporting of each report, not the intervention content for that report, and (ii) there is considerable variability in these descriptions implying that similar components may be described differently or, conversely, that similar-looking descriptions may mask important substantive differences in content, delivery or both. Indeed even different reports of the same study portrayed different depictions of the same intervention. Notwithstanding these reporting limitations we found that some element of socialization was included in 15 of the studies and Group Discussion (i.e. Many-to-Many interaction) was reported in 14 studies. Eleven studies explicitly reported Health Education/ Information Presentation(s) by Individual Clinicians, with one for Health Education/ Information Presentation(s) by Multiple Clinicians and two for Health Education/Information via booklet, leaflet or video. Seven studies reported medication review and four describe completion of prescriptions. Six studies reported Individual Consultation within the Group Session with five describing Individual Consultation immediately following the Group Session for All Patients and three for Individual Consultation immediately following the Group Session for Selected patients. Six studies reported routine medical checks being performed by multiple clinicians, six reported these checks being made by individual clinicians while only two studies reported routine medical checks being conducted by the patient. Only one study reported telephone follow-up.

Group size

The smallest group sizes started at around 3 or 4 patients and these smaller groups typically did not extend beyond 7 or 8 participants (Table 15). Typical group sizes involved between six and ten patients. Three studies had around 20 participants with the largest of these ranging

between 20 and 25 patients. One group involved up to 7 patients but also made provision for patients' families. It was not clear from most reports about whether these numbers were aspirational, reflecting full capacity, or whether they represented typical attendance. Two studies reported means of 7.7 and 9 patients indicating that these were actual attendance figures. It was not possible to make any observations about optimal group size. Clearly there is a potential tension between efficiency, as reflected in higher numbers, and optimal group interaction which may be represented in smaller numbers while nevertheless needing to realise a critical mass for viability and interaction.

Visit Frequency

Visit intervals ranged from weekly through to quarterly or semi-monthly (Table 15). Typical visit frequencies were monthly but even here these varied in duration (e.g. monthly for 3 months, 6 months or one year). It was not clear in most instances whether these reflected a therapeutic interval (as determined by clinical need) or an evaluation interval (as determined by the needs of a particular study). Most of the studies reported these intervals only over the period covered by the study and studies made little reference to continuation beyond the study period or to issues relating to sustainability. It is not clear, therefore, what the optimal visit interval and frequency is from a therapeutic viewpoint. Some studies employed different visit frequencies for initiation and maintenance (e.g. Fortnightly for first 3 months then monthly for next 3 months or Weekly for 4 weeks then monthly for 5 months) suggesting a potential line for further investigation. However the underlying assumptions for such a pattern were typically not surfaced. It was not clear whether these periods were determined by clinical considerations, by assumptions of patient burden or by the available clinical resources within the health service. One study alternated group visits and individual consultations every three months. However it was again not clear what the drivers were for this particular decision. The study with the longest follow-up required patients to visit 4 times a year for 2 years then a further 7 over years 3-4.

Session Duration

A typical length of session was between 1.5 and 2 hours (90-120 minutes) (Table 15). Shortest sessions were 60-70 minutes in duration although sessions of 40-50 minutes might

require additional time for individual consultations. The longest sessions were 2.5 to 3 hours although one session was described as "half a day" albeit at less frequent intervals. Two interventions reflected variable time periods either when switching to less frequent intervals (Weekly sessions 2 hours and monthly sessions 90 minutes) again with implicit assumptions about differential requirements for initiation and maintenance or reflecting differences between a scheduled period and an actual duration (e.g. Scheduled for 2 hours but after 1st session often 90 minutes). Methodologically it is very difficult to summarise the information about the session durations, mainly because some studies record the complete duration from arrival to departure and others only include the time spent in a group setting. Studies also handle any individual consultations differently with some recording these as supplementary (i.e. additional time) and others including these within the group session times.

Total Duration

The value of information on the total duration of all documented sessions is questionable, partly for the reasons mentioned above in individual Session Duration and partly because the denominator is typically determined by the study period, not by therapeutic considerations. A further limitation is that comparability between individual and group sessions is not possible – in most cases studies follow an enhancement model, not a substitution model, and therefore individual consultation sessions take place in both arms. Equally importantly we typically do not have details on whether the individual consultations within a group context are typically shorter than those in an individual treatment context. It should be borne in mind that the total time required by clinical staff is considerable; requiring preparation for the group sessions in terms of educational content, review of medical notes and results prior to the visit etcetera. In addition provision for follow up is often not formally documented within the studies.

Notwithstanding these limitations we can see from Table 15 that, over the study period total durations of 12-14 hours are common with other studies reaching 24 or 30 hours of clinical group input. The longest duration was a total of 60 hours, spread over four years although some studies recorded the total duration as "indefinite" implying ongoing service provision beyond the study period.

In summary it can be seen that data on such important evaluative group features as size, frequency and session and total duration, where available, is extremely difficult to synthesise and interpret. In particular justification for these features is rarely provided, although we can make some assumptions about their underpinning rationale (e.g. different assumptions about initiation versus maintenance). More worryingly such considerations seem to be determined primarily either by pragmatic or study considerations rather than by enhanced effectiveness, optimal curriculum content or empirical evidence on group processes and interactions.

Table 15 - Group Characteristics – Quantitative

Study	Group Size	Visit Frequency	Individual session duration	Total duration	No. of follow up appointments.	Total time spent in group per session	Total time spent in individual consultation
CLANCY (2003) Clancy (2003) [48] Clancy (2003) [47] Clancy (2003) [49]	19-20	Monthly for 6 months	2 hours	12 hours	6 (1+5)	75 minutes	30 minutes
CLANCY (2006) Clancy (2006) [50] Clancy (2007) [51] Clancy (2008) [52]	14-17	Monthly for 1 year	2 hours	24 hours	2 at 6 and 12 months	60 minutes	60 minutes
Cohen (2011) [53]	4-6	Weekly for 4 weeks then monthly for 5 months	Weekly sessions 2 hours and monthly sessions 90 minutes	15.5 hours	1 at 6 months	Weekly sessions 2 hours and monthly sessions 90 minutes	
Cole (2013) [54]	6-8	Monthly over 3 months	90-minutes	4.5 hours	Not specified	80 minutes	10 minutes

Study	Group Size	Visit Frequency	Individual session duration	Total duration	No. of follow up appointments.	Total time spent in group per session	Total time spent in individual consultation
Coleman (2001) [55]	8-12	Monthly	120 minutes	Indefinite	Indefinite	80 minutes	40 minutes (3.5-5 minutes each)
Dorsey (2011) [58]	3-7	Once every 3 months for 12 months	90 minutes	6 hours	1 at 12 months	90 minutes	10 minutes per patient
EDELMAN (2010) Edelman (2010) [59] Crowley (2014) [56] Crowley (2013) [57]	7-9	Every 2 months for 7 visits over 12 months	Scheduled for 2 hours but after 1st session often 90 minutes	14 hours	2 (6 months & 1 year)	60-75 minutes	1 hour allocated to individual consultations (estimated 6.5 to 8.5 minutes per participant)
Graue (2005) [60]	4-9	Every 3 months for 15 months (alternate group visits/individual consultations)	3 hours	11 hours and 15 minutes	2 at 15 months & 24 months	3 hours	45 minutes
Griffin (2009) [61]	6	Not stated	60 minutes	Indefinite	Indefinite	60 minutes	Not stated

Study	Group Size	Visit Frequency	Individual session duration	Total duration	No. of follow up appointments.	Total time spent in group per session	Total time spent in individual consultation
Gutierrez (2011) [62]	9 (mean)	Every two weeks. 36 SMAs in total.	Not given	Not given	Maximum 17 months, mean follow up at 9.5 months	Not given	Not given
Junling (2012) [63]	18-20	Fortnightly for first 3 months then monthly for next 3 months	120 minutes	18 hours	1 at 6 months	60 minutes	60 minutes
Liu (2012) [64]	20-25	Monthly for 12 months	150 minutes	30 hours	1 at 12 months	90 minutes	60 minutes
Naik (2011) [65]	5-7	4 visits, every three weeks	1 hr 10 minutes	4 hours 40 minutes	1+3	60 minutes	10 minutes
Ratanawongsa (2012) [66]	6-10	Monthly for 9 months	90 minutes	13 hours and 30 minutes	1 at 1 year	Unclear	Unclear
Sadur (1999) [20]	10-18	Monthly	2 hours	Not specified	Over 6 months	Not specified	Not specified

Study	Group Size	Visit Frequency	Individual session duration	Total duration	No. of follow up appointments.	Total time spent in group per session	Total time spent in individual consultation
SCHILLINGER (2008) Schillinger (2008) [67] Schillinger (2009) [68]	6-10	Monthly for 9 months	90 minutes	13 hours 30 minutes	1 at 1 year	90 minutes	Unclear
Scott (2004) [69]	7.7 patients (mean)	Monthly for 24 months	2 hours, 30 minutes	60 hours	1 at 24 months	90 minutes	60 minutes
Taveira (2010) [70]	4-8	4 once weekly	2 hours	8 hours		2 hours	0
Taveira (2011) [71]	4-8	4 once weekly THEN 5 monthly	100-140 minutes	?	N/A		
Trento (2001) [72]	9-10	4 times a year	120 minutes	3 hours 20 minutes		50 minutes	Not specified
Trento (2002) [73]	9-10	4 times a year for 2 years then 7 over years 3-4	No details	No details	No details	No details	No details
Trento (2004) [74]	9-10	4 sessions per year	No details	No details	No details	No details	No details

Study	Group Size	Visit Frequency	Individual session duration	Total duration	No. of follow up appointments.	Total time spent in group per session	Total time spent in individual consultation
Trento (2005) [75]	No details	Every 2-3 months	40-50 minutes plus individual consultations"	15 hours	15	40-50 minutes	Described as "brief"
Wagner (2001) [76]	6-10	Every 3-6 months	Half day	Indefinite	Indefinite	60 minutes	
Yehle (2009) [31]	Up to 7 patients (plus family/ friends)	Every 8 weeks	No details	No details	No details	60 minutes	10 minutes

Table 16 Included RCTs with Outcomes Included and Results

Study	Outcome Measures	Results
Clancy (2003) [48]	Hospital Admissions Emergency Department Visits Costs	GV patients showed statistically significant improvement in concordance with 10 process-of-care indicators ($P < 0.001$). 76% of GV patients had at least 9/10 items up to date, as compared with

Study	Outcome Measures	Results
	Concordance with 10 process-of-care indicators recommended by the American Diabetes Association (ADA) standards of care. (HbA_{1c}levels and lipid profiles, urine for microalbumin, appropriate use of ACE inhibitor or angiotensin receptor blockers, use of lipid-lowering agents, daily aspirin use, annual foot examinations, annual referrals for retinal examinations, and immunizations against streptococcal pneumonia and influenza).	23% of control patients; 86% of GV patients had at least 8/10 indicators compared with 47% of control patients.
Clancy (2003) [47]	Primary Care Assessment Tool Trust in Physician Scale. Attendance records	Patients who received care in group visits showed an improved sense of trust in their physician compared with patients who continued to receive usual care. Tendency for patients in groups to report better coordination of their care, better community orientation, and more culturally competent care. Patient attendance at groups also indicated good acceptance.
Clancy (2003) [49]	Feasibility Acceptability,	GV patients exhibited improvement in American Diabetes Association standards of care ($P < .001$), improved sense of trust

Study	Outcome Measures	Results
	Concordance with American Diabetes Association standards of care	in physician (P = .02), and tended to report better coordination of care (P = .07), better community orientation (P = .09), and more culturally competent care (P = .09).
Clancy (2006) [50]	Haemoglobin A1c Blood pressure [BP] Lipid profiles Quality of care measures (adherence to 10 ADA guidelines and 3 USPSTF cancer screens) at 12 months.	At both measurement points, HbA1c, BP, and lipid levels did not differ significantly for GV patients versus those in usual care. At 12 months, however, GV patients exhibited greater concordance with ADA process-of-care indicators (P < .0001) and higher screening rates for cancers of the breast (80 vs. 68%, P = .006) and cervix (80 vs 68%, P = .019).
Clancy (2007) [51]	Primary Care Assessment Tool (PCAT), Diabetes-Specific Locus of Control (DLC) survey Trust in Physician Scale (TPS).	Compared to patients in usual care, GV patients' PCAT scores were higher for ongoing care (P = .001), community orientation (P < .0001), and cultural competence (P = .022). GV patients had higher scores for the Powerful-Other Health Professional subscale of the DLC survey (P = .010).
Clancy (2008) [52]	Emergency Department charges Outpatient Visit Charges	GV patients had reduced ED and total charges but more outpatient charges than usual care patients. GVs increased outpatient visit charges; however, controlling for endogeneity showed that GVs statistically significantly reduced outpatient charges (P <.001).

Study	Outcome Measures	Results
		Separate treatment effect model of specialty care visits confirmed that GV effects on outpatient visit charges occurred via reduction in specialty care visits.
Cohen (2011) [53]	Haemoglobin A1c Systolic blood pressure LDL cholesterol Diabetes self-care behavior questionnaires at 6 months.	Randomization groups similar at baseline in all cardiovascular risk factors except for LDL; significantly lower in IG. At 6 months, significant improvements from baseline found in IG for exercise, foot care, and goal attainment of A1C, LDL-C, and BP but not in CG.
Cole (2013) [54]	Fasting Blood Glucose (mg/dL). Weight (WT; kg) Body mass index (BMI) Systolic blood pressure Diastolic blood pressure Haemoglobin A1C (%); Total cholesterol Low density lipoprotein cholesterol [LDL; mg/dL];	94 participants in 2 study groups with 69% completion rate at 1 year (n = 34 SMA, n = 31 control). Average participant was Caucasian (64%), male (54%), 58.3 ± 9.6 years, had BMI of 30.8 ± 4.9 kg/m(2) (obese), and fasting blood glucose of 109 ± 9.5 mg/dL. SMA and control participants lost mean of 6.6 pounds and 3.6 pound, respectively; neither group met 5% modest weight loss expected. SMA and control group experienced a mean drop in fasting blood glucose of 6 mg/dL.

Study	Outcome Measures	Results
	High density lipoprotein cholesterol [HDL; mg/dL]; Triglycerides [TG; mg/dL]).	
Coleman (2001) [55]	Emergency department visits, Hospitalizations Primary care visits.	On average, patients in IG attended 10.6 group visits during 2-year study period. IG patients averaged fewer emergency department visits (0.65 vs. 1.08 visits; P = 0.005) and were less likely to have any emergency department visits (34.9% vs. 52.4%; P = 0.003) than controls. These differences remained statistically significant after controlling for demographic factors, comorbid conditions, functional status, and prior utilization. Adjusted mean difference in visits was -0.42 visits (95% CI, -0.13 to -0.72), and adjusted RR for any emergency department visit was 0.64 (CI, 0.44 to 0.86).
Crowley (2014) [56]	Total Cholesterol LDL Cholesterol HDL Cholesterol Triglycerides	At baseline, mean total cholesterol was 169.7 mg/dL (SD 47.8), LDL-C 98.2 mg/dL (SD 41.7), and high-density lipoprotein cholesterol (HDL-C) 39.3 mg/dL (SD 13.0). Median baseline triglycerides were 131 mg/dL (interquartile range 122). By study end, mean total cholesterol and LDL-C in GMCs were 14.2 mg/dL (P = .01) and 9.2 mg/dL (P = .02) lower than usual care, respectively; 76% of GMC patients met goals for LDL-C, versus

Study	Outcome Measures	Results
		61% of usual care patients (P = .02). Triglycerides and HDL-C remained similar between study arms. Treatment intensification occurred in 52% of group medical clinic patients, versus 37% of usual care patients between study baseline and end (P = .04). Mean statin dose higher in GMC patients at study midpoint and end.
Crowley (2013) [57]	Haemoglobin A1c Self Efficacy	Effect of GMC on HbA1c differed by baseline insulin regimen versus UC (P = 0.05); no differential effect on self-efficacy (P = 0.29). Among those using complex insulin regimens at baseline, GMC reduced HbA1c by study end compared with UC (-1.0%; 95% CI -1.8 to -0.2; P = 0.01). No HbA1c difference between GMC and UC patients using no insulin (P = 0.65) or basal insulin only (P = 0.71). No clinically significant differences in hypoglycaemia by baseline insulin regimen and intervention group.
Dorsey (2011) [58]	Feasibility (ability to recruit participants and proportion of participants who completed study) Quality of life measured by PD Questionnaire-39.	30 patients and 27 caregivers enrolled. 13/15 patients randomized to GPVs and 14/15 randomized to usual care completed study. Quality of life measured 12 months after baseline between 2

Study	Outcome Measures	Results
		groups was not different (25.9 points for GPVs vs 26.0 points for usual care; P = 0.99).
Edelman (2010) [59]	Haemoglobin A1c Diastolic blood pressure Systolic blood pressure Hospital Admissions Emergency Department Visits	Mean baseline systolic blood pressure and HbA(1c) level were 152.9 mm Hg (SD, 14.2) and 9.2% (SD, 1.4), respectively. At end of study, mean systolic blood pressure improved by 13.7 mm Hg in GMC group and 6.4 mm Hg in usual care group (P = 0.011 by linear mixed model), whereas mean HbA1c level improved by 0.8% in GMC group and 0.5% in usual care group (P = 0.159).
Graue (2005) [60]	Haemoglobin A1c Child Health Questionnaire (CHQ-CF87) Diabetes Quality of Life Questionnaire (DQOL	101 adolescents (55/46) agreed to participate, mean age 14.2 years (sd 1.5), mean diabetes duration 6.5 years (sd 3.6, range 1-16 years), mean HbA(1c) 9.3% (sd 1.4, range 6.1-12.8%). 83 (72%) completed questionnaires at follow-up (intervention/ control 45/38). Significant age by randomization group interactions for diabetes-related impact (P = 0.018), diabetes-related worries (P = 0.004), mental health (P = 0.046) and general behaviour (P = 0.029), implying GVs were effective in older adolescents (above 13-14 years). No significant effects on mean HbA(1c) identified.

Study	Outcome Measures	Results
Griffin (2009) [61]	Number of visits International Normalized Ratio (INR)	28/45 patients participated for the 16-week study period. CG included 108 patients seen by pharmacist for individual anticoagulation appointments. No significant difference in percentage of INR values within therapeutic range detected between patients in GV model vs. patients receiving individual visits (59% vs. 56.6%; P = 0.536). 73% of INR values for GV patients within +/- 0.2 of desired INR range compared with 71.9% of CG (P = 0.994). 79% of GV patients within the therapeutic range at their last clinic visit compared with 67% of patients who attended individual appointments (P = 0.225). GVs preferred by 51% (n = 38) of patients who completed satisfaction survey. Of 92 patients who declined GV participation, 36% indicated that time of day that GVs were offered was inconvenient. No thromboembolic or haemorrhagic events documented in either group.
Gutierrez (2011) [62]	Haemoglobin A1c Quality of life Diabetes knowledge.	Mean decreases in glycated haemoglobin level of 1.19% for SMA group (P <.01) and 0.67% for CG (P = .02).In SMA group, quality-of-life and diabetes knowledge scores increased by 5 and 1.5 points, respectively (P <.01).

Study	Outcome Measures	Results
Junling (2012) [63]	Diastolic Blood Pressure Treatment compliance Self-efficacy	The average diastolic blood pressure decrease in the GV groups (1.5 mm Hg) was more than in CGs (0.4 mm Hg) significantly. In GV groups, compliance with medicine, physical activities, and diet increased to 14.7%, 9.7%, and 10.1%, respectively, which is more significant than that in CGs (2.0%, 1.6%, and 8.0%); self-reported health and self-efficacy also improved significantly.
Liu (2012) [64]	Systolic blood pressure Changes in 17 self-management behavior, self-efficacy and health status related variables	GV patients, on average, increased their duration of aerobic exercise by more than 40 minutes per week (*p=0.001*); had significant increase of 0.71 in mean score on self-efficacy to manage diabetes (*p=0.02*); and had significant improvements in measures of illness intrusiveness and systolic blood pressure. GV patients attended an average of 10.1/12 program sessions. 75.6% of them attended 10 and more sessions.
Naik (2011) [65]	Haemoglobin A1c	GV participants had significantly greater improvements in HbA1c levels immediately following active intervention (8.86%-8.04% vs 8.74%-8.70% of total haemoglobin; mean [SD] between-group difference 0.67% [1.3%]; P=.03), and differences persisted at 1 year follow-up (0.59% [1.4%], P=.05). Repeated-measures

Study	Outcome Measures	Results
		analysis found significant time-by-treatment interaction effect on HbA1c levels favouring intervention (F(2,85)=3.55; P=.03). Effect of time-by-treatment interaction seems to be partially mediated by DM self-efficacy (F(1,85)=10.39; P=.002).
Ratanawongsa (2012) [66]	Patient activation to create and achieve goals Quality of care Barriers to care	Of 113 eligible PCPs caring for 330 enrolled patients, 87 PCPs (77%) responded to surveys about 245 (74%) enrolled patients. Intervention patients more likely to be perceived by PCPs as activated to create and achieve goals for chronic care when compared with UC patients (standardized effect size, ATSM vs UC, +0.41, P = 0.01; GMV vs UC, +0.31, P = 0.05). Primary care providers rated quality of care higher for patients exposed to ATSM compared to UC (odds ratio 3.6, P < 0.01). Compared with GMV patients, ATSM patients more likely to be perceived by PCPs as overcoming barriers related to limited English proficiency (82% ATSM vs 44% GMV, P = 0.01) and managing medications (80% ATSM vs 53% GMV, P = 0.01).
Sadur (1999) [20]	Haemoglobin A1c Hospital Admissions	HbA1c levels declined by 1.3% in CV group versus 0.2% in the control subjects (P < 0.0001). Several self-care practices and

Study	Outcome Measures	Results
	Emergency Department Visits Self-reported changes in self-care practices, self-efficacy, and satisfaction	several measures of self-efficacy improved significantly in CV group. Satisfaction with program was high. Both hospital (P = 0.04) and outpatient (P < 0.01) utilization significantly lower for CV subjects after the program.
Schillinger (2008) [67]	Participation among clinics, clinicians, and patients Patient representativeness; patient engagement with SMS.	Participation rates high across all levels and preferentially attracted Spanish-language speakers, uninsured, and Medicaid recipients. Although both programs engaged a significant proportion in action planning, Automated Telephone Disease Management yielded higher engagement than GMVs, especially among those with limited English proficiency and limited literacy.
Schillinger (2009) [68]	Systolic blood pressure Diastolic blood pressure 1-year changes in structure (Patient Assessment of Chronic Illness Care [PACIC]), communication processes (Interpersonal Processes of Care [IPC]), and outcomes (behavioral, functional, and metabolic).	Compared with usual care group, ATSM and GMV groups showed improvements in PACIC, with effect sizes of 0.48 and 0.50, respectively (P < 0.01). Only ATSM group showed improvements in IPC (effect sizes 0.40 vs. usual care and 0.25 vs. GMV, P < 0.05). Both SMS arms showed improvements in self-management behavior versus usual care arm (P < 0.05), with gains being greater for the ATSM group than for the GMV group (effect size 0.27, P = 0.02). ATSM group had fewer bed days per month

Study	Outcome Measures	Results
		than the usual care group (-1.7 days, P = 0.05) and GMV group (-2.3 days, P < 0.01) and less interference with daily activities than the usual care group (odds ratio 0.37, P = 0.02). No differences in A1C change.
Scott (2004) [69]	Clinic visits, inpatient admissions, emergency room visits, hospital outpatient services, professional services, home health, and skilled nursing facility admissions; measures of patient satisfaction, quality of life, self-efficacy, and activities of daily living (ADLs).	Outpatient, pharmacy services, home health, and skilled nursing facility use did not differ between groups. CHCC patients had fewer hospital admissions (P=.012), emergency visits (P=.008), and professional services (P=.005). CHCC patients' costs $41.80 per member per month less than those of control patients. CHCC patients reported higher satisfaction with their primary care physician (P=.022), better quality of life (P=.002), and greater self-efficacy (P=.03). Health status and ADLs did not differ between groups.
Taveira (2010) [70]	Glycated haemoglobin A1c (HbA1c) LDL Cholesterol Blood pressure, Fasting lipids	109/118 participants completed study. VA-MEDIC (n = 58) participants were younger and had greater tobacco use at baseline than usual care but similar in other cardiovascular risk factors. After 4 months, a greater proportion of VA-MEDIC participants versus controls achieved an A1C of less than 7% and a systolic

Study	Outcome Measures	Results
	Target goals in Tobacco use recommended by the American Diabetes Association.	blood pressure less than 130 mm Hg. No significant change found in lipid control or tobacco use between study arms.
Taveira (2011) [71]	Haemoglobin A1c (change in the proportion of participants who achieved an A1C <7% at 6 months) LDL Cholesterol Hospital Admissions Emergency Department Visits	Compared to standard care (n = 44), a lower proportion of patients in VA-MEDIC-D (n = 44) had systolic blood pressure (SBP) <130 mm Hg at baseline, but similar in other cardiovascular risk factors and psychiatric comorbidity. Change in proportion of participants achieving an A1C <7% was greater in the VA-MEDIC-D arm than in the standard care arm (29.6% vs 11.9%), with odds ratio 3.6 (95% CI 1.1 to 12.3). VA-MEDIC-D participants also achieved significant reductions in SBP, low-density lipoprotein cholesterol, and non-high-density lipoprotein (HDL) cholesterol from baseline, whereas significant reductions were attained only in non-HDL cholesterol with standard care. No significant change in depressive symptoms for either arm.
Trento (2001) [72]	Haemoglobin a1c Total Cholesterol Systolic blood pressure Diastolic blood pressure	After 2 years, HbA(1c) levels lower in GV patients than in control subjects (P < 0.002). Levels of HDL cholesterol had increased in patients seen in groups but had not increased in control subjects (P = 0.045). BMI (P = 0.06) and fasting triglyceride level (P = 0.053)

Study	Outcome Measures	Results
	Costs Knowledge of diabetes Quality of life	were lower. GV patients had improved knowledge of diabetes (P < 0.001) and quality of life (P < 0.001) and experienced more appropriate health behaviours (P < 0.001). Physicians spent less time seeing 9-10 patients as a group rather than individually, but patients had longer interaction with health care providers.
Trento (2002) [73]	Haemoglobin a1c Total Cholesterol Systolic blood pressure Diastolic blood pressure Costs Knowledge of diabetes Quality of life	Observation times were 51.2+/-2.1 months for GV and 51.2+/-1.8 for CGs. Glycated haemoglobin increased in CG but not in GV patients (p<0.001), in whom BMI decreased (p<0.001) and HDL-cholesterol increased (p<0.001). Quality of life, knowledge of diabetes and health behaviours improved with GV (p<0.001, all) and worsened among CG (p=0.004 to p<0.001). Dosage of hypoglycaemic agents decreased (p<0.001) and retinopathy progressed less (p<0.009) among the group care patients than the control subjects. Diastolic blood pressure (p<0.001) and relative cardiovascular risk (p<0.05) decreased from baseline in group patients and control patients alike. Over study period, GV required 196 min and 756.54 US dollars per patient, compared with 150 min and 665.77 US dollars for CG patients, resulting in an

Study	Outcome Measures	Results
		additional 2.12 US dollars spent per point gained in the quality of life score.
Trento (2004) [74]	Knowledge of diabetes, Problem solving ability Quality of life, Haemoglobin a1c BMI HDL cholesterol.	Knowledge of diabetes and problem solving ability improved from year 1 with group care and worsened among control subjects (P<0.001 for both). Quality of life improved from year 2 with group care but worsened with individual care (P<0.001). HbA1c level progressively increased over 5 years among control subjects (+1.7%, 95% CI 1.1-2.2) but not group care patients (+0.1%, -0.5 to 0.4), in whom BMI decreased (-1.4, -2.0 to -0.7) and HDL cholesterol increased (+0.14 mmol/l, 0.07-0.22).
Trento (2005) [75]	Haemoglobin A1c Total Cholesterol quality of life knowledge of diabetes, health behaviours circulating lipids. Differential costs to the Italian National Health System and to patients	After 3 years, quality of life improved among patients on group care, along with knowledge and health behaviours (p<0.001, all). Knowledge added its effects to those of group care by independently influencing behaviours (p=0.004) while quality of life changed independently of either (p<0.001). Among controls, quality of life worsened (p<0.001) whereas knowledge and behaviours remained unchanged. HDL cholesterol increased among patients on group care (p=0.027) and total cholesterol

Study	Outcome Measures	Results
		decreased in the controls ($p<0.05$). HbA1c decreased, though not significantly, in both. Direct costs for group and one-to-one care were Euros 933.19 and Euros 697.10 per patient, respectively, giving cost-effectiveness ratio of Euros 19.42 spent per point gained in the quality of life scale.
Wagner (2001) [76]	Haemoglobin a1c Total Cholesterol Hospital Admissions Emergency Department Visits Costs Process of care received Satisfaction with care, and the health status of each patient.	In intention-to-treat analysis at 24 months, IG received significantly more recommended preventive procedures and helpful patient education. Of five primary health status indicators, two (SF-36 general health and bed disability days) significantly better in IG. IG patients slightly more primary care visits, but significantly fewer specialty and emergency room visits. Consistently positive associations between number of chronic care clinics attended and patient satisfaction and HbA1c levels.
Yehle (2009) [31]	Heart Failure Knowledge Test Self-Care Heart Failure Index	From baseline to 8 weeks, Heart Failure Knowledge Test scores improved more for IG than CG ($P = .038$). No difference in groups' rates of change on the total Self-Care Heart Failure Index.

Table 17- Quality assessment of RCTs

Study Identifier	Cochrane risk of bias (low, high, unclear)	Did study address clearly focused issue?	Trials: Was assignment of patients to treatments randomized?	Trials: All patients entering trial properly accounted for at conclusion	Trials: Patients, health workers and study personnel 'blind' to treatment?	Trials: Groups similar at start of trial?	Trials: Aside from experimental intervention, groups treated equally?
CLANCY Clancy (2003) [47] Clancy (2003) [48] Clancy (2003) [49]	High	Yes	Yes	Yes	No	Yes	Yes
CLANCY Clancy (2007) [50] Clancy (2007) [51] Clancy (2008) [52]	Low	Yes	Yes	Yes	No	Can't Tell	Yes
Cohen (2011) [53]	Low	Yes	Yes	Yes	No	No	Yes

Cole (2013) [54]	High	Yes	Yes	No	No	No	Yes
Coleman (2001) [55]	Low	Yes	Yes	Yes	No	Yes	Yes
Dorsey (2011) [58]	Low	Yes	Yes	Yes	No	Yes	Yes
EDELMAN Crowley (2013) [57] Crowley (2014) [56] Edelman (2010) [59]	Low	Yes	Yes	Yes	Yes[1]	No	Yes
Graue (2005) [60]	Low	Yes	Yes	Yes	No	Yes	Yes
Griffin (2009) [61]	High	Yes	Yes	No	No	No	Yes
Gutierrez (2011) [62]	Unclear	Yes	Yes	Can't tell	No	Can't tell	Can't tell
Junling (2012) [63]	Low	Yes	Yes	Yes	No	Yes	Yes
Liu (2012) [64]	High	Yes	Yes	Yes	No	No	Yes
Naik (2011) [65]	High	Yes	Yes	No	No	Yes	Yes
Ratanawongsa (2012) [66]	Unclear	Yes	Can't Tell	Can't Tell	No	Can't Tell	Yes
Sadur (1999) [20]	High	Yes	Yes	No	No	Yes	Yes
SCHILLINGER	Unclear	Yes	Yes	Can't Tell	No	Can't Tell	Yes

Schillinger (2008) [67] Schillinger (2009) [68]							
Scott (2004) [69]	High	Yes	Yes	Can't Tell	No	Yes	Yes
TAVEIRA Taveira (2010) [70] Taveira (2011) [71]	High	Yes	Yes	No	No	No	Yes
TRENTO Trento (2001) [72] Trento (2002) [73] Trento (2004) [74]	High	Yes	Yes	No	No	No	Yes
TRENTO Trento (2005) [75]	High	Yes	Yes	No	No	No	Yes
Wagner (2001) [76]	High	Yes	Yes	No	No	Yes	Yes
Yehle (2009) [31]	High	Yes	Yes	No	No	Yes	Yes

[1]Research assistant completing outcome measures blinded to group assignment. Patients and care teams running GMCs not blinded to treatment group assignment

Narrative summary of study quality

The review of RCTs included 32 papers reporting 22 trials. The quality of included RCTs was assessed using questions relevant for RCTs and from these responses a Cochrane risk of bias was determined for each study (Table 17). Of the 22 trials, 11 studies were categorised as having a low risk of bias, 9 studies were categorised as having a high risk of bias and 2 studies were categorised as unclear. The large number of studies with a high risk of bias means that any conclusions based on these trials should be treated with caution. The discussion on the quality of the RCTs will begin by discussing general problems with the studies then considered the groups of studies with a low, high and unclear risk of bias.

A key problem for all these studies is the possibility of selection bias having impacted on the results. All studies included patients who chose to participate in group clinics. Patients who wished to participate in group clinics are likely to give more positive results on self-reported outcomes. Additionally, a patient's choice to be involved may indicate greater concern about improving their condition. As such they may be more motivated to implement suggested changes to their lifestyle thereby improving their clinical outcomes.

Another significant problem with these studies was that it was not possible to blind patients or healthcare personnel to treatment intervention group which could lead to bias. Two studies [59 73] did state that they have researchers blinded to patient's treatment groups to measures outcomes. This bias could potentially be more significant with certain outcome measures. Clinical outcomes measures for example, blood pressure, blood glucose would be less likely to be affected by this bias. However, outcome measures around patient satisfaction, self-efficacy, self-reported outcomes or outcomes reported by the team delivering the group clinics could be open to bias. Some studies had doctors treating patients in both the intervention and control group giving the possibility of a'halo effect' [62].

The majority of the studies had only a short follow-up, generally 6 months to 1 year making it impossible to assess the longer-term impact of the interventions. Two of the studies [60; 69] did

have a 24 month follow-up. The eleven studies assigned a low risk of bias [50 51 5355-60 63 68] were generally large well-conducted trials.

13 studies were assigned a high risk of bias [20 47/48 61 64 6569 75 31 76]. One of the studies with a high risk of bias was a pilot study [47 48] with small sample sizes, no blinding, patient selection bias and short-term follow-up. Five of the studies with a high risk of bias [48 61 70 71 73] had patients with different baseline characteristics.

Three studies were given an unclear risk of bias [62 66 67] due to insufficient details of the trials methodology been provided. One of these studies was a pilot study [62].

Study analyses - Condition specific clinical outcomes

Fifteen of the 22 trials included a population with diabetes. By far the majority of the trials (11/22 trials) studied a population with Type II diabetes [47 50 53 54 62 64 65 66 67 70 73]. A further 4 trials studied either a mixed Type I or Type II diabetes population [20] a Type I only diabetes population [60 75] or a population with type 2 diabetes and hypertension [56 57 59].

A further group of studies examined the effects of group clinics in populations with a variety of cardiac problems (Heart Disease/Hypertension [61 63] and Hypertension/Heart Failure [31]). Coleman studied a population with one or more self-reported chronic conditions (e.g., asthma, chronic obstructive pulmonary disease, congestive heart failure, diabetes, and heart disease) [55]. Scott also studied a population with a range of chronic conditions (arthritis, hypertension, difficulty hearing, heart disease, liver disease, and bladder/kidney disease) [69].

Recent years have seen group clinics extended to a wider variety of conditions. Dorsey studied a population with Parkinson's Disease [58] and Seesing has completed six month follow up of a population with chronic neuromuscular disorders [91].

Diabetes

Eleven of the diabetes trials studied a population with Type II diabetes only [47 50 53 54 62 64 65 66 67 70 73]. Sadur studied a population with either Type I or Type II diabetes [20]. Graue worked with adolescents with Type I diabetes [60] and Trento intervened with a wider Type I diabetes population [72]. In the most recent trial Crowley [56 57] and Edelman[59] intervened with a population with type 2 diabetes and hypertension. Most commonly measured outcomes are Haemoglobin A1c, blood pressure, cholesterol and health related quality of life.

Haemoglobin A1c

We identified 13 eligible trials of group clinic approaches for diabetes [20 49 51 53 57 59 62 65 70 71 72 75 76] that measured Haemoglobin A1c. Several meta-analyses exist for this outcome. In the review for the Department of Veteran Affairs Edelman [18] performed a sensitivity analysis and identified six good quality studies [20 49 59 65 71 93] that demonstrated a significant effect on haemoglobin A1c in favour of group clinics. We excluded one of these studies[93] from our review because of a lack of evidence for clinical input, other than education. The significant effect was not maintained when Edelman [18] included the results from 7 poor/fair quality trials [72 76 75 51 70 62 53]. We identified one additional study with a low risk of bias that examined this outcome measure that had not been included in the two previous meta-analyses [57]. The results of this additional study are difficult to integrate with previous studies because the triallists examined the effect of the complexity of insulin regimens as a possible explanatory factor. Among those using complex insulin regimens at baseline, the Group Medical Clinic (GMC) intervention reduced HbA1c by the study end compared with Usual Care (UC) (21.0%; 95% CI 21.8 to 20.2; P = 0.01). The trialists found no such HbA1c difference between GMC and UC patients using no insulin (P = 0.65) or basal insulin only (P = 0.71) [57].

The same outcome measure was examined by Housden [83] who included ten studies in a meta-analysis [20 49 59 65 67 71 74 75 76 94], seven of which are included in our review. They reported a significant effect of group clinics on Haemoglobin A1c. They included a study by Rygg [94], excluded from our review due to lack of evidence that the intervention involved more than an educational component. Despite the considerable variation in trial quality and in the trials

included by each meta-analysis team it appears that we can be fairly confident that an effect does indeed persist for Haemoglobin A1c. As mentioned in the context of the Edelman meta-analysis [18], integration of the additional study we identified [57] is problematic given that it examined the effects of using complex insulin regimes. However this report[57] originated from the Edelman trial [59] and would not be eligible for inclusion alongside the original report because of the risk of double counting. So neither the meta-analysis by Edelman [18] nor that by Housden [83] is sensitive to the inclusion of the newly retrieved study.

Systolic blood pressure

Five studies had previously been identified examining systolic blood pressure [53 59 70 93 71]. When these five studies were pooled together in a meta-analysis the studies demonstrated a statistically significant effect favouring group clinics [20]. Our review found one additional study[64] published in 2012. Liu found that patients in the intervention group had significant improvements in systolic blood pressure with, on average, 3.72 mmHg fewer increase in systolic blood pressure *(*p=0.04) [64]. This additional trial therefore appears to strengthen the pre-existing evidence finding in favour of a positive effect of group clinics on systolic blood pressure [64]. However one of these trials [93] was excluded from our review because we were unable to ascertain clinician involvement in anything other than an educational role.

Housden [83] also included five studies (only two [48 59] overlapping with the Edelman review [18]) examining the effect of shared medical appointments on systolic blood pressure in diabetes. Across these five trials the overall pooled effect on systolic blood pressure was −2.81 (−6.84 to 1.21). Four included studies [68 71 72 94] failed to find a significant effect. The pooled effect in both reviews is heavily dependent upon the results from a single study[34]. Furthermore Housden [83] included a trial by Rygg [94] which we excluded due to lack of evidence that the intervention involved more than an educational component.

Diastolic blood pressure

Based on four trials Housden [83] concluded that the effect of shared medical appointments on diastolic blood pressure was non-significant (−1.02 (−2.71 to 0.67)) [68 72 59 94]. These trials included the trial by Rygg [94] which we excluded due to lack of evidence that the intervention

involved more than a simple educational component. We found no additional trials examining diastolic blood pressure as an outcome. The review by Edelman [18] did not examine diastolic blood pressure. We have therefore concluded that, in contrast with systolic blood pressure, shared medical appointments do not demonstrate an effect for diastolic blood pressure.

LDL cholesterol

Based on four previous studies [47 71 70 93] Edelman concluded that shared medical appointments did not have an overall effect on LDL cholesterol [18]. We identified one additional recent study to supplement the pre-existing evidence base [56]. This additional trial reported that by study end, LDL-Cholesterol in group medical clinics was 9.2 mg/dL (P = .02) lower than usual care [56]. Housden did not pool results for LDL choosing only to examine HDL cholesterol and total cholesterol [83]. We conclude that the additional trial is probably insufficient to overturn the previously non-significant result for changes in LDL cholesterol but this has not been demonstrated quantitatively.

HDL cholesterol

Based on 3 studies previously meta-analysed by Edelman looking at HDL cholesterol [18] we concluded that effects of group clinics can be considered non-significant. We did not identify any additional trials to be included in the meta-analysis.

Total cholesterol

Five studies measuring changes to total cholesterol [49 72 75 76 93] had previously been examined by Edelman [18]. They had found no statistical significance for the effect of group clinics. We had excluded one of these studies because we found no explicit mention of other than educational input from the clinicians [93]. We identified one further study [56] to augment the pre-existing data. By the end of the study, mean total cholesterol in group medical clinics was significantly lower than usual care. However this study was not sufficient to overturn the pooled result of the five previous studies. Housden also examined effect on total cholesterol, identifying 3 studies and finding a non-significant effect for the pooled studies [83]. Housden [83] also excluded the study by Trento [93].

Health Related Quality of Life

Three studies of diabetes patients had been previously identified examining disease specific quality of life [72 75 93], two of these were included in our review. When pooled together in a meta-analysis these studies demonstrated a statistically significant effect favouring group clinics[6]. Our review found no additional studies examining disease specific quality of life as an outcome measure. We therefore uphold the previous finding of significance for disease specific quality of life. However it should be noted that (i) that the studies all relate to the work of a particular team and therefore may not be generalizable and (ii) one of these trials was excluded from our review [93] because we were unable to ascertain clinician involvement in anything other than an educational role – one criterion for our definition of group clinics. The study by Gutierrez reported measuring HRQOL, but did not report the outcomes in the study report [62].

Two studies of diabetes had been previously identified examining generic measures of quality of life [76 28]. When these studies were pooled together in a meta-analysis the two studies demonstrated a marginally significant effect favouring group clinics. Our review found no additional studies examining generic measures of quality of life. We therefore upheld the previous finding of marginal significance for generic quality of life.

Other Outcomes

Previous reviews have examined the effect of group clinic type interventions on body mass index (4 included studies); weight (3 included studies) and triglycerides (3 included studies). We identified no additional studies for these outcomes. None of these outcomes were found to be statistically significant.

Outcome Intervals

Examination of the results, even for the largely significant Haemoglobin HBA1c. outcome measure appeared to reveal that the effect of the group clinic intervention was not sustained over a longer period of time. This sub-analysis requires further investigation. However as illustrated in Table 18 results that are significant up to 12 months are less likely to have a continued effect after this time period. It should however be noted that the included studies

make no allowance for trial quality and the table is based only on the availability of the data. Nevertheless more research is required on the longer term outcomes of group clinic interventions. It would be unwise to assume that the initial impetus of a group clinic intervention is sustained over longer periods of time as, based on the experience with group education diabetes sessions, commitment, enthusiasm and engagement with the programme are likely to decay.

Table 18 - Outcome Intervals analysed by time (Illustrative analysis)

	0-3 months	4-6 months	6 months-one year	13-24 months	> 24 months
HBA1c		≥ 5 mo after randomization: 8.18% in IG and 9.33% in CG (p < 0.0001) [20] At 6 mo: 9.513% in IG and 9.714% in CG; difference not significant [47 49]	At 12 mo: no significant difference (P = 0.432), **except in** patients with highest **HbA1c** (> 7.7%) at baseline (8.2% ± 1.4% in IG v. 8.8% ± 1.4% in CG; P = 0.012) [94] At 1 yr: 8.05% ± 1.40% in IG v. 8.64% ± 1.39% in CG (P = 0.05) [65]	At 24 mo: no difference between groups (7.9% in both groups; P = 0.9) [76]	At 3 yr: 7.88% ± 0.20% in IG and 8.79% ± 1.38% in CG (P = NS) [75] At 5 yrs: 7.3% ± 1.0% in IG and 9.0% ± 1.6% in CG (P < 0.001) [73 74]

Cardiac Problems

A further group of studies examined the effects of group clinics in populations with a variety of cardiac problems. Griffin conducted a prospective, randomized, repeated-measures, two-group, intention-to-treat comparison and survey at a pharmacist-managed anticoagulation clinic in a managed-care ambulatory care setting [61]. Eligible patients were randomly invited to participate in group visits. Of 45 patients who consented to group visits, 28 patients participated for the 16-week study period. No significant difference was detected between patients in the percentage of INR values within the therapeutic range in the group-visit model versus patients receiving individual visits (P = 0.536). Seventy-three percent of INR values for patients who attended group visits were within ± 0.2 of the desired INR range compared with 71.9% of those in the control group (P = 0.994). 79% of group-visit patients were within the therapeutic range at their last clinic visit compared with 67% of patients attending individual appointments (P = 0.225). Group visits were preferred by 51% (*n* = 38) of patients who completed the satisfaction survey. Of 92 patients who declined group-visit participation, 36% indicated that the time of day that group visits were offered was inconvenient. No thromboembolic or haemorrhagic events were documented in either group during the study period.

In a randomised controlled trial of group visits (GV) studying 1024 Chinese patients with hypertension Junling reported an average diastolic blood pressure decrease in the GV groups (1.5 mm Hg), significantly more than in the control groups (0.4 mm Hg) [63]. The study also reported significant differences in favour of the GV group for compliance with medicine, physical activities, and diet, as well as for self-reported health, and self-efficacy also improved significantly [63].

An additional RCT comparing group care with usual care in adults with hypertension was identified [95]. However this study was excluded from our review because group care involved small group educational meetings with physicians and dietitians but no apparent clinical input. According to the CADTH rapid review, which had a broader inclusion of "group care" [82], this RCT [95] reported on fasting blood glucose, blood pressure, lipids, weight and BMI. The

study did demonstrate that compared to control, group care resulted in statistically significant improvement in blood pressure, weight and BMI but more details of the intervention are required to establish its eligibility.

Heart Failure

We identified one RCT that examined heart failure [31]. The status of this study has been questioned in some reviews because the fullest account has not been published in the peer reviewed literature. However the study has been included in a systematic review of group visits for heart failure [84]. The study is small with a short period of follow-up, and many patients dropped out. It is not possible to draw any conclusions on the basis of such limited evidence.

Parkinson's Disease

In a small feasibility study for a randomized controlled trial Dorsey studied a population with randomly divided patients in two groups (12 months of group visits versus regular "one on one" style care [58]. Four group visits were administered over a year, each lasting for 90 minutes. 30 patients and 27 caregivers participated with quality of life not being demonstrably different between the two groups. Although group care was feasible, it did not offer any enhancement to quality of life. A key issue for this study, as with many others, is the number of patients that had to be approached in order to achieve this small sample of 30 patients [58]. Information on reasons why patients decline participation would be helpful in targeting potential beneficiaries.

Chronic neuromuscular disorders

Seesing recently completed a randomized controlled trial of shared medical appointments in patients with chronic neuromuscular disorders [91]. Two hundred seventy-two patients and 149 partners were included. Health-related QOL showed greater improvement in patients who had attended an SMA (mean difference 2.8 points, 95% confidence interval 0.0–5.7, P = 0.05). Secondary outcomes showed small improvements favouring the control group for satisfaction with the appointment (P = 0.01). Neurologists spent less time per patient during the group clinic intervention: mean 16 minutes (range 11–30) vs 25 minutes (range 20–30) for individual appointments.

Older adults

Only two randomized trials have evaluated SMA interventions in older adults with a recent hospitalization or other criteria for increased utilization. Coleman studied a population with one or more self-reported chronic conditions (e.g., asthma, chronic obstructive pulmonary disease, congestive heart failure, diabetes, and heart disease) and measured the effect of the intervention with respect to a range of healthcare utilization measures such as emergency department visits, hospitalisations and primary care visits [55]. Similarly Scott [69] also studied a population with a range of chronic conditions using utilisation measures (e.g. clinic visits, inpatient admissions, emergency room visits, hospital outpatient services, professional services, home health, and skilled nursing facility admissions); measures of patient satisfaction, quality of life, self-efficacy, activities of daily living (ADLs) and patient costs. A further trial, deemed by Edelman [18] as being poor quality, predates our date-cut off having been published in 1997 [92]. The study by Coleman did not include any clinical outcomes and so is discussed under health service utilisation below [55]. We did not find any recent trials studying an older adult population.

In the trial by Scott [69] only participants expressing a strong interest in group care (37% of those eligible) were randomized occasioning significant concerns relating to external validity. Other methodological problems included failure to describe allocation concealment, outcomes assessed without blinding to intervention, and poor specification of outcome measures [18]. SMA visits for older adults were designed in a similar way to the diabetes studies, except that fewer disciplines participated in the clinical teams.

Scott conducted his trial in primary care, in a group-model HMO setting in the United States [69]. The comparison was between SMAs and usual care. The mean age of participants ranged from 73.5 to 78.2 years of age. The most common chronic conditions were arthritis, hypertension, difficulty hearing, heart disease, liver disease, and bladder/kidney disease. The trial by Scott has been rated by our team as possessing a moderate risk of bias [69].

Scott [69] found that patients assigned to SMAs rated the quality of care 0.3 points higher on a 1-to-4 scale than usual care patients did (p=0.048). Scott did not evaluate staff satisfaction using a validated measure nor did he report comparative data on medication adherence [69]. Among strongly motivated participants with a high interest in group visits, Scott [69] reported 2 or fewer visits over 24 months by approximately 25 percent of patients.

Biophysical outcomes were not reported, likely because of patient selection being on the basis of age and health care utilization rather than a particular illness[6]. Scott reported effects on overall health status (via the Likert scale) and functional status using activities of daily living or instrumental activities of daily living; there were no differences in outcomes for any of these measures [69]. Scott reported effects on HRQOL using a 10-point scale [69]. Participants randomized to SMAs rated HRQOL higher at 24-month follow up versus usual care (p=0.002).

Study analyses - Health Service Utilisation Measures

In addition to the biomedical outcomes several health service utilisation measures have been measured in isolated studies. These are not suitable for meta-analysis but these are reviewed together with an assessment of the consistency around results.

Diabetes

Group approaches to diabetes have primarily been evaluated with regard to emergency department utilisation (see below).

Other Conditions

We identified two randomized trials [55 69] that evaluated the effects of group clinic approaches on older adults with high health care service utilization rates. Both studies reported positive effects on patient experience from the group clinic approach (specifically SMAs) compared with usual care. There was no difference compared with usual care for overall health status or functional status. Neither study reported biophysical outcomes. Both trials showed fewer hospital admissions in the SMA groups.

Emergency Department Utilisation

Diabetes

Edelman [18] reports that effects on emergency department visits were reported in five studies [20 47 59 71 76]. Two studies reported significantly lower visit rates [59] or the proportion with an emergency department visit [76]. Rates were not significantly different in the other three studies [20 47 71].

Other Conditions

One study of older adults found that participants in a CHCC group were significantly less likely to make any emergency visit than those in the control group (35% vs. 52%; P =0.003) [55]. After controlling for age, gender, asthma, chronic obstructive pulmonary disease, congestive heart failure, diabetes, heart disease, functional status, and previous emergency utilization, the adjusted risk ratio for a group patient making any emergency department visit compared with a control patient was statistically significant 0.64 (CI, 0.44 to 0.86). Similarly, CHCC participants averaged fewer emergency visits during the 2-year follow-up period than control participants (0.65 vs. 1.08; P =0.005). With regard to the frequency of emergency department use Coleman reports that, over a 24-month study period CHCC participants were less likely to make an emergency visit and also less likely to have made multiple emergency visits (P <0.001) [55].

In another population of older adults Scott showed a statistically significant difference with fewer admissions in the SMA group [69]. SMA visits were also associated with a statistically significant decrease in emergency department visits [69].

Hospital and Outpatient Services Utilization

Diabetes

Edelman [18] identified 5 studies of diabetes group clinics reporting the effect on hospital admissions [59 48 42 71 76]. Four studies reported admission rates involving 603 patients followed from 6 to 18 months. In three of these, admission rates were lower with SMAs, but the result was statistically significant in only one study [42]. The fifth study [76] followed 707 patients for 2

years and reported a statistically non-significant lower proportion of patients with a hospital admission who were randomized to SMAs (16.9% versus 21.0%, p=0.10).

Other Conditions

Coleman also examined the effect of group visits on overall utilization in an older adult population [55]. On average, CHCC participants had fewer hospitalizations (0.44 vs. 0.81; P=0.04) than controls[30]. Primary care visits did not differ between the two groups. However, once the group visits themselves were added to the primary care visits, intervention patients had significantly higher overall outpatient utilization (23.5 vs. 13 visits over 2 years; P<0.01) [30].

Acceptability and Sustainability

A further important consideration with regard to the effect of group clinic type interventions is the progressive attrition of a group clinic cohort over time as one progresses along the pathway of care. We undertook a preliminary analysis using available data to explore indicative types of attrition along this pathway.

Starting with the important area of recruitment to the programme even if levels of recruitment are impressively high (e.g. 80% of eligible patients) this still means that alternative provision, by which we would typically mean an individual consultation plus some type of information provision is still being required by one in every five patients. A recent trial found an enrolment percentage of only 31% [54] - and this was with the prospect of 50% of the patients receiving usual care. Alternatively if group clinics are mandatory as the only type of provision this would yield a significantly large proportion of patients who would be being treated either inappropriately (e.g. those with more complex or more advanced conditions) or with a high possibility of dissatisfaction. Some commentators hypothesise that those patients most likely to opt for group care would include patients with shorter disease durations and those with less severe disease, but this cannot be established from available data.

At the next stage acceptability can be examined through attendance at the clinics. This issue is confounded because the evidence base is unable to determine optimal frequencies, intervals

and intensities for the intervention. For example a patient may attend only half of the scheduled sessions but still receive an "effective dose" of the group clinic intervention. Even taking this factor in account we have encountered figures of 14% of patients attending no visits at all [30]. Again the issue is whether these patients would be picked up by usual care or whether group clinic type provision would result in a significant proportion missing out on care all together. Even assuming a patient attends some of the scheduled sessions, and that this actual number of sessions still constitutes an active dose, there are still issues of inefficiency if large numbers of available slots are unoccupied. An alternative is to overbook, as with appointment systems, but this in turn may cause problems (e.g. accommodation, scheduling of individual meetings, suboptimal staff to patient ratios etcetera) if all eligible patients turn up for a particular session. Indicative figures suggest that between 12% [63] and 22% [59] of patients miss one session with many more missing more than this. Of course this must be compared with figures for attendance at individual consultations. Furthermore Junling separately analysed attendance for the first three months and then the next six months and found that the percentage of those missing one session increased from 12% to 16% [63]. Barriers to attendance include transportation difficulty, hospitalizations, transferring clinics, and scheduling conflicts [65]

Next there is the issue of how many patients will continue with the intervention. Unfortunately for this issue only limited data is available, relating to short term attendance. Cole found that 80% remained at 3 months, and only 69% completed the 1-year assessment [54]. Of course much more critical would be the corresponding figures for continuation over three to five years. Housden signals the absence of long term evaluations of group clinic type interventions:

> "Fifteen of the 26 studies were 12 months or less in duration, and 6 studies were up to 2 years in duration. The study with the longest duration followed patients for 5 years after the intervention. Therefore, the long-term or sustainable outcomes of group medical visits are unclear" [83]

Evidence from group education sessions suggests that patients "satisfice" [96] with the information they have already received and once they have attained perceived benefits of the group intervention they are correspondingly less motivated to continue to attend. Certainly the evidence examined for this review indicated that less experienced patients were more likely to want to continue with the intervention than those with greater knowledge and personal resources relating to their condition [97].

Finally even where patients have adhered to treatment during a carefully prescribed trial period this does not mean that they would continue outside the limited time period of the experiment. Significantly, in a group clinic for parents and adolescents, when asked about their views of the group clinic approach having experienced the intervention 66% of parents returning the questionnaire would join a GMA in future and 87% would recommend a GMA to other patients. For the adolescents, 46% would join a future GMA [97]. With either a third or over a half of participants preferring not to join a group medical intervention outside of an experimental period this approach does not appear well suited for mainstream provision of chronic disease management.

These limited insights from available data suggested to the review team that circumstances under which a group clinic intervention might be more successful are:

1. During an initiation period for a particular condition over a time period as determined by both patient and clinician.
2. For a potentially time-limited circumstance (e.g. during preparation for bariatric surgery for obesity)

Outside of these circumstances a model that involves periodic booster sessions may prove more effective and acceptable than the implied life long monitoring of the condition within a group dynamic. This also raises the issue of alternative formats for such refresher sessions – for example using internet virtual technologies for the socialisation and facilitated interactions. We return to these issues in the Discussion chapter.

Summary of main findings from RCTs

In summary, findings from a total of 33 RCTs, of which almost half are considered to possess a low to moderate risk of bias, indicate that biomedical outcomes (e.g. blood pressure and glycated haemoglobin, specifically within the disease context of hypertension and diabetes) are most likely to be significantly affected by group clinic type interventions,. However this is by no means the case for all such outcomes. One of our clinical advisers suggests that factors affecting modification of blood pressure and glycated haemoglobin are multifactorial and are therefore correspondingly more likely to respond to a complex, multifactorial intervention such as a group clinic. In contrast measurements such as cholesterol are affected by less complex health choices for which a group intervention may be less appropriate. The reasons for this difference in results across biomedical outcomes require further investigation.

Where such effects to be demonstrated conclusively, these would be of important clinical significance. As Housden states:

> "Small decreases have … substantial clinical impacts: a 1.0% reduction in HbA 1c may be associated with a 37% decrease in microvascular complications, up to a 14% reduction in the incidence of myocardial infarction and a 21% decrease in the risk of death from diabetes" [83]

In moving away from easily monitorable and measurable outcome measures it becomes increasingly more challenging to demonstrate a causal effect. For example disease-specific health related quality of life demonstrates a significant effect (albeit from only three RCTs) whereas generic health related quality of life (measured in two RCTs) at a further level of abstraction is only marginally significant. The most recent systematic review and meta-analysis, including only SMAs within a diabetes context [85], concludes that published examples were so heterogeneous as to yield genuine uncertainty about which elements of the intervention make an SMA intervention successful. Furthermore issues concerning acceptability and sustainability have been raised from the trial evidence and require further

exploration. These issues are explored in the following sections examining qualitative, UK-centric and theoretical aspects of the group clinic type of intervention, respectively.

3d Results of the qualitative synthesis

Characteristics of qualitative studies

The review identified 12 qualitative papers [25, 98-108] reporting 10 studies (See Table 19). Seven of the ten studies were conducted in the United States with one each from the UK, Netherlands and Canada (three papers). Four studies explored SMAs, and 1 examined DIGMAs. The remainder comprised Group Medical Visits (2 studies, 4 papers) and Group Clinics (n = 3).

Characteristics of surveys

In addition, the review identified four surveys [97, 109 –111] to be used to corroborate findings from qualitative evidence. Three of the surveys were conducted in the United States with the remaining survey from the Netherlands (See Table 20). Two surveys explored Group Medical Appointments and one survey examined DIGMAs. Jhagroo [110] reported an adaptation of 3 models: the DIGMA, cooperative health care clinic and physical shared medical appointment. As quality assessment of surveys is problematic these papers were not critically appraised and data was only used to triangulate findings, not to generate themes.

Table 19 - Intervention Label and Country for Included Qualitative Studies

Author (Year) Ref Id	Model	Country	Size and Nature of Sample	Disease/ Condition
1. Asprey (2012) [98]	Group Clinic	UK	16 patients and 4 nurses	Osteoarthritis
2. Capello (2008) [99]	DIGMA	USA	Random sample of 30 completers and 7 non-attenders	Hypertension
3. Cohen (2012) [100]	SMA	USA	17 veterans	Overweight/ obesity, metabolic assistance and smoking cessation.
4. Hroscikoski (2006) [101]	Group Clinic	USA	45 organizational leaders, external and internal change leaders, midlevel clinic managers, medical and administrative clinic leaders, front-line physicians, and nurses (53 persons).	Diabetes
5. Kirsh (2009) [25]	SMA	USA	23 Medical Students – 12 in SMA Group; 11 in Control	Non Specific Chronic Disease

6. Lavoie (2013) [102]	Group Medical Visit	Canada	34 providers and 29 patients	Most common conditions: diabetes (59%), high blood pressure (52%), and arthritis (48%)
7. McCuistion (2014) [103]	SMA	USA	12 medical & admin staff	Non Specific
8. Mejino (2012) [104]	SMA	Netherlands	46 Patients	Type 1 Diabetes
9. Miller (2004) [105]	Group Medical Visit	USA	28 women with at least one chronic disease	Non Specific
10. Ovbiagele (2010) [106]	Group Clinic	USA	13 Spanish-only speaking participants; 6 caregivers; 11 care providers and 9 administrators.	Stroke
11. Piper (2011) [107]	Group Medical Visit	Canada	9 patients	Chronic disease
12. Wong (2013) [108]	Group Medical Visit	Canada	63 participants. 10 family physicians; 7 nurses; 2 nurse practitioners; 4 PHC coordinators; 11 other allied health workers (e.g. nutritionists, social workers, medical	Diabetes, Depression, Smoking Cessation

			office assistants and community health representatives) and 29 patients.	

Table 20 - Intervention Label and Country for Included Surveys

Author (Year) Ref Id	Model	Country	Size and Nature of Sample	Disease/Condition
1. Hirsh (2001) [109]	DIGMA	USA	32 patients	Endometriosis
2. Jhagroo (2013) [110]	Adapted 3 models: DIGMA, cooperative health care clinic and physical shared medical appointment	USA	112 patients (51+/-14 years, range 19 to 87) seen in 27 SMAs over 14 months	Kidney stones
3. Lock (2012) [97]	Group Medical Appointment	Netherlands	38 parents (72%) and 14 adolescents	Haemophilia
4. Trotter (2012) [111]	Group Medical Appointment	USA	122 patients	Breast Cancer

Comparison of the distribution of clinic models from the effectiveness literature with that from the qualitative literature reveals that the principal models of group clinic type approaches are all well represented.

Eight qualitative studies [112 – 119] were excluded from the qualitative synthesis as they were only available as conference abstracts. However three abstracts [112 118 128] relate to UK initiatives and so are examined further in the review of UK practice below.

Study populations and settings

We identified a total of twelve qualitative studies of group clinic type interventions. One third of these (four studies) examined the attitudes of patients only. One study [97] explored the views of patients and carers and four studies investigated both patients and health care providers [98 101 102 108]. One study investigated the views of providers in isolation[103] and one study included views of providers, patients and caregivers [106]. A final study examined the views of students regarding SMAs as an educational experience [25]. The quantitative review had revealed a complete absence of measurement of provider experience in the included studies. The qualitative evidence base clearly has an important part to play in addressing the wider acceptability of the group clinic intervention within a healthcare delivery system [76].

Quality of included qualitative studies

Table 21 - Study Design and Overall Study Quality of Included Qualitative Studies

Author (Year)	Country	Study Design
Asprey (2012) [98]	UK	Semistructured interviews
Capello (2008) [99]	USA	Semistructured interviews
Cohen (2012) [100]	USA	Focus Groups
Hroscikoski (2006) [101]	USA	Semi-structured interviews
Kirsh (2009) [25]	USA	Interviews
Lavoie (2013) [102]	Canada	In-depth Interviews
McCuistion (2014) [103]	USA	Audio recorded key informant interviews
Mejino (2012) [104]	Netherlands	Questionnaires and online focus group
Miller (2004) [105]	USA	Open-ended interviews
Ovbiagele (2010) [106]	USA	Focus groups and interviews
Piper (2011) [107]	Canada	In-depth interviews
Wong (2013) [108]	Canada	Interviews and direct observation

One study [103] was not available by completion of report. For full version of quality assessment criteria please see Appendix 9.

Table 22 - Quality Assessment of Included Qualitative Studies

Author (Year) {Ref Id /id}	Overall Risk of Bias Assessment	Statement of Aims	Methodology Appropriate	Design Appropriate	Recruitment	Data Collection	Relationship	Ethical Issues	Data Analysis	Findings
Asprey (2012) [98]	Low Risk of Bias	✓	✓	✓	✓	✓	X	✓	✓	✓
Capello (2008) [99]	Moderate Risk of Bias	✓	✓	✓	✓	?	X	✓	?	?
Cohen (2012) [100]	Low Risk of Bias	✓	✓	✓	✓	✓	X	✓	✓	✓
Hroscikoski (2006) [101]	Low Risk of Bias	✓	✓	✓	✓	✓	✓	?	✓	✓
Kirsh (2009) [25]	Low Risk of Bias	X	X	X	✓	✓	X	✓	✓	✓
Lavoie (2013) [102]	Low Risk of Bias	✓	✓	✓	?	✓	X	✓	✓	✓
Mejino (2012) [104]	Moderate Risk of Bias	✓	✓	?	?	✓	?	✓	?	✓
Miller (2004) [105]	Low Risk of Bias	✓	✓	✓	✓	✓	✓	?	✓	✓
Ovbiagele (2010) [106]	Low Risk of Bias	✓	✓	✓	✓	✓	?	?	✓	✓
Piper (2011) [107]	Moderate Risk of Bias	✓	✓	?	?	✓	?	✓	?	✓

Wong (2013) [108]	Low Risk of Bias	✓	✓	✓	✓	✓	✓	?	✓	✓

NB. One study [103] not available by completion of report.

Population of the conceptual framework

We extracted qualitative data against the elements of the analytical conceptual framework[13] (Figure 2), deconstituted into fields on a data extraction form (See Appendix 7). The Best Fit Framework approach provides for inclusion of additional inductive elements once the deductive stage of the synthesis is completed. The qualitative data yielded six principal themes as presented below. However much of the data has been extracted from one particularly rich qualitative study [102] and therefore may represent views that are not necessarily typical of the study populations across all the included qualitative studies. 8 richer studies were particularly influential in populating the conceptual framework and subsequent synthesis [97 98 99 100 102 103104 112]

PURPOSE or MISSION of Group Clinics/Group Medical Visits

INPUTS or RESOURCES	ACTIVITIES	OUTPUTS	EFFECTS (Outcomes, impacts)
Clinicians	Individual Consultations	Patient Participation	Short-term
Support Staff	Group Facilitation		Adherence
Premises	Peer Support		Biophysical Markers
Training	Information Provision		Patient Satisfaction
Equipment	Education		Mid-term
CONSTRAINTS or BARRIERS to Group Clinic objectives	Socialization		Self Efficacy
Accessibility	Self Monitoring		Longer-term
Confidentiality			Self Management
Privacy			Better Disease Control
			Reduced Utilization

CONTEXT or CONDITIONS of Group Clinic Initiatives

Patient Characteristics

Health Care System

Figure 2 - Analytic framework to evaluate group visits [13]

Findings 1: Feeling Supported

A common finding was that the group environment offered individuals an opportunity to derive support from others in a similar or comparable position to themselves. Such support could be accessed during the initial socialisation sessions or, subsequently, when engaging in group education or interaction with clinicians.

There was some evidence to suggest that this feeling of being supported subsequently led to a sense of security.

> You gain; I think you gain a feeling of security, of understanding, of sharing with other people, of compassion, of support… so many things that you wouldn‘t gain if you were one on one because of the humanity of us as people. You know we try to support one another [107]

Within such a climate of trust patients were more likely to share information within the group. This in turn affected the cohesion and a feeling of community within the group, described by one author as an “esprit de corps” [100].

The need for feeling supported is illustrated by one extract which attests to the feeling of isolation a patient may feel if they are not receiving necessary support from either partner (husband) or doctor:

> You‘ve got a group that can back you up…understanding what you‘re going through…if I tell my husband oh my blood sugar is 2.4 today, he says…well you better take some insulin,‘…he hasn‘t really bothered to even read about it…he‘ll get irritated with me. Well that‘s the last thing you need [107].

Findings 2: Learning from each other (Reciprocal learning)

A notable finding from the qualitative research studies was that the group setting offered a context within which individual group members could learn from the clinicians, where they could learn from other group members and, significantly, where the clinician could learn from the group members. This last finding was one of a number that signalled at a shift in the power differential from the clinician dominance of the one-to-one consultation. This important consequence of group clinic approaches is explicitly highlighted by several commentators:

> Overall, the power dynamic between patient and physician was lessened as the patient now viewed themselves as being able to impart information to the physician[103].

Learning from clinicians

Improved learning from clinicians was frequently identified as a benefit from group approaches: "enhanced learning by being able to cover more information than what would be provided in a traditional visit" [103].

Such enhanced learning was expressed in both qualitative and quantitative terms. Piper charts a move from an information flow that aligns with the power dynamic towards something more dynamic, and ultimately more creative:

> The learning in the GMVs occurs from the shared experiences of participants and the medical expertise of the physician and the other health care providers. The loose boundaries created changed the typical linear exchange of information from authority to client to a circular flow of questions and answers… [107]

Learning from other group members

Sharing of information with other members was viewed as a form of social bartering by which they could affirm their membership of, and value to, the group:

> Many participants spoke about the satisfaction of sharing their knowledge of living with a chronic illness. Sharing…acknowledged their personal experience and it was

> hoped that they would be able to help others in managing their chronic condition: —You learn from other people and hopefully they learn something from me. [107]

The emphasis is on what is described as "reciprocal learning":

> You feel you'd like to share with a group because you think that they can learn from this problem as well as you can learn from their problems. [107]

In addition to problem solving sharing includes the experience of the disease as well as practical tips for self management:

> Learning what other veterans had experienced and "tips" on chronic disease self-management provided a much needed perspective for many.

A powerful vignette of the practical value of group based interactions is evoked in the context of a UK-based acupuncture clinic:

> "Somebody perhaps will go swimming, so they'll say, "This was a nice swimming pool and it was easy to get to" so it sort of spreads into all sorts of things…which you wouldn't actually have if you were sat on your own in a cubicle" Woman in her 50s [98]

Clinician learning from group members

The group situation may encourage clinicians to acquire a greater understanding of what life with a chronic condition is like for their patients.

> "Yeah, they learn things they wouldn't have learned in one on one, and I could see that. …. Dr. [name] admitted it even in front, to everybody the other day. He said that more than once that he's had revelations that he would not get from one-on-one visits". [107]

In addition to learning that may equip a provider to demonstrate more empathy and understanding there was some evidence of more instrumental learning:

> "It [the GMV] has helped me to be more creative in looking at ways to meet people's needs. Some of that just comes from the patients themselves because they often have some really neat ideas about how to overcome challenges or difficulties in dealing with the diabetes" Provider [102]

Such suggestions simultaneously become a resource to the group at that time but also a future resource for use by the provider:

> "they've given me some really good tips and ideas.,,,stuff I learned that I wouldn't have learned if I had done it on an individual basis. There's a lot of value that comes out of…impromptu patient teaching of each other " Provider [102]

Indeed a clinician's willingness to learn did itself acquire a symbolic function as a contributing factor to improved trust in the clinician-patient relationship:

> Being emotionally present allowed the physician to listen and to be genuine in trying to understand life with a chronic condition: ―I trust him [doctor] more when I see that he's open to learning and figuring out new things that are only happening in group dynamics. [107]

Findings 3: Legitimising question answering

A group clinic environment may represent a less intimidating clinical context for patients who are more reticent. Safety, and indeed strength, in numbers may be perceived as an antidote to the power imbalance experienced when a patient encounters a clinician on a one-to-one basis.

A safe environment

The idea of a safe haven, both as a protection and as a source of encouragement is expressed by several participants.

> I let the physician dominate me a little more in a one-on-one situation than…in a group situation. I'm more likely to open up in a group… because there are witnesses….a doctor is less likely to be verbally abusive or mistreat me when there are other people watching and listening… [102]

Surrogate question answering

Wider evidence suggests that patients will often be reluctant to ask questions within a one-to-one consultation. Within a group context they may find that a more active participant is more able to vocalise their own concerns. Patients therefore become vicariously exposed to information that would not otherwise be forthcoming.

> And sometimes if you're a little too timid to ask the questions maybe someone else will ask them for you. So that's one of the benefits of the group, of course, is the fact that there are a number of people there up to twelve or thereabouts [102].

Encouragement from others

Provided the group is sufficiently informal, cohesive and relaxed and, importantly, does not add to the stress already encountered from experiencing the condition it can offer a setting that is conducive to relationships and positive interaction:

> "The more relaxed, less-structured environment inherent in GMVs lends itself to meaningful relationship building for participants who might be shy in a one-on-one visit or who might need more time to build a trusting patient-provider relationship ." [102]

Benefits for "Lurkers"

Even if a patient has not formulated a question that they wish to have answered, that might correspond to a question asked by another group member there is some evidence that they can still derive benefit from information being shared within the group:

> Patients reported learning from others' experiences, gaining additional information from their provider based on his/her responses to other attendees' questions…Both

patients and providers also reported that patients felt less intimidated and more secure interacting with PHC providers in a group, thus sharing more health information [102].

Here the analogy is to a virtual discussion list where some feel more comfortable as active participants while others feel equally comfortable at being "lurkers". Indeed these respective roles may be transitory as lurkers ease themselves gently into the group before feeling empowered to pursue their own information agendas.

Findings 4: Structure and Content

We were able to map the qualitative findings on the individual components of group clinics to those aspects of self management (Table 23) identified in the report by Taylor [29].

Table 23 - Components of Self Management as identified from Taylor [29]

Example from Group Clinics	Component [29]
There's a sort of certain socio-educational aspect to it as well, which is supportive…and they'll discuss other therapies such as chondroitin or that sort of thing…there's quite an exchange of information going on. [98]	1. Education about condition and management
The nurses confirmed that this kind of information exchange took place among the patients, including discussions about the advice and treatment they had been given by different healthcare professionals [98]	2.Information about available resources
Empowering Patients in Care (EPIC) - clinician-led, patient-centered group clinic consisting of 4 sessions on setting self-management action plans (diet, exercise, home monitoring, medications, etc) and communicating about progress with action plans [65]	3.Provision of/agreement on specific action plans and/or rescue medication
And, of course, then having their conditions checked. I think there's this level of comfort too for them, they come in, they know they're being seen, they're feeling that they're being really well looked after…. [the GMV] gives them a bit of peace of mind" [102]	4. Regular clinical review
It isn't just me sitting telling you what to do. They hear from their peers which its, people will change doing something, I could tell them ten times and as soon as somebody beside them with the same condition tells them to do it they listen, they do " [102]	5. Monitoring of condition with feedback to the patient
People were still struggling with integrating it into their life, right? I think just understanding those things a little bit better and just to be able to express those things seemed to be helpful, … [102]	6.Practical support with adherence (medication or behavioural)

No illustrative quotations	7.Provision of equipment
A little bit more than just one-on-one, if it's going to be in a group medical visit you might be safer, you might not be probed, poked quite so much " [102]	8.Safety netting
"If you have a group medical visit on a particular subject there's a certain protection there in numbers too, I mean there's probably not going to be a whole lot of 'in your face' and things done to you or maybe even more probing questions." [102]	9.Training/rehearsal to communicate with health care professionals
… there was evidence that participants shared useful information with each other, particularly about managing … on a daily basis: Or someone says "Oh well I find if I lay this way or do that it eases it " and, of course, it all helps everybody…so you're picking up the information"[98]	10.Training/rehearsal for activities of daily living
Patients reported that peer teaching and peer pressure to adopt better self-care strategies were welcomed, and understood as supportive. When such pressures came from providers in a one-on-one CE, the same behavior was portrayed as abusive or threatening. [102]	11.Training/rehearsal for practical self-management
I don't think it's all medical: a lot of it is mindset… it's like football players, they like to hang out with other football players… …you hang out with other people who know what you're dealing with and you can talk to and they know what you're talking about. [107]	12.Training/rehearsal for psychological strategies
"the social aspect of it is important for people, it' s like meeting old friends … they love coming in, having a cup of coffee with their friends and just talking about things. [102]	13.Social support

Forty-two percent of the patients and 76% of the health care providers had the opinion that more information about lifestyle is discussed during an SMA. However, 46.7% of the patients thought that the amount of information provided about lifestyle was similar to that in an individual visit. [104]	14.Lifestyle advice and support

Noticeable from the above mapping process (Table 23) is that group clinics are able to fulfil many of the extended self-management roles that may be required from any clinician-patient interaction. In particular the group context is strong in meeting a need for training/rehearsal of communication with health professionals, for activities of daily living, for practical self management and for psychological strategies, providing a safe environment in which these activities can be modelled. The group setting is able to fulfil some requirements for social support, especially when these needs are not being met by a patient's significant others or by their health professional. However what is missing from the Taylor framework [29] (Table 23) are the functions of "groupness" seen in socialization, a sense of shared experience, modelling of realistic or ideal behaviours and identity through group cohesiveness. Clearly the group clinic approach cannot be conceived simply in terms of its self management function, even though this was a major driver in the origins of group clinics.

Findings 5: Confidentiality and Privacy

One qualitative study in particular [108] focused on issues relating to confidentiality and privacy – a frequently expressed concern in the context of group approaches. Certain protections can be easily instituted such as:

1. Initiating each session with a discussion of confidentiality
2. Setting ground rules with examples
3. Gaining permission for disclosure of particular types of information (e.g. laboratory values).
4. Emphasising that participation in the group is not dependent on sharing of personal information

5. Asking specific consent to share information of a particular patient at times during a session when it is considered potentially valuable as a resource to a group.

This latter approach is described very positively by one participant as a way of allaying initial concerns about attendance:

> But he's [doctor] he's been very good because he, he makes sure each person gives permission for him to relate any information about them. You have to agree. So _do you mind if I talk about your disease or whatever' and you can say yes or no [107].

Reciprocal learning and circular questioning require similar protections and filters in order to protect the confidentiality of those sharing the learning. An elegant example of how the distinction between the contexts of information sharing and confidentiality is presented in a small town context:

> "one provider explained to the group that if he/she learned something about thyroid disease, then this information could be shared with others. The provider went on to tell the group that what was to remain confidential was who 'Mrs. Jones, our neighbor' was the person who has a thyroid condition" [108].

Findings 6: The Life Cycle of the Group

It is interesting to observe different views of the group process depending upon the stage a person was at within the life cycle of the group. These views can be clustered around the three phases of contemplation, initiation, and maintenance of group attendance.

Contemplation

Initially, when the prospect of a group clinic is raised, patients may view this with apprehension. It was not uncommon for participants to express discomfort on contemplating a first visit to a group clinic:

> feelings of apprehension of the unknown, wondering what it would be like to speak about their health status in front of strangers and what it would be like to listen to

> others' stories, fearing judgment by others, and feeling pressured to share their experiences of living with a chronic condition [107].

This initial hesitance is described by one participant:

> I was a bit skeptical at first. I wasn't sure I wanted to sit ensconced in a clinic and learn all about everybody's problems. And then I wondered what it would be like to talk about, it's like showing off your, you know [107].

Participants often need to overcome this barrier by attending at least one session:

> "At first I was wary about this program, but only one visit converted me. It felt warm and friendly vs. clinical, which is exactly what I needed" Breast Cancer Survivor [129]

Initiation

In some cases observing other patients can serve as an antidote to the initial apprehension, as in the case of group visits to an acupuncture clinic:

> I was just a little apprehensive at first, but I saw all the other brave ladies there not flinching or anything, so I thought, "Oh well, it can't be too bad" [98]

In other cases it is the facilitation skills of the provider that can allay such concerns:

> But he's [doctor] he's been very good…it worked out very well but like I say we were a bit skeptical at first, just kind of reticent about it a bit. But after we got going it's, it's really, it's educational actually [107]

The duration of this initiation period is highly variable and personalised:

> Many of the interviewees stated that it only took attending one GMV before they became comfortable with the concept. [107]

The initiation phase was therefore seen as the time when participants were at their most vulnerable – presented almost as a make or break time:

.

> Participants who have attended two or more GMVs could identify the vulnerability in first timers…The first one they come to they're quite quiet…don't ask very many questions, they just listen….as they come to other DIGMAS …they are more relaxed all the time and it works, it's working for them [107]

Maintenance

While the initial visit serves an initial function in allowing participants to understand what to expect more observable benefits accrue with repeated attendance. Participation, and in particular sharing openly, leads to increased self-confidence in understanding their chronic condition, which leads to improved self-management.

One man spoke of how he was able to see personal growth in individual participants that led to improved self-management.

> you can see their growth because you see them willing to take more risk…and be more open within the group. And if that isn't growth, you know, of the individual then growing towards self-management. That's why the group is so great, I mean…it gives you a great feeling [107].

This level of engagement is described by one participant as really getting "into a group":

> And these people are really taking this in and they're helping themselves and they're sharing with you …you don't feel comfortable until you really get into a group and become part of it and then you can [107]

There is some evidence to suggest that the perceived benefits of learning within a group context may diminish over the life of the group as individual patients become more experienced. For example:

> None of the experienced patients reported an increase in acquired knowledge (P < 0.001). In children ‡12 years, all less experienced adolescents reported learning of new aspects of their disease, unlike the 75% of experienced adolescents who reported no learning effect (P = 0.011). [97]

In contrast, other patients observed the importance of being reminded of information that they had previously learned but subsequently forgotten:

> " It helped me remember things that I forgot; I thought it was very informative and I thought I knew all about high BP, but I learned more new things" [99]

Interestingly none of the qualitative studies makes a distinction between an inception cohort-type group (where all members of the group grow together) and a self-replenishing group where new members are continually added. One might anticipate that a self-replenishing group might become frustrating for those who have been with the same group for some time. However this could be mitigated, at least partially, as group members migrate roles from being primarily beneficiaries to becoming primarily donors of information and experience.

Summary of main findings from Qualitative Studies

Clearly socialization played a large part in the group clinic intervention with this factor being mentioned consistently across the qualitative studies. Several respondents mentioned the relaxed atmosphere where they are not afraid to share health issues with others. Linked to this is the role of the clinician as facilitator with the group being cast in the expert role – unless misinformation needs correction [102]. Providers benefit from adopting this communicative role [102] and also learn more about their patients' experience of their condition and their medication than they typically might in a one-to-one setting.

There is some evidence of patients benefiting from role models – not necessarily in the sense of modelling ideal behaviours but often in the sense of conveying a realistic expectation for

what the patients are going through [98]. Such modelling extended to normalization of group behaviours especially with regard to management of their condition.

Information exchange is a key component of the group interaction with patients sharing technical knowledge of their condition, practical suggestions, detail on available resources and their own personal experience. However it is interesting to observe that patients do not adopt a particular role within a group setting. To use the analogy of online forums there are those who are active participants and those who are quite comfortable being "lurkers". Lurkers benefit from information shared within the group. They may also benefit from "information surrogacy" i.e. someone asking a question of concern to them (either serendipitously or because this question has surfaced during socialisation and is then articulated by a more vocal member of the group). This explains why group interventions can be fulfilling for these quite different personality types:

> It seemed intuitively likely that the group situation would be more acceptable to a more gregarious type of personality…the interview data did not support this hypothesis….more private people appeared to be content to read a book or a newspaper or to listen to others rather than to join in… [98]

Adverse Events/Negative opinions

SMAs were not experienced positively by all [104]. One parent indicated that he/she was not informed properly about the purpose of SMAs, which resulted in incorrect expectations. SMAs were also valued negatively by some parents (25%) when patients are present who do not want to participate or when patients do not interact with each other.

Confidentiality

Wong [108] conducted in-depth interviews with 34 PHC providers and 29 patients living in nine rural communities in British Columbia, Canada the team identified three themes specifically related to confidentiality: (i) choosing to disclose: balancing benefits and drawbacks of GMVs, (ii) maintaining confidentiality in GMVs and (iii) gaining strength from

interdependent relationships: patients learning from each other. The study concluded that confidentiality can be addressed and was not a major concern for either patients or providers.

3e Results of the review of the UK Evidence

Characteristics of UK Studies/Initiatives

A total of 12 reports [98 112 117-127] reflecting 9 initiatives within current UK practice were identified from the literature (Table 24). One further UK initiative, a phenylketonuria (PKU) group clinic at Great Ormond Street Hospital [128] was identified from Web searching. Due to the limited volume of UK evidence, information from conference abstracts was included, where the initiative met the inclusion criteria.

Table 24 - Summary of UK Studies/Initiatives

Author (Date)	Type of clinic	Condition	Study Type
ASPREY (2011) Asprey (2011) [112] Asprey (2012) [98]	Group Clinics	Multiple rheumatological conditions	Abstract Only Qualitative
Berkovitz et al (2008) [119]	Group Clinics	Chronic Knee Pain	Audit
Birrell (2009) [120]	Group Clinics	Rheumatoid Arthritis	Abstract Only
Birrell (2010) [121]	Group Clinics	Osteoporosis	Abstract Only
Cummings (2012) [122]	Group Clinics	Chronic Knee Pain	Letter
Da Costa (2003) [123]	Group Clinics	Diabetes	Book Chapter – Case Study
De Valois (2012) [124]	Group Clinics	Breast Cancer	Observational Study
Kay (2012) [125]	Group Clinics	Diabetes	Abstract Only

Raymond (2010) [128]	Group Clinics	Phenylketonuria	Abstract Only
Seager (2012) [126]	SMA	Obesity	Satisfaction Study
White (2012) [127]	Group Clinics	Knee Osteoarthritis	Evaluation
Winfield (2013) [118]	Group DMARD counselling clinics	Rheumatoid Arthritis	Abstract Only

Quality of included UK studies

Although the remit of this report was to identify all published examples of UK group clinic practice this approach can be seen to have had a deleterious effect on quality. Of the 13 identified studies only five [98, 119, 124, 126, 127] could be considered either research or evaluation and so could be formally assessed for quality (Table 25). Four of these were Audits, Service Evaluations or Patient Questionnaires leaving just one observational study [124] (Moderate Risk of Bias) and one good quality qualitative study [98].

Table 25 - Quality of UK group clinic studies

Author (Date)	**Study Type**	**Study Quality**
Asprey (2012) [98]	Qualitative	LOW Risk of Bias
Berkovitz et al (2008) [119]	Audit	HIGH Risk of Bias
De Valois (2012) [124]	Observational Study	MODERATE Risk of Bias
Seager (2012) [126]	Questionnaire Study	HIGH Risk of Bias
White (2012) [127]	Service Evaluation with Cost Savings	HIGH Risk of Bias

Contact with UK advisers

Given the absence of rigorous UK evaluations the review team decided to approach (i) clinicians involved in delivering group clinic interventions and (ii) clinicians delivering care to patients with diabetes as the group most represented by international evidence (15 of 22 RCTs). The team contacted three clinicians (two replies) delivering diabetes care and two academics (two replies) involved in evaluation of a group acupuncture initiative (See Acknowledgements). Clinicians were sent a four page summary of review findings to date as of mid-September 2014. Questions explored with clinicians are reproduced in Box 2.

Box 2 Questions for Consultation with UK Stakeholders

For this consultation we would like you to address the following questions:

1. For clinical experts (e.g. Diabetes) – how might you explain the fact that Group Clinics appear to have a significant effect for Haemoglobin and Systolic Blood Pressure (and indeed for Disease Specific Quality of Life) but not for other biomedical or wider outcomes?
2. To what extent is it feasible to join together clinical consultation and group education activities within a National Health Service context? What are current typical levels of group education provision (i.e. is group education a common part of current service provision?)
3. Could you foresee any potential cost savings from introducing a group clinic approach?
4. Which activities do you see as most appropriate within a group clinic approach? Are there any specific populations for whom a group clinic approach would seem particularly inappropriate?
5. Which type of conditions might be most suited to a group clinic approach?
6. Have you any other observations, relating to the above information or to the topic of group clinics in general, that you would like to share with our review team?

For ease of interpretation observations from these clinical specialists have been integrated as far as possible with relevant findings from the literature (see Study Analyses).

Patient and Public Involvement

The short timeframe for the review and the heterogeneity of group care models, coupled with an overall review strategy that already accommodated patient perspectives from the qualitative and UK research literature, meant that it was not considered feasible to elicit unique perspectives from current or past NHS patients. We accept that had there been more examples of current UK initiatives this could have proved a useful source of additional data. We therefore recommend that any future UK-based evaluations seek to engage patients and the public through robust involvement mechanisms.

Study analyses

What UK models of Group Clinics currently exist?

Table 26 reports the frequency of the terminology relating to group clinics in the UK ordered according to mentions in the UK literature. It is noticeable with regard to terminology that UK initiatives favour the terminology of "group clinic" (Table 26). This tendency may mask the theoretical and philosophical origins of UK initiatives and to make any attribution of potential effectiveness from US-based trial evidence potentially more problematic.

Table 26 - Most frequently described group clinic approaches in the UK

Model (Studies)	**No. of studies**
Group Clinics [98 112 119-128]	9
Shared Medical Appointments [126]	1
Other - Group DMARD counselling clinics [118]	1
No mentions for : Cooperative Health Care Clinic Model; Specialty Cooperative Healthcare Clinic Model; DIGMAs; Chronic Care Clinics; Cluster Visits; Group Medical Appointments; Group Medical Visits; Group Visit.	

How do UK patients feel about group clinics?

Three studies from a related programme of research by Asprey on attitudes to group acupuncture provide some useful insights as to UK considerations for group clinic provision [98 112 127]. In a published abstract Asprey reports that most patients were very positive about the clinics, reporting several benefits, both physiological (reduction of pain) and social (useful support and information sharing with fellow sufferers) [112]. In a more extensive qualitative study by the same author there was a "generally positive and often very enthusiastic attitude towards the group sessions" [98]. Significantly patients took great pains to emphasise the differentness of their own personal experience while drawing strength from being in the same situation. This illustrates that group homogeneity may be considered an artificial construct.

Group interaction can be perceived by some as “idle chitchat” and yet by others as a valuable exchange of advice, support and information. Even though people saw themselves as different from each other they were still interested in other’s experience of treatment especially if it was seen to make a difference. They were also interested in learning how someone who was essentially different and yet who faced the same situation, e.g. difficulties in getting out of bed, coped with their own challenges. However for others the need to be with like-minded people was an important factor in a satisfactory group experience.

One added benefit from the group experience relates to the perception that it will be a forum for sharing experience, this contrasts with the individual consultation where interaction between individuals is limited as they serially follow each other through the consultant’s door. This suggests that certain desired features of the group clinic such as socialisation and information sharing might be harnessed without necessarily utilising the formalised group clinic structure.

An interesting observation from the group acupuncture programme of research is that patient preferences could extend in either direction between what patients received and what they would have liked to have received. Additionally patients were not always able to anticipate accurately what their actual experience of a particular modality might be. There was thus a sense that patients would only truly know how they respond to the situation once they are receiving the modality. For example they may feel that they have very little to contribute within a group situation only to discover that they could provide reassurance to another patient and thus feel good about their role within the group**.** The group dynamic also tended to deflect attention away from the therapist as a single key part of the treatment programme to focus on what the group might collectively contribute through their conversations and interactions.

Finally the reality in a knee osteoarthritis context was that group clinic approaches might be perceived as a delaying tactic as patients were willing to try anything to put off the uncertain prospects of knee surgery for as long as possible. In such a context the altruism that one

might contribute to the group could conceivably be viewed as a post hoc response to make the best of a situation where one is running out of viable alternatives.

Are there any negative reactions to group clinics from UK patients?

One patient from 16 interviewed by Asprey had a negative reaction to the group experience and ceased to attend [112]. No specific details were provided regarding the nature of this reaction. Privacy was not considered to be a problem even in mixed-sex clinics but single-sex clinics were preferred. However, as the authors comment, the condition under study, i.e. knee osteoarthritis, does not carry any specific sensitivities. Concerns expressed related to the intimacy of conversations among women and potential embarrassment relating to physical appearance, as expressed by women or perceived by the men [98]. It was suggested by patient representatives that it would be helpful to forewarn patients of what the procedure would involve before arrival at the clinic, suggesting that they dress accordingly. Although this arises in a specific treatment context this links with other qualitative comments about the importance of communicating realistic expectations of what will happen within the group process.

How do UK health providers feel about group clinics?

Asprey reports that four nurses interviewed perceived benefits of group clinics, both in terms of cost efficiency, the efficacy of the acupuncture treatments and the positive effect of group interaction on their patients [112]. The same author further reports the specific needs, as mentioned by one nurse, to make provision for "Asian ladies", by which the nurse specifically meant Muslim women [98]. Generally single sex clinics were preferred to mixed sex clinics even though the level of physical privacy required for osteoarthritis clinics was not significant. Another population group for whom group approaches may not be an attractive option is those with hearing difficulties who may find it difficult to interact and participate and may not benefit fully from information exchange.

What evidence is there about feasibility or costs?

In an abstract presentation Winfield describes the use of group clinics for DMARD treatment within South Devon [118]. Over a period of 3 months 90 patients were seen in clinic, representing a saving of an average of 2 hours and 40 minutes per week by counselling

patients in groups. The average wait from referral to appointment was 10 days. However the author reports that some patients took longer than this because of abnormal tests or personal issues such as holidays. Levels of patient satisfaction were very high with average scores ranging from 4.6 to 5 out of 5 across the 7 questions in the group clinic and from 4.8 to 5 in the individual clinic. There was minimal variation between the scores given by the 2 groups with the largest variation on whether patients felt confident to start the medication. Here the individual clinic gave an average score of 4.8 with the group clinic giving an average score of 4.6. Winfield concludes that group DMARD clinics allowed them to keep up with demand for clinic slots while freeing up our nurses to undertake other duties [118]. Patient satisfaction was generally maintained across group clinic and individual settings. However the author alerts readers to an ongoing need to address all patient ideas, concerns and expectations.

The group acupuncture setting described by Asprey [98 112] and White [127] involves use of a dual purpose room and a carefully crafted logistic timetable. A single room is used with a single practitioner, present for say 2 hours. Treatment in the group is given in a seated position with about 12 chairs around the room. The very first appointment is different: the patient is seen alone (to establish therapeutic relationship, and in case confidential issues arise), and treated on a couch (in case of fainting, which may occur on first treatment with acupuncture). For convenience, the couch may be in the same room as the group is held in, in which case the initial, individual appointment would take place during specially identified time-slots at the beginning or end of the group clinic. All subsequent attendances are in the group: patients arrive at different times and join the others already there, and are treated by the practitioner in the presence of the other patients.

Two clinical advisers reported unpublished experience from trying to join up the clinical consultation and group education aspects of diabetes care. This attempt had not worked very well as large numbers of patients did not attend and among those who did attend there was a fall off in attendance as the appointments went on. These issues around acceptability and long term sustainability have been previously flagged in the literature and are returned to later in the report. Interestingly an explanation advanced from both clinical advisers from their team

was that group education is currently presented as an optional extra and not an essential part of the treatment. This observation highlights the important mechanisms that engage with the symbolic function of the group clinic**.**

Another concern from the group acupuncture programme of research relates to the spatial implications of delivering services within a group. One participant felt that the presence of equipment for multiple patients within a confined space might impair others' experience of group treatment. Similar considerations may well pertain where equipment and activities relate to monitoring instead of treatment. Again we can conceive that inadequate space may serve as a symbolic, as well as a practical, barrier in that inadequate resourcing of the group clinic premises may be taken as signalling a lack of importance attached to this specific activity**.**

Summary of main findings from UK Evidence

Fourteen papers were identified describing initiatives from the UK. None of these represented experience from rigorously conducted experiments. Descriptions of several initiatives were only available as abstracts. Acceptability of group clinics is high among a population requiring group acupuncture for knee osteoarthritis. However the sensitivity of health and lifestyle topics is not a key issue for this particular population. Even within this context there was an expressed demand for single sex sessions, including in a Muslim population [98]. Patients considered that single sex sessions represented good practice, regardless of specific religious and cultural considerations. A good quality qualitative study from the UK [98] highlighted the importance of situational factors such as a physical space and a flexible appointment system [98]. Patients for whom group clinic sessions may not be as appropriate include those with complex conditions, those with extreme pain [98] and those with hearing difficulties.

It should be noted that the absence of empirical studies from a UK context has led to a disproportionate reliance on the reported experience from UK group acupuncture clinics. Two particular considerations are:

(i) group acupuncture clinics differ from other group clinics because patients arrive with the expectation that they will receive treatment. For group clinics in general treatment and follow-up is more typically contingent on the findings from the monitoring and consultation processes. Potentially patients attending group acupuncture clinics may have stronger motivations for attendance than those attending for routine monitoring.

(ii) acupuncture treatment involves patient downtime (typically at least 20 minutes) as the patient receives treatment. Although the efficiency argument (in terms of number of patients that can be seen by a consultant) is frequently rehearsed in opinion papers the driver for acupuncture clinics may be seen as an example of where a clinical team may be able to "work smarter". Although this driver may be seen to make group acupuncture clinics demonstrably different from other monitoring contexts this may have the potential benefit of showcasing another type of situation that might potentially benefit from group approaches in other disease areas.

Contact with the clinical experts revealed other potentially important issues in that the acupuncturist was not formally trained in, or charged with the task of facilitating the group. As a consequence group interaction is expected to be more organic and less manufactured. Furthermore socialisation, as we have termed it elsewhere in the report cannot really be considered a formal part of the 'programme'. However, potential benefits have been identified where group communication occurs opportunistically such as a) normalisation of symptoms b) sharing of information on resources available c) encouragement to adhere (or more accurately to continue to attend even though improvement may take a few weeks to become noticeable).

Other contextual UK evidence

The review team also accessed a UK-based discussion on group clinics hosted by the GP-UK Discussion list. Several observations from list-members are worthy of note. First one correspondent observed that use of the word clinic in "group clinics" might be considered problematic as it might create an impression of an individual session. This might even remain the case despite the provision of explanatory information to the contrary. Two studies [98] [104],

including one from the UK [98], observed that patients or their carers had different expectations from the group clinic arrangement and this resulted in negative perceptions when these expectations were not actually met.

> There was some evidence…that explanations given by the nurses (as recalled by the patients) were inconsistent and sometimes incomplete, which could cause difficulties….
> *It (mixed sex clinic) wasn't something I was expecting, wasn't something I was told about before I went in…you know we're not all beautiful shapes or whatever, and it's sort of a bit embarrassing (Woman in her 50s)* [98]

And

> One parent indicated that he/she was not informed properly about the purpose of SMAs, which resulted in incorrect expectations [104].

The GP-UK Discussion list also raised concerns about Confidentiality:

> Erectile dysfunction will invariably be discussed in a diabetic clinic and could be a bit of a minefield if you have couples attending. In my experience, ladies are often very forthcoming with stories about their partners to other ladies and poor hubby could be left rather red faced.

This observation highlights that assumptions must not be made about the content of a group discussion simply on the basis of the condition itself – a sensitive condition might engender sympathetic discussion and yet a general condition may equally yield embarrassment. The critical aspect is the dignity of those who are participating not the condition *per se*.

Chapter 4 - Realist Review of Quantitative and Qualitative Evidence

Towards Programme Theory

From a reading of qualitative studies, review and trial evidence the review team developed a large number of candidate programme theories as to how the group clinics might work. In particular we looked for mechanisms by which patients or providers might be motivated to sustain their involvement in a group clinic type approach.

Our initial overarching programme theories are given in Table 27.

Table 27 - Overarching programme theories for Group Clinics

"Label"	**Programme Theory**	**Relevant Theory**	**Clinic Components**
	Patients with Chronic Disease benefit from attending Group Clinics if…		
BY ACTIVITY			
PT1. "Feeling Supported"	**Individuals** gain support from others in the same position as they are, or worse. [102]	Social Support	Group sessions; Socialisation social support
PT2. "Building Trust"	**Individuals** build up relationships with care providers resulting in increased trust, sharing of concerns and responding to advice [102]		Individual and Group Components training to communicate with health care professionals

	Individuals build up relationships with peers resulting in increased trust, sharing of concerns and responding to advice		Socialisation social support
PT3. "Learning By Doing"	**Individuals** model activities in a safe environment that they can subsequently repeat at home	Self Efficacy – Social Cognitive Theory	Group sessions training for practical self-management activities; training for activities of daily living
PT4 "Monitoring as ownership"	By participating in self-monitoring **individuals** experience greater engagement with their self-care		Self monitoring activities
PT5. "Acquiring Problem Solving Strategies"	**Individuals** are exposed to a variety of problem solving strategies from both clinicians and fellow patients. [102]		Group sessions training in psychological strategies
PT6. "Gaining Information"	**Individuals** gain both general and personalised information for self care [98 104]		Didactic Group and Individual Components Information about resources
PT7 "Legitimising Question Asking"	**Individuals** observe and imitate other group members seeking to meet their own information needs [104]	Empowerment Social learning theory	Didactic Group and Individual Components training to communicate with

			health care professionals
PT8 "Information seeking surrogacy"	**Individuals** benefit from questions asked by others on "the group's behalf" [102]		Group sessions Information about resources training to communicate with health care professionals
PT9 "Looking for warning signs"	**Clinicians** can identify individuals who require personalised follow up [102]		Review of Clinical Data; Self Monitoring; Group Sessions monitoring with feedback to the patient
PT10 "Gaining Understanding"	**Clinicians** achieve greater insight into disease experience of their patients		

SYMBOLIC/EMBLEMATIC			
PT11 "Observing a Difference"	**Individuals** are able to observe the impact of self care on their own health and that of group members		Self Monitoring monitoring with feedback to the patient
PT12. "Modelling Positive Behaviours"	**Individuals** observe strategies of fellow patients as role models for their own self care		Group sessions; Socialisation; Specific Action Plans
PT13. "Normalising on Group Behaviour"	**Individuals** identify helpful self care behaviours triumphing over realistic patterns of relapse	Social Norms	Group sessions; Socialisation Specific Action Plans; lifestyle advice and support
PT14. "Signalling Importance"	**Individuals** perceive that self care for their chronic disease is important enough to justify a dedicated initiative		Regular Group Clinic slots
PT15. "Making a Difference"	**Clinicians** gain satisfaction from a more impactful intervention as a change from routine clinics		Group Clinics
PT 16. "Joining Up Care"	**Clinicians and patients** perceive a more joined up team-based approach with potentially greater continuity of care [104]		Multi-professional team working

PT1. "Feeling Supported"

The Group Clinic model allows for support from two main sources – from clinicians and from other patients – to contribute to what has been described as a supportive environment [129]. In theory this dual support should result in an additive effect over that offered by either a one-to-one consultation:

> "I trust him more when I see that he's open to learning and figuring out new things that are only happening in group dynamics " [102]

or from attendance at a peer support group:

> You know we try to support one another, it's kind of human to do that. It's human to have compassion for other people who have problems and you can show that and you can feel that from other people when you're in a group, you don't in isolation. [102]

Support may be verbal or may be the effect of perceived solidarity:

> I was just a little apprehensive at first, but I saw all the other brave ladies there not flinching or anything, so I thought, "Oh well, it can't be too bad" [98]

However other implications for this dual source of support are that patients may access support judiciously and appropriately by deciding between the two sources or they may use the availability of an alternative source of support to compensate, for example, for the perceived inadequacies of support from clinical staff.

> The same behaviors are not portrayed as a problem by patients when coming from peers. Patients reported that peer teaching and peer pressure to adopt better self-care strategies were welcomed, and understood as supportive. When such pressures came

> from providers in a one-on-one CE, the same behavior was portrayed as abusive or threatening. [102]

Of course the availability of both kinds of support requires careful management when misinformation is being given.

PT2. "Building Trust"

Following an effectiveness review for the Veterans Affairs organisation in the United States two experienced researchers, Kirsh & Aron, have undertaken "Theory Driven, Context Dependent Studies of Shared Medical Appointments: A Realist Work in Progress" [131]. They propose that a key mechanism to the success of shared medical appointments is the build up of trust within the peer group. We also found evidence of trust being built up in the relationship of the patient with the care provider:

> I've learned to trust him. I trust him more than I used to and that's important, that bond of trust has to be there." [102]

This establishment of trust with the care provider explains inclusion of group visit interventions in a Cochrane review of interventions to build up trust [86].

PT3. "Learning By Doing"

Kirsh & Aron also identify the importance of "learning in context" [131] . While this is not a complete match to our concept of "learning by doing" it does share mechanisms by which what is being learnt becomes familiar and thereby no longer carries a connotation of anxiety. We consider "learning in context" would more appropriately characterise a home-based intervention. In contrast the type of activities that we characterise as "learning by doing" (e.g. taking blood glucose or blood pressure measurements) within a group clinic setting become familiar from experience and support. Although not by any means a home environment *per se*, the group clinic becomes a "safe environment" where an individual can trial an activity and seek recourse to help before incorporating the activity into their independent self-

management routine. Trialability is considered an important characteristic that impacts upon people's likelihood to contemplate change.

PT4 "Monitoring as ownership"

Fundamental to a group clinic approach, as exemplified by SMAs, is the "combination of witnessed and private individualized interactions between patients and their physicians, as well as an educational component". In the RCT by Edelman [59], pharmacists and physicians developed individualized plans for alterations in medication and lifestyle management, apparently before meeting with the patients themselves. However there is sufficient evidence relating to principles of co-creation to suggest that more effective behaviour modification will result from patients generating their own plans, with a provider simply helping to facilitate. In this context involvement of patients in their own monitoring, particularly where this requires hands-on engagement with monitoring equipment, may be both a practical and symbolic way of getting them to start to engage with their own management.

PT5. "Acquiring Problem Solving Strategies"

The qualitative studies demonstrated a clear role of the group clinics in the context of problem solving. First of all patients were reassured by being placed within a group where people shared the same problems:

> "Well it was quite nice being in the group, because you kind of think, well other people have got the same sort of problems, you're not completely weird!" [98]

Ostensibly problems do not seem to be conceived as problems if they are issues that other participants are themselves having to face on a routine day-to-day basis. However aside from such reassurance there is also a strong line of argumentation regarding the problem solving function of the group clinic meetings:

> Yeah it's beneficial in a group from the point of view you've got someone to talk to, you've got an exchange of ideas or problems or whatever. Whereas if you sit there on

> your own you're basically waiting for the clock to tick round to say, "Well I'm finished now" [98]

Furthermore patients gain reassurance from other patients having their own problems resolved:

> you can follow the other people and you can see what the doctor is doing for their problems … we can see where we 're heading and try to stop it before we get there. We know we're going to get there eventually but we want to slow down getting there [102]

PT6. "Gaining Information"

The gaining of information is seen by many patients as one of the primary purposes for participating in a group situation. This information may relate to the technical aspects of the condition or how a treatment works, it may relate to how people cope practically or emotionally with their condition:

> There was evidence that participants shared useful information with each other, particularly about managing the arthritis on a daily basis:
>
> > Someone says "Oh well I find if I lay this way or do that it eases it " and, of course, it all helps everybody…" [98]

it may relate to facilities or aids that can help to manage the implications of their condition or how to navigate health services or other facilities:

> "They would exchange ideas, their own experiences, how long that they'd had the condition, how, you know, how much support locally they had, or not (laughs) ….often they would say "Which doctor do you see here? My doctor says this," because they might see different consultants in this hospital" [98]

> They'll say, "This was a nice swimming pool and it was easy to get to" so it sort of spreads…. And how the shop-mobility works …all sorts of things, really, which you wouldn't actually have if you were sat on your own in a cubicle [98]

PT7 "Legitimising Question Asking"

Within the context of the group clinic patients may feel more empowered to ask questions than they might otherwise be within an individual consultation. The fact of others asking questions during a group session, together with the potential modelling of how they should (or even should not) be asked, can encourage individuals to feel that asking questions is a legitimate activity. However there is a corollary because people may be discouraged from asking questions either because the topic is not of the type they feel comfortable to share with a group or because they are generally reticent within a group situation. Good facilitation skills are required for the group process so that no question is considered too stupid and that individual contributions are valued by the group. The comparative comfort with which patients may ask questions within the group will also depend upon the comparator i.e. how comfortable they have felt in a corresponding one-to-one situation with a health care provider.

PT8 "Information seeking surrogacy"

There is significant evidence to suggest that, within the time-pressured environment of the individual consultation, patients often forget to ask questions that concern them [132]. Furthermore even if they do remember to ask pertinent questions they often forget the answers that they have been given [133]. Being present when others are asking questions may have several effects:

(i) Someone else may ask a question that addresses an issue that concerns a patient;

(ii) A question asked by someone else may prompt a patient to remember a related question that concerns them.

(iii) The asking of any question by someone else legitimises the question asking process.

(iv) Observing the question asking and response process may provide a less pressurised environment for taking in information relating to the condition.

The corollary to this is that a patient may be deterred from asking a question in a group setting because of the number or characteristics of the other group members, they may consider their question less important, or more trivial, than other questions asked by members of the group and they may become more passive in the role that they choose to assume within the question answering process.

Good facilitation skills are required to elicit questions from patients who may be reticent, to manage the influence of those who are more vocal and to correct misinformation that may arise during the group interaction.

PT9 "Looking for warning signs"

One of the functions of the group clinic from a clinician's viewpoint is that it offers the possibility of unobtrusively observing and monitoring a group of patients and thus of "triaging" those who require specific follow-up. This feature would be particularly important in a model where individual consultation is not universal but where it is reserved for those for whom it is indicated and/or for a selected population of those with particularly complex or heavy requirements. While in practice this type of observation differs little from the observation that might take place within an individual consultation it is interesting to find that it may be framed differently by a participating clinician:

> It [the GMV] creates an environment that is the trickery in medicine- to think people are having a social gathering and you're working the crowd and doing the medical work while they're having a good time, I mean that's optimal [102]

Although the overall impression from this data extract is that the "trickery" is in the patient's best interests and that it is justified by the fact that the patients are enjoying themselves, this type of comment again illustrates the importance of setting initial expectations of how information gathered through the group component of the process will be used.

The same clinician then seeks to explain how such trickery might work:

> there's no fear involved, there's no worry, people are enjoying themselves, it's almost social like and yet there's a team going around getting all the information that needs to be gleaned…that's the secret, so you turn it into a really positive experience for the patients so that's why they want to keep coming back…." [102]

PT10 "Gaining Understanding"

While much of the rhetoric of the group clinic literature relates to efficiency for the provider and improved information and social support for the patient we were able to identify qualitative benefits to the health care professional in terms of their improved understanding of the patient's situation, the constraints of their condition and, specifically issues relating to their medication or wider treatment.

> I think that it [the GMV] has helped me to be more creative in looking at ways to meet people's needs. Some of that just comes from the patients themselves because they often have some really neat ideas about how to overcome challenges or difficulties in dealing with the diabetes. [102]

Furthermore the group clinic interaction also served to enhance provider's skills and awareness:

> Through interaction with patients, providers reported having gained a more advanced communication repertoire, and developed greater self- and situational awareness [102]

PT11 "Observing a Difference"

One of the motivations for attending a group clinic is observing a difference that is perceived to have the potential to make a difference to the participant's own life. Such a difference may be seen in a reduction in unhelpful behaviours:

> A number of the patients mentioned that they had reduced their use of pain killing drugs as a result of participating in the acupuncture clinics:

> I took it upon myself to reduce the medication…I have reduced it by 50% so, you know, that is a big difference, but ultimately I want to not be taking diclofenac at all [98].

In other cases patients may observe a change in their underlying health condition and be encouraged to persist. Observability is considered another characteristic that impacts upon people's likelihood to contemplate change.

PT12. "Modelling Positive Behaviours"

One of the putative mechanisms for effect in a group context is that other group members may model the desired behaviours required from the patient group and therefore participants will adopt the desired behaviour. This is supported at a theoretical level by the various social theories itemised earlier in Chapter 1. We found some empirical data to support this effect. For example:

> …participants specifically mentioned the usefulness of meeting role models—women who were successful in coping with their disease. [126]

> We always know we're not the only one in that boat, when you're in a lot of pain you think, "Oh I don't know, is it just me, am I exaggerating? Is it mental? " like this. And you see how everyone else suffers and how they cope with it.[98]

PT13. "Normalising on Group Behaviour"

Kirsh & Aron identify an important mechanism as "motivation to comply with others" [131]. This corresponds quite closely with our conception of "normalising on group behaviour". A group member can establish a benchmark against which they can critically appraise their own behaviour. While this mechanism is linked with the idea of other group members "modelling positive behaviours", which may then encourage an individual group member to comply with others, there is some evidence that models may exhibit realistic, and hence reassuring, behaviours which might allow a person to aspire to slight but feasible behaviour modification rather than to a more dramatic and thus less attainable change. A potential adverse effect of the concept of the "opinion leader" as such is that the very characteristics that make them

stand out as an opinion leader may be the same characteristics that make their example seem unattainable to an "average" person targeted by a group intervention.

A further issue relates to the implied need for homogeneity within the group in order to harness shared norms and values. This issue, which is apparent in Web based articles, has not been explored in depth in the research literature. It is conceivable that minority interests within the group may be overlooked or neglected and that the minority individual may feel marginalised. Interestingly, in the study by Raballo [130], concepts most used by patients with type 1 diabetes to define group visits were as follows: "Comparing," "Knowledge," "Educational," and "Friendship." In patients with type 2 diabetes, the group visit resonated with: "Friendship," "I feel good," "I like this," "I learn," and "Interesting."

PT14. "Signalling Importance"

As illustrated in the UK evidence (Section 3e) there is data to suggest that one mechanism for engagement relates to signalling to patients, and indeed to clinicians, that the group clinic, and by implication the activities that take place there, are considered important. These "signals" may be literal (i.e. in the communications sent to the patients) or tacit (for example in the premises and activities assigned to the group clinic activity. There is reason to believe that there may be an asymmetrical effect in operation in that negative perceptions of the premises may have a more powerful effect in deterring attendance than positive perceptions of the premises might do in encouraging attendance. However this needs further investigation.

PT15. "Making a Difference"

For clinicians persuasion that group clinics can make a difference is important if they are to contemplate the not inconsiderable organisational and professional adjustments that may be required for successful implementation. The qualitative studies appeared to indicate that clinicians were monitoring whether the group clinic interventions were making a difference and this had a positive effect on their own belief in the intervention. When clinicians witness the achievement of the group clinic approach against an implied inability to engineer change they are moved to contemplate the advantages of the intervention:

> "They will self-manage with the group. It isn't just me sitting telling you what to do. They hear from their peers…people will change… I could tell them ten times and as soon as somebody beside them with the same condition tells them to do it they listen…" [102]

This statement indicates the influence of both observability and relative advantage both important characteristics when someone is contemplating behaviour change.

PT 16. "Joining Up Care"

Group clinics are perceived by some staff as an opportunity to develop shared team approaches to patient care [101]. In a UK context a further mechanism relating to joining up care relates to bringing together the clinical consultation activity and the group education activity that have previously existed separately. Such coordination may result in potential efficiencies but may also be seen symbolically in signalling the impoirtance of a coordinatyed approach to chronic disease management. Joining up care is therefore not simply about bringing the two activities together but emphasising their genuine partnership as activities of complementary importance.

Summary of consideration of theory

Programme Theory

Group clinics can improve outcomes through socialisation, improved information flows and patient self monitoring when:

Health Professionals

- create an atmosphere of trust within which information is freely shared
- encourage patients to take responsibility for management of their own condition
- supply information that is genuinely attuned to the needs of the patients

Patients

- present to the group clinics frequently enough to allow effective monitoring
- do not perceive that group clinics are an inferior option to the one-to-one consultation
- do not have reservations in respect of issues discussed and questions to be answered
- perceive that the needs of partners, carers and significant others are being met appropriately within the group clinic arrangement

It is helpful to consider the process of engaging with Group Clinics as being composed of three key stages:

1. **Contemplation** – patients must feel that Group Clinics are a viable and meaningful alternative to the engrained model of the one-to-one consultation. In an experimental context those refusing to contemplate a group clinic approach will refuse to enter into randomisation. In a service setting patients holding similar views will not participate in such a service.
2. **Initiation –** patients must have the desire and circumstances to start attending the group clinic sessions. In an experimental context those agreeing to participate will submit themselves to randomisation but may not subsequently attend any group clinic sessions..In a service setting an agreement to attend may be overtaken by other circumstances or events.
3. **Maintenance** – patients must experience continuing ongoing benefits from attendance at the group clinics. In essence they construct a temporal balance sheet of "costs" versus "benefits" and, as soon as the balance sheet is perceived to be irredeemably located in the "red" they will no longer attend. Such circumstances may relate to the perceived quality and relevance

of the curriculum, the desirability of the group interaction or the effort taken to attend. It is important that such non-attendance is not solely attributed to "problem patients"; it may equally indicate a lack of flexibility or other suitability of clinic provision. In either a research or a service context such circumstances may be reflected in infrequent attendance, a tapering off pattern of attendance or discontinuation after a certain period of time.

A further consideration, operating at a population rather than an individual level, relates to

4. **Sustainability** – should a clinical team continue to work with an inception cohort of patients for as long as the group remains viable, should they transfer their efforts to a more recent group, assuming that a residual effect will persist in the original group without further intervention, or is the optimal model one of periodic group replenishment with members joining or leaving as their desire and circumstances allow? In this final case, there are challenges associated with group coherence and shared learning although more experienced group members may increasingly become a resource to other members of the group and find this altruistic role an alternative source of fulfilment, prolonging their engagement.

This brief consideration of theory reveals that the question "under what circumstances are group clinics effective for patients with chronic disease conditions" may be constructed around three key issues:

i. Under what circumstances do patients with chronic conditions agree to participate in group clinic approaches?
ii. Having agreed to attend group clinics, why do some patients with chronic conditions decide not to attend any group clinic sessions?
iii. Having started to attend group clinics, why do some patients with chronic conditions discontinue a group clinic programme?

Finally given (i)-(iii) above what is the most sustainable model of group clinic delivery from (a) the ongoing cohort; (b) "out with the old, in with the new", and (c) periodic group replenishment.

We will return to these issues in the Discussion section.

Chapter 5 - Brief overview of Cost Issues and Feasibility

Overview

This chapter first addresses the costs of group clinic interventions before moving on to more general issues of implementation and feasibility. Using information from studies assessing the costs of group clinics and economic evaluations of interventions, this chapter aims to

(i) identify key cost elements of group clinic interventions (i.e. where costs might be incurred or saved as part of a group clinic intervention)

(ii) identify information relating to the actual costs of these interventions (i.e. the costs of establishing and running a group clinic intervention and the savings attributed to a group clinic intervention.

5a Costs

Methods

The methods for this section are found in Chapter Two.

Results of the literature search

The results of the three stage literature search are presented in Table 28. The analysis of costs used 8 studies.

Table 28 - Results of the literature search - Costs

Search	Retrieved and screened at abstract	Screened at full text	Included
Stage One - Identification of papers during screening for study inclusion	6	6	2
Stage Two - Search of Reference Manager Database	1030	17	6
Stage Three - Search of Medline and Embase	100	15 (7 duplicates)	0

Included and excluded articles

The included articles consisted of one cost effectiveness analysis [133], four RCTs with costs included [59] [48] [76] [69] and three cost utilisation analyses [52] [134] [118].

The included studies are summarised in Table 29. Full details from data extraction may be found in Appendix 7.

Table 29 - Summary Table of Cost Studies

Author (Date) [Country]	Type of Study	Condition
Bondonio (2005) [133] Italy	Cost Effectiveness Analysis	Diabetes
Clancy (2003) [48] USA	RCT	Diabetes
Clancy, 2008, [52] USA	Cost Utilisation Analysis	Diabetes
Crane (2012) [134] USA	Cost Utilisation Analysis	Low-Income, Uninsured Patients
Edelman (2010) [59]USA	RCT	Diabetes
Levine (2010) [135] USA	Cost Utilisation Analysis	Older people
Scott (2004) [69] USA	RCT	Older people
Wagner (2001) [76] USA	RCT	Diabetes

Overview of studies

Of the eight papers included, seven reported studies undertaken in the USA and one was reporting a study undertaken in Italy. The medical conditions for which the group clinics were run were diabetes (5 articles), comorbid diabetes with hypertension (1 article) and complex behavioural health and medical needs (2 articles). The patients in this latter group were frequent users of the emergency department. For all of the papers, the perspective was of the health system. The health settings were a diabetes clinic [133], Kaiser Permanente health maintenance organisation [118]; [69], Puget Sound health maintenance organisation [76], Veterans Affairs Medical Centres [59], university affiliated medical centre [128]; [48] and a hospital [134].

What are the key elements in examining the costs of group clinics?

Costs incurred in setting up/running a group clinic

Edelman [59] calculated the costs of a group visit using data on staff time to run the group medical visit and staff time to make follow up phone calls. Scott [69] estimated costs for CHCC meetings according to the amount of time that providers spent at the meeting and their mean hourly salaries.

Costs saved as a result of the group clinic

Evidence on costs saved as a result of group clinics tends to be related to health service utilisation e.g. hospital admissions, urgent care visits, primary care visits, specialty visits and group visits. Clancy [52] portioned charges into outpatient visits, emergency department visits and inpatient stays.

What evidence exists for the costs of group clinics?

Costs incurred in setting up/running a group clinic

Edelman [59] estimated a cost of $504 (range $445-$578) to conduct a group visit, with an annual, per patient cost of $460 (range $393-$554). Crane [134] estimated the total annualized direct costs of the program as $66,000. Scott [69] estimated an average per patient group cost over 24 months of $484. Staff salaries consisted of 77.4% of the total average cost ($375).

Bondonio [133], undertook a cost effectiveness analysis of RCT's in Type I and Type II diabetes. For Type II diabetes, they calculated that over the study period (4 years), €119.25 was spent by the Italian health service on each intervention patient, as compared to €90.44 for the control group over the same period. For Type I diabetes, over the study period (3 years), €271.24 per patient was spent on the intervention group and €120.15 per patient on the control group.

Costs saved as a result of the group clinic

One study showed no significant difference in costs between group clinics and usual care [76]. There were differences in utilisation with intervention patients visiting primary care almost one time more than usual care patients, although there were significant reductions in specialty and emergency room visits amongst intervention patients.

Clancy [48] established that total costs were higher for intervention patients as compared to control patients in terms of outpatient costs ($1444 versus $1099, p=0.008) and inpatient costs ($1410 versus $365). However emergency department costs did not differ.

There was no difference in health service utilization in the study by Levine [135] and they found that the difference in total costs for intervention and control patients was not statistically significant ($8845 vs $10228, p=0.11).

Edelman [59] found a pattern of reduced health service utilisation in the group medical care group compared with the usual care group as follows: emergency care visits (0.9 versus 1.3 visits per patient year, p<0.001), primary care visits (5.3 versus 6.2 visits per patient year, p=0.01).

Crane [134] compared patients before and after a DIGMA intervention in terms of emergency department and inpatient charges and also compared DIGMA patients with a control group. The median total costs (emergency department and inpatient charges) prior to the intervention starting was $1167 and twelve months after the intervention had fallen to $230 (p<0.001). This was as a result of reduced utilisation – per person per month emergency department visits dropped from 0.58 in the twelve months prior to involvement to 0.23 (p<0.001).

Scott [69] found that the intervention (CHCC) group had lower health service utilisation (admissions χ^2 5.8, p=0.012, emergency department visits χ^2 9.8, p=0.008 and professional services χ^2 7.5, p=0.005). However in other aspects of utilisation, there was no significant difference between the groups. Intervention group costs associated with ED visits were significantly lower for intervention than control patients although there were no other significant differences, costs were lower for health service utilisation in the intervention group. The overall cost saving was $41.80 per member per month.

Group clinic patients in the study by Clancy [52] found reduced emergency department (49.1% lower) and total (30.2% lower) charges but greater outpatient charges (34.7% higher) when comparing patients in the intervention group with the usual care group. However controlling for endogeneity

(the potential for unobserved patient characteristics to influence adherence), group clinics significantly reduced outpatient visit charges through a reduction in specialty visits (for which group clinics were found to substitute).

Cost effectiveness analysis

Bondonio [133] undertook a cost effectiveness analysis. For Type II diabetes group care patients, using DQoL/Mod score as a proxy outcome, the cost effectiveness ratio was €2.28 and for Type II diabetes group care, it was €19.46. The authors stated that they were not able to calculate a QALY outcome.

Discussion

Group care is more expensive to set up and run, although not many studies have actually calculated these increased costs, they have reported increased use of physician time, increased educational resources, increased frequency of appointments per patient and the existence of one to one appointments for patients on group care, all of which will increase costs when compared with usual care. The lack of information relating to the costs of the intervention in the studies we examined means that it is challenging to draw conclusions about the cost of group clinics. From the data from the randomised controlled trials, we can understand more about the key cost elements of group clinics. However, this information would need to be considered in a full economic analysis in order to be meaningful.

From the studies we examined, we can make better judgements on the cost savings as a result of patient participation in group clinic interventions. The majority of studies examined addressed the changes in utilisation and the subsequent changes in costs. There was a mixed pattern of changes in utilisation, with some studies reporting that intervention patients used fewer health services overall whilst others reported an increase in some areas (primary care, inpatient and outpatient). This mixed pattern was repeated in the assessment of changes in costs, understandably in studies where utilisation decreased; there was a decrease in costs. With this mixed set of results, it would not be meaningful to cluster studies together in terms of utilisation and cost changes.

It would have been informative to identify whether the savings identified are realised over a longer period of time. We found evidence to suggest that the US healthcare system reimbursement process means that these interventions will always be delivered in a standard way to ensure insurance claims

are reimbursed, therefore making costs across interventions (although not cost savings) more uniform. It may be possible to hypothesise that as group clinics become more widespread, staff costs will decrease as more staff become trained (training being a major part of establishing a group clinic as identified in the main review).

Clancy [48] aimed to determine why costs were higher for intervention patients than control patients. In addition to small sample sizes, they note that participating in an intervention such as a group clinic might "activate" patients who had previously missed care to catch up with the care that they had missed therefore increasing health service utilisation. In addition, length of study is important – improved self-care (which is often an outcome of group clinic interventions) may have a time lag, so for a shorter study, six months is not sufficient time to demonstrate a decrease in utilisation and therefore a decrease in costs.

Summary of Included studies

Our assessment of costs and feasibility across a heterogeneous set of studies has showed mixed effects of group clinic interventions on costs and savings. A full economic analysis of group clinics, along with the robust collection of costs data alongside group clinic interventions is recommended. A full economic analysis could allow for data included in RCTs, such as the type of clinician delivering the intervention and how long each group clinic lasts, for example, to be costed, to get a more complete picture of the costs of group clinic. Primary research assembling information on the running of group clinics and the costs that are saved specifically within a National Health Service setting would be essential to inform decisions about group clinic provision in a UK context.

5b Feasibility

Overview

Feasibility conflates many issues such as acceptability to patients and providers, practicality in terms of required procedures (whether alongside or as a substitute for existing practice) and affordability, in terms of financial considerations and available equipment and premises. The evidence to be mapped against this domain is drawn from qualitative studies of provider and patient attitudes, implementation studies not otherwise included in this review and an overall picture of likely cost effectiveness as has emerged from the previous chapter. Feasibility includes general issues to be considered within any context for implementation of group clinics and specific issues relating to implementation within an NHS context.

What are the key considerations regarding feasibility?

Key to a consideration of feasibility in this context is affordability. Although claims are made of cost savings these are either (i) based upon U.S. studies of limited geographical or temporal relevance or (ii) based on a simplistic argument of more patients seen by a clinician per hour. In particular there is limited evidence of cost implications within a UK study. Indeed although the insights from group acupuncture clinics is informative in terms of the group interactions and dynamics within a UK context the actual assessment of costs would be potentially misleading. As will be explained later in this report the achievements of the group acupuncture clinics are located within a "work smarter" treatment delivery model. These otherwise promising achievements therefore have limited relevance to the monitoring model that is fundamental to group clinic provision.

A further concern relates to acceptability. Our clinical advisers point out that there is a strong expectation within the NHS of being seen by a specialist clinician within an individual consultation. Even if the default position was to become the group clinic provision there would remain a sizeable proportion of the population who would require, perhaps through the complexity or severity of their condition, or demand, through exercising patient choice, access to the more traditional model. Such a preference may be affirmed upon commencement of treatment or, as illustrated by UK group acupuncture clinic qualitative

data, may emerge following experience of the group clinic provision. In particular the willingness of patients to try a new modality of service provision should not be interpreted as a commitment to that service modality on a long term basis.

Practical issues relate to the requirement to be able to access all patient records and results in advance of a single shared medical appointment. This may place a burden on diagnostic services but may also prove problematic for the individual specialist who would have to make time for review of the notes. This latter factor is examined in a U.S. context of uncompensated clinician time [136].

Other feasibility concerns relate to the need for clinician training, particularly in group facilitation, and the need for suitable premises. Within the wider picture of feasibility it would be worth exploring whether the individual components considered essential to the group clinic approach could be delivered in an alternative format. For example the socialisation or the interaction with a group facilitator may be offered virtually in some circumstances, offering the opportunity for the clinical team to identify those needing particular help.

What evidence exists for feasibility of Group Clinics?

Little evidence exists on the feasibility of Group Clinics even though much literature suggests how group clinics might be introduced. Particularly noticeable is a shortage of data from the UK. The wider non-NHS specific literature informs such aspects as implementation and confidentiality. A feasibility study [105] revealed such positive aspects of GMVs as personalized attention (77%), self-care education (69%), access to medication refills and examinations (69%), and advice from peers (62%). Negative aspects included insufficient personal attention (23%), logistical barriers (8%), and loss of confidentiality [105].

Kirsh [25] has explored implementation issues relating to shared medical appointments. She identified such important promoting factors as the formation of a core team committed to quality and improvement with strong support for the clinic leadership from other team members. Notably tailoring had to take into account such “key innovation-hindering factors”

as limited resources (such as space), potential to alter longstanding patient-provider relationships, and organizational silos (disconnected groups) with core team members reporting to different supervisors. The latter point emphasises that group clinics should not be seen in isolation but as a potential vehicle towards interprofessional team working, with all the associated culture changes that this might necessitate.

Concerns relating to confidentiality were raised consistently in the reviewed literature. This issue was examined specifically in a study by Wong [108]. This study aptly highlights that group medical visits can impact upon the clinician-patient relationship as patients are "able to draw upon more informational resources and social support from attendees and often feel more empowered to pose questions to their providers than they might otherwise in individual encounters" [108]. However providers reported that "the most common reason for not attending a GMV was patients' concerns about confidentiality and hence a preference for individual visits" [108]. Nevertheless one overall finding from the study was that patients who did attend a GMV consciously selected which information they were comfortable sharing in a group situation [108]. Although filtering the information that they felt able to share could be perceived as a drawback some interventions include a discussion of confidentiality with practical examples as a component of the initial group clinic sessions.

Discussion

The review team has identified specific concerns relating to the interpretation of predominantly U.S. data within a specific UK context. In particular many of the interventions have been delivered within the context of health care financing that determines both the exact configuration of approved packages of group clinic provision and, for example, requires guaranteed access to an individual consultation if requested. Advice from our clinical advisers suggests that a model where an increasing amount of the content of the previous individual consultation is assumed within a group context, facilitated perhaps by a member of staff who is not the specialist clinician, may be an alternative form of substitution. This might facilitate shorter individual consultations although this issue remains to be investigated. Importantly, however, such provision would need to be in a context where group education is seen as more central to the chronic disease management process and not as an optional extra.

Summary of Included Studies

While the evidence from the U.S. and that from a UK group acupuncture clinic context does inform a discussion of feasibility there remains a specific need for further investigation of the monitoring model of group clinics within a UK context. This research requirement sits naturally alongside the suggestion made in the previous chapter for a full UK-centric economic evaluation and the need to explore qualitatively the attitudes of NHS patients, providers and caregivers towards group clinic provision. In addition there is a requirement to explore the feasibility of "substitution" of specific functions from the individual consultation with a corresponding group-based provision along with any training and role development issues this might occasion.

Chapter 6 - Discussion

Summary of evidence on Effectiveness of Group Clinics

Health Outcomes

By far the majority of studies examining clinical outcomes relate to diabetes and focus on basic biomedical outcomes that are relatively easy to monitor routinely. It is therefore difficult to extrapolate these effects to other chronic conditions.

Diabetes

Although there is consistent and promising evidence in favour of an effect of group clinics for basic biomedical measures, particularly haemoglobin and systolic blood pressure, this evidence does not extend to other important biomedical considerations such as control of cholesterol. Group-based training for self-management strategies in people with type 2 diabetes effective by improving fasting blood glucose levels, glycated haemoglobin and diabetes knowledge and reducing systolic blood pressure levels, body weight and the requirement for diabetes medication

Disease-specific quality of life improved significantly in a small number of studies and yet this effect was not found to be as significant for generic health-related quality of life

Other conditions

For other conditions in older adults benefits have been observed with regard to positive effects on patient experience with group clinic approaches compared with usual care. However no difference from usual care was reported for overall health status, functional status and biophysical outcomes.

Health Service Outcomes

Diabetes

Effects of group clinic approaches on hospital admissions and emergency department visits were explored in five studies on patients with diabetes. In three of these, admission rates were lower with group clinic approaches, but the result was statistically significant in only one

study. Two studies found emergency department visits decreased significantly with group clinic approaches.

Other Conditions

Two trials in older adults showed fewer hospital admissions for group clinic approaches and a statistically significant decrease in emergency department visits for group clinic approaches compared with usual care [55 69].

Summary of evidence on Feasibility, Acceptability, Meaningfulness of Group Clinics

Practical concerns remain. A practical impact of seeing patients individually over separate consultations is a spreading of workload demand on laboratory and other diagnostic services. In contrast a group clinic relies on all patients having their results available for the same clinic. To what extent is this feasible given the heavy time and workload pressures on diagnostic services? In mitigation it should be said that we found little reason to believe that the actual burden of workload would be any greater from seeing patients as a group rather than individually – batches of diagnostic test results could still be processed within the intervals between clinics. However there would be a need for improved record keeping. Perhaps more significantly the expectations of patients that their test results will be available will be shaped by "normalisation" alongside others in attendance at the group clinic. Nevertheless for conditions such as diabetes a significant part of the interaction is derived from self monitoring, not from external test results.

Confidentiality is another important consideration and its full impact has been masked by methodological issues – those with significant concerns may well refuse to enrol in trials or qualitative studies in the first place. Furthermore their concerns may be neglected within studies if they withdraw and are consequently lost to follow up. On a positive note Wong [108] concluded that confidentiality can be addressed and was not a major concern for either patients or providers. In fact they observed that patients adopted strategies to address their own and others' concerns related to confidential health information. In turn health care providers used multiple strategies to maintain confidentiality within the group, including

renegotiating what information is shared and providing examples of what information ought to be kept confidential. These practical considerations should be contemplated by anyone planning group clinic type approaches.

Summary of evidence on Cost Effectiveness of Group Clinics

The eight relevant studies examining cost effectiveness of group clinics were all associated with settings that are not directly comparable to a UK setting (e.g. 7 from the USA and 1 from Italy). In addition some studies relate to time periods that do not reflect current clinical practice. Medical conditions at which group clinics were targeted were diabetes (5 articles), comorbid diabetes with hypertension (1 article) and complex behavioural health and medical needs (2 articles) resulting in very narrow coverage of clinical areas that potentially might be explored within a group clinic context.

The heterogeneity of the included studies and their different time and geographical settings explains, at least in part the uncertain effects of group clinic interventions on cost saved. A full economic analysis of group clinics, along with the robust collection of costs data alongside group clinic interventions is recommended. A full economic analysis would accommodate data included in RCTs, such as the type of clinician delivering the intervention and how long each group clinic lasts, to derive a richer picture of the costs of group clinics. Research bringing together information on the running of group clinics and potential cost savings within a UK National Health Service context would be particularly valuable. Certain costs were not explicitly identified within the included studies. For example, it is likely that a group clinic intervention may require specialist training of healthcare staff, particularly in relation to facilitations skills.

Perceived and actual benefits and disadvantages of a group consultation when compared with an individual consultation

While crude analyses compare the number of patients seen within a group session with those seen individually within the same time period such an approach is inadequate for the purposes of a rigorous evaluation. There is substantial evidence that provision must be made for individual consultations and also that costs may be displaced to other parts of the health

care system. The cost of individual consultations must factor in provision for such consultations within the group session, for those that are displaced to sessions outside the group clinic and for those for whom group provision is either inappropriate or unacceptable. Although one assumption encountered within the literature is that reduction of health costs will take place over an extended time period studies that have been conducted to date have not covered a long enough evaluation period to demonstrate this realisation of cost benefits.

The value of group education

The cost benefit of group clinic approaches depends upon whether current provision (usual care) includes existing group education provision and, specifically, whether this is delivered by health professionals or lay peer supporters. Group education has been found to have an effect on some of those biomedical measures addressed by group clinics but not typically to the degree realised by most group clinic studies. The cost issue therefore becomes "what is the demonstrable cost-benefit to be realised by delivering the specific group clinic intervention compared with the individual consultation plus group education sessions?". As indicated by some of the foregoing this question is complicated by what are quantified as benefits. In particular is the evaluation framework to be exclusively that of cost savings – in which case group clinics are unlikely to deliver against this agenda – or is the evaluation to be situated in the context of joined up improved quality interprofessional care?

The value of multiprofessional approaches resulting from simultaneous clinical involvement

We found some evidence that involvement in group clinics may have accrued particular advantages in relation to interprofessional team working and mutuality:

> the flexibility of the individual team members is manifest during the SMA sessions. A weekly meeting … continues to occur to discuss patients and processes to assure that all team members have an open forum to voice concerns and make group changes[7]

The literature around uni-professional, multi-professional and inter-professional working emphasises flexibility of roles and a degree of interchangeability as the means by which interprofessional working might be achieved [137].

Issues emerging from the evidence?

The large majority of studies have been conducted within the disease area of diabetes. Diabetes appears particularly suited to the group clinic approach. It is a chronic condition that requires regular monitoring. A large number of potential complications are common to the experience or concerns of a large number of patients. For the clinician the attractions of a group clinic approach for diabetes are quite compelling. As one of our clinical advisors noted, successful management of the condition requires patient cooperation in the provision of their clinical data and their participation in self management. Consequences of non-participation may be serious in terms of both effects on health and utilisation of emergency departments or other specialist services.

The majority of studies of group clinic type approaches have been conducted within the United States. While this is typically an underlying concern for all health service and delivery topics we found evidence that this may be particularly significant for this topic area. The U.S. health care funding system is very prescriptive in terms of acceptable models of group medical visit for the purposes of reimbursement. Extensive research and evaluation has been conducted but only within a very limited range of possible models. Such prescription is likely to result in a stifling effect with regard to experimentation and innovation potentially denying a range of possible models from which the National Health Service might conceivably benefit. Our clinical advisors have highlighted a significant expectation for an individual consultation within the NHS patient culture, a reluctance to participate in group care activities and an appetite for only minimal requisite levels of patient information and education.

A major limitation of this review was that it has not been able to examine the evidence base for the individual components of the group clinic intervention, such as the individual consultation, group education, self monitoring and peer support etcetera. We conclude with Edelman that:

> Without further, more mechanistic studies that attempt to elucidate the key components of an SMA intervention, implementation of a diabetes SMA or design of

an SMA for another condition will be at least partially based on reasoned judgment rather than strict evidence-based decision making [18].

Our review was unable to find data to address some very critical key questions in relation to group clinic provision. The evidence base is insufficient to address the issue of what constitutes either a minimally effective or an optimal dose with regard to the duration, intensity and content of the group medical visit. Furthermore we detected a tension between what care providers consider to be an optimal curriculum to be covered in the educational component of the group medical visit and the expressed requirement for a programme to be co-produced to meet participant needs. It would be particularly helpful to be able to answer questions regarding the time period over which clinically significant outcomes are achieved, the time period for which any positive outcomes are sustained while the participant is receiving the intervention and the "washout period" following cessation of the intervention after which effects are no longer achieved. Related to this final point is the effectiveness of top up or refresher sessions together with questions about the duration, intensity and content of any refresher provision. Discussion with our clinical advisers suggested that answers to some of these questions may be linked to research findings for group education provision more generally although (i) data of the particularity specified above is not typically contained in published reports (ii) group clinics engage, at least in theory, with additional mechanisms when compared with group education so their effect might be underestimated if using this source of data.

Discussion with our clinical advisors also revealed an evidence gap with regard to longer term attendance. Published research studies tend to interpret attendance in a forgiving manner – some even considering attendance at a single clinic as constituting an "attender". More typically an aggregate of attendances per person is given which does not allow us to detect a decay in attendance and commitment over time. Furthermore attendance patterns may be confounded by the flexibility or otherwise of the clinic, the number of alternatives on offer and other issues relating to access and alternative health care provision.

Under what circumstances do patients with chronic conditions agree to participate in group clinic approaches?

From the theoretical literature we have identified four principal components of a group clinic approach:

(i) **Monitoring** – this is a traditional activity in the individual consultation but there is some evidence that group clinic approaches may make this more of a shared activity between patient and clinician with the patient becoming involved in some of the monitoring activities;

(ii) **Self Management** – the group clinic approach encourages patients to become more active in managing their condition. In contrast to an individual consultation the group based approach may offer both role models of those who manage their own condition and tips on techniques and resources acquired from fellow patients.

(iii) **Peer Support** – this is a completely discrete activity from the individual consultation and which offers additional sources of support beyond the clinicians and the significant others of the patient. Commonly in the U.K. there is a separation between clinical activities and group education approaches.

(iv) **Education and Information** – quantitatively there is the opportunity for the clinician to share information with more patients at the same time, reducing duplication and repetition, and resulting in greater consistency in information provision. Qualitatively patients may respond better to information shared in a less didactic manner or to information originating from fellow patients. More reticent patients may benefit vicariously from questions asked by more proactive members of the group, in effect becoming "lurkers" within the group.

Typically patients with chronic conditions appear to make an overall assessment of the benefits of participation before agreeing to participate. There is some evidence that the disadvantages of participation are not adequately explained to participants by clinical staff. A significant proportion of those invited decline, largely because they do not recognise benefits against the perceived advantages of an individual consultation. Expectations of being seen in an individual consultation, whether specified by a health plan as in the United States or

through cultural conditioning in the United Kingdom, appear to militate against use of a group clinic approach. Alternate provision will likely be required for this sizeable group of patients and the very availability of such an alternative may have a negative effect on uptake.

Having agreed to attend group clinics, why do some patients with chronic conditions decide not to attend any group clinic sessions?

Constraints related to the logistics of attending the group clinic appointment (e.g. timing, other commitments etcetera) play a major role in determining whether patients with chronic conditions will attend. However these same constraints are also present for those seeking individual appointments. The primary considerations therefore appear to be the flexibility of attendance patterns. In particular this may depend upon whether group clinics employ a closed cohort based approach or more of a drop-in model.

Having started to attend group clinics, why do some patients with chronic conditions discontinue a group clinic programme?

There is some evidence to suggest that some patients will attend with a specific goal of receiving sufficient information for self management of their condition. Once they feel that they have obtained this information their motivation for attendance wanes. For others the socialization aspect is particularly important and this may contribute to their motivation for ongoing attendance, even where other benefits of attendance degrade over time. Finally there are others for whom the sense of shared community persists recognised from their transition from being beneficiaries to becoming donors to the overall group process.

Which is the most sustainable model of group clinic delivery?

The identified research literature does not support a detailed analysis of sustainability. Most initiatives were only evaluated over a relatively short time period. For example Cohen claimed to have demonstrated that "that the pharmacist-led group intervention program was an efficacious and sustainable collaborative care approach" and yet only evaluated the initiative over a period of two years [53]. In fact within the context of group clinics such an evaluation period is comparatively long. Housden reported that 15/26 studies were 12 months or less in duration, and 6 studies were up to 2 years in duration [83]. The study with the longest

duration only followed patients for a period of 5 years after the intervention. We conclude with Housden that:

> the long-term or sustainable outcomes of group medical visits are unclear, and it is difficult to know if the outcomes were maintained for a substantial length of time after the intervention [83]

Qualitatively there is very little discussion in the published literature about the practicalities of managing different models of group membership. Such contrasting models have considerable implications for facilitation, educational content and the group dynamic. These are briefly discussed together with their possible implications as follows:

(a) the ongoing cohort

Explicit to the Chronic Care Clinic and Group Visit models is the idea of the group representing an ongoing cohort of patients who therefore have the opportunity to "grow" together. However there is no discussion in the included research studies about the implications of withdrawals and dropouts for the group viability and for its dynamics. Clearly in an older population, or equally with those with a chronic condition, the likelihood that the numbers in attendance will diminish, either through natural wastage or through utilisation of alternative inpatient or long term care health services, poses a significant challenge for the ongoing sustainability of a particular group. Increasing numbers of patients with the chronic condition place further needs for extra facilitators, training and utilisation of premises.

(b) "out with the old, in with the new"

Another potential model of group membership, given that resources for facilitation and group processes are likely to be finite, would be to work with a particular group to a pre-defined temporal or developmental point and then to disband the whole group and return to individual consultations. This model was not identified within the literature although it is unclear whether this is because it is not prevalent or whether the relatively short research and evaluation frame precludes study of longer term sustainability. This model assumes that the initial life of the group is a key point in the disease trajectory, that the curriculum is relatively

finite and stable and, importantly, that there is a carryover of the group effect beyond the lifespan of the group. Such a group model makes unchallenged assumptions about shared information needs and a common pace of learning for all group members. Maintaining a group for a finite period, identified a priori, may help to sustain the impetus of the group but, paradoxically, may reduce commitment to the group. A challenge for the facilitator is in identifying an optimal lifespan for the group – an issue not addressed by the literature.

(c) periodic group replenishment.

A final model would be to treat the group as a more fluid vehicle with patients being able to leave or join at any point, subject to being able to accommodate numbers within the group membership. From an efficiency point of view such a model is attractive as it ensures that provision is sustainable and safeguards against attrition of members. However this "mixed" model may provide challenges to facilitation – in terms of both building up relationships from new with facilitators and with existing group members and, educationally, in terms of planning of content for a group with heterogenous learning needs and varying experiences. One study of such a fluid group measured discernible differences in perceptions of the value of group attendance for parents of less experienced and more experienced members of the group for those with haemophilia:

> The majority of parents (62%) did not regard the additional time investment for GMA as inconvenient (74% less experienced, 30% experienced; P-value 0.023) [97]

This was further reflected in differences between the patients themselves in terms of learning:

> In children <12 years, all less experienced adolescents reported learning of new aspects of their disease, unlike the 75% of experienced adolescents who reported no learning effect (P-value 0.011) [97]

It is true that more experienced group members could be harnessed as a resource to be utilised by the facilitator to benefit newer members:

> Several veterans enthusiastically volunteered to attend future group clinics to share their chronic disease self-management experience [100]

However the fluidity of group membership may have adverse effects in terms of commitment to the group 'community'.

Strengths and Limitations of this Review

This was a protocol driven review conducted by multiple investigators. The information specialist conducted a very comprehensive subject search of bibliographic databases and this was supplemented by extensive pursuit of references and use of citation search techniques. In particular this allowed us to identify clusters of associate studies reporting more complete data where available [38]. We believe that we have identified more published trials than any previous review and this has meant we have included more studies and we have been able to review reports included in previous reviews but excluded from our own inclusion criteria, together with reasons. We performed a rigorous process of checking for inclusion and subsequent quality assessment. In implementing an innovative methodology of "progressive fractions" we extended the review resources beyond a narrow focused question defined by the term "group clinics" to engage with a wider body of the most relevant literature with a range of synonyms. We also employed exhaustive supplementary search techniques such as follow up of references, citation searching and searching for study clusters. We are therefore not only confident that we have identified the most significant literature related to the review question but also that we have minimised the risk of missing relevant qualitative, cost and UK studies.

The timescale of this review, telescoped within half the time period of a conventional systematic review, and its ambition in covering feasibility, appropriateness and meaningfulness in addition to the effectiveness and cost effectiveness most typically covered by comparator reviews have prompted use of several rapid review methods. For example our approach was to examine the extent to which recently published evidence from randomised controlled trials has made a supplementary contribution to the existing evidence base. In actuality because of the relatively small number of recent trial reports and the extensive

quantity and coverage of previous reviews this additive contribution has not been as significant as initially anticipated. As this was a rapid review we were unable to perform independent double data extraction and quality assessment. However frequent iteration between extracted data and the full text of articles minimises the likelihood of important errors.

Methodological Limitations of the Included Studies

In conducting the review we identified a systematic bias in the reporting of group clinic interventions. Selection bias was very likely to occur – even though some studies made strenuous efforts to locate and collect data from patients who had dropped out success was limited [98] making it "not possible to investigate the possible disadvantages that some patients might experience" [98]. In addition the positive group effect, particularly from qualitative studies, may well have been "influenced by the fact that those who do not gain benefit drop out, leaving only patients with a positive experience" [98]. Furthermore there is considerable underrepresentation of patients from UK relevant ethnic minority backgrounds (U.S. studies include Latinas and African Americans) making it "not possible to identify any potential differences that might be experienced by these groups" [98].

Included studies and their corresponding inclusion in systematic reviews typically confused different models of group clinic provision. One economic attraction of a group clinic approach relates to a "substitution" model i.e. where patients attend a group clinic *instead of* attending individual consultations. It appears that the rationale underpinning a substitution model is flawed as (i) most U.S. provision of group medical visits/shared medical appointments requires provision of individual consultations *in addition to* group clinic provision; (ii) studies may report individual consultations at the time of the group clinic but are less likely to report these outside of the group clinic session resulting in an incomplete picture of resource use. One of our clinical advisers suggested that in a UK setting a different form of substitution might take place in that the group clinic facilitator, typically a nurse or dietitian for primarily economic reasons, may fulfil several roles otherwise assumed by a clinician in an individual consultation (e.g. review of patient results). The challenge in such a UK substitution model lies in how to decide the extent to which the duration of the

individual consultation might be reduced, the impact this might have on the topic content of the individual consultation and the logistics of coordinating the individual and group sessions. Unless a study demonstrates an explicit reduction within the experimental group in the corresponding time for the individual consultation input as compared with the control then the model being described is essentially an enhanced care model (i.e. previous individual consultation enhanced by group medical visit).

Our typology of group clinics models characterised two further variations:

(i) the group clinic plus model, where every patient is offered an individual consultation (i.e. *universal* same session individual appointments) and savings are achieved for each patient that deems an individual consultation as unnecessary,

(ii) the group clinic triage model (i.e. an *indicated* simultaneous individual appointment where a clinician only offers a consultation where the group session reveals a cause of particular concern and savings are achieved by not consulting with patients who do not merit special attention.

A disappointing feature of the evidence base relating to group clinics is the predominance of diabetes as a studied disease area. As Edelman observes little evidence is available for other chronic conditions of interest such as coronary artery disease, chronic heart failure, asthma, chronic obstructive pulmonary disease, hyperlipidaemia, or hypertension [18]. In addition included studies focus on achievement of biomedical outcomes with comparatively little information on organisational or system-wide factors [18].

We approached this review with the perhaps simplistic expectation that group clinics would represent a genuine alternative to the individual consultation. In actuality, mainly through patient expectation and the stringencies of the U.S. health care system individual consultations continued to be delivered. The revised research questions, for which we have remarkably little evidence, relate to the extent to which the duration of an individual consultation can be reduced and the extent to which information from this consultation can be delivered by other less specialist staff within a group context. A further disappointment

relates to the lack of clarity with regard to intervention components and their corresponding mechanisms of action. It thus becomes problematic when seeking to identify which are the active ingredients, which components might be considered essential and to map which components address each requisite from the group clinic intervention. In addition we have identified a research paradox in that the effectiveness of the group clinic intervention is believed to be related to the degree of co-production achieved by patients and clinicians in the group but such co-production makes it correspondingly more difficult to ensure the fidelity of the intervention. In addition to this evaluation challenge there are attendant consequences in terms of subsequent implementation.

Another methodological limitation relates to the outcomes being studied. Substantial variability in outcomes, together with the previously mentioned heterogeneity of interventions, makes it problematic when seeking to explain the observed variability in intervention effects. Generally, for this reason, we have resisted the use of meta-analyses using summary measures of treatment effect as these may not adequately describe the expected effects of the intervention (cp. Edelman [18]). Indeed the main function of the availability of analyses for such outcome measures appears to be in developing a hierarchy of outcome measures according to how easy it might be to demonstrate an effect and, indeed the converse likelihood of a systematic measurement error. We also note the comparative absence of repeated measurements for outcomes making it difficult to isolate the point at which improvements take place and, indeed, the trajectory of the management of the disease. As mentioned above, this absence of outcome data makes clinical decisions, specifically about optimal dosage, intensity and duration, problematic. Furthermore the limited time window covered by the included studies does not address the very important issue of the long term sustainability of such an intervention.

Research Implications

Although the review team identified a sizeable body of evidence around group clinic type approaches the practical value of this research for the specific review question is limited. Much of the research has been conducted in the United States, within a different health system, often with a requirement to make provision for an individual consultation. The

dominant model is therefore one of enhancement of interaction, not of substitution. There is therefore a need for research which specifically focuses on the role of group clinic approaches in substituting for identifiable components of, or the whole content of, individual consultation episodes. In addition randomised controlled trials have predominantly been conducted within the context of diabetes and rigorous evaluations are required across a wider range of chronic conditions. Finally the indistinct nature of the different service models, and a lack of clarity regarding their individual constituents, requires research that elicits more detail of individual service components, their putative mechanisms and their associated costs.

The team identified five ongoing trials in group clinic type interventions (See Appendix I0). However none of these ongoing trials is taking place in the United Kingdom. Three of these trials relate to diabetes care, one to heart failure and one to the new disease area (with respect to group clinics) of atopic dermatitis. This research is unlikely to overturn any of the research implications or implications for practice although the studies in the less investigated context of heart failure and dermatitis are to be particularly welcomed.

Numerous commentators have observed on the heterogeneous nature of group clinic type interventions [130]; [6] and this has several implications for this review. First while we may identify some overall biomedical effects from group clinic approaches across a wide range of settings, strengthening the likelihood of generalizability, it is correspondingly more difficult to isolate the "active ingredients" of what are essentially complex multi-faceted interventions [136].

In an implementation context, given the typically poor standard of description of each intervention in included studies, it is problematic to ensure the fidelity of a particular type of group clinic intervention:

> Implementation fidelity is often presented as critical to achieving the levels of efficacy demonstrated in clinical trials. However, it became apparent that descriptions

of SMA interventions provided insufficient detail to guide implementation into differing clinical settings [25].

This heterogeneity also provides operational challenges to the definition of interventions for inclusion in this review and also explains the apparent inconsistency of inclusions across previous reviews which in turn may partially explain some of the reported differences in effect.

From a cost viewpoint we know little about the added benefit of incremental additions to a particular group clinic model. In fact given that there is some evidence for the effectiveness of group based education interventions accompanied by individual clinician visits it is unclear what the superiority or added benefit of the more complex group clinic model might be over this comparatively simpler version.

At the same time heterogeneity, while complicating the evaluation of group clinic type interventions, may offer attractions within the context of innovation. A potential criticism for the preponderance of US based models is that there is little evidence of genuine innovation around a familiar looking menu of group clinic models, perhaps due to characteristics of the U.S. funding system. The UK offers considerable scope for innovation, provided that the components of each model are clearly identifiable, isolatable and costable.

With regard to future comparators to the group clinic based intervention two technological developments require further investigation. With improved availability of Internet technologies virtual clinics may offer a technology-supported alternative to members of a group being present in person [138]. Also the relatively good performance of automated telephone disease management systems as a comparator for group clinics suggests that for some patients at least support might potentially be offered via such technologies [67 68]. These weekly, rotating automated (prerecorded) telephone calls take between 6-12 minutes to complete with any "out of range" responses triggering a personal call back by a nurse manager [67 68]. One attraction of these contrasting technological approaches is that they may

cater for the needs of two quite different population demographics. Schillinger's use of telephone support was particularly welcomed by those with language difficulties [67 68]. These approaches need rigorous evaluation in the context of the UK National Health Service.

Further studies, of different patient populations in various practice settings, are needed to identify the best protocols and to assess the true benefits of group clinic approaches. Hopefully, these would reveal that complementary, innovative, and evolving care approaches involving multidisciplinary teams are useful tools for meeting the significant challenges to access, cost, and quality that now face the health care delivery system [136]. Our findings confirm that there is limited data on satisfaction, patient access, or other key patient-centred outcomes [18].

As with the most recent review identified by this project, our review "uncovered far more gaps in the literature than it found definitive results" [85]. Gaps include the heterogeneity of the group clinic approaches intervention, characterised as a "black box", with "many components that are hard to capture and tease out, even in a well-conducted analysis" [85]. In seeking to add value by examining putative context-mechanism-outcome (CMO) configurations we attempted to advance an explanation for what makes particular group clinic type interventions successful.

In summary we have identified a requirement for future research to extend the breadth of chronic conditions within a wider evaluation framework in rigorously conducted trials in a U.K. context, to focus on benefits of substitution not enhancement, to characterise interventions by their components rather than their labels and to target these individual components for specific evaluation of both costs and benefits.

Chapter 7 - Conclusions

What, if anything, does the evidence reveal about the different models of group clinics?

The evidence reveals significant variation in the use of labels for interventions and, more significantly, in the components included within each type of group clinic approach. Indeed many approaches share common theoretical or philosophical origins. Particularly problematic, with regard to isolating the specific contribution of each of the different models, are variations in key characteristics required for evaluation. These include frequency and duration of sessions, the numbers present, the clinician input, the role (if any) of an individual consultation and the content and duration of individual intervention components.

What, if anything, does the evidence reveal about the uptake and rate of the spread of group clinic approaches across different chronic conditions?

Group clinic approaches originated within the clinical area of diabetes and were also popularised in the context of older patients with multiple health conditions. Discussion with our clinical advisers confirms that diabetes is a strong candidate for such approaches because of the need for ongoing monitoring, the frequency, complexity and severity of complications and the high prevalence of group education interventions more generally. More recently there has been increased interest, as reflected in the published research, in the use of group clinic approaches in other common chronic conditions, such as heart disease and hypertension. In the UK there have been limited, but not rigorously evaluated, attempts at using the approach for rheumatological conditions. Limited published experience with conditions typically first encountered earlier in life, such as inherited metabolic conditions reveals enthusiasm for group approaches early in the learning curve for an individual condition but possible practical difficulties in access, availability and attendance and a diminution in support and perceived usefulness as participants become more acquainted with their condition and its management. A significant U.K. movement to use group clinic approaches for acupuncture seeks to capture aspects of socialisation and peer support promulgated by the models. However, as highlighted by one of our clinical advisers, acupuncture clinics possess specific requirements for a patient to be immobile when receiving treatment and we therefore consider a regular treatment-

oriented group clinic to be conceptually different from approaches that harness such mechanisms as monitoring and self-management.

What, if anything, does the evidence reveal about where group clinic approaches might be most promising in a UK setting?

As mentioned when considering U.K. based initiatives, it is difficult to map such experiments against the underpinning theoretical and philosophical foundations invoked by the trial evidence. In many cases the literature is mobilised generically with little attempt to ensure the fidelity of a particular model. Indeed the heterogeneity and lack of distinctness of the models and terminology make it questionable about whether such fidelity is actually achievable. A more promising line of inquiry may require future researchers to identify and isolate specific intervention components and their specific effects within the context of rigorous evaluation. Such an approach should specifically seek to surface the added value of a coordinated group clinic intervention over and above an individual consultation plus group education provision, particularly given that systematic review evidence provides some evidence for comparable effects from group education.

Discussion with our clinical advisors suggested several models of group care that might prove more appropriate than others:

i. **Group clinics within the context of initial diagnosis, education and self monitoring of a new condition close to onset.** Group attendance when patients have high initial anxiety, intense information needs and a requirement to learn self management behaviours may harness patient commitment at a critical early phase in their chronic disease. This might be supported at a later time by ongoing periodic refreshment at longer intervals. In addition to diabetes a clinical advisor suggested this model might be appropriate for asthma care including instruction on inhaler use. We also located a protocol for an RCT of women carrying the breast cancer gene BRCA1 and 2 suggesting a potential role in relation to surveillance. This model requires research and evaluation.

ii. **Group clinics for a time-limited circumstance.** While the CenteringPregnancy initiative is the most common example of this approach from outside the scope of

this review, within chronic disease there is the potential for chronic conditions that lead to an acute intervention being managed through a group clinic approach. Bariatric surgery for obesity features in the literature and was mentioned by a clinical adviser. However in the latter instance attendance at group sessions is a mandatory condition of eligibility for surgery and so does not strictly conform to the voluntary philosophy of group clinics perpetuated in the U.S. studies.

iii. **Group clinics as a venue for treatment.** The best documented approach of group clinic use within a UK context involved acupuncture for knee osteoarthritis. In contrast to the model of self monitoring and intervention where required that characterises most other group clinic models this clinic carries an expectation of treatment. This limits the generalizability of some of the acceptance data although evidence on the group processes remains valid. As acupuncture treatment has a duration of about 20 minutes we have characterised this as a "working smarter" model for group clinic intervention, confirmed by the team. Within an NHS context there may be additional opportunities to offer group clinic provision where a patient might otherwise be waiting for or undergoing treatment or other non-monitoring procedures.

In particular, what does the evidence from diverse sources reveal about the feasibility, appropriateness, meaningfulness, effectiveness and efficiency of group clinic approaches for chronic medical conditions?

Feasibility (Evidence from Qualitative Research, Cost Studies and UK Studies and Informants)

UK informants highlighted a current separation between the clinical consultation and the provision of group education, as evidenced within diabetes care. Even within existing UK provision the coverage and quality of group education is believed to be extremely variable. Wider issues relating to feasibility concern appropriate premises for delivery [98] and training in facilitation skills for participating clinical staff [102].

Appropriateness (Evidence from Qualitative Research, UK Studies and UK Informants)

Evidence for the appropriateness of a group clinic approach, as perceived by patients, is largely equivocal. Substantively comparable perceptions of improvement are reported by patients across both group and individual interventions with both groups sharing concerns about appointment availability. There was little evidence of dissatisfaction with care from those actually receiving group clinic approaches. However other considerations may result in poor adherence with the group clinic regime. More typically those with expressed reservations regarding group clinic approaches operationalised this concern by not consenting to entry into a group intervention arm. We have made some initial observations based on data available on recruitment and maintenance from included studies. This suggests that any assessment of effectiveness should pay close attention to those who, though eligible, exit the intervention prior to its commencement. In practical terms this population will require alternative health care provision which may make a dual model of service delivery particularly problematic.

Perceived advantages of group based approaches include greater flexibility in length of time of appointment, and more time with the clinician [98 127]. Improved flexibility is expressed in the fact that a group clinic "can be altered to fit various patient populations, specific physician practices/organizations, and a number of health care delivery systems)" [78]. Recent qualitative evidence suggests that the group clinic approach may have a beneficial effect in terms of challenging the previous clinician-patient dynamic, thereby producing a "levelled playing field" [102]

Corresponding disadvantages include a perceived lack of privacy although this was not found to be a significant problem in existing UK studies, albeit in the context of group acupuncture clinics. Of significant concern however is the fact that participants attending individual sessions perceive little apparent advantage from switching to a group based approach and report difficulty in imagining how such group-based approaches might be feasible.

Given outstanding questions about the sustainability of group clinic approaches, the severity of attrition and the lack of long term outcome measurement (with the longest follow up being five years[74] it is problematic to consider group clinics within the context of life-long chronic disease management provision.

Group clinics may not be appropriate for certain patients or under certain situations. In addition to religious and cultural considerations, as exemplified by the specific mention of Muslim women, group clinic approaches may be less acceptable to an older generation or where threats are perceived to dignity or where there is an increased likelihood of embarrassment (e.g. revealing of unsightly varicose veins etcetera). Although concerns regarding privacy are underplayed in the included studies this may be a function of the types of conditions being reported and a focus on those who have consented either to randomisation (for RCTs) or to a group intervention (for other research designs). Some concerns may be alleviated by such factors as design of single sex group sessions or by groups offered to particular ethnic groups although providers should be sensitive to the fact that such measures may not necessarily result in addressing all the concerns of the target population.

Other considerations regarding appropriateness are implied by exclusion criteria employed by the included trials. Many trials purposely exclude patients with dementia or cognitive impairment. Others exclude those with hearing difficulties or other communication-related constraints. Exclusion of those not speaking the predominant language is also evident. For qualitative studies it is less obvious whether such exclusions relate to the specific group nature of the intervention or are a function of the methods of investigation. In either case it is clear that the group clinic approaches are not suited to particular segments of the population. For other patients concerns of access and attendance, e.g. for those who do not have their own transport or for those who are working during clinic hours, are also evident.

Meaningfulness (Evidence from UK Studies and UK Informants)

Individuals within the NHS have a general expectation of receiving an individual consultation as a marker of good quality individualised care. This impression may be strengthened by use of the word “clinics” and by the fact that several patients will have specific expectations of

the group clinic notwithstanding any information provided. Furthermore group education within the NHS is typically presented as a "bolt on extra" and may therefore be regarded as optional or less important by patients and/or health providers.

Effectiveness (Evidence from Systematic Reviews and Randomised Controlled Trials)

We identified 13 systematic reviews including multiple variations of group medical visit. Ten of these were analysed in detail, one is still at protocol stage and one was unavailable and used only in summary form. The majority of these reviews is disease specific, primarily with a focus on diabetes. One Cochrane Review included two studies of group visits as interventions designed to increase patient trust of their clinician – one of the putative mechanisms of the group clinic effect.

Taken as a body of evidence the reviews shared common conclusions:

- Evidence of a significant positive effect in terms of haemoglobin A1c and systolic blood pressure
- Non-significant effects in relation to LDL, HDL and Total Cholesterol
- A significant effect in relation to disease-specific quality of life
- A moderately significant effect on generic quality of life.
- Equivocal evidence in relation to potential cost savings.

Many of the reviews concluded that the heterogeneity of group clinic type interventions made it problematic to classify such initiatives, to isolate the effect of specific intervention components and, subsequently, to evaluate their effects.

We identified 22 RCTs (32 papers) published between 1999 and 2014. 17 of the 22 studies were conducted in the USA, 2 in Italy, 2 in China, and 1 in Norway. Included studies recruited a total of 5,572 patients. Diabetes was the most represented condition being present in 23 of the 31 papers representing, in turn, 15 of the 23 RCTs. One further study was conducted in a pre-diabetes population. Other conditions included Asthma, Cardiovascular

Disease, Heart Disease/Hypertension (3 RCTs), Stroke/Transient Ischaemic Attack (TIA), and Parkinson Disease.

We found 8 trial reports (7 trials) published over the period 2012-2014. Only one previous review had included any of these reports (n = 1).

Biomedical Outcomes

Three reports [56 57 64] contributed information to existing meta-analyses. Liu confirmed a significant improvement effect on systolic blood pressure finding[64]. Crowley[57] confirmed previous findings of a significant effect on Haemoglobin HbA1c in good quality trials. However this effect was only observed among those using complex insulin regimens at baseline with no observed difference between GMC and UC patients using no insulin (P = 0.65) or basal insulin only (P = 0.71). Crowley[56] found significant effects for total cholesterol and LDL cholesterol. This finding contributes to an overall pattern from a meta-analysis of previous studies that found non-significant effects for LDL cholesterol (4 previous studies) and for total cholesterol (5 previous studies)

In addition to the biomedical outcomes several health service utilisation measures have been measured in isolated studies. These are not suitable for meta-analysis but these are reviewed in chronological order with an assessment of the consistency around results.

Health Service Utilisation

Edelman [18] reports that effects on emergency department visits were reported in five studies [20 59 48 71 76]. Two studies reported significantly lower visit rates [59] or the proportion with an emergency department visit [76]. Rates were not significantly different in the other three studies [48 71 76]. Group clinic participants were significantly less likely to make any emergency visit than those in the control group and averaged fewer emergency visits during the 2-year follow-up period than control participants. Coleman reports that, over a 24-month study period CHCC participants were less likely to make an emergency visit and also less likely to have made multiple emergency visits [55].

Edelman [18] identified 5 studies reporting the effect of SMAs on hospital admissions [20 59 48 71 76]. Admission rates were lower for SMAs in three studies, but the result was statistically significant in only one study [20]. The fifth study reported a statistically nonsignificant lower proportion of patients with a hospital admission in the SMA group [76]. In a further study group clinic participants had, on average, fewer hospitalizations than controls [55]. Primary care visits did not differ between the two groups. Studies in older adults show a pattern of lower health care utilization, but the number of studies and participants are relatively few and these results cannot be considered conclusive. In patients with diabetes, lower hospitalization was the most consistent effect, but effects on other utilisation outcomes are inconclusive. It is important to note that once the group visits themselves are added to primary care visits, group clinic patients have significantly higher overall outpatient utilization [55].

Efficiency [Cost Effectiveness] (Evidence from Cost Studies)

The evidence for the cost effectiveness of group clinic approaches is equivocal. The efficiency of group clinics is determined by the perspective from which the group intervention is being examined, the level of current (comparator) provision and whether there is recognition of a need for provision of such enhancements as training for clinicians (e.g. to act as facilitators) and accommodation for group activities. A full economic evaluation is required within a UK setting with recognition of the factors described above re: feasibility and the other realities of implementation.

Rehearsing the main arguments

In summarising the evidence base we return to a consideration of the four principal drivers for the introduction of group clinic type interventions as identified in the Background Section (Chapter 1):

The Substitution argument

An initial attraction of group clinic approaches, as encapsulated in our review protocol was the assumption that such approaches might offer a viable alternative to, and substitute for, individual consultations. In reality many models either make routine provision for individual consultations, offer follow-up consultation on demand or use the group setting as a mechanism for singling out those requiring specific support. The implications of these three

different approaches are similarly varied. In the first instance efficiencies are only gained to the extent that information-giving that would have taken place in an individual setting is provided in a group setting and the corollary that duplication of genuinely shared concerns may be commensurately reduced. In the second instance, the numbers of on demand consultations may be difficult both to predict and to provide for with the consequent dangers of under- or over-utilisation of clinical staff and, in the latter case, decreased patient satisfaction. The third variant, whereby those requiring an individual consultation are "triaged" through the group processes, is heavily dependent on the clinician's capacity to identify genuine need amidst a preoccupation with group processes and facilitation. Perversely those least likely to communicate or engage in a group setting may be the very ones who are most need supplemental individualised care.

We found no compelling evidence that, **within the context of the entire health system**, the group clinic approach offers efficiencies over the usual care system. Considerations here are that a large proportion of patients will not take up group clinic provision – either because of initial preferences or following personal experience of the approach – and will require individual consultations. Furthermore the large majority of group clinic approaches make provision for individual consultations within the model with additional cost consequences. Investigation of this phenomenon, which ran counter to the original perceived rationale for conducting this review revealed that this may be primarily an artefact of U.S. funding arrangements, where most evaluations have taken place. For example, Blue Cross/Blue Shield Corporate Reimbursements will not cover Group Visit (Shared Medical Appointments) if "the patient is not allowed to have one-to-one time with the physician during the group visit, at the patient's request" and furthermore requires that "Individual as well as group interaction must be documented in the patient's medical record" [139] . Detailed evaluation in a UK setting is required to assess the proportion of patients who would avail themselves of an individual consultation in addition to the group interaction or who would find a group clinic unacceptable.

The Quality of care argument

Achievement of positive biomedical or associated outcomes is variable. While it is conceivable that ongoing self monitoring, allied to hands on experience of aspects of self care and the positive support of realistic models and peers, may achieve a beneficial effect it is unclear whether group clinics are the optimal method for harnessing such mechanisms.

The Acceptability argument

While concerns over confidentiality and privacy are not as plentiful as might be expected it must be recognised that the views of those who are not willing to enter into a group clinic trial at all are imperfectly captured by either quantitative or qualitative studies. In addition individuals may be able to enter a group clinic arrangement on an experimental basis but may subsequently decide the experience was not positive enough for them to continue such an approach beyond the lifespan of the trial. Indeed there is little evidence on the sustainability of group clinic approaches.

The Enhancement model

Typically group clinic approaches have been investigated as an alternative to individual consultations. Comparisons between different types of group intervention of differing intensities and with/without clinical input are required to examine the differential benefit of the added group clinic-specific input. Considerations for the feasibility of group clinics may centre on whether group clinics are seen as an entirely new intervention or whether they represent a means of systematising and joining up existing group education and individual clinician input and, thereby, placing group education provision in a more central role than currently appears to be the case.

Translating the Evidence to a UK Context – A "translational appendix"

When translating the evidence from the (primarily) U.S. trials to a U.K. context health service managers should recognise that…

The research, evaluation and service delivery agenda has been heavily influenced by U.S. health provider funding patterns. Although current U.K. initiatives favour the terminology "group clinics" this term is not commonly used by the predominantly U.S.-based evaluated models. This difference in terminology may mask common theoretical foundations and intervention components, making comparability of real practice to available research particularly challenging. In addition the solutions developed by the U.S. do not by any means reflect the wide range of formats, content and intensities that might be of value within an NHS setting.

There is little empirical evidence examining the most attractive model for the U.K., namely of group clinics as a substitute for the individual consultation. Within the UK there is a strong expectation of being seen by a clinical specialist. For these reasons the potential to alter the content of the individual consultation, by transferring some of this content to a group context, or indeed other formats, may well be more attractive than complete substitution of a new model. However the joining up of individual consultation and group education approaches may be problematic given that the latter are often seen as an optional extra, by patients, primary care physicians and other health care providers.

In particular, it must be recognised that provision must still be made for those whose complex needs or other circumstances may militate against a group clinic approach. A particular concern is the possible effect on those who may otherwise seem disadvantaged in terms of access to health or healthcare. Specific populations mentioned were those with hearing impairment, for whom the group environment may be unaccommodating, and those from specific ethnic minorities, where cultural considerations may impact on dignity, respect and privacy.

With regard to facilities, the availability of suitable venues and of suitably trained staff is a key consideration. If group approaches are delivered badly then this may be taken as a sign of a lack of commitment on the part of the health care providers.

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Appendices

Appendix 1 - FAME Framework [11]

Table 30 - Components of FAME Framework

Feasibility (F)[1]	**Appropriateness (A)[2]**	**Meaningfulness (M) to specific populations, cultures and settings[3]**	**Effectiveness (E)[4]**	**Economic Evidence (EE)**
Excluding Developing Countries	Staff Attitudes	Cultural values	Clinical Outcomes Health Services Outcomes (including Utilisation)	Costs Cost-Benefit

1. "The extent to which an activity is practical and practicable. Clinical feasibility is about whether or not an activity or intervention is physically, culturally or financially practical or possible within a given context".
2. "The extent to which an intervention or activity fits with or is apt in a situation. Clinical appropriateness is about how an activity or intervention relates to the context in which care is given."
3. Evidence of meaningfulness – "the extent to which an intervention or activity is positively experienced by the patent. Meaningfulness relates to the personal experience, opinions, values, thoughts, beliefs and interpretations of patients or clients."
4. "The extent to which an intervention, when used appropriately, achieves the intended effect. Clinical effectiveness is about the relationship between an intervention and clinical or health outcomes."

Appendix 2 – Search Strategies

The following electronic databases were searched for published and unpublished research evidence from 1999 - present:

- The Cochrane Library including the Cochrane Systematic Reviews Database, Cochrane Controlled Trials Register, DARE, HTA and NHS EED databases
- MEDLINE (Ovid)
- EMBASE (Ovid)
- CINAHL (EBSCO)
- Science Citation Index (via ISI Web of Science)
- Social Science Citation Index (via ISI Web of Science)
- Conference Proceedings Citation Index- Science (CPCI-S)- (via ISI Web of Science)

Search strategies for each database are provided below:

MEDLINE search strategy

1. group visit$.tw.
2. group clinic$.tw.
3. *Group Processes/
4. group appointment$.tw.
5. group care.tw.
6. group meeting$.tw.
7. group medical visit$.tw.
8. group medical clinic$.tw.
9. group medical appointment$.tw.
10. group medical care.tw.
11. group medical meeting$.tw.
12. gmv.tw.
13. gma.tw.
14. shared medical appointment$.tw.
15. shared medical visit$.tw.

16. cluster visit$.tw.

17. (group outpatient$ adj1 (visit$ or clinic$ or appointment$ or meeting$ or care)).tw.

18. or/1-17

19. limit 18 to (english language and yr="1999 -Current")

Embase search strategy

1. group visit$.tw.

2. group clinic$.tw.

3. *group process/

4. group appointment$.tw.

5. group care.tw.

6. group meeting$.tw.

7. group medical visit$.tw.

8. group medical clinic$.tw.

9. group medical appointment$.tw.

10. group medical care.tw.

11. group medical meeting$.tw.

12. gmv.tw.

13. gma.tw.

14. shared medical appointment$.tw.

15. shared medical visit$.tw.

16. cluster visit$.tw.

17. (group outpatient$ adj1 (visit$ or clinic$ or appointment$ or meeting$ or care)).tw.

18. or/1-17

19. limit 18 to (embase and english and yr="1999 -Current")

Cochrane Library

ID	Search
#1	"group visit*":ti,ab,kw (Word variations have been searched)
#2	"group clinic*":ti,ab,kw (Word variations have been searched)

#3 MeSH descriptor: [Group Processes] this term only

#4 "group appointment*":ti,ab,kw (Word variations have been searched)

#5 "group care":ti,ab,kw (Word variations have been searched)

#6 "group meeting*":ti,ab,kw (Word variations have been searched)

#7 "group medical visit*":ti,ab,kw (Word variations have been searched)

#8 "group medical clinic*":ti,ab,kw (Word variations have been searched)

#9 "group medical appointment*":ti,ab,kw (Word variations have been searched)

#10 "group medical care":ti,ab,kw (Word variations have been searched)

#11 group medical meeting*:ti,ab,kw (Word variations have been searched)

#12 gmv:ti,ab,kw (Word variations have been searched)

#13 gma:ti,ab,kw (Word variations have been searched)

#14 shared medical appointment*:ti,ab,kw (Word variations have been searched)

#15 shared medical visit*:ti,ab,kw (Word variations have been searched)

#16 "cluster visit*":ti,ab,kw (Word variations have been searched)

#17 "group outpatient visit*":ti,ab,kw (Word variations have been searched)

#18 "group outpatient clinic*":ti,ab,kw (Word variations have been searched)

#19 "group outpatient appointment*":ti,ab,kw (Word variations have been searched)

#20 "group outpatient meeting*":ti,ab,kw (Word variations have been searched)

#21 "group outpatient care":ti,ab,kw (Word variations have been searched)

#22 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21

CINAHL search strategy

#	Query
S22	(S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21)
S21	TI group outpatient care OR AB group outpatient care
S20	TI group outpatient meeting* OR AB group outpatient meeting*
S19	TI group outpatient appointment* OR AB group outpatient appointment*

S18 TI group outpatient clinic* OR AB group outpatient clinic*

S17 TI group outpatient visit* OR AB group outpatient visit*

S16 TI cluster visit* OR AB cluster visit*

S15 TI shared medical visit* OR AB shared medical visit*

S14 TI shared medical appointment* OR AB shared medical appointment*

S13 TI gma OR AB gma

S12 TI gmv OR AB gmv

S11 TI group medical meeting* OR AB group medical meeting*

S10 TI group medical care OR AB group medical care

S9 TI group medical appointment OR AB group medical appointment

S8 TI group medical clinic* OR AB group medical clinic*

S7 TI group medical visit* OR AB group medical visit*

S6 TI group meeting* OR AB group meeting*

S5 TI "group care" OR AB "group care"

S4 TI group appointment* OR AB group appointment*

S3 (MM "Group Processes")

S2 TI "group clinic*" OR AB "group clinic*"

S1 TI group visit* OR AB group visit*

Web of Science

#22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1

#24 Refined by: **LANGUAGES:** (ENGLISH)

DocType=All document types; Language=All languages;

#22 OR #21 OR #20 OR #19 OR #18 OR #17 OR #16 OR #15 OR #14 OR #13 OR #12 #23 OR #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4 OR #3 OR #2 OR #1

DocType=All document types; Language=All languages;

TI=(gma)

#22 *DocType=All document types; Language=All languages;*

TOPIC: (gmv)

#21 *DocType=All document types; Language=All languages;*

TOPIC: ("group outpatient care*")

#20 *DocType=All document types; Language=All languages;*

TOPIC: ("group outpatient meeting*")

#19 *DocType=All document types; Language=All languages;*

TOPIC: ("group outpatient appointment*")

#18 *DocType=All document types; Language=All languages;*

TOPIC: ("group outpatient clinic*")

#17 *DocType=All document types; Language=All languages;*

TOPIC: ("group outpatient clinic*")

#16 *DocType=All document types; Language=All languages;*

TOPIC: ("group outpatient visit*")

#15 *DocType=All document types; Language=All languages;*

TOPIC: ("cluster visit*")

#14 *DocType=All document types; Language=All languages;*

TOPIC: ("shared medical visit*")

#13 *DocType=All document types; Language=All languages;*

TOPIC: ("group medical clinic*")

#12 *DocType=All document types; Language=All languages;*

TOPIC: ("group medical meeting*")

#11 *DocType=All document types; Language=All languages;*

TOPIC: ("group meeting*")

#10 *DocType=All document types; Language=All languages;*

TOPIC: ("group care")

#9 *DocType=All document types; Language=All languages;*

TOPIC: ("group appointment*")

#8 *DocType=All document types; Language=All languages;*

#7 **TOPIC:** ("shared medical appointment*")
DocType=All document types; Language=All languages;

#6 **TOPIC:** ("group medical appointment*")
DocType=All document types; Language=All languages;

#5 **TOPIC:** ("group medical care")
DocType=All document types; Language=All languages;

#4 **TOPIC:** ("group medical visit*")
DocType=All document types; Language=All languages;

#3 TS=("group processes")
DocType=All document types; Language=All languages;

#2 **TOPIC:** ("group visit*")
DocType=All document types; Language=All languages;

#1 **TOPIC:** ("group clinic*")
DocType=All document types; Language=All languages;

Search Strategies for finding details of UK initiatives/experts [Google]

S1. “united kingdom” AND “group clinics”

S2. “united kingdom” AND “shared medical appointments”

S3. “united kingdom” AND “group medical appointments”

S4. “united kingdom” AND “group medical visits”

S5. "shared medical appointments" AND host:ac.uk

S6. "group medical appointments" AND host:ac.uk

S7. “group clinics” AND host:ac.uk

S8. "group medical visits" AND host:ac.uk

S9. "shared medical appointments" AND host:nhs.uk

S10. "group medical appointments" AND host:nhs.uk

S11. “group clinics” AND host:nhs.uk

S12. "group medical visits" AND host:nhs.uk

Appendix 3 – Existing Systematic Reviews related to Group Clinics

Table 31 - Systematic Reviews with Outcome Measures and Results

Reference	Total no. of Patients	Biologic Markers	Other Outcomes/ Measurements
Edelman (2014) [20]	(2,921 in RCTs; 326 in OS)	**Haemoglobin** SMAs improved haemoglobin A1c (Δ=−0.55 percentage points [95 % CI, −0.11 to −0.99]); A1c result had significant heterogeneity among studies, likely secondary to heterogeneity among included SMA interventions. **Blood Pressure** SMAs improved systolic blood pressure (Δ=−5.2 mmHg [95 % CI, −3.0 to −7.4]); **Cholesterol** SMAs did not improve LDL cholesterol (Δ = −6.6 mg/dl [95 % CI, 2.8 to −16.1]).	Nonbiophysical outcomes, including economic outcomes, were reported too infrequently to meta-analyze, or to draw conclusions from

Rolfe (2014) [86]	11,063 patients	None	Trials showing small but statistically-significant increase in trust included: a trial of GVs for new inductees into a Health Maintenance Organisation and a trial of GVs for diabetic patients. However, trust not affected in subsequent larger trial of GVs for uninsured people with diabetes. No evidence of harm from any of the studies.

CADTH (2013) [82]		**Glycemic control** Better glycemic control achieved for group care vs usual care. **Blood Pressure** One included study found that for adults with hypertension better control of blood pressure is achieved with group care vs usual care. No information on effectiveness of group care for COPD or HIV/AIDS.	No cost-effectiveness evaluations of group care models identified. No evidence based guideline specifically on group care for chronic disease management was identified. One guideline on diabetes management recommended that diabetes education should be delivered in groups or individually, but did not recommend a preferred model.

Housden (2013) [83]	2,240 patients	**Glycated haemoglobin A1c (HbA1c)** Clear benefits of GMVs for HbA1c levels which are consistent post-intervention and change from baseline effect sizes. Most significant effect is change from baseline results. **Blood Pressure** Some evidence for post-intervention, and change from baseline, systolic blood pressure improvement at 9-12 months interval and change from baseline improvement at 4 years. **Cholesterol** No evidence that GMVs improve LDL cholesterol values.	None Reported

Slyer (2013) [84]	108 participants (52 in RCT)	2 studies; one RCT (52 participants) and one cohort study (56 participants).	Review examined knowledge, quality of life, self-care, and readmissions **Knowledge** RCT reported statistically significant improvement in heart failure knowledge at eight weeks, compared with control, not maintained at 16 weeks. **Quality of Life & Self care** **No** statistically significant differences in self-care and health-related quality of life, between groups at eight and 16 weeks. **Readmissions** No trial data

Edelman (2012) [18]	4157 patients	10/13 RCTs evaluating outcomes for patients with diabetes examined type 2 diabetes only, one examined type 1 only. Two examined mixed patient population. **Haemoglobin HbA1c** Studies enrolled patients with poor glucose control (thresholds varied from A1c .6.5% to >9%); a minority required elevated blood pressure or lipids. All studies reported effects on average glycated haemoglobin A1c (HbA1c) at end of intervention. SMAs associated with lower A1c vs. usual care at 4 to 48 months' follow up (mean difference= −0.55; 95% CI, −0.99 to −0.11). Effects varied significantly across studies; not explained by study quality. **Cholesterol** 8 studies reported effects on either total or LDL cholesterol, showing small but statistically non-significant treatment effects that varied across studies. **Blood Pressure** 5 studies reported effects on systolic blood pressure, showing consistent and statistically significant effect (mean difference= −5.2; CI, −7.40 to −3.05).	Two trials described effects on patient experience. Neither showed greater satisfaction for SMAs vs. usual care. **Quality of Life** Five studies reported large improvements in health-related QoL (standardized mean difference=−0.84; CI, −1.64 to −0.03). Effects greater for disease-specific measures. Findings from OS generally consistent with RCTs. **Admissions/ED vIsits** Effects of SMAs on hospital admissions and emergency department visits explored in five studies on patients with diabetes. In 3/5 studies admission rates lower with SMAs. Result statistically significant in only one study. Two studies found emergency

			department visits decreased significantly with SMAs. **Costs** Four studies reported effects on total costs. Results were mixed. In one, total costs significantly higher; in another, total costs significantly lower; in third, results did not differ significantly; and fourth conducted in Europe. **Health Care Utilization** 2 RCTs and one OS evaluated effects of SMAs on older adults with high health care service utilization rates. All studies reported positive effects on patient experience for SMAs vs. usual care. Both trials reported no difference vs. usual care for overall health

			status and functional status. Biophysical outcomes not reported. **Hospital Admissions/ED visits** 3 studies (2 RCTs + 1 OS) showed fewer hospital admissions in SMA groups. Both trials reported statistically significant decrease in ED visits for SMAs vs. usual care. Total costs lower for SMA group in each study but varied substantially across studies. Did not reach statistical significance for any study.

Steinsbekk (2012) [81]	2833 participants	4/10 participants were male, baseline age = 60 years, BMI 31.6, HbA1c 8.23 %, diabetes duration 8 years. 82 % used medication. Glycated haemoglobin A1c (HbA1c) reduced at 6 months (0.44 % points; P = 0.0006, 13 studies, 1883 participants), 12 months (0.46 %points; P = 0.001, 11 studies, 1503 participants) and 2 years (0.87 %points; P < 0.00001, 3 studies, 397 participants) **Blood Glucose** Fasting blood glucose levels reduced at 12 months (1.26 mmol/l; P < 0.00001, 5 studies, 690 participants) but not at 6 months.	**Knowledge** Diabetes knowledge improved at 6 months (SMD 0.83; P = 0.00001, 6 studies, 768 participants), 12 months (SMD 0.85; P < 0.00001, 5 studies, 955 participants) and 2 years (SMD 1.59; P = 0.03, 2 studies, 355 participants). **Self Management** Self-management skills improved at 6 months (SMD 0.55; P = 0.01, 4 studies, 534 participants). Improvement for empowerment/self-efficacy (SMD 0.28, P = 0.01, 2 studies, 326 participants) after 6 months. **Quality of Life** No conclusion could be drawn due to high heterogeneity. **Other Outcomes**

			Significant improvements in patient satisfaction and body weight at 12 months for IG. No differences between groups in mortality rate, body mass index, blood pressure and lipid profile.

Burke (2011) [87 88]	2240 patients	**Glycated haemoglobin A1c (HbA1c)** Clear benefits of GMVs for patients' HbA1c levels which are consistent in the post-intervention and change from baseline effect sizes. Most significant effect is with change from baseline results. **Blood Pressure** Evidence suggests post-intervention and change from baseline systolic blood pressure improvement at 9-12 month interval and change from baseline improvement at the 4 year timeframe. **Cholesterol** No evidence that group visits improve LDL cholesterol values of GMV participants.	No Details
Riley 2010 [79]		**Glycated haemoglobin A1c (HbA1c) , Blood Pressure, Lipids** Diabetes focused group visits that incorporate group education and a health provider office visit vs. traditional brief office visit failed to demonstrate consistent statistical improvement in A1C, BP, or lipids.	**Other Outcomes** GVs may reduce costs, some physiological outcomes may be improved, and patient and clinician satisfaction may be enhanced.

Jaber 2006 [78]		None	Although heterogeneity renders assessment of GV model problematic, there is sufficient data to support effectiveness of GVs in improving patient and physician satisfaction, quality of care, quality of life, and in decreasing emergency department and specialist visits. Future research may benefit, however, from abandoning old nomenclatures and clearly defining structure, processes of care, content of visits, and appropriate outcome measures.

Deakin (2005) [77]	1532 participants	**Haemoglobin** Results favour group-based diabetes education programmes for reduced glycated haemoglobin A1c (HbA1c) at 4-6 months (1.4%; 95% confidence interval (CI) 0.8 to 1.9; P < 0.00001), at 12-14 months (0.8%; 95% CI 0.7 to 1.0; P < 0.00001) and two years (1.0%; 95% CI 0.5 to 1.4; P < 0.00001); **Blood Glucose Levels** Reduced fasting blood glucose levels at 12 months (1.2 mmol/L; 95% CI 0.7 to 1.6; P < 0.00001); **Blood Pressure** Reduced systolic blood pressure at 4-6 months (5 mmHg: 95% CI 1 to 10; P = 0.01).	reduced body weight at 12-14 months (1.6 Kg; 95% CI 0.3 to 3.0; P = 0.02); improved diabetes knowledge at 12-14 months (SMD 1.0; 95% CI 0.7 to 1.2; P < 0.00001) Reduced need for diabetes medication (odds ratio 11.8, 95% CI 5.2 to 26.9; P < 0.00001; RD = 0.2; NNT = 5). For every five patients attending a group-based education programme one patient would reduce diabetes medication.

Appendix 4 - Intervention characteristics from Randomised Controlled Trials

Table 32 - Intervention Characteristics from RCTs

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
Clancy (2003) [48]	Cooperative Health Care Clinic (CHCC)	Socialization, Health Education/Information Presentation(s) by Individual Clinician, Routine Medical Checks by Multiple Clinicians, Immunization, Individual Consultation immediately following Group Session - All Patients	CHCC approach based on Beck Model [92]. Those randomized to CHCCs scheduled into three groups, 19- 20 patients, monthly meetings for 6 months. Main source of medical care. Each group visit session scheduled for 2 hours (15 min of warm-up, 30 min of presentation of a health-related topic, 15-min break, during which time the nurse and physician circulated, attending to individual needs, immunizations, appointment scheduling, and other issues; 15 min of questions and answers; 15 min of planning the next session; and 30 min of one-on-one consultations with physician). Content of GVs guided by group members themselves, although educational topics covered included core	GVs co-led by primary care internal medicine physician and diabetes nurse educator	If patients needed care between scheduled GVs, or if specific medical needs could not be accommodated in GV, they could schedule a one-on-one visit with an APCC provider.

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			curriculum topics (e.g. nutrition, exercise, foot care, medications, complications, and the emotional aspects of diabetes [20]). Upon conclusion of group portion of visit, patients had opportunity to see physician individually if desired.		
Clancy (2003) [47]	Cooperative Health Care Clinic (CHCC)	Socialization, Health Education/Information Presentation(s) by Individual Clinician, Routine Medical Checks by Multiple Clinicians, Immunization	Warm up and Socialization [15 mins], Presentation of Health Topic [30 mins], Break (While Physician and Nurse circulated attending to individual needs, immunization, appointment scheduling etc) [15 mins] Questions and Answers [15 mins], Planning Next Session [15 mins], One-on-One Consultations with Physician [30 mins]	Hospital physician and specialist nurse.	Care between scheduled visits or specific needs to see individual clinician between visits scheduled as one-on-one sessions.
Clancy (2003) [49]	Cooperative Health Care	Socialization, Health Education/Information Presentation(s) by	Warm up and Socialization [15 mins], Presentation of Health Topic [30 mins], Break (While Physician and Nurse circulated attending to individual needs,	Hospital physician and specialist nurse.	Care between scheduled visits or specific needs to see

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
	Clinic (CHCC)	Individual Clinician, Routine Medical Checks by Multiple Clinicians, Immunization, Individual Consultation immediately following Group Session - All Patients	immunization, appointment scheduling etc) [15 mins] Questions and Answers [15 mins], Planning Next Session [15 mins], One-on-One Consultations with Physician [30 mins]		individual clinician between visits scheduled as one-on-one sessions.
Clancy (2006) [50]	Cooperative Health Care Clinic (CHCC)	Socialization, Health Education/Information Presentation(s) by Individual Clinician, Routine Medical Checks by Individual	Patients randomized to GVs divided into 6 cohorts (14–17 patients). Met monthly for 1 year on different floor in same building as clinic. One-on-one visits available for care needed between scheduled GVs or for specific medical needs not amenable to GVs. GVs scheduled for 2 hours (10–	Primary care internal medicine physicians. Registered nurses.	Mammograms, PAP smears and Retinal examinations were scheduled separately

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Clinician, Medication Review, Individual Consultation within the Group Session - All Patients	15 minutes for "warm-up", 30-45 minutes for an interactive discussion of a health-related topic such as foot care or health eating strategies, and 60 minutes for one-on-one consultations with the physician. Vaccinations, foot exams, medication adjustments, laboratory orders, and referrals for retinal examinations could be done in GVs. GV content, though patient-guided, was physician-directed to cover educational topics included in a core curriculum (e.g. nutrition, exercise, foot care, medications, complications of diabetes, and emotional aspects of diabetes [20]).		
Clancy (2007) [51]	Cooperative Health Care Clinic (CHCC)	Socialization, Health Education/Information Presentation(s) by Individual Clinician,	CHCC approach based on Beck Model[65]. Patients randomized to GVs divided into 6 groups that met monthly for 12 months, each consisting of 14 to 17 patients. Main source of medical care. Visit lasts	Primary care internal medicine physicians. Registered nurses.	At GVs patients could schedule appointments for mammograms and

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Routine Medical Checks by Individual Clinician, Individual Consultation within the Group Session - All Patients	for 2 hours: 10 to 15 minutes for warm up, 30 to 45 minutes for interactive discussion of health-related topic, and 60 minutes for one-on-one consultations with the physician. Medical appointments requiring privacy undertaken outside Group Clinic setting. GV content, guided by patients, was directed by physicians to cover educational topics included in a core curriculum [20].		PAP smears and for other specific medical needs not suited to GV (e.g. abdominal examination, electrocardiograms).
Clancy (2008) [52]	Cooperative Health Care Clinic (CHCC)	Socialization, Health Education/Information Presentation(s) by Individual Clinician, Routine Medical Checks by Individual Clinician, Individual Consultation within	As Above	Primary care internal medicine physicians. Registered nurses.	At GVs patients could schedule appointments for mammograms and PAP smears and for other specific medical needs not suited to GV.

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		the Group Session - All Patients			
Cohen (2011) [53]	Shared Medical Appointment (SMA)	Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Multiple Clinicians, Routine Medical Checks by Individual Clinician, Medication Review, Completion of Prescriptions, Referral from within Group to [Different day] Follow Up Visit	Phase 1: VA MEDIC-E Intervention. Regular visits with a primary care provider PLUS 4 once-weekly 2-hour sessions, followed by 5 monthly booster sessions. 4 to 6 participants in each session. Family members, friends, and other sources of social support were encouraged to participate in the sessions with the participants. Two parts: education in the first half and behavioural and pharmacologic interventions for hypertension, hyperlipidaemia, and hyperglycaemia and tobacco use in the second. This part allowed for open discussions about each risk factor control, obstacles, and solutions. Participants given a cardiovascular report card (medication list, vitals, and laboratory data).	Educational component from pharmacist, dietician, nurse, and physical therapist. Intervention component provided by clinical pharmacist who was either a nationally certified diabetes educator or Rhode Island certified	Visits with primary care provider as required

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			Participants set dietary goals, kept a food log, and set goals to increase daily exercise Medication regimens were discussed and evaluated, and dose up-titrations were made per pre-established protocols. Participants that wanted individual assistance with exercise or dietary guidance were given referrals to the health care provider after the 4 weekly sessions. Phase 2: Monthly Booster Intervention Booster SMA sessions occurred monthly for 5 months and lasted 90 minutes. Structure of monthly booster was similar to weekly group SMA session except that educational component was less structured and focused on group needs. Treatment plans for diet, exercise, monitoring, or other self-care behaviours followed and adjusted.	diabetes outpatient educator	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
Cole (2013) [54]	Shared Medical Appointment (SMA)	Group Discussion (i.e. Many-to-Many),	Screener received patients, ensured patients understood and signed consent form; documented height, weight, and blood pressure measurements; asked each patient to complete an individual questionnaire; and escorted patients to SMA room. SMA sessions set up for 6-8 patients. Facilitator greeted each patient, familiarized new patients to SMA process, covered ground rules, built group cohesion, and facilitated discussion on topics of interest while provider reviewed notes and consulted with recorder between individual sessions. Each patient received 10 minutes individual focused time with provider to review their clinical and biochemical measures and challenges, successes, and questions regarding their progress in making lifestyle changes using SMART	Supported by nutrition technician serving as a screener; a dietitian or nutrition technician as session recorder; a certified diabetes educator registered dietitian as provider; and a behavioral specialist, registered nurse, or registered dietitian trained in group dynamics as facilitator of sessions.	No details

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			goals (specific, measurable, achievable, realistic, and time-based). All pertinent information discussed during visit recorded in each patient's medical record by recorder who also scheduled a follow-up SMA appointment.		
Coleman (2001) [55]	Cooperative Health Care Clinic (CHCC)	Socialization, Routine Medical Checks by Multiple Clinicians, Immunization, Completion of Prescriptions, Individual Consultation within the Group Session - All Patients	GVs held monthly. Average attendance of 8-12 participants per group. Caregivers and spouses invited to attend. Standard format. Visit began with brief warm-up and socialization period followed by presentation on a specific health topic. Initially, topics were same for all groups. Subsequent topics chosen based on group consensus. Next 25 minutes devoted to health-promotion activities and included blood-pressure assessment, administration of such immunizations as influenza and pneumococcal vaccines, and medication refills. Group then	Core delivery - primary care physician, nurse, and clinical pharmacist. Ancillary providers, including a dietitian, social worker, and physical therapist, attended periodically.	No details

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			reconvened for brief question-and-answer period on the topic that was presented. During this time, next session and its health topic presentation planned. Remaining time reserved for individual sessions between patients and physician which served as interim assessments of ongoing chronic disease management, although acute problems were evaluated as well. Remaining patients used time to fill prescriptions or to socialize.		
Crowley (2014) [56]	Group Clinic (GC)	Socialization, Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Individual Clinician, Routine Medical	Initial Study Visit - Collection of baseline information (demographic and medical) then randomisation then intervention (three phases). Phase 1 - brief medical questionnaire, BP check, collection of patient delivered blood glucose data from patients, informal conversation between patients. Phase 2 - Interactive group educational	Care team comprising a general internist, a pharmacist, and a nurse or certified diabetes educator.	Telephone contact between GMC only when lab tests undertaken in GMC and changes to symptom management made.

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Checks by Multiple Clinicians, Medication Review, Individual Consultation within the Group Session - All Patients	session on topics selected by patients. During session, clinicians reviewed data collected in Phase 1 and developed medication and lifestyle management plan with the aim of improving BP and HbA1c. Phase 3 - Individual meeting between pharmacist/internist/both and patient to gather patient specific information to inform the medication and lifestyle management plan. Then patient and clinician negotiated final plan for improved disease control which was entered into patient medical record. Patient received updated medication list with instructions for any medication or lifestyle changes.		GMC patients continued to receive usual primary care in addition to GMC. Changes in medication noted in electronic medical record.
Crowley (2013) [57]	Group Clinic (GC)	Group Discussion (i.e. Many-to-Many), Health	Each group included 7-9 patients. Groups met every 2 months for 12 months (7 120-minute sessions over 12 months). Within groups, patients	Care team comprising a general internist, a	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Education/Information Presentation(s) by Individual Clinician, Routine Medical Checks by Individual Clinician, Individual Consultation within the Group Session - All Patients	and care teams remained consistent across sessions. Each 120-minute GMC session included 3 phases. Phase 1 (30 minutes) focused on patient intake and data collection. On presentation, each patient completed a brief triage form, had BP check, and turned in recent self-monitored blood glucose or BP data. Intake also allowed time for informal conversation among group members. Phase 2 (30-45 minutes) consisted of an interactive group education class led by assigned educator. Concurrent with the education class, the internist or clinical pharmacist reviewed patients' self-monitored data, medical records, and laboratory values, and developed a plan to improve cardiovascular disease risk-factor control (including lipids). In phase 3 (30-45 minutes), clinical	pharmacist, and a nurse or certified diabetes educator.	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			pharmacist or internist met individually with patients for 5-10 minutes each to gather additional information about issues that could affect treatment decisions (e.g., medication adherence, adverse drug events). Final treatment plan was determined. Patients received an updated medication list with instructions regarding any changes. GMC patients continued to receive usual primary care alongside intervention. Lipid goals discussed with GMC patients during phase-3 individual sessions, and lipid medications adjusted as clinically indicated. Lifestyle modification measures explicitly targeting lipids not addressed during GMCs but patients received extensive education in related areas, including medication adherence, diet, and exercise.		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
Dorsey (2011) [58]	Group Medical Visit (GMV)	Socialization, Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Individual Clinician, Individual Consultation immediately following Group Session - All Patients	Patients and their caregivers. Visits lasted approximately 90 minutes (5 minutes of introductions, 10 minutes of patient updates, 40-minute educational session chosen by participants. 15-minute break, 20 minutes completing the educational session, addressing patient/caregiver questions, discussing current research opportunities, and selecting educational session topics. Brief 10 minute one-on-one visits prior to or after the group session with physician. 12-month study, group visits once every 3 months. Patients could attend an unscheduled one-on-one visit with the study physician between sessions. Individuals in the usual care group saw the physician whom they had previously seen for their care. Generally patients in the usual care group saw their physician	Physician	Group patients could attend unscheduled one-on-one visit with study physician between sessions. Participants were encouraged to contact the physicians' office via telephone at any time for issues happening between visits (medicine refills, acute change in disease status).

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			every 3–6 months for approximately 30-minute visits.		
Edelman (2010) [59]	Group Clinic (GC)	Socialization, Group Discussion (Many-to-Many), Health Education/ Information Presentation(s) by Individual Clinician, Health Education/ Information Presentation(s) by Multiple Clinicians, Routine Medical Checks by Multiple Clinicians, Routine Medical Checks by	Randomised patients selected suitable GMC date. Each group comprised 7-9 patients. Groups met every 2 months for 7 visits, and the same patients met with the same care team each visit. GMC sessions scheduled for 2 hours; however, visits after the first typically lasted approximately 90 minutes. Each session was divided into 3 phases Phase One - intake and data collection phase (brief questionnaire, BP check, assessment of self-monitored blood glucose, informal conversation). Phase Two, 30 minutes into the session – Patient chosen interactive educational session provided by the assigned educator. While patients were attending the interactive education session, internist	Care team for each group composed of a primary care general internist, a clinical pharmacist, and a nurse or other certified diabetes educator.	All patients received usual primary care from Veterans Affairs Medical Centre

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Patient, Medication Review, Individual Consultation immediately following Group Session - All Patients, Telephone follow-up	and clinical pharmacist reviewed clinical information and developed a plan for medication and lifestyle management Phase Three - a one-on-one breakout session (pharmacist/internist) for a final plan for improved disease control. At conclusion of meeting, patients received an updated list of their medications, with instructions for any medication or lifestyle changes and reminder for next visit.		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
Graue (2005) [60]	Group Visit (GV)	Socialization, Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Individual Clinician, Health Education/Information via booklet, leaflet, video, Routine Medical Checks performed by Patient, Computer-assisted individual consultation	Intervention group (structured educational and counselling programme) or a control group (traditional care). Intervention group - 15-month structured educational and counselling programme At intervals of 3 months, separate group visits for the adolescents and their parents and also individual computer assisted consultations for the adolescents. Each of the three 3-h group visits (four to nine participants per group) followed a structured programme. Younger (11–13 years) and older (14–17 years) adolescent groups. An older, experienced adolescent with diabetes (about 3–4 years older than participants) participated as a co-leader of each group. Three 45-min individual consultations scheduled during intervention period for nurse to review patients participation and	Physician, diabetes nurse specialist, clinical psychologist, dietician and social worker.	In months 4 of programme parents attended meeting with other parents.

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			understanding. Combining GVs with individual computer-assisted consultations to take advantage of group dynamics on the learning process. GVs gave opportunity to build up a social network Patient–provider relationship strengthened by the three individual consultations.		
Griffin (2009) [61]	Group Clinic (GC)	Health Education/Information Presentation(s) by Individual Clinician, Medication Review	60 minute anticoagulation group session two mornings a week. 15 minute administrative preparation time for pharmacist. One pharmacist/student presented health education topic and facilitated a group discussion while other called patients one by one into private room. During one	Pharmacist/Pharmacy student	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			to one session pharmacist interviewed patient and inquired about missed doses, change in medication, changes in diet, alcohol use, and bleeding or bruising experiences and measured patients INR value. No patient specific information discussed with group. If patient required further time patient was asked to stay after group discussion to complete visit. Warfarin dosing instructions and scheduling of follow up appointments discussed with each patient at end of each visit.		
Gutierrez (2011) [62]	Shared Medical Appointment (SMA)	No details	No Details	General Practitioner/Family Physician, General Nurse, Pharmacist, Social Worker,	No Details

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
				Medical Assistant, Registration Clerk	
Junling (2012) [63]	Cooperative Health Care Clinic (CHCC)	Socialization, Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Individual Clinician, Routine Medical Checks by Individual Clinician, Individual Consultation immediately following Group Session - Selected Patients	Intervention based on CHCC model - taking into consideration Chinese culture and the Chinese guideline for hypertension management, called the Chinese hypertension group visits model (CHGVM). The CHGVM was composed of intensive sessions (ISs) and continuous usual sessions (CUSs). The IS involved 6 sessions, held once a half month. CUSs were held once a month and followed the IS. Sessions were interactive, and the nurse or the CHW facilitated conversation among the patients. Typical GV consisted of warm-up period (15 minutes), an education component (30 minutes on specific key hypertension topics), and question and answer period, followed by	General Practitioner/Family Physician, General Nurse, Community Health Worker	No details

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			individual consultation (60 minutes) for patients who needed it where blood pressures, test results, immediate health care needs, and scheduled future tests. Plus patient concerns, prescriptions and adjusted therapeutic scheme as required.		
Liu (2012) [64]	Cooperative Health Care Clinic (CHCC)	Socialization, Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Individual Clinician, Routine Medical Checks by Individual Clinician, Routine Medical Checks by Multiple Clinicians,	12 sessions of the program. Each session had six phases: (1) introduction/feedback; (2) group self-management education; (3) refreshments and group interaction; (4) questions and answers; (5) planning and closing; and (6) one-on-one visit with health care providers. Length of each session was 1.5 hours plus 1 hour post for selected individual visits. Group self-management education sessions focused on helping participants build confidence in their ability to deal with diabetes by incorporating self-efficacy enhancing strategies Each participant to	General Practitioner/Family Physician, General Nurse, Preventive Doctor	No details

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Completion of Prescriptions, Individual Consultation immediately following Group Session - Selected Patients	make weekly action plan for coming month (four weeks) at each group session in this study. In total, each participant made 12 weekly action plans over the whole 12-month intervention period. Participants could seek further self-management support during 60-minute one-on-one visits with health care providers at the end of each GV session (25% uptake)		
Naik (2011) [65]	Group Clinic (GC)	Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Individual Clinician, Medication Review, Individual	EPIC Intervention. 4 group sessions every 3 weeks over a 3-month period. Each session consisted of 1 hour of group interaction then each participant had 10 minutes of individual interaction with the study clinician. For each EPIC session, the group interaction was divided into three 20-minute blocks, each conveying the session theme using different modalities - clinician led, group led and	Three study clinicians (primary care physicians).	No details

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Consultation within the Group Session - All Patients, Communication with Primary Care Provider	peer led. During the one-on-one consultation with the study clinician, participants discussed their DM status, received feedback on their specific DM goal and action plan, and addressed medication-related issues. Study clinicians sent a research note to PCPs after each session about HbA1c, goals and actions and medication changes..		
Ratanawongsa (2012) [66]	Group Medical Visit (GMV)	Socialization, Group Discussion (i.e. Many-to-Many), Individual Consultation within the Group Session - Selected Patients	GMV involves language-specific monthly group medical visits for 9 months. Group medical visits involve 6–10 patients, are facilitated by a language concordant primary care physician and health educator, last 90 min, and share the same basic structure: (1) group check-in, in which participants report any problems or progress with action plans and the group facilitates problem solving, adjustment, and/or recommitment to action plans;	Hospital Physician, Health Educator.	Standard diabetes care provided by their PCPs and any diabetes education, nutritional counseling, or subspecialty endocrinology care that was

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			(2) discussion of common concerns or modelling of self-management practices; (3) social break with healthy snacks; (4) short planning session to select subsequent topics; and (5) brief, individualized care to patients with unmet medical needs. All patient interactions with GMV facilitators, including action plans created and achieved, were communicated with PCPs.		recommended by their PCPs
Sadur (1999) [20]	Cluster Visit (CV)	Health Education/Information Presentation(s) by Individual Clinician, Referral from within Group to [Different day] Follow Up Visit	Diabetes Cooperative Care Clinic (DCCC), a CV model of care management. 6-month intervention. Team behaviorist conducted from 1-4 individual sessions with a total of 13 patients after either patient self-referral or referral initiated by nurse or dietician. Pharmacist reviewed medication. Medical assistant measured blood pressure and provided clerical support. Information provided in	Multidisciplinary diabetes care team includes dietitian, behaviorist, and pharmacist. Led by diabetes nurse educator who is	Referrals to the behaviorist, smoking cessation or drug and alcohol rehabilitation programs, or patient's primary care physician made

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			education sessions was suggested by patients e.g. every group opted to schedule a cluster session with the podiatrist, who lectured and screened all patients with a foot examination. Patients requiring individual therapy were scheduled for visits in the podiatry clinic. Patients requiring ophthalmology screening had examinations scheduled by team. Doctors and nurses met to discuss patient progress. Clinic provided all patients' primary care physicians with copies of progress notes that went into the medical record. Near end of 6-month intervention, diabetes nurse educator and behaviourist discussed transitioning diabetes care back to primary care physician.	supported by two diabetologists.	as appropriate. Between meetings, diabetes nurse educator reviewed diabetes management by telephone from twice monthly to every 3 days,

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
Schillinger (2008) [67]	Group Medical Visit (GMV)	Socialization, Group Discussion (i.e. Many-to-Many), Routine Medical Checks by Individual Clinician, Individual Consultation within the Group Session - Selected Patients, Short planning session to decide future topics	GMV model involves language-specific monthly group medical visits for 9 months. GMVs involve 6-10 patients, are co-facilitated by a language-concordant primary care physician and health educator, last 90 minutes, and share the same basic structure: (a) group check-in, in which participants report any problems or progress with action plans and the group facilitates problem-solving, adjustment, and/or recommitment to action plans; (b) discussion of common concerns or modeling of self-management practices; (c) social break with healthy snacks; (d) short planning sessions to select subsequent topics; and (e) brief, individualized care to patients with unmet medical needs by the physician, health educator, or pharmacist (to review medication regimens).		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
Schillinger (2009) [68]	Group Medical Visit (GMV)	Socialization, Group Discussion (i.e. Many-to-Many), Routine Medical Checks by Individual Clinician, Individual Consultation within the Group Session - Selected Patients, Short planning session to decide future topics	GMV arm involved 90-min monthly sessions over 9 months, with 6–10 participants, co facilitated by a primary care physician and health educator. GMV participants received bus tokens and healthy snacks.	No Details	No Details
Scott (2004) [69]	Cooperative Health Care Clinic (CHCC)	Socialization, Health Education/Information Presentation(s) by Individual Clinician, Health	Research staff contacted intervention members by telephone to schedule an initial group meeting. Groups met with their primary care physician and a nurse every month for 90 minutes. Other providers (e.g., physical therapists, pharmacists, occupational	General Practitioner/Family Physician, General Nurse, Pharmacist, Occupational	Individual consultations were available.

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Education/Information Presentation(s) by Multiple Clinicians, Routine Medical Checks by Multiple Clinicians, Immunization, Completion of Prescriptions, Individual Consultation immediately following Group Session - Selected Patients, Referral from within	therapists, and individuals representing community resources) attended as needed, depending on the topics scheduled for discussion during GV. Typical group meeting consisted of 15-minute spontaneous or organized warm-up period, an education component, a caregiving period, and question and answer period, followed by planning next meeting. After each meeting, physician would meet briefly one-on-one with individual patients as needed. For first few meetings, reminiscence therapy techniques were used to identify common experiences among group members to build a sense of group cohesiveness. In later groups process became more informal (e.g., jokes, stories about vacations, grandchildren). 30-minute presentation on specific health-related topics followed warm-up period. Six	Therapist, Physiotherapist Dietitian	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Group to [Different day] Follow Up Visit	core topics presented during meetings after introduction to program: patient care notebooks, routine health maintenance, pharmacy brown bags, advanced directives, emergency care, and continuing care. Other topics included chronic pain; nutrition; exercise; home safety; and disease processes (e.g. stroke, hypertension, arthritis, osteoporosis, and Alzheimer's disease). Participants requested some topics. Physician and other members of CHCC interdisciplinary healthcare team presented topics. A 20-minute caregiving period followed, during which nurse took blood pressures; reviewed patient charts for immunizations, laboratory tests, and immediate healthcare needs; and scheduled future, individual physician visits, if needed. At the same time, the		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			physician responded to minor patient concerns, refilled prescriptions, and responded to individual needs. Patients not being evaluated by the nurse or physician given opportunity to socialize and have refreshments. 15 minutes dedicated to questions and answers about material covered in the educational period or any other patient's inquiry. Additional 10 minutes used to elicit ideas for following month's education topic and to schedule next month's meeting. 60-minute period for patients needing private office visits to meet individually with their physician for 5-10 minutes followed each group meeting.		
Seesing 2014 [91]	Shared Medical	Health Education/ Information	Patients and partners invited to attend an SMA of 1.5 to 2 hours in lieu of their annual appointment. During the SMA, one of 2 neurologists saw 5 to 8	Neurologist; group mentor	In both groups, patients not necessarily seen by

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
	Appointment (SMA)	Presentation(s) by Single Clinician	patients with the same diagnosis and their partners simultaneously, addressing the same topics that are frequently covered during an individual appointment. Neurologist supported by a group mentor who facilitated the group process by fostering interaction between patients and partners and by managing time. Both neurologists and the group mentor had received training in conducting SMAs before the study. More detailed description of content on *Neurology*® Web site at Neurology.org.		their regular consulting physician. For both groups, care was tailored to needs of patients and their partners. Prescriptions, referrals, and medical record-keeping were as usual.
Taveira (2010) [70]	Shared Medical Appointment (SMA)	Health Education/ Information Presentation(s) by Multiple Clinicians,	Patients in VA-MEDIC arm attended 4 weekly, 2-hour sessions in a classroom setting, with approximately 4 to 8 participants in each session. Family members, friends, or other sources of social	Nurse, nutritionist, physical therapist, clinical pharmacist.	Patients attended their regular visits with their primary care physicians.

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Health Education/Information via booklet, leaflet, video, Medication Review	support encouraged to participate in sessions with participants. Each session had 2 parts: education in the first half and behavioural and pharmacological interventions in the second half. The education part (40 to 60 minutes) - interactive lectures covering learning objectives from curriculum of American Association of Diabetes Educators. Each session focused on 1 or 2 diabetes self-care behaviours. Pharmacological and behavioural intervention (60 to 80 minutes) conducted by clinical pharmacist who treated diabetes, hypertension, dyslipidaemia, and tobacco. Clinical pharmacist began by reflecting on content of educational half and performed group assessment of confidence and conviction in achieving target behaviours. Medication regimens discussed and titrated based		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			on previously formulated medication titration algorithms for blood pressure, cholesterol, glycaemic control, and tobacco cessation. Exercise prescriptions given following recommendations of American Heart Association. Participants taught to carry a cardiovascular risk report card containing medical history, medications, vitals, and laboratory values obtained prior to the sessions. For tobacco cessation, VA-MEDIC interventions based on trans-theoretical model.		
Taveira (2011) [71]	Shared Medical Appointment (SMA)	Socialization, Health Education/Information, Routine Medical Checks, Medication Review	VA MEDIC-D Intervention - "In additional to attending regular visits with a primary care provider" plus "4 once-weekly sessions of 2 hours followed by 5 monthly booster sessions held in a classroom with approximately 4-6 participants in each session". "Each session comprised of 2 parts:	Specialist Nurse, Pharmacist, Dietician	Regular visits with a primary care provider

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			education in the first half, and behavioural and pharmacologic interventions....in the second half". Education session lasted 40-60 minutes and included interactive lectures and focussed on 1 or 2 self-care behaviours. Pharmacologic and behavioural intervention portion lasted 60-80 minutes. Led by pharmacist. Group counselling and reinforcement. Each group member provided with individualized homework for medication changes and a behaviour change goal.		
Trento (2001) [72]	Group Visit (GV)	Group Discussion (i.e. Many-to-Many), Routine Medical Checks by Individual Clinician, Individual Consultation	Four sessions focused on undesirability of being overweight, meal planning, improving and checking metabolic control, and preventing chronic complications. Blood samples collected in advance of group consultation. Patients needing individual clinical attention were seen on a one-to-one basis	Hospital Physician, Educationalist	Physicians spent ;30 min before each session to examine the case notes and the results of the patients' blood tests

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		immediately following Group Session - All Patients, hands-on activities, problem-solving exercises, real-life simulations, and role playing	by the same physician at the end of the group session. Each group session was structured into four phases: 1) welcome and introduction to the subject to be discussed; 2) interactive learning; 3) discussion of some of the patients' experiences; and 4) conclusions, with directions for follow-up "homework," information about the next appointment, and where necessary, individual visits with the physician During phase 1, the "homework" was collected and checked. Patients were given sealed envelopes containing results of their blood tests; these results were discussed collectively only if the patients so desired. During phases 2 and 3, which were not strictly separated, various hands-on activities, group work, problem-solving exercises, real-life simulations, and role playing were		and another 30 min meeting individually with all patients who had specific clinical problems and/or had completed their yearly screenings for complications. Each individual control visit required 15–20 min. In total, 150–200 min were needed to see 10 patients with the traditional

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			proposed. To reinforce cohesion and interpersonal relationships, same patients and facilitators took part in same groups over time. Relatives wishing to participate were welcomed. During phase 4, a diary for weekly monitoring of body weight and food intake was distributed as homework to be collected during phase 1 of the following session. Relatives were instructed in procedure to help patients with literacy problems. The four-session cycle was repeated for a second year.		approach, whereas group consultations did not take longer than 120 min.
Trento (2002) [73]	Group Visit (GV)	Group Discussion (i.e. Many-to-Many), Health Education/Information Presentation(s) by Multiple Clinicians,	Educational sessions held every 3 months (1-2 physicians and educationist as facilitators). The programme included: the burden of overweight, choosing food, meal planning, physical exercise, checking and improving metabolic control, smoke cessation, assuming medication and	One to two physicians and an educationist.	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		Individual Consultation immediately following Group Session - Selected Patients	preventing complications. This curriculum, divided into four sessions, was repeated in years 1–2 and then spread over seven sessions in years 3–4 to avoid excessive repetition and allow more in-depth discussion and learning. Patients requiring individual attention (i.e. those undergoing annual screening for complications and/or presenting clinical or biochemical abnormalities) and any who requested it, were offered individual care soon after the group session. Control patients were scheduled for 3-monthly visits, or as frequently as necessary, in the general diabetes clinic by the same physicians in charge of group sessions, blinded to avoid performance bias. Knowledge on diabetes self-care checked annually. One-to-one educational reinforcement offered accordingly by		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			the same educationist involved in group activities, with special reference to eating habits, home monitoring of blood glucose, if practised, and preventing complications.		
Trento (2004) [74]	Group Visit (GV)	Group Discussion (i.e. Many-to-Many), Routine Medical Checks by Individual Clinician, Individual Consultation within the Group Session - Selected Patients	Group sessions held every 3 months, with one or two physicians and an educator acting as facilitators. None of the patients moved from one treatment to the other during the study period. Group care was based on a systemic education approach. Curriculum intentionally kept to a minimum of essential concepts to be transmitted by hands-on activities, group work, problem-solving exercises, real-life simulations, and role playing. Program included the burden of overweight, choosing food and planning meals, physical exercise, checking and improving	One or two physicians and an educator	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			metabolic control, smoking cessation, correct assumption of medication, and preventing complications. This curriculum, initially divided in four sessions, was repeated in years 1 and 2, then spread over seven sessions in years 3 and 4 and started again in year 5 to allow more in-depth discussion and learning. Formal teaching and medical or scientific jargon avoided as much as possible.		
Trento (2005) [75]	Group Clinic (GC)	Group Discussion (i.e. Many-to-Many), Individual Consultation immediately following Group Session - All Patients, Hands-on	Focus groups run in advance of study to determine relevant topics. Nine session programme was developed according to a systemic education approach to address these topics. After these 9 sessions, the programme was re-assessed in a second round of focus groups, this time involving all the patients who had received group care. New	Doctor and a psychopaedagogist	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
		activities, group work, problem-solving exercises, real life simulations and role playing	curriculum designed with the patients included: differences between type 1/type 2 diabetes; principles of nutrition, classification of nutrients, composition of food and food exchanges: personal habits and day-to-day management; how to embed eating patterns into daily life, as tastes and habits evolve over time; physical exercise: adaptation of insulin dosage and daily activity; hypoglycaemia and hyperglycaemia: why do they occur, how to recognize and manage them, how to inform relatives and friends; areas of insulin injection and their rotation; retinopathy, neuropathy, microalbuminuria and nephropathy: self-care, when and how to screen; hypertension and cardio-vascular aspects. The patients also requested that insulin, glycated haemoglobin and day-to-day		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			problems be discussed whenever felt necessary. Re-design of a new 9-visit programme. Six more visits were delivered over the reminder of the 36 months - a total of 15 group care sessions. Samples taken in advance of clinic and reviewed. GVs held every 2 or 3 months by a doctor and a psychopaedagogist, who acted as facilitators Sessions were centred on hands-on activities, group work, problem-solving exercises, real life simulations and role playing, as well as group discussions concerned with motivational aspects, acceptance of diabetes, psychosocial problems and coping strategies. Sessions planned to last 40-50 min. Followed by brief individual consultations with same doctor, to comment on laboratory results, previous group		

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			session, and yearly check-up or emerging problems, if any.		
Wagner (2001) [76]	Chronic Care Clinic	Group Discussion (i.e. Many-to-Many), Routine Medical Checks by Multiple Clinicians, Individual Consultation within the Group Session - All Patients	Each chronic care clinic consisted of assessment; individual visits with primary care physician, nurse, and clinical pharmacist; and a group educational/ peer support session. Self-management support provided through one-on-one counselling with practice nurse and a group session. The 1-h group sessions conducted by the practice nurse or another relevant health professional covered various self-management issues and encouraged group involvement and interaction. Each clinic preceded by brief planning session involving a Masters-trained research nurse and practice nurse in which registry information was reviewed and plans established for individual patients and for the	Primary care physician, nurse, and clinical pharmacist	

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			group. Individual patient data and plans were summarized on a worksheet that indicated those assessments and management issues to be addressed.		
Yehle (2009) [31]	Shared Medical Visit		Participants privately saw clinic's one nurse practitioner for 10-minute physical examination and met in group of up to 6 other patients with HF plus a friend or family member for 1-hour semi-structured education and support group. Half intervention group had physical examination before group time, and half received it after group time. Education provided by nurse practitioner and the primary investigator. Medications and recent laboratory results were also discussed. Participants in control group saw nurse practitioner for one-on-one 30-minute visit. Participant received	Nurse practitioner	No details

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement	Other care received by the intervention group
			physical examination and time to ask questions related to living with HF in addition to discussing medications and recent laboratory results. Family member may or may not be present for the follow-up appointment.		

Appendix 5 – Characteristics of Qualitative Studies and Surveys

Table 33 - Population Characteristics – Qualitative Studies

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
Asprey (2012) [98]	Knee Osteoarthritis	Participation in one of three clinics for acupuncture for knee osteoarthritis.	Ten women and 6 men aged 49-89 years.	None given	Patients from clinics in two general practices in St Albans and the Royal London Hospital.	Nurses asked to give information packs to approximately same numbers of men and women and to approach as wide an age range of patients as possible. 4/6 nurses agreed to participate.

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
Capello (2008) [99]	Hypertension	Participants from Central Texas Veterans Healthcare system (CTVHCS). No exclusion of any racial/ ethnic group in recruitment. Participants were military veterans with hypertension as diagnosed by CTVHCS medical personnel: elevated systolic blood pressure readings at	Because of the high percentage of men receiving care from the CTVHCS, entire sample of study participants were men.	Medical or psychological conditions that may inhibit optimal functioning of group intervention (e.g. physiological diagnoses of hearing loss and psychological diagnoses as defined by DSM-IV TR) (e.g. dementia, schizophrenia and schizophrenia	After pre-screening, prospective participants were contacted by telephone and invited to take part in a program geared towards helping individuals who suffer from hypertension learn ways in which to better manage their own health. Individuals who	Random sample of 30 participants who completed program was contacted. In addition, a random sample of 7 individuals who failed to attend all DIGMA meetings was contacted.

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
		or above 140mm/Hg and diastolic blood pressure readings at or above 63 90mm/Hg.		related disorders and other psychotic disorders (e.g. dissociative disorders and mental disorders due to a general medical condition). Other psychological exclusionary criteria included diagnosis of any Axis Two disorders (DSM-IV TR). Review of patient medical files	agreed to program enrollment were asked to attend four meetings in total in addition to one brief telephone contact after the intervention	

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
				assessed exclusion criteria.		
Cohen (2012) [100]	Obesity, Metabolic Disorders and Smoking Cessation [Excluded]	Participation in three existing SMAs	Mean age (n = 17) was 62 (39- 85). 94% of sample (16) was male. Ethnicity closely divided between Caucasians (9, 53%) and African Americans (8, 47%). Majority of purposive sample was unemployed or retired (12, 70.6%).	No details	17 people participated in focus groups (Sept 2011-Jan 2012) out of 145 veterans contacted.	Sampling continued until all researchers agreed that saturation had been met and no new insights would be identified.

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
			Inclusion criteria included current enrollment, English speaking, adequate ability to hear, and under age 89 with documentation of participation in SMAs			
Hroscikoski (2006) [101]	Diabetes & Depression	None Given	None Given	None Given	No details	45 semistructured interviews with organizational leaders, external and internal change leaders, midlevel

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
						clinic managers, medical and administrative clinic leaders, front-line physicians, and nurses (53 persons).
Kirsh (2009) [25]	Diabetes	Not Relevant	Students on Interprofessional Course	No Details	Students enrolled in VA rotation participating in 4 SMAs	12 medical students observing SMAs plus 11 undergoing control
Lavoie (2013) [102]	Diabetes, Heart Disease/Hypertension, Providers; Arthritis	Self-reported health (1–5)+ • Mean (SD) (1.1)	Eligible providers had taken part in delivering GMVs during previous year. Providers	Mean Age (SD) 62.0 (16.0) Gender (% female) 65.5 Ethnicity (%)	Had attended a GMV (average of four GMVs in the previous year). 24 patients attended	Number of chronic conditions (%) Range 0 – 7 0 10.3 1 6.9

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
	Just over half (n=16) reported 3+ chronic conditions (%): Diabetes 58.6 Arthritis 48.3 High blood pressure 51.7 Depression 34.5 Heart Disease 20.7 Other: Kidney Disease 10.3 Other: Cholesterol 6.9	Notes: +higher score=better health;.	identified possible patients. Eligible patients were aged 19 years and over and who had attended one or more GMVs over previous year. Satisfied with care from family physician (%) Always/Usually 79.3	Caucasian 55.2 Aboriginal (%) First Nation 41.4 Métis 3.5 Marital Status (%) Married 79.3 Income (%) <$20,000 37.9 $20,000-$29,999 20.7 $30,000-$39,999 20.7 >$40,000 13.9	homogenous GMV where all in attendance shared similar diagnosis (e.g. pain or diabetes) and 5 attended heterogeneous GMV where diagnoses were mixed. Type of GMV attended (%)	2 27.6 3 or more 55.2 GMVs attended in last year Range 1-15 Mean (SD) 4 (3.0)

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
	Other* 27.6 ++patients asked to report all chronic diseases where they were given a diagnosis		Sometimes/Rarely/ Never 20.7	Missing 6.9	Cooperative Health Clinic model/ Homogenous 82.8 Drop-in Group Medical Appointments/ Mixed 17.2	
McCuistion (2014) [103]	General Chronic Disease	N/A	Medical and administrative staff (*n*=12) involved with implementation of SMAs at 3 geographically	No Details	No Details	Data collected by conducting key informant interviews focusing on SMA implementation process, including

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
			distinct, semiautonomous divisions of medical group.			motivations, history, barriers, and facilitators.
Mejino (2012) [104]	Type I diabetes	Children, Adolescent, Parents and health care providers	Understand and speak Dutch. Aged between 6 and 18 years. Scheduled to have an SMA.	No Details	Parents who had previously attended SMA asked to participate in online focus group (OFG) to exchange their experiences of SMAs with other parents.	Online focus group of eight parents

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
Miller (2004) [105]	At least one chronic disease diagnosis	No details	Low-income women with chronic disease	71% Latina	No details	No details
Oybiagele (2010) [106]	Stroke	No details	Elderly Spanish-only speaking stroke patients.	No details	13 Spanish-only speaking participants aged ≥60 years discharged from local government hospital in Los Angeles within 18 months of an index ischemic stroke.	13 Spanish-only speaking participants aged ≥60 years, 6 caregivers, 11 care providers and 9 administrators at hospital.

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
Piper (2011) [107]	Diabetes	No details	Adults over age of 19 who resided in Northern Health Authority and who had participated in at least one medical group visit in primary healthcare delivery within past year. Participants had to be able to understand and speak English.	Excluded GMV participants who are First Nations.	Communities and primary care practices in Northern Health Authority that offer GMVs asked to identify possible participants. Research team contacted participants by phone, answered questions, and set up telephone or	Five women and four men

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
					face-to-face interview.	
Wong (2013) [108]	Diabetes	Not relevant	For patient participants: (i) adults aged 19 years or older; (ii) living in rural community in Northern Health; and (iii) no significant cognitive impairment. Providers recruited if they had either provided or taken	No details	Rural practices delivering PHC and FN communities identified by Northern Health Authority partner as potential participants. Rural practices and FN communities recruited if they had offered GMVs for more than 2 years.	34 PHC providers and 29 patients living in nine rural communities in British Columbia, Canada.

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
			part in GMVs in past year.		Nine communities (five family physician-led primary care practices and four FN communities) agreed to participate.	

Table 34 - Characteristics of Included Surveys

Study	Health Condition	Details about health condition and inclusion criteria	Other non-health characteristics	Exclusion criteria (health or non-health)	Recruitment to qualitative research	Participants
Hirsh (2001) [109]	Endometriosis	History of pelvic pain of at least 3 months' duration and laparoscopic confirmation of pelvic endometriosis. Either consecutive visitors to outpatient gynaecology clinic or consecutive surgical admissions over three months.	Average age = 62 years, mostly female, and married. Patients reported either Caucasian (55%) or Aboriginal descent - most were First Nations (41%). Almost half of patient participants reported	No details	No details	Nine parents wanted to participate of which eight (seven mothers, one father) actually did

			household income of less than $30,000 CDN			
Jhagroo (2013) [110]	Kidney Stones	Patients largely calcium or mixed calcium stone formers (95%), recurrent (90%) and Caucasian (94%).	Patients (mean age 51 ± 14 years, range 19 to 87) seen in 27 SMAs during 14 months. 55% were women, significantly younger than males (48 ± 14 vs 55 ± 12 years, respectively, P = 0.007).	Not specified	All attenders at clinics over 14 months	No further details
Lock (2012) [97]	Haemophilia and von Willebrand	Less experienced group (28 families with	No Details	3/103 families (total of six children)	No Details	69 parents returned questionnaire on

		30 children; 17 with haemophilia A and 2 with haemophilia B and 11 with von Willebrand's disease). Experienced group (10 families with 11 children; 10 with haemophilia A and 1 with haemophilia B).		excluded from participation in GMA due to language problems.		expectations of a GMA results of patients ‡12 years (n = 14) and parents (n = 38) undergoing both IMA and GMA are presented
Trotter (2012) [111]	Breast Cancer	No details	Breast Cancer survivors	No details	No details	22-item Likert-type questionnaire sought opinions regarding logistics and the class and function of care delivered. 122 surveys collected.

Table 35 - Intervention Details - Qualitative Studies

Study	Intervention Model	Intervention Components	Description of Intervention	Clinical Involvement
Asprey (2012) [98]	Group Clinics	Socialization, Group information sharing	Not given	Nurses
Capello (2008) [99]	DIGMA	Pre meetings: Chart Review and Telephone Recruitment Orientation session: Informed consent and baseline measures Session 2: Initial BP reading; Stress Component Session 3: Nutrition and Exercise Session 4: Medication compliance	Before participation, all participants completed a set of self-report psychological inventories during initial orientation meeting. One week afterward, participants attended the first of three components of intervention. Each meeting occurred weekly for an hour and a half on Wednesday mornings. During each meeting, primary care practitioners were hand to monitor subjects' physiological well-being and make any necessary changes to treatment. This study took place over the course of four separate face-to-face appointments and one telephone meeting. The structure of these meetings included one orientation meeting, three group appointments	Primary care physicians and other primary care staff

		Post BP reading and post test measures Telephone session: Contact to assess qualitative component	as well as one individual telephone interview appointment.	
Cohen (2012) [100]	SMA	No details	MOVE, MAGIC, and smoking cessation SMAs offered to veterans at VAMC in Salem, Virginia. Main focus of MOVE program is nutrition, weight loss, and increasing physical activity. MAGIC program focuses on diabetes, hypertension, weight control, and hyperlipidemia management. Programs incorporate motivational interviewing techniques and address depression, anxiety, stress management, and coping strategies. Content of programs overlap and complement each other.	Collaborative programs include experts in primary care, health behavior change and mental health, nutrition, exercise, and smoking cessation.
Hirsh (2001) [109]	Drop In Group Medical Appointments (DIGMAs)	Health Education/ Information Presentation(s) by Multiple Clinicians	32 women with confirmed endometriosis asked to discuss potential benefits of establishment of a specialist endometriosis clinic.	No details given

Hroscikoski (2006) [101]	Chronic Care Model	No Details	No Details	Prepared practice teams (PPTs) made up of clinician and rooming nurse and supplemented by a registered nurse and a receptionist shared among 3 contiguous PPTs. Core PPT was understood to have an expanded version that included other clinicians.
Jhagroo (2013) [110]	Adapted aspects of 3 models: drop-in group medical appointment, cooperative health care clinic and physical	Health Education/Information Presentation(s) by Multiple Clinicians	After collecting consent forms each visit began with presentation introducing patients to SMA and providing general background information. This included epidemiology, renal physiology, pathophysiology and risk factors. Followed by focused diet assessment of each patient, conducted	No Details

	shared medical appointment		by the RD. Then gathered individual medical histories and reviewed each patient's 24-hour urine study, which was projected at the front of the room. Next, clinical decisions regarding medical and nutritional management were discussed with patients in group setting. Each patient provided with checklist identifying his/her specific risk factors. Finally, nutrition education was provided, including practical strategies to address common risk factors. Patients reminded to focus especially on therapies for individual risk factors as identified during individual rounds. At end of visit RD left and MA returned to administer patient satisfaction survey and 2 brief tests to determine patient understanding of core nutrition concepts. At checkout, patients received follow up information and scheduled their next appointment.	
Kirsh (2009) [25]	Shared Medical Appointment (SMA)	Not relevant	SMA structured in 4 phases (i) Welcome and introduction to the group format with patient & staff	Diabetes SMA staffed by physician

			introductions (5-15 mins); (ii) group discussion of diabetes-related topics e.g. patient goals and ABCs of diabetes (20-30 mins); patients and families/ caregivers sharing experiences (44-55 mins); and (iv) individual visits in examination rooms for medication titration, note writing and development of an individualized treatment plan (10-15 mins).	(nonendocrinologist), nurse practitioner, health psychologist, a clinical pharmacist, and a nutritionist.
Lavoie (2013) [102]	Group Medical Visit (GMV)	a) **Social event:** Patients and providers emphasized importance of social component of GMV. b) **Affiliation:** Both providers and patients highlighted that social element results in a shift in power, in part because of the presence of peers with shared experiences, but also because providers share role of adjudicator with patients attending GMV. c) **Co-production of GMV:** Providers	Opportunistic sample of any patients/providers with recent experience of GMVs. 63 participants completed in-depth interview to provide their experiences with GMVs.	Providers interviewed included family physicians (n=10), nurses (n=7), nurse practitioners (n=2), PHC coordinators (n=4), other allied health professionals (n=11), such as nutritionist and social workers and supportive

		highlighted key differences between one-on-one and GMV format, in that GMV is co-produced by provider(s) and group..		personnel, such as medical office assistants and community health representatives, involved in delivering a variety of GMVs
Lock (2012) [97]	Group Medical Appointment	Group information sharing with multiple professionals	All haemophilia professionals trained in different aspects of GMA management, including GMA setting and practical aspects. Within GMA, physician proceeds as in an individual appointment under supervision of a chairman, in presence of other patients, parents and other haemophilia caretakers. Chairman hosts session and facilitates group process, while monitoring allotted time. At beginning of each GMA, chairman emphasizes confidentiality of the shared experiences and explicit oral informed consent of participants is	Treating physician, haemophilia nurse, physiotherapist, social worker, clinical geneticist, guests depending on availability and topics. One medical caretaker functions as chairman

			obtained. General disease topics are discussed collectively under supervision of the chairman.	
McCuistion (2014) [103]	Shared Medical Appointment (SMA)	No details	No details	No details
Mejino (2012) [104]	Shared Medical Appointment (SMA)		Hospitals in west, east and south part of Netherlands. SMAs conducted by 36 health care providers. Each health care team consisted of 3-6 health care providers such as paediatricians, diabetes nurses, and psychologists. One of these providers was also moderator during an SMA.	Hospital Physician, General Nurse, Dietitian
Miller (2004) [105]	Group Medical Visit	Personalized Attention, Self-Care Education, Access To Medication Refills And Examinations, and Advice From Peers.	On average, patients required 20 minutes of physician time plus 21 minutes of nurse practitioner time per session.	Physician, nurse Practitioner
Ovbiagele (2010) [106]	Group Clinic	No details	No details	No details
Piper (2011) [107]	Group Medical Visit	No details	All GMVs that participants attended were centered on chronic conditions, including diabetes, chronic	No details

			pain, fibromyalgia, and heart disease and were heterogeneous according to sex.	
Trotter (2012) [111]	Group Medical Appointment	Socialization, Monitoring, Group information sharing with multiple professionals; Individual examinations	15-minute check-in period when patients took their own vital signs and updated their treatment summary and care plan on institution-specific document hand-generated by nurse practitioner (NP) prior to visit. Followed by 45-minute facilitated group discussion with six survivors. Structured with initial completion of a self-assessment sheet, discussion often revolved around chronic issues (e.g. menopausal symptoms, bone health, libido issues, insomnia, and latest media information about cancer). Then participants moved to individual exams with NP, but some first went (often in tandem, as extension of group camaraderie) for their mammogram and returned later for exam. Between examination and mammogram, participants spent time discussing nutritional issues with dietitian or stress management/relationship issues with social	NP, registered dietitian, physical therapist, and social worker were present for sessions.

			worker. Before exiting, NP reviewed individual treatment summary care plan with each patient. NP completed specific health-care plan, including recommendations for various cancer screenings, while patient wrote both her short- and long-term personal goals. Patients took approximately 2.5 hours to completely work through all services. If abnormal findings were noted NP further evaluated them, referring patient to primary oncologist when indicated.	
Wong (2013) [108]	Group Medical Visit	Socialization, Monitoring, Group information sharing with multiple professionals; Individual examinations	GMVs typically facilitated by a family physician or nurse practitioner. GMVs offer all components of an individual clinical encounter but are delivered to groups of patients ranging in size from 12 to 20 individuals. GMVs unique in delivering medical care, health promotion, chronic disease management, health education and group support simultaneously. Two broad types of GMVs: (i) 'Homogenous'; (a) co-operative health-care clinics,	Providers included family physicians, nurses, nurse practitioners, PHC coordinators, other allied health workers, e.g. nutritionists, social workers, medical office

			(b) physicals and SMAs, and (ii) ‘Heterogeneous’ or DIGMAs.	assistants and community health representatives.

Appendix 6 - Data Extraction Elements

Table 36 - Elements of Data Extraction form

Concept.
Population
Facilitation
Group Size
Components
Frequency
ACCESS AND CONVENIENCE
Duration
Follow Up
PEER SUPPORT
Appraisal Support
Informational Support
Emotional Support
Instrumental Support
Team Composition
Other Contacts
Patient Characteristics
Built Environment
Social Support
PARTNER SUPPORT
SUPPORT FROM HEALTH PROFESSIONAL
Appraisal Support
Informational Support
Emotional Support
Instrumental Support
Adherence
Physical Signs and Symptoms (was Biophysical Markers)

Self Efficacy

Patient Participation

Long-term Symptom management)

Psychological Status (was Functional Status)

Quality of Life

ED visits

Rehospitalisations

Unplanned primary care office visits

Mortality

Costs

Patient Confidentiality

Patient (Non) Participation

Missed appointments

Appendix 7 – Details of Studies on Costs of Group Clinics

Table 37 - Details of Included Cost Studies

Study (Author, Date, ID)	Study Type	What has been measured in terms of costs?	Method for capturing cost information	Costs of staffing the Group Clinic (per clinic)	Costs of staffing Group Clinic (per patient)	Total costs of the group clinic	Costs to patients or charges incurred	Headline Messages

Edelman (2010) [59] USA	RCT	Cost of group clinics in terms of: staff time	Staff time for clinic and for follow up phone calls	In 2009 dollars, estimated cost of $504 (range, $445 to $578) to conduct each group visit.	Each group visit accommodates 8 patients, per-patient cost is $63 (range, $56 to $72). If patients attended all 7 GMC sessions, annual per-patient cost would be $441 (range, $389 to $506). Follow-up calls cost an additional $19 (range, $4 to 48), which brings annual per-patient cost to $460 (range, $393 to $554).			

Clancy, 2008, [52] USA	RCT	Impact of group clinics on patient costs to access other parts of the health system.					Mann-Whitney test results show that GV patients had 34.7% higher outpatient expenditures, 49.1% lower ED expenditures, and 30.2% lower total expenditures compared with those of the control group (P <.05 for all). Based on these initial	This cost study of GVs among inadequately insured patients with type 2 DM showed statistically significant reductions in outpatient charges after controlling for endogeneity of the GV variable in the charge model via a treatment effect model. Because the GV

							estimates, it seemed that GV treatment increased outpatient costs by $699.52 per patient per year. Although we found a statistically significant and marginally positive effect on GVs in the outpatient cost model that did not correct for endogeneity,	model of care is an intervention that depends on patient adherence, we hypothesized and found evidence of endogeneity of the GV variable. Therefore, we believe that future studies on GVs should consider the potential for endogeneity

							the treatment effect model showed a statistically significant marginally negative effect of GV treatment on outpatient charges of $3065.47.	in estimating the effect of GV treatment on healthcare utilization and charges

Clancy (2003) [48]	RCT	Outpatient, inpatient and emergency room costs and use (visits to outpatients and emergency room and admissions to inpatients) for patients who had participated in a group clinic	Wilcoxon's rank test			In 6-month study period, overall costs significantly higher (p=0.0003) for group visit patients ($2,886 per patient) compared with control patients ($1,490 per patient)"		Higher costs for patients in group visits differs from previous studies. Cost findings should be interpreted with caution… samples are relatively small for economic analyses…group visits may have served to "activate" participants…to catch up on care previously neglected….

		intervention.				Outpatient ($1444 intervention and $1099 control) and inpatient ($1410 intervention and $365 control) costs were statistically significant (p=0.008 and 0.049) respectively but emergency department		possible time lag for decreased costs that might not show up in first six months of group visits

						costs were not.		

Wagner (2001) [76]	RCT	Primary Care visits (mean/year) . ER visits (mean/year) . Specialty visits (mean/year) Hospital admissions (% admitted). Totals costs (median $). Examined intervention versus control.	Health care uses and costs were also obtained from GHC administrative data systems. The time required of the clinical study personnel is not included in the total health care costs.			Total health care costs did not differ between the groups.		Whereas chronic care clinics relied on existing clinic personnel to deliver services, study nurses played an important role that must be considered when estimating the full cost of the intervention.

Crane (2012) [134]	Intervention, including a DIGMA. Group size 36 patients			Total annualized direct costs of program, including value of donated physician time, was $66,000.		Total annualized cost of program was $66,000 Emergency department use dropped from a rate of 0.58 per patient per month to 0.23 (P <.001), and hospital charges dropped	Total ED and inpatient mean charges per person per month fell from $1167 for the 12 months before enrollment to $230 since enrollment (P < .001).	Low-income or uninsured may be more likely to use ED for nonemergent care because of reduced access to primary care or complex social, behavioral health, or physical health needs that are difficult to address in traditional primary care settings.

						from $1167 per patient per month to $230 (P < .001).		

Levine (2010) [135]	Retrospect-ive case control design	Total direct healthcare costs (all costs directly related to delivering healthcare services) for individual in year after first group visit was primary outcome.	Evaluate differences in direct costs and utilization during first year of intervention. Because a few patients incurred higher total costs than others, distribution of total cost was heavily skewed. Natural logarithm transformation of total costs				Intervention patients had lower total costs in 12 months preceding intervention (mean total costs $7,968 vs $10,215, P=.007). Total costs remained lower for group that participated in group visits than for	After adjustment for case-mix, comorbidity, baseline costs, and baseline utilization, group visit intervention not associated with effect on total costs. Total costs not statistically different for intervention patients and controls ($8,845

			was used in linear regression model. Multivariate negative binomial regression was used for primary care and specialty care utilization. Multivariate logistic regression was performed for urgent care and hospital utilization.				controls but not statistically significant. ($8,845 vs $10,288, P=.11). No significant differences between intervention and controls on any form of utilization: hospital admission, urgent care visits, primary	vs $10,288, P=.11)

							care visits, and visits to specialists. Group visits were not counted in the primary care visit counts.	

Scott (2004) [69]	RCT	Service utilization and resulting costs measured for 12 months before patient's study enrollment and for 24 months after enrollment. Outpatient utilization costs		Average physician cost was $375 (77.4% of total average cost).			CHCC members had significantly lower costs associated with ED visits than did controls. No other significant differences in utilization costs. Hospital, professional services, and health-plan termination costs	Service utilization savings came from prevention of more costly ED visits, hospital admissions, and professional services.

		measured for visits to each type of clinic department and provider. Pharmacy charges. A claims and referral database that tracks services and costs not directly					approached significance (Po.10), with lower costs in the CHCC group. Average per patient group cost over 24 months was $484, which included salary and overheads for physician, nurse, and any other provider attending the group.	

		provided by health plan provided hospital, ED, professional services, home health, and skilled nursing facility charges. The total cost for all CHCC group meetings					The average monthly cost advantage per CHCC member over the 24 months of the study was $133 ($463 for control patients _ $330 for CHCC). The cost advantage for CHCC patients before the start of the study was $92 per patient per	

		was estimated as the sum of the costs for each meeting based on the amount of time providers spent at the meeting and their mean hourly salaries. There were no adjustments					month. CHCC group members' monthly costs were $42 per member less than those of control members when adjusted for costs 12 months before the start of the study ($133 cost advantage during the study *F*	

		for the number of patients attending a meeting because the cost of a meeting remained the same regardless of how many patients attended.					$92 cost advantage before the study), but this difference was not statistically significant	

Bondonio (2005) [133]	Cost Effectiveness Analysis of two interventions from quasi societal point of view	Differential direct costs to Health Service (staff and educational material costs) or to patients (transportation and opportunity costs)	Cost effectiveness ratios for group care are calculated with sole reference to differential outcomes and costs (i.e. so where there is an overlap between costs of usual care and costs of group clinics, these are not accounted for.	T2DM Average estimated value of staff time led to a total cost of EUR 126.43 per patient on group care and EUR 66.37 per control patient. T1DM	Costs to see one patient over study period: EUR 111.50 for group care and EUR 90.44 for individual consultations. T1DM	In total, each patient on group care cost EUR 831.57 and each control cost EUR 731.82 with a difference of EUR 99.75 per patient treated over the observation period. T1DM	Transportation costs for patients were 48.45 Euro for Group Care and 38.34 Euro for controls. T1DM	Each incremental improvement in quality of life for patients on group care was obtained with an expenditure (i.e. cost effectiveness ratio) of EUR 2.28. T1DM "…a cost effectiveness ratio of EUR 19.46 per each of 12.16 differential

						Direct costs for INHS over 3 years totalled EUR 271.24 for group care patients and EUR 120.15 for control patients. The total cost differential between the group care and the control		DQoL scores. Not possible to calculate QALYs.

						procedure was therefore EUR 236.60 over 3 years.		

References for Appendix 7

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Appendix 8 - Criteria used in Quality Assessment

For quality assessment of randomised controlled trials we used the CASP checklist for randomised controlled trials[1] and the Cochrane Risk of Bias Tables[2].

For quality assessment of qualitative studies we used the CASP checklist for qualitative studies[3]. There is no qualitative equivalent of the Cochrane Risk of Bias Tables. Indeed the effect of bias on quantitative research is currently unknown and requires further exploration.

- Was there a clear statement of the aims of the research?
- Is a qualitative methodology appropriate?
- Was the research design appropriate to address the aims of the research?
- Was the recruitment strategy appropriate to the aims of the research?
- Were the data collected in a way that addressed the research issue?
- Has the relationship between researcher and participants been adequately considered?
- Have ethical issues been taken into consideration?
- Was the data analysis sufficiently rigorous?
- Is there a clear statement of findings?

References

1. Critical Appraisal Skills Programme. Critical Appraisal Skills Programme. 10 questions to help you make sense of a trial. 2013. 24-9-2014. Ref Type: Unpublished Work

2. Higgins J, Altman DG, Gotzsche PC, Juni P, Moher D, Oxman AD et al. The Cochrane Collaboration's tool for assessing risk of bias in randomised trials. *BMJ* 2011; 343.

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Appendix 9 - Ongoing Clinical Trials

Table 38 - Details of Ongoing Clinical Trials

Official study title	Organization	Intervention	Comparator	Sponsor and ClinicalTrials .gov ID	Funding Start/Stop	Status
A randomised controlled study: effects of shared medical appointments (SMAs) on parental quality of life and disease severity of children with atopic dermatitis	University-affiliated clinic	3 shared medical appointments in outpatient clinic of Pediatric Dermatology UMC Utrecht	3 face-to-face consults in outpatient clinic of Pediatric Dermatology UMC Utrecht	The Foundation for Children's Welfare Stamps (Netherlands)	Nov 2009 May 2013	Study has been completed.
Interprofessional Training for Improving Diabetes Care	Government	Shared medical appointments to promote establishing	Traditional diabetes education and teleconsultation	Department of Veterans Affairs NCT00854594	Sep 2010–Sep 2012	Study has been completed.

Official study title	Organization	Intervention	Comparator	Sponsor and ClinicalTrials .gov ID	Funding Start/Stop	Status
		collaborative teams (ReSPECT)				
Initiating Diabetic Group Visits in Newly Diagnosed Diabetics in an Urban Academic Medical Practice	University-affiliated clinic	Group Visit	Standard individual medical appointment	Oregon Health and Science University NCT01497301	Feb 2012–Feb 2013	Recruitment status of study unknown because information has not been verified recently.
Heart Failure Group Clinic Appointments: Rehospitalization	University-affiliated clinic	Heart Failure Group Clinic Appointments	Standard heart failure education	Carol Smith, RN, PhD, FAAN (NHLBI) NCT00439842	Mar 2007–Sep 2012	Study ongoing, but not recruiting participants.
Group Intervention for DM Guideline Implementation	Government	Pharmacist-led group medical visits for patients	Usual care	Department of Veterans Affairs NCT00554671	May 2008–June 2012	Study has been completed.

Official study title	Organization	Intervention	Comparator	Sponsor and ClinicalTrials .gov ID	Funding Start/Stop	Status
		with type 2 diabetes mellitus				

Abbreviations: DM=diabetes mellitus; NHLBI=National Heart, Lung, and Blood Institute

Appendix 10 - Other UK Group Clinic Initiatives Identified

The following UK Group Clinic initiatives were identified during the course of the project. Contact was made with any projects identified early in the course of the review. Other projects are listed for the sake of completeness:

Table 39 - Ongoing UK Group Clinic Initiatives

Title of Initiative	Disease Condition	Details	Contact Details
Northumbria Osteoporosis Project: Group Clinics	Osteoporosis	National Osteoporosis Society Northumbria Healthcare NHS Foundation Trust	Mrs Norma Cardill North Tyneside General Hospital Rake Lane North Shields, Tyne and Wear. NE29 8NH Tel: 0191 293 4087 Norma.Cardill@northumbria-healthcare.nhs.uk
Pilot study of acupuncture in a group setting for chronic knee pain: ScrutiKnee	Chronic knee pain	NIHR Research for Patient Benefit (RfPB) Plymouth Hospitals NHS Trust	Dr Liz Tough Plymouth Hospitals NHS Trust I T T C Building 1 Tamar Science Park Davy Road Plymouth, Devon. PL6 8BX Liz.tough@pms.ac.uk

Transforming our insulin pump service	Diabetes	Nottingham University Hospitals NHS Trust, Nottingham, UK	Kay S, Soar C, Page RCL. Transforming our insulin pump service. *Diabetic Medicine Conference: Diabetes UK Professional Conference Glasgow (7th March-9th March 2012) Conference Publication:* 2012; 29 (pp 99-100):March.