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A Realist Review on Targeting the Use of Reminders & Notifications for Uptake by Populations (TURNUP)

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1. Aims/Objectives:
The overall objective of this study is to explore the effectiveness of outpatient appointment reminders. This effectiveness can be measured in terms of different outcomes, and it is envisaged that the effectiveness of different types of appointment reminders will be different for different population groups.

Thus:
The primary aim of the study is to investigate the impact for different population groups, of different types of health service outpatient appointment reminders, on the following outcomes:

Health services outcomes	**Patient centred outcomes**	**Staff focused outcomes**
Appointment fulfilment Rescheduled appointments to a more convenient date Substitution of alternative person in the vacated slot Timely cancellation Late cancellation Overbooking Costs *Secondary outcomes* including quality of life, therapeutic relationship, impact on treatment outcome, hospital readmission etc	Ease of cancellation Patient satisfaction Attitudes towards communication process Individual costs	Utility of system Staff satisfaction Attitudes towards communication process

2. Background:

The NHS needs to achieve up to £20 billion of efficiency savings by 2015 through a focus on quality, innovation, productivity and prevention (QIPP)(DH, 2011a). The QIPP programme was developed to ensure value for money through cost efficiencies and improved productivity whilst simultaneously working towards better patient outcomes (DH 2011a). Missed health care appointments are a major source of potentially avoidable cost and resource inefficiency which impact upon the health of the patient and treatment outcomes.

Since 1999 the cost of missed appointments to the NHS has tripled and in 2009 was estimated to be more than £600 million for that year (Kennard, 2009; Beecham, 1999). A recent report by the Department of Health, England (DH, 2011b) reported that of the 4.1 million patients referred to consultant led clinics between October and December 2010, about 10% did not attend their first appointment while 23% missed their follow-up appointments (DH, 2011b). In the UK more than 12 million GP appointments are missed each year, costing the tax payer in excess of £162 million (Martin et al., 2005; Beecham, 1999). There has been little research into the costs of missed appointments at outpatient clinics led by AHPs and nurses; however Gleeson et al (1991) reported that the average annual cost of missed appointments to one

Occupational Therapy department was equivalent to a full time member of staff. In addition, several studies indicate that non-attendance rates at physiotherapy clinics are frequently between 6-30% (El Tantawy et al., 2000; Alexandre et al., 2002; Kolt and McEvoy, 2003) and could be as high as 46% in some services (Funch & Gale, 1986). Nursing studies have found similarly high non-attendance rates (Murdock et al., 2002; Weinger et al., 2005).

In addition to the costs identified above, non-attendance may lead to increased waiting times for appointments (Gucciardi, 2008; Martin et al., 2005), increased cost of care delivery (Murdock et al., 2002; Weinger et al., 2005), under-utilisation of equipment and personnel (Murdock et al., 2002), reduced numbers of appointments available for all patients (Martin et al., 2005; Weinger et al., 2005), reduced patient satisfaction (Taylor et al., 2002; Lloyd et al., 2003) and negative relationships between the patient and staff (Martin et al., 2005; Gucciardi, 2008). The delay in presentation at healthcare departments and consequent lack of monitoring of chronic conditions may predispose patients to exacerbations of their condition and its related complications (Murdock et al, 2002; Karter et al, 2004) leading to unnecessary suffering and possible costly hospital admission.

Reducing the rate of missed appointments may lead to many benefits including reduced NHS costs and improved treatment outcomes (NHS Executive, 2000; George and Rubin, 2003). At an estimated cost of around £100 per appointment (Kennard, 2009), a 1% reduction of missed appointments could result in savings of £6 million per year on consultant clinics in England and in excess of £16 million per year in savings to GP practices. Cost savings to AHP and nursing clinics are potentially considerable. Reducing the number of missed appointments may be a relatively inexpensive way to support the intentions of the NHS to treat patients within 18 weeks of GP referral (DH 2009), whilst simultaneously supporting the NHS QIPP agenda.

Systematic reviews reveal a wide range of factors associated with appointment attendance including an array of barriers to attending appointments such as: older and younger age, unemployed job status, gender, foreign nationality, low socioeconomic status, poor social support, depression or other psychological factors, lack of transportation and forgetfulness to name but a few (Falagas and Zarkadoulia, 2008; Bowser et al, 2009; Jack et al, 2010; Cooper et al 2002). Hogan et al. (2008) identified that half of patients who did not attend their appointment would have been more inclined to attend if they had received a reminder. However the choice of reminder needs to factor in an array of potentially influencing factors such as those identified above, in order to ensure the greatest impact. In an attempt to manage the negative effects and improve the efficiency of the appointment system, many healthcare organisations are increasingly investing in text, telephone and email reminder systems. However they frequently employ a 'one-size-fits-all' approach, with little evidence of overall effectiveness or acceptability for particular populations or subgroups. The proposed research will systematically examine the published evidence around different models of patient reminders and their effectiveness for, and acceptability to, particular population groups who use outpatient clinical services. By being able to identify reminder strategies which are most appropriate for particular subgroups of patients, healthcare organisations may be able to improve attendance at outpatient clinic appointments. The output of this study will be the production of a practice guide to help managers identify which approaches are likely to be most effective for reducing non-attendance rates for their service and client groups.

3. Need:

Health need: The number of missed appointments in GP practices, consultant, nursing and AHP led outpatient clinics represents a substantial and costly inefficiency within healthcare organisations. These inefficiencies create increased waiting times for appointments, reduced numbers of appointments available for all patients, under-utilisation of resources and increased cost of care delivery to organisations. The impacts on patients potentially include: reduced treatment effect; poorer health outcomes; reduced patient satisfaction; negative relationships between the patient and staff; and poorer monitoring or identification of health conditions and their related complications which may lead to unnecessary suffering. Reducing the rate of missed appointments across all healthcare organisations could create substantial cost savings and improve the efficiency of outpatient clinics. The benefit to patients is likely to be reduced waiting times, improved satisfaction with services and staff, enhanced treatment outcomes and reduced morbidity.

Expressed need: Available research and our involvement with service users, healthcare providers and service managers leads us to believe that there are diverse reasons for missing appointments and that particular subgroups may be more likely to miss appointments. The challenges of everyday life, with its competing priorities, can mean that attending healthcare appointments can be of secondary importance or can be forgotten. Our service users support the idea that reminders may act as a useful way to improve attendance at appointments. This view is certainly supported by research where many patients who missed their appointment stated that they would be more inclined to attend following a reminder (Hogan et al, 2008). The NHS Institute for Innovation and Improvement (2008) acknowledges that the use of reminders may be useful and may be more beneficial for certain client groups.

Sustained interest and intent: The NHS needs to achieve up to £20 billion of efficiency savings by 2015. The aim of the QIPP programme is to ensure value for money through cost efficiencies and improved productivity whilst simultaneously working towards better patient outcomes (DH 2011a). Since missed healthcare appointments are estimated to exceed £600 million annually, small improvements in attendance can result in substantial cost savings and simultaneous benefits for patients. Such improvements maintained over years represent an ongoing substantial benefit to the NHS and patients which will remain relevant and important to the needs of the NHS in the future.

Capacity to generate new knowledge: Several studies, including Cochrane reviews or protocols (Car et al, 2008; Jacobsen et al, 2005; Reda et al, 2010) represent an attempt to summarise the evidence on patient reminders for particular conditions (e.g. mental illness), interventions (e.g. immunisations) or reminder type/mode (e.g. mobile phone messaging) and therefore gaps in the research exist across many other conditions which can potentially be referred to outpatient clinics. The trend to split reviews by technology or by condition, results in an evidence base that is potentially useful, but is presented in a format which is limited for health decision makers. To date there has been no systematic attempt to bring together the evidence across all technologies and conditions, and examine it according to population characteristics such as age, gender, ethnicity, socioeconomic status or other factors which potentially predict non-attendance. This new study will review all the available evidence pertaining to patient reminders, allow more in-depth and wide-ranging analysis and sub-group analysis of benefit and present the findings in a format which will have meaning for health decision makers and influence health policy.

Organisational focus consistent with HS&DR mission: Consistent with the aims of NIHR HS&DR, this research project will provide rigorous evidence which can identify

potential ways of improving planning and organisation of appointment systems for outpatient clinics. This can directly impact on costs and financing, quality, access and how outpatient services are experienced by patients and potentially lead to improved patient satisfaction and improved treatment outcome. This research will address dimensions of quality that are of central concern to the NHS and stated aims of the NIHR HS&DR programme, namely: patient safety, patient experience and effectiveness of care.

Generalisable findings and prospects for change: The outputs of this research will produce findings in a form that is of value to NHS managers responsible for the delivery of NHS outpatient services. They will be able to use this evidence to facilitate decision making to bring about change and improvement to outpatient appointment systems by using reminder systems of known relevance for their patient population and mode of delivery. Because of the widespread use of outpatient clinics in primary, secondary and tertiary care this research has application across all healthcare organisations across the UK and beyond.

Building on existing work: Missed appointments are a major problem, hence many studies investigate the use of patient scheduling and reminders. This research will build on these studies by systematically examining, appraising and synthesising the published evidence around different models of patient scheduling and reminders and their effectiveness for, and acceptability to, particular population groups using outpatient clinical services. The proposed work will complement the current HSR funded protocol led by Dr Robert Bottle (award number 09/2001/32) which investigates a slightly different aspect of non-attendance namely, predictors of non-attendance at outpatient clinics.

4. Methods:

The process of booking, responding to and attending an NHS outpatient appointment is a complex intervention, best explored using a realist approach. The realist approach provides the possibility of identifying causal patterns underlying complex interventions (Pawson & Tilley, 1997). Appointment systems may be considered complex interventions given the number of actors, the complexity of interactions and the role of individual and societal preferences and values in the success of a system. Such research aims therefore to identify and describe, in a certain context (C), the mechanisms (M) operated by the intervention to produce its outcomes (O).

A key step will be the development of middle-range theories, defined as “theories that lie between the minor but necessary working hypotheses that evolve in abundance during day-to-day research and the all-inclusive systematic efforts to develop a unified theory that will explain all the observed uniformities of social behavior, social organization and social change” (Merton, 1949). Middle-range theories will permit the review team to move from the specifics of particular appointment systems to examine their application to other contexts.

In order to achieve the above objectives, the following specific questions will be addressed:

1. Which types of reminder systems are most effective in improving the uptake of health service appointments?

   1.1 Are there any systems which effectively support the cancellation of appointments?

2. Do different reminder systems have differential effectiveness for particular subgroups of the population (e.g. by age group, ethnic group, socio-economic status, gender etc.)?

3. What factors influence the effectiveness of different reminder systems for particular population subgroups?

   3.1 How do the perceptions and beliefs of patients, their carers and health professionals regarding specific types of reminder systems, and patient/carer resources and circumstances, influence their effectiveness?
   3.2 How do external factors (e.g. content, delivery, setting, frequency, notice period) influence the effectiveness of reminder systems?
   3.3 How do organisational factors (e.g. person sending the message, perceived status, proximity to delivery of care etc) influence the effectiveness of reminder systems?

4. What factors or possible disadvantages should be considered when introducing reminder systems for specific populations for health care and health services?

For the purpose of this study, appointments are defined as "specific scheduled individual encounters for access to, or utilisation of diagnostic or treatment services". Reminders are defined as " targeted communications to individual patients to remind them of an appointment about which they have previously been notified." Notifications to inform patients about an initial appointment will therefore be excluded. Reminders for patient-initiated clinics, and non-targeted health education, health promotion or preventative medicine messages or sessions will also be excluded.

a. Context
The review will seek to access the full range of relevant international literature. However at all times this will be examined through the lens of a UK National Health Service system.

b. Design

The study will involve a mixed methods review (Pluye et al, 2009) in which data on the effectiveness of different approaches to reminding patients to attend health service appointments will be integrated with related data on factors (barriers/facilitators) that have a bearing on effectiveness, and/or related data on the attitudes of patients or staff to reminders.

Realist synthesis techniques (Pawson et al 2004) will be used to investigate differential intervention effectiveness. Studies identified in a first phase of preliminary searches will be analysed (**thematic synthesis**) to identify factors that influence the effectiveness of reminder systems. These factors will be used to identify candidate programme theories to produce a preliminary **programme logic model** (Baxter et al 2010). A programme logic model links outcomes with programme activities/processes and the theoretical assumptions/principles of the programme. It therefore represents a systematic and visual way of presenting and sharing understanding of the relationships among the resources operating a programme, the planned activities, and the anticipated changed results. In the context of a mixed methods review, the model provides a framework against which the data from quantitative and qualitative studies can be extracted in a consistent and meaningful way (Anderson et al, 2011). In this particular review, the programme logic model will document possible sources of variation in effect of different reminder systems amongst different population groups. As well as providing a theoretical framework to inform extraction, synthesis

and analysis of study data, the final version of the programme logic model will be used as a graphical mechanism for integrating quantitative and qualitative findings.

c. Data collection

The **Context-Intervention-Mechanisms-Outcomes (CIMO) framework** (Denyer & Tranfield, 2009) will be used to guide the review. The components of the framework are:

Context: UK public National Health Service (NHS) setting, or comparable health systems (i.e. US. Canada, Australia, New Zealand and Europe), and from 2000 onwards.

Interventions: Patient appointment reminder systems, where appointments are defined as "specific scheduled individual encounters for access to, or utilisation of diagnostic or treatment services".

Mechanisms: Appointment reminders and alerts by various paper-based and technology-based mechanisms including: letters, postcards, telephone, text, email.

Outcomes: appointment fulfilment, missed appointments, rescheduled appointments to a more convenient date, substitution of an alternative person in the vacated slot, ease of cancellation, timely cancellation, late cancellation, overbooking, patient satisfaction with or attitudes towards the communication process, staff satisfaction with or attitudes towards the communication process, costs.

Search strategy

i. Preliminary searches (Phase 1)

The objective of the preliminary searches will be to identify, in broad terms, studies and reviews relating to outpatient appointment reminder systems. A fairly broad search strategy will be utilised to capture a large body of relevant papers including those reporting the outcomes of the use of reminder systems, or on attitudes, barriers or facilitators to their use.

Searches will be conducted in a range of health and general databases including: Medline, Embase, CINAHL Plus with Fulltext, Web of Science, Cochrane Library. The search strategy will use the concepts of [reminders or prompts or alerts] in proximity to [appointments]. Where supported, appropriate database headings/thesaurus terms will be also used. For the non-medical or more general databases, additional terms will be used in order to restrict the results to a healthcare context. The searches will be limited to those documents published in or after 2000, and written in English.
Supplementary searching will include citation (backward and forward) chaining from relevant papers, and searches of grey literature.

ii. Purposive sampling (Phase 2)

Further searches will be targeted to test particular aspects of the candidate programme theories that are being explored.

Study selection

For each study selection process, one or two reviewers will independently sift through the lists of titles and abstracts resulting from the literature searches to identify potentially relevant studies for initial selection, based on an agreed set of exclusion/inclusion criteria. These criteria will be used when the full text papers are reviewed, again by one or two reviewers. Bu virtue of the nature of realist synthesis,

the selection process is likely to err on the side of inclusivity. Where a paper is excluded at the full text stage, this decision will be taken with the agreement of two reviewers, through reference to an independent arbiter if no initial consensus is reached. The selection process will be piloted by applying the exclusion/inclusion criteria to a sample of papers reviewed by all reviewers, in order to check they can be interpreted reliably and consistently by more than one person. If necessary the criteria will be refined and/or clarified at this stage. Inter-assessor reliability will be measured during the pilot phase and the selection process, in which a sample of the studies will be reviewed by two reviewers.

Selected studies will be prioritised according to relevance, fulfilment of quality criteria (see below) and richness of data. Studies that appear *prima facie* relevant but fail on one or more exclusion/inclusion relevance criteria (i.e. near misses) will be recorded. A PRISMA flowchart will be used to document the study selection process.

For the Phase 1 searches, an article will be selected and proceed to quality assessment if it meets all the following (initial) inclusion criteria:
(1) It includes an outpatient reminder system in at least study arm (for quantitative comparative studies), or as the target phenomenon of interest (qualitative studies) or relates to outpatient appointments and patient attendance behaviour, or relates to theories and models of appointment attendance and adherence;
(2) It is written in English;
(3) The publication date is from 2000 onwards

Exclusion/inclusion criteria for the Phase 2 searches will be led by the candidate programme theories that are being explored.

Reference management
Reference management will be achieved using the RefWorks online reference management system. This will facilitate inter-organisational collaboration within the review team. The information specialist will act as custodian of the data, facilitating document acquisition and version control.

Quality assessment
In line with accepted realist synthesis practice quality assessment will examine both rigour and relevance. Realist synthesis seeks to access the widest range of relevant data, irrespective of study design (Pawson et al, 2005), and then seeks to use an assessment of quality to moderate study conclusions. In other words no study or data will be excluded simply on the basis of study quality although the degree of reliance on individual studies will be identified and carefully explicated. Checklist based approaches, relevant to each study design, will be used as a means of exploring the robustness of each individual study. Where possible a generic mixed review study tool will be used to assist in comparability across different studies (Pluye et al, 2009).

Data extraction
The programme logic model will provide a framework against which the data from the quantitative and qualitative studies can be extracted in a consistent and meaningful way. Data will be extracted into purpose-designed forms which will be developed, piloted and refined using a sample of included studies. All queries will be reviewed by the entire review team in seeking to achieve consensus and to improve inter-reviewer consistency. The extracted data will include the article citation, the search process it relates to (e.g. Phase 1; Phase 2; citation searching), study characteristics and context, identifiable demographics, the exact nature and target of the intervention, effect sizes and barriers/facilitators, and outcomes (appointment fulfilment, missed appointments, rescheduled appointments, etc.).

Data extraction processes will optimise the trade-off between efficiency and rigour. Data extraction will be performed initially by one reviewer. A sample of work from each reviewer will be independently checked by other reviewers. As the primary function of this checking is consistency such sampling will continue until acceptable levels of inter-assessor reliability is reached.

Google Forms software will be used for the extraction forms. This will offer flexibility for work processes and will provide the facility to examine the emerging patterns from the data as new data is added. Such formative and iterative analysis is considered essential within the context of realist synthesis (Pawson et al, 2005). Contact with authors, or reference to related studies, will be used in cases where reports are unclear or where additional process data is required.

d. Data analysis
Data analysis will be undertaken using a variant of framework analysis, known as framework synthesis (Barnett-Page & Thomas, 2009). The preliminary logic model will be translated into a best fit framework (Carroll et al, 2011) which will be used to examine different components of individual appointment systems.

In parallel a meta-analysis of quantitative studies that are sufficiently appropriate and comparable quantitative studies will be undertaken. Given the likely heterogeneity of the populations and interventions a random effects model will be used for such an analysis. This provides a more conservative estimate of likely effectiveness. Elements of cost will be identified and specified but a full economic evaluation lies outwith the proposed study.

Following completion of the logic model and the meta-analysis stages, narrative synthesis techniques (Popay et al, 2006; Pope et al, 2007) will be used to bring together quantitative and qualitative findings for particular population segments. Findings will therefore be accessible both by type of intervention and by population group thus providing added value to those interested in serving a particular client group, patient group, age group or demographic characteristic. A method of iteration will be used to shape the review while in progress to maximise opportunities to identify findings with implications for multiple groups. At the same time mechanisms for identifying the disconfirming or deviant case, already identified by the review team, will be used to protect against over-generalisation or oversimplification.

The above-mentioned logic model, initially devised as a framework for analysis, will further be used as a graphical mechanism for integrating quantitative and qualitative findings (Candy et al, 2011). This follows draft guidance from the Cochrane Collaboration Qualitative Research Methods Group and opens up the possibility for use of techniques that draw upon realist synthesis in presenting the final analysis. In short the logic model will bring together elements of Context, Mechanisms and Outcomes (Pawson & Tilley, 1997) to explain the differential effectiveness of different interventions for different population subgroups in different settings.

The review team will use the components from the logic model as the basis for devising statements that underpin recommendations for policy makers, managers and commissioners. These statements will be contextualised within population-specific synthesis sections.

5. Contribution of existing research:
Existing research will be used to identify all important variables relating to

appointment systems and to create the framework for analysis.

6. Plan of Investigation:

The plan of investigation will be based around the following timetable

Activity	**Month**
Scoping Searches & Finalisation of Scope	January-February 2012
Protocol based literature searches (Phase 1)	February 2012
Pilot syntheses (by population, intervention, service)	February 2012
Identification and Exploration of Theory based approaches	March 2012
Production of Draft Logic Models	April 2012
First Advisory Group Meeting	April 2012
Production of Population, Intervention, Study Type Sampling matrix (Phase 2)	April 2012
Data Extraction of RCTs	May-June 2012
Development of Framework for analysis	June 2012
Selection of Extended Cases for Realist Synthesis	June 2012
Draft Syntheses	September-October 2012
Quality Assessment	October 2012
Draft Report	November 2012
Second Advisory Group Meeting	November 2012
Revision and Completion of Report	November-December 2012
Delivery of Final Report	December 2012

7. Project Management:
Project management will be led by the Chief Investigator with other members of the project team. Meetings will be monthly with small subgroups leading on various components of the review (i.e. literature search sub-team; theory synthesis sub-team etcetera). The project team will meet with an external advisory group on two occasions during the life of the project.

8. Service users/public involvement:
A non-executive member of the local NHS Trust will be a standing member of the project team and will act as a referral point to users of appointment systems as appropriate. Additional engagement with users will be achieved through the existing South Yorkshire CLAHRC arrangements.

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