Targeting the Use of Reminders and Notifications for Uptake by Populations (TURNUP): a systematic review and evidence synthesis

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Scientific summary

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Scientific summary

Background

Missed health-care appointments are a major source of potentially avoidable cost and resource inefficiency that impact on 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 £600M. In the UK, more than 24 million appointments with the general practitioner (GP) or consultant-led clinics are missed each year. Non-attendance rates of between 6% and 30% are frequently reported at outpatient clinics led by Allied Health Professionals (AHPs) and nurses. Non-attendance may also lead to increased waiting times for appointments; increased cost of care delivery; under-utilisation of equipment, premises and personnel; reduced numbers of appointments available for all patients; reduced patient satisfaction; and negative relationships between the patient and staff. They may also predispose patients to exacerbations of their condition, leading to unnecessary suffering and possible costly hospital admission.

Reducing the number of missed appointments may be a relatively inexpensive way to reduce NHS costs, treat patients within 18 weeks of GP referral and improve treatment outcomes. In an attempt to manage the negative effects and improve the efficiency of the appointment system, many health-care organisations are increasingly investing in short message service (SMS), telephone and e-mail reminder systems. However, they frequently employ a 'one-size-fits-all' approach, with little evidence of differential effectiveness or acceptability for particular populations or subgroups.

Objectives

The aim of the project is to explore the differential effect of alternative types of reminders (written and automated) for scheduled health service encounters for different segments of the population on fulfilled or rescheduled appointments, substitutions and satisfaction. The following questions will be addressed:

1. Which types of reminder systems are most effective in improving the uptake of health service appointments?
    i. Do any systems effectively support the cancellation of appointments?
2. Do different reminder systems have differential effectiveness for particular population subgroups?
3. Which factors influence the effectiveness of different reminder systems for particular population subgroups?
    i. 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?
    ii. How do reminder intrinsic factors (e.g. content, delivery, setting, frequency, notice period) influence the effectiveness of reminder systems?
    iii. How do health-care organisational factors influence the effectiveness of reminder systems?
4. What disadvantages should be considered when introducing reminder systems for specific populations for health care and health services?
5. What are the economic impacts of reminder systems?

Methods

The three inter-related reviews of quantitative and qualitative evidence comprise three components: (1) a review of conceptual frameworks of reminder systems and attendance/adherence behaviours, (2) a review of the reminder effectiveness literature and (3) a review informed by realist principles to explain the contexts and mechanisms that lead to reminder effectiveness (and appointment attendance). Searches were conducted on the following databases: Allied and Complementary Medicine (via Ovid 1 January 2000 to 15 February 2012), Cumulative Index to Nursing and Allied Health Literature Plus with Full Text (via EBSCO*host*, January 2000 to 11 January 2012), The Cochrane Library (1 January 2000 to 15 February 2012), EMBASE (via NHS Evidence, 1 January 2000 to 15 February 2012), Health Management Information Consortium database (via NHS Evidence, 1 January 2000 to 15 February 2012), Institute of Electrical and Electronics Engineers *Xplore* (1 January 2000 to 15 February 2012), The King's Fund Library Catalogue (1 January 2000 to 8 February 2012), Maternity and Infant Care (via Ovid, 1 January 2000 to 15 February 2012), MEDLINE (via EBSCO*host*, 1 January 2000 to 11 January 2012), Physiotherapy Evidence Database (1 January 2000 to 8 February 2012), PsycINFO (via ProQuest, 1 January 2000 to 8 February 2012), SPORTDiscus (via EBSCO*host*, 1 January 2000 to 11 January 2012), Web of Science (1 January 2000 to 2 February 2012). The reference lists of included studies were screened for additional relevant studies to inform the three review stages. Studies of various quantitative and qualitative designs, published from the year 2000 onwards, were included if they investigated the effectiveness of outpatient appointment reminders in any geographic context or investigated appointment attendance behaviour or adherence to treatment (if this included appointment attendance behaviour) in the UK or a comparable health context. Studies explicating theories/models/frameworks relating to reminder systems or appointment attendance were specifically included in review 1. Studies were excluded if they investigated reminders sent to a patient to schedule an appointment. Comprehensive searches yielded 1200 citations. All members of the project team were involved in screening and selection of studies and data extraction from included articles.

The aim of review 1 was to develop a conceptual framework to aid an understanding of the contexts and mechanisms that influence reminder effectiveness. We identified no pre-existing conceptual models or frameworks that directly explained the mechanisms by which reminder systems support appointment attendance; therefore, we broadened our review to encompass behavioural models that influence medical adherence. Relevant models related to the use of text messages to promote clinical outcomes, health-care utilisation theory, the theory of planned behaviour, the transtheoretical model, self-determination theory, protection motivation theory, rationale choice theory and complexity theory. The conceptual framework emerged from an iterative process involving examination of the various theories and discussions about context, mechanisms and outcomes that were important to explain how reminder systems works, for whom and in which circumstances. Our preliminary conceptual framework consisted of six draft propositions that would potentially influence the effectiveness of the reminder and whether or not patients would attend their appointment. These six propositions were the reminder–patient interaction, reminder accessibility, health-care settings, wider social issues, cancellation and rebookings, and distal/proxy attributes. We used this preliminary conceptual framework to facilitate the development of a data extraction template for review 3.

In review 2, standardised methods, following Centre for Reviews and Dissemination (CRD) guidelines, were used to select, quality assess, data extract and synthesise the findings of systematic reviews and randomised controlled trials (RCTs). Quality appraisal was carried out using the Critical Appraisal Skills Programme (CASP) appraisal tool for RCTs for all RCTs not already quality assessed in a pre-existing systematic review. The aim of this systematic review was to investigate the effectiveness of reminder systems for improving attendance, cancellations and rescheduling of appointments. A total of 31 RCTs and 11 separate systematic reviews were included; however, most of these had already been incorporated within one or more pre-existing systematic reviews. Only 10 RCTs were uniquely identified for this review.

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For review 3, the framework for data extraction was developed employing the important six elements of the conceptual framework described above. Studies were prioritised for data extraction based on study type and relevance to a UK NHS context. All RCTs about reminder systems and all reviews (systematic and otherwise) about reminder systems and appointment systems, previously identified for review 2, were prioritised for full extraction of contextual and explanatory variables. This was followed by qualitative, mixed-methods and non-RCT quantitative studies about reminders and appointments for the UK, Ireland, Europe, Australia and New Zealand. Four members of the project team examined different sections of the data as they aligned with the conceptual framework and undertook thematic analysis of the evidence available for that section of the framework. The reviewers formulated evidence statements using summary categories for bodies of evidence for each of the six elements of the framework. To support each evidence statement, the reviewers also developed a narrative synthesis that sought to explain the context and mechanisms influencing how reminders support attendance, cancellation and rebooking. Reviewers also provided a supplementary synthesis of evidence to explain emergent factors that explain patient attendance behaviours. The findings of each stage of the review were brought together to refine the preliminary framework and will be used to produce practice guidelines.

The preliminary database searches yielded 1200 records and, following the screening stages, a total of 466 records were included for reviews 2 and 3. Data extraction was prioritised according to study type and relevance to the UK context. Consequently, in accordance with realist principles, not all records contributed to the review.

Results

Review 2

There is overwhelming evidence that all reminder systems are effective at improving attendance at appointments, regardless of health-care setting or patient population subgroups. Only one of the 31 RCTs did not show a significant reduction in non-attendance.

Review 3

In general, all reminders are effective at improving attendance at appointments. The limited poor-quality evidence that is available suggests that reminders are also cost-effective. Simple reminders, which provide details of timing and location of appointments, are effective at increasing attendance at appointments and would appear to be useful for all patients, across all health-care settings, who they are at risk of forgetting their appointment. There is weak evidence that 'reminder plus', which provides additional information over and above the date, time and location of the appointment, may be more effective than simple reminders at reducing non-attendance. Additional information may reduce perceived obstacles to attendance. 'Reminder plus' may be useful for first appointments and screening appointments and simple reminders may be appropriate thereafter for most patients the majority of the time.

There was strong evidence that:

- The timing of reminders, between 1 and 7 days prior to the scheduled appointment, has no effect on attendance.
- A substantial number of reminders may not be received by patients.
- Reminders promote cancellation of appointments.
- Patients cannot always cancel appointments because of structural factors affecting reminder systems (e.g. busy telephone line, nobody answers the telephone).
- Relatively few studies investigated factors that influence the effectiveness of different reminder systems for particular population subgroups.

Discussion

General implications for health services

Unless patients indicate otherwise, the evidence suggests that all patients should receive a reminder or 'reminder plus', which actively encourages patients who are unable to attend to cancel their appointment and to reschedule if further appointments are required, and the reminder should be sent around 3 days in advance. Because timing of a reminder – between 1 and 7 days prior to the scheduled appointment – has no effect on patient attendance behaviour, an interval of 3 days should allow sufficient time either for patient cancellation and health service reallocation of the appointment to another patient or to allow the clinician to undertake care-related administrative tasks.

For the most part, reminder systems are not being fully exploited to maximum advantage. Optimisation of attendance, cancellation and rescheduling rates requires (1) robust administrative procedures to ensure that patient contact details are up to date, (2) easy-to-use, multioption systems for cancelling appointments matched to the needs of the patients, e.g. automated SMS cancellation, answer telephone, e-mail, etc., and (3) robust 24 hours per day rescheduling procedures to allow easy rescheduling of appointments for patients. However, an effective reminder system will increase the workload of clinical staff and alternative time will need to be scheduled for staff to undertake health-care-related administration.

We found few studies investigating the differential effectiveness of reminder systems for population subgroups. However, findings suggest that reminder system choices need careful consideration in order to maximise accessibility for the following key patient groups: those from deprived communities or ethnic groups, substance abusers and those with comorbidities and/or illnesses. Simple reminders to attend may be overlooked by patients in these vulnerable groups and may increase disadvantage in health-care access in comparison with general outpatient populations. Reminders with direct personal contact might be appropriate in these groups. Intensive sequential reminders may maximise contact in these difficult-to-reach groups and, therefore, may maximise attendance. Intensive approaches, such as 'stepped reminders' and patient navigators, may be effective at re-engaging patients with ongoing health needs who have dropped out of treatment. These general recommendations are suitable for all health-care outpatient services.

Specific implications

Reminder systems are a complex intervention because of the potential number of interacting components within the interventions, the requirement for tailoring of the intervention to the health service and the number of difficulties and behavioural changes from those receiving and delivering the reminder. Therefore, in addition to following the general recommendations provided above, health service managers will need to tailor their reminder systems to meet the needs of the service and the patient population that it serves. This review provides some findings that will inform health service managers' decision-making processes. We are producing a practice guide to help health service managers consider specific issues that may be relevant to the design of reminder systems for their health service. The practice guide consists of four sections:

1. a conceptual framework
2. a set of clinical scenarios
3. reasons for non-attendance and possible reminder solutions and wider solutions
4. advantages/disadvantages for various reminder systems.

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Conclusions

All health services should be using a reminder system for all patients, in the absence of any clear contraindication. This review has found strong, consistent evidence to support the use of all reminder systems for all patients in any outpatient setting for increasing attendance, cancellation or rescheduling. There is additional evidence that 'reminder plus', which provides additional information over and above the date, time and location of the appointment, may be more effective than simple reminders at reducing non-attendance, particularly at first appointments. However, there is limited evidence investigating the differential effectiveness of alternative types of reminders for different segments of the population. Nevertheless, we have used the findings of our review to suggest important reminder alternatives for key groups of patients: those from deprived communities, ethnic minorities, substance abusers and those with comorbidities and/or illnesses. Based on the findings of this review, we are producing a practice guideline to help managers identify further important considerations when selecting the reminder system most likely to be effective for reducing non-attendance rates for their service and client groups. Many elements of the conceptual framework are hypothetical and, consequently, elements of the practice guide are also hypothetical and further research is required to investigate these elements.

The gaps in the evidence point to the need for further research investigating (1) the differential influence of providing additional information as part of the reminder system in different contexts, (2) the differential effectiveness and cost-effectiveness of an 'optimised' reminder system over and above usual reminder systems and (3) intensive approaches, such as 'stepped reminders' and patient navigators in disadvantaged and vulnerable populations.

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