COV.31: How do patients respond to text messaging in primary care?

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Research Question[s]

1. How many people respond to text messages from their primary care provider?
2. How do primary care providers manage non-responses to text messages?
3. Are there any demographic differences between responders and non-responders of text messages from their primary care provider?

Verdict

There is minimal evidence on response to text messages from primary care providers, particularly on characteristics of non-responders. Response varies considerably depending on patient groups and health condition.

Studies generally show that use of bidirectional text messaging in primary care is feasible, but response from patients decreases over time after messaging has been initiated by healthcare practitioners. Tailored/personalised text messaging leads to better response and improved patient outcomes. Increased patient engagement with text messages typically has a positive impact for patient outcomes.

As most studies typically involved active participant recruitment, engagement with the study was likely to lead to higher response to text messages than would be expected in the general population.

We also highlight that, due to COVID-19, current responses to text messaging may also be substantially different to that found in previous studies, making the use of peer-reviewed evidence to answer these research questions challenging.

What does the evidence say?

Number of included studies/reviews (number of participants)

We found 2 systematic reviews matching our inclusion criteria (including 28 and 61 studies), and 21 primary studies. Although there were several systematic reviews that investigated text messaging and healthcare, the majority of studies they included did not match our selection criteria. Across all 21 primary studies there were 8384 participants.

Main findings

We found that response rates varied substantially depending on patient group and setting, and it was difficult to identify clear patterns. Whilst we aimed to identify evidence in primary care, some studies recruited patients from other clinics (depending on the disease in question).

Response rates by population in included studies:

- General population: low response (Baldwin et al. 2017; Bergmo et al. 2005; Cocosila et al. 2009)
- Carers of young children: varied response depending on setting (Stockwell, Broder, et al. 2017; Westphal et al. 2016; DeCamp et al. 2020)
- Pregnant women: >80% (Stockwell, Cano, et al. 2017)
- Type I diabetes patients: 96% (Herbert et al. 2014)
- Schizophrenia patients: 76% (Granholm et al. 2012)
- Smoking cessation: varied response depending on setting (Devries, Kenward, and Free 2013; Snuggs et al. 2012)
- Children/adolescents with knee pain: 71% (Swain et al. 2017a)
- Obese patients: 66% (Lin et al. 2015)

In most studies that reported response over time, responsiveness reduced after the initiation of text communication (Stockwell, Broder, et al. 2017; Herbert et al. 2014; Lin et al. 2015; Swain et al. 2017b). However, in pregnant women responses appeared to remain high even a year after commencing text message communication programmes (Stockwell, Cano, et al. 2017).

Use of text messaging for mental health patients typically led to poorer response, and there was some evidence to suggest that in mental health patients, non-responders had more severe mental illness (Granholm et al. 2012).

Use of text messaging did not help improve mental health programme adherence (Bauer et al. 2012)

Impacts of text message communication

Whilst not of direct interest to our research questions, many included studies reported on the impacts of using text messages in healthcare.

Generally, we found that text message-based interventions could be impactful. Higher response and more daily engagement with text message communication with healthcare practitioners lead to more positive outcomes for patients.

Park et al. 2016 found that 22 of the 28 included studies in a systematic review demonstrated that using mobile phone features (text messaging, mobile apps, telemonitoring via mobile phones) was effective in improving behavioural and clinical outcomes. Most text messaging studies requested

participants to respond with text messages or enter data into supporting software; and all of these studies found positive adherence or clinical outcomes.

From a workload perspective, text messaging was found to help reduce the number of clinic visits to some degree (Bergmo et al. 2005; DeCamp et al. 2020), and to be quicker to do than telephoning patients (Leahy et al. 2017).

Tailored/interactive messaging leads to better response and improved patient outcomes (Bobrow et al. 2016).

Text messaging seemed to be more impactful for long-term conditions such as diabetes, less clear for mental health conditions.

Strength of the evidence

The evidence was generally of poor quality. The included studies were mostly at high risk of bias, most commonly due to the study design (observational, non-comparative). Furthermore, despite matching our inclusion/exclusion criteria they often only provided indirect information to answer our research questions. Studies typically focussed on a specific programme of text messaging as a targeted intervention, rather than use of text messaging as a substitute for primary care attendance. They also often focussed on very specific groups of patients, which make generalisations to other, more general patient groups, challenging.

As studies typically involved active participant recruitment, they were also a highly selective sample, so we expect that response rates would be higher in these studies than in the general population.

We highlight Leahy et al (Leahy et al. 2017) as being a study that provided very direct evidence regarding the use of text messaging by GPs in NHS primary care. However, we determined it to be at high risk of bias.

Summary of searches

We first performed an initial project screen to identify if there was any evidence that would answer the question from any of the resources listed in Table 3. As we did not find information here to answer the question, we performed a rapid systematic review searching in Medline, Cochrane Database of Systematic Reviews, and Cochrane Central Register of Controlled Trials. Search terms and search results are given in Table 4. A PRISMA flow diagram for the search is shown in Figure 1.

When checking full texts, we identified several systematic reviews that included studies investigating the impact of text message interventions. As the systematic reviews themselves were not sufficiently specific to match our inclusion/exclusion criteria we did not include them but searched through their study characteristics tables to see if any included studies would be particularly relevant for answering our research questions.

We used the following study selection criteria for developing the search and for study screening. However, when evaluating full texts we took a broader approach and included studies that may not have perfectly matched the selection criteria but that we felt could help answer the research questions.

Population: Patients registered with a primary care service.

Intervention: Active text messaging (SMS, MMS, instant messaging) in which a response from the patient is expected (bidirectional messaging)

Comparison: No active text messaging

Outcomes: Response rates, patient characteristics.

Inclusion criteria:
Primary studies, systematic reviews
English/Spanish language

Exclusion criteria:
Instant messaging using groups (e.g. WhatsApp groups)
Studies not reporting the number/characteristics of non-responders?
Automated text messages to which patients are not expected to reply
Messaging via social apps or proprietary / bespoke apps
Conference abstracts
Qualitative studies
Case studies/reports
Study protocols
Non-systematic reviews

Strategy:
Due to time constraints, once there were 945 refs remaining that had not been screened we refined our selection criteria to speed up the process and searched only for remaining references with the words “systematic”, “randomised” or “randomized” that were published after (and including) 2005

Date question received: Thursday 16th April
Date searches conducted: Friday 17th April
Date answer completed: Monday 20th April

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Disclaimer

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Systematic Reviews

Table 1

Author (year)	Search Date	Inclusion criteria	Number of included studies	Summary of results	Risk of bias
(Park et al. 2016)		The inclusion criteria included studies using text messaging and/or mobile app with mobile phones for the secondary prevention of CVD. Studies were excluded if interventions were predominately conducted via voice phone calls (i.e. interactive voice response calls), email, Internet, or telemonitoring devices without the use of mobile phones. No studies were disqualified on the basis of quality.	28	Overall, 22 of the 28 studies (79%) demonstrated that using mobile phone features (text messaging, mobile apps, telemonitoring via mobile phones) was effective in improving behavioral and clinical outcomes. The majority of studies (18 out of 28, 64%) used text messaging as the intervention. Twelve out of 28 studies (43%) applied smartphone technology. In particular, seven studies used smartphones for data acquisition / transmission in telemonitoring programs 30,32–35,38,45 Five studies tested a smartphone app as the primary intervention. Factors associated with positive outcomes tended to have at least one of the following characteristics: (a) higher frequency of text messages; (b) personalized text message content with tailored advice; (c) 2-way SMS (request for a text message response from the participant); (d) timing frequencies correlated to medication prescriptions; (e) higher frequency of	

Author (year)	Search Date	Inclusion criteria	Number of included studies	Summary of results	Risk of bias
				text messages; (f) greater engagement by the user; and (g) use of multiple modalities (i.e. SMS, mobile app). The majority of text messaging studies used personalized text message content such as participants' names, medication name and/or dosage, catered timing based on the individual's prescription, individualized message copy related to the participant's condition, motivational text correlating to the participant's indicated goals, and content matching the participant's individual barriers (i.e. forgetfulness vs. fear of side effects of medications). Most text messaging studies requested participants to respond with text messages or enter data into supporting software; and all of these studies found positive adherence or clinical outcomes. These patterns suggest the importance of high frequency, interactive mHealth models using individualized, personalized messaging.	

Author (year)	Search Date	Inclusion criteria	Number of included studies	Summary of results	Risk of bias
(Yeager and Menachemi 2011)		*This systematic research does not focus on response to SMS; although it may have some relevant information.* The studies included were English written publications in peer-reviewed journals published before 2009 (including this year). Studies must involve short text messages use in health care. Authors sorted out the publications following these criteria: • Clinical care or disease management. • Public health. • SMS use in health care administrative. We only focus in the first categories (i.e., clinical care or disease management) due to the interactive nature of these interventions between patients and primary care involving short messages in part of the process.	61 in total 27 to disease management	From those 27 studies the 66% (n = 18) focused on diabetes and1 4.8% (n = 4) in mental health disorder. Most of the studies found that SMS interventions leaded to better primary outcomes particularly in diabetes management. This was less clear in mental health disorder studies. The authors addressed few aspects from individual studies included in this review. Such as that those studies that involve two-way response might have better outcomes or that text messages interventions can keep patient engaged with their care, but this engagement might difficult to sustain. *We recommend reading Table 3 in pages 244 –246.*	

Primary studies

Table 2

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
(Baldwin et al. 2017)	Study design: Mixed methods (only quantitative data reported here) Population: Patients at a family clinic; USA Intervention: Automated texts inviting to clinic that requested responses from participants Comparator: No text messages Outcomes: Text response, interview responses	N=31 in intervention, 30 in control group	Response: 67.9% of those messaged responded to at least one text Interview responses: 7/8 who completed an interview had a positive experience of receiving the text message.	High risk (non-randomised, selective sample)
(Bauer et al. 2012)	**Study design**: RCT **Population**: female patients with bulimia nervosa or a related eating disorder **Intervention**: Short Message Service (SMS) based maintenance intervention (weekly symptom report via text message reply) **Comparator**: treatment as usual **Outcomes**: · Rate of partial remission 8 months after. Impact on the utilization of outpatient treatment.	n = 165 (83 – SMS arm)	· A total of 13.41% of participants from the intervention arm lost contact in the second follow-up (8 months) in comparison to 15% in the control arm. · No clear evidence of remission rate after 8 months (p = 0.06) between arms. · There were no differences in the utilization of outpatient treatment between arms. · Remission rates between the intervention and control arms were not significantly different (p = 0.51) among patients who used outpatient treatment (63.2% vs. 55.6%). Remission rates between the intervention and control groups were significantly different (p = 0 0.04) among patients who did not used outpatient treatment (54.5% vs. 30.3%).	Low risk of bias

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
(Bergmo et al. 2005)	Study design: RCT Population: Primary care patients with a scheduled GP appointment; Norway Intervention: Direct messaging with GP via a web portal + Usual Care Comparator: Usual Care Outcomes: Number of online, telephone, and clinic consultations	N=99 in intervention group, 100 in control group	**Change in number of clinic visits:** Median (range) = -1 (-3 to 0) in intervention group and –1 (-2 to 1.75) in control group (p=0.034) **Change in number of phone consultations:** Median (range) = 0 (-2 to 1) in intervention group and 0 (-1 to 2) in control group (p=0.258) **Response in intervention group:** 46% used the messaging system on at least one occasion. 146 messages sent to 6 GPs in total: • 46% test results or health-related questions • 20% requests for prescription refill • 7% sick note renewals • 2% requests for referral	Unclear risk
(Bobrow et al. 2016)	**Inclusions:** Adults (age ≥21 years) who had the following characteristics: diagnosed with hypertension by a clinician using local guidelines; prescribed blood pressure lowering medication; and with a systolic blood pressure (SBP) <220 mm Hg and a diastolic blood pressure (DBP) <120 mm Hg at enrolment. Eligible patients were attending the primary care clinic, resided in one of the two study communities, and had regular access to a mobile phone (and were able to send SMS text-messages, or could do so with help of a relative). We enrolled only one member per household. **Exclusions:** those requiring specialist care for their hypertension at a hospital (in secondary care): women who self-reported being pregnant or within three months post-partum and those with very high blood pressures (systolic BP >220 mm Hg or diastolic BP >120 mm Hg) who had symptoms suggestive of a hypertensive emergency or were otherwise acutely unwell (who were directly referred to the appropriate clinical service).	1372	We sent 40,333 SMS text-messages to participants in the information-only message group, 41,450 to those in the interactive message group and 8277 to those receiving usual care. Of the messages sent, 5.5% had a “failed delivery” response. In addition, 3477 messages were not sent as planned because of technical errors. 230 (50.2%) of the participants allocated to the interactive adherence support group responded to a message at some point in the trial; in total 630 reply messages were sent by participants. There were 1231 visits by participants in the interactive group, 1109 for the information only group and 1093 for usual care.	Not assessed

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
(Carrasco et al. 2008)	Patients were enrolled by 38 GPs from 21 health centers in four different health areas in Madrid, Spain, that spanned the entire socioeconomic spectrum. Patients with hypertension, defined as a mean systolic BP (pSBP) ≥140 mmHg or a mean diastolic BP (pDBP) ≥ 90 mmHg in six determinations taken by a professional during two separate visits, were included. Patients with a previous diagnosis of hypertension, receiving drug therapy, with pSBP ≥ 130 mmHg or pDBP ≥ 80 mmHg (mean of three determinations) were also included if they presented type 2 diabetes, were under 40 years of age, or presented a major cardiovascular risk factor, for example, ischaemic heart disease (angina, infarction, revascularization), stroke or transient ischaemic attack, or peripheral arterial disease. Excluded from the study were: 1) controlled hypertensive patients, that is, those with pSBP < 140 mmHg and pDBP < 90 mmHg; 2) pregnant women; 3) patients with a history of serious cardiovascular events; 4) severely hypertensive patients with multiorgan involvement and pDBP > 110 mmHg; and 5) patients with chronic renal failure defined as a creatinine level over 2.5 mg/dl.	285	During the training phase, prior to the initial visit, there were 12 dropouts (Intervention: *n* = 11; Control: *n* = 1). In the intervention group, seven considered the procedure to be too complicated and two withdrew because the family support they had counted on when they signed the informed consent failed them, and the remaining two and the control patient for reasons not related to the project. The two groups presented similar percentages percentages in optimal adherence, or having complied with > 90% of the requirements (25.2% versus 26.1%), while the adherence was better, although not significantly so, in the TmG in the remaining three levels: > 75% (59.6% versus 53.6%), > 50% (84.8% versus 73.3%), and > 25% (92.4.8% versus 75.4%). In all, 212 short messages were sent to 66 patients in the intervention group by 30 of the 38 participating GPs, while 49.6% of the patients received no messages; the maximum number of messages received by a single patient was 11. Of the 212 messages, 123 (58% of all those transmitted) were sent by just eight GPs, whereas another eight GPs sent none whatsoever.	Not assessed
(Cocosila et al. 2009)	Study design: RCT Population: Adults recruited at a Canadian university Intervention: Interactive SMS system to encourage taking Vitamin C for preventative reasons (mean age of participants: 23.8; % female: 55.7%; mean experience with SMS (months): 31.3) Comparator: No text messages Outcomes: Response, vitamin C adherence	N=52 in intervention, 52 in control	SMS response reported only here Mean SMS replies during the experiment 43.8%	Unclear risk
(DeCamp et al. 2020)	Study design: RCT Population: Latino famillies with newborn infants (<2months) attending paediatric clinics; USA	N=79 to intervention	**Those receiving messages (intervention group):** • 5% of participants did not send any responses	Unclear risk

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
	Intervention: Interactive text messages during the child's 1st year of life Comparator: Regular care Outcomes: Emergency department (ED) use, immunizations, parent experience of care, clinic visits	group, 78 to control group	• 96% felt that the messages made them feel more strongly connected to the clniic • 92% felt that the messages made them feel they were able to do more for their child's health **Emergency Department visits:** Mean: 1.23 (SD: 1.66) in intervention and 1.82 (SD:1.64); p=0.03 **Immunizations up to date:** 85% in intervention vs 79% in control (p=0.38) • Received 2 flu shots: 81% vs 67% (p=0.04) **Clinic visits up to date:** 76% in intervention vs 68% in control (p=0.26) • No clinic no shows: 66% vs 51% (p=0.06) • No clinic cancellations: 37% vs 31% (p=0.37) • No sick care visits: 37% vs 36% (p=0.23) **Patient experience:** • Parent health knowledge score, mean (SD): 10.88 (2.14) in intervention vs 8.53 (2.75) in control (p=0.50) Infant health knowledge score, mean (SD): 0.67 (0.15) in intervention vs 0.52 (0.15) in control (p=0.52)	
(Devries, Kenward, and Free 2013)	Anonymised data from the txt2stop, conducted from 2009-2010 in London, UK. Txt2stop is a single-blind randomised controlled trial of an automated mobile phone based smoking cessation programme. There were 5800 participants randomised in txt2stop; 2915 of those were in the	2915	Of the 2915 participants who could send lapse and crave texts, 1794 (61.5%) did not send any text messages. Of the remaining 1121 (38.5%) who sent text messages, 765 people sent 2339 crave texts. Most sent only one crave message.	Not assessed

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
	intervention group and could send lapse and crave text messages. This analysis includes only those 2915 participants.		the minimum number of crave texts per person was 1, maximum 100, and median was 1 (IQR 1-3). 778 people sent 1336 lapse messages. The minimum number of lapse texts sent by any one person was 1, maximum 9, median 1 (IQR 1-2).	
(Franklin et al. 2008)	The subjects were 64 boys and girls aged 8-18 years with type 1 diabetes participating in the intervention arms (Sweet Talk plus conventional therapy n = 33; Sweet Talk plus intensive therapy n = 31) of a three-arm clinical trial during a 12-month period between October 2002 and March 2004.	64	All but 4 of the 64 patients allocated to the Sweet Talk intervention submitted one or more text messages during the 12 months of the study. A total of 1180 messages were submitted, representing an average of 18.4 messages per patient. However, total messaging varied widely between individuals, from 0 to 240 (median 6), and the distribution was skewed by 5 patients who contributed 52% (614/1180) of the messages. A significant proportion of these messages were from 2 boys who sent in very regular blood glucose readings, comprising 338 of the total 1180 messages received (29%). There were no associations between the total number of messages submitted to Sweet Talk and patients' social or clinical demographics, including age, gender, duration of diabetes, insulin regimen, HbA1c (glycosylated hemoglobin), or social deprivation score. Messages that were sent by patients in direct response to a Sweet Talk text message made up 40% (472/1180). Of these, the sporadic text message newsletters generated the most responses (40%, 190/472). The remaining messages were in response to the daily scheduled messages (30%, 142/472), personal messages (25%, 118/472), and the weekly goal reminder (5%, 22/472).	Not assessed

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
(Granholm et al. 2012)	Study design: Pilot trial Population: Patients with schizophrenia or schizoaffective disorder from outpatient residential and treatment settings Intervention: Interactive text message-based cognitive behavioural therapy Comparator: None Outcomes: psychometric measures (PANSS, BDI-I, ILSS), response	N=55	13/55 did not send any valid messages or stopped sending messages within 2 weeks (non-completers) **Characteristics of completers vs non-completers; mean (SD):** • ILSS 10-domain average: 0.68 (0.105) vs 0.62 (0.102); p=0.052 • PANSS total: 63.9 (18.2) vs 69.3 (19.7); p=0.364 • PANSS positive total: 17.8 (6.4) vs 16.2 (6.1); p=0.437 • PANSS negative total: 15.2 (6.3) vs 20.7 (8.1); p=0.013 • BDI-II total: 15.7 (12.6) vs 15.8 (10.9); p=0.979 • ANART IQ estimate: 103.7 (8.6) vs 98.2 (7.8); p=0.046 • Age: 48.7 (9.1) vs 48.9 (7.9); p=0.947 Education (y): 12.4 (1.3) vs 11.8 (0.7); p=0.123	High risk
(Herbert et al. 2014)	Study design: Feasibility study (one-arm study) Population: Adolescents diagnosed with type I diabetes Intervention: SMART – A 6wk text message programme Comparator: None Outcomes: Response, patient characteristics, glycaemic control, blood glucose data,	N=23	96% of participants responded to texts throughout the 6 weeks of the study Response to text messages reduced with subsequent weeks (mean % responded to): week 1 (73%), week 2 (76%), week 3 (83%), week 4 (80%), week 5 (72%), week 6 (53%) Response to text messages varied by time of day (mean % responded to): morning (86%), mid-morning (76%), afternoon (79%), evening (80%)	High risk
(Kongsted and	**Study design**: multicase study **Population**: 18 - 65 years patients presenting low back pain	n = 78 patients	· Dropped out before week 12[SEP]= 41% (n=32 o 69% male o 31% female	High risk of bias

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
Leboeuf-Yde 2010)	**Intervention**: 12 weeks responded to the questions sent by text messaging **Comparator**: N/A **Outcomes**: · Participant characteristics and attrition · Number of LBP-days the preceding week · The intensity of present LBP.		· Study population who did not answer all weeks= 44% (n=34) o 35% male o 65% female · Study population responding every week 0 56% (n = 44) o 61% male o 39% female A rapid improvement was observed through weeks one to four. After week seven no further improvement happened.	
(Leahy et al. 2017)	**Study design**: Case study - mixed methods (only quantitative data reported here) **Population**: · GPs (telephone survey). · GPs (follow-up telephone survey) · Patients (satisfaction survey) **Intervention**: GPs to communicate with patient through text messages. **Comparator**: N/A **Outcomes**: · How many GPs communicated with their patients by text message. · Current practice regarding text messaging. Patient satisfaction	telephone survey (n=389) follow-up telephone survey (n=30) satisfaction survey (n=78)	· Of the 389 GPs surveyed, 38% (n = 148) used text messaging to contact patients and 62% (n = 241) did not. · The main advantage of text messaging was time management (n = 20; 80%). GPs found it quicker than phoning. · The main disadvantage was potential confidentiality issues (GPs who used text messages - 36%, n = 9) · 54% (n=14) of these GPs that did not used text messages indicated that they would start using them · 92% (n = 23) of GPs obtained consent from patients to receive messages. · 52% (n = 13) also obtained patient consent to text medically sensitive information. · Most patients were happy to receive texts from their GP (99%; n = 77). • Fast test results (32%; n = 23), followed by providing effective patient reminders (12%; n=9), were identified as the main advantages of receiving such texts.	High risk of bias (non-randomised, selective sample)

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
(Lin et al. 2015)	**Study design**: RCT **Population**: African American adults aged 21þ years, with a body mass index > 27. **Intervention**: Standard care plus daily tailored interactive text messages for 6 months **Comparator**: standard care (included one-on-one counselling sessions with a dietitian and a physician) **Outcomes**: Weight change from baseline to end- intervention at 3 and 6 months.	n = 124 (63 – standard care)	• Engagement from the intervention arm declined over the course of time from a mean of 66% participants who responded daily to interactive messages in month 1 to 37% in month 6. The mean response rate over the 6 months was 47.6%. • At 3 months: 2.5 kg greater weight loss in the intervention group compared with standard care (p < .001). At 6 months: 3.4 kg greater weight loss (p < .001)	Medium risk (attrition was high)
(Oliveira, Santos, and Furegato 2017)	20 primary Health Care Units (PHCUs) were randomly allocated either to the intervention or to the control group. In addition to the PHCUs, four maternity hospitals providing public health services took part in this study. Eligible participants of this study were pregnant women aged 18 or above with a gestational age of 20 weeks or less receiving ANC at selected PHCUs between April and June 2015. Exclusions: minors due to the additional complexity of obtaining informed consent from minors' guardians through a phone interview. Women with gestational age above 20 weeks were excluded as the intervention was designed to be implemented as early as possible in pregnancy.		A total of 1210 women received ANC at selected PHCUs and gave birth at participating maternity hospitals (770 women from intervention PHCUs and 440 women from control PHCUs). 20.4% (157/770) of women receiving ANC in intervention group PHCUs registered in PRENACEL, but only 116 of them received and read all messages (73.9% of women registered in PRENACEL, 116/157).	Not assessed
(Richmond et al. 2015)	Recruited from 27 general medical practices located across Northern England. All participants were 18 years of age or older, had consulted for depression within the previous five years, and had a score of 20 or above at baseline on the Beck Depression Inventory (BDI-II), which this scale classed as 'moderate' or 'severe' depression	755 (527 consented to SMS part of study)	Baseline characteristics of patients who did and did not consent to the texting sub-study are: Consenters tended to be younger, female, in employment, and reported experiencing their first major episode of depression at a younger age than those who declined to take part in the texting sub-study. However, levels of depression were comparable in terms of their BDI-II, PHQ-9 and EQ-5D anxiety/depression scores. Responding patients submitted a total of 6,541 individual text messages, in response to 7,787 of sent	Not assessed

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
			texts. Of all text messages received, 6,137 (93.8%) were considered valid (single scores or extracted from additional narrative), 71 messages (1.1%) were invalid (out of range or not including score information), and 333 (5.1%) messages were additional responses to the same texts. Of the 527 consenting patients, 498 (94.5%) of responded to at least one text message and replied to an average of 12.5 (SD = 3.45) texts. No reasons were given for refusing to opt into the SMS sub-study, although many of the participants who declined also failed to provide a mobile telephone number in the contact details section of their trial consent forms.	
(Snuggs et al. 2012)	**Study design**: feasibility study **Population**: patients who had been abstinent for 4 weeks. **Intervention**: weekly text messages aimed at motivation to remain abstinent, prevent careless lapses and continue smoking cessation medication **Comparator**: N/A **Outcomes**: · Response to interactive messages Requests for the medication	n = 202 (mean age =43, 50.5% female)	· 94% of eligible participants enrolled · 70% (*n* = 63) of patients who completed follow-up considering the intervention helpful. · 85% (*n* = 172) of patients responded to at least one of the nine interactive text messages. · Sixty-four clients (32% of the total, 47% of those we managed to contact) reported continuous abstinence at 6 months. · Patients who reported to be continuously abstinent at 6-month follow-up responded to more text messages than those who were smoking (3.2 versus 1.9, $P < 0.001$) A total of 84 (42%) clients accepted at least one of the three offers of Nicotine Replacement Treatment.	bias (non-randomise, selective sample)
(Stockwell, Broder, et al. 2017)	Study design: Prospective observational Population: Families of 24-59 month child receiving influenza vaccine at community clinic; USA	N=540	Response: Initial text response rates were high (87%) but steadily decreased over the 10 days of the study (53% at day 10).	Unclear risk

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
	Intervention: Interactive text message asking families to report child's temperature each day Comparator: None Outcomes: Response, fever incidence, healthcare utilization		Other outcomes not reported here due to no comparison between active messaging and no active messaging	
(Stockwell, Cano, et al. 2017)	2013–2014 influenza season at a family planning clinic and three obstetrics and gynecology practices. **Inclusion criteria:** (1) were pregnant with a GA <20 weeks by last menstrual period and/or ultrasound; (2) were aged >=18 years; (3) elected to receive IIV (trivalent) at time of enrollment; (4) had a cell phone with text messaging capabilities; (5) were English or Spanish speaking; and (6) were willing to report via text message through pregnancy end. **Exclusion criteria:** (1) decision to not continue pregnancy at time ofenrollment; (2) temperature >=100.41F at vaccination; (3) antipyretic administration within 6 hours pre-vaccination or stated intent to use prophylactically; and (4) inability to read text messages.	166	89% provided data on days 0-2. Eight women never responded via text or phone. There was no difference in the 25 women who stopped or were non-responders versus responders on baseline text message use. Response rates remained high throughout pregnancy. In both the Day 7–42 and Day>=70 periods, women reported via text both pregnancy specific and non-pregnancy specific health events. Text message responses were in general agreement with events as recorded on the electronic health record (e.g. Birth weight reported via text message was within 8% of that recorded in the EMR for all infants and 5% for all but two infants.	80% of those eligible enrolled so decent response.
(Swain et al. 2017b)	**Study design**: feasibility study **Population**: Children and adolescents with knee pain that presented to primary care physiotherapy clinics. **Intervention**: short messaging service (SMS) to followed-up on a weekly basis via until their knee pain had recovered (i.e. two consecutive weeks of no pain). **Comparator**: N/A **Outcomes**: · Recruitment, retention and response rates to SMS. Pain, disability, physical function, physical activity and health related quality of life.	n = 30 (mean age 13.0, 53% boys)	· Response rate to weekly SMS follow-up was 71.3% (809 received/1135 sent) · No significant difference between the baseline and follow-up pain and disability scores for non-responder versus responders. · Median time for knee pain recovery = 8 weeks (95% CI: 5, 10) At six-month follow-up, the percentage of participants who reported knee pain (≥1 on the QVAS-Now) at the time of response was 29.2%.	High risk of bias
(van der Kop et al. 2018)	Study design: Open-label RCT Population: HIV-positive individuals attending a community health centre; Kenya	N=349 to intervention group, 351 to control group	**Risk Ratios (RRs) reported as intervention vs conrol (95%CI)** **Retained in care at 12 months:**	Low risk

Author (year)	Inclusion criteria	Number	Summary of results (only those of interest reported)	Risk of bias
	Intervention: WelTel weekly SMS messages asking how patients were doing and whether they required assistance + Usual care Comparator: Usual care Outcomes: 12-month retention in care, % patients who completed 3-week anti-retroviral therapy (ART) eligibility assessment, response		• RR: 0.98 (0.91 to 1.05); p=0.54 **Completed 3-week ART assessment:** • RR: 0.98 (0.93 to 1.04); p=0.48 **Response in intervention group:** 55% responded to messages (53% said they were "OK" and 2% "Not OK")	

Search details

Initial project screen:

Table 3

Source	Link	Relevant Evidence Identified
CEBM, University of Oxford	https://www.cebm.net/covid-19/	-
Evidence aid	https://www.evidenceaid.org/coronavirus-resources/	-
Cochrane Methodology Review Group	Infection control and prevention: https://www.cochranelibrary.com/collections/doi/SC000040/full Evidence relative to critical care: https://www.cochranelibrary.com/collections/doi/SC000039/full	-
Department of Health and Social Care Reviews Facility	http://eppi.ioe.ac.uk/COVID19_MAP/covid_map_v3.html	-
UCSF COVID19 papers	https://ucsf.app.box.com/s/2laxq0v00zg2ope9jppsqtnv1mtxd52z	-
PHE Knowledge and Library Services	https://phelibrary.koha-ptfs.co.uk/coronavirusinformation/	-
WHO Global Research COVID19 database	https://www.who.int/emergencies/diseases/novel-coronavirus-2019/global-research-on-novel-coronavirus-2019-ncov	-
CDC COVID19 guidance	https://www.cdc.gov/coronavirus/2019-ncov/hcp/index.html	-

Search for SRs and Primary studies

Figure 1

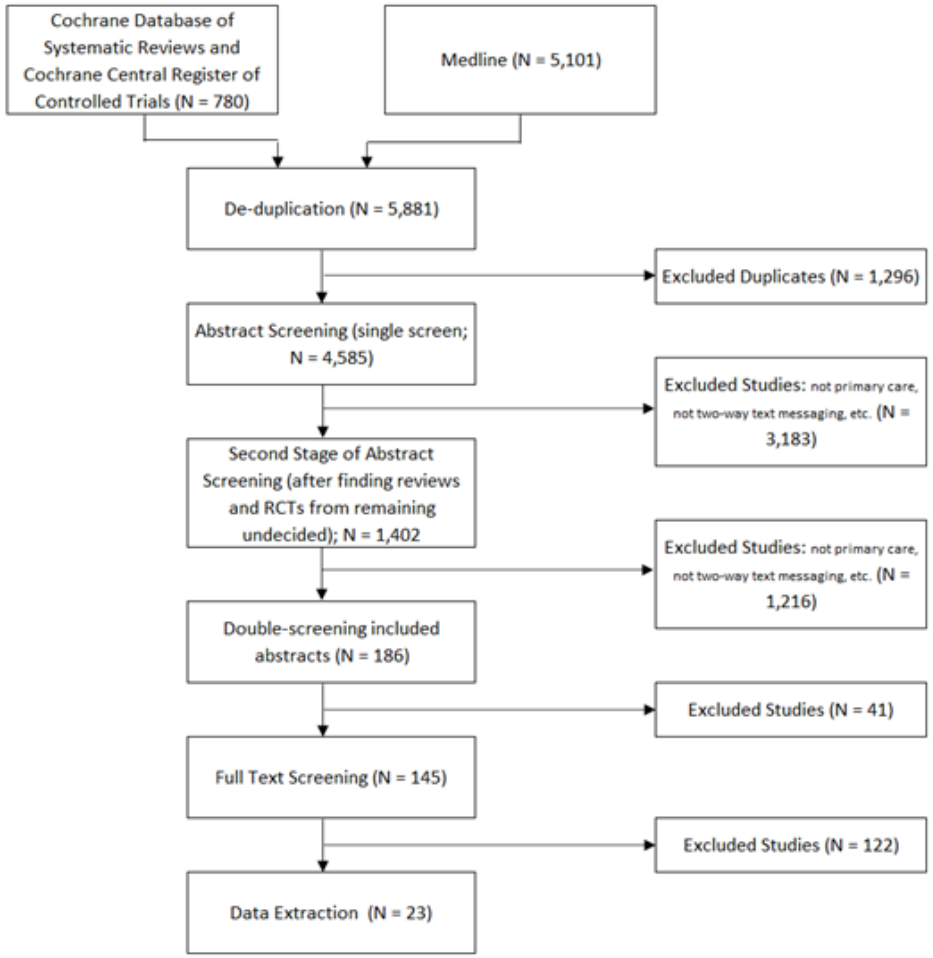


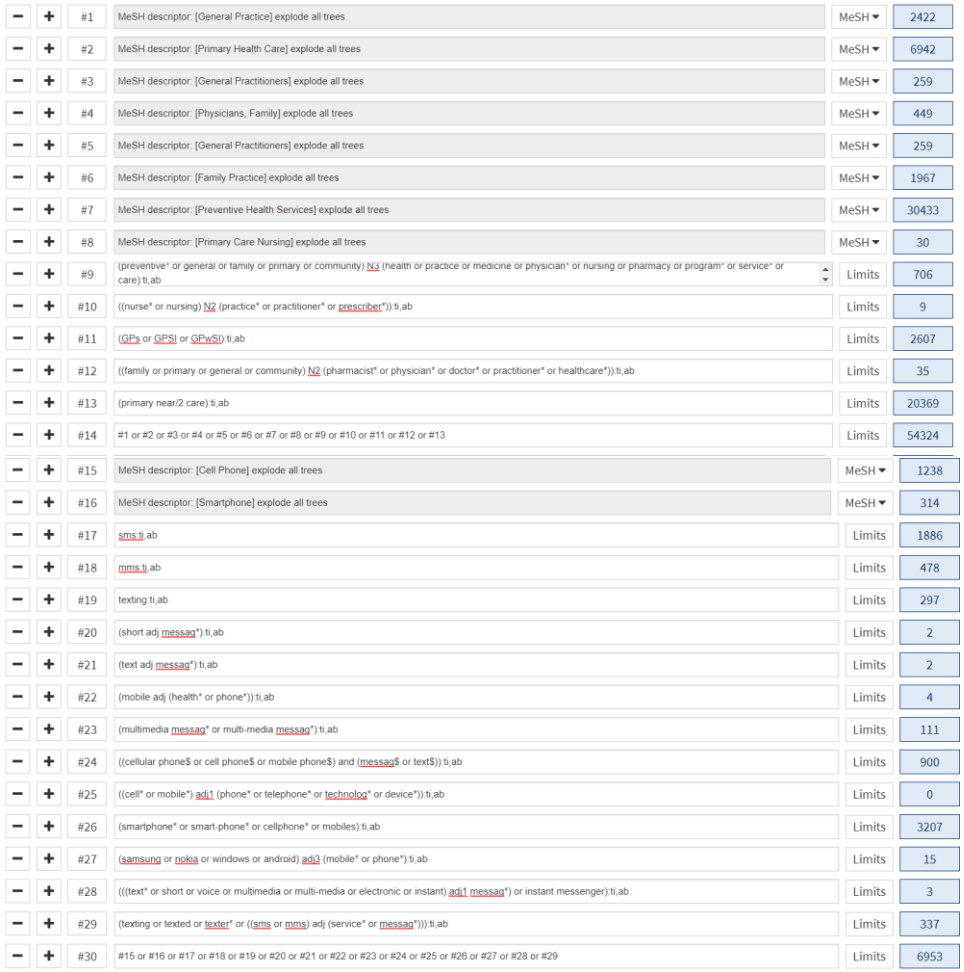
Table 4

Source	Search strategy	Number of Hits	Relevant evidence identified
Medline	See FIgures 2 and 3 below	5101	See FIgures 2 and 3 below
Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials	See Figure 4 and 5 below	780	See FIgures 4 and 5 below

Figures 2 & 3: Search terms for Medline

☐	1	exp General Practice/	74652
☐	2	exp Primary Health Care/	156362
☐	3	exp General Practitioners/	7700
☐	4	exp Physicians, Family/	16313
☐	5	exp General Practitioners/	7700
☐	6	exp Family Practice/	65088
☐	7	exp Preventive Health Services/	588063
☐	8	exp Primary Care Nursing/	473
☐	9	((preventive* or general or family or primary) adj3 (health or practice or medicine or physician* or nursing or program* or service* or care)).ti,ab.	311250
☐	10	(GPs or GPSI or GPwSI).ti,ab.	24258
☐	11	((family or primary or general or community) adj2 (physician* or doctor* or practitioner* or healthcare*)).ti,ab.	106469
☐	12	(primary adj2 care).ti,ab.	129328
☐	13	1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12	1015784
☐	14	exp Cell Phone/	10423
☐	15	exp Smartphone/	4097
☐	16	(sms or mms).ti,ab.	10189
☐	17	texting.ti,ab.	798
☐	18	(short adj messag*).ti,ab.	1235
☐	19	(text adj messag*).ti,ab.	3767
☐	20	(mobile adj (health* or phone*)).ti,ab.	10542
☐	21	multimedia messag*.ti,ab.	73
☐	22	multi-media messag*.ti,ab.	3
☐	23	((cellular phone$ or cell phone$ or mobile phone$) and (messag$ or text$)).ti,ab.	2126
☐	24	((cell* or mobile*) adj1 (phone* or telephone* or technolog* or device*)).ti,ab.	17915
☐	25	(smartphone* or cellphone* or mobiles).ti,ab.	10232
☐	26	smart-phone.ti,ab.	668
☐	27	(((text* or short or voice or multimedia or electronic or instant) adj1 messag*) or instant messenger).ti,ab.	5127
☐	28	(texting or texted or texter* or ((sms or mms) adj (service* or messag*))).ti,ab.	1094
☐	29	14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28	43824
☐	30	13 and 29	5101

FIgures 4 & 5: Search terms for Cochrane Database of Systematic Reviews and Cochrane Central Register of Controlled Trials



#1	MeSH descriptor: [General Practice] explode all trees	MeSH	2422
#2	MeSH descriptor: [Primary Health Care] explode all trees	MeSH	6942
#3	MeSH descriptor: [General Practitioners] explode all trees	MeSH	259
#4	MeSH descriptor: [Physicians, Family] explode all trees	MeSH	449
#5	MeSH descriptor: [General Practitioners] explode all trees	MeSH	259
#6	MeSH descriptor: [Family Practice] explode all trees	MeSH	1967
#7	MeSH descriptor: [Preventive Health Services] explode all trees	MeSH	30433
#8	MeSH descriptor: [Primary Care Nursing] explode all trees	MeSH	30
#9	(preventive* or general or family or primary or community) N3 (health or practice or medicine or physician* or nursing or pharmacy or program* or service* or care):ti,ab	Limits	706
#10	((nurse* or nursing) N2 (practice* or practitioner* or prescriber*)):ti,ab	Limits	9
#11	(GPs or GPSI or GPwSI):ti,ab	Limits	2607
#12	((family or primary or general or community) N2 (pharmacist* or physician* or doctor* or practitioner* or healthcare*)):ti,ab	Limits	35
#13	(primary near/2 care):ti,ab	Limits	20369
#14	#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	Limits	54324
#15	MeSH descriptor: [Cell Phone] explode all trees	MeSH	1238
#16	MeSH descriptor: [Smartphone] explode all trees	MeSH	314
#17	sms:ti,ab	Limits	1886
#18	mms:ti,ab	Limits	478
#19	texting:ti,ab	Limits	297
#20	(short adj messag*):ti,ab	Limits	2
#21	(text adj messag*):ti,ab	Limits	2
#22	(mobile adj (health* or phone*)):ti,ab	Limits	4
#23	(multimedia messag* or multi-media messag*):ti,ab	Limits	111
#24	((cellular phone$ or cell phone$ or mobile phone$) and (messag$ or text$)):ti,ab	Limits	900
#25	((cell* or mobile*) adj1 (phone* or telephone* or technolog* or device*)):ti,ab	Limits	0
#26	(smartphone* or smart-phone* or cellphone* or mobiles):ti,ab	Limits	3207
#27	(samsung or nokia or windows or android) adj3 (mobile* or phone*):ti,ab	Limits	15
#28	(((text* or short or voice or multimedia or multi-media or electronic or instant) adj1 messag*) or instant messenger):ti,ab	Limits	3
#29	(texting or texted or texter* or ((sms or mms) adj (service* or messag*))):ti,ab	Limits	337
#30	#15 or #16 or #17 or #18 or #19 or #20 or #21 or #22 or #23 or #24 or #25 or #26 or #27 or #28 or #29	Limits	6953