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Interactive Voice Response (IVR) for Tobacco Cessation: A Systematic Review

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2	Title: Interactive Voice Response (IVR) for Tobacco Cessation: A Systematic Review
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Objective: To summarize the uses, outcomes, and implementation of interactive voice response (IVR) as a tobacco cessation intervention.

Data sources: A systematic review was conducted. Searches were performed on May 3, 2023. The strategies used key words such as "tobacco cessation", "smoking reduction" and "interactive voice recording". Ovid MEDLINE®ALL, Embase, APA PsycInfo, CINAHL, Cochrane Library, and Web of Science were searched. Grey literature searches were also conducted.

Study selection: Titles and abstracts were assessed by two independent reviewers. Studies were included if: IVR was an intervention for tobacco cessation for adults; any outcomes were reported; and study design was comparative. Any abstract included by either reviewer proceeded to full text review. Full texts were reviewed by two independent reviewers.

Data extraction: Data was independently extracted by two reviewers using a standardized form. The ROB-2 and the ROBINS-I tools were used to assess study quality.

Data synthesis: Of 308 identified abstracts, 20 moderate- to low-quality studies were included. IVR was used standalone or adjunctly as a treatment, follow-up or risk-assessment tool across populations including general smokers, hospitalized patients, quitline users, perinatal women, cancer patients and veteran smokers. Effective studies found that IVR was delivered more frequently with shorter follow-up times. Significant gaps in the literature include a lack of population diversity, limited implementation settings and delivery schedules, and limited patient and provider perspectives.

Conclusions: While the evidence is weak, IVR appears to be a promising intervention for tobacco cessation. However, pilot programs and research addressing literature gaps are necessary.

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Strengths and limitations

- This systematic review followed a prior written protocol and searched multiple databases and grey literature sources to identify relevant studies.
- Details on study selection and data extraction were explicitly reported and conducted by at least two independent reviewers.
- Study quality was assessed using the Cochrane risk of bias tools for controlled and observational studies.
- Due to limited time and resources, only relevant studies published in English or French language were included.
- Where possible, outcomes were stratified by population, sex and/or gender, however significant heterogeneity across studies precluded a meta-analysis.

Introduction

As of 2020, 22.3% of the global population reported using tobacco products - around 1.3 billion individuals (1). The annual economic costs of tobacco use are significant, equaling an estimated US\$ 1.4 trillion and 1.8% of the world's annual gross domestic product (1). Over eight million deaths per year are attributed to direct and indirect tobacco use (1). While current global tobacco control efforts contribute to decreasing the prevalence of tobacco use and associated morbidity and mortality rates, it is crucial to continue finding ways to support patients who want to make a quit attempt or change their smoking behaviour.

Interactive voice response (IVR) is a phone-based platform that can be used to deliver health behaviour interventions (2). IVR can be used to deliver educational messages, reinforce behaviours, motivate and guide patients, record patient symptoms or outcomes, encourage medication adherence, and connect patients with further resources or professionals (3). With IVR, a human speaker is replaced with a high-quality, pre-recorded interactive script and responds to patients based on answers provided (2). Patients can either call the IVR or receive calls. The possible advantages of IVR include its ability to make multiple

calls during and outside regular business hours, it can connect with patients quickly, and it can identify those who are at higher risk and more likely to benefit from continued support (3, 4).

IVR has been used in interventions for alcohol consumption, asthma, heart failure, obesity, sleep apnea, hypertension, high cholesterol, dietary behaviour, to increase physical activity and to improve medication adherence (2). IVR has also been used as a tool to support tobacco cessation in patients, particularly post-hospital discharge (5). Post-discharge, patients receive tailored automated IVR calls at different time points (5). The calls typically assess patients' current smoking status, intention to quit or confidence in staying quit, current cessation medication use, and desire for additional support, and provides motivational messages, encourages patients to stay quit or continue attempting, promote the use of cessation medication, and offer to transfer patients to a counselor (5). IVR is also frequently used in conjunction with other interventions, such as nicotine replacement therapy (NRT), or after counselling with a physician in-hospital or in a primary care setting (5). However, the effectiveness of IVR as a tobacco cessation intervention for specific population groups, and the best uses and optimal delivery schedule of IVR interventions, are unknown.

This systematic review aims to synthesize and understand the current knowledge regarding IVR for tobacco cessation and to identify any gaps in the literature. Questions that guided this review included the ideal IVR delivery schedule, components of IVR, utilization of the intervention, outcomes reported in the literature, patient and provider perspectives, and costs of using IVR for tobacco cessation.

Methods

Search strategy

This systematic review followed a written, unregistered protocol and was conducted by following the Cochrane best practice guidelines and the PRISMA reporting standards (6, 7). An experienced medical information specialist developed and tested the search strategies through an iterative process in consultation with the review team. The MEDLINE strategy was peer reviewed by another senior information specialist using the PRESS Checklist (8). The strategies utilized a combination of controlled vocabulary (e.g., "Smoking Reduction", "Tobacco Use Cessation", "Reminder Systems") and keywords (e.g., "quit smoking", "interactive voice response"). Vocabulary and syntax were adjusted across

databases. Using the multifile option and deduplication tool available on the Ovid platform, we searched Ovid MEDLINE®ALL, Embase, APA PsycInfo, CINAHL (Ebsco), the Cochrane Library (Wiley), and Web of Science (Core Databases). Records were downloaded and deduplicated using EndNote version 9.3.3 (Clarivate Analytics). All searches were performed on May 3, 2023. Grey literature searches were conducted through the Canadian Agency for Drug and Technologies in Health Grey Matters database, targeted Google searches, and preprint databases including medRixV and Research Square.

122 Study selection

A calibration exercise was conducted by four reviewers on a sample of the retrieved abstracts. After 100% agreement was reached among reviewers, the remaining abstracts were screened in duplicate by two independent reviewers. Abstracts selected for inclusion by either reviewer proceeded to full-text review. This initial screen was intentionally broad to ensure that all relevant literature was captured. Abstracts proceeded to full-text review if: IVR was used as an intervention tool for tobacco cessation; IVR targeted adults; any outcomes were reported, including treatment completion, quit rates, smoking abstinence, and patient perspectives; and was a comparative study, comparing IVR to any comparator. Studies that reported other kinds of interventions but used IVR for data collection purposes were excluded.

Full texts were included if they met the above inclusion criteria. Conference abstracts, case series, reviews, letters, and editorials were excluded. Along with grey literature databases, the reference lists of relevant systematic reviews were also searched. Full-text review was conducted in duplicate by two independent reviewers. Discrepancies between reviewers were resolved through discussion and consensus.

Data extraction

Publication year, country, study design, target population, participant characteristics, intervention setting, purpose or use of IVR, IVR schedule and follow-up, and outcomes were extracted by a single reviewer using standardized data extraction forms. A second reviewer verified the extracted data.

Discrepancies between reviewers during data extraction were resolved through consensus.

Quality assessment

The quality of controlled trials was assessed using the revised Cochrane Risk-Of-Bias Tool for Randomized Trials (ROB-2) (9), while the observational studies were assessed with the Risk of Bias in Non-Randomized Studies of Interventions (ROBINS-I) tool (10). Controlled trials were assessed using five criteria broadly covering the areas of randomization, deviation from intended intervention, missing outcome data, measurement of outcome, and selection of reported results (9). Observational studies were assessed based on the following parameters: bias due to confounding, selection bias, bias in classification, bias due to deviations from intended interventions, bias due to missing data, bias in measurement, and reporting bias (10). Quality assessment was completed by one reviewer and verified by a second reviewer.

Data analysis and synthesis

Significant heterogeneity of studies was expected. Therefore, a narrative approach to synthesis was adopted a-priori. A stratified analytic approach by population was adopted. Interventions used, outcomes, effectiveness, trends, and any gaps in the literature were assessed by population.

Patient and public involvement

Patients and the public were not involved this review. Stakeholders (and co-authors) from Alberta Health Services were involved in the conceptualization of this review and provided feedback on the final manuscript draft.

Results

Overall results

The search strategy yielded 308 unique citations, 271 of which were excluded after abstract review, Figure 1. Six studies were identified through hand and grey literature searches. Following abstract review, 43 studies proceeded to full-text review. At the full text-review phase, 23 studies were excluded for the following reasons: not IVR (n=4), IVR used as a data collection method (n=6), commentary or abstract (n=9), no outcomes (n=2), or duplicates (n=2), Figure 1.

The final dataset included 20 studies; 13 controlled trials and seven observational studies, Figure 2, panel A. Sixteen studies were conducted in the US (11-26), two were conducted in Canada (27, 28), and the remaining two were conducted in Norway (29, 30), Figure 2, panel B. Studies were published between 1995 – 2022, Figure 2, panel C. In eight studies, study sample sizes ranged between 100 to 500 participants while five studies each included between 500-1,000 participants, and >1,000 participants respectively. Only two studies included less than 100 participants, Figure 2, panel D. Appendix A includes additional details on the characteristics and outcomes of the 20 studies.

Quality of included studies

The risk of bias assessment of the 13 controlled trials ranged from some concerns (n=7) to high risk of bias (n=6), Figure 3, panel A. The most common critical weakness across the controlled trials was the deviation from intended intervention and the selection of reported results. However, most studies were assessed at a low risk of bias in the measurement of outcomes and the randomization process.

Overall, one observational study was assessed at a moderate risk of bias, two studies were at a high risk of bias, and the remaining four studies were assessed at critical risk of bias. The most common critical weakness across studies were confounding, deviation from interventions, measurement of outcomes, and the selection of reported results. Most of the observational studies were assessed at a low risk of bias in the classification of interventions and selection of participants to the study, Figure 3, panel B.

How was IVR used as an intervention?

Two uses of IVR were identified. Across the 20 studies, IVR was used as either a standalone (n=6) or an adjunct intervention (n=13) for tobacco cessation. The use of IVR was unclear in one study (17). When used as a standalone intervention, IVR was the primary intervention reported in the study (13, 14, 18, 20, 25, 31). When used as an adjunct intervention, IVR was used in combination with other interventions including counselling, referrals, quitlines, and web- or SMS-based cessation activities (11, 12, 15, 16, 19, 21-24, 26, 27, 29, 30).

When in the care trajectory was IVR used?

Studies examined IVR use along different points in the care treatment trajectory. Included studies used IVR as a treatment tool, a follow-up tool and a risk-assessment tool, Figure 4.

As a treatment tool, IVR asked questions regarding smoking habits, overall goals, and fears surrounding tobacco cessation. IVR provided tailored behaviour change therapeutic responses based on answers given by the patients, through personalized motivational messages and advice, coping mechanisms, and interactive activities. When IVR was used as a treatment tool, IVR delivery schedule varied widely for interventions with call schedules ranging from calls every day (20) to every 2-, 12-, 28-, 68-, and 88-days post-discharge (24) to every two weeks for 39 weeks (27). In two studies, IVR was available on an asneeded basis where patients were called regularly in response to their unique requirements (29, 30) and

As a follow-up tool, IVR was used post-discharge to monitor patients' progress, provided personalized motivational messages, provided access to requests for NRTs/pharmacotherapy, and directed calls to a quitline or counsellor. Five studies delivered IVR at 3-,14-, and 30-days post-discharge (12, 15, 16, 22, 28) and one delivered IVR at eight predetermined unspecified time periods over 12 weeks post-discharge (11). In all the studies that used IVR as a follow-up tool, IVR was also used as a risk-assessment tool (11, 28).

in two studies IVR was available 24/7 for participants to utilize when they wanted (18, 25).

As a risk assessment tool, IVR assessed the risk of relapse based on responses to curated questions, flagging at-risk patients and connecting them to a counsellor, quitlines or nurse specialists to mitigate relapse and provide immediate support. Risk assessment was conducted differently across the different studies. In one study, specific questions were asked to assess risk of relapse and "at risk" patients were transferred to a quit coach for brief intervention (21). Frequency of IVR calls and follow-up times ranged widely.

For whom was IVR more likely to be effective?

IVR was used as a tobacco cessation intervention across multiple specific populations. Six studies targeted general adult smokers (20, 24, 25, 27, 29, 30), seven studies targeted hospitalized patients (11, 15, 16, 19, 22, 23, 28), three studies targeted quitline users (13, 14, 21), two studies targeted adult perinatal or pregnant women (12, 18), one study targeted cancer patients (17), and one study targeted veteran smokers (26), Figure 5.

General adult smokers

Four studies were controlled trials and the remaining two were observational studies (20, 24, 25, 27, 29, 30). Four controlled trials used IVR as an adjunct treatment tool. One reported biochemically confirmed abstinence rates and three reported self-reported point abstinence rates (24, 27, 29, 30). No statistically significant difference in past-7-days biochemically confirmed abstinence was found at 6-month follow-up (24). However, three controlled trials reported significantly higher self-reported point abstinence rates at 1-, 3-, 6, and 12-month follow-ups (24, 29, 30).

One observational study used IVR as a standalone treatment tool and reported abstinence rates. Of participants that reported abstinence at the 1-month follow-up, 47.1% were still abstinent at the 3-month follow-up and 37.3% were still abstinent at the 6-month follow-up (25). One observational study examined IVR as a treatment and risk assessment tool and focused on quit rates (20). Overall, 30% of individuals that opted into the IVR program were smoke-free at the last contact.

Hospitalized patients

Seven studies included patients admitted to hospital; four controlled trials and three observational studies (11, 15, 16, 19, 22, 23, 28). In the two controlled trials that used IVR as an adjunct treatment tool, one study found that 25.8% of intervention patients were biochemically confirmed abstinent in the past 7 days (p=0.009) and self-reported abstinence rates in the past-7-days at the 1-month and 6-month follow-ups were significantly higher in intervention patients (23). However, the other study found no statistically significant difference in self-reported abstinence rates between intervention and usual care participants (19). One controlled trial found that intervention patients were significantly more likely to be abstinent at 6-month follow-up (8.9%) compared to usual care control patients (3.5%, p=0.01) (11). Finally, one controlled trial that examined IVR as a standalone follow-up and risk assessment tool reported abstinence rates and found no difference in abstinence rates between intervention and control groups (28).

Two observational studies examined different outcomes of the same IVR follow-up program. One study reported that IVR was associated with significantly lower total healthcare costs at one-year post-discharge, with mean charges for the IVR group being over \$8,000 less than the usual care control group (15). The other study found no statistically significant reduction in odds of readmission between the IVR 9

group and the usual care control group and no significant difference in readmission rates at 30-, 90-, or 180-days post-discharge (16). IVR reach was also reported to be low as IVR only reached about 43% of eligible participants, and 36.4% of those reached reported abstinence since their last IVR call. The remaining observational study examined the reach of a hospital-based counselling and IVR tobacco cessation program (22). IVR reach was low as only 43% of eligible participants were reached. While no difference was found between IVR alone and bedside counselling with IVR, counselling with IVR was associated with an increase in response to IVR utilization (22).

277 Quitline users

Three controlled trials targeted tobacco cessation quitline users (13, 14, 21). Two controlled trials used IVR as a standalone treatment tool. IVR intervention participants were significantly more likely to reenroll into the quitline (28.2% intervention vs. 3.3% usual care; p<0.001), though the proportion of those that re-enrolled was small (14). Of those followed-up, 79.9% of those followed-up reported making a quit attempt lasting 24 hours or more in the last 90 days, with 24.0% reporting abstaining from tobacco in the last 7 days (13). One controlled trial used IVR as an adjunct risk assessment tool reported quit rates in quitline users at two different IVR delivery schedules: twice weekly for 2 weeks then weekly for 6 weeks (10 calls total) or daily for 2 weeks and weekly for 6 weeks (20 calls total) (21). The intervention found no difference in abstinence rates between the two IVR delivery schedules and the frequency of IVR calls did not impact tobacco cessation. Those that did not screen as at-risk for relapse during the scheduled IVR relapse risk assessments were 77% more likely to be abstinent at the 6-month follow-up (21).

Adult perinatal women

Two studies targeted adult perinatal women (12, 18). In the controlled trial, IVR was used as a standalone treatment tool and while 16.7% of IVR intervention participants were biochemically confirmed end-of-pregnancy quitters, there was no significant difference compared to usual care patients (18). The observational study used IVR as an adjunct follow-up and risk-assessment tool. There was no difference in reported abstinence between participants that only received IVR and those that received bedside counselling with IVR (12).

Cancer patients

One observational study examined IVR as a treatment tool at cancer centers (17). This study compared the effectiveness of multiple different tobacco cessation interventions, including IVR, implemented across 38 participating cancer centers. IVR was implemented at 4 out of the 38 cancer centers. Of all the cessation interventions, IVR had the greatest mean, median, minimum, and maximum ranges for reach, with responses from an average of 56% of those reached by IVR. No IVR-specific or patient-specific abstinence rates were reported; however, 22% of patients reported not smoking in the past 7 days and 19% not smoking in the past 30 days across all cancer centers and implemented interventions (17).

308 Veteran smokers

One controlled trial examined IVR as an adjunct treatment tool targeting veteran smokers (26). IVR was implemented in conjunction with a tobacco cessation manual, an expert system feedback report, and NRT use. At follow-up, 6-month prolonged abstinence rates at month 10 (6.6%), month 20 (9.3%) and month 30 (15%) showed a steady increase in abstinence, however, this increase was not statistically significant (26).

What were the patient-reported experiences with IVR?

Three controlled trials included elements of patient-reported experience with IVR for tobacco cessation (21, 29, 30). Most participants (96%) reported satisfaction with the overall quitline program and 98% stated that they would likely recommend the program to others (21). Furthermore, most participants reported that it was easy to answer questions using the IVR system (95%) regardless of IVR delivery schedule (21). Satisfaction with the IVR intervention was also highly positive, regardless of whether participants were given the option to utilize NRTs (29, 30).

323 What was the reach of IVR?

Eight studies reported reach of the IVR intervention (12, 14, 17, 18, 20, 22, 25, 26). The rate of participants interacting with IVR ranged from 20.8% to 42.8% (12, 14, 17, 18, 20, 22, 25, 26). In one study, IVR did have the highest average reach, compared to other smoking cessation interventions, with responses from 55.8% of those called by IVR; however, these results were at the institution-level, not the individual-level (17).

Sex and gender in this literature

Only one study stratified outcomes by sex or gender; it is unclear which (20). This observational study, of low quality, assessed IVR used as a standalone treatment and risk assessment tool for general adult smokers. It was found that females were significantly more likely to opt-in to the IVR intervention compared to males (OR = 0.78; 95% CI = 0.65-0.95). Of those that opted-in and received IVR calls, females were more likely to report being smoke free at last contact compared to males (OR = 0.87; 95% CI = 0.66-1.15), though this difference was not significant (20).

Discussion

Overall, this review included 20 heterogenous studies. While the evidence base is weak, results indicate that IVR is a promising intervention that can be implemented in multiple healthcare settings, across distinct populations. IVR was implemented as either a standalone or adjunct technology. When implemented as an adjunct technology, IVR was often paired with in- and out-patient counselling, nicotine replacement therapy, or self-help materials, though the type of adjunct intervention did not impact effectiveness of IVR. IVR was also implemented at several points along the patient trajectory and was effective at increasing self-reported abstinence and increasing the use of other tobacco cessation interventions across diverse populations, including general smokers, hospitalized patients, quitline users, adult perinatal or pregnant women, cancer patients, and veteran smokers. The frequency of IVR calls and follow-up times varied widely and studies comparing different IVR delivery schedules reported no differences between brief/short-term and sustained IVR delivery. However, increased IVR frequency and shorter time between follow-ups were generally associated with increased effectiveness of IVR. IVR also reduced healthcare costs. However, IVR did not significantly affect other outcomes, including hospitalization and biochemically confirmed abstinence. Additionally, the reach of IVR was consistently low. Despite variability of findings, no application or use of IVR was shown to be harmful to participants and studies that reported patient perspectives were positive.

Our investigation of the applications, uses and outcomes associated with IVR as a tobacco cessation intervention highlights considerable implications of this health technology on patients, providers, and the healthcare system. For patients, IVR can be an accessible tobacco cessation tool, whether delivered independently or as a supplementary treatment. It can provide a private, judgement-free environment for patients to speak freely about their smoking habits, tobacco use, goals, fears, and motivations, and 12

can offer an opportunity for patients to engage in self-monitoring of their own care and progress as they persist towards becoming smoke-free. However, due to the automated nature of IVR, there is a loss of the emotional support patients may receive with in-person counselling and the risk of response bias. For providers, IVR can reduce workloads and may be valuable tool to provide optimal care for many patients. IVR can help providers gain regular insight on the progress of their patients, can help guide or revise treatment plans and provide additional support. IVR implementation considerations for providers may include technical training, privacy concerns, and costs. IVR may provide considerable benefits for healthcare systems by helping to address smoking and tobacco use which continues to pose a high public health burden through smoking-related diseases. IVR can also assist with data collection, appropriate resource allocation and may serve as a cost-saving healthcare tool.

To our knowledge, this review is the first to compile available evidence on the utilization, application, and effectiveness of IVR technology for tobacco cessation, limiting the possibility for comparison with previous reviews. A previous review by Shoesmith et al. examining different tobacco cessation interventions, including IVR, found that while both longer (> 6 months) and shorter (<6 months) follow-up durations produced an effect in favour of the smoking cessation interventions, abstinence rates showed a decreasing trend once follow-up length exceeded 6 months, supporting our findings that tobacco cessation intervention effectiveness may be associated with shorter follow-up times (32). However, Shoesmith et al. did not provide IVR-specific findings, opting to examine different behaviour change techniques for smoking cessation and relapse prevention (32). Conclusions made in this study may not appropriately correlate with the findings of this review due to the variability in purpose, mode of delivery, frequency and quality of behaviour change smoking cessation interventions and the impact of these factors have on intervention outcomes.

While this study provides a broad overview of the current literature surrounding IVR for tobacco cessation, several limitations exist. The majority of included studies were of low to moderate quality. Though most studies were controlled trials, variability in interventions, methods and outcome measures precluded a meta-analysis. This limited the extent to which the comparative effectiveness of IVR applications and uses across the different populations could be inferred. Further, due to the low number and quality of studies available for multiple populations, generalizations cannot be made, and results should be interpreted cautiously.

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There are significant gaps in the literature that should be noted. First, while this review identified some studies targeted at several populations, no studies were found for some populations that may benefit from IVR including racialized groups and Indigenous Peoples. Furthermore, only one study stratified outcomes by sex or gender. Second, no studies compared IVR initiated in different contexts or settings, such as inpatient versus outpatient settings. Third, only two studies compared different IVR delivery schedules and found no difference (21, 27). Different schedules and times to follow-ups may have different effectiveness. Finally, no qualitative studies examining patient or provider perspectives on IVR were identified.

Conclusion

Tobacco cessation interventions should be approached with effective mitigating and preventative strategies. Overall, IVR was effective at increasing abstinence rates and encouraging positive health outcomes for tobacco cessation. While this review summarized the current knowledge base of IVR for tobacco cessation, several significant gaps in the literature still exist. Organizations can pilot tobacco cessation intervention programs using IVR and contribute, using real-life contexts, to the growing knowledge base of this technology.

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- **Contributors:** MK: Analysis and interpretation of data, data quality assessment, draft of manuscript,
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- interpretation of data, draft of manuscript, review and editing of report. BA: Analysis and interpretation
- of data, data quality assessment, draft of manuscript, review and editing of report. RD: Review and
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20	519	
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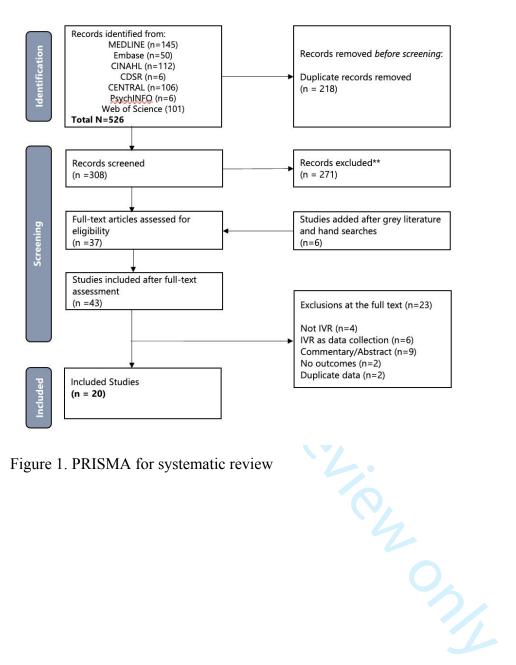
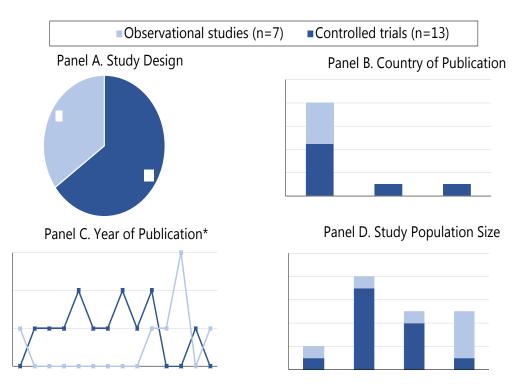
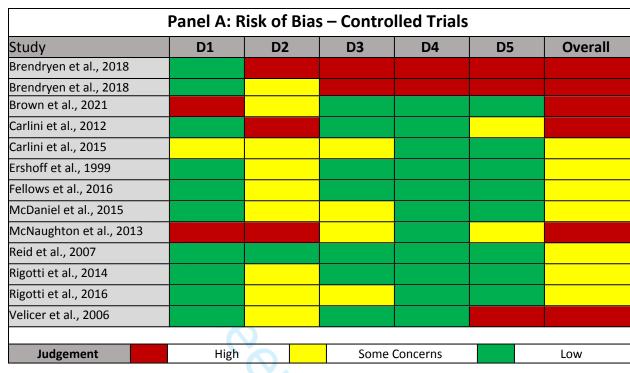


Figure 1. PRISMA for systematic review



*Only the 14 years with at least one publication are shown

Figure 2. Summary characteristics of included studies



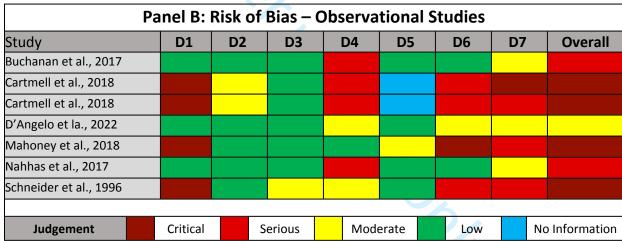


Figure 3. Quality assessment for included studies

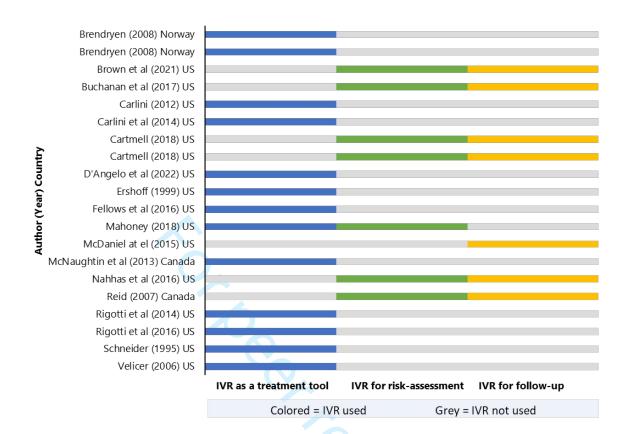


Figure 4. Timing of IVR use in the care trajectory

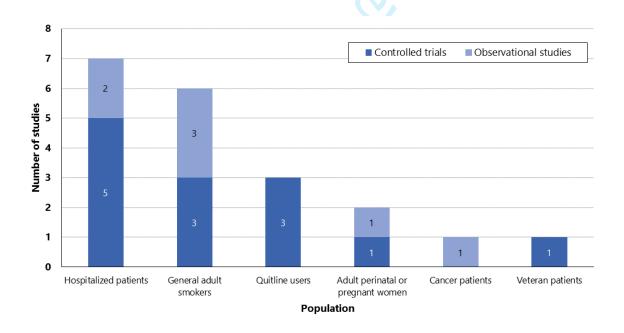


Figure 5. Populations assessed in systematic review

Appendix A: Table of Study Characteristics

Appendix A: Table	of Study Characteristics	BMJ Ope	en	136/bmjopen-2023-08197 cted by copyright, includ	
	Study information	Intervention	Patient characteristics	Primary Outcomeg ပို ဖ	Other outcomes
Brendryen et al.	Study design:	Purpose of IVR:	Population:	Reach: 62% of eggs	At 1 month, 51% of
(2008) Norway	Controlled	Intervention	Adult Smokers	participants large answered log-eat to answered log-eat to a second to a secon	participants found
, ,				answered log-	HE to be "helpful,"
Trial #: Not	Study setting:	Description of	Comparator:	calls. 87 ownloaded from the superior completed can be completed calls. 87 ownloaded from the superior calls	and 32% reported
reported	Digital/Quitline	intervention: Happy	Usual care	intervention \$ 500	HE to be "very
_		Ending program is an		participants and ended	helpful".
Funder:	Inclusion criteria:	internet-based	N: 144	completed a fr	
Norwegian	Wanting to attempt	multimedia	Control: 146	treatment.	
Research Council	quitting, 18 or older,	intervention that used	A = 2.20 F	ning Sp.	
Industry	smoking 5+	CBT techniques to help	Age: 39.5	Abstinence at SES). Abstinence at Follow-up: Repeated points abstinence was an abstinence was abstinence was an abstinence was an abstinence was an abstinence was a	
Industry sponsored: No	cigarettes a day,	people quit smoking	% female: 50%	follow-up:	
sponsored. No	attempt quit without	without the use of	70 ICITIAIC. 5070	Repeated points	
	nicotine replacement therapy	nicotine replacement		abstinence was 20% for and	
	Петару	therapies. IVR is an aspect of the		20% for ₹ 100 lintervention gr 200 lintervention g	
		intervention, along		and 7% for congrol	
		with website-based		group (p=0.002)	
		activities and SMS		h 3,	
		messages.		2025 nologi	
				0 0	
		Standalone or adjunct:		Age	
		Adjunct		nt Agence Bibliograp s.	
		 IVR/Follow-up		blio	
		Schedule: Regular IVR		grap	

В		T			136/bmjopen-2023-081972 on scted by copyright, including fo	
В		1			yrigl	
В			calls depending on		-2023-081972 right, includir	
В			participants' needs;		819 Iclud	
B			follow up at 1, 3, 6 and		72 c ding	
В			12 months		n 9 for	
	rendryen et al.	Study design:	Purpose of IVR:	Population:	Reach: 71% of ses religiorement Superieur (AB participants completed treatment.	At 1 month, 48.2%
(2	2008) Norway	Controlled	Intervention	Adult Smokers	participants 3 20	found HE to be
					answered log-	'helpful' and 44.7%
Tr	rial #: Not	Study setting:	Description of	Comparator:	calls. 152	reported HE to be
re	eported	Digital/Quitline	intervention: Happy	Usual Care	participants	'very helpful'.
			Ending program is an		completed are a	
	under:	Inclusion criteria:	internet-based	N: 197	treatment.	Most participants in
	Iorwegian	Wanting to attempt	multimedia	Control: 199	om r (Al ata	both groups opted
	esearch	to quit smoking,	intervention that used		Abstinence at 1.75	for NRT therapy
C	ouncil, Pfizer	aged 18+, smoking	CBT techniques to help	Age: 35.9	follow-up: គ្លី ំ	(93% intervention
		10+ cigarettes a day	people quit smoking.		Repeated poin	vs. 87% control - p =
	ndustry	and have access to	IVR is an aspect of the	% female:	abstinence was្នី 🚆	0.07). At 1 month,
sp	ponsored: Yes	the internet, email	intervention, along	50.8%	significantly higher	the mean number of
		and cellphone	with website-based		in treatment g ug	days of NRT use was
			activities and SMS		(22.3%) vs. con	significantly higher
			messages. Participants		(13.1%) (p = $0.\overline{62}$.	in treatment group
			were given and allowed		At the 12 mont ಕ್ಷಿ	(M = 5.1 vs. 3.9; p =
			to use NRT products if		follow up, 74 🖺 👶	0.02).
			they wanted.		follow up, 74 chnologies at 2025 at	
					participants es at	
			Standalone or adjunct:		reported 💆	
			Adjunct		abstinence vs. 48 ខ្លី	
					control participant	
			IVR/Follow-up		(p = 0.005)	
L			Schedule: Regular IVR		ρ = 0.005) liographique de	

				<u> </u>	
		calls depending on		ght, including fo	
		participants' needs;		81972 cludin	
		follow up at 1, 3, 6 and		72 on ling f	
		12 months		n 9 for	
Brown et al.	Study design:	Purpose of IVR: Follow-	Population:	Abstinence at uses elarged follow-up: 8.9% elared to describe abstinence vs.	Use of any smoking
(2021) US	Controlled	up monitoring	Hospitalized	follow-up: 8.9%	cessation treatment:
			Patients	intervention # 24	74.6% of
Trial #:	Study setting: Acute	Description of		reported 5 0	intervention vs.
NCT02204956	care private	intervention: Patients	Comparator:	abstinence vs. 8.58	40.5% of control at 6
	Psychiatric hospital	received in-patient	Usual Care	of control, p=0 1 2 2	months, p<0.001
Funder: National		tobacco cessation		verified at 6	
Institute of	Inclusion criteria:	counselling. Following	N: 174	months by sali	Use of counselling:
Mental Health	Inpatient psychiatric	discharge, IVR asked	Control: 179	cotinine analys	37.3% of
	patients aged 18 or	about participants'		ing,	intervention vs.
Industry	older who smoked at	smoking, intentions to	Age: 36.1	//bmjopen.bmj.com/) . ng, Al training, and :	11.0% of control at 6
sponsored: No	least 5 cigarettes per	quit, desire for an		pen traii	months, p<0.001
	day	additional 4 weeks of	% female:	ning	
		transdermal nicotine	46.7%	j.co j, an	Use of
	Exclusion: a current	patches (ie, 8weeks		nd si	pharmacotherapy:
	diagnosis of non-	total), and interest in		in ii	71.0% vs. 37.0% at 6
	nicotine substance	connecting with free		une ar te	months, p<0.001
	use disorder,	telephone quitline		njopen.bmj.com/ on June 13, 2025 at Al training, and similar technologies	
	dementia,	counseling.		202 nolo	
	intellectual disability,			gie:	
	autistic spectrum or	Standalone or adjunct:			
	other cognitive	Adjunct		Agence	
	impairment, an			i e e	
	inability to provide	IVR/Follow-up		Bibliogra	
	consent, medical	Schedule: 8 times over		ogra	

		ВМЈ Ора	en	cted by copyright, including	
	contraindication to the use of NRT or a current pregnancy.	12 weeks post- discharge			
Buchanan et al. (2017) US	Study design: Observational Study setting:	Purpose of IVR: Follow- up monitoring and transfer	Population: Adult perinatal women	Reach: 35.5% of Figure 1.5% of Figur	15.4% of IVR + counselling participants used NRT vs. 4% of IVR
Funder: MUSC, NIDA	Academic medical center	Description of intervention: Patients counselled in-hospital	Comparator: Bedside Cessation	Abstinence at to the follow-up: 12.8% of those who recails and those who recails are the follow-up: 12.8% of	only 10.8% of IVR +
Industry sponsored: No	Inclusion criteria: Adult women admitted to the	by a tobacco treatment specialist; Post- discharge, IVR collected	Counselling + IVR	both counselling and IVR reported abstinence vs.	
	peripartum, delivery, and postpartum units	info on smoking status, frequency, quit attempts, motivation to quit, use of nicotine	N: 421 Age: 29	of those who ing, and si received IVR or training, and si	quitline vs. 14.0% of IVR only
	Exclusion criteria: Women over 41 and admitted for something non-pregnancy-related	replacement therapy (NRT) and whether the patient wanted to be transferred to the quitline	% female: 100%	on June 13, imilar techr	
		Standalone or adjunct: Adjunct		2025 at Agend	
		IVR/Follow-up Schedule: 3-, 14-, and 30-days post-discharge		at Agence Bibliogra ss.	

		ВМЈ Оре	en	Reach: 23.6% önce previous quitlined in users reached in the control of the contr
Carlini et al.	Study docion	Durnoso of IVD:	Donulation	Reach: 23.6% of 33
	Study design:	Purpose of IVR:	Population:	Reacti: 23.0% (4)
(2012) USA	Controlled	Intervention	Quitline users	previous quitline 8197
Trial #:	Study setting:	Description of	Comparator:	users reached line 22 on 9
NCT0126059	Quitline	intervention: Recruited	Usual Care	မှ ဖြ Re-enrollment နွေခန်င်
NC10120039	Quitille		Osual Care	was 28.2% for $\stackrel{\circ}{=}$ $\stackrel{\circ}{=}$ $\stackrel{\circ}{=}$ $\stackrel{\circ}{=}$ $\stackrel{\circ}{=}$ $\stackrel{\circ}{=}$
Funder: National	Inclusion criteria:	participants who were	N: 245	intervention vs
Cancer Institute	Previously enrolled	previously enrolled in a	Control: 276	1
Cancer mistitute	in quitline, Medicaid	quitline intervention; IVR call assessed	Control. 270	3.3% for control # # # # # # # # # # # # # # # # # # #
Industry	or uninsured, 18 or		Age: 42.2	< 0.001) Sit Sul
sponsored: No	older, sought help	smoking behaviours,	Agc. 42.2	IVR participants of
sponsored. No	for cigarette/tobacco	current smoking status;	% female:	were 11.2 times
	_	if participants were	66.5%	were 11.2 times 介用 more likely to 聲器計
	use	interested in	00.370	enroll than controls
		reattempting quit, they		! <u>9</u> ≥ !
		were enrolled into		• • • • • • • • • • • • • • • • • • •
		connected with quitline		ain:
		specialist and	'0 /.	, gri
		reenrolled into IVR		anc
		intervention.		d sir
		Standalone or adjunct:		nilau 1
		1		ne (
		Standalone		13, 2
		 IVR/Follow-up		pen.bmj.com/ on June 13, 2025 at training, and similar technologies.
		Schedule: One IVR call		ie at /
		to assess and/or recruit		at Agence Bibliog
		into intervention. Up to		nce
		20 call attempts made.		Bib
				- -

		ВМЈ Оре	en	cted by copyright, in Abstinence at
				opyrigh
Carlini et al.	Study design:	Purpose of IVR:	Population:	Abstinence at 🛱
(2014) US	Controlled	Intervention	Quitline Users	follow-up: 24.0 🖟
				reported abstanin
Trial #:	Study setting:	Description of	Comparator:	from tobacco i g th
	Quitline	intervention: IVR	Usual Care	last 7 days
Funder: Quitline		system delivered a set		nsei es r
Registries for	Inclusion criteria: 18	of questions to identify	N: 3,510	S reight Quit rate: 79.9
Continuously	or older, having	motivational and	Control: 22,824	those followed $\hat{\vec{P}}$
Engaging	received services in	informational barriers		with reported to super making a quit tape attempted lasting
Participants in	English, providing	to recycling into a new	Age: 65.2% over	making a quit 축동
Cessation from	verbal consent,	quit attempt and	40	attempted last
the Centers for	being a cigarette	provided tailored		24 hours or mare
Disease Control	smoker, not being	messages to specifically	% female:	in the last 90 daining, Al training, and sin
and Prevention	incarcerated, and	address these barriers	53.8%	ning
	not having received	(0)		, <u>Þ</u>
Industry	quitline services for	Standalone or adjunct:	/ °	trai
sponsored: No	at least 5 months	Standalone	10.	nin
	before the study			Al training, and similar tech
	launch	IVR/Follow-up		nd s
		Schedule: Two cycles of		simil
		6 IVR attempts each;		nilar te
		follow-up at 90 days		
Cartmell et al.	Study design:	Purpose of IVR: Follow-	Population:	Cost/Cost-
(2018) USA	Observational	up monitoring and	Hospitalized	effectiveness: \ ota
		transfer	patients	mean healthcare
	Study setting:			
Funder: Agency	Hospital	Description of	Comparator:	discharge: \$51,937
of Healthcare		intervention: IVR call at	Usual Care	IVR vs. \$59,132
Research and	Inclusion criteria:	discharge determined		cost post- discharge: \$51,937 IVR vs. \$59,132 control, p=0.03.
Quality, Pfizer	18+ smokers		N: 764	

		ВМЈ Оре	en	136/bn cted by	
				136/bmjopen-202: cted by copyright	
	admitted to the	smoking status and	Control: 1439	1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	
Industry	hospital	referred to the tobacco		Comparing ove	
sponsored: Yes		treatment specialist	Age: 49.4	health care charged	
	Exclusion criteria:	that assessed patients'		for the TDTS logv	
	Those admitted for	behaviour and	% female:	exposed (IVR) မြှုံ့ ကျင်	
	psychiatric care,	developed a treatment	47.5%	versus unexpo 🏖	
	same day surgery,	plan with the patient.		patient groups	
	<24-hour	IVR also conducts		mean charges 🏖 💆	
	observation or not	follow-up calls to		the IVR group 🎇 💆	
	discharged	evaluate smoking		\$8006 lower th ្ណីគ្គី ខ្លី	
		status and transfer to		for the control of of the control of of the control of of the control of of the control of the c	
		counsellor if needed.		group (P=0.08) (S) (S) (S) (S)	
		1 C/A		mii mii	
		Standalone or adjunct:		Intervention is significant.	
		Adjunct		implementatio	
			· ·	costs were \$34 21 2	
		IVR/Follow-up	10.	per participant n	
		Schedule: At discharge,		12-month period 👼	
		3, 14, 30 days post-		(incl. start-up 🏚 st 💆	
		discharge		with total	
				intervention cost	
				being \$158,14(క్త్రి ప్రే	
Cartmell et al.	Study design:	Purpose of IVR: Follow-	Population:	Readmission ræes	
(2018) USA	Observational	up monitoring and	Hospitalized	30-day - 9.8% 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	
		transfer	patients	vs. 11.9% control	
Funder: Agency	Study setting:			(p=0.05), 90 day - 👸	
of Healthcare	Hospital	Description of	Comparator:	17.3% IVR vs. 👸	
Research and		intervention: IVR call at	Usual Care	18.6% control (p = 5	
Quality, Pfizer		discharge determined		0.258), 180 day - ଔୁ	

		ВМЈ Оре	en	22.4% IVR vs. 24.3% control (p=0.239).	
	Inclusion oritoria.	conclains status and	N: 764	oyright,	I
Industry	Inclusion criteria:	smoking status and		22.4% IVR vs. in 20	
sponsored: Yes	18+ smokers	referred to the tobacco	Control: 1439	24.3% control & 39	
sponsored. res	admitted to the	treatment specialist	Age: 49.4	(p=0.239).	
	hospital	that assessed patients' behaviour and	Age. 43.4		
	Exclusion criteria:		% female:	uly : Ens	
	Those admitted for	developed a treatment	47.5%	202. rela	
	psychiatric care,	plan with the patient. IVR also conducts	17.570	ated	
	same day surgery,			own to 1	
	<24-hour	follow-up calls to		Sur Sur ext	
	observation or not	evaluate smoking status and transfer to		ded berie and	
	discharged	counsellor if needed.		fror	
	discharged	coursenor ir fleeded.		July 2024. Downloaded from http://bmjopen.bmj.com/ Enseignement Superieur (ABES) . uses related to text and data mining, Al training, and :	
		Standalone or adjunct:		http://br BES) . mining,	
		Adjunct		g, A	
			•	opei I tra	
		IVR/Follow-up		inin	
		Schedule: At discharge,		g, a	
		3, 14, 30 days post-			
		discharge; Follow-up at		simil on .	
		30-, 90- and 180-day		June ilar te	
		post-discharge.		ech	
D'Angelo et al.	Study design:	Purpose of IVR:	Population:	Reach: IVR had the 25 highest average of 55.8%	21.7% of patients
(2022) US	Observational	Intervention	Cancer Patients	highest average. 5	had not smoked in
				reach with an " 🚡	the past 7 days and
Funder: National		Description of	Comparators:	average of 55.8%	18.6% had not
Cancer Institute	Study setting: Cancer	intervention: IVR used	Other smoking	of patients reache	smoked in the past
	Centers	to automatically	cessation	bliogra	30 days, however,
		identify and contact	intervention	graphiq	this result applies to

		ВМЈ Ор	en	136/bmjopen-2023-081972 on 9 July ; Ens cted by copyright, including for uses	
				pen-202 opyrigh	
Industry	Inclusion criteria:	patients who smoked	including	t, in	all cancer centers,
sponsored: No	Adults 18 years and	to provide treatment.	telephone	819; cluc	across all
	older	Implemented in 4/38	counselling, in-	72 o	implemented
		cancer centers.	person	on 9 g for	interventions and is
			counselling,	July Er use	not specific to IVR.
		Standalone or adjunct:	cessation	y 20 nseinsei ss re	
		Unclear	medication and	24. gne gne late	
			access to a	Down mer	
		IVR/Follow-up	quitline.	/nlo	
		Schedule: Not reported		ade uper (t ar	
		100	N: 38 Cancer	d fra	
			centers	om ata	
		C/C	Age: N/A	July 2024. Downloaded from http://bmjoper Enseignement Superieur (ABES) . uses related to text and data mining, Al tra	
		. 6	% female: N/A		
Ershoff et al.	Study design:	Purpose of IVR:	Population:	Reach: 285 participants successfully	Only 20.8% of IVR
(1999) USA	Controlled	Intervention	Adults Perinatal	participants 🖁 🖁	patients placed one
			women	Jaccessiany (n	or more calls to the
Trial #: Not	Study setting:	Description of		reached for folition 2	system and it had no
reported	Hospital	intervention: For the	Comparators:	up at the 34th	impact on their quit
		IVR subgroup,	Cessation	week of pregnancy	status
Funder: Not	Exclusion criteria:	participants were given	booklet,	(IVR only group not) specified)	
reported	Women under the	informational booklet	Motivational	specified) G. 15 at	
In director	age of 18, and those	along with access to	Interviewing	▶	
Industry	who began prenatal	computerized IVR		Quit rate: 16.7% of	
sponsored: No	care past the 26th	support system that	N: 120	IVR intervention	
	week of pregnancy,	they had access to 24/7	Control: 111	group were	
	smoked less than 7	toll-free. IVR would ask	1 4 20 6	group were bliograph	
	cigarettes week pre-		Age: 29.6	ph.	

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	pregnancy, had experienced a miscarriage/ abortion, and had not smoked prior to the baseline interview	about smoking behaviour and readiness to change as well as stage-appropriate, customized motivational messages, interactive activities and reinforcement. Standalone or adjunct: Adjunct IVR/Follow-up Schedule: Available 24/7 for participants to utilize as needed; Follow-up at 32 weeks pregnancy	% female: 100%	opyright for uses related to text and data mining, Al training, a confirmed statisticant confirmed significant significant significant confirmed statistical confirmed statistic	
Fellows et al. (2016) US	Study design: Controlled	Purpose of IVR: Intervention	Population: Hospitalized patients	Reach: 50.6% of patients completed call 1, 31.3%	Use of any quit program: 8.4% in intervention, 5.0% ir
Trial #: NCT01236079 Funder: National Heart, Lung, and Blood Institute Industry sponsored: No	Study setting: Hospitals Inclusion criteria: Adult patients admitted to one of the hospitals who reported having	Description of intervention: Patients were counselled inhospital and created a tailored discharge treatment recommendation; medications; IVR	Comparator: Usual Care N: 597 Control: 301 Age: 53	completed calling 2025 at Agence Bibliographique 1.7) Abstinence at follow-up: 30-day abstinence = 18%	control, p=0.096 Use of telephone quitline: 6.9% intervention vs. 2.5% control, p=0.014

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	smoked a cigarette	contacted patients for	% female:	for intervention, 17% for control 17% for control 17%	Use of any
	in the previous 30	smoking status,	56.6%	for intervention for intervention for control 17% for control for uses related for uses rel	medication: 47.9%
	days, spoke English,	cessation program		p=0.569 ling 2	intervention vs.
	had a working	enrollment status, and		for	38.0% control,
	phone, and were	cessation medication		use E	p=0.013
	interested in	use, and received tips		y 20 nsei es ro	
	remaining abstinent	for quitting		2024. Do seignemos s related	
	post-discharge			Dov ed t	
	O_{I}	Standalone or adjunct:		o te	
	Exclusion criteria:	Adjunct		Downloaded ment Supering to text and text	
	Patients living more	\mathcal{O}_{Δ}		ded from the control of the control	
	than 50 miles away,	IVR/Follow-up		data	
	admitted to a critical	Schedule: 4, 14, 28, and		m. m.	
	care, labor/delivery,	49 days; Follow-up at 6		ning,	
	or psychiatric unit,	months		j, Al	
	were pregnant or		/ · ·	ABES) . a mining, Al training, and similar	
	breastfeeding, were		10.	inin.	
	physically too ill or			ning, an	
	cognitively unable to			nd s	
	provide informed			simi on	
	consent			June ilar te	
Mahoney et al.	Study design:	Purpose of IVR:	Population:	Reach: 32% of ဋိ ္မိ	
(2018) USA	Observational	Intervention, transfer	Adult Smokers	patients reached	CI 0.65-0.95) and
				following charter is	those over 40 were
	Study setting:	Description of	Comparator:	review, 55% of	less likely to opt out
Funder: Western	Telephone	intervention: Looks at	Usual Care	these opted in to	while rural smokers
New York Cancer		AVR system (same as		AVR program.	(OR = 3.84, CI 3.01-
Coalition Center,	Inclusion criteria: 18	IVR). Following chart	N: 1049 (opt-in)		3.90) were more
Roswell Park	years or older,	review of smokers in		these opted in to and a second control of the second control of th	likely to opt out.

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				pen-202 opyrigh	
Comprehensive	visited an	area, baseline AVR call	Control: 850	Abstinence at 🚡 🞖	
Cancer Center,	urban/rural primary	was made to all eligible	(opt-out)	follow-up: 30% cof 89	
National Cancer	care office	patients. Opt-in		intervention grain	Smokers from rural
Institute	community health	participants received	Age: 59.1% over	that complete ₫ th ਫ	medical offices were
	center, academic site	AVR calls every day.	50	AVR program 🖫 📆	more likely to report
Industry	or private practice in	AVR customized		reported 8 7 20	being smoke free
sponsored: No	a medically	motivational messages,	% female:	abstinence at 24.	(OR, 1.41, CI 1.01-
	underserved	activities and questions	51.9%	Dov mer ed to	1.97) - smoke free
	communities of	during call to specific		vnlo nt Si o tex	status did not differ
	interest	stage of change. If		ade uper kt ai	by sex, racial group
		participant relapsed,		id fr rieu nd d	or age.
		they were transferred		om r (A lata	
		to primary care office		http BES min	
		or state quitline for		ing	
		counselling.		mjope , Al tr	
		Standalone or adjunct:	10.	en.brr aining	
		Standalone	1/	that completed to text and data mining, Al training, and similar technologies, at AVR program reported abstinence abstine	
		IVR/Follow-up		V on a	
		Schedule: IVR calls		June ilar te	
		every day for study		echr	
		period (undefined)		Abstinence at 9	
McDaniel et al.	Study design:	Purpose of IVR: Risk	Population:	Abstinence at 9 a	98% were satisfied,
(2015) US	Controlled	Assessment	Quitline users	follow-up: At 6 months: No smoking in last 7 days = 66.0% of	98% would
				months: No	recommend the
Trial #:	Study setting: QFL	Description of	Comparators:	smoking in last 7 📆	programme to
NCT0088899	program	intervention: All	Standard		others; overall, 87%
		participants received		control, 69.6% of graphique de	said IVR was helpful

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Funder: National	Inclusion criteria:	five counselling calls	quitline uses,	TEQ-10 (p=0.3 🕏 1 🖁	
Institutes for	Tobacco users	from a Quit Coach; IVR	TEQ-10, TEQ-20	vs. control), 6723%35 of TEQ-20	
Health	enrolled in the Quit	calls delivered risk		of TEQ-20 di 72	
	For Life (QFL)	assessments, and high-	N: 602 in TEQ-	(p=0.7121 vs. g 6	
Industry	programme who	risk participants were	10, 591 in TEQ-	control); ធ្លូ <u>ក</u> ្នុ	
sponsored: No	were quit for 24	transferred to a Quit	20	Did not smoke 🖫 😸	
	hours or more,	Coach	Control: 592	the last 30 day 🚆 🕏	
	English-speaking, 18			60.6% of contrස් දූ	
	or older, having	Standalone or adjunct:	Age: 43.4	65.2% of TEQ-1မ္မာ 👸 💍	
	access to a touch-	Adjunct		(p=0.1946), 61 3 4 2 3 4 4 5 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	
	tone phone	\mathcal{O}_{Δ}	% female:	of TEQ-20	
		IVR/Follow-up	54.2%	(p=0.8947); $\frac{1}{2}$ $\frac{1}{2}$ $\frac{1}{2}$	
	Exclusion criteria:	Schedule: TEQ-10 =		mir	
	Smokeless tobacco	twice weekly for 2		At 12 months: 👸 🥳	
	users, actively	weeks, then weekly for		smoking in lastor of the state	
	participating in	6 weeks; TEQ-20 = daily	/	days = 65.3% o 🚡 🂆	
	another tobacco	for 2 weeks, then	10.	control, 67.0% of	
	cessation	weekly for 6 weeks;		TEQ-10 (p=169ម្នី), 👸	
	programme, had	follow-up at 6 and 12		62.2% of TEQ-2 1	
	previously enrolled	months		(p=0.4655); in E st 3	
	in QFL during the			30 days: 61.6% ្នីof ទ្ហី	
	past 6 months, had			control, 63.1% క్త్రోగ్ల ప్రే	
	limited phone access			TEQ-10 (p=0.6 221)2	
				(p=0.1871) , , , , , , , , , , , , , , , , , , ,	
McNaughton et	Study design:	Purpose of IVR:	Population:	(p=0.1871) Abstinence at Company of the company of	
al. (2013) Canada	Controlled	Intervention	Adult Smokers	follow-up: Of 👸	
				patients who had	
				quit smoking at 12g	

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 Trial #:	Study setting:	Description of	Comparator:	weeks, 59% weeks 2	
NCT00832806	Outpatient Clinic	intervention: All	Participants	smoke-free at 2 2	
Funder: Pfizer	Outputient chine	participants received a	who only	weeks, 52% of 52	
Canada	Inclusion criteria:	12-week supply of	received IVR for	intervention and	
Callada	Smoking ≥35	varenicline; IVR asked	12 weeks.		
Industry	cigarettes per week	about cigarette use,	12 Weeks.	(n=0.22)	
sponsored: Yes	or ≥5 cigarettes per	side effects, confidence	N: 101 initially	66.7% of contributions	
sponsored. res	day for at least 2	,	and then 44 IVR	At two years 1993 D	
		in maintaining	only	of overall	
	years with no period	abstinence, and	Control: 41	At two years, 19 bown of overall examples of population, 30 man	
	of abstinence longer	motivational messages;	Control: 41	population, 30% 96	
	than 3 months	at 12 weeks, all	A g o . F 2 . 6	those abstinent at a	
	E al ata a strata	participants who were	Age: 52.6	12 weeks, and	
	Exclusion criteria:	still abstinent were	overall	of those absting	
	Use of any smoking	randomized to receive	0/ (at 52 weeks (n ្ត្រី។0 ្ន	
	cessation drugs or	either further IVR or no	% female: 33%	were confirment to	
	nicotine replacement	IVR		be non-smokeស្នី; oំ្នំ	
	in the last 3 months,		10,	these, 21% had	
	use of medications	Standalone or adjunct:	1/1.	received extended	
	to treat depression	Adjunct		IVR (so 21.7% 👸 💈	
	or any psychiatric			intervention vsii 9 42.9% of control 1	
	illness, history of	IVR/Follow-up		42.9% of contrថ្នីl, ទ្ហី	
	depression or an	Schedule: Days 1, 3, 8		p=0.13, were 🖺 🖫	
	unstable medical	and 11 post-quit then			
	condition	every 2 weeks for		smoke-free at gwoo25 years) ge at	
		following 39 weeks;		, 1	
		follow-up at 52 weeks		gen	
		and 2 years		at Agence Biblices.	

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Nahhas et al.	Study design:	Purpose of IVR: Follow-	Population:	Reach: 42.8% were 88 1972 once within 30ing for days	19.6% who were
(2016) US	Observational	up monitoring and	Hospitalized	reached at least 1972	reached asked to be
	Study setting:	transfer	Patients	once within 305 on	transferred to the
Funder: Medical	Medical University	Description of	Comparator:	1 22/2	9 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
University of	iviedical offiversity	intervention: Patients	Bedside	Abstinence at sess resigned.	Bedside counselling
South Carolina	Inclusion criteria:	counselled in-hospital	Counselling +	follow-up: 36 /8/2018	was associated with
Health	Adult cigarette	by tobacco treatment	IVR	those who were	a 13% increase in
riculti	smokers	specialist and		reached reported	response to IVR
Industry		developed an	N: Not reported	not smoking at	•
sponsored: No	Exclusion criteria:	individualized tobacco-		time of their laster	increase in reported
•	Patients who died	treatment plan; IVR	Age: Not	phone contact	abstinence (51% vs.
	during	collected info on	reported	based on inten	27%), and double
	hospitalization,	smoking status and		treat, 13.5% of	the rate of those
	receiving hospice	provide additional	% female: Not		using medications
	care, not discharged	support through the	reported	patients were zero classified as nost	(21% vs. 8%)
	back home, and	offer of a direct		smoking based on	
	psychiatric inpatients	immediate referral		their most recent 8	
		"warm transfer" to a		·	
		quitline		simi on	
		'		i June	
		Standalone or adjunct:		e 13, techr	
		Adjunct		m/ on June 13, 2025 at d similar technologies.	
				ogie	
		IVR/Follow-up		s. at A	
		Schedule: 3-, 14-, and		Agence	
		30-days post-discharge			
				Bibliographique de	
				raph	
				iiqu	
				e de	
	For peer re	view only - http://bmjopen.bn	nj.com/site/about/qui		

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			Reach: At 3-days follow-up, 70 landing participants
Reid et al. (2007) Study design:	Purpose of IVR: Follow-	Population:	Reach: At 3-da¥
Canada Controlled	up monitoring and risk	Hospitalized	follow-up, 70 and to
	assessment	patients	participants
Trial #: Not Study setting:			answered IVR @alls
reported Hospital	Description of	Comparator:	us m
	intervention: IVR	Usual Care	Abstinence at S
Funder: Inclusion criteria:	system called		follow-up: At the
Canadian Current smokers (5	participants post-	N: 50	52-week follow
Tobacco Control or more cigarettes	discharge and asked	Control: 50	46% of the IVR
Research per day), 18+,	about smoking status,		group and 34.7
Initiative hospitalized for	confidence in staying	Age: 54	the control gro
acute coronary	smoke free until next		were abstinen
Industry syndrome	call, and use of self-	% female: 39%	1 o o = v = = = = = = = = = = = = = = = =
sponsored: No	help materials and		ning
	pharmacotherapies.		, ≥
	Patients were flagged	· ·	tra
	and connected with	10.	nin n
	nurse specialists if they		nining, Al training, and similar technologies.
	reported relapse but		nd s
	interest in quit		si mil
	reattempt or if they		nilar te
	were not confident in		ech
	their ability to stay		chnolog
	smoke free. Further) gie
	telephone counselling		رً مُ
	was given.		35. Series 1910 1910 1910 1910 1910 1910 1910 191
	Standalone or adjunct:		
	Standalone		<u> </u>

Rigotti et al. (2014) US Trial #: NCT01177176 Funder: National Institutes of Health/National Heart, Lung, and Blood Institute Industry sponsored: No	Study design: Controlled Study setting: Hospital Inclusion criteria: 18 or older, smoked ≥1 cigarette/day during the month before admission, received smoking cessation counseling in the hospital, stated that they planned to try to quit smoking after discharge Exclusion criteria: Expected hospital stay of <24 hours	IVR/Follow-up Schedule: 3-, 14- and 30-days post-discharge; 12- and 52-weeks post- discharge (by telephone, not IVR) Purpose of IVR: Intervention Description of intervention: Participants give a 30- day supply of tobacco cessation medication, refillable for up to 90 days of treatment; 5 IVR calls provided advice and support messages that prompted smokers to stay quit, encouraged proper use and adherence to cessation medication, offered medication refills, and triaged smokers to a	Population: Hospitalized patients Comparator: Usual Care N: 198 Control: 199 Age: 53.9 % female: 48.5%	Abstinence at follow-up: Biochemically confirmed abstinence for abstinence in panilla structure of control, p=0.008 of intervention, 28.1% of control, p=0	Any smoking cessation use: at 1 month = 82.8% of intervention, 62.8% of control, p<0.001; at 6 months = 89.9% of intervention, 80.4% of control, p=0.01
	stay of <24 hours, substance use in the	triaged smokers to a return telephone call from a live counselor		Abstinent since bio hospital discharges phique de delines xhtml	

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		ı		, 	
	past 12 months			at 1 month = 45.0% 81972 of intervention 33.2% of control 33.2%	
	other than tobacco,	Standalone or adjunct:		of intervention & 3	
	alcohol, or	Adjunct		33.2% of contr a , 2	
	marijuana, admitted			p<0.01; at 6 of o	
	for an alcohol or	IVR/Follow-up		months = 27.3% ALE	
	drug overdose, could	Schedule: 2, 14, 30, 60,		lintervention 1829%	
	not consent or	and 90 days; follow-up		of control, p=0	
	participate in	at 6 months		Dov ed t	
	counselling,			Reducing costs	
	admitted to obstetric	A		Hospital cost printing	
	or psychiatric units,	\mathcal{O}_{Δ}		of control, p=000000000000000000000000000000000000	
	life expectancy <12	Co			
	months, medical	reer te		subsequent year S	
	instability			3) ://b	
		(0)		Incremental peg-	
				patient costs: \$\frac{1}{25}4\frac{2}{3}	
			10.	in year 1, \$294 n	
				subsequent years	
				(year 1 costs ware	
				primarily for	
				building the phone	
				system and traging	
				staff) S S	
Rigotti et al.	Study design:	Purpose of IVR:	Population:	Reach: Interve	59% requested
(2016) US	Controlled	Intervention	Adult smokers	participants answered (62%) of	transfer to a Quit
				answered (62%) of	Coach
Trial #:	Study setting:	Description of	Comparator:	IVR calls; median = m	
NCT0171432	Hospitals	intervention:	Usual Care	3 of 5 planned call	Any use of smoking
		Intervention patients		per person	cessation treatmen
				per person ographique de l	
				que	
		eview only - http://bmjopen.bn		de	

		ВМЈ Оре	en	Abstinence at follow-up:	
				open-203 opyrigh	
Funder:	Inclusion criteria:	receive a 30-day supply	N: 680	Abstinence at long follow-up:	at 6 months: 85.3%
NIH/NHLBI	Adults 18 or older	of free FDA-approved	Control: 677	Abstinence at E	of intervention,
	who smoke one or	tobacco cessation		follow-up:	
Industry	more cigarettes	medication, refillable	Age: 49.6	Abstinent for past	p<0.001
sponsored: No	daily, had >5 minutes	for up to 90 days of		7 days, at 1 moេត្តាដ្ឋា≧	
	of smoking cessation	treatment; IVR calls	% female:	= 43.4% Solution 1 = 43.4%	
	counselling in the	prompted smokers to	48.8%	intervention, 3 3 3 3	
	hospital, stated they	quit or stay quit,		control, p<0.0∰ įį; j	
	planned to try to	offered support		at 6 months: 38.7%	
	quit smoking post-	messages, encouraged		intervention, 25 5	
	discharge	adherence to cessation		control, p<0.10 = = = = = = = = = = = = = = = = = = =	
		medication, and		abstinent since	
	Exclusion criteria:	offered smokers the		hospital discha	
	Had no telephone,	option of a direct two-		at 1 month: 31,30%	
	could not give	step transfer to a		intervention, $2\frac{1}{2}$.4 $\frac{1}{2}$	
	informed consent or	telephone quitline	·	control, p<0.10 at	
	participate in		10.	6 months: 17.8 17.8 17.8 17.8 17.8 17.8 17.8 17.8	•
	counselling, were	Standalone or adjunct:		intervention, 14.9%	•
	admitted to obstetric	Adjunct		control, not	
	or psychiatric units,			significant $\frac{1}{2}$ $\frac{9}{2}$	
	were admitted for IV	IVR/Follow-up		June illar te	
	drug overdose, had	Schedule: 2, 12-, 28-,		Quit rate:	
	medical instability,	58-, and 88-days post-		control, not significant technology on June 13, 202	
	had <1 year of	discharge; follow-up at		confirmed tob	
	estimated life	6 months		abstinence signal	
	expectancy.			immediately post-	
				discharge = 16.6%	
				of intervention,	

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Schneider et al. (1995) USA Funder: National Institute of Health Industry sponsored: No Study setting: Telephone Inclusion criteria: or older, smoke date of the sponsored of		Population: Adult Smokers Comparator: Self- Comparison N: 571 Age: Not reported % female: Not reported	ight, and significant ludied program at least once, 571 were significant was final analysis. these 473 participants make 5 or more calls. Abstinence at follow-up: Of that reported abstinent at 3-temporary abstinent at 3-month follow-ups. Abstinent at 3-month follow-ups.	more often were more likely to remain abstinent at 6 month follow up (m = 17.67 calls vs. 7.65 calls; p < .001) Similar results foun at 1- and 3-month follow-ups.

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Velicer et al. (2006) USA Controlled Controlled Intervention Description of intervention: IVR was used in conjunction with a manual, expert system feedback report according to participant responses. Standalone or adjunct: Adjunct Veteran Smokers IVR multiple 30% used it cand 40% did use it at all. Dooklet, Cessation booklet, Cessation booklet, Cessation booklet + NRT, Cessation booklet + NRT, Cessation booklet + NRT + expert system feedback report according to participant responses. Standalone or adjunct: Adjunct Veteran Smokers IVR multiple 30% used it cand 40% did use it at all. Dooklet, Cessation booklet, Cessation booklet + NRT, Cessation booklet + NRT, Cessation booklet + NRT + expert system feedback report according to participant responses. Standalone or adjunct: Adjunct N: 500 Control: 523 Mage: 49.9 Age: 49.9	123-081972.on 9 July 2024. Downloaded from http://sbmjopen.dom.ht. including for uses related to sex than at deep control at 15 cm. at he is a few control at 15 cm. a



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PRISMA 2020 Checklist

Cocation and Time Checklist item			righ	
Title 1 I Identify the report as a systematic review.		Item #		Location where item is reported
ABSTRACT Abstract 2 See the PRISMA 2020 for Abstracts checklist. Pg. 2 INTRODUCTION Rationale 3 Describe the rationale for the review in the context of existing knowledge. Pg. 3 - 4 Objectives 4 Provide an explicit statement of the objective(s) or question(s) the review addresses. Eligibility criteria 5 Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses. Information 6 Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted. Search strategy 7 Present the full search strategies for all databases, registers and websites, including any filters and limits used 5 and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in time process. Data collection 9 Specify the methods used to decide whether a study met the inclusion criteria of the review, including how magazite process. Data titlems 10a List and define all outcomes for which data were sought. Specify whether all results that were compatible witheseculation tools used in the process. Data titlems 10a List and define all outcomes for which data were sought. Specify whether all results that were compatible witheseculation whether they worked independently, and if applicable, details of automation tools used in the process. Data total title and define all outcomes for which data were sought. Specify whether all results that were compatible witheseculation tools used in the process. Data titlems 10a List and define all outcomes for which data were sought, Specify whether all results that were compatible witheseculation tools used in the process. Study risk of bias assessment 10a List and define all outcomes for which data were sought (e.g. participant and intervention characteristics, anding sources). Describe any methods used to decide which saudis including the title of the process. Specify the methods used to assess risk of bias in the included studies, including details of the	TITLE	ı	5 2 9 0	
Abstract 2 See the PRISMA 2020 for Abstracts checklist. Pg. 2	Title	1	Identify the report as a systematic review.	Ln. 2
Nationale 3 Describe the rationale for the review in the context of existing knowledge. 3 5 5 6 7 7 7 7 7 7 7 7 7	ABSTRACT		<u>, π</u> ⊆	
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PRISMA 2020 Checklist

Pag	e 47 of 47		BMJ Open BMJ Open	
1 2	PRISM	ИА 20	BMJ Open Cted by Copyrigh D20 Checklist	
3 4 5	Section and Topic	Item #	Checklist item	Location where item is reported
6	assessment		ling	
7	RESULTS		o o o	
8 9	Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to t	Fig. 1
10 11		16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they was cluded.	Fig. 1
12	Study characteristics	17	Cite each included study and present its characteristics.	Table. A
14 15	Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Fig. 3
16 17	Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) and (c.g. confidence/credible interval), ideally using structured tables or plots.	Table. A
18	Results of	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	
19 20	syntheses	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summary mate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
21		20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
22 23		20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
24	Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Pg. 7
25 26	Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Pg. 7
27	DISCUSSION		<u> </u>	
28 29	Discussion	23a	Provide a general interpretation of the results in the context of other evidence.	Pg. 13
30		23b	Discuss any limitations of the evidence included in the review.	Pg. 14
31		23c	Discuss any limitations of the review processes used.	Pg. 14
32		23d	Discuss implications of the results for practice, policy, and future research.	Pg. 14
33	OTHER INFORMA	TION		
34 35	Registration and	24a	Provide registration information for the review, including register name and registration number, or state that the review was not registered.	Pg. 4
36	protocol	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
37		24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
38	Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the	Pg. 15
39 40	Competing interests	26	Declare any competing interests of review authors.	Pg. 15
41 42 43	Availability of data, code and other materials	27	Report which of the following are publicly available and where they can be found: template data collection forms; data extracted from included studies; data used for all analyses; analytic code; any other materials used in the review.	Pg. 15

BMJ Open

Interactive Voice Response (IVR) for Tobacco Cessation: A Systematic Review

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 Title: Interactive Voice Response (IVR) for Tobacco Cessation: A Systematic Review

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- **Key words:** Nicotine, cessation, health services, smoking cessation, interactive voice response, behaviour intervention, priority/special populations, surveillance and monitoring, systematic review

27	Abstract
28	Objective: To summarize the uses, outcomes, and implementation of interactive voice response
29	(IVR) as a tobacco cessation intervention.
30	
31	Data sources: A systematic review was conducted. Searches were performed on May 3, 2023.
32	The strategies used key words such as "tobacco cessation", "smoking reduction" and "interactive
33	voice recording". Ovid MEDLINE®ALL, Embase, APA PsycInfo, CINAHL, Cochrane Library,
34	and Web of Science were searched. Grey literature searches were also conducted.
35	
36	Study selection: Titles and abstracts were assessed by two independent reviewers. Studies were
37	included if: IVR was an intervention for tobacco cessation for adults; any outcomes were
38	reported; and study design was comparative. Any abstract included by either reviewer proceeded
39	to full text review. Full texts were reviewed by two independent reviewers.
40	
41	Data extraction: Data was independently extracted by two reviewers using a standardized form.
42	The ROB-2 and the ROBINS-I tools were used to assess study quality.
43	
44	Data synthesis: Of 308 identified abstracts, 20 moderate- to low-quality studies were included.
45	IVR was used standalone or adjunctly as a treatment, follow-up or risk-assessment tool across
46	populations including general smokers, hospitalized patients, quitline users, perinatal women,
47	cancer patients and veteran smokers. Effective studies found that IVR was delivered more
48	frequently with shorter follow-up times. Significant gaps in the literature include a lack of
49	population diversity, limited implementation settings and delivery schedules, and limited patient
50	and provider perspectives.
51	
52	Conclusions: While the evidence is weak, IVR appears to be a promising intervention for
	tahaana anggatian Hayyayar nilat programs and regearsh addressing literature conserva
53	tobacco cessation. However, pilot programs and research addressing literature gaps are
53 54	necessary.
54	

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data mining, Al training, and similar technologies.

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Strengths and limitations of this study

- This was a thorough and comprehensive search of the literature created by an
 experienced medical information specialist and peer reviewed by another specialist. Six
 peer-reviewed databases were searched, along with grey literature searches and hand
 searches of the included studies.
- There was significant heterogeneity in the interventions utilized, reported methods, and outcome measures reported, meaning meta-analysis was not possible.
- Limited populations and settings were assessed by the included studies, meaning generalizability is limited and significant gaps still remain.

Introduction

As of 2020, 22.3% of the global population reported using tobacco products - around 1.3 billion individuals (1). The annual economic costs of tobacco use are significant, equaling an estimated US\$ 1.4 trillion and 1.8% of the world's annual gross domestic product (1). Over eight million deaths per year are attributed to direct and indirect tobacco use (1). While current global tobacco control efforts contribute to decreasing the prevalence of tobacco use and associated morbidity and mortality rates, it is crucial to continue finding ways to support patients who want to make a quit attempt or change their smoking behaviour.

Interactive voice response (IVR) is a phone-based platform that can be used to deliver health behaviour interventions (2). IVR can be used to deliver educational messages, reinforce behaviours, motivate and guide patients, record patient symptoms or outcomes, encourage medication adherence, and connect patients with further resources or professionals (3). With IVR, a human speaker is replaced with a high-quality, pre-recorded interactive script and responds to patients based on answers provided (2). Patients can either call the IVR or receive calls. The possible advantages of IVR include its ability to make multiple calls during and outside regular business hours, it can connect with patients quickly, and it can identify those who are at higher risk and more likely to benefit from continued support (3, 4).

IVR has been used in interventions for alcohol consumption, asthma, heart failure, obesity, sleep apnea, hypertension, high cholesterol, dietary behaviour, to increase physical activity and to improve medication adherence (2). Effectiveness has been mixed, with IVR having small but significant effects on medication adherence and physical activity, but limited effectiveness for alcohol consumption or dietary behaviour (2). IVR has also been used as a tool to support tobacco cessation in patients, particularly post-hospital discharge (5). Post-discharge, patients receive tailored automated IVR calls at different time points (5). The calls typically assess patients' current smoking status, intention to quit or confidence in staying quit, current cessation medication use, and desire for additional support, and provides motivational messages, encourages patients to stay quit or continue attempting, promote the use of cessation medication, and offer to transfer patients to a counselor (5). IVR is also often used in conjunction with other

interventions, such as alongside nicotine replacement therapy (NRT), or after counselling with a physician in-hospital or in a primary care setting (5). However, the effectiveness of IVR as a tobacco cessation intervention for specific population groups, and the best uses and optimal delivery schedule of IVR interventions, are unknown.

This systematic review aims to synthesize and understand the current knowledge regarding IVR for tobacco cessation and to identify any gaps in the literature. Questions that guided this review included the ideal IVR delivery schedule, components of IVR, utilization of the intervention, outcomes reported in the literature, patient and provider perspectives, and costs of using IVR for tobacco cessation.

Methods

Search strategy

This systematic review followed a written, unregistered protocol and was conducted by following the Cochrane best practice guidelines and the PRISMA reporting standards (6, 7). An experienced medical information specialist developed and tested the search strategies through an iterative process in consultation with the review team. The MEDLINE strategy was peer reviewed by another senior information specialist using the PRESS Checklist (8). The strategies utilized a combination of controlled vocabulary (e.g., "Smoking Reduction", "Tobacco Use Cessation", "Reminder Systems") and keywords (e.g., "quit smoking", "curtail tobacco", "interactive voice response"). Vocabulary and syntax were adjusted across the databases. Using the multifile option and deduplication tool available on the Ovid platform, we searched Ovid MEDLINE®ALL, Embase, APA PsycInfo, CINAHL (Ebsco), the Cochrane Library (Wiley), and Web of Science (Core Databases). No language restrictions were placed on the search. Records were downloaded and deduplicated using EndNote version 9.3.3 (Clarivate Analytics). All databases were searched from inception to May 3, 2023. The final search strategy is available in the supplementary material, Appendix A.

Grey literature searches were conducted through the Canadian Agency for Drug and Technologies in Health Grey Matters database, a database of government reports and non-

130	commercially published reports, and preprint databases including medRixV and Research
131	Square. Targeted Google searches were also conducted to identify any relevant reports that may
132	have been missed by these databases.
133	
134	Study selection
135	A calibration exercise was conducted by four reviewers on a sample of the retrieved abstracts.
136	After 100% agreement was reached among reviewers, the remaining abstracts were screened in
137	duplicate by two independent reviewers. Abstracts selected for inclusion by either reviewer
138	proceeded to full-text review. This initial screen was intentionally broad to ensure that all
139	relevant literature was captured. Abstracts proceeded to full-text review if: IVR was used as an
140	intervention tool for tobacco cessation; IVR targeted adults; any outcomes were reported,
141	including treatment completion, quit rates, smoking abstinence, and patient perspectives; and
142	was a comparative study, comparing IVR to any comparator. Any comparative study design was
143	eligible for inclusion. Studies that reported other kinds of interventions but used IVR for data
144	collection purposes were excluded.
145	
146	Full texts were included if they met the above inclusion criteria and were in English. Conference
147	abstracts, case series, reviews, letters, and editorials were excluded. Along with grey literature
148	databases, the reference lists of relevant systematic reviews were also searched. Full-text review
149	was conducted in duplicate by two independent reviewers. Any discrepancies between reviewers
150	were resolved through discussion and consensus.
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Data extraction

For all included studies, year of publication, country, study design, target population, participant characteristics, intervention setting, purpose or use of IVR, details about IVR schedule and follow-up, and outcomes were extracted by a single reviewer using standardized data extraction forms. A second reviewer verified the extracted data. Discrepancies between reviewers during data extraction were resolved through consensus.

Quality assessment

The quality of controlled trials was assessed using the revised Cochrane Risk-Of-Bias Tool for			
Randomized Trials (ROB-2) (9), while the observational studies were assessed with the Risk of			
Bias in Non-Randomized Studies of Interventions (ROBINS-I) tool (10). Each controlled trial			
was assessed using five criteria broadly covering the areas of randomization, deviation from			
intended intervention, missing outcome data, measurement of outcome, and selection of reported			
results (9). The observational studies were assessed based on the following parameters: bias due			
to confounding, selection bias, bias in classification, bias due to deviations from intended			
interventions, bias due to missing data, bias in measurement, and reporting bias (10).			
Quality assessment was completed by one reviewer and verified by a second reviewer			

Quality assessment was completed by one reviewer and verified by a second reviewer.

- Data analysis and synthesis
- 172 Significant heterogeneity of studies was expected. Therefore, a narrative approach to synthesis
- was adopted a-priori. A stratified analytic approach by population was adopted. The types of
- interventions used, the outcomes reported, the effectiveness, overall trends, and any gaps in the
- literature were assessed by population.

- 177 Ethics approval
- All data were from published studies so ethics approval was not required.

- 180 Patient and public involvement
- There was no patient or public involvement in this review.

183 Results

- 185 Overall results
- The search strategy yielded 308 unique citations, 271 of which were excluded after abstract
- review, Figure 1. Six studies were identified through hand and grey literature searches.
- Following abstract review, 43 studies proceeded to full-text review. At the full text-review phase,
- 23 studies were excluded for the following reasons: not IVR (n=4), IVR used as a data collection
- method (n=6), commentary or abstract (n=9), no outcomes (n=2), or duplicates (n=2), Figure 1.

The final dataset included 20 studies, including 13 controlled trials and seven observational studies, Figure 2, panel A. Sixteen of the included studies were conducted in the US (11-26), two were conducted in Canada (27, 28), and the remaining two were conducted in Norway (29, 30), Figure 2, panel B. The included studies were published between 1995 – 2022, Figure 2, panel C. In most of the studies (n=8), study sample sizes ranged between 100 to 500 participants while five studies each included between 500-1,000 participants, and >1,000 participants respectively. Only two studies included less than 100 participants, Figure 2, panel D. Appendix B includes additional details on the characteristics and outcomes of the 20 studies.

Quality of included studies

Full risk of bias assessments can be found in the supplementary material, Appendix C. The risk of bias assessment of the 13 controlled trials ranged from some concerns (n=7) to high risk of bias (n=6), Figure 3, panel A. The most common critical weakness across the controlled trials was the deviation from intended intervention and the selection of reported results. However, most studies were assessed at a low risk of bias in the measurement of outcomes and the randomization process.

Overall, one observational study was assessed at a moderate risk of bias, two studies were at a high risk of bias, and the remaining four studies were assessed at critical risk of bias. The most common critical weakness across studies were confounding, deviation from interventions, measurement of outcomes, and the selection of reported results. Most of the observational studies were assessed at a low risk of bias in the classification of interventions and selection of participants to the study, Figure 3, panel B.

How was IVR used as an intervention?

Two uses of IVR were identified. Across the 20 studies, IVR was used as either a standalone (n=6) or an adjunct intervention (n=13) for tobacco cessation. The use of IVR was unclear in one study (17). When used as a standalone intervention, IVR was the primary intervention reported in the study (13, 14, 18, 20, 25, 31). When used as an adjunct intervention, IVR was used in combination with other interventions including counselling, referrals, quitlines, and web- or

SMS-based cessation activities (11, 12, 15, 16, 19, 21-24, 26, 27, 29, 30). In one study, participants were able to contact the IVR services (18); in all other interventions, the IVR system contacted participants.

When in the care trajectory was IVR used?

Studies examined IVR use along different points in the care treatment trajectory. Included studies used IVR as a treatment tool, a follow-up tool and a risk-assessment tool, Figure 4.

As a treatment tool, IVR asked questions regarding smoking habits, overall goals, and fears surrounding tobacco cessation. IVR provided tailored behaviour change therapeutic responses based on answers given by the patients, through personalized motivational messages and advice, coping mechanisms, and interactive activities. When IVR was used as a treatment tool, IVR delivery schedule varied widely for interventions with call schedules ranging from calls every day (20) to every 2-, 12-, 28-, 68-, and 88-days post-discharge (24) to every two weeks for 39 weeks (27). In two studies, IVR was available on an as-needed basis where patients were called regularly in response to their unique requirements (29, 30) and in two studies IVR was available 24/7 for participants to utilize when they wanted (18, 25).

As a follow-up tool, IVR was used post-discharge to monitor patients' progress and track tobacco behaviour, as well as provide personalized motivational messages and give patients direct access to resources such as requesting additional NRTs/pharmacotherapy and directing calls to a quitline or counsellor. Five studies delivered IVR at 3-,14-, and 30-days post-discharge (12, 15, 16, 22, 28) and one delivered IVR at eight predetermined, yet unspecified, time periods over the course of 12 weeks post-discharge (11). In all the studies that used IVR as a follow-up tool, IVR was also used as a risk-assessment tool (11, 28).

As a risk assessment tool, IVR assessed the risk of relapse based on responses to curated questions, flagging at-risk patients and connecting them to a counsellor, quitlines or nurse specialists to mitigate relapse and provide immediate support. Risk assessment was conducted differently across the different studies. As an example, one study specifically asked questions as part of a risk assessment for relapse and flagged "at risk" patients and directly transferred the call

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1		
2 3 4 5	253	to a quit coach for brief intervention (21). Frequency of IVR calls and follow-up times ranged
	254	widely.
6	255	widery.
7 8 9 10 11 12	256	For whom was IVR more likely to be effective?
	257	IVR was used as a tobacco cessation intervention across multiple specific populations. Six
	258	studies targeted general adult smokers (20, 24, 25, 27, 29, 30), seven studies targeted
13	259	hospitalized patients (11, 15, 16, 19, 22, 23, 28), three studies targeted quitline users (13, 14, 21),
14 15	260	two studies targeted adult perinatal or pregnant women (12, 18), one study targeted cancer
16 17		
18	261	patients (17), and one study targeted veteran smokers (26), Figure 5.
19 20 21 22 23 24	262 263	General adult smokers
	264	In the six studies that looked at general adult smokers, four were controlled trials and two were
	265	observational studies (20, 24, 25, 27, 29, 30). Four controlled trials used IVR as an adjunct
25	266	treatment tool. One reported biochemically confirmed abstinence rates and three reported self-
26 27 28 29 30 31 32 33 34 35 36 37 38 39	267	reported point abstinence rates (24, 27, 29, 30). No statistically significant difference in past-7-
	268	days biochemically confirmed abstinence was found at the 6-month follow-up (24). However,
	269	three controlled trials reported significantly higher self-reported point abstinence rates at 1-, 3-,
	270	6, and 12-month follow-ups (24, 29, 30).
	271	
	272	One observational study used IVR as a standalone treatment tool and reported abstinence rates.
	273	Of participants that reported abstinence at the 1-month follow-up, 47.1% were still abstinent at
	274	the 3-month follow-up and 37.3% were still abstinent at the 6-month follow-up (25). One
40 41	275	observational study examined IVR as a treatment and risk assessment tool and focused on quit
42 43 44 45 46 47 48	276	rates (20). Overall, 30% of individuals that opted into the IVR program were smoke-free at the
	277	last contact.
	278	
	279	Hospitalized patients
49	280	Of the seven studies that included patients admitted to hospital, four were controlled trials and
50 51 52 53 54 55 56	281	three were observational studies (11, 15, 16, 19, 22, 23, 28). In the two controlled trials that used
	282	IVR as an adjunct treatment tool, one study found that 25.8% of intervention patients were
	283	biochemically confirmed abstinent in the past 7 days (p=0.009) and self-reported abstinence rates
57 58		10

in the past-7-days at the 1-month and 6-month follow-ups were significantly higher in intervention patients (23). However, the other study found no statistically significant difference in self-reported abstinence rates between intervention and usual care participants (19). One controlled trial found that intervention patients were significantly more likely to be abstinent at 6-month follow-up (8.9%) compared to usual care control patients (3.5%, p=0.01) (11). Finally, one controlled trial that examined IVR as a standalone follow-up and risk assessment tool reported abstinence rates and found no difference in abstinence rates between intervention and control groups (28).

Two observational studies examined different outcomes of the same IVR follow-up program. One study reported that IVR was associated with significantly lower total healthcare costs at one-year post-discharge, with mean charges for the IVR group being over \$8,000 less than the usual care control group (15). The other study found no statistically significant reduction in odds of readmission between the IVR group and the usual care control group and no significant difference in readmission rates at 30-, 90-, or 180-days post-discharge (16). IVR reach was also reported to be low as IVR only reached about 43% of eligible participants, and 36.4% of those reached reported abstinence since their last IVR call. The remaining observational study examined the reach of a hospital-based counselling and IVR tobacco cessation program (22). IVR reach was low as only 43% of eligible participants were reached. While no difference was found between IVR alone and bedside counselling with IVR, counselling with IVR was associated with an increase in response to IVR utilization (22).

Quitline users

Three controlled trials targeted tobacco cessation Quitline users (13, 14, 21). Two controlled trials used IVR as a standalone treatment tool. IVR intervention participants were significantly more likely to re-enroll into the quitline (28.2% intervention vs. 3.3% usual care; p<0.001), though the proportion of those that re-enrolled was small (14). Of those followed-up with, 79.9% of those followed-up reported making a quit attempt lasting 24 hours or more in the last 90 days, with 24.0% reporting abstaining from tobacco in the last 7 days (13). One controlled trial used IVR as an adjunct risk assessment tool reported quit rates in quitline users at two different IVR delivery schedules: twice weekly for 2 weeks then weekly for 6 weeks (10 calls total) or daily for

2 weeks and weekly for 6 weeks (20 calls total) (21). The intervention found no difference in abstinence rates between the two IVR delivery schedules and the frequency of IVR calls did not impact tobacco cessation. Those that did not screen as at-risk for relapse during the scheduled IVR relapse risk assessments were 77% more likely to be abstinent at the 6-month follow-up (21).

Adult perinatal women

Two studies targeted adult perinatal women (12, 18). In the controlled trial, IVR was used as a standalone treatment tool and while 16.7% of IVR intervention participants were biochemically confirmed end-of-pregnancy quitters, there was no significant difference compared to usual care patients (18). The observational study used IVR as an adjunct follow-up and risk-assessment tool. There was no difference in reported abstinence between participants that only received IVR and those that received bedside counselling with IVR (12).

Cancer patients

One observational study examined IVR as a treatment tool at cancer centers (17). This study compared the effectiveness of multiple different tobacco cessation interventions, including IVR, implemented across 38 participating cancer centers. IVR was implemented at 4 out of the 38 cancer centers. Of all the cessation interventions, IVR had the greatest mean, median, minimum, and maximum ranges for reach, with responses from an average of 56% of those reached by IVR. No IVR-specific or patient-specific abstinence rates were reported; however, 22% of patients reported not smoking in the past 7 days and 19% not smoking in the past 30 days across all cancer centers and implemented interventions (17).

Veteran smokers

One controlled trial examined IVR as an adjunct treatment tool targeting veteran smokers (26). IVR was implemented in conjunction with a tobacco cessation manual, an expert system feedback report, and NRT use. At follow-up, 6-month prolonged abstinence rates at month 10 (6.6%), month 20 (9.3%) and month 30 (15%) showed a steady increase in abstinence, however, this increase was not statistically significant (26).

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What were the patient-reported experiences with IVR?

Only three studies, all controlled trials, included elements of patient-reported experience with IVR for tobacco cessation (21, 29, 30). Most participants (96%) reported satisfaction with the overall quitline program and almost all participants (98%) stated that they would likely recommend the program to others (21). Furthermore, most participants reported that it was easy to answer questions using the IVR system (95%) regardless of IVR delivery schedule (21). Satisfaction with the IVR intervention was also highly positive, regardless of whether participants were given the option to utilize NRTs (29, 30).

355 What was the reach of IVR?

Eight studies reported reach of the IVR intervention (12, 14, 17, 18, 20, 22, 25, 26). The rate of participants interacting with IVR ranged from 20.8% to 42.8% (12, 14, 17, 18, 20, 22, 25, 26). In one study, IVR did have the highest average reach, compared to other smoking cessation interventions, with responses from 55.8% of those called by IVR; however, these results were at the institution-level, not the individual-level (17).

362 Sex and gender in this literature

Only one study stratified outcomes by sex or gender; it is unclear which (20). This observational study, of low quality, assessed IVR used as a standalone treatment and risk assessment tool for general adult smokers. It was found that females were significantly more likely to opt-in to the IVR intervention compared to males (OR = 0.78; 95% CI = 0.65-0.95). Of those that opted-in and received IVR calls, females were more likely to report being smoke free at last contact compared to males (OR = 0.87; 95% CI = 0.66-1.15), though this difference was not significant (20).

Discussion

Overall, 20 studies were included. There was a heterogenous body of literature identified in the present review. IVR was implemented as either a standalone or adjunct technology. When implemented as an adjunct technology, IVR was often paired with in- and out-patient counselling, nicotine replacement therapy, or self-help materials, though the type of adjunct

intervention did not impact effectiveness of IVR. IVR was also implemented at several points along the patient trajectory and was effective at increasing self-reported abstinence and increasing the use of other tobacco cessation interventions across multiple different populations, including general smokers, hospitalized patients, quitline users, adult perinatal or pregnant women, cancer patients, and veteran smokers. While the frequency of IVR calls and follow-up times varied widely in the literature and studies specifically comparing different IVR delivery schedules reported no differences between brief/short-term and sustained IVR delivery, increased IVR frequency and shorter time between follow-ups were generally associated with increased effectiveness of IVR. The studies that reported on costs reported that IVR reduced healthcare costs. However, IVR did not significantly affect other outcomes, including hospitalization and biochemically confirmed abstinence. Additionally, the reach of IVR was consistently low. Despite variability of findings, no application or use of IVR was shown to be harmful to participants and studies that reported patient perspectives were highly positive.

The results of our search are mixed on the effectiveness of IVR, and the use of IVR in other contexts is similarly mixed. Some studies report significantly improved patient outcomes with the use of IVR, particularly those for disease management and medication adherence (32-34); others, however, report minimal effectiveness of IVR, particularly for alcohol dependence (35-37). The studies on alcohol dependence found that while clinical outcomes were not different, IVR was useful for self-monitoring and provided regular feedback on alcohol use to patients (36, 37). Additionally, most studies noted that IVR is relatively inexpensive and can have a high reach, particularly for otherwise hard-to-reach patients, meaning it may be useful in keeping patients engaged in treatment even if clinical effectiveness is low (34-37). These findings, along with the results of our search, may suggest that IVR for tobacco cessation may be most effective when used as a way of engaging patients in treatment rather than as a treatment itself.

Our review, along with the wider literature on IVR, suggests that while IVR may have limited clinical effectiveness, there are other factors that should be considered for IVR use in tobacco cessation. For patients, IVR can be an accessible tobacco cessation tool. Barriers to entry are relatively low, it can provide a private, judgement-free environment for patients to speak freely about their smoking habits, tobacco use, goals, fears, and motivations, and it can offer an

opportunity for patients to engage in self-monitoring of their own care and progress. However, due to the automated nature of IVR, there may be a loss of the emotional support patients can receive with in-person counselling (38). For providers, IVR can immensely reduce their workload and optimize their time and scalability, while still allowing them to thoroughly care for many patients simultaneously. IVR can help providers gain regular insight on the progress of their patients and can help guide or revise treatment plans and provide additional support when needed most. However, there is required technical training, privacy concerns, and implementation costs that providers should consider when thinking about using IVR for tobacco cessation. Implications on the healthcare system include important public health and population health considerations. IVR directly addresses smoking and tobacco use which continues to highly burden the healthcare system through smoking-related diseases. IVR can also assist with appropriate resource allocation and may serve as a cost-saving healthcare tool. Ultimately, though the clinical effectiveness of IVR may be low for some patients, it may still be a useful tool for patients, providers, and the healthcare system for increasing smoking cessation and reducing healthcare use and costs.

While this study provides a broad overview of the current literature surrounding IVR for tobacco cessation, several limitations exist. First, the majority of included studies were of low to moderate quality. Though most studies were controlled trials, variability in interventions, methods and outcome measures prevented the possibility for a metanalysis. This limited the extent to which the comparative effectiveness of IVR applications and uses across the different populations could be inferred. Further, due to the low number and quality of studies available for multiple populations, generalizations cannot be made, and results should be interpreted with caution.

There are also significant gaps present in the literature that should be noted. Though the literature review identified several unique populations, there were several populations that were not identified that may uniquely benefit from IVR, such as racialized groups and Indigenous Peoples, and only one study stratified by sex or gender. Therefore, little is known about how the effectiveness of IVR is affected by race, marginalization, or sex or gender. Similarly, there were no studies that compared IVR initiated in different contexts or settings, such as inpatient versus

outpatient, and very few compared rural and urban settings. The effectiveness of IVR could be impacted by the context or setting in which it is initiated as this may affect how open patients are to quitting, and different considerations or barriers associated with different settings may be required. Further, only two studies compared different IVR delivery schedules and found no difference (21, 27). Different schedules and times to follow-ups may have different effectiveness, and effectiveness may be dependent on patient needs. Finally, the literature search did not identify any qualitative studies examining patient perspectives on IVR, the usefulness of IVR, and patient's responsiveness to IVR for tobacco cessation and no studies examined providers' opinions on IVR.

Conclusion

It is imperative that tobacco cessation interventions be approached with effective mitigating and preventative strategies. While the evidence base is weak, results of this review indicate that IVR appears to be a promising intervention that can be implemented in multiple healthcare settings, across multiple distinct populations. Overall, IVR was effective at increasing abstinence rates and encouraging positive health outcomes for tobacco cessation. However, several significant gaps in the literature still exist. Organizations can pilot tobacco cessation intervention programs using IVR and contribute, using real-life contexts, to the growing knowledge base of this technology.

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- Supplemental material Appendix A. Final Search Strategies; Appendix B. Table of Study
- Characteristics; Appendix C. Full Risk of Bias Assessment

Data sharing: Not applicable.

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data mining, Al training, and similar technologies

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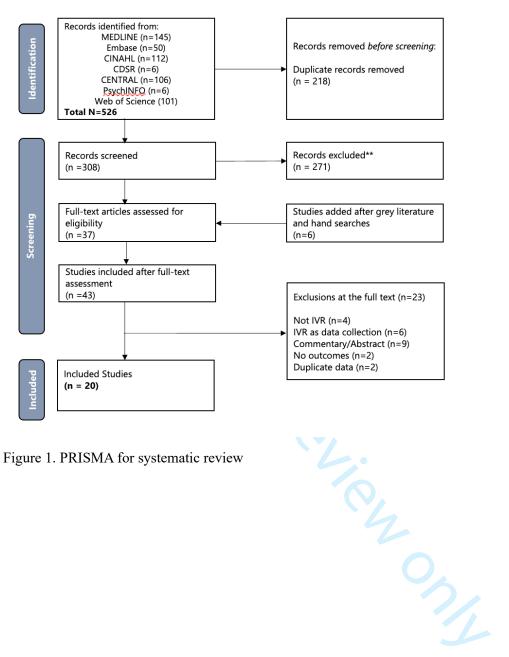


Figure 1. PRISMA for systematic review

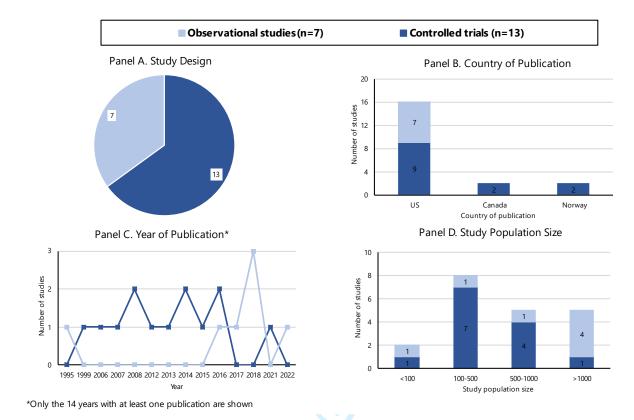


Figure 2. Summary characteristics of included studies

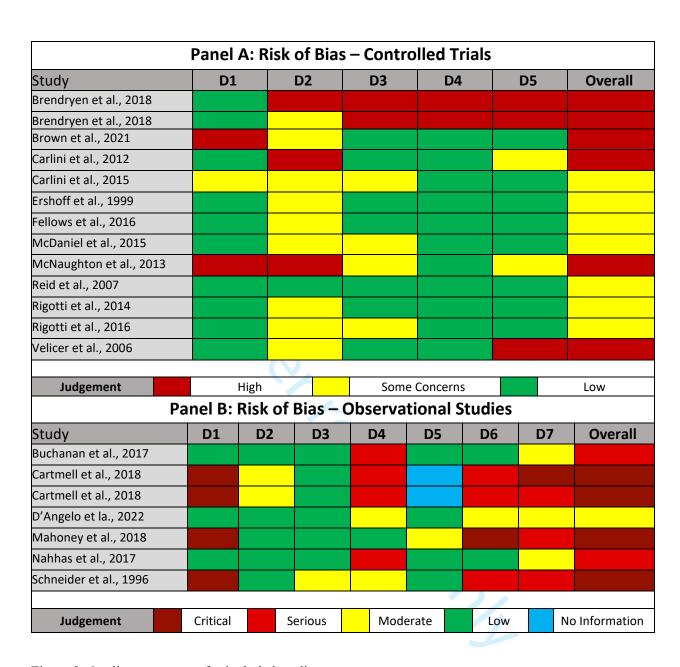


Figure 3. Quality assessment for included studies

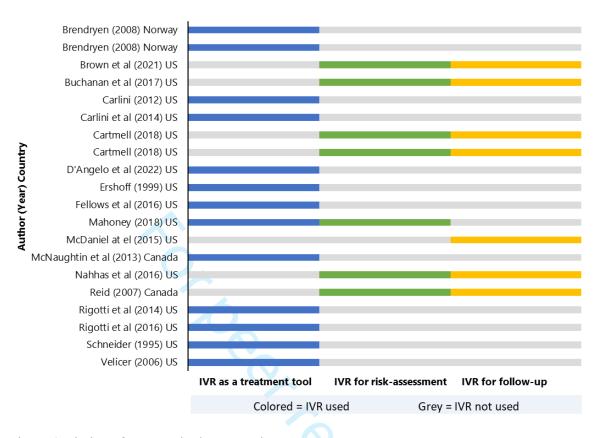


Figure 4. Timing of IVR use in the care trajectory

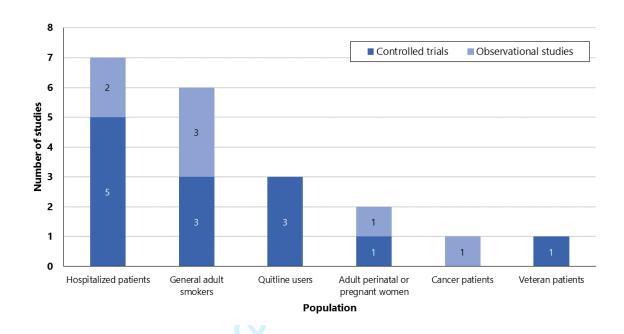


Figure 5. Populations assessed in systematic review

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Appendix A. Final search strategies

2023 May 3

Ovid Multifile

Database: Embase <1974 to 2023 May 02>, APA PsycInfo <1806 to April Week 4 2023>, Ovid MEDLINE(R) ALL <1946 to May 02, 2023>

Search Strategy:

- 1 Smoking Cessation/ (115928)
- 2 Smoking Reduction/ (519)
- 3 "Tobacco Use Cessation"/ (70076)
- 4 Smoking Cessation Agents/ (314)
- 5 "Tobacco Use Cessation Devices"/ (5573)
- 6 Smoking/th [therapy] (2353)
- 7 exp Tobacco Smoking/th [therapy] (561)
- 8 "Tobacco Use Disorder"/th [therapy] (3548)
- 9 Vaping/th [therapy] (17)
- 10 ((smoking or smoker* or tobacco* or nicotine or cigar? or cigarette* or cigarillo? or vape\$1 or vaping or ecig* or e-cig* or e-vape\$1 or e-vaping or evape\$1 or evaping or snuff or snus or gutka or gutkas or naswar) adj5 (abstain* or abstinen* or cease or ceased or ceases or cessation* or dehabituat* or desist* or discontinu* or end or ended or ending or ends or "give up" or "giving up" or "gives up" or "gave up" or halt* or quit* or stop*)).tw,kw,kf. (135877)
- 11 ((smoking or smoker* or tobacco* or nicotine or cigar? or cigarette* or cigarillo? or vape\$1 or vaping or ecig* or e-cig* or e-vape\$1 or e-vaping or evape\$1 or evaping or snuff or snus or gutka or gutkas or naswar) adj5 (curb* or curtail* or decreas* or diminish* or lessen* or limit* or lower* or reduc* or taper* or cut back or cuts back or cutting back)).tw,kw,kf. (111997)
- 12 or/1-11 [TOBACCO CESSATION] (243977)
- 13 ((interactive or inter-active) adj voice record*).tw,kw,kf. (60)
- 14 ((interactive or inter-active) adj voice respon*).tw,kw,kf. (2573)
- 15 voice response unit?.tw,kw,kf. (5)
- 16 (IVR adj5 (call* or cellphon* or cell-phon* or dialogue* or mobile? or phon* or record* or smartphon* or smart-phon* or system? or technolog* or telephon*)).tw,kw,kf. (1220)
- 17 ((IVR or IVRS) and (interactive or inter-active or voice or record* or respons*)).tw,kw,kf. (2376)
- 18 AI-IVR.tw,kw,kf. (2)
- 19 ((automated or digital* or intelligent or interactive or inter-active or smart or virtual) adj3 (assistant? or PDA or PDAs)).tw,kw,kf. (4153)
- 20 (Alexa or Bixby or Cortana or Siri or Google Assistant).tw,kw,kf. (8019)
- 21 Reminder Systems / (6619)
- 22 Speech Recognition Software/ (2074)
- 23 or/13-22 [IVR] (24377)
- 24 12 and 23 [TOBACCO CESSATION IVR] (334)
- 25 24 use medall [MEDLINE RECORDS] (146)
- 26 smoking cessation/ (115928)
- 27 smoking cessation program/ (3867)
- 28 smoking reduction/ (519)
- 29 smoking cessation agent/ (314)

```
30 nicotine gum/ (3087)
```

- 31 smoking/th [therapy] (2353)
- 32 tobacco dependence/th [therapy] (4751)
- ((smoking or smoker* or tobacco* or nicotine or cigar? or cigarette* or cigarillo? or vape\$1 or vaping or ecig* or e-cig* or e-vape\$1 or e-vaping or evape\$1 or evaping or snuff or snus or gutka or gutkas or naswar) adj5 (abstain* or abstinen* or cease or ceased or ceases or cessation* or dehabituat* or desist* or discontinu* or end or ended or ending or ends or "give up" or "giving up" or "gives up" or "gave up" or halt* or quit* or stop*)).tw,kw,kf. (135877)
- 34 ((smoking or smoker* or tobacco* or nicotine or cigar? or cigarette* or cigarillo? or vape\$1 or vaping or ecig* or e-cig* or e-vape\$1 or e-vaping or evape\$1 or evaping or snuff or snus or gutka or gutkas or naswar) adj5 (curb* or curtail* or decreas* or diminish* or lessen* or limit* or lower* or reduc* or taper* or cut back or cuts back or cutting back)).tw,kw,kf. (111997)
- 35 or/26-34 [TOBACCO CESSATION] (244250)
- 36 ((interactive or inter-active) adj voice record*).tw,kw,kf. (60)
- 37 ((interactive or inter-active) adj voice respon*).tw,kw,kf. (2573)
- 38 voice response unit?.tw,kw,kf. (5)
- 39 (IVR adj5 (call* or cellphon* or cell-phon* or dialogue* or mobile? or phon* or record* or smartphon* or smart-phon* or system? or technolog* or telephon*)).tw,kw,kf. (1220)
- 40 ((IVR or IVRS) and (interactive or inter-active or voice or record* or respons*)).tw,kw,kf. (2376)
- 41 AI-IVR.tw,kw,kf. (2)
- 42 ((automated or digital* or intelligent or interactive or inter-active or smart or virtual) adj3 (assistant? or PDA or PDAs)).tw,kw,kf. (4153)
- 43 (Alexa or Bixby or Cortana or Siri or Google Assistant).tw,kw,kf. (8019)
- 44 reminder system/ (6830)
- 45 automatic speech recognition/ (1338)
- 46 or/36-45 [IVR] (23924)
- 47 35 and 46 [TOBACCO CESSATION IVR] (340)
- 48 47 use oemezd [EMBASE RECORDS] (156)
- 49 Smoking Cessation/ (115928)
- 50 "Tobacco Use Disorder"/ (26295)
- ((smoking or smoker* or tobacco* or nicotine or cigar? or cigarette* or cigarillo? or vape\$1 or vaping or ecig* or e-cig* or e-vape\$1 or e-vaping or evape\$1 or evaping or snuff or snus or gutka or gutkas or naswar) adj5 (abstain* or abstinen* or cease or ceased or ceases or cessation* or dehabituat* or desist* or discontinu* or end or ended or ending or ends or "give up" or "giving up" or "gives up" or "gave up" or halt* or quit* or stop*)).tw,id. (134325)
- 52 ((smoking or smoker* or tobacco* or nicotine or cigar? or cigarette* or cigarillo? or vape\$1 or vaping or ecig* or e-cig* or e-vape\$1 or e-vaping or evape\$1 or evaping or snuff or snus or gutka or gutkas or naswar) adj5 (curb* or curtail* or decreas* or diminish* or lessen* or limit* or lower* or reduc* or taper* or cut back or cuts back or cutting back)).tw,id. (111682)
- 53 or/49-52 [TOBACCO CESSATION] (252880)
- 54 ((interactive or inter-active) adj voice record*).tw,id. (58)
- 55 ((interactive or inter-active) adj voice respon*).tw,id. (2522)
- 56 voice response unit?.tw,id. (5)
- 57 (IVR adj5 (call* or cellphon* or cell-phon* or dialogue* or mobile? or phon* or record* or smartphon* or smart-phon* or system? or technolog* or telephon*)).tw,id. (1210)
- 58 ((IVR or IVRS) and (interactive or inter-active or voice or record* or respons*)).tw,id. (2327)
- 59 AI-IVR.tw,id. (2)

- 60 ((automated or digital* or intelligent or interactive or inter-active or smart or virtual) adj3 (assistant? or PDA or PDAs)).tw,id. (4035)
- 61 (Alexa or Bixby or Cortana or Siri or Google Assistant).tw,id. (7941)
- 62 Automated Speech Recognition/ (2494)
- 63 or/54-62 [IVR] (18078)
- 64 53 and 63 [TOBACCO CESSATION IVR] (228)
- 65 64 use psyh [PSYCINFO RECORDS] (38)
- 66 25 or 48 or 65 [ALL DATABASES] (340)
- 67 remove duplicates from 66 (201) [TOTAL UNIQUE RECORDS]
- 68 67 use medall [MEDLINE UNIQUE RECORDS] (145)
- 69 67 use oemezd [EMBASE UNIQUE RECORDS] (50)
- 70 67 use psyh [PSYCINFO UNIQUE RECORDS] (6)

CINAHL

#	Query	Limiters/Expanders	Last Run Via	Results
S24	S19 OR S23	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	112
S23	S7 AND S22	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	66
S22	S20 OR S21	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	1,199

			Database - CINAHL Plus with Full Text	
S21	TX "interactive voice" W0 record*	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	23
S20	TX "interactive voice response"	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,181
S19	S7 AND S18	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	82
S18	S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	6,342

S17	(MH "Voice Recognition Systems")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1,311
S16	(MH "Reminder Systems")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	3,117
S15	TI (Alexa or Bixby or Cortana or Siri or "Google Assistant") OR AB (Alexa or Bixby or Cortana or Siri or "Google Assistant")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	426
S14	TI ((automated or digital* or intelligent or interactive or inter-active or smart or virtual) N3 (assistant# or PDA or PDAs)) OR AB ((automated or digital* or intelligent or interactive or interactive or smart or virtual) N3 (assistant# or PDA or PDAs))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	950
S13	TI "AI-IVR" OR AB "AI-IVR"	Search modes - Find all my search terms	Interface - EBSCOhost Research	0

			Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	
S12	TI ((IVR or IVRS) and (interactive or inter-active or voice or record* or respons*)) OR AB ((IVR or IVRS) and (interactive or inter-active or voice or record* or respons*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	290
S11	TI (IVR N5 (call* or cellphon* or cell-phon* or dialogue* or mobile# or phon* or record* or smartphon* or smart-phon* or system# or technolog* or telephon*)) OR AB (IVR N5 (call* or cellphon* or cell-phon* or dialogue* or mobile# or phon* or record* or smartphon* or smart-phon* or system# or technolog* or telephon*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	217
S10	TI "voice response" W0 unit# OR AB "voice response" W0 unit#	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	1
\$9	TI (((interactive or inter-active) W0 voice respon*)) OR AB (((interactive or inter-active) W0 voice respon*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced	629

			Search Database - CINAHL Plus with Full Text	
S8	TI (((interactive or inter-active) W0 voice record*)) OR AB (((interactive or inter-active) W0 voice record*))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	91
S7	S1 OR S2 OR S3 OR S4 OR S5 OR S6	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	45,557
S6	TI ((smoking or smoker* or tobacco* or nicotine or cigar# or cigarette* or cigarillo# or vape or vaped or vapes or vaping or ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or snuff or snus or gutka or gutkas or naswar) N5 (curb* or curtail* or decreas* or diminish* or lessen* or limit* or lower* or reduc* or taper* or "cut back" or "cuts back" or "cutting back")) OR AB ((smoking or smoker* or tobacco* or nicotine or cigar# or cigarette* or cigarillo# or vape or vaped or vapes or vaping or ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or snuff or snus or gutka or gutkas or naswar) N5 (curb* or curtail* or decreas* or diminish* or lessen* or limit* or lower* or reduc* or taper* or "cut back" or "cuts back" or "cutting back"))	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	16,852
S5	TI ((smoking or smoker* or tobacco* or nicotine or cigar# or cigarette* or cigarillo# or vape or vaped or vapes or vaping or ecig* or e-cig* or e-vape* or	Search modes - Find all my search terms	Interface - EBSCOhost Research	25,644

	e-vaping or evape* or evaping or snuff or snus or gutka or gutkas or naswar) N5 (abstain* or abstinen* or cease or ceased or ceases or cessation* or dehabituat* or desist* or discontinu* or end or ended or ending or ends or "give up" or "giving up" or "gives up" or "gave up" or halt* or quit* or stop*)) OR AB ((smoking or smoker* or tobacco* or nicotine or cigar# or cigarette* or cigarillo# or vape or vaped or vapes or vaping or ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or snuff or snus or gutka or gutkas or naswar) N5 (abstain* or abstinen* or cease or ceased or ceases or cessation* or dehabituat* or desist* or discontinu* or end or ended or ending or ends or "give up" or "giving up" or "gives up" or "gave up" or halt* or quit* or stop*))		Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	
S4	(MH "Smoking/TH") OR (MH "Vaping/TH")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	981
S3	(MH "Tobacco Use Cessation Products+")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	3,979
S2	(MH "Smoking Cessation Programs")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search	2,617

			Database - CINAHL Plus with Full Text	
S1	(MH "Smoking Cessation")	Search modes - Find all my search terms	Interface - EBSCOhost Research Databases Search Screen - Advanced Search Database - CINAHL Plus with Full Text	22,734

Web of Science

Set		
#	Search Query	Results
	(smoking or smoker* or tobacco* or nicotine or cigar or cigars	
	or cigarette* or cigarillo* or vape or vaped or vapes or vaping or	
	ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or	
	snuff or snus or gutka or gutkas or naswar) NEAR/5 (abstain* or	
	abstinen* or cease or ceased or ceases or cessation* or	
	dehabituat* or desist* or discontinu* or end or ended or ending	
_	or ends or "give up" or "giving up" or "gives up" or "gave up" or	
1	halt* or quit* or stop*) (Topic)	53731
	(smoking or smoker* or tobacco* or nicotine or cigar or cigars	
	or cigarette* or cigarillo* or vape or vaped or vapes or vaping or	
	ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or	
	snuff or snus or gutka or gutkas or naswar) NEAR/5 (curb* or curtail* or decreas* or diminish* or lessen* or limit* or lower*	
	or reduc* or taper* or "cut back" or "cuts back" or "cutting	
2	back") (Topic)	49489
3	#2 OR #1	89674
3	(interactive or inter-active) NEAR/0 ("voice record" or "voice	05074
	recorded" or "voice recording" OR "voice recordings" or "voice	
4	records") (Topic)	20
	(interactive or inter-active) NEAR/0 ("voice response" or "voice	
	responses" or "voice respond" or "voice responded" OR "voice	
5	responding" or "voice responds") (Topic)	1288
6	"voice response unit" or "voice response units" (Topic)	8
	IVR NEAR/5 (call* or cellphon* or cell-phon* or dialogue* or	
7	mobile or mobiles or phon* or record* or smartphon* or smart-	716

7 (Topic)

	phon* or system or systems or technolog* or telephon*) (Topic)	
8 9	(IVR or IVRS) and (interactive or inter-active or voice or record* or respons*) (Topic) "AI-IVR" (Topic) (automated or digital* or intelligent or interactive or inter-	1165 1
10	active or smart or virtual) NEAR/3 (assistant or assistants or PDA or PDAs) (Topic)	6484
11	Alexa or Bixby or Cortana or Siri or "Google Assistant" (Topic)	4778
12	#11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4	12886
13	#12 AND #3	101
Web o	f Science	
Set		
#	Search Query	Results
	(smoking or smoker* or tobacco* or nicotine or cigar or cigars	
	or cigarette* or cigarillo* or vape or vaped or vapes or vaping or	
	ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or	
	snuff or snus or gutka or gutkas or naswar) NEAR/5 (abstain* or	
	abstinen* or cease or ceased or ceases or cessation* or	
	dehabituat* or desist* or discontinu* or end or ended or ending	
1	or ends or "give up" or "giving up" or "gives up" or "gave up" or halt* or quit* or stop*) (Topic)	53731
1	(smoking or smoker* or tobacco* or nicotine or cigar or cigars	33/31
	or cigarette* or cigarillo* or vape or vaped or vapes or vaping or	
	ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or	
	snuff or snus or gutka or gutkas or naswar) NEAR/5 (curb* or	
	curtail* or decreas* or diminish* or lessen* or limit* or lower*	
	or reduc* or taper* or "cut back" or "cuts back" or "cutting	
2	back") (Topic)	49489
3	#2 OR #1	89674
	(interactive or inter-active) NEAR/0 ("voice record" or "voice	
_	recorded" or "voice recording" OR "voice recordings" or "voice	
4	records") (Topic)	20
	(interactive or inter-active) NEAR/0 ("voice response" or "voice	

responses" or "voice respond" or "voice responded" OR "voice

IVR NEAR/5 (call* or cellphon* or cell-phon* or dialogue* or

phon* or system or systems or technolog* or telephon*)

mobile or mobiles or phon* or record* or smartphon* or smart-

"voice response unit" or "voice response units" (Topic)

responding" or "voice responds") (Topic)

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(IVR or IVRS) and (interactive or inter-active or voice or record*
   or respons*) (Topic)
 8
                                                                      1165
 9 "AI-IVR" (Topic)
                                                                      1
    (automated or digital* or intelligent or interactive or inter-
    active or smart or virtual) NEAR/3 (assistant or assistants or PDA
10 or PDAs) (Topic)
                                                                      6484
11 Alexa or Bixby or Cortana or Siri or "Google Assistant" (Topic)
                                                                      4778
12 #11 OR #10 OR #9 OR #8 OR #7 OR #6 OR #5 OR #4
                                                                      12886
13
    #12 AND #3
                                                                      101
```

5599

42

Cochrane Library

Search Name:

Date Run: 04/05/2023 05:20:45

[mh "Smoking Cessation"]

[mh "Smoking Reduction"]

[mh "Tobacco Use Cessation"]

Search Hits

Comment:

ID

#1

#2

#3

```
#4
        [mh "Smoking Cessation Agents"]
                                                66
#5
        [mh "Tobacco Use Cessation Devices"]
#6
        [mh ^Smoking/TH]
                                598
#7
        [mh "Tobacco Smoking"/TH]
#8
        [mh "Tobacco Use Disorder"/TH]
                                                472
#9
        [mh Vaping/TH]3
#10
        ((smoking or smoker* or tobacco* or nicotine or cigar or cigars or cigarette* or cigarillo* or vape
or vaped or vapes or vaping or ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or snuff or
snus or gutka or gutkas or naswar) NEAR/5 (abstain* or abstinen* or cease or ceased or ceases or
cessation* or dehabituat* or desist* or discontinu* or end or ended or ending or ends or "give up" or
"giving up" or "gives up" or "gave up" or halt* or quit* or stop*)):ti,ab,kw
                                                                                 14748
        ((smoking or smoker* or tobacco* or nicotine or cigar or cigars or cigarette* or cigarillo* or vape
#11
or vaped or vapes or vaping or ecig* or e-cig* or e-vape* or e-vaping or evape* or evaping or snuff or
snus or gutka or gutkas or naswar) NEAR/5 (curb* or curtail* or decreas* or diminish* or lessen* or
limit* or lower* or reduc* or taper* or "cut back" or "cuts back" or "cutting back")):ti,ab,kw
                                                                                                 6686
#12
        {or #1-#11}
                        17438
#13
        ((interactive or inter-active) NEXT voice record*):ti,ab,kw
                                                                         210
#14
        ((interactive or inter-active) NEXT voice respon*):ti,ab,kw
                                                                         1052
#15
        ("voice response" NEXT (unit# or units)):ti,ab,kw0
        (IVR NEAR/5 (call* or cellphon* or cell-phon* or dialogue* or mobile* or phon* or record* or
#16
smartphon* or smart-phon* or system or systems or technolog* or telephon*)):ti,ab,kw 276
#17
        ((IVR or IVRS) and (interactive or inter-active or voice or record* or respons*)):ti,ab,kw
                                                                                                 554
#18
        "AI-IVR":ti,ab,kw
#19
        ((automated or digital* or intelligent or interactive or inter-active or smart or virtual) NEAR/3
(assistant# or PDA or PDAs)):ti,ab,kw
#20
        (Alexa or Bixby or Cortana or Siri or "Google Assistant"):ti,ab,kw 166
#21
        [mh "Reminder Systems"]
                                        1108
```

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#22 [mh "Speech Recognition Software"]

#23 {or #13-#22} #24 #12 AND #23

CDSR - 6 reviews CENTRAL - 106 trials

Appendix B: Table of Study Characteristics

Appendix B: Table	of Study Characteristics	BMJ Op	en	136/bmjopen-2023-08197	
	Study information	Intervention	Patient characteristics	Primary Outcomes	Other outcomes
Brendryen et al.	Study design:	Purpose of IVR:	Population:	Reach: 62% of series	At 1 month, 51% of
(2008) Norway	Controlled	Intervention	Adult Smokers	participants answered log-get to text and data reatment.	participants found
Trial #: Not	Study setting:	Description of	Comparator:	calls, 87	HE to be "helpful," and 32% reported
reported	Digital/Quitline	intervention: Happy	Usual care	intervention standard	HE to be "very
		Ending program is an		participants and ded	helpful".
Funder:	Inclusion criteria:	internet-based	N: 144	completed of for	
Norwegian Research Council	Wanting to attempt	multimedia	Control: 146	treatment.	
Research Council	quitting, 18 or older, smoking 5+	intervention that used CBT techniques to help	Age: 39.5	Abstinence at 9. br	
Industry	cigarettes a day,	people quit smoking		follow-up:	
sponsored: No	attempt quit without	without the use of	% female: 50%	Abstinence at 9 hmjopen.bmj.co	
	nicotine replacement	nicotine replacement	(0).	abstinence was	
	therapy	therapies. IVR is an		20% for and S	
		aspect of the		intervention grapupg	
		intervention, along		and 7% for controls	
		with website-based		group (p=0.0025) Ine 13,	
		activities and SMS		nologi	
		messages.		<u></u>	
		Standalone or adjunct:		s. s.	
		Adjunct		at Agence B	
		IVR/Follow-up		Bibliograp	
		Schedule: Regular IVR		graphi	

	1	calls depending on		9ht, including for		
		participants' needs;		081		
		follow up at 1, 3, 6 and		972 udir		
		12 months		ng fo		
Duonduron ot ol	Ctudu dosion.		Danulation	Reach: 71% of ses related to text and data means completed treatment.	A+ 1	
Brendryen et al.	Study design:	Purpose of IVR:	Population:	Reach: /1% of s m =	At 1 month, 48.2%	
(2008) Norway	Controlled	Intervention	Adult Smokers	participants <u>regular</u>	found HE to be	
				answered log-@13 :	'helpful' and 44.7%	
Trial #: Not	Study setting:	Description of	Comparator:	calls. 152	reported HE to be	
reported	Digital/Quitline	intervention: Happy	Usual Care	participants 🕏 💆	'very helpful'.	
		Ending program is an		completed និក្ខិត្ត		
Funder:	Inclusion criteria:	internet-based	N: 197	treatment.	Most participants in	
Norwegian	Wanting to attempt	multimedia	Control: 199	ata	both groups opted	
Research	to quit smoking,	intervention that used		Abstinence at mining. (bit follow-up: 9, 10, 10, 10, 10, 10, 10, 10, 10, 10, 10	for NRT therapy	
Council, Pfizer	aged 18+, smoking	CBT techniques to help	Age: 35.9	follow-up:	(93% intervention	
	10+ cigarettes a day	people quit smoking.		follow-up: ခြွ . မြာ	vs. 87% control - p =	
Industry	and have access to	IVR is an aspect of the	% female:	abstinence was 🖺 🥞	0.07). At 1 month,	
sponsored: Yes	the internet, email	intervention, along	50.8%	significantly highei	the mean number of	
	and cellphone	with website-based	1/1.	in treatment guo	days of NRT use was	
		activities and SMS		(22.3%) vs. con (70)	significantly higher	
		messages. Participants		(13.1%) (p = 0. @ 2. ਤੋਂ	in treatment group	
		were given and allowed		At the 12 month	(M = 5.1 vs. 3.9; p =	
		to use NRT products if		follow up, 74 ទី ដឹ	0.02).	
		they wanted.		follow up, 74 ch ologic treatment participants ex at		
				participants 👸 🖁		
		Standalone or adjunct:				
		Adjunct		reported Age abstinence vs. 48		
				control participant		
		IVR/Follow-up		(p = 0.005)		
		Schedule: Regular IVR		(p = 0.005) ibliogra		
	1	1	1	aphique de	l	
				ue de		
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		calls depending on participants' needs; follow up at 1, 3, 6 and 12 months		ng fo	
Brown et al. (2021) US Trial #: NCT02204956 Funder: National Institute of Mental Health Industry sponsored: No	Study design: Controlled Study setting: Acute care private Psychiatric hospital Inclusion criteria: Inpatient psychiatric patients aged 18 or older who smoked at least 5 cigarettes per day Exclusion: a current diagnosis of nonnicotine substance use disorder, dementia, intellectual disability, autistic spectrum or other cognitive	Purpose of IVR: Follow-up monitoring Description of intervention: Patients received in-patient tobacco cessation counselling. Following discharge, IVR asked about participants' smoking, intentions to quit, desire for an additional 4 weeks of transdermal nicotine patches (ie, 8weeks total), and interest in connecting with free telephone quitline counseling. Standalone or adjunct:	Population: Hospitalized Patients Comparator: Usual Care N: 174 Control: 179 Age: 36.1 % female: 46.7%	Abstinence 8.9 intervention reported abstinence vs. of control, p verified at 6 months by sali months by sali months by scotinine analysis cotinine analysis	months, p<0.001 Use of counselling: 37.3% of
	impairment, an inability to provide consent, medical	Adjunct IVR/Follow-up Schedule: 8 times over		at Agence Bibliogra es.	

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	contraindication to the use of NRT or a current pregnancy.	12 weeks post- discharge			
Buchanan et al. (2017) US	Study design: Observational Study setting:	Purpose of IVR: Follow- up monitoring and transfer	Population: Adult perinatal women	Reach: 35.5% for Janseignemen by IVR Abstinence at to	15.4% of IVR + counselling participants used NRT vs. 4% of IVR
Funder: MUSC, NIDA	Academic medical center	Description of intervention: Patients counselled in-hospital	Comparator: Bedside Cessation	Abstinence at to	
Industry sponsored: No	Inclusion criteria: Adult women admitted to the	by a tobacco treatment specialist; Post- discharge, IVR collected	Counselling + IVR	both counselling in a from and IVR reported abstinence vs. 3.5%	counselling participants were transferred to the
	peripartum, delivery, and postpartum units	info on smoking status, frequency, quit attempts, motivation to quit, use of nicotine	N: 421 Age: 29	of those who ing Hy received IVR of training, and si	quitline vs. 14.0% of IVR only
	Exclusion criteria: Women over 41 and admitted for something non- pregnancy-related	replacement therapy (NRT) and whether the patient wanted to be transferred to the quitline	% female: 100%	pen.bmj.com/ on June 13, 2025 at training, and similar technologies.	
		Standalone or adjunct: Adjunct		, 2025 at Agen nologies.	
		IVR/Follow-up Schedule: 3-, 14-, and 30-days post-discharge		at Agence Bibliograp ss.	

			ВМЈ Оре	en	Reach: 23.6% copyright previous quitline previous quitline previous quitline quient qu
Γ	Carlini et al.	Study design:	Purpose of IVR:	Population:	<u>역</u> 항 Reach: 23.6% 현 경
	(2012) USA	Controlled	Intervention	Quitline users	previous quitline 6
	(2012) 05A	Controlled	intervention	Quitilile users	users reached ig
	Trial #:	Study setting:	Description of	Comparator:	on g
	NCT0126059	Quitline	intervention: Recruited	Usual Care	Re-enrollment हुर्सार्ट
			participants who were		was 28.2% for \$\frac{60}{28} \frac{1}{8} \
	Funder: National	Inclusion criteria:	previously enrolled in a	N: 245	intervention vs 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	Cancer Institute	Previously enrolled	quitline intervention;	Control: 276	3.3% for control and a second
		in quitline, Medicaid	IVR call assessed		< 0.001)
	Industry	or uninsured, 18 or	smoking behaviours,	Age: 42.2	oade oxt a
	sponsored: No	older, sought help	current smoking status;		IVR participants of t
		for cigarette/tobacco	if participants were	% female:	were 11.2 time
		use	interested in	66.5%	more likely to 聲照畫
			reattempting quit, they		enroll than con
			were enrolled into		(OR - p < 0.001 ₹ 3.
			connected with quitline	/	ypen trai
			specialist and	10.	ning
			reenrolled into IVR		g, gi.
			intervention.		nd si
			Standalone or adjunct:		mjopen.bmj.com/ on June 13, 2025 at Agence Biblio Al training, and similar technologies.
			Standalone		ne 1
			Standarone		3, 20 hnol
			IVR/Follow-up) 25 ; ogie
			Schedule: One IVR call		at A
			to assess and/or recruit		gen
			into intervention. Up to		Ce E
			20 call attempts made.		3ibli

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Carlini et al. (2014) US Trial #: Funder: Quitline Registries for Continuously Engaging Participants in Cessation from the Centers for Disease Control and Prevention Industry sponsored: No	Study design: Controlled Study setting: Quitline Inclusion criteria: 18 or older, having received services in English, providing verbal consent, being a cigarette smoker, not being incarcerated, and not having received quitline services for at least 5 months before the study launch	Purpose of IVR: Intervention Description of intervention: IVR system delivered a set of questions to identify motivational and informational barriers to recycling into a new quit attempt and provided tailored messages to specifically address these barriers Standalone or adjunct: Standalone IVR/Follow-up Schedule: Two cycles of 6 IVR attempts each;	Population: Quitline Users Comparator: Usual Care N: 3,510 Control: 22,824 Age: 65.2% over 40 % female: 53.8%	Abstinence at follow-up: 24. Downloaded from http://bmjopen.bmj.com/ on June 13 reported abstagging from tobacco in uses remember Superiour (ARES). Quit rate: 79.9 red to text and dining, Al training, and similar techning a quit attempted last 90 dining. Al training, and similar techning in the last 90 dining.
Cartmell et al. (2018) USA Funder: Agency of Healthcare Research and Quality, Pfizer	Study design: Observational Study setting: Hospital Inclusion criteria: 18+ smokers	follow-up at 90 days Purpose of IVR: Follow- up monitoring and transfer Description of intervention: IVR call at discharge determined	Population: Hospitalized patients Comparator: Usual Care N: 764	Cost/Cost- o 20 effectiveness: Cost/Cost- at Agency cost post- discharge: \$51,937 Bibliograph IVR vs. \$59,132 control, p=0.03.

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	admitted to the	smoking status and	Control: 1439	f, ir
Industry	hospital	referred to the tobacco		Comparing over all of the comparing over all
sponsored: Yes		treatment specialist	Age: 49.4	health care charges
	Exclusion criteria:	that assessed patients'		for the TDTS logv
	Those admitted for	behaviour and	% female:	exposed (IVR) 😸 m 🖆
	psychiatric care,	developed a treatment	47.5%	versus unexpo 🕰 💆
	same day surgery,	plan with the patient.		patient groups
	<24-hour	IVR also conducts		mean charges 🏖 💆
	observation or not	follow-up calls to		the IVR group 🎇 🚉
	discharged	evaluate smoking		\$8006 lower th ដូច្នាំ ខ្លួំ
		status and transfer to		for the control a minute of th
		counsellor if needed.		group (P=0.08) (S)
		, C/2		htt NBE
		Standalone or adjunct:		Intervention no.
		Adjunct		implementation 3
			/ i°	costs were \$34521 2
		IVR/Follow-up	10.	per participant g
		Schedule: At discharge,		12-month periရှိပြ 👸
		3, 14, 30 days post-		(incl. start-up 桑st崑
		discharge		with total
				intervention cos្នីt ធ្វី
				being \$158,14 🕰 📆
Cartmell et al.	Study design:	Purpose of IVR: Follow-	Population:	Readmission rates
(2018) USA	Observational	up monitoring and	Hospitalized	30-day - 9.8% (2) R 25
		transfer	patients	vs. 11.9% control
Funder: Agency	Study setting:			(p=0.05), 90 day - 👸
of Healthcare	Hospital	Description of	Comparator:	17.3% IVR vs.
Research and		intervention: IVR call at	Usual Care	18.6% control (p = 500)
Quality, Pfizer		discharge determined		0.258), 180 day - ^Q Ohi

		ВМЈ Ор	en	22.4% IVR vs. 24.3% control (p=0.239).	
				open-20: copyrigh	
	Inclusion criteria:	smoking status and	N: 764	22.4% IVR vs. includin 24.3% control din (n=0.239)	
Industry	18+ smokers	referred to the tobacco	Control: 1439	24.3% control 🚡 👸	
sponsored: Yes	admitted to the	treatment specialist		(p=0.239). di 72	
	hospital	that assessed patients'	Age: 49.4	on 9	
		behaviour and		r us	
	Exclusion criteria:	developed a treatment	% female:	ly 20 nse es r	
	Those admitted for	plan with the patient.	47.5%)24. igne elat	
	psychiatric care,	IVR also conducts		Do me ed t	
	same day surgery,	follow-up calls to		o te	
	<24-hour	evaluate smoking		oade Supe ext a	
	observation or not	status and transfer to		ed fi	
	discharged	counsellor if needed.		rom Jar (A data	
	_	10/h		n mi BE	
		Standalone or adjunct:		http://bi BES) . mining,	
		Adjunct		-	
			· ·	tra	
		IVR/Follow-up	10.	inin 1.bn	
		Schedule: At discharge,		njopen.bmj.com/ on June 13 Al training, and similar tech	
		3, 14, 30 days post-		nd s	
		discharge; Follow-up at		on simi	
		30-, 90- and 180-day		June ilar te	
		post-discharge.		ech	
D'Angelo et al.	Study design:	Purpose of IVR:	Population:	Reach: IVR hadether highest average	21.7% of patients
(2022) US	Observational	Intervention	Cancer Patients	highest average	had not smoked in
				reach with an Agency average of 55.8%	the past 7 days and
Funder: National		Description of	Comparators:	average of 55.8%	18.6% had not
Cancer Institute	Study setting: Cancer	intervention: IVR used	Other smoking	of patients reache	smoked in the past
	Centers	to automatically	cessation		30 days, however,
		identify and contact	intervention	bliographique de	this result applies t

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Industry	Inclusion criteria:	patients who smoked	including	n-2023- yright, i	all cancer centers,
sponsored: No	Adults 18 years and	to provide treatment.	telephone	081 ncl	across all
Sponsored. No	older	Implemented in 4/38	counselling, in-	972 din	implemented
	oluci	cancer centers.	person	on a	interventions and is
			counselling,	9 Ju Fus	not specific to IVR.
		Standalone or adjunct:	cessation	ily 2	
		Unclear	medication and	v 2024. Do seignem s related	
			access to a	ted :	
		IVR/Follow-up	quitline.	to te	
		Schedule: Not reported	1	Downloaded ment Superi ed to text and	
		\mathcal{O}_{\triangle}	N: 38 Cancer	ed fi	
	•		centers	rom ur (A data	
		To	Age: N/A	http://bm \BES) . mining, /	
			% female: N/A	//bmjoper	
Ershoff et al.	Study design:	Purpose of IVR:	Population:	Reach: 285 ning and successfully	Only 20.8% of IVR
(1999) USA	Controlled	Intervention	Adults Perinatal	Reach: 285 ning, and comparticipants	patients placed one
			women	baccessiany (a	or more calls to the
Trial #: Not	Study setting:	Description of		reached for folition [8]	system and it had no
reported	Hospital	intervention: For the	Comparators:	up at the 34th	impact on their quit
		IVR subgroup,	Cessation	week of pregnancy	status
Funder: Not	Exclusion criteria:	participants were given	booklet,	(IVR only group not)	
reported	Women under the	informational booklet	Motivational	specified) g. 25 at	
Industry.	age of 18, and those	along with access to	Interviewing	▶	
Industry	who began prenatal	computerized IVR	N. 420	Quit rate: 16.7% of	
sponsored: No	care past the 26th	support system that	N: 120	IVR intervention 💆	
	week of pregnancy,	they had access to 24/7	Control: 111	group were	
	smoked less than 7	toll-free. IVR would ask	Ago: 20 6	group were bliograph	
	cigarettes week pre-		Age: 29.6	<u> </u>	

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				136/bmjopen-20 cted by copyrigh	
	pregnancy, had	about smoking		confirmed end	
	experienced a	behaviour and	% female: 100%	pregnancy quiteers	
	miscarriage/	readiness to change as		- not statistica	
	abortion, and had	well as stage-		significant ថ្មី 👨	
	not smoked prior to	appropriate,		Ens uses	
	the baseline	customized			
	interview	motivational messages,		2024. Do seignemo s related	
		interactive activities		Dov	
		and reinforcement.		vnlo	
		Standalone or adjunct:		Downloaded ment Superi ed to text and	
		Adjunct		ded fr perieu and d	
		Co		om r (A lata	
		IVR/Follow-up		min min	
		Schedule: Available		sing,	
		24/7 for participants to		· -	
		utilize as needed;	//	pen traii	
		Follow-up at 32 weeks	10,	njopen.bmj. Al training,	
		pregnancy		ar <mark>8</mark>	
Fellows et al.	Study design:	Purpose of IVR:	Population:	Reach: 50.6% of	Use of any quit
(2016) US	Controlled	Intervention	Hospitalized	patients competed	program: 8.4% in
			patients	call 1, 31.3%	intervention, 5.0% in
Trial #:	Study setting:	Description of		completed call 🛱 ; 👼	control, p=0.096
NCT01236079	Hospitals	intervention: Patients	Comparator:	mean total call	
Funder: National		were counselled in-	Usual Care	completed = 2 နို့SD ရှိ	Use of telephone
Heart, Lung, and	Inclusion criteria:	hospital and created a		completed = 2 SD at Agence 1.7) Abstinence at Bit	quitline: 6.9%
Blood Institute	Adult patients	tailored discharge	N: 597	enc	intervention vs.
	admitted to one of	treatment	Control: 301	Abstinence at $\frac{\sigma}{\underline{\mathbf{p}}}$	2.5% control,
Industry	the hospitals who	recommendation;		follow-up: 30-day 🚆	p=0.014
sponsored: No	reported having	medications; IVR	Age: 53	abstinence = 18% ម៉ឺត ខ្មុំ	
	1		l	abstinence = 18% graph	1
				de	

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	smoked a cigarette in the previous 30 days, spoke English, had a working phone, and were interested in remaining abstinent post-discharge Exclusion criteria: Patients living more than 50 miles away, admitted to a critical care, labor/delivery, or psychiatric unit, were pregnant or breastfeeding, were physically too ill or	contacted patients for smoking status, cessation program enrollment status, and cessation medication use, and received tips for quitting Standalone or adjunct: Adjunct IVR/Follow-up Schedule: 4, 14, 28, and 49 days; Follow-up at 6 months	% female: 56.6%	ropyright, molyding for uses related to text and data mining, Al training, and similar to for control p= for 17% for p= for	Use of any medication: 47.9% intervention vs. 38.0% control, p=0.013
	cognitively unable to provide informed consent			d similar to	
Mahoney et al. (2018) USA	Study design: Observational	Purpose of IVR: Intervention, transfer	Population: Adult Smokers	Reach: 32% of spatients reached following charles	CI 0.65-0.95) and
Funder: Western New York Cancer Coalition Center,	Study setting: Telephone Inclusion criteria: 18	Description of intervention: Looks at AVR system (same as IVR). Following chart	Comparator: Usual Care N: 1049 (opt-in)	review, 55% of these opted in to	less likely to opt out, while rural smokers
Roswell Park	years or older,	review of smokers in		AVR program.	likely to opt out.

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				open-20; ≎opyrigh	
Comprehensive	visited an	area, baseline AVR call	Control: 850	Abstinence at 🚡 🖁	
Cancer Center,	urban/rural primary	was made to all eligible	(opt-out)	follow-up: 30% of 8	
National Cancer	care office	patients. Opt-in		intervention gradiup?	Smokers from rural
Institute	community health	participants received	Age: 59.1% over	that complete of the	medical offices were
	center, academic site	AVR calls every day.	50	AVR program 🖫 📆	more likely to report
Industry	or private practice in	AVR customized		reported see 2	being smoke free
sponsored: No	a medically	motivational messages,	% female:	abstinence abstinence	(OR, 1.41, CI 1.01-
	underserved	activities and questions	51.9%	Dov ed to	1.97) - smoke free
	communities of	during call to specific		vnlo nt S o te:	status did not differ
	interest	stage of change. If		pade upe xt ai	by sex, racial group
		participant relapsed,		rieu nd d	or age.
		they were transferred		om r (A lata	
		to primary care office		mir mir	
		or state quitline for		o://b iing	
		counselling.		mjope , Al tr	
		Standalone or adjunct:	70.	en.brr aining	
		Standalone	1/1/	July 2024. Downloaded from http://bmjopen.bmj.com/ on June 13, 2025 at Enseignement Superieur (ABES) . uses related to text and data mining, Al training, and similar technologies, at a certain encomposition of the certain and the certain	
		IVR/Follow-up		d simi	
		Schedule: IVR calls		June ilar te	
		every day for study		echr	
		period (undefined)		Abstinence at 18	
McDaniel et al.	Study design:	Purpose of IVR: Risk	Population:	Abstinence at $\frac{\mathcal{G}}{\mathcal{G}}$	98% were satisfied,
(2015) US	Controlled	Assessment	Quitline users	follow-up: At 6 Agence months: No smoking in last 7	98% would
				months: No	recommend the
Trial #:	Study setting: QFL	Description of	Comparators:		programme to
NCT0088899	program	intervention: All	Standard	days = 66.0% of	others; overall, 87%
		participants received		control, 69.6% of	said IVR was helpful
		eview only - http://bmjopen.bn		hique de	

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Funder: National Institutes for Health	Inclusion criteria: Tobacco users enrolled in the Quit	five counselling calls from a Quit Coach; IVR calls delivered risk	quitline uses, TEQ-10, TEQ-20 N: 602 in TEQ-	opyright 20.30.51-20.51-
Industry sponsored: No	For Life (QFL) programme who were quit for 24 hours or more, English-speaking, 18 or older, having access to a touch- tone phone Exclusion criteria: Smokeless tobacco users, actively participating in another tobacco cessation programme, had previously enrolled in QFL during the past 6 months, had limited phone access	assessments, and highrisk participants were transferred to a Quit Coach Standalone or adjunct: Adjunct IVR/Follow-up Schedule: TEQ-10 = twice weekly for 2 weeks, then weekly for 6 weeks; TEQ-20 = daily for 2 weeks, then weekly for 6 weeks; follow-up at 6 and 12 months	10, 591 in TEQ-20 Control: 592 Age: 43.4 % female: 54.2%	control); Did not smoke The gignement Supplement (ABES) of TEQ-10 (p=0.1946), 61 and minimal supplement of TEQ-20 (p=0.8947); At 12 months: gign supplement suppleme
McNaughton et al. (2013) Canada	Study design: Controlled	Purpose of IVR: Intervention	Population: Adult Smokers	(p=0.1871) Abstinence at follow-up: Of patients who had of quit smoking at 12 paid to be defines whimle

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Trial #:	Study setting:	Description of	Comparator:	
NCT00832806	Outpatient Clinic	intervention: All	Participants	weeks, 59% weeks 52% of 3 weeks 52% of 3 72
Funder: Pfizer		participants received a	who only	weeks, 52% of 52
Canada	Inclusion criteria:	12-week supply of	received IVR for	intervention and
	Smoking ≥35	varenicline; IVR asked	12 weeks.	66.7% of control
Industry	cigarettes per week	about cigarette use,		(p=0.33) 35 20 20
sponsored: Yes	or ≥5 cigarettes per	side effects, confidence	N: 101 initially	(p=0.33) srelate
	day for at least 2	in maintaining	and then 44 IVR	At two years, 19 Down of overall to support of population, 30 and population, 30 and population of the support
	years with no period	abstinence, and	only	of overall to so of solutions
	of abstinence longer	motivational messages;	Control: 41	population, 30ន្នីវត្តិទ្ឋី
	than 3 months	at 12 weeks, all		those abstinen
		participants who were	Age: 52.6	12 weeks, and 🚡 🕏
	Exclusion criteria:	still abstinent were	overall	of those absting
	Use of any smoking	randomized to receive		at 52 weeks (n 240)
	cessation drugs or	either further IVR or no	% female: 33%	were confirme to de la confirme to de la confirme d
	nicotine replacement	IVR	· ·	be non-smoke <u>ស</u> ្នី; o្មី
	in the last 3 months,		10.	these, 21% had
	use of medications	Standalone or adjunct:		received extended
	to treat depression	Adjunct		IVR (so 21.7% 🙀 💆
	or any psychiatric			intervention verification verif
	illness, history of	IVR/Follow-up		42.9% of contrថ្នីl, ធ្លី
	depression or an	Schedule: Days 1, 3, 8		p=0.13, were 🖺 🗓
	unstable medical	and 11 post-quit then		smoke-free at ewo 8
	condition	every 2 weeks for		years) years) 25 at
		following 39 weeks;		at Agence
		follow-up at 52 weeks		jenc
		and 2 years		Се В

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Nahhas et al.	Study design:	Purpose of IVR: Follow-	Population:	Reach: 42.8% were	19.6% who were
(2016) US	Observational	up monitoring and	Hospitalized	reached at lease 3	reached asked to be
` ,		transfer	Patients	reached at least 81972 on days	transferred to the
	Study setting:			I uavs o 🙃	quitline
Funder: Medical	Medical University	Description of	Comparator:	r us	'
University of	·	intervention: Patients	Bedside	Abstinence at Abstinence	Bedside counselling
South Carolina	Inclusion criteria:	counselled in-hospital	Counselling +	Abstinence at resigned follow-up: 36.4	was associated with
Health	Adult cigarette	by tobacco treatment	IVR	those who wer	a 13% increase in
	smokers	specialist and		reached report	response to IVR
Industry		developed an	N: Not reported	not smoking at	(55% vs. 49%), a 90%
sponsored: No	Exclusion criteria:	individualized tobacco-	·	time of their last of	increase in reported
	Patients who died	treatment plan; IVR	Age: Not	phone contact	abstinence (51% vs.
	during	collected info on	reported	I la a a a al a a :a ta a a ₹ Wa →	27%), and double
	hospitalization,	smoking status and		treat, 13.5% of	the rate of those
	receiving hospice	provide additional	% female: Not	patients were ≥	using medications
	care, not discharged	support through the	reported	patients were z classified as nost	(21% vs. 8%)
	back home, and	offer of a direct		smoking based	
	psychiatric inpatients	immediate referral		their most recent is	
		"warm transfer" to a			
		quitline		on	
		quitinie		June iilar te	
		Standalone or adjunct:		techr	
		Adjunct		m/ on June 13, 2025 at d similar technologies.	
		.,		2025 nologi	
		IVR/Follow-up		es.	
		Schedule: 3-, 14-, and		ger	
				lce l	
		30-days post-discharge		at Agence Bibliographique de l	
				phique c	
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		ВМЈ Оре	en	cted by copyright, Reach: At 3-days	136/bmjopen-2023-081972
Reid et al. (2007) St	tudy design:	Purpose of IVR: Follow-	Population:	Reach: At 3-day.	n-2023-
, ,	ontrolled	up monitoring and risk	Hospitalized	follow-up. 70	081
		assessment	patients	follow-up, 70 kg	972
Trial #: Not St	tudy setting:	ussessifierie	patients	answered IVR @ils	20
	ospital	Description of	Comparator:	5 m	יַם פּ
		intervention: IVR	Usual Care	Abstinence at	<u>-</u> 2
Funder: Inc	clusion criteria:	system called		Abstinence at region follow-up: At the	024
Canadian Cu	urrent smokers (5	participants post-	N: 50	52-week follow	Do
	r more cigarettes	discharge and asked	Control: 50	46% of the IVR ☆	<u>₹</u>
	er day), 18+,	about smoking status,		group and 34. $\frac{8}{2}$	og Og
I ⁻	ospitalized for	confidence in staying	Age: 54	the control group	ed f
ac	cute coronary	smoke free until next		were abstinent	
Industry sy	/ndrome	call, and use of self-	% female: 39%		
sponsored: No		help materials and		0.07). mining,	http://bmjopen.bmj.com/
		pharmacotherapies.		g, A	Ĭ,
		Patients were flagged	·	ltra	pper
		and connected with	10.	in i	.bn
		nurse specialists if they		Al training, and similar technologies.	<u>ئ</u> رور
		reported relapse but		nd s	Ĭ
		interest in quit			on June
		reattempt or if they		ar t	lune
		were not confident in		echi	13,
		their ability to stay		olor	2025
		smoke free. Further		gie	
		telephone counselling		<u>,</u>	t Ag
		was given.			enc
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		Standalone or adjunct:			at Agence Bibliographique de l
		Standalone			gra

9			ВМЈ Оре	en	cted by co	
_	otti et al. 014) US	Study design: Controlled	IVR/Follow-up Schedule: 3-, 14- and 30-days post-discharge; 12- and 52-weeks post- discharge (by telephone, not IVR) Purpose of IVR: Intervention	Population: Hospitalized patients	136/bmjopen-2023-081972 on 9 July 2024. Downloaded from Enseignement Superieur Cted by copyright, including for uses related to text and distribution at a follow-up: Biochemically confirmed confirmed	Any smoking cessation use: at 1 month = 82.8% of
Fur Insi Hea Hea Blo	al #: T01177176 Inder: National titutes of alth/National art, Lung, and bood Institute Justry Consored: No	Study setting: Hospital Inclusion criteria: 18 or older, smoked ≥1 cigarette/day during the month before admission, received smoking cessation counseling in the hospital, stated that	Description of intervention: Participants give a 30-day supply of tobacco cessation medication, refillable for up to 90 days of treatment; 5 IVR calls provided advice and support messages that prompted smokers to	Comparator: Usual Care N: 198 Control: 199 Age: 53.9 % female: 48.5%	abstinence for the state of days = 25.8% intervention, 15.2% of control, p=0.200 pen.bm; control abstinence in past of days: At 1 montrol abstinence in past o	intervention, 62.8% of control, p<0.001; at 6 months = 89.9% of intervention, 80.4% of control, p=0.01
		they planned to try to quit smoking after discharge Exclusion criteria: Expected hospital stay of <24 hours, substance use in the	stay quit, encouraged proper use and adherence to cessation medication, offered medication refills, and triaged smokers to a return telephone call from a live counselor		of control, p=0 1;3; at 6 months = 0 225 at 40.9% of intervention, 28.1% of control, p=0.00% Abstinent since hospital discharge	

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past 12 month other than tobalcohol, or marijuana, adrifor an alcohol drug overdose not consent or participate in counselling, admitted to obor psychiatric life expectancy months, medicinstability	Standalone or adjunct: Adjunct mitted or c, could and 90 days; follow-up at 6 months ostetric units, y < 12		at 1 month = 4through on July 2024. Downloaded from http://bmjoggn.bmj.com/ on July 2024. Downloaded from http://bmjoggn.bmj.com/ of intervention, 1 of control, p=0 of contro	
Rigotti et al. Study design: (2016) US Controlled	Purpose of IVR: Intervention	Population: Adult smokers	Reach: Intervestions participants answered (62%) of	59% requested transfer to a Quit Coach
Trial #: Study setting: NCT0171432 Hospitals	Description of intervention: Intervention patients	Comparator: Usual Care	IVR calls; median = 3 of 5 planned calls; per person	Any use of smoking- cessation treatment

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Fundori	Inclusion critoria	roccius a 20 day supply	N. 690	pen-20 2 3 opyright,	
Funder:	Inclusion criteria:	receive a 30-day supply	N: 680	Abstinence at udir	at 6 months: 85.3%
NIH/NHLBI	Adults 18 or older	of free FDA-approved	Control: 677	following di	of intervention,
to disakas	who smoke one or	tobacco cessation	A 40 C		00.270 01 control,
Industry	more cigarettes	medication, refillable	Age: 49.6	Abstinent for past 5	`
sponsored: No	daily, had >5 minutes	for up to 90 days of	0/ famala.	7 days, at 1 month	
	of smoking cessation	treatment; IVR calls	% female:	= 43.4% is reight	
	counselling in the	prompted smokers to	48.8%	intervention, 3	
	hospital, stated they	quit or stay quit,		control, p<0.0∰∄;5	
	planned to try to	offered support		at 6 months: 38.7%	
	quit smoking post-	messages, encouraged		intervention, 25 5	
	discharge	adherence to cessation		control, p<0.10 2	
		medication, and		abstinent since	
	Exclusion criteria:	offered smokers the		hospital discha	
	Had no telephone,	option of a direct two-		at 1 month: 31 20%	:
	could not give	step transfer to a		intervention, 2 <u>\$</u> .4%	
	informed consent or	telephone quitline	· ·	control, p<0.10 at	
	participate in		10.	6 months: 17.8 3	•
	counselling, were	Standalone or adjunct:		intervention, 14.9%	•
	admitted to obstetric	Adjunct		control, not	
	or psychiatric units,			significant $\frac{\pi}{2}$ 9	
	were admitted for IV	IVR/Follow-up		June ilar te	
	drug overdose, had	Schedule: 2, 12-, 28-,		Quit rate:	
	medical instability,	58-, and 88-days post-		control, not significant Quit rate: Biochemically log	
	had <1 year of	discharge; follow-up at		confirmed tob	
	estimated life	6 months		abstinence $\overset{\aleph}{\sim}$	
	expectancy.			immediately post-	
	C.pectaricy.			discharge = 16.6%	
	<u> </u>			of intervention,	' [

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Schneider et al. (1995) USA Funder: National Institute of Health Industry sponsored: No	Study design: Observational Study setting: Telephone Inclusion criteria: 18 or older, smoke daily	Purpose of IVR: Intervention Description of intervention: Early IVR system monitored participants progress, provided motivation, helpful techniques and coping mechanisms and interactive activities (smoking diary). Standalone or adjunct: Standalone	Population: Adult Smokers Comparator: Self- Comparison N: 571 Age: Not reported % female: Not reported	copyright on 9 July 2024. Downloaded from http://bmjopen.bmj.com/ Enseignement@gram at least once, 571 were religious final analysis. These 473 participants maxtandodate mining, and 2 or more calls and 5 or more calls. Abstinence at follow-up: Of that reported abstinence at month follow-month follow-mo	Those who used IVR more often were more likely to remain abstinent at 6 month follow up (m = 17.67 calls vs. 7.65 calls; p < .001). Similar results found at 1- and 3-month follow-ups.
		IVR/Follow-up Schedule: Participants called as needed following the initiation call; follow-up at 1, 3 and 6 months after initiation call (letter and post-card for data collection)		47.1% were stimilar to abstinent at 3-tes month follow-by and 37.3% were stimilar to and 37.3% were stimilar to and 37.3% were stimilar to a stiment at 3-tes of abstinent at 3-	

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Velicer et al. (2006) USA Trial #: Not reported Funder: Not reported Industry sponsored: No	Study design: Controlled Study setting: Telephone Inclusion criteria: Regularly smoke 10+ cigs a day	Purpose of IVR: Intervention Description of intervention: IVR was used in conjunction with a manual, expert system feedback report and NRT. With the addition of IVR, calls were made on a schedule depending on NRT acceptance. IVR system asked questions and provided support according to participant responses. Standalone or adjunct: Adjunct IVR/Follow-up Schedule: 2 contact schedules depending on NRT acceptance: if not accepted, IVR calls made monthly for 6 months; if accepted, IVR calls made weekly	Population: Veteran Smokers Comparators: Cessation booklet, Cessation booklet + NRT, Cessation booklet + NRT + expert system feedback report N: 500 Control: 523 Age: 49.9 % female: 24.2%	Reach: 30% of participants used IVR multiple tiggers and 40% did not use it at all. Abstinence at follow-up: The month prolone abstinence rate month 10 = 6. The finite structure at month 20 = 30% intervention group and at month 30 = 15% of intervention group and 30 = 15% of int

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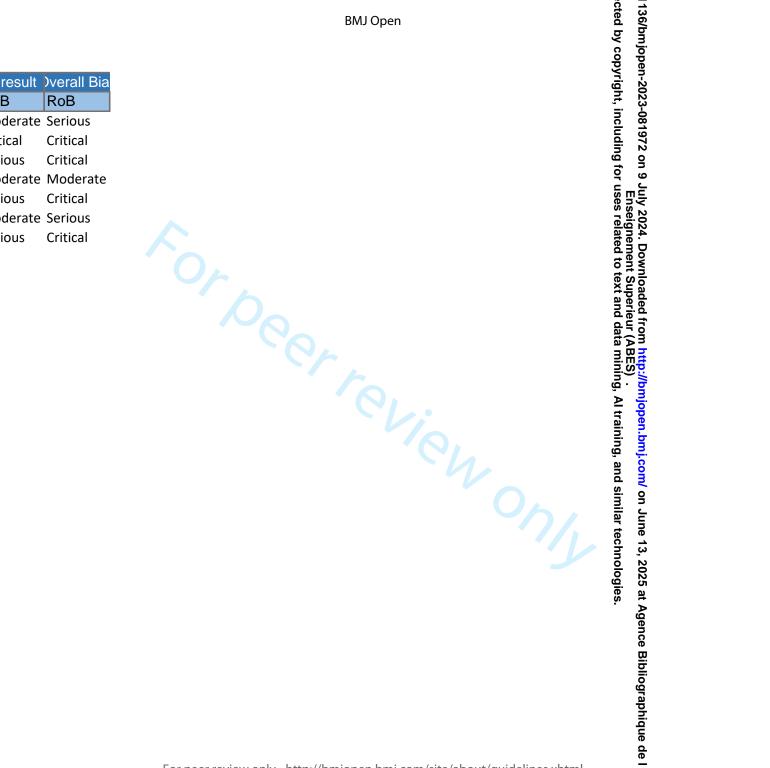
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PRISMA 2020 Checklist

Section and Topic	Item #	Checklist item	Location where iten is reported
TITLE		5.72 9.0	
Title	1	Identify the report as a systematic review.	Ln. 2
ABSTRACT	1 1	<u>е ш с</u>	
Abstract	2	See the PRISMA 2020 for Abstracts checklist.	Pg. 2
INTRODUCTION		<u> </u>	
Rationale	3	Describe the rationale for the review in the context of existing knowledge.	Pg. 3 - 4
Objectives	4	Provide an explicit statement of the objective(s) or question(s) the review addresses.	Pg. 4
METHODS	I I	te Su	
Eligibility criteria	5	Specify the inclusion and exclusion criteria for the review and how studies were grouped for the syntheses.	Pg. 5
Information sources	6	Specify all databases, registers, websites, organisations, reference lists and other sources searched or consulted to date when each source was last searched or consulted.	Pg. 4
Search strategy	7	Present the full search strategies for all databases, registers and websites, including any filters and limits used	Pg. 4 <u>.</u> Appendix /
Selection process	8	Specify the methods used to decide whether a study met the inclusion criteria of the review, including how many reviewers screened each record and each report retrieved, whether they worked independently, and if applicable, details of automation tools used in the process.	Pg. 45
Data collection process	9	Specify the methods used to collect data from reports, including how many reviewers collected data from each to the methods used to collect data from reports, including how many reviewers collected data from each to the methods used to collect data from reports, including how many reviewers collected data from each to the methods used to collect data from reports, including how many reviewers collected data from each to the methods used to collect data from reports, including how many reviewers collected data from each to the methods used to collect data from reports, including how many reviewers collected data from each to the methods used to collect data from each to the methods used to collect data from each to the methods used to collect data from reports, including how many reviewers collected data from each to the methods used t	Pg. 5
Data items	10a	List and define all outcomes for which data were sought. Specify whether all results that were compatible with action of control of the study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which study were sought (e.g. for all measures, time points, analyses), and if not, the methods used to decide which sought to collect.	Pg. 4 - 5
	10b	List and define all other variables for which data were sought (e.g. participant and intervention characteristics, and by sources). Describe any assumptions made about any missing or unclear information.	Table. AAppendix B
Study risk of bias assessment	11	Specify the methods used to assess risk of bias in the included studies, including details of the tool(s) used, how many reviewers assessed each study and whether they worked independently, and if applicable, details of automation tools used in the process.	Pg. 5, 7
Effect measures	12	Specify for each outcome the effect measure(s) (e.g. risk ratio, mean difference) used in the synthesis or presentation of results.	Pg. <u>9 - 12</u> 6
Synthesis methods	13a	Describe the processes used to decide which studies were eligible for each synthesis (e.g. tabulating the study intervention characteristics and comparing against the planned groups for each synthesis (item #5)).	Pg. 6
	13b	Describe any methods required to prepare the data for presentation or synthesis, such as handling of missing summary statistics, or data conversions.	Pg. 6
	13c	Describe any methods used to tabulate or visually display results of individual studies and syntheses.	Pg. 6
	13d	Describe any methods used to synthesize results and provide a rationale for the choice(s). If meta-analysis was performed, describe the model(s), method(s) to identify the presence and extent of statistical heterogeneity, and software package(s) used.	Pg. 6
	13e	Describe any methods used to explore possible causes of heterogeneity among study results (e.g. subgroup analyes, meta-regression).	N/A
	13f	Describe any sensitivity analyses conducted to assess robustness of the synthesized results.	N/A
Reporting bias assessment	14	Describe any methods used to assess risk of bias due to missing results in a synthesis (arising from reporting biases). For peer review only - http://bmjopen.bmj.com/site/about/guidelmes.xhtml	Pg. 5 <u>N/A</u>



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PRISMA 2020 Checklist

Pag	ge 69 of 69		BMJ Open BMJ Open	
1 2	PRISM	ИА 20	by copyrigh 5020 Checklist	
3 4 5	Section and Topic	Item #	Checklist item	Location where item is reported
6 7	Certainty assessment	15	Describe any methods used to assess certainty (or confidence) in the body of evidence for an outcome.	Pg. 5N/A
8	RESULTS			
9 10 1 ₁ 1	Study selection	16a	Describe the results of the search and selection process, from the number of records identified in the search to the review, ideally using a flow diagram.	Fig. 1
		16b	Cite studies that might appear to meet the inclusion criteria, but which were excluded, and explain why they wक्षेट्र हो cluded.	Fig. 1 <u>, pg. 6</u>
12 13 14 15	Study characteristics	17	Cite each included study and present its characteristics.	Table. AAppendix B
16 17	Risk of bias in studies	18	Present assessments of risk of bias for each included study.	Fig. 3
18 19 20	Results of individual studies	19	For all outcomes, present, for each study: (a) summary statistics for each group (where appropriate) and (b) aggreet estimate and its precision (e.g. confidence/credible interval), ideally using structured tables or plots.	Table. AAppendix B
21	Results of	20a	For each synthesis, briefly summarise the characteristics and risk of bias among contributing studies.	Pg. 6 - 12
22 23	syntheses	20b	Present results of all statistical syntheses conducted. If meta-analysis was done, present for each the summar estimate and its precision (e.g. confidence/credible interval) and measures of statistical heterogeneity. If comparing groups, describe the direction of the effect.	N/A
24		20c	Present results of all investigations of possible causes of heterogeneity among study results.	N/A
25 26		20d	Present results of all sensitivity analyses conducted to assess the robustness of the synthesized results.	N/A
27	Reporting biases	21	Present assessments of risk of bias due to missing results (arising from reporting biases) for each synthesis assessed.	Pg. 7
28 29	Certainty of evidence	22	Present assessments of certainty (or confidence) in the body of evidence for each outcome assessed.	Pg. 7 <u>N/A</u>
30	DISCUSSION	ı	te e 7	
31 32	Discussion	23a	Provide a general interpretation of the results in the context of other evidence. ✓ // ਤੂੰ అ	Pg. 1 <u>2 - 13</u> 3
32		23b	Discuss any limitations of the evidence included in the review.	Pg. 14
34		23c	Discuss any limitations of the review processes used.	Pg. 14
35		23d	Discuss implications of the results for practice, policy, and future research.	Pg. 14
36	OTHER INFORMA		90 0	
37	Registration and protocol	24a	Provide registration information for the review, including register name and registration number, or state that the remember was not registered.	Pg. 4
38 39	protocor	24b	Indicate where the review protocol can be accessed, or state that a protocol was not prepared.	N/A
40		24c	Describe and explain any amendments to information provided at registration or in the protocol.	N/A
41	Support	25	Describe sources of financial or non-financial support for the review, and the role of the funders or sponsors in the	Pg. 15
42 43	Competing interests	26	Declare any competing interests of review authors.	Pg. 15
44 45	Availability of data, code and	27	Report which of the following are publicly available and where they can be found; template data collection forms; data extracted from included studies; data used for all amaryses, ariallytic bode, any other materials ଓଡ଼େ ମି ଲେକ ବିଷୟ ଓଡ଼ିଆ ବିଷୟ ।	Pg. 15
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6	other materials			ing	
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8	From: Page MJ, McKe	enzie JE,	ossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated gui	ideline for reporting systen atic feviews. BMJ 2021;	372:n71. doi: 10.1136/bmj.n71
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10			ossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guid For more information, visit: http://www.prisma-stateme	seio	
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