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Evidence Snapshot

Factors associated with successfully embedding brief primary prevention interventions in cancer screening programs

An Evidence Snapshot rapid review produced by the Sax Institute (www.saxinstitute.org.au) for Cancer Council Victoria.

June 2024.

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Suggested Citation:

Schiavuzzi A, Petrunoff N, Dawkins J, Goldberg E, Goodenough B. Factors associated with associated with successful implementation of brief interventions for primary prevention of cancer in cancer screening programs: An Evidence Snapshot rapid review produced by the Sax Institute (www.saxinstitute.org.au) for Cancer Council Victoria. June 2024. doi: 10.57022/oqfn9773

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This Evidence Snapshot was produced using the Evidence Snapshot methodology in response to specific questions from the commissioning agency.

It is not necessarily a comprehensive review of all literature relating to the topic area. It was current at the time of production (but not necessarily at the time of publication). It is reproduced for general information and third parties rely upon it at their own risk.

Contents

Introduction

This Evidence Snapshot was commissioned by Cancer Council Victoria and prepared by the Sax Institute.

The purpose of this rapid review is to provide evidence about the factors that influence the successful implementation of brief primary prevention interventions delivered in a cancer screening setting. The findings of this Evidence Snapshot have been arranged into key themes using the *RE-AIM framework*[1, 2] to assist in the identification of potentially essential elements that may improve the adoption and sustainment of evidence-based interventions. The five RE-AIM domains include: Reach, Effectiveness, Adoption, Implementation and Maintenance.

This review only considered brief or low-intensity interventions requiring <20 minutes of physician time or <30 minutes of nurse time, embedded in skin or other imaging-based cancer screening programs (breast or lung) where outcomes of the brief intervention were reported.[1, 2] Finally, we focused on studies that reported outcomes of the intervention and therefore excluded reviews from this Snapshot.

Evidence Snapshot question

Which factors are associated with successfully embedding primary prevention brief interventions in cancer screening programs?

Methods

Search strategy, approach and rationale

This Evidence Snapshot was conducted within a condensed time frame of one month, adhering to methodologies consistent with rapid review guidelines.[3] Although we employed a systematic review approach, we omitted certain steps because of the expedited nature of this review.[4] We defined the search strategy using stringent inclusion and exclusion criteria, including date range, English language and inclusion of peer-reviewed publications only, while also limiting the number of databases searched. These constraints limited the scope of the search but facilitated identification of key primary papers and published reviews relevant to the research question. While we followed a rigorous process for searching it is possible we may have missed some peer-reviewed literature.

The search strategy is provided in Appendix 1

Sources

We selected and searched two databases, chosen because of their extensive and up-to-date coverage of cross-referenced peer-reviewed research articles, particularly in the fields of medical, allied health and nursing research:

- Medline via OVID
- Cinahl via EBSCO

Additionally, we performed a manual search of key implementation science journals to identify relevant articles. Reference lists of shortlisted papers or other review papers (if found) were also examined. This approach aimed to capture articles reporting on conceptually relevant implementation outcomes secondary to clinical outcomes.

We conducted these searches on 4 June 2024. Grey literature was not included in the search.

Screening

The screening process involved several reviewers and included interrater reliability checks. Initially, 20% of titles and abstracts were independently screened by two reviewers to assess eligibility against inclusion and exclusion criteria, testing interrater reliability. Concordance between reviewers was deemed acceptable with a Cohen's Kappa score of 0.56, indicating moderate agreement. Following a discussion to ensure a consistent approach, one reviewer screened the remaining titles and abstracts.

For the full-text review, two reviewers independently applied the inclusion and exclusion criteria to a proportion of the remaining full-text records to confirm these criteria. Specifically, 20% of the full-text

papers were screened by two reviewers to ensure consistent application of the criteria. At this stage, substantial agreement was achieved between the two independent reviewers, with a Cohen's Kappa score of 0.75. Once the agreement between reviewers was confirmed, the remaining papers were assessed for inclusion by a single reviewer. At all stages, any rating disparities were resolved through discussion and consultation with an additional reviewer as needed.

The PRISMA flow chart illustrating the search process is provided in Appendix 2.

Inclusion and exclusion criteria

The inclusion and exclusion criteria for this Evidence Snapshot (see Table 1) were developed in consultation with Cancer Council Victoria. Because of the constrained time frame, we developed them to ensure the search strategy was sufficiently broad to capture evidence relevant to the general subject matter, yet specifically targeted to a key criterion of the delivery of cancer prevention information embedded in another screening setting.

Table 1—Inclusion and exclusion criteria (used to screen references captured in the search)

Inclusion criteria	Exclusion criteria
Prevention interventions delivered in the context of a cancer screening program. 'Low intensity' interventions, requiring up to 20 minutes if delivered by a physician, or up to 30 minutes if delivered by a nurse practitioner. Outcomes that relate to the brief intervention. Cancer screening programs delivered in health service settings, clinical settings or a clinical service delivered in a community-based setting. Interventions and screening programs that focus on the whole population or focus on high-risk groups for skin cancer (e.g. fair-skinned people). Interventions that are embedded within skin cancer or other imaging-based cancer screening programs (breast or lung). Interventions embedded in non-imaging based screening programs (e.g. bowel	Studies that don't report patient outcomes / effectiveness data related to cancer prevention. Studies that describe a low intensity prevention intervention but do not report patient outcomes / effectiveness data related to cancer prevention. Outcomes related to the screening program in which the intervention is embedded. Cancer screening programs that involve self-screening.

Inclusion criteria	Exclusion criteria
screening) to be included only as a secondary priority.	
Peer-reviewed publications. Written in English. Australia and countries with similar healthcare systems / income levels. 2014 – present. Adults.	Grey literature. Written in languages other than English. Low income and middle income countries. <2014. Children.

Reviews were excluded as it was expected that all primary studies would have been captured by the comprehensive search strategy. Therefore, this review focused on the primary studies because of the tight time frame.

Data extraction

The data extraction table for the final set of 11 included papers is provided in Appendix 3.

Data was extracted about study aim, study type, participants, focus and time frame of study, key findings, effect on community and implications in the context of the presenting issue. We classified the study types using an adapted version of the NHMRC hierarchy for levels of evidence, excluding systematic reviews. Our classifications included randomised controlled trial; cluster-RCT; comparative study with concurrent controls (e.g. quasi-experiment, cohort study, case-control study, interrupted time series with a control group); comparative study without concurrent controls (e.g. historical control study, two or more single-arm studies, interrupted time series without a parallel control group); case series with either post-test or pre-test/post-test; and other implementation-focused studies (e.g. feasibility studies). Risk of bias and quality assessment was beyond the scope of this Evidence Snapshot.

Information included in data extraction tables
Population groups included in studies, including sociodemographic characteristics and (where noted) high-risk group/s.
Description of intervention—type, cancer prevention behaviour, mode of delivery, time taken, provider who delivered the intervention, personalised vs. generic, single vs. multi-episode interventions.

Information included in data extraction tables
Description of screening program—cancer type, setting.
Implementation outcomes that relate to the brief intervention only (i.e. don't include those that relate to the screening program): • **Reach**: The absolute number, proportion and representativeness of individuals who are willing to participate in a given initiative, intervention or program • **Effectiveness (or efficacy)**: The impact of an intervention on important outcomes, including potential negative effects, quality of life and economic outcomes • **Adoption:** The absolute number, proportion and representativeness of settings and intervention agents (people who deliver the program) who are willing to initiate a program • **Implementation:** At the setting level, implementation refers to the intervention agents' fidelity to the various elements of an intervention's protocol, including consistency of delivery as intended and the time and cost of the intervention. At the individual level, implementation refers to clients' use of the intervention strategies • **Maintenance**: The extent to which a program or policy becomes institutionalised or part of the routine organisational practices and policies. Within the RE-AIM framework, maintenance also applies at the individual level. At the individual level, maintenance has been defined as the long-term effects of a program on outcomes six or more months after the most recent intervention contact.

Summary of findings

Findings

The searches yielded a total of 1028 papers, which were subsequently exported into Covidence (Cochrane technology platform). Following the removal of 188 duplicates, we screened 840 papers for inclusion based on the criteria outlined in Table 1. After the title and abstract screening, 797 papers were excluded and 43 advanced to a full-text review. On reviewing full text, we excluded an additional 32 papers, resulting in 11 papers meeting the inclusion criteria for analysis.

Evidence base

Delivering brief cancer prevention interventions within a screening setting is an emerging area of research, so the literature on the topic was limited. We identified 11 studies meeting the inclusion criteria. Of these, four studies were concerned with skin cancer and the remaining seven with lung cancer. Studies of primary prevention interventions embedded in screening programs were more common for lung cancer—potentially reflecting more mature policy directives, such as mandated requirements for smoking cessation counselling to occur at the time of screening.[5] We classified the study types using an adapted version of the NHMRC hierarchy for levels of evidence, excluding systematic reviews. Of the studies identified, there were five randomised controlled trials of which two were feasibility studies, one was a cluster randomised controlled trial, three were comparative studies with no concurrent control and one was a comparative study with a concurrent control. Table 2 summarises the studies captured in this Evidence Snapshot.

Table 2—Summary of interventions

	Study	Country	Aim of study (design)	Cancer	Description of intervention
1	Yiannias 2014[6] Study design: Comparative, no concurrent control.	US	To measure the impact of a dictation template on screening and skin protection education.	Skin	A dictation template (DT) was made available to physicians in the dermatology department by placing the DT at each physician workstation. Using the template was voluntary.
2	Rat 2014[16] Study design: Cluster-RCT.	France	To compare the effect of a targeted screening and education strategy using the SAMScore (self-assessment of	Skin	Patients responded to seven questions that were used to calculate their risk score for melanoma. In the intervention arm, patients were provided with their level of risk and all patients identified as at risk had a total skin examination by the GP,

	Study	Country	Aim of study (design)	Cancer	Description of intervention
			melanoma risk score) on patient prevention behaviour with that of a conventional prevention campaign.		counselling and an information leaflet on prevention measures. In the control group, GPs did not have access to the risk calculator to interpret the risk factors and therefore did not have access to the patient risk status. GPs did not receive specific instructions to perform skin examinations, yet they could perform them at their own discretion.
3	de Troya-Martín 2014[14] Study design: Comparative, no concurrent control.	Spain	In the summer of 2010, a skin cancer prevention campaign aimed at beachgoers was undertaken on the western Costa del Sol (southern Spain).	Skin	Face-to-face—qualified healthcare professionals (dermatologists, family physicians and specially trained nurses) provided four interventions: Stand 1: interviewer-administered behavioural risk factors questionnaire + feedback on personal risk status Stand 2: face-to-face cutaneous examination using dermoscopy provided by dermatologists Stand 3: face-to-face health advice and a hard-copy brochure on recommendations for skin cancer prevention Stand 4: face-to-face sunscreen workshop.
4	Pozzi 2015[7] Study design: Comparative, no concurrent control.	Italy	To see whether combining a pharmacologic and behavioural smoking cessation intervention within a prospective low-dose CT screening would help smokers to continuously abstain from smoking.	Lung	Participants were instructed to reduce their free-of-charge dose of varenicline. Behavioural support was 4 x 10-minute telephone calls by the same counsellor during the months of treatment; psychologist delivered behavioural advice. Additional contacts, if needed.
5	Marshall 2016[8] Study design: RCT (feasibility).	Australia	To test whether the intervention described in the last column would (1) be feasible when delivered on the day of screening and (2) result in higher self-reported quit	Lung	Intervention group—motivational interviewing (MI) counselling delivered after screening by thoracic physician, non-tailored audio materials, non-tailored printed materials, Quitline details. Control group—non-tailored printed materials, Quitline details.

	Study	Country	Aim of study (design)	Cancer	Description of intervention
			rates at 1 year compared with standard printed materials and Quitline referral alone.		
6	Chao 2017[15] Study design: Comparative, with concurrent control.	US	To assess the effectiveness of a melanoma educational intervention targeted towards people of colour.	Skin	A research associate delivered a 10-minute educational intervention, which was either the conventional educational intervention using the ABCDEs of Melanoma brochure from the US Skin Cancer Foundation or targeted intervention + brochure that included a skin of colour section and other additions.
7	Taylor 2017[9] Study design: RCT (confirmatory).	US	To determine the feasibility and efficacy of a telephone-counselling smoking cessation intervention compared with usual care, in the lung cancer screening setting.	Lung	Cessation resources: booklet and website; contact for local cessation resources; a text messaging link with My Quit App link. Those in the intervention arm were also offered six-weekly counsellor-initiated counselling calls. Discussion of normal and abnormal LCS results.
8	Meltzer 2019[10] Study design: RCT (feasibility).	US	To develop and examine the feasibility and acceptability of a self-help smoking cessation intervention targeted to the teachable moment of smokers undergoing low-dose computed tomography (LDCT) lung cancer screening.	Lung	Participants were randomised to: (1) self-help intervention (SHI) or (2) usual care (UC). For the SHI, 10 booklets were distributed to participants over the next 18 months. Those receiving UC received a booklet at their scan.
9	Tremblay 2019[11] Study design: RCT (confirmatory).	Canada	To determine the effectiveness of smoking cessation counselling in smokers presenting for lung cancer screening.	Lung	Intervention arm—intensive (seven telephone sessions) tailored counselling-based; including recommendations with regards to nicotine replacement therapy (NRT), prescription cessation medications and simultaneously incorporating the screening LDCT result.

	Study	Country	Aim of study (design)	Cancer	Description of intervention
					Subjects randomised to the control arm were mailed an information pamphlet outlining 'quit' resources with their screening result letter. The resources they could access voluntarily included a similar telephone counselling intervention, but the counsellor would not have access to the LDCT screening results.
10	Kotti 2023[12] Study design: RCT (confirmatory).	UK	To measure acceptance of referral to SC support by either practitioner-referral or self-referral among participants attending a hospital-based lung health check appointment for LCS as part of the Lung Screen Uptake Trial.	Lung	Arm a: given a contact information card for self-referral to a local stop smoking service (SSS). Arm b: a referral to a local SSS was made on their behalf by the nurse or trial practitioner.
11	Kim 2024[13] Study design: Comparative, no concurrent control.	South Korea	To measure the effectiveness and related factors of smoking cessation services provided to the participants in a population-based lung cancer screening trial.	Lung	Verbal and face-to-face smoking cessation and cancer screening results counselling provided by physicians + pharmacological treatments. The public smoking cessation program provided counselling 6 times by physician with pharmacotherapy for 3 months.

Population description

There are criteria in place for people to be able to freely access lung cancer screening so the resultant population in these studies tends to be those at higher risk for lung cancer, in terms of having higher exposure to smoking and older age.[6–13] de Troya-Martín et al. (2014) combined skin cancer screening with prevention interventions targeted at a general population at the beach but reported that, in fact, their study had captured a high-risk population for skin cancer.[14] Chao et al. (2017) targeted people of colour, as this group has a higher mortality risk from melanoma despite a lower overall risk of developing melanoma than the general population.[15] Another study by Rat et al. (2014) focused on individuals at higher risk for melanoma by examining the impact of providing a risk

score on participants' preventive behaviours.[16] The final skin cancer-related paper, by Yiannis et al. (2014), was aimed at a general population receiving screening at their general practitioner's office.[6]

Intervention delivery

Mode of delivery

The mode of delivery for the interventions varied and included provision of hard-copy materials[14, 16], verbal counselling[7, 12–15], providing audio materials[8], telephone calls[7, 9, 11] and face-to-face advice.[7, 8, 12–15] One intervention described providing patients with a risk score for developing melanoma at the time of screening as a motivation for behaviour change.[16]

Person delivering the intervention

In the majority of cases, the brief intervention was delivered by a physician.[6, 8, 13, 14, 16] Counsellors or psychologists were the second most common providers of the brief intervention; however in all cases this was for verbal smoking cessation counselling at lung cancer screening.[7, 9, 11] Only one study explicitly identified that the intervention was delivered by a nurse.[12] In one study[15] the intervention was delivered by a research associate (clinical affiliation unclear).

Intensity

Not all studies published precise estimates of the time taken for intervention delivery. We were able to review the methods of these studies and impute an estimated intervention time where possible. This was necessary to capture relevant papers delivering a brief intervention in a screening setting. Most interventions could be undertaken in 10 minutes or less.[7, 10, 12, 14–16] Longer duration interventions tended to be those where counselling was delivered—in this Evidence Snapshot, these interventions often targeted smoking cessation embedded in lung cancer screening.[8, 9, 11, 13]

Six out of 11 studies involved a single contact intervention.[6, 8, 12, 14–16] The intensity of the multiple interventions varied, including one call every six weeks for a total of six calls[9], six counselling sessions over three months[13], and between four[7] and seven[11] telephone calls over 12 months. The intervention by Meltzer et al. (2019) included delivery of booklets every month for 18 months.[10]

Implementation outcomes

This section summarises the available evidence about implementation outcomes and provides key insights about factors associated with implementation success (including potential caveats or confounders).

Reach

We defined reach as reflecting how participation varied according to population group (e.g. risk stratification, sociodemographic subgroups). Seven studies provided information on reach.[11–15]

Chao et al. (2017) note people who attend skin cancer screening may be those who are already more health aware and receptive to skin cancer prevention messages.[15] They may not, therefore, represent the general population. This study describes an important group of people with coloured skin who are over-represented in terms of mortality from melanoma. Several studies noted the older age of

screening participants, suggesting interventions delivered in these settings may have limited generalisability for younger populations.[10, 11, 13, 14]

To improve reach, one study brought cancer screening and prevention education to the beach to target those engaging in high-risk behaviours for skin cancer.[14] It should be noted that this study may not have captured a local population as the beach was frequented by tourists to the area and this may have implications for local health system resourcing, and who would be responsible for funding such interventions. This study notes that the participants had a high average age, which resulted in a high rate of detection of cancerous and precancerous lesions. This may result in possible selection bias, as attitudes and intentions to participate in screening for skin cancer are strongly associated with people's risk status.

Several of the studies note the importance of measuring the stages of behaviour change as additional indicators of success and note that only measuring the behaviour change end point may miss the movement of participants through the stages of behaviour change.[12, 13] Individuals who feel less motivated or less able to change their behaviour may need more intensive and individualised interventions.[12] One study by Rat (2014) took the opposing view that the success of such a targeted screening strategy may rely on the selection of concerned patients, allowing general practitioners to focus their attention, energy and time on the education of at-risk populations, with greater efficiency.[16]

Effectiveness

Effectiveness was defined as the impact of an intervention on important outcomes, including the factors that are associated with the greatest improvement in intervention outcomes. For this Evidence Snapshot, effectiveness captures both the impact on primary prevention behaviours and the factors that influence the implementation of the intervention. Information about effectiveness was provided in all 11 studies.

Participation in screening may help to promote behaviour change in and of itself.[13] Interventions may be able to leverage higher motivation to adopt a cancer prevention behaviour at the time of screening.[10, 13] Participants who received smoking cessation counselling simultaneously with the lung cancer screening results by the same physician were up to 3.2 times more likely to quit smoking than participants who received counselling separately from LDCT screening results.[13] Additionally, participants who attend screening may represent a group that is more concerned with their health than those that don't attend screening.[13] Hence, an intervention delivered at screening could make the most of this opportunity to educate a population already motivated to change.

Yiannias et al. (2014) found when physicians used the dictation template, 98% of examinations showed documentation of patient education about sun protection, compared with 20% when the dictation template was not used.[6]

Negative screening results could potentially provide false reassurance to smokers, to encourage them to continue smoking.[13] Integrating physician counselling with the simultaneous provision of screening results in smoking cessation interventions could mitigate this risk, as physicians can address other findings related to smoking.[13] Similarly, for skin cancer, identifying patients at risk, performing skin examinations, and providing advice and printed information about prevention had a greater impact on patient behaviour compared with a conventional information-based campaign. This intervention was more effective in reducing skin cancer risk and increasing early detection.[16]

Most participants in the de Troya-Martín study exhibited a long history of high-risk sun exposure evidenced by the prevalence of sunburns during childhood (up to 70%) and poor sun protection behaviour reported by beachgoers (<50% of all sun protection practices except for sunscreen use).[14] This could result in either an increase in the effectiveness of this intervention by converting this group with high-risk behaviours to lower levels of risk or, alternatively, this population may represent a group that is particularly resistant to sun protection messaging and therefore reduce the impact of the intervention on their health behaviours. Behaviour change was difficult to measure in this study as it purposely circumvented the health system, which made follow-up of participants difficult.

Adoption

Adoption encompassed the factors that determine the uptake of the intervention by staff and patient participants. We found information about adoption in five studies.[10–12, 14, 16]

Awareness-raising was an important component of a screening and skin cancer prevention campaign delivered at the beach. This campaign was heavily publicised which is likely to have increased its uptake. To encourage the participation of the press, a journalism and health prize was offered for the best report about the campaign in any of the mass media. This was considered a crucial component of the increasing attendance at the campaign.[14]

Competing demands are a universal issue when it comes to implementing a new procedure and physicians may have neglected to follow the protocol for an intervention if they were busy.[16] Hence a low burden intervention is important for adoption from both a participant and practitioner perspective.[10, 16] Readiness to change behaviour may also influence adoption.[11, 12]

Implementation

Implementation describes how the mode, intensity, provider and other key features affect program fidelity, acceptability, feasibility and cost.[2] It also encompasses information about fidelity to the intervention protocol, consistency of delivery and cost. Information about implementation was noted in seven studies.[9–13, 15, 16]

The level of burden on the person delivering the intervention as well as the person receiving the intervention was noted to be an important factor, especially if the intervention offered minimal disruption to clinical flow and the pace of consultations.[10, 16] It was noted that a single tailored session of counselling on the day of screening, combined with the provision of non-tailored take-home audio materials was feasible to deliver.[8] Having a clear and simple protocol was an important aspect of the success of the intervention—it was key to ensuring intervention fidelity and feasibility; however, some practitioners may have neglected to follow the protocol when they were too busy.[16]

In at least one instance the authors noted that while the intervention was delivered by a physician, it could feasibly be implemented by a nurse or other health professional.[8] While having the same person deliver the intervention would potentially support consistency, there may be context-specific questions relating to scalability or cost-effectiveness in a real-world setting.[8] One study noted that the clinicians were required to view an e-learning module on melanoma prevention and detection.[16] This clinician training may be an important aspect of implementing an intervention in a uniform manner. Providing a dictation template, which encouraged physicians to document skin examinations and skin cancer education efforts, or a script for health professionals to read, increased the fidelity of the intervention.[6, 15]

Rat et al. (2014) emphasised the efficacy of delivering verbal counselling alongside objective lesion identification as an efficient and powerful strategy to significantly influence patient behaviour, compared with solely providing written information.[16] It was noted that face-to-face counselling may be more effective than telephone counselling, although telephone counselling may be more cost-effective.[9, 11]

Maintenance

Maintenance describes the factors that are critical for program sustainability and scalability. This also applies at an individual level, to capture the long-term effects of a program on outcomes. We found information about maintenance in three studies.[8, 15, 16]

Continued reinforcement and repeated education about skin cancer risk and signs could improve the long-term success of a targeted intervention.[15] Identifying patients at risk, performing skin examinations, and giving advice and printed information about prevention had a greater impact on patients than a conventional information-based campaign in terms of changing behaviours. Five months later, the patients in the intervention group better remembered the information provided.[16] Tailoring the intervention to the level of risk may increase uptake and maintenance of desired behavioural outcomes, i.e. those who are resistant to quitting could be offered a telephone follow-up.[8]

Other implementation outcomes

The literature search and data extraction focused on the domains of the RE-AIM framework. Other implementation outcomes are of potential relevance. For example, *Acceptability* can be specifically defined and measured as the perception among stakeholders that an intervention is agreeable or satisfactory. Likewise, the concept of *Appropriateness* includes the perceived fit or compatibility of an intervention with the delivery setting to address the target issue or problem.

While not explicitly referenced in the RE-AIM framework, both Acceptability and Appropriateness may warrant consideration from patient and professional perspectives, given that this Evidence Snapshot is intended to inform pilot study testing. An example from the set of included papers is a study in which participants rated the distribution of materials over 18 months (10 booklets and nine pamphlets reinforcing quit smoking messaging) as helpful and were generally satisfied with the information they received.[10] All but one participant was satisfied with the amount of help received and would recommend it to a friend. Four of the seven participants reported that the booklets helped them deal more effectively with trying to quit smoking and remaining smoke-free.[10] Another example is evaluating the comfort of participants with technology-based interventions.[8]

Strengths and limitations of this Snapshot

Strengths

- The snapshot method was appropriate for the five-week time frame Cancer Council Victoria requested the report be provided within[4] and enabled it to be delivered within this time frame
- Cancer Council Victoria reviewed the search strategy in a meeting and added synonyms for search terms and additional search terms to the final strategy, which increased the chance of identifying relevant literature.

Limitations

- The Evidence Snapshot method for a rapid review is intentionally non-exhaustive (e.g. only two databases and no contact with authors/experts in the field), yet the addition of hand searches of implementation-focused journals increased the chance of identifying literature relevant to the review question and one contributor to the review has expertise in implementation science.
- The complexity of the review question may have been better suited to the Sax Institute's Evidence Check method[17], although such a review was not feasible in the five-week delivery time frame
- The Evidence Snapshot does not allow time for development of a full discussion section, which includes full interpretation of findings (e.g. deep insights into their public health and/or clinical significance and relation to broader literature on the topic), yet these insights could be provided via further collaborative work on a peer-reviewed publication where Cancer Council Victoria can share its deep understanding of skin and lung cancer prevention.

Key insights and recommendations

Based on the 11 studies identified in this Evidence Snapshot, the following key insights and recommendations are presented for the skin cancer screening context.

A key lesson from the review is that tailoring interventions to the level of risk is a promising strategy. Therefore, we recommend:

1. Consider tailoring the level of intervention to the level of risk of future disease.[8, 16]

A related and important consideration for communicating risk scores is whether this communication may impact mental wellbeing. The review did not find an example study incorporating communication of skin cancer risk scores that also measured mental wellbeing to assess if there were any unintended negative impacts. Therefore, we recommend:

2. Consider the risk of adverse events, for example, whether providing a risk score to patients will result in desired behaviour changes at the risk of negative unintended impacts such as the stress of knowing about being in a high-risk category.[13]
3. Provide checklists or dictation templates to health professionals who are carrying out skin cancer screening, as it may help increase the rate at which sun protection advice is provided.[8]
4. Deliver a combined screening and brief intervention campaign in targeted settings where high-risk behaviours occur, as it may capture a higher-risk and more motivated group.[14]
5. For technology-dependent interventions, ensure participants understand how to use the technology and are comfortable in doing so.[8]
6. Develop an implementation protocol that is considerate of clinic workflows and busy physician schedules, as it is likely to result in increased adoption by clinicians.
7. Consider changes in the stages of behaviour change as a measure of the effectiveness of an intervention.[8, 12, 13]
8. Consider inclusive educational material relevant to ethnic minorities, which may better promote early detection and help decrease the disparity in melanoma-related mortality rates.[15]
9. Reduce risk of negative reactive effects, such the situation where a normal screening result gives permission to continue with behaviours that increase risk of cancer.[10, 11]
10. Balancing the feasibility and cost of delivering personalised, in-person counselling with telephone or web-based counselling is a challenge and requires further research.[7]

Examples of international policy directives and recommendations by peak health bodies to incorporate smoking cessation programs in lung cancer screening have resulted in a large body of more mature research than brief interventions associated with skin cancer screening; this was evident from the papers the Evidence Snapshot identified, which mostly described smoking cessation interventions associated with lung cancer screening. Therefore, we recommend:

11. After conducting research to contribute to demonstrating the effectiveness of brief interventions associated with skin cancer screening, this research could be used in advocacy

efforts to promote the development of Australian recommendations that these evidence-based brief interventions be considered for adoption as standard practice when screening for skin cancer.

Future opportunities

The limited studies looking at embedding brief cancer prevention intervention in cancer screening settings represents an opportunity for Cancer Council Victoria to address a key evidence gap by evaluating its planned program of work. These studies should be adequately powered to measure an effect.[8] Collection of qualitative data is also important for future research.[8] The Evidence Snapshot did not find an example of a brief intervention study in skin cancer screening settings that incorporated communication of skin cancer risk scores and also measured mental wellbeing prospectively to see if there were any unintended negative impacts. Therefore, an opportunity exists for any future research incorporating skin cancer risk scores in a screening intervention to include validated brief measures of mental wellbeing.

A protocol informed by an implementation science framework may offer the scaffolding to design, measure and monitor key outcomes relevant to practice and policy—including acceptability, appropriateness, feasibility and cost-effectiveness.

Appendices

Appendix 1—Search strategy

The search strategy used combinations of terms aligned to the key words and definitions (as discussed with the commissioning agency)

	Concept	Key words
Population	Adults	Adults “High risk”
Intervention	Low intensity primary prevention (behavioural) interventions for cancer	Brief Low intensity Low intensity Short Time-limited Personalised Tailored Behaviour* Lifestyle Change Sun protection behaviour Alcohol reduction Smoking cessation Risk reduction Web Web-based App Digital Mobile* Mobile-app* Internet-based Text message SMS Telephone-based Email Patient education Patient education handout Patient handout

		Education Intervention Counselling Advice Information Primary prevention Cancer prevention
Outcome	Implementation outcomes (RE-AIM framework)	Reach Effectiveness Adoption Implementation Maintenance Feasib* Acceptab* Fidelity Scale*
Setting	Delivered as part of an imaging-based cancer screening program	Screening program Cancer (skin/lung/breast) screening Early detection of cancer Imaging Total body photography Clinical examination

[1] See here for methods: https://ebm.bmj.com/content/28/6/412

Syntax for EBESCO

4 June 2024
Yield = 315 papers

#	Query	Results
S25	S15 AND S22 AND S23 AND S24	315
S24	S19 OR S20	370,402
S23	S17 OR S18	961,089
S22	S6 OR S7 OR S8 OR S9 OR S11 OR S12 OR S13 OR S14 OR S21	586,307
S21	S3 AND S10	197,670
S20	imaging or "total body photography" or "clinical examination"	328,486
S19	"Early Detection of Cancer"/ or Mass Screening/	44,360
S18	primary prevention	12,978
S17	prevent*	0
S16	cancer	567,925
S15	Skin Neoplasms/ or Lung Neoplasms/ or Breast Neoplasms/	163,172
S14	Patient Education as Topic/ or Patient Education Handout.mp.	27,926
S13	email	16,934

S12	"text message" or sms or telephone-based	6,445
S11	web or web-based or app or digital or mobile* or mobile-app* or internet-based	249,134
S10	educat* or counsel* or intervent* or advice or inform*	1,964,625
S9	sun protection or sun protective behaviors or sun safety	1,579
S8	smoking cessation or smoking cessation interventions or quit smoking or stop smoking	32,048
S7	alcohol reduction	1,932
S6	S4 AND S5	106,830
S5	change	645,903
S4	behavior* or behaviour* or lifestyle	576,125
S3	S1 OR S2	495,899
S2	Personal* or Tailor*	251,757
S1	brief or "low intensity" or "low-intensity" or short or "time-limited" or "time limit*"	257,031

Syntax forOvid MEDLINE

4 June 2024
Yield = 698 papers

1 (brief or "low intensity" or "low-intensity" or short or "time-limited" or "time limit*").mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] 1,221,815

2 (Personal* or Tailor*).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] 710,394

3 1 or 2 1,895,259

4 (behavior* or behaviour* or lifestyle).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] 2,196,449

5 change.mp. 1,397,474

6 4 and 5 179,411

7 sun protection behaviour.mp. 93

8 alcohol reduc*.mp. 735

9 smoking cessation.mp. or Smoking Cessation/ 46,639

10 (educat* or counsel* or intervent* or advice or inform*).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word,

unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] 4,467,557

11 (web or web-based or app or digital or mobile* or mobile-app* or internet-based).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] 586,870

12 ("text message" or sms or telephone-based).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] 13,341

13 email.mp. 11,299

14 Patient Education as Topic/ or Patient Education Handout.mp. 94,298

15 Skin Neoplasms/ or Lung Neoplasms/ or Breast Neoplasms/ 732,467

16 cancer.mp. 2,319,527

17 prevent*.mp. 2,935,579

18 primary prevention/ 20,191

19 "Early Detection of Cancer"/ or Mass Screening/ 148,122

20 (imaging or "total body photography" or "clinical examination").mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms, population supplementary concept word, anatomy supplementary concept word] 2,581,964

21 3 and 10468,884

22 6 or 7 or 8 or 9 or 11 or 12 or 13 or 14 or 21 1,313,372

23 17 or 18 2,935,579

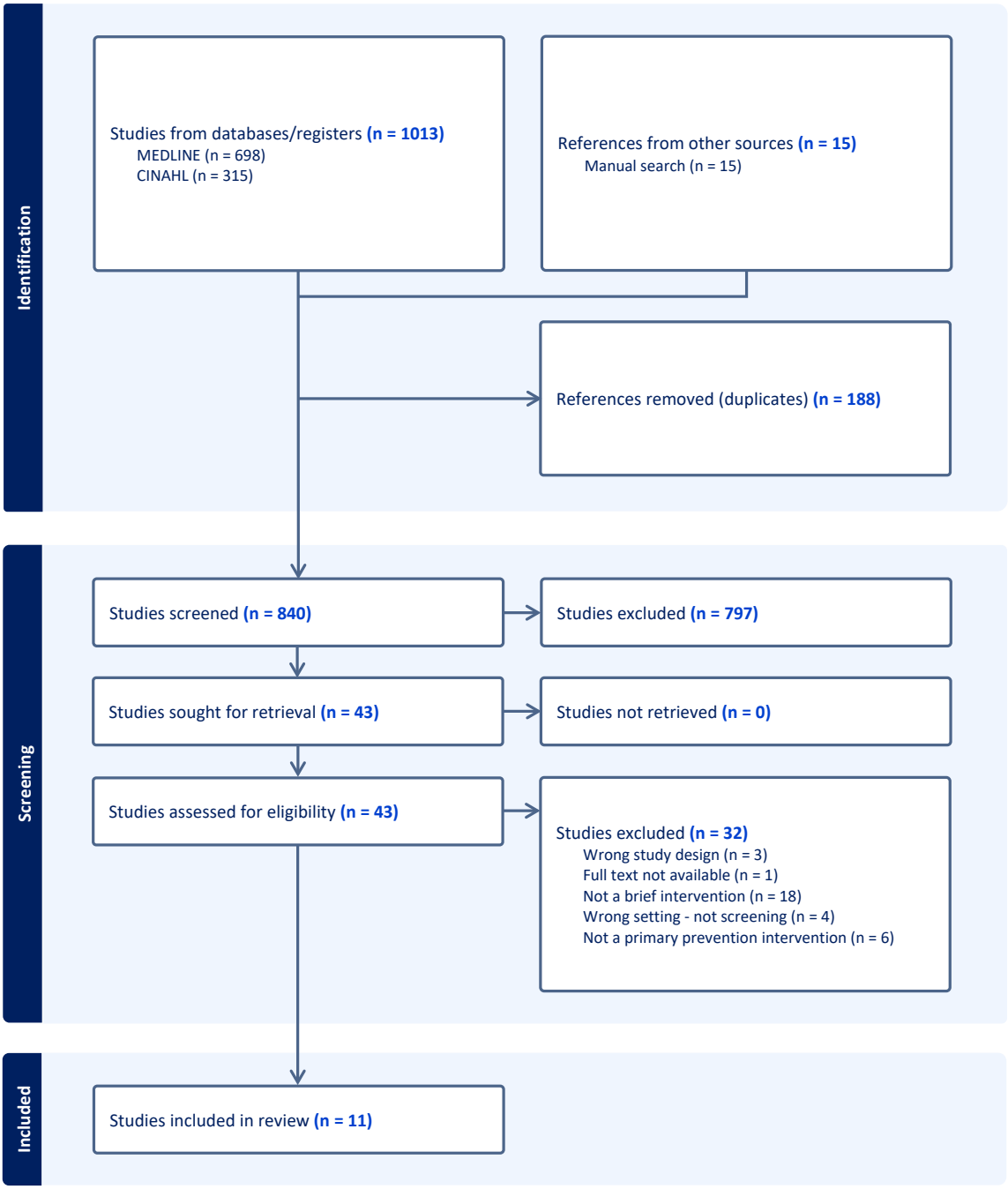
24 19 or 20 2,711,813

25 15 and 22 and 23 and 24 1531

26 limit 25 to (english language and yr="2014 -Current") 698

Appendix 2—PRISMA diagram

Summary of literature flow and outputs of screening stages



Appendix 3—Data extraction tables

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
Yiannias 2014	Skin cancer prevention in annual performance of total skin examination, photoprotection counselling, and patient instruction of self-skin examination	US	This study sought to determine the extent to which patients were being screened and educated about finding and preventing skin cancer. They also sought to measure the impact of a dictation template on screening and skin protection education.	Comparative, no concurrent control; retrospective review of random sample.	Skin Cancer prevention outcome: Physician documentation of physician-performed total skin exam, patient-performed self-skin exam and photoprotection counselling.	An outpatient dermatology practice of a tertiary care academic medical centre.	Adults, mean age 62 years, 53% male.	400	Unknown. The skin cancer prevention component is likely to be brief.	Dermatologist	Other: Unknown if the dictation template was a hard copy or electronic. Hard copy assumed	The intervention tested whether physicians were more likely to document that they had provided sun protection advice when they used a dictation template than when they did not. The dictation template was made available to physicians in the dermatology department by placing the DT at each physician workstation. It appears that using the template was at the discretion of the physician.
Rat 2014	Targeted melanoma prevention intervention: a cluster randomized controlled trial	France	Aimed to compare the effect of a targeted screening and education strategy using the SAMScore (self-assessment of melanoma risk score) on patient prevention behaviour with that of a conventional prevention campaign based on mass communication.	Cluster-RCT	Skin Cancer prevention outcome: Patients remember campaign, correctly identify their melanoma risk, prevention behaviours, e.g. likelihood of sunbathing in summer, performing self-skin examination.	Study took place in GP clinics.	Adults identified as being at risk were included in the study. The mean age was 43.6Â±17.1 years and 42.8Â±14.6 years in the intervention and control group, respectively. In both groups, 76% of patients were women.	Total of 217 ppts (121 in intervention and 96 in control).	<10 minutes (I)	GP	Hard copy. Other: Completion of risk survey and provision of risk score poster in waiting room.	In the control group, general practitioners undertook a conventional public health campaign that entailed displaying the documents described above in their waiting room, but they did not have access to the calculator to interpret the risk factors, and therefore did not have access to the patient's dichotomous risk status. In this group, general practitioners did not receive specific instructions to perform skin examinations; thus, they were free to perform them at their own discretion as in any conventional screening campaign. During the consultation, the general practitioner entered

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
												each patient's responses to the 7 questions. The calculator integrated the risk factors using the SAMScore algorithm and expressed the risk in dichotomous format: either at elevated risk or not for melanoma. For all patients identified as having elevated risk, general practitioners performed a total skin examination, counselled the patient, and gave the patient the information leaflet detailing primary and secondary prevention measures.
de Troya-Martín 2014	Skin cancer prevention campaign aimed at beachgoers on the Costa del Sol (southern Spain).	Spain	In the summer of 2010, a skin cancer prevention campaign aimed at beachgoers was undertaken on the western Costa del Sol (southern Spain).	Comparative, no concurrent control. Other: Descriptive.	Skin Cancer prevention outcome: Health behaviour education.	One stand (out of a total five stands) provided cutaneous examination using dermoscopy. Specialists undertook a complete skin examination using conventional dermoscopy to identify potentially malignant lesions. Participants were referred to specialists for treatment or clinical follow-up where required. Stands were set	General population Mean age 45 years 85% of participants were Spanish 55% of participants women High risk population: 42.2% showed phototypes I and II; 69.7% reported a history of sunburn during childhood and 29.0% reported sunburn during the last summer (24.3% of women	407	Not specified (I)	Dermatologists, family physicians, specially trained nurses.	Verbal; hard copy; face-to-face.	The multicomponent intervention was conducted face-to-face by qualified healthcare professionals (including dermatologists, family physicians and specially trained nurses) with four different interventions located at four separate stands. Stand 1: Participants were interviewed using a previously validated questionnaire on constitutional and behavioural risk factors and provided personalised feedback about personal risk status, Stand 2: Face-to-face cutaneous examination using dermoscopy provided by dermatologists to participants.

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
						up at “chiringuitos”, popular Spanish bars located on the beach during the months of July and August 2010 (10:00am to 2:00pm).	and 35.3% of men). Concerning sun protection habits: 58.5% of the beachgoers reported sunscreen use of SPF >15 (69.3% of women and 43.8% of men); 50.4% avoided the midday sun; 57.6% used sunshade; and 61.0% wore sunglasses, 35.8% a hat or cap, and 12.6% long-sleeved clothes. All sun protection practices were significantly higher among older beachgoers (>50 years).					Stand 3: Face-to-face health advice and a hard-copy brochure on recommendations for skin cancer prevention provided to participants. Stand 4: Face-to-face sunscreen workshop. Personalised training about appropriate sunscreen for skin type, instruction on correct use, and personalised sunscreen samples provided to participants.
Pozzi 2015	A combined smoking cessation intervention within a lung cancer screening trial: a pilot observational study	Italy	To see whether combining pharmacologic and behavioural smoking cessation intervention within a prospective low-dose CT screening will help smokers to continuously abstain from smoking.	Comparative, no concurrent control.	Lung Cancer prevention outcome: Smoking cessation rate, propensity to succeed in smoking cessation.	Multicentric Italian Lung Detection (MILD) is a randomised prospective lung cancer screening trial. This study is a subset of MILD.	A subsample of patients already participating in the MILD trial who were enrolled in 2009–10 to receive an intervention with varenicline plus individual behavioural counselling to promote continuous SC. Age 49–75 years, persistent smoking despite brief	187	Drug intervention <10mins of clinician time, CBT = 4 telephone calls of 10 minutes.	Counsellor/ psychologist	Verbal. Other: Drug therapy plus cognitive behavioural support via telephone.	Participants were subsequently instructed to titrate their dose of varenicline to a maximum of 1mg per day by the end of week 1, continuing until the end of week 12. Subjects were allowed to continue smoking only until the 14th day of therapy, after which they were supposed to quit smoking. The drug was provided free of charge by the study investigators, as the Italian Health System does not provide any

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
							advice for stopping smoking during prior MILD visits, and cumulative exposure to smoke of at least 20 pack-years. Individuals with renal, neurologic or psychiatric disorders as well as those with a history of drug or alcohol abuse were excluded.					reimbursement for SC drugs. The one-on-one cognitive behavioural support consisted of 4 telephone calls lasting at least 10 minutes, promoted by the same counsellor during the months of treatment; the psychologist provided behavioural advice about how to cope with craving, and supported the motivation and self-efficacy of the subject to quit or remain abstinent. If required by the participant, additional contacts were scheduled.
Marshall 2016	Brief Tailored Smoking Cessation Counselling in a Lung Cancer Screening Population is Feasible: A Pilot Randomized Controlled Trial	Australia	To test whether a single session of tailored face-to-face counselling on the day of screening CT scan, coupled with audio and printed cessation information, would be feasible to deliver in a CT screening trial.	Randomised controlled trial (feasibility).	Lung <u>Cancer prevention outcome</u>: Smoking cessation rate.	Screening occurs at a single tertiary institution. This is a sub study of the Queensland Lung Cancer Screening Study.	55 participants (these are a subgroup of 256 pts enrolled in a larger study) = 51 current smokers and 4 baseline recent quitters who had since relapsed. Adults aged 60–74 years; 30 pack year smoking. More than half had tertiary education, nearly one-third lived with another smoker and one-third consumed more alcohol than recommended. Median cigarette consumption was 25/day; 54/55 (98%) smoked at least 15 cigarettes	55	Mean duration of counselling was 26.5 minutes (M), delivered by a single thoracic physician.	Thoracic physician	Hard copy; face-to-face. Other: Audio quit materials.	Testing a single face-to-face tailored motivational interviewing session (supported by take-home audio quit educational materials plus standard printed quit materials and Quitline telephone helpline referral would (1) be feasible when delivered on the day of screening and (2) result in higher self-reported point prevalence quit rates at 1 year compared with standard printed materials and Quitline referral alone. Volunteers were randomised 1:1 to intervention (MI counselling, non-tailored audio materials, non-tailored printed materials, Quitline details) or control groups

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
							per day. Median smoking duration was 46 years.					(non-tailored printed materials, Quitline details). Counselling was delivered immediately following lung cancer screening (CT scan) and included discussion of lung function tests and lung cancer risk. For consistency, a single thoracic physician (HMM) provided the counselling. Thirty audio tracks, based on Quitline materials (duration 0.5 to 4 minutes) and three relaxation tracks were provided on an MP3 player.
Chao 2017	Melanoma Perception in People of Colour: A Targeted Educational Intervention	US	Assess the effectiveness of a melanoma educational intervention targeted towards people of colour.	Comparative, with concurrent control ; Case series, pre-post	Skin Cancer prevention outcome: Melanoma knowledge, perceived risk for developing melanoma, skin self-examination.	Not delivered in a screening setting - dermatology clinic at an academic hospital. Likely for patients to attend dermatology clinic for screening.	Adults (18 years or older) with proficiency in English. Predominantly female, with majority having post-secondary level of education. Consecutive patients seen for care at dermatology clinic in Chicago. Self-identified as African American, Asian/Pacific Islander, American Indian and	100	10-mins (M)	Research associate	Verbal; hard copy; face-to-face.	A single-episode, generic face-to-face verbal and hard-copy educational intervention. Research associate delivered a scripted 10-min educational intervention by reading aloud the melanoma brochure to each participant. Participants were alternately assigned to either the conventional educational intervention (ABCDEs of Melanoma brochure from US Skin Cancer Foundation) or targeted intervention (modified version of ABCDEs of Melanoma brochure from US Skin Cancer Foundation pamphlet that included a

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
							Alaskan Native, or Hispanic. This group is at low risk for developing melanoma, but high risk for poor outcomes (esp. mortality) from melanoma.					skin of colour section, the nomenclature melanoma skin cancer, and an image of an individual performing a skin self-examination with the help of a friend). Participants kept the brochure after the educational intervention.
Taylor 2017	Preliminary evaluation of a telephone-based smoking cessation intervention in the lung cancer screening setting: A randomized clinical trial	US	To determine the feasibility and efficacy of a telephone-counselling smoking cessation intervention, compared with usual care, in the lung cancer screening setting.	Randomised controlled trial (confirmatory).	Lung Cancer prevention outcome: Smoking cessation rate.	Delivered in a screening setting at 3 sites.	Eligible screening participants were 50–74 years old (mean = 60.2 years) with a 20+ pack-year smoking history. 56.5% female. 30% were ready to stop smoking in the next 30 days.	92	15–20 minutes each (M).	Counsellor	Hard copy; digital; text message. Other: Telephone calls.	Following the T0 interview, all participants received the following cessation resources: Legacy's BecomeAnEx booklet and website; contact information for local cessation resources; a text messaging link; and the LIVESTRONG My Quit App link. In addition to these, those in the intervention arm were also offered 6-weekly, counsellor-initiated counselling calls that began 1–2 days post-randomisation. The TC protocol included validated cessation techniques: motivational interviewing, identifying and coping with smoking triggers, and encouragement to consider NRT and to speak with their doctors about varenicline and bupropion. Discussion of an abnormal LCS result was designed to increase risk perceptions and

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
												emotional reactions to the result, and challenge one's self-concept as a smoker. Discussion of a normal LCS result provided education that this was not a permanent "clean bill of health" and that older adults who quit can still add years to their lives, challenging thoughts that minimised the consequences of smoking.
Meltzer 2019	Capitalizing on a teachable moment: Development of a targeted self-help smoking cessation intervention for patients receiving lung cancer screening	US	To develop and examine the feasibility and acceptability of a self-help smoking cessation intervention targeted to the teachable moment of smokers undergoing low-dose computed tomography (LDCT) lung cancer screening.	Randomised controlled trial (feasibility). Other: Qualitative—focus groups.	Lung Cancer prevention outcome: Feasibility and acceptability of a self-help smoking cessation booklet.	Participants were smokers who had recently completed a LDCT scan at a large NCI-designated cancer centre in the US southeast.	Adults. Smokers who had received a negative (normal) scan result as well as smokers who had received a positive (abnormal) result.	18	<10 minutes (providing a booklet) (I).	Not reported	Hard copy	"Our overarching goal was to develop a self-help intervention that could be provided to smokers within the context of LDCT screening and with minimal disruption to clinic flow." Phase I, was formative research via focus groups and learner verification interviews to adapt and modify the existing SSFG intervention for individuals receiving LDCT scan. Phase II was a feasibility study to evaluate the acceptability of, demand for, and practicality of the new intervention as well as the methodological procedures for a future efficacy trial. Participants in the feasibility study were randomised to (1) self-help intervention (SHI) or (2) usual care (UC). SHI participants received the intervention developed in Phase I. UC participants

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
												received an existing smoking-cessation booklet. This intervention comprised 10 booklets and 9 pamphlets distributed over 18 months . The first booklet provides a general overview about quitting smoking, and each of the remaining 9 booklets includes more extensive information on a topic related to maintaining abstinence (see Table 1). In addition to the booklets, 9 tri- fold colour pamphlets reinforce key messages about quitting smoking, communicated via a first-person narrative to induce a sense of social support. Materials were written at the 5^{th}–6^{th} grade reading level. Participants in the SHI arm received the new booklet at the time of their LDCT scan appointment. Participants in the usual care arm received the National Cancer Institute's Clearing the Air booklet at their scan appointment. The remaining SHI materials, including the 10 SSFG booklets and 9 supportive pamphlets were sent to participants via US mail over a 6-month period. Follow-up assessments were sent by email link or US mail (participants' choice) at 1, 3, 6 and 9 months following enrolment.

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
Tremblay 2019	A Randomized Controlled Study of Integrated Smoking Cessation in a Lung Cancer Screening Program	Canada	To determine the effectiveness of smoking cessation counselling in smokers presenting for lung cancer screening.	Randomised controlled trial (confirmatory).	Lung Cancer prevention outcome: Smoking cessation rate.	All participants were active smokers enrolled in the Alberta Lung Cancer Screening Study cohort. The Alberta Lung Cancer Screening Study is an investigational cohort of 806 individuals screened for lung cancer with three annual LDCT examinations. Participants were recruited to the main screening study/ program through a combination of media reports and social media advertising, as well as paper posters and pamphlets in community centres and primary care medical offices.	Adults 55–80 years old. Active smokers (any cigarette smoking in the 4 weeks before enrolment). 6-year lung cancer risk >= 1.5%.	345	28.6 minutes (M)	A trained smoking cessation counsellor.	Other: Telephone.	The active intervention arm comprised an intensive counselling-based (7 telephone sessions) program tailored to the specifics of the smoker (individualised to motivation and addiction levels), including recommendations with regards to nicotine replacement therapy (NRT) and prescription cessation medications and incorporating the screening LDCT result. The timing of the counselling referral was simultaneous with the communication of the baseline screening results to maximise the relevance of incorporating the screen results in the counselling intervention. Subjects randomised to the control intervention were mailed an information pamphlet outlining resources available at AlbertaQuits.ca along with their screening result letter. Should a control participant contact the AlbertaQuits program, a similar telephone counselling intervention would be available free of charge, although the counsellor would not have access to the LDCT screening results.

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
Kotti 2023	A randomised controlled trial testing acceptance of practitioner-referral versus self-referral to stop smoking services within the Lung Screen Uptake Trial	UK	This study aimed to measure acceptance of referral to SC support by either practitioner referral or self-referral among participants attending a hospital-based lung health check appointment for LCS as part of the Lung Screen Uptake Trial.	Randomised controlled trial (confirmatory); comparative, with concurrent control.	Lung Cancer prevention outcome: Acceptance of practitioner referral to a local stop smoking service; acceptance of self-referral to a local stop smoking service.	A hospital-based Lung Health Clinic appointment offering lung cancer screening as part of the Lung Screen Uptake Trial (LSUT).	Individuals ages 60–75 years, who self-reported currently smoking within the previous 7 years or had a carbon monoxide reading over 10 ppm during the lung health check appointment.	642	Not specified: 5–10 mins (I)	Nurse or trial practitioner.	Verbal; hard copy; digital; face-to-face.	Participants were randomised (1:1) to receive either a contact information card for self-referral to a local stop smoking service (SSS) (self-referral, n = 360) or a referral to a local SSS made on their behalf by the nurse or trial practitioner (practitioner-referral, n = 329). For the practitioner referral, the nurse or trial practitioner identified the individual's (geographically) closest SSS and referred them within 3 days using a brief standardised electronic referral form sent to the respective SSS by email. Those declining the practitioner referral were offered the self-referral contact information card as an alternative. Participants were unaware of this randomisation, with each referral type presented as usual care.
Kim 2024	Strategies to Improve Smoking Cessation for Participants in Lung Cancer Screening Program: Analysis of Factors Associated with Smoking Cessation in Korean Lung Cancer Screening	South Korea	Effectiveness and related factors of smoking cessation services provided to the participants in a population-based lung cancer screening trial.	Comparative, no concurrent control. Other: Single-arm cohort study.	Lung Cancer prevention outcome: Motivation to quit smoking; smoking cessation.	The K-LUCAS was a population-based lung cancer screening trial with LDCT conducted in 14 regional cancer hospitals nationwide.	The screening targeted a high-risk population aged between 55 and 74 years with at least 30 pack-years of smoking history. Participants comprised visitors participating in other national health screening	5144	15–20 mins (I)	Physicians certified by the Korean Health Promotion Institute (in public smoking cessation programs), and non-certified counselling physicians (in private programs). Internal medicine doctors (6 out of 14 hospitals) with	Verbal; face-to-face.	Public smoking cessation program: Verbal and face-to-face counselling provided by physicians educated in structured motivational smoking cessation counselling and pharmacotherapy. Physicians performed counselling and provided pharmacological treatments according to nicotine dependence, withdrawal symptom experience and

Study ID	Title	Country in which the study was conducted	Aim of study	Study type	Cancer type	Screening setting	Population description	Total number of participants	Time taken to deliver	Person who delivered intervention	Intervention delivery mode	Description of intervention
	Project (K-LUCAS)						programs or smoking cessation clinics in these hospitals who were previously required to complete a set of questionnaires.			the rest being family medicine doctors.		participant's preference with the standardised protocol. During the counselling for lung cancer screening results, physicians could register the participants for public smoking cessation programs and prescribe pharmacological treatments, if the participants were willing to quit smoking. The public smoking cessation program provided counselling 6 times by physician with pharmacotherapy within 3 months at low cost. National health insurance covers 70% of the total costs for counselling and medications. If participants successfully attended the program 3 times or more, these out-of-pocket costs were fully reimbursed regardless of smoking cessation results. Private smoking cessation program: Face-to-face and verbal counselling and unstructured cessation treatments, with cessation counselling and pharmacological treatment.

Study ID	RE-AIM outcomes	RE-AIM outcomes—description
Chao 2017	Reach, Effectiveness, Implementation and Maintenance	Reach: Although melanoma is more common in non-Hispanic Whites, ethnic minorities face a greater risk of melanoma-related mortality, which may be partially attributed to presentation at atypical sites and a lack of awareness. Because they have selected this population, these results cannot be implied as being generalisable to other populations. People attending screening/ dermatologist may already be those who are health-aware and more receptive to melanoma educational campaigns; therefore, this may not be generalisable to other populations. The majority of participants had college degrees or higher. Effectiveness: Both groups experienced a similar increase in melanoma knowledge that was retained at 2 months. Perceived personal risk for developing melanoma increased more in the targeted intervention group immediately post-intervention (p = 0.015), but this difference no longer existed between the groups at the 2-month follow-up. The targeted intervention group also demonstrated a greater increase in skin self-examinations (p = 0.048) and knowledge of warning signs to look for when examining the skin (p = 0.002) at the 2-month follow-up. Additionally, a single educational pamphlet was likely insufficient to change the long-held belief that people of colour are unlikely to develop skin cancer. At 2-month follow-up, 84% of all participants looked over the pamphlet after the intervention and 71% shared the information learned from the pamphlet with family and friends (without instruction to do so). These findings suggest a melanoma educational campaign conducted in a dermatological clinic may reach a wider audience that includes the general population. There was no long-term effect resulting from the intervention relating to perceived personal risk. However, there was a greater effect relating to skin self-examinations and knowledge about warning signs on the skin. Implementation: High fidelity because of the use of a script in the intervention. Maintenance: All participants completed a post-intervention questionnaire (same questions as pre-intervention questionnaire) immediately after the educational intervention. 2 months post-intervention participants answered the same questions via a 5-min phone call. It is possible that continued reinforcement and repeated education about skin cancer risk and signs could improve the long-term success of a targeted intervention. Individuals were able to recall the medical information presented to them.
de Troya-Martín 2014	Reach, Effectiveness, Adoption and Maintenance	Reach: A singular aspect of this health promotion campaign is the fact that it took place on the beach, the outdoor recreational space where a high-risk population meets and develops the risk behaviour, enabling us to inoculate the intervention directly to the target, avoiding the usual barriers between the health provider system and the high-risk population. Most participants exhibited a long history of high-risk sun exposure evidenced by the prevalence of sunburns during childhood (up to 70%) and poor sun protection behaviour reported by beachgoers (<50% of all sun protection practices except for sunscreen use) as described in the literature. The high average age of the participants affected the high rate of precancerous and cancerous lesions detected in the beachgoers, as well as the positive attitude and intention to change their sun protection behaviours. Therefore, these findings cannot be extrapolated to the whole target population. Effectiveness: Out of 353 beachgoers who completed the satisfaction surveys, 78.2% identified their phototypes; 82.4% recognised the warning signs of skin cancer; and 67.4% improved their knowledge about sunscreens. Finally, most beachgoers stated their intention to improve their sun protection in the future: 81.5% intended to avoid midday sun exposure (versus 50.4% reporting this behaviour before the intervention); 88.6% intended to use a sunscreen (versus 58.5% using it before); 86.1% intended to use a sunshade (versus 57.6% using it before); 81.0% intended to wear sunglasses (vs. 39.0% wearing them before); 60.9% intended to wear a hat (vs. 35.8% wearing it before); and 12.7% intended to wear long-sleeved clothes (vs. 12.6% wearing them before). Difficult to measure whether there was any behaviour change as follow-up was not undertaken. Adoption: A total of 353 beachgoers completed the satisfaction surveys: 77.6% of participants evaluated the campaign very positively. The campaign was publicised at press conferences at the start of the summer. To encourage their participation, a journalism and health prize was offered for the best report about the campaign in any of the mass media. The campaign was followed by more than 30 local, provincial, regional, and national media (radio, TV and press). All local media (radio, TV and press) followed the campaign during the summer and reported messages about sun protection and skin cancer prevention to the general population (more than one million people reside in the western Costa del Sol during the

Study ID	RE-AIM outcomes	RE-AIM outcomes—description
		summer season). Furthermore, several regional and national mass media were interested in the campaign and published the news on TV programs with large audiences. Implementation: Beachgoers are a strategic target audience to prevent skin cancer. Beaches are also suitable places to develop a skin cancer prevention campaign, allowing direct access to the high-risk population for surveying, health behaviour education and screening. Several keys may be useful to optimise results, such as the design of a personalised intervention of proven efficacy, provision of a trained healthcare team and development of an attractive strategy for the mass media. Every Thursday during July and August between 10.00 and 14.00 h, a team of qualified healthcare professionals including dermatologists, family physicians and specially trained nurses connected with interested Spanish- and English-speaking sunbathers and organised them into five stands. Each participant was interviewed about constitutional and behavioural risk factors using a previously validated questionnaire. Specialists undertook a complete skin examination using conventional dermoscopy to identify potentially malignant lesions. No cost analysis was performed. Maintenance: The most praised aspects by participants in the satisfaction surveys were the accessibility and personalised attention, and suggestions for future directions were to continue the campaign every year, extending it to more beaches. Unsure: Finally, we cannot rule out possible selection bias because, as reported previously, attitudes and intentions to participate in screening for skin cancer are strongly associated with risk status.
Kim 2024	Reach, Effectiveness , Adoption, Implementation and Maintenance	Reach: Smoking is the leading cause of lung cancer and lung cancer screening provides an excellent opportunity for smoking cessation intervention as participants in screening are generally followed up for a number of years and are likely to be more concerned with their health than the eligible nonparticipants in screening. Age is associated with smoking cessation rate. Effectiveness: Overall, the participants' motivation to quit smoking significantly increased after participating in lung cancer screening. Current smokers' motivation to quit smoking increased by 9.4% on average, and the same pattern was observed regardless of age, sex, pack-years of smoking history, educational level, household income and screening results. Of the 1021 quitters, 848 (83.1%) stated that participation in lung cancer screening motivated them to quit smoking. An alluvial plot showed a high proportion of success in continuous smoking cessation after lung cancer screening in the participants who received positive screening results and went to a public smoking cessation clinic. In K-LUCAS, the 1-week point abstinence rates and 6-month continuous abstinence rates were 24.3% and 10.6% respectively, which were much higher than the average smoking cessation rate of 3.8%. Adoption: The probability of smoking cessation was higher in older participants than in younger participants. Participants with positive screening results were 1.6 times (1-week point abstinence [OR, 1.55; 95% CI, 1.28 to 1.87]) or 1.4 times (6-month continuous abstinence [OR, 1.39; 95% CI, 1.07 to 1.81]) more likely to quit smoking than participants with negative screening results. Implementation: A simultaneous provision allowed physicians to provide smoking cessation counselling effectively with images of LDCT scans including pulmonary nodules, emphysema or fibrosis, which of smoking-related findings could astound current smoking participants. Participants who simultaneously received both smoking cessation counselling and LDCT screening results with CT images were 2.0 times (1-week point abstinence [odds ratio (OR), 2.01; 95% confidence interval (CI), 1.50 to 2.70]) or 3.2 times (6-month continuous abstinence [OR, 3.19; 95% CI, 2.06 to 4.93]) more likely to quit smoking than participants who received counselling separately from LDCT screening results. Participants who were referred to public smoking cessation programs were 1.3 times (1-week point abstinence [OR, 1.32; 95% CI, 1.03 to 1.69]) more likely to quit smoking than participants who were referred to privately operated clinic programs. The specialty of the physician who provided smoking cessation counselling did not have any statistically significant impact on the participant's point abstinence; however, the continuous abstinence rate was higher when participants were counselled by family medicine doctors rather than by internal medicine doctors. Participation in lung cancer screening may motivate people to quit in and of itself.

Study ID	RE-AIM outcomes	RE-AIM outcomes—description
		There were differences in SC effectiveness between different screening units, but this study did not explore why. Participants who received smoking cessation counselling simultaneously with the LDCT screening results by the same physician were up to 3.2 times more likely to quit smoking than participants who received counselling separately from LDCT screening results. Smoking counselling then might have become more personalised when provided with the screening results or may have provoked greater perception and awareness of risk from smoking as in the self-regulation model. Maintenance: The achievement of continuous abstinence is difficult because every smoking episode after the intervention was counted as failure. Thus, the robust indicator of continuous abstinence might not show a significant difference between the factors associated with success of smoking cessation. Family medicine doctors have greater success in achieving smoking cessation in their patients than internal medicine doctors. Previous studies reported one of the important factors leading to smoking cessation was how many times smokers periodically visited their physicians for quitting smoking . It seems one of the key factors related to the success of smoking cessation is not who provides smoking cessation counselling, but how long the care continuity is maintained after the initial smoking cessation counselling. One potential problem raised in this study is that participants with negative LDCT screening results had significantly lower abstinence rates than participants with positive LDCT screening results, consistent with previous findings. Negative screening results could signal false reassurance to smokers to continue smoking. “Our results imply that physician counselling with simultaneous provision of LDCT screening results in [a] smoking cessation intervention could prevent negative lung screening results becoming a licence to smoke because physicians discussed other findings related [to] smoking.” Unsure: There could be confounding factors affecting an individual’s decision to continue smoking other than variations in the smoking cessation interventions and demographics tested in this study. For example, the participant’s current stress status (e.g. temporary job loss), willingness to quit, or the counselling skills of physicians could also affect smoking cessation, “but this was beyond the scope of this study”.
Kotti 2023	Reach, Effectiveness, Adoption, Implementation and Maintenance. Other: Acceptability	Reach: Compared with those self-reporting very low confidence about quitting smoking, those self-reporting not very high and quite high confidence to quit were more likely to accept the practitioner referral (aOR = 2.64; 1.20–5.78 and aOR = 2.58; 1.12–5.93, respectively). A higher exhaled CO reading was also associated with acceptance (OR = 1.04; 1.01–1.08), as was ethnicity, with those reporting their ethnicity as Black being more likely to accept the practitioner referral than those of a White ethnic background (aOR = 3.03; 1.18–7.79). Another limitation is the generalisability of findings. Although the LSUT recruited individuals from several socioeconomic backgrounds to ensure sample diversity and external validity, the current sample consisted mostly of people from a White ethnic background living within the most deprived areas and a narrower age range compared with national lung screening programs. Effectiveness: Although acceptance of the self-referral was greater than the practitioner referral (88.5% vs. 49.8%), it was high for both strategies, indicating high receptiveness to SC support among lung screening attendees. The odds of accepting the practitioner referral were statistically significantly lower (adjusted odds ratio [aOR] = 0.10; 0.06–0.17) than the self-referral. “Our findings, interpreted with caution, suggest practitioner-referrals as an acceptable first-line strategy for arranging smoking cessation support for people who currently smoke attending LCS, in particular for individuals of a Black ethnic background, and when self-referral is offered as an alternative to those declining the practitioner-referral.” “We were unable to examine subsequent SSS attendance so it remains unclear if individuals pursued either type of referral and whether there were differences in uptake or quit rates between arms.” Adoption: In the practitioner-referral group, compared with those who had never attempted to quit smoking, those who had attempted to quit previously (e.g. >5 attempts) were more likely to accept the practitioner referral to an SSS (aOR = 3.39; 1.42–8.09). Implementation: Web-based platform used to randomise participants (1:1) For the practitioner referral, the nurse or trial practitioner identified the individuals (geographically) closest SSS and referred them within 3 days using a brief standardised electronic referral form sent to the respective SSS by email. A contact information card for self-referral to a local stop smoking service (SSS) was used for the self-referral group and offered as an alternative for those declining the practitioner referral. Maintenance: Those individuals who feel less motivated or less able to quit may need more intensive and individualised interventions to support engagement with SC support.

Study ID	RE-AIM outcomes	RE-AIM outcomes—description
		Acceptability: A higher CO reading increased the odds of accepting an SSS referral overall (aOR = 1.04; 1.01–1.07), but there was no interaction with referral group. "The finding that those from Black ethnic backgrounds, specific to the UK setting, were more likely to accept the practitioner referral than those from White ethnic backgrounds is interesting. Because of lack of evidence in this area, we are only able to speculate about the possible reasons for this. Although people of a Black ethnic background might be less likely to succeed in quitting smoking in the long term than those of a White ethnic background who smoke, evidence shows they make relatively more attempts to quit. Therefore, in the present study their increased likelihood to accept the practitioner-referral specifically could plausibly reflect higher motivation for or receptivity to, proactive methods of support." Although acceptance of the self-referral was higher, fewer may have subsequently engaged with a stop smoking service, and arguably, acceptance of the self-referral requires a lesser immediate commitment from the individual. Additionally, opt-out referral strategies, as recommended by UK government guidelines, have been seen as a potentially acceptable addition to midwifery practice, which may increase motivation to quit smoking, with self-referral strategies predicting increased acceptability and engagement with SC support in later pregnancy. Evidence has shown that practitioner-made referral approaches increase quit attempts and smoking abstinence in pregnant women and intensive cessation intervention in lung screening increases short-term quit rates, although low quit rates were found in a telephone-based smoking cessation counselling intervention embedded into LCS.
Marshall 2016	Effectiveness, Adoption, Implementation	Effectiveness: It was feasible to deliver a single tailored session of MI counselling on the day of CT screening combined with non-tailored take-home audio cessation materials. No clear advantage over Quitline and printed materials was observed and therefore the intervention was not further pursued. After 1 year, four participants (14.3%) in the intervention group and five participants (18.5%) in the control group had quit (P = .74). Adoption: Participants were given MP3 players for the audio tracks. Familiarity with these was low, which could have limited their use. Fewer than half used the MP3 players. Implementation: Providing audio materials offers convenience. For this study, one thoracic physician delivered all counselling sessions. This allows for consistency but is unlikely to be scalable and the authors state that it is not feasible or cost-effective in a real-world setting. The authors recommend that a nurse or smoking-cessation counsellor could take on this role. Recommend tailoring the intervention to the level of risk, i.e. those who are resistant to quitting could be offered a telephone follow-up.
Meltzer 2019	Effectiveness, Adoption, Implementation. Other: Acceptability	Reach: All ppts were Caucasian, current smokers, 56% male, mean age 64 years, 41% tertiary educated and had a higher income than other screening-embedded studies. Older ppts with higher income and education as well as limited ethnic diversity limits the generalisability of the results. Effectiveness: Among the respondents who received the new intervention (n = 7), all rated the quality of service received as mostly good or very good and reported that they generally received the kind of service they wanted. Five of the seven participants said the program met most of their needs. All but one participant were mostly satisfied or very satisfied with the amount of help received and would recommend it to a friend. Four of the seven participants reported that the booklets helped them deal more effectively with trying to quit smoking and remaining smoke-free. Implementation: There were no difficulties in distributing the intervention materials and completing the baseline assessment during the clinic visit and clinical flow was not disrupted. This intervention focused on increasing self-efficacy and motivation to quit, e.g. by talking about enjoyment of retirement and learning the benefits of quitting smoking at an older age. Results from formative research suggest the intervention should be offered before the receipt of screening results/ at the time of the results.

Study ID	RE-AIM outcomes	RE-AIM outcomes—description
		Adoption: The intervention is low burden for both participants and staff at screening. Five of six SHI responders indicated that they read the newly developed booklet received at the LDCT scan appointment (one participant did not answer that question), and five of seven responders indicated that they read at least some of the additional SSFG booklets that they received via mail. Acceptability: Participants rated the new intervention as helpful and were satisfied with the help they received. The claim of “minimal disruption of clinic work-flow” (see abstract) could be cited as indexing “penetration” (as per the definition in the review proposal on p5 "Penetration: The integration of the intervention within the service setting.”).
Pozzi 2015	Effectiveness, Maintenance	Effectiveness: Prevalence of smoking cessation at months 1, 3, 6 and 12 was 52.4%, 48.7%, 33.7%, and 32.6% respectively. One year continuous abstinence rate was 19.8%.
Rat 2014	Effectiveness, Implementation	Reach: Women were overrepresented in both groups. The success of such a targeted screening strategy may therefore also rely on the selection of concerned patients, allowing general practitioners to focus their attention, energy and time on the education of at-risk populations, with greater efficiency. Effectiveness: Identifying patients at risk, performing skin examinations, and giving advice and printed information on prevention had a greater impact on patients than a conventional information-based campaign in terms of changing behaviours in ways that may decrease melanoma risk and increase early detection. Five months later, the patients in the intervention group better remembered the information provided. Their knowledge of melanoma risk factors was significantly greater, and for 2 main prevention outcomes, they were significantly more likely to have favourable behaviours. Implementation: All the general practitioners had to view an e-learning module about melanoma screening to update their knowledge and skin examination practices. Skin examination by the general practitioner provided an opportunity for individualised counselling allowing patient education, based on visual feedback. The practitioners could give tailored advice on primary and secondary prevention, and adapt and personalise their counselling to the patient, depending on the results of the clinical examination. Linking the counselling to the objective identification of lesions is an efficient and powerful strategy, as general practitioners can perform two tasks simultaneously and possibly have greater influence than if they had simply given out written information. The intervention and protocol for handling patients during the office visit were designed to be compatible with the pace of primary care consultations. Simply identifying risk factors (even multiple) would not be a relevant message in practice for the patient, whereas the unambiguous, black-and-white risk status communicated on completion of the SAMScore would be more understandable. “Some general practitioners might have neglected to follow the intervention protocol if they were too busy. Competing demands are a universal issue when it comes to implementing a new procedure. Our inability to ensure compliance might have affected our findings, even though we tried to avoid such bias using an intent-to-treat statistical analysis.”
Taylor 2017	Effectiveness, Adoption, Implementation and Maintenance	Adoption/ Maintenance: TC ppts completed an average of 4.4 sessions. 60.9% of participants completed all 6 telephone counselling sessions. 55.6% of TC participants reported liking phone-based counselling, 27.6%preferred in-person counselling but still liked the phone counselling, and 14.7% preferred in-person counselling. Further, 75% said 6 was an appropriate number of counselling calls, while 25% reported it was too few. Effectiveness:

Study ID	RE-AIM outcomes	RE-AIM outcomes—description
		At 3 months (T2), no usual care (UC) participants (0/9) who had results suspicious for lung cancer had quit vs. 22.2% (2/9) of telephone counselling participants. Similarly, regarding baseline readiness to quit, 30% (N = 13) in each arm were ready to quit in the next 30 days (Table 1). Of those, 7.7% (1/13) of UC participants had verified abstinence, compared with 46.2% (6/13) of TC participants. Implementation: TC could improve the cost-effectiveness of LCS via its implementation in state and national quit lines, for use by LCS participants nationwide (note this relates to the American context where provision of smoking cessation advice is mandatory at lung cancer screening).
Tremblay 2019	Reach, Effectiveness, Adoption	Reach: Can't assume that interventions that have been effective in other groups will be effective in this group of older smokers. This group may be representative of a general smoking population as they are not selected for interest or motivation to quit. Population in this study was skewed towards a Caucasian and more highly educated group, which may not be representative of the general population. Effectiveness: There was no overall difference in quit rates or intention to quit between control and intervention arms at any of the time points. Within the active intervention arm, a trend towards higher 12-month cessation success was noted for participants who had at least one contact with the program. Routine referral of all current smokers to telephone-based smoking cessation counselling programs may not be effective in long-term heavy smokers older than 55 years of age undergoing lung cancer screening. Adoption Only 42% had more than one contact with the smoking cessation program, which limited the impact of the intervention. There is a difference between the population that is undergoing screening (i.e. age, level of risk) and a more general smoking population and this may impact the adoption of the intervention. Readiness to quit also has an impact on adoption of the program.
Yiannias 2014	Effectiveness. Other: Penetration	Effectiveness When physicians used the dictation template, 98% of examinations showed documentation of patient education about sun protection, compared with 20% when the dictation template was not used. "Our findings indicate that the use of a dictation template seems to encourage physicians to document skin examinations and skin cancer education efforts. This suggests the need for such checklists in all dermatology settings. The use of a checklist would also facilitate the assessment of melanoma screening of patients as well as efforts to educate them about the need for photoprotection."

Appendix 4—Implementation science definitions

The RE-AIM framework and the Proctor list of implementation outcomes both aim to evaluate the success of interventions, but they focus on different aspects and have distinct definitions.

The RE-AIM framework

RE-AIM was originally developed as a framework for consistent reporting of research results and later used to organise reviews of the existing literature on health promotion and disease management in different settings. The acronym stands for Reach, Effectiveness, Adoption, Implementation and Maintenance, which together determine public health impact. The following definitions apply:

- **Reach**: The absolute number, proportion and representativeness of individuals who are willing to participate in a given initiative, intervention or program.
- **Effectiveness (or efficacy)**: The impact of an intervention on important outcomes, including potential negative effects, quality of life and economic outcomes.
- **Adoption**: The absolute number, proportion and representativeness of settings and intervention agents (people who deliver the program) who are willing to initiate a program.
- **Implementation**: At the setting level, implementation refers to the intervention agents' fidelity to the various elements of an intervention's protocol, including consistency of delivery as intended and the time and cost of the intervention. At the individual level, implementation refers to clients' use of the intervention strategies.
- **Maintenance**: The extent to which a program or policy becomes institutionalised or part of the routine organisational practices and policies. Within the RE-AIM framework, maintenance also applies at the individual level. At the individual level, maintenance has been defined as the long-term effects of a program on outcomes six or more months after the most recent intervention contact.

Proctor list of implementation outcomes

The Proctor list, on the other hand, defines implementation outcomes as the effects of deliberate actions to implement new treatments, practices and services. These outcomes are distinct from service and clinical outcomes and include:

- **Acceptability**: The perception among stakeholders that an intervention is agreeable or satisfactory.
- **Adoption**: The intention or action to employ an intervention.
- **Appropriateness**: The perceived fit or relevance of the intervention for a given setting.
- **Feasibility**: The extent to which an intervention can be successfully used within a given setting.
- **Fidelity**: The degree to which an intervention is implemented as intended.
- **Implementation cost**: The financial impact of implementing the intervention.
- **Penetration**: The integration of the intervention within a service setting.
- **Sustainability**: The extent to which an intervention is maintained over time.

Key differences

- **Scope of effectiveness**:
  - **RE-AIM**: Focuses on the overall impact of the intervention, including health outcomes, quality of life and economic factors.
  - **Proctor list**: Concentrates on the success of the implementation process itself, including how well the intervention is adopted, integrated and sustained.
- **Outcome types**:
  - **RE-AIM**: Includes both positive and negative health outcomes, quality of life and economic impacts.
  - **Proctor list**: Includes specific implementation metrics such as acceptability, adoption and fidelity, which are more process-oriented.
- **Measurement focus**:
  - **RE-AIM**: Measures the effectiveness of the intervention in achieving desired health outcomes.
  - **Proctor list**: Measures the success of the implementation process, which is a precursor to achieving desired health outcomes.

A note on 'effectiveness'

The RE-AIM framework and the Proctor list of implementation outcomes both aim to evaluate the success of interventions, but they focus on different aspects and have distinct definitions of 'effectiveness'.

In the RE-AIM framework 'effectiveness' refers to the impact of an intervention on important outcomes, including:

- **Primary and secondary outcomes**: Changes in health behaviour or clinical measures
- **Quality of life**: Improvements in the overall wellbeing of participants
- **Economic outcomes**: Cost-effectiveness and financial impact
- **Negative effects**: Any adverse or unintended consequences of the intervention.

In summary, while the RE-AIM framework's definition of effectiveness is broad and outcome-focused, encompassing the overall impact of an intervention, the Proctor list of implementation outcomes is more specific to the implementation process, evaluating how well an intervention is adopted, integrated and sustained within a given setting.

Appendix 5—Commentary on other work of potential interest

A modest pocket of work from the US by Mallett et al.[18–20] has focused on the efficacy of a brief (3–4 minute) dermatologist–patient communication protocol named ABC (Addressing Behaviour Change). The published studies (from 2011) culminated in a two-group comparison using a non-randomised

longitudinal controlled cohort study design—published in 2018 and within the time frame for consideration for inclusion in the this Evidence Snapshot.[3] The outcomes were positive and included:

- Increased use of sunscreen and reduced incidence of sunburns in the short term compared with usual care
- Patient reports of higher satisfaction with dermatologist–patient communication compared with those receiving usual care
- The intervention did not add significant length to consultation visits and could be used by a dermatologist to build rapport with patients.

There were some features of the work program that potentially placed the Mallet et al. intervention outside the snapshot review inclusion criteria:

- The work program focused on establishing efficacy rather than effectiveness
- The patient satisfaction result was not in scope as a clinical effectiveness outcome
- The intervention was delivered by dermatologists, with no mention of the role of professionals in a primary care / population health setting (e.g. GP, nurse)
- No specific implementation outcomes were reported, although some can be derived:
- patient satisfaction could be viewed as a proxy for ‘acceptability’
- dermatologists like the ABC method, were able to learn it quickly, and used it reliably over six months (all potential indices of acceptability, feasibility and fidelity)
- The intervention required a training phase for dermatologists involving reasonable resources, including an education module and in situ practice observation by external experts. It was not clear, therefore, whether this protocol met the required inclusion criterion for ‘brief’ if the full quotient of implementation resourcing was factored in.

It was also noted that the publications of Mallett et al. had a very low citation rate (seven max, including self-citations), which could be interpreted as a work program lacking high impact or penetration. There is also little to no report of the uptake or implementation of the intervention into knowledge products such as clinical guidelines. Despite these caveats, the work program of Mallett et al. may be informative for planning a brief intervention in the Australian setting, if dermatology specialist settings are in scope as the delivering agent. The relevant research gap could target implementation outcomes inclusive of costs and investment in CPD (continuing professional development, and which agency could or should deliver) as potentially core for promoting and sustaining the wider adoption of this type of communication tool in dermatology settings.

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