

**Evidence Check**

# Smoking cessation care in hospitals

An **Evidence Check** rapid review brokered by the Sax Institute for the NSW Ministry of Health.  
April 2016.

**This report was prepared by:**

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# Implementing nicotine dependence and smoking cessation care in hospitals

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# 1 Executive summary

The objective of this Evidence Check is to assess the evidence regarding models for managing nicotine dependence in health facilities under a smoke-free healthcare policy directive evidence.

The Evidence Check involved a systematic review of the peer-reviewed literature, an internet search for grey literature, and material requested from Australian state and territory health departments and national health departments in Australia and New Zealand.

Question 1 concerns the general evidence gathered from international and Australasian sources. Findings are presented according to the source of the evidence, that is: from systematic reviews; from randomised, non-randomised and non-controlled trials; from best practice documents; and from material about strategies implemented by Australasian health jurisdictions. Question 2 concerns the evidence specific to New South Wales. Findings derived from randomised, non-randomised and non-controlled studies conducted in NSW are presented.

In this review, nicotine dependence management 'models' are considered to include policies, protocols, training, systems, tools and resources to enhance clinician management of nicotine dependent patients. Such models are referred to throughout this report as 'clinical practice change strategies'. The scope of nicotine dependence management has been broadened to include smoking cessation care more generally.

## **Question 1: What is the evidence regarding models for managing nicotine dependence in health facilities under a smoke-free healthcare policy directive?**

### [Evidence from systematic reviews](#)

The searches identified four systematic reviews (including two Cochrane systematic reviews) of the effectiveness of practice change strategies in increasing the provision of smoking cessation care by hospital clinicians, or by clinicians generally.

**Evidence from systematic reviews supports the effectiveness of clinical practice change strategies in increasing the provision of smoking cessation counselling by hospital. Evidence also supports the effectiveness of training and electronic prompts and reminders to increase documentation of smoking status, and the effectiveness of clinician provision of assistance to quit, counselling, and the use of self-help material.**

### [Evidence from randomised, non-randomised and non-controlled trials](#)

Of the 33 trials we identified, 31 reported a significant increase in the provision of at least one type of smoking cessation care. Three of four randomised controlled trials, all six non-randomised trials and 21 of 23 non-controlled trials reported increases in provision of such care.

**Consistent evidence from randomised, non-randomised and non-controlled trials suggests that hospital provision of smoking cessation care can be increased.**

The 33 trials assessed varying types of smoking cessation care. The most common of these were: assessment of patient smoking status, provision of advice/counselling, provision of pharmacotherapy and referrals to specialist smoking cessation service or follow-up care. Significant increases in each type of

smoking cessation care were reported in multiple trials. Twenty-one trials addressed the provision of multiple practice change strategies with 19 reporting a significant increase in multiple types of care.

**Consistent evidence from randomised, non-randomised and non-controlled trials suggests that hospital provision of multiple types of smoking cessation care can be increased.**

**The clinical practice change interventions most commonly reported to increase smoking cessation care were: smoking status assessment, provision of smoking cessation advice/counselling, provision of Nicotine Replacement Therapy (NRT) and referral to a specialist cessation service or follow-up.**

**Considerable variability between studies in the measurement and definition of types of smoking cessation care limits the ability to identify specific types of care that were consistently shown to have increased.**

All 33 trials assessed the implementation of a varying number and mix of broadly similar types of clinical practice change strategies. Thirty-one trials used multiple practice change strategies. Of these, 28 reported a significant increase in smoking cessation care provision. The clinical practice change strategies implemented in 50% or more of these trials were: leadership, tools/prompts and reminders, training, provider information and resources, audit and feedback.

**The findings of randomised, non-randomised and non-controlled trials suggest that the implementation of multiple clinical practice change strategies is effective in increasing hospital clinician provision of smoking cessation care.**

**The types of clinical practice change strategies most commonly included in successful practice change interventions were: leadership, tools/prompts and reminders, training, provider information and resources, and audit and feedback.**

**Almost all trials involved the use of multiple clinical practice change strategies. No conclusions were drawn regarding the absolute or relative effectiveness of specific strategies.**

**Due to considerable variability between studies regarding the mix and definition of clinical practice change strategies, identification of an optimal combination of strategies for improving smoking cessation care cannot be made.**

The scale of trials varied markedly, from one hospital clinic to more than 3000 hospitals. Twenty-four trials involved two or more hospitals, with 22 such trials reporting a significant increase in care provision. Five trials (one non-randomised, four non-controlled) were conducted at a 'jurisdictional' level – national, state, company or Local Health District – with all five reporting significant increases in care provision. The five trials included the implementation of jurisdictional level leadership, consensus, performance measurement and practice change resource strategies, in addition to hospital level strategies.

**The findings of non-randomised and non-controlled trials suggest that interventions involving both jurisdictional and hospital level practice change strategies are associated with increases in the provision of smoking cessation care by hospitals.**

#### [Best practice documents](#)

Searches identified nine best practice documents describing or recommending strategies to increase clinician provision of smoking cessation care. These included the World Health Organization (WHO)

*Framework Convention on Tobacco Control* and publications by central agencies or peak organisations in Europe, New Zealand, the US and the Australian Government (National Tobacco Strategy).

Best practice documents consistently recommended the implementation of multiple clinical practice change strategies at both jurisdictional and hospital levels to increase hospital provision of multiple types of smoking cessation care.

**All best practice documents supported the provision of care aligned to the '5As' smoking cessation care framework: assess, advise, advice/counselling, assist and arrange, or other versions of this framework.**

**Best practice documentation supported multiple strategies to increase clinician provision of smoking cessation care, including leadership; consensus; policies and guidelines; tools such as prompts and reminders; training, care provision monitoring; and support or incentives for practice change.**

### Strategies implemented by Australasian jurisdictions

In each Australasian jurisdiction, government policy promotes tobacco control, as well as promotes the provision of smoking cessation care supported by healthcare providers. Specific services such as Quitline support smoking cessation in each jurisdiction. There is a focus on the promotion of their use by healthcare providers.

In a number of jurisdictions specific smoking cessation initiatives focused on enhancing the provision of smoking cessation care by healthcare providers. New Zealand's comprehensive smoking cessation initiative, the ABC Approach for Smoking Cessation, seeks to increase the provision of smoking cessation care by the health sector. Strategies are designed to enhance: provider uptake of the approach; provider knowledge and competencies; the development of supportive systems (care provision tools and pathways, recording, reporting and monitoring); and consumer demand for smoking cessation care.

Finally, most jurisdictions provide a range of jurisdiction specific tools and resources such as clinical policies and guidelines, care provision tools and templates, and training programs to support hospital care providers and care providers generally to provide smoking cessation care.

**Each Australasian jurisdiction supports clinician provision of smoking cessation care through tobacco plans, strategies or related documents, and a range of supportive jurisdiction specific guidelines, policies, tools, resources and programs.**

**Strategies and resources for smoking cessation care consistently used the '5As' smoking cessation care framework.**

**Jurisdictional strategies and resources for smoking cessation care included: policies and guidelines; care delivery tools/prompts and reminder templates; provider and patient information and resources; audit/care monitoring tools and practice change support/incentives.**

**New Zealand's ABC Approach is an example of a comprehensive initiative that seeks to systematically increase clinician provision of smoking cessation care.**

**No peer-reviewed evidence describing the impact of jurisdictional strategies on provision of smoking cessation care by clinicians was identified.**



## Question 2: Within the broader context of question 1, what is the evidence that is specific to New South Wales?

Of the 33 identified individual trials, six were conducted in New South Wales. Four of the six trials (one of two randomised controlled trials, one non-randomised controlled trial and two of three non-controlled trials) reported significant increases in the provision of smoking cessation care. The six studies were conducted in various settings: surgical clinics or wards, antenatal clinics, and whole of hospital (medical/surgical or psychiatric). The scale of studies also varied widely — from a single clinic to a network of 37 hospitals.

**Evidence from randomised, non-randomised and non-controlled trials suggests that provision of smoking cessation care by NSW hospitals may be increased at the clinic, hospital and hospital network levels through the implementation of clinical practice change strategies.**

Of the four trials reporting an increase in provision of smoking cessation care, three (one randomised trial and two non-controlled trials) reported an increase in all targeted types of smoking cessation care. The three trials involved a comprehensive range of clinical practice change strategies (seven or more). The remaining successful trial, conducted in two hospitals in different Local Health Districts and involving a comprehensive range of practice change strategies reported improvements in a limited number of targeted types of smoking cessation care.

**The types of smoking cessation care reported to have increased due to interventions in NSW hospitals were: smoking status assessment, provision of smoking cessation advice, provision of NRT, provision of self-help materials and referral to Quitline.**

**The clinical practice change strategies most commonly included in successful interventions emphasised: leadership, consensus, tools/prompts and reminders, training, provider information and resources, audit and feedback and provision of practice change resources.**

**As almost all trials involved the use of multiple clinical practice change strategies, a conclusion regarding the absolute or relative effectiveness of specific strategies, or the optimal mix of such strategies, cannot be made.**

### Policy and practice guidance

The following types of smoking cessation care are the minimum required to enhance the likelihood of smoking cessation by hospital patients who are smokers: assessment of the smoking status of all patients, and for those who are smokers, provision of brief cessation advice, inpatient and discharge NRT, and referral to the NSW Quitline.

The following clinical practice change strategies should be implemented at the hospital level to enhance the likelihood that smoking cessation care is provided to all smokers: hospital leadership/consensus, provision of policies, tools, prompts and reminders, training, provider information and resources, care delivery audit and feedback, and resources for the implementation of such strategies.

The implementation of such strategies at the hospital level is enhanced by jurisdiction-level strategies including: provision of standardised policies, tools, systems, and training; establishment of smoking cessation care provision monitoring and reporting requirements; and provision of resources/incentives for the implementation of the above strategies by hospitals.

## Recommendations

It is recommended that:

Based on the evidence provided in this report, NSW should consider adopting an integrated state-led approach to increasing the provision of smoking cessation care to NSW Local Health District patients. The approach should include multiple practice change strategies to be implemented as appropriate at both the state and Local Health District level. Consideration should be given to the following strategies:

- Ongoing committed jurisdictional and hospital level executive leadership support and consensus
- Evidence-based policies and guidelines (based on the 5As brief intervention framework) to provide clear direction for clinicians providing smoking cessation care to patients
- Smoking cessation training and related resource materials available for clinicians are evidence-based, practical and standardized
- Evidence-based smoking cessation clinical tools and templates for the assessment, treatment, recording and auditing of smoking cessation care provision are developed and/or disseminated and are easily accessible by clinicians
- Development of mechanisms for incorporating the provision of smoking cessation care into NSW hospital electronic patient records and clinical data systems — may include prompts, reminders, tools and templates, recording and audit and reporting functions
- Development of a smoking cessation care performance monitoring system for Local Health District provision of smoking cessation care for hospital patients
- Provision of additional resources including staffing and/or incentives to Local Health Districts to facilitate implementation of local clinical practice change strategies to drive continuous improvement in clinician provision of smoking cessation care
- Evaluation and ongoing monitoring of the impact of the above strategies on clinician provision of smoking cessation care at local and state levels.

## 2 Review objectives

The specific questions to be answered by the Evidence Check, as identified by the NSW Ministry of Health, were:

Question 1: What is the evidence regarding models for managing nicotine dependence in health facilities under a smoke-free healthcare policy directive?

Question 2: Within the broader context of question 1, what is the evidence that is specific to New South Wales?

Nicotine dependence management 'models' were considered to involve policies, protocols, training, systems, tools and resources to enhance clinician management of nicotine dependent patients. Such models are referred to throughout this report as 'clinical practice change strategies'.

The focus on nicotine dependence management was broadened to include smoking cessation care or treatment to align with the published literature and international and national policy recommendations. Such care, incorporating nicotine dependence treatment, is referred to as 'smoking cessation care' throughout this report.

The Evidence Check addressed strategies to change the care delivery behaviour of clinicians, not strategies to modify patient smoking behaviour.

# 3 Review methods

The Evidence Check questions were addressed by the conduct of three search strategies:

- Systematic review of the peer-reviewed literature
- Systematic and targeted internet search (via Google)
- Request for information from health departments in each Australian State and Territory, the Commonwealth of Australia, and New Zealand.

The search strategies were supplemented by review of the reference lists of identified documents for additional relevant studies and reports, and studies known to the review authors.

## Systematic review of the peer-reviewed literature

### Databases searched

The following electronic databases were searched: MEDLINE (1946); Embase (1947); PsycINFO (1806); and CINAHL (1937). [Appendix 1] Ovid database [Appendix 2]

### Study eligibility criteria

Published studies were eligible for inclusion if they fulfilled the following criteria:

- MEDLINE/Ovid; Embase/Ovid; EBM Reviews — Cochrane Database of Systematic Reviews/Ovid; APAIS-Health/Informit; CINAHL/Ebsco; EconLit/ProQuest; ABI/INFORM Global/ProQuest
- Written in English
- Published from January 2005 to March 2015
- Conducted in a hospital setting, inpatient, outpatient or emergency, private or public, inclusive of studies conducted across multiple hospitals, a whole hospital or in a particular hospital unit/department. Studies for which the setting was unclear or were predominantly non hospital-based were excluded
- Described the provision of smoking cessation care by a routine healthcare provider (not exclusively by a research team)
- Described the provision of any variation of the following elements of smoking cessation care:
  - Assessment of smoking status
  - Advice to quit; counseling or assistance to quit
  - Advising, offering, or providing NRT
  - Any form of follow-up care or referral to a Quitline or other smoking cessation service
- Involved an intervention study (including controlled trials, time-series, or non-controlled studies) and reported provision of at least one element of smoking cessation care (either as a primary or secondary outcome) at follow-up against a baseline
- Measured the proportion of patients receiving an element of smoking cessation care, the proportion of health professionals providing an element of such care, or both
- Measurement of care provision by: patient or healthcare provider self-report, hospital medical record audit or care provision data from other service provider organisations such as a Quitline
- Described at least one practice change strategy designed to increase the provision of smoking cessation care. Studies that included an insufficient description of clinical practice change strategies were excluded.

### Study selection/screening

Following the removal of duplicate articles, one person independently screened the titles and abstracts of all identified studies for inclusion in the review, using Endnote (version X7.0). Subsequently, two reviewers independently examined the full text of all included studies. Any differences between reviewers in determining study eligibility were resolved by consensus. The reviewers were not blinded to the name or institution of study authors or to journal titles. Data for each study were extracted by two persons.

### Internet search for grey literature

Google was searched to identify grey literature studies and reports, and relevant policies, guidelines and frameworks (first 100 hits). The search term used for the systematic search was:

"Hospital (or physician or nurse or managed care) and smoking cessation (**and** NRT or smoking counselling/counselling or referral."

In addition, a targeted search was conducted for each Australasian jurisdiction, other than NSW.

### Information from Australian and New Zealand health jurisdictions

An email requesting information regarding clinical practice change strategies to increase the provision of smoking cessation care was forwarded to representatives of each Australian State and Territory, the Commonwealth of Australia and New Zealand by the NSW Ministry of Health. [Appendix 3]

### Review limitations

Although a comprehensive search methodology was employed, it is likely that relevant material will have been overlooked due to:

- Differences between jurisdictions in the definitions and terms used to describe healthcare settings, clinical practice change strategies and types of smoking cessation care
- Reliance on best practice and jurisdictional information accessible via the internet
- Variable responses by health jurisdictions to the request for information.

### Inclusion and presentation of identified information

Question 1:

Identified systematic reviews were included if they specifically addressed the effectiveness of clinical practice change strategies in increasing clinician, including hospital, delivery of smoking cessation care to patients.

For included studies, a narrative synthesis of findings is presented according to levels of evidence as represented by study type: randomised controlled trials, non-randomised controlled trials, and non-controlled trials.

Only selected high level (global, national, peak organisation) frameworks, policies, guidelines or similar documents that described particular strategies or approaches to improving clinician provision of smoking cessation care to patients were included. Information from such documents is presented as 'best practice documents'.

Identified clinical practice change strategies and resources implemented at the jurisdictional and hospital levels across Australasia are broadly summarised. Neither enumeration of all such available strategies and resources, nor assessment of their adequacy or quality was undertaken.

Question 2:

The findings of identified individual trials conducted in NSW are presented.

Information from the searches is presented, regardless of the search strategy by which it was obtained, under the following headings:

- Evidence from individual studies:
- Evidence from randomised controlled trials
- Evidence from non-randomised controlled trials
- Evidence from non-controlled trials
- Best practice documents
- Strategies implemented by Australasian jurisdictions.

# 4 Findings

## **Question 1: What is the evidence regarding models for managing nicotine dependence in health facilities under a smoke-free healthcare policy directive?**

### **Evidence from systematic reviews**

The search strategies identified four systematic reviews that addressed the effectiveness of clinical practice change strategies in improving the provision of smoking cessation care by hospital clinicians, and by clinicians generally. The findings of the reviews support the effectiveness of clinical practice change strategies in improving the provision of such care (see Table 1).

A systematic review of interventions to increase smoking cessation care provision in hospitals<sup>1</sup> was identified. The review included 25 studies, 10 of which were controlled trials. Meta-analysis of the controlled trials demonstrated a significant effect for increased provision of counselling to quit, but not for other care provision outcomes. The review did not assess the effectiveness of either specific or combinations of clinical practice change strategies.

We identified two Cochrane systematic reviews relevant to the effectiveness of strategies to support the provision of smoking cessation care by healthcare providers generally.<sup>2,3</sup> One such review assessed the effectiveness of training strategies, and the other the effectiveness of electronic health records. Most of the included studies in both reviews were conducted in non-hospital settings, mainly primary care.

Based on evidence from randomised controlled trials, training programs were found to be effective in increasing the provision of smoking cessation care.<sup>2</sup> Based on evidence from controlled trials in the second Cochrane review, electronic reminder and prompt systems were found to increase documentation of tobacco smoking status and the provision of quit assistance to smokers.<sup>3</sup>


An earlier rapid review of systematic reviews and of identified trials conducted primarily in primary care before 2006 found inconsistent evidence of effect for training and reminder systems<sup>4</sup> in increasing clinician provision of smoking cessation care. However, the evidence supported a combination of training and reminder strategies in increasing such care provision. No evidence was identified regarding the differential effect of type and intensity of training on care provision. There was insufficient evidence to determine the effect of incentive payments on healthcare provider provision of smoking cessation care.

Table 1: Systematic reviews

Author/Aims	Included study designs	Setting	Participant	Clinical practice change strategies	Outcomes of interest	Data source	Result
<p>Freund et al 2009<sup>1</sup></p> <p><b>Aim:</b></p> <p>To synthesise the evidence regarding the effectiveness of interventions in increasing smoking cessation care provision in hospitals</p>	Controlled trials, non-controlled trials	Hospitals (inpatient, outpatient)	Healthcare professionals	Any practice change strategy	At least 1 of: assessment of smoking status, advice; counselling or assistance to quit; advising, offering, providing NRT; follow-up or referral to Quitline	MEDLINE, Embase, CINAHL, PsycINFO.	25 included studies (10 controlled trials) Meta-analysis of controlled trials found significant intervention effect for provision of assistance and counselling
<p>Carson et al 2012<sup>2</sup></p> <p><b>Aim:</b></p> <p>To determine the effectiveness of training health professionals in the provision of smoking cessation interventions to patients, and to assess the additional effects of intervention content, provision method and intensity (Cochrane Review)</p>	Randomised controlled trials	Healthcare practices, predominantly primary care, 2 hospitals, 2 HMOs	Healthcare professionals dentists, doctors, healthcare worker	Training, with or without prompts and reminders, performance feedback	6 secondary outcomes: Ask patients to set quit date, counselling, provision of NRT, self-help materials, prescription of quit date, follow-up appointments 6-month follow-up or more	MEDLINE, Embase, PsycINFO, Central Meta-analysis	17 included studies (3 included prompts and reminders and 4 included performance feedback) Significant positive effects for 5 of 6 measures: Ask patients to set quit date, counselling, provision of self-help materials, prescription of quit date, follow-up appointments



<p>Boyle et al 2014<sup>3</sup></p> <p><b>Aim:</b></p> <p>To assess the effectiveness of electronic health record-facilitated interventions on smoking cessation support actions by clinicians, clinics, and healthcare provision systems</p> <p>(Cochrane Review)</p>	<p>Randomised and non-randomised studies</p>	<p>Healthcare clinics predominantly primary care (14), 1 hospital</p>	<p>Healthcare providers</p>	<p>Any intervention that involved electronic health record systems to improve documentation or assistance to patients by: prompting clinicians, clinic or health system action; measuring and reporting on clinical performance</p>	<p>Primary outcomes:</p> <p>Counselling, referral to telephone support, medication</p>	<p>MEDLINE, Embase, PsycINFO, Central Narrative synthesis</p>	<p>16 included studies (all cluster RCTs)</p> <p>Significant but variable positive effects found in individual studies for counselling, referral to Quitlines, but not for medication</p>
<p>Stead et al 2006<sup>4</sup></p> <p>Rapid review of brief interventions and referral for smoking cessation for Department of Health, UK by the National Institute for Health and Clinical Excellence (NICE).</p>	<p>Systematic reviews and trials</p>	<p>Healthcare services (primarily primary care)</p>	<p>Healthcare providers</p>	<p>Any</p>	<p>Provider care provision and patient cessation rates</p>	<p>Review of reviews and primary trials:</p> <p>MEDLINE ASSIA British Nursing Index CINAHL Embase PsycINFO Sociological Abstracts</p>	<p>2 systematic reviews and 13 trials (all pre-2006)</p> <p>Inconsistent evidence of effect for training and reminder systems however, evidence supports a combination of training and reminder systems.</p> <p>There is no direct evidence regarding the type and intensity of training that would be most effective</p> <p>There is insufficient evidence to determine the effect of incentive payments to healthcare providers on either intervention provision or smoking behaviour. Complex</p>



								interventions are required involving both system level and individual components to increase provision of effective interventions.
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### Evidence from individual studies

Thirty-three individual studies were included in the review, four randomised and six non-randomised controlled trials, and 23 non-controlled trials (see Appendix 4). Appendices 5, 6 and 7 provide summary details of the included studies.

The large majority of studies (n=23) were conducted in the US, and in two or more (max >3000) hospitals (n=24). A wide variety of patient diagnostic groups/clinical settings were addressed in the studies, including surgical, medical, maternity, and paediatric, as well as multiple diagnostic groups in whole-of-hospital studies.

Twenty-one studies involved the promotion and measurement of multiple types of smoking cessation care. The most common types were assessment of smoking status; advice to stop smoking; brief cessation advice/counselling; provision of pharmacotherapy; and arranging referral/provision of follow-up care. The types of care addressed by the included studies were informed by or aligned to the recommended '5As' smoking cessation care framework<sup>5</sup>, or variants thereof. Notwithstanding this finding, considerable variability was evident across studies in the measurement and definition of the types of care addressed, limiting any conclusions regarding consistency of increase in provision of specific types of care.

Thirty-one studies involved the use of multiple clinical practice change strategies. The clinical practice change strategies implemented by 50% or more of such trials were leadership, prompts and reminders, training, provider information/resources, audit and feedback (see Tables 3, 4 and 5). The remaining studies involved a single practice change strategy, either training, performance feedback, or a specialist care provider. Notwithstanding the use of similar types of clinical practice change strategies, considerable variability was evident across studies in the number, mix and operationalisation (frequency, duration, content and mode of provision) of clinical practice change strategies, limiting any conclusions regarding consistency of effect for specific strategies or for an optimal mix of such strategies.

Five trials (one non-randomised, four non-controlled) were conducted at a 'jurisdictional' level — national, state, company or health district, with all five reporting significant increases in care provision. The five trials included the implementation of jurisdictional level leadership, consensus, performance measurement and practice change resource strategies, in addition to hospital level strategies.

Thirty of the 33 studies reported a significant increase in the provision of at least one type of smoking cessation care. Of the 24 trials that involved two or more hospitals, 22 reported a significant increase in care provision, with all five trials conducted at a jurisdictional level reporting significant increases in care provision. Of the 21 trials that addressed multiple types of smoking cessation care provision, 19 reported a significant increase in such care provision. Of the 31 trials that involved the use of multiple practice change strategies, 28 reported a significant increase in smoking cessation care provision.

A summary of the evidence findings is presented below by study type.

### Randomised controlled trials

Of the four included randomised controlled trials, two were conducted in the US<sup>6,7</sup> and two in Australia (both NSW).<sup>8,9</sup> (see Table 3)

Two trials were conducted in pre-operative surgical clinics in single hospitals<sup>7,8</sup>, one trial was conducted in two paediatric hospitals<sup>6</sup>, and one trial was conducted in all hospital antenatal clinics in NSW.<sup>9</sup> The unit of randomisation/allocation was either individual patients<sup>7,8</sup>, practitioners<sup>6</sup>, or hospital antenatal clinics.<sup>9</sup>

Three of the four trials involved the promotion and measurement of multiple types of smoking cessation care (including assessment, advice, counselling, NRT, self-help materials, referral)<sup>6,8,9</sup>, with the remaining study involving measurement of referral to a Quitline.<sup>7</sup>

All four trials involved the use of multiple clinical practice change strategies (three to seven strategies, including leadership, consensus, prompts/reminders, audit and feedback, resource materials), but with considerable variability in their number, mix and operationalisation.

All three trials that involved allocation of individual patients or practitioners to the intervention condition<sup>6-8</sup> reported a significant increase in at least one type of smoking cessation care, with significant increases reported for the following types of care across the trials: provision of cessation advice, NRT, self-help materials and referral. No effect was found for any type of smoking cessation care in the cluster-randomised controlled trial conducted in multiple antenatal clinics.<sup>9</sup>

Given that all four trials involved the use of multiple clinical practice change strategies, a conclusion regarding the absolute or relative effectiveness of single clinical practice change strategies in improving clinician provision of smoking cessation care cannot be made. Similarly, the variability across trials in number, mix and operationalisation of practice change strategies precludes the identification of an optimal combination of such strategies for improving the provision of smoking cessation care.

Table 2: Study characteristics

Study characteristics	Category	Number of trials
Country	US	23
	NSW, Australia	6
	Other	4
Study design	Randomised control trial	4
	Non-randomised comparison group trial	6
	Non-controlled studies	23
Number of sites/facilities	1	9
	2 or more	24
Clinical practice change strategies**	Leadership	15
	Consensus	14
	Guidelines, policies	12
	Forms/template, prompts, reminders	21
	Other	3
	Training	27
	Provider information	20
	Audit and feedback	18
	Practice change support	10
	Other	5
Type of smoking cessation care**	Multiple (2 or more)	31
	Ask/assess smoking status	15
	Advise to quit	16
	Assist in quitting – quit date, advice, counselling	22
	Assist in quitting – self-help materials	7
	Assist in quitting – pharmacotherapy	14
	Arrange – follow-up	6
	Arrange – referral to telephone or other cessation service	11
	Composite care score	3
	Multiple types of care (2 or more)	21

\*\* Not mutually exclusive

### Non-randomised controlled trials

Of the six included non-randomised controlled trials, four were conducted in the US<sup>10-13</sup>, one in France<sup>14</sup> and one in Australia (NSW).<sup>15</sup> (See Table 4)

One trial was conducted across multiple care units in a single hospital<sup>14</sup>; another was conducted in multiple psychiatric hospitals.<sup>11</sup> The remaining four trials were conducted across multiple general hospitals, with one trial<sup>13</sup> being conducted on a jurisdictional basis involving in excess of 3000 hospitals. The unit of allocation in all six trials was either hospital or care unit, with a wide variety of patient diagnostic groups/clinical settings being addressed, including surgical, medical, emergency and outpatient.

Four trials variously involved the promotion and measurement of multiple types of smoking cessation care<sup>10,11,14,15</sup> (assess, advice, NRT, self-help materials, referral), with the remaining two trials involving measurement of a single type of care, either provision of advice/counselling<sup>13</sup> or referral to a Quitline.<sup>12</sup>

Five trials involved the use of multiple clinical practice change strategies (including leadership, prompts, audit and feedback, resource materials)<sup>10-13,15</sup>, but with considerable variability in their number, mix and operationalisation. The remaining trial involved the use of a single practice change strategy, training.<sup>14</sup>

All six trials reported a significant increase in at least one type of smoking cessation care, with significant increases variously reported across trials for the provision of the following types of care: advice, counselling, NRT provision, self-help materials, and referral.

The finding that all trials that involved the implementation of multiple clinical practice change strategies resulted in significant increases in care delivery suggests that a multi-strategic practice change intervention approach can be effective. The finding of a significant increase in the provision of smoking cessation care in the one study that involved a training only intervention suggests that such an intervention approach may also be effective.<sup>12</sup>

Given that five of the six trials involved the use of multiple clinical practice change strategies, a conclusion regarding the absolute or relative effectiveness of single clinical practice change strategies in improving clinician provision of smoking cessation care cannot be made. The variability in number and mix of clinical practice change strategies implemented across the trials precludes the identification of an optimal combination of strategies for improving the provision of such care.

The single trial that involved the implementation of clinical practice change strategies at a jurisdictional level involving more than 3000 hospitals involved in the implementation of leadership, consensus, care performance monitoring, audit and feedback and accreditation practice change strategies implemented at the jurisdictional level, in addition to non-specified hospital level practice change strategies.<sup>13</sup>

### Non-controlled trials

Of 23 identified non-controlled trials, 16 were conducted in the US, three in Australia (all NSW)<sup>16-18</sup>, and one each in Lithuania<sup>19</sup>, Taiwan<sup>20</sup>, Canada<sup>21</sup>, and the Czech Republic.<sup>22</sup> (See Table 5)

Seven trials were conducted in single hospitals with the remainder being conducted across multiple hospitals. Four trials were conducted at the jurisdictional level, either national<sup>20,23</sup>, company<sup>24</sup> or health district.<sup>16</sup>

Fourteen trials involved the promotion and measurement of multiple types of smoking cessation care (assess, advice, NRT, self-help materials, referral), with the remaining nine trials involving measurement of a single type of care, most commonly advice/counselling.<sup>20,23-27</sup>

All but one of the 23 trials involved the use of multiple clinical practice change strategies (including leadership, leadership, prompts, audit and feedback, resource materials), but with considerable variability in their number, mix and operationalisation. The remaining trial involved the use of a single practice change strategy, patient feedback.<sup>19</sup>

All but two<sup>17,28</sup> of the 23 trials reported a significant increase in at least one type of smoking cessation care, with significant increases variously reported across trials for provision of the following types of care: advice, counselling, NRT provision, self-help materials, and referral.

Given that all but one of the 23 trials involved the use of multiple clinical practice change strategies, a conclusion regarding the absolute or relative effectiveness of single clinical practice change strategies in improving clinician provision of smoking cessation care cannot be made. However, the finding of a significant increase in the provision of smoking cessation care in the one study that involved a patient feedback only intervention suggests that such an intervention approach may have the potential to be effective. The variability in number and mix of clinical practice change strategies implemented across the trials precludes the identification of an optimal combination of strategies for improving the provision of such care.

All four of the trials implemented at the jurisdictional level reported significant increases in at least one type of smoking cessation care. All four trials involved the implementation of jurisdictional level leadership, consensus, care performance monitoring, audit and feedback and accreditation practice change strategies, in addition to multiple hospital level practice change strategies.

Table 3: Clinical practice change strategies – randomised controlled trials (RCT)

Study type	Clinical practice change strategies								
	Leadership	Consensus	Guidelines, policies, protocols	Tools, prompts, reminders	Training	Provider resources, information	Audit Feedback	Practice change support	Others
Gordon et al 2013 <sup>6</sup> (RCT)	-	-	-	-	• Web-based	• Web-based	-	•	-
Warner et al 2011 <sup>7</sup> (RCT)	-	-	-	-	•	•	-	-	• Specialist provider
Campbell et al 2006 <sup>9</sup> (Cluster RCT) (NSW)	-	-	-	•	•	•	•	•	-
Wolfenden et al 2005 <sup>8</sup> (RCT) (NSW)	•	•	-	• Computer-based	•	• Computer-based	•	-	• Computer provided care

• Practice change strategy included in study

- Practice change strategy not included in study

Study presented in red = no significant increase on any care provision outcome



Table 4: Clinical practice change strategies – non-randomised comparison group/quasi-experimental trials

Study type	Clinical practice change strategies								
	Leadership	Consensus	Guidelines, policies, protocols	Tools, prompts, reminders	Training	Provider resources, information	Audit feedback	Practice change support	Others
Schmaltz et al 2011 <sup>13</sup> (Quasi-experimental)	• National	• Accreditation standard	-	-	-	-	•	-	• Accreditation
Targhetta et al 2011 <sup>14</sup> (Non-randomised control study)	-	-	-	-	•	-	-	-	-
Carpenter et al 2012 <sup>12</sup> (Quasi-experimental)	-	-	-	• Web-based	• Web-based	-	-	-	-
Duffy et al 2014 <sup>11</sup> (Non-randomised control study)	-	-	•	•	•	•	-	-	-
Duffy et al 2009 <sup>10</sup> (Non-randomised control study)	-	-	•	•	•	•	-	-	-
Freund et al 2009 <sup>15</sup> (Quasi-experimental) (NSW)	•	•	•	•	•	•	•	•	• Communication

- Practice change strategy included in study
- Practice change strategy not included in study

Table 5: Clinical practice change strategies – non-controlled trials

Study	Clinical practice change strategies								
	Leadership	Consensus	Guidelines, policies, protocols	Tools, prompts, reminders	Training	Provider resources, information	Audit feedback	Practice change support	Others
Naudziunas et al 2005 <sup>19</sup>	–	–	–	–	–	–	• (Patient report)	–	–
Williams et al 2010 <sup>23</sup>	• National	• Accreditation standard	–	–	–	–	•	–	• Accreditation
Kisuule et al 2010 <sup>29</sup>	–	–	–	–	•	–	•	–	–
Sarna et al 2014 <sup>22</sup>	–	–	–	–	•	•	–	–	–
Bernstein et al 2009 <sup>30</sup>	–	–	–	–	•	•	–	–	–
Tran et al 2009 <sup>17</sup> (NSW)	–	–	•	–	•	•	–	–	–
Chang et al 2010 <sup>20</sup>	• National	–	•	–	•	–	–	–	• Incentive payments
Stoeckle-Roberts et al 2006 <sup>27</sup>	•	•	–	• Online	–	–	–	–	–
Koplan et al 2008 <sup>31</sup>	–	–	–	• Computerised	•	•	–	–	–
Butler et al 2006 <sup>26</sup>	–	–	–	• Computerised	–	• Computerised	–	–	–
California Acute Stroke Pilot Registry et al 2005 <sup>32</sup>	•	•	•	•	•	•	•	–	–
Moss et al 2009 <sup>33</sup>	–	–	•	•	•	•	•	–	–
Zhang et al 2005 <sup>24</sup>	•	•	–	•	•	–	•	•	–

	Company and hospital								
Bunik et al 2015 <sup>34</sup>	•	•	-	• Computerised	•	•	•	-	-
Leuthard et al 2015 <sup>35</sup>	•	•	•	• Computer-based	•	-	-	-	-
Katz et al 2013 <sup>36</sup>	-	-	•	• Computer-based	•	-	•	•	-
Katz et al 2014 <sup>37</sup>	-	-	•	• Computer-based	•	-	•	•	-
Katz et al 2012 <sup>38</sup> (ED)	•	•	-	• Computer-based	• Incl. online	•	•	•	-
Katz et al 2013 <sup>25</sup> June (ED)	•	•	-	• Computer-based	• Incl. online	•	•	•	-
Reid et al 2010 <sup>21</sup>	•	•	-	•	•	•	•	•	-
Moody-Thomas et al 2013 <sup>39</sup>	•	•	•	• Computer-based	• Incl. online	•	-	•	-
Slattery et al 2016 <sup>16</sup> (NSW)	• District	•	•	•	•	•	•	•	• Communication
Wye et al (Under review) <sup>18</sup> (NSW)	•	•	•	•	•	•	•	•	-

• Practice change strategy included in intervention

- Practice change strategy not included in intervention

Trials presented in red = no significant increase on any care provision outcome

## Best practice documents

The search strategies identified nine best practice documents describing or recommending strategies to increase clinician provision of smoking cessation care. [Table 6] The documents included the *WHO Framework Convention for Tobacco Control*<sup>40</sup>, to which Australia is a signatory, and documents published by central agencies or peak organisations in Europe<sup>41</sup>, Canada<sup>42</sup>, the US<sup>43-46</sup> and the Australian Government.<sup>47</sup>

The best practice documents consistently recommended that practice change strategies should focus on improving the provision of multiple evidence-based types of smoking cessation care, care types aligned to the '5As' Smoking Cessation Care Framework.<sup>5</sup>

Despite variability in terms and definitions used, the identified documents consistently included recommendations for the implementation of multiple clinical practice change strategies to increase healthcare provider provision of such types of smoking cessation care.

Four identified documents<sup>28,45,48,49</sup> described system-level approaches to increasing the provision of smoking cessation care by healthcare providers. These approaches included the implementation of the following clinical practice change strategies: systems to prompt identification and provision of smoking cessation care; provision of training and resources for clinicians; monitoring and audit and feedback regarding cessation care provision; and implementation of policies to support the provision of smoking cessation care. The US Center for Disease Control guideline *Best Practices for Comprehensive Tobacco Control Programs*<sup>43</sup> provides a description of strategies to be implemented at the jurisdictional (state) level to reduce the prevalence of smoking generally. Included in the guideline are recommendations for the following system clinical practice change strategies: electronic reminder systems, multidisciplinary approaches to care provision, training of clinical staff, monitoring of the impact of clinical practice change strategies, academic detailing, and technical support, resources and financial incentives for undertaking the practice change process itself.

Similarly, guidelines for the implementation of Article 14 of the *WHO Framework Convention on Tobacco Control*<sup>40</sup> and the Australian National Tobacco Strategy 2012-2018<sup>47</sup> stipulate the following clinical practice change strategies for increasing the provision of smoking cessation care: establishment of prompt and reminder systems; training of and provision of resource materials to healthcare providers; monitoring of cessation care provision and outcomes; conduct of academic detailing of care provision; and establishment of tobacco-user identification systems.

Table 6: Best practice documents

Author and Title	Document/publication type	Setting	Findings/recommendations
Tønnesen P et al 2007 <sup>41</sup> Smoking cessation in patients with respiratory diseases: a high priority, integral component of therapy	Review/policy article European Respiratory Society (ERS) Task Force	Respiratory health services	<ul style="list-style-type: none"> <li>Smoking cessation treatment should be integrated into management of patient's respiratory condition</li> <li>Respiratory physicians should receive training to ensure they have the knowledge, attitudes and skills necessary to deliver interventions and to refer to an appropriate specialist.</li> <li>A budget should be established to enable implementation of smoking cessation care</li> </ul>
CDC Best Practices for comprehensive tobacco control programs <sup>48</sup>	Guideline	Healthcare services	<ul style="list-style-type: none"> <li>Establish healthcare reminder systems</li> <li>Adopt a multidisciplinary care provision approach in healthcare services</li> <li>Training of healthcare providers</li> <li>Support healthcare organisations to monitor cessation care provision and outcomes</li> <li>Conduct academic detailing of healthcare providers provision of care</li> <li>Use of electronic systems to prompt provider provision of care</li> <li>Increase proportion of smokers utilising Quitlines by increasing referrals from healthcare organisations</li> </ul>
Fiore et al 2007 <sup>45</sup> Health system changes to facilitate the provision of tobacco-dependence treatment	Guideline	Healthcare services	<ul style="list-style-type: none"> <li>Establish tobacco-user identification system</li> <li>Provide education, resources and feedback for healthcare providers</li> <li>Dedicating staff to provide tobacco-dependence treatment</li> <li>Promoting hospital policies that support and provide tobacco-dependence service</li> <li>Including effective tobacco-dependence treatments in health insurance packages</li> <li>Reimburse clinicians for delivering interventions</li> </ul>
Agency for Healthcare Research and Quality 2012 <sup>49</sup> Systems change: Treating tobacco use and	Guideline	Clinical services	<ul style="list-style-type: none"> <li>Implement a tobacco-user identification system in every clinic</li> <li>Provide education, resources and feedback to promote provider intervention</li> <li>Dedicate staff to provide tobacco-dependence treatment</li> </ul>

dependence			<ul style="list-style-type: none"> <li>• Assess tobacco-dependence treatment provision in staff performance evaluations</li> <li>• Promote hospital policies that support and provide inpatient tobacco dependence services</li> <li>• Include tobacco-dependence treatments as paid or covered services in health insurance packages</li> </ul>
Partnership for Prevention 2011 <sup>44</sup> Helping patients quit: Implementing the Joint Commission Measure set in your hospital	Implementation guideline	Hospitals	<p>Recommends the following steps:</p> <ul style="list-style-type: none"> <li>• Obtain hospital leadership commitment</li> <li>• Conduct assessment of existing tobacco use service provision</li> <li>• Plan and build consensus with key stakeholders</li> <li>• Train hospital staff</li> <li>• Provide cessation interventions to patients</li> <li>• Monitor performance and solicit feedback</li> </ul>
McCammon-Tripp L et al, 2013 <sup>50</sup> The development of smoke-free hospitals In Ontario	Program report	Hospitals	<ul style="list-style-type: none"> <li>• Identify staff best suited to take on smoke-free policy-related tasks</li> <li>• Provide paid work time to carry out tasks related to implementing and sustaining the policy</li> <li>• Provide training opportunities using various learning strategies to ensure relevance and accessibility to target group</li> <li>• Tailor training intensity and content to each target group's information needs</li> <li>• Ensure policy tasks are integrated into policies, procedures and tools that are routinely used and fit with the hospitals' ways of working</li> <li>• Institute ways to evaluate, formally and informally the policies enabling continuous improvement in practice.</li> </ul>
Framework Convention for Tobacco Control (Article 14) <sup>40</sup>	Guidelines	Healthcare services	<ul style="list-style-type: none"> <li>• Promote tobacco cessation among healthcare workers</li> <li>• Training of healthcare workers</li> <li>• Recording of tobacco use in medical notes</li> <li>• Provision of brief advice</li> <li>• Offer Quitlines</li> </ul>

			<ul style="list-style-type: none"> <li>• Specialised treatment services</li> <li>• Make pharmacotherapies available</li> <li>• Monitor provision of smoking cessation care by health services</li> </ul>
National Tobacco Strategy 2012-2018 <sup>47</sup>	National Strategy	Healthcare services	<ul style="list-style-type: none"> <li>• Increase smoking cessation services e.g. Quitlines</li> <li>• Develop systems that encourage health professionals to routinely ask patients their smoking status and provide advice, support and referral</li> <li>• Improve management of smoking cessation care in healthcare facilities</li> <li>• Provide policy guidelines and training regarding best practice smoking cessation care</li> <li>• Improve appropriate use of pharmacotherapies</li> </ul>

## Strategies implemented by Australasian jurisdictions

In each jurisdiction, high-level tobacco plans and strategies or related documents sought to promote tobacco control. Such documents included a focus on the provision of smoking cessation care by healthcare providers, as well as specific initiatives, programs and services to encourage smoking cessation. Measures such as Quitlines, provision of NRT, or specific healthy lifestyle programs for the general population or for specific population groups were identified in most jurisdictions. Such initiatives commonly included a focus on healthcare provider provision of smoking cessation care.

Further, in a number of jurisdictions (e.g. Tasmania, Northern Territory, New Zealand) specific policy initiatives and programs to enhance the provision of smoking cessation care were identified, initiatives that included a focus on enhancing the provision of smoking cessation care by healthcare providers. In New Zealand, for example, a specific and comprehensive smoking cessation initiative (ABC Approach for Smoking Cessation) was implemented in 2009 following enhancements in Government funding to support smoking cessation.<sup>51</sup> The initiative sought to support a systematic approach by the health sector to support smoking cessation, addressing cessation care provision by primary care, hospital, and specialist and non-healthcare providers. The comprehensive initiative involved integrated strategies that sought to enhance:

- Provider uptake of care provision (through leadership, plans, contracts, incentives and performance target strategies)
- Provider knowledge and competencies (through information provision, guidance, competencies and training strategies)
- Supportive systems (through practice management, patient information, referral pathway, specialist providers, NRT availability and care monitoring and reporting strategies)
- Consumer demand for cessation care (through consumer knowledge and awareness raising strategies).

In Queensland, a quality improvement initiative was identified that employed a number of clinical practice change strategies, including incentive payments, to promote the provision of smoking cessation care by hospitals. Evaluation of the initiative reported: a three-fold increase in the number of smokers receiving brief interventions; a 15%-76% increase in coding of patients as smokers; and a three-fold increase in health practitioner referrals to the Quitline. In Tasmania, specific smoking cessation care positions were established to facilitate the provision of smoking cessation care by healthcare providers.

In most cases, a range of jurisdiction specific online standardised tools and resources such as clinical policies and guidelines, care provision tools and templates and training programs were identified. These supported hospital and care providers more generally to implement Smoke Free Policies and/or the provision of smoking cessation care to patients. Such policies, tools and resources broadly aligned to clinical practice change strategies that were supported by the identified trials and best practice documents.

No peer-reviewed evidence describing the impact of such strategies implemented by Australasian jurisdictions on the provision of smoking cessation care by hospital clinicians was identified.

### Question 2: Within the broader context of question 1, what is the evidence that is specific to New South Wales?

Six identified trials<sup>8,9,15-18</sup> were conducted in Australia, all in NSW — two randomised controlled trials, one non-randomised controlled trial and three non-controlled trials. (Tables 3, 4 and 5) (Appendices 5, 6 and 7)

Four of the six trials (two of three randomised and non-randomised trials<sup>8,15</sup>, two of three non-controlled trials<sup>16,18</sup>) reported a significant increase in at least one element of smoking cessation care. Variability of



outcomes was evident between the four trials, with three trials reporting significant increases across all measured care outcomes<sup>8,16,18</sup>, whereas in the other<sup>15</sup>, approximately 30% of care practices were reported to have significantly increased. Similarly, variability was evident between the trials in terms of the extent of increase in care provision.

The six trials were conducted in various settings (surgical clinics or wards, antenatal clinics, whole of hospital, medical and psychiatric) and at different scales (single clinic to hospital network in a single local health district). The two non-effective trials were conducted, respectively, in surgical wards in two metropolitan hospitals and in 22 of all 23 hospital antenatal clinics in NSW.<sup>9,17</sup>

The four trials reporting significant increases in care provision varied in a number of intervention design characteristics: intervention duration (six months to two years), mode of provision (computer or manual) and scale (single clinic to 37 hospitals). All four trials used multiple (five or more) practice change strategies, with five practice change strategies most commonly used: opinion leaders; consensus processes; modification of tools, systems and processes; training, and provision of care audit and feedback. The two unsuccessful trials did not use four of these five practice change strategies, and involved either use of a smaller number of practice change strategies (n=3)<sup>17</sup> or a lower intensity dissemination approach.<sup>9</sup>

All six trials had a focus on improving multiple types of smoking cessation care, with the majority incorporating types of care informed by the '5As Framework'.

Of the four trials reporting an increase in care provision, three reported improvements in all targeted types of smoking cessation care.<sup>8,16,18</sup> All three trials were conducted in different clinical settings (surgical, medical and psychiatric) in a single local health district, and involved comprehensive clinical practice change interventions (seven or more strategies).

One of the trials involved the use of computer delivered and prompted care, and achieved larger effect sizes relative to the other identified trials (20%-100%).<sup>8</sup> The study conducted across a network of all 37 hospitals in a health district involved multiple clinical practice change strategies including institutional leadership and consensus development processes, audit and feedback and practice change resources.<sup>16</sup> The third study was conducted in two psychiatric inpatient facilities utilising a similar comprehensive practice change approach.<sup>18</sup>

The remaining study involved an intervention implemented in two hospitals located in different local health districts.<sup>15</sup>

# 5 Policy and practice guidance

This section provides additional descriptive information for policy makers and practitioners regarding the types of smoking cessation recommended to be provided to patients by hospitals, and the types of clinical practice change strategies recommended to enhance the provision of such care. The information has been obtained from identified best practice documents, systematic reviews, individual trials and examples of policies and practice change strategies implemented by Australasian health jurisdictions. These materials provide understanding about how proposals for smoking cessation care and clinical practice change strategies can be operationalised. Given the limited amount of such information provided in the identified documents, particularly peer-reviewed papers and policy documents, a comprehensive description of how to operationalise the specific recommendations has not been provided.

## Types of smoking cessation care

Various international and national frameworks, policies and guidelines<sup>28,40,41,44,45,47-50</sup>, including Australasian documents, include recommendations for the provision of various types of smoking cessation care that align to the '5As' Smoking Cessation Care Framework, a framework recommended in the US Treating Tobacco Use and Dependence Guideline (2008).<sup>52</sup>

The steps towards smoking cessation care in the 5As Framework are:

- Assess patient smoking status
- Advise to quit
- Assess willingness to quit
- Assist in the quit attempt – brief advice, counselling, pharmacotherapy, referral
- Arrange follow-up.

Given challenges of limited time availability and competing clinical priorities for clinicians in patient consultations, various abbreviated versions of the 5As framework have been developed, such as New Zealand's ABC approach to the provision of smoking cessation care.<sup>51</sup> These approaches involve fewer (most commonly three) recommended types of care, which are variously described as involving:

- Ask (smoking status)
- Brief advice
- Connect/refer (to cessation services e.g. Quitlines, specialist cessation care providers).

Although the 5As Framework is based on strong evidence regarding the efficacy of its key constituent types of care (brief advice, counselling, NRT and telephone coaching and specialist counselling<sup>5</sup>) in increasing smoking cessation when provided by clinicians, less evidence is available regarding the efficacy of such types of care when provided to hospital patients. In a review of smoking cessation interventions for hospitalised patients specifically, Rigotti et al 2012<sup>53</sup> found that counselling interventions commenced during hospitalisation and followed by at least one month of follow-up contact were efficacious in increasing patient smoking cessation rates, regardless of presenting condition. In addition, the provision of NRT was found to further increase cessation rates compared to counselling alone.

In practice, operationalisation of the 5As Framework, or its variants, has involved the provision of a greater number of types of care. The five major types of care included in the Framework reflect broad categories, rather than specific types of care. For example, assessment of smoking status has been divided into

assessment of smoking status and assessment of nicotine dependence.<sup>15</sup> Similarly, assistance can include provision of inpatient NRT and of discharge NRT<sup>16</sup> or provision of pre-operative and post-operative care,<sup>8</sup> whilst provision of follow-up care and referral can be treated as separate types of care. The measurement of care provision has resulted in a more fine-grained specification of types of care. For example, provision of NRT can be measured in terms of either offer or acceptance of such care.<sup>16</sup>

Based on the recommendations of best practice documents, the findings of individual trials and systematic reviews, and descriptions of how the various types of care have been operationalised in trials (including Australasian trials), we propose a minimum level for hospital-based smoking cessation care provision. The minimum level of care should include:

- Assessment of the smoking status of all patients (a necessary prerequisite for subsequent care provision)
- Provision of brief cessation advice
- Offer of inpatient NRT (to manage nicotine withdrawal during the hospital stay)
- Offer of discharge NRT (to maintain abstinence following the hospital stay)
- Referral to a specialist smoking cessation service post discharge (e.g. Quitline).

Additional types of care can be added to this minimum set depending on the objectives and context of each hospital/health system setting, and on the results of monitoring of the impact of such care delivery on patient smoking cessation.

### **Clinical practice change strategies to enhance the provision of smoking cessation care to hospital patients**

#### **Multi-strategic clinical practice change**

Various international and national frameworks and guidelines<sup>28,40,41,44,45,47-50</sup>, including Australasian material, and evidence from systematic reviews and individual trials suggest that multiple clinical practice change strategies be implemented to increase the provision of smoking cessation care by hospitals.

In summary, these strategies include:

- Establishment of jurisdictional and hospital level leadership support and consensus
- Implementation of jurisdictional and/or hospital level cessation care policies
- Establishment of jurisdictional and/or hospital tools and systems (including electronic health records) to record patient smoking status, and provide prompt, reminder, decision support and care ordering (referral) functions
- Provision of jurisdictional and/or hospital standardised clinician training and resources
- Establishment of jurisdictional and/or hospital care delivery recording and performance reporting systems
- Implementation of smoking cessation care quality improvement initiatives, including academic detailing (audit and feedback) mechanisms
- Establishment of hospital level cessation care providers.

Limited systematic review evidence was found regarding the effectiveness of multiple clinical practice change strategies in increasing the provision of smoking cessation care. Stead et al (2006)<sup>4</sup> reported inconsistent evidence of impacts of a combination of training and reminder systems on the provision of cessation advice.

The findings of individual trials identified in this review provide clear support for the implementation of a multi-strategic approach to increasing the provision of smoking cessation care. Of the 31 identified trials

that involved the use of multiple practice change strategies, 28 reported a significant increase in smoking cessation care provision. However, as previously noted, there was marked variability in the mix and operationalisation of the practice change strategies. This variability is illustrated by three of the successful trials conducted in NSW.

In a trial of an intervention implemented in all 37 general hospitals in a single health district, Slattery et al (2016)<sup>16</sup> reported the implementation over a two-year period of nine separate practice change strategies in a jurisdictional level practice change initiative: leadership, consensus, policies, tools, training, provider information, audit and feedback, practice change support and communication. The same broad types of strategies were implemented by Wye et al (under review)<sup>18</sup> over a nine-month period in two selected psychiatric inpatient facilities. The operationalisation of the strategies in the latter study differed to those implemented by Slattery et al (2015)<sup>16</sup> to ensure alignment to the clinical and administrative context of the psychiatric inpatient settings, and to the research context of the particular study. Both studies reported similar levels of increase in the provision of multiple measures of smoking cessation care.

In a further example of the variability in the operationalisation of clinical practice change strategies, Wolfenden et al (2005)<sup>8</sup> reported the implementation of a six month computer-prompted/delivered practice change intervention. This case was developed in a pre-surgical clinic in NSW. Its seven clinical practice change strategies were similar in principle to those reported in the two previously described trials, with the key exception being that their delivery was electronically supported. The randomised controlled trial reported very large effect sizes (up to 100%) across all targeted measures of smoking cessation care.

New Zealand's ABC Approach for Smoking Cessation, implemented in 2009<sup>51</sup>, is perhaps the most comprehensive example of a multi-strategic practice change approach. The states of Tasmania and Queensland have similarly implemented specific jurisdiction-wide initiatives involving multiple strategies to enhance the provision of smoking cessation care, with the Queensland initiative having a specific focus on in hospital care provision. In both cases, additional resources were allocated to increase the provision of care, with specific smoking cessation care positions established in Tasmania and financial incentives provided to hospitals in Queensland. The variable mix and operationalisation of clinical practice change strategies demonstrated by the identified trials, best practice documents and jurisdictional initiatives can be considered to reflect, in part, differences in jurisdictional and clinical policy contexts.

No evidence was identified regarding the optimal number or mix of clinical practice change strategies in terms of impact on the provision of smoking cessation care. Given the limited evidence, the way in which clinical practice change strategies are operationalised can be best determined by considering the jurisdictional and clinical context in which a practice change initiative is to be implemented, and by examining the findings of ongoing monitoring of impacts of such initiatives on smoking cessation care delivery.

### Individual clinical practice change strategies

Considerable variation was also evident in best practice documents, systematic reviews, trials and jurisdictional information regarding the operationalisation of individual clinical practice change strategies. As with the lack of evidence regarding the optimal mix and operationalisation of multiple practice change strategies, evidence regarding the comparative effectiveness of different approaches to operationalising individual practice change strategies was reported for training only. In this context, the following examples of how individual practice change strategies have been operationalised are provided for descriptive purposes only. We selected examples from strategies from identified trials that reported an increase in care delivery, and had applicability for implementation in NSW.

## *Leadership*

Of the trials that involved the use of leadership strategies, all but one reported an increase in provision of smoking cessation care. A wide variety of leadership approaches were evident across the identified trials. This diversity was similarly evident in the four trials conducted in NSW, which emphasized the following kinds of leaders/leadership:

- Clinical leaders<sup>8</sup>
- Management support<sup>15</sup>
- Management and clinical support, clinical champions<sup>18</sup>
- Executive leadership.<sup>16</sup>

A fifth trial conducted in NSW reported by Campbell et al (2006)<sup>9</sup> did not include a leadership practice change strategy, despite being conducted in all NSW hospital antenatal clinics. The trial was not successful in increasing the provision of smoking cessation care.

The type/level of leadership support selected in the NSW studies was associated with the type and scale of setting of each practice change initiative. For example, the trial reported by Wolfenden et al (2005)<sup>8</sup> was conducted in a single clinic with leadership support being provided by the clinic director. In contrast, the trial reported by Freund et al (2009)<sup>15</sup> was conducted on a whole-of-hospital basis with leadership support provided at the hospital management level. For the trial reported by Slattery et al (2016)<sup>16</sup> which was conducted at a health district jurisdictional level, the practice change initiative was initiated and led by the Chief Executive of the organisation. Such jurisdictional level leadership was similarly involved in a number of trials conducted in the US and other countries, including practice change leadership from: national hospital agency organisations<sup>13,23</sup>; company executives<sup>24</sup>; and national governments.<sup>51</sup>

Based on these examples, the level of leadership support required for a clinical practice change initiative can be argued to be best determined by the scale of the initiative. However, obtaining leadership support from multiple organisational levels may represent the best practice approach, particularly for those initiatives conducted at the whole of hospital or jurisdictional levels.

## *Consensus and communication strategies*

Of the individual trials identified in this review involving the use of consensus strategies, all reported an increase in the provision of smoking cessation care, four of which were conducted in NSW.<sup>8,15,16,18</sup>

Consensus strategies seek to gain the support of clinicians and other stakeholders for the implementation of smoking cessation care practice change initiatives. In the information identified by this review, consensus strategies were applied in gaining support for the objectives, methods and processes of smoking cessation care enhancement initiatives, and for the delivery of smoking cessation care itself. Such strategies were also used in gaining agreement regarding the selection of the types of smoking cessation care to be delivered, and in the development and implementation of clinical practice change strategies including policies and guidelines, care delivery tools, prompts, training and provider resources.

A diverse range of consensus gaining mechanisms was described in the identified best practice documents and trials. In broad terms these mechanisms involved stakeholder participation in information gathering and consultation meetings, advisory groups, process and quality improvement teams, and/or use of opinion leaders.<sup>8,15,16,21,24</sup>

Consensus strategies implemented in the four successful trials conducted in NSW variously involved obtaining Executive and clinician support<sup>16</sup>, consultation with staff and consumers<sup>18</sup>, establishment of a working group<sup>8</sup> and an advisory group.<sup>15</sup> These strategies were applied to the development of a smoking cessation care guideline, training program and care delivery support tools<sup>16</sup>, the development of a computer

program<sup>8</sup>, and the development of an implementation action plan.<sup>15</sup> In the studies reported by Freund et al (2009)<sup>15</sup> and Slattery et al (2016)<sup>16</sup> additional communication and engagement strategies were implemented throughout the practice change initiative to provide ongoing reinforcing information, and to provide progress reports through staff meetings, newsletters and noticeboards.

The consensus methods entailed differing levels of staff involvement, with the level of involvement varying according to the scale of the practice change initiative — clinic, hospital or jurisdiction. In the absence of evidence, the selection of the method of consensus gaining to be used in a practice change initiative is best informed by the context and scale of the proposed clinical practice change initiative.

### *Policies and guidelines*

International frameworks and guidelines<sup>28</sup>, including the Australian Tobacco Strategy<sup>48</sup>, recommend that policies and guidelines be implemented to provide direction for clinicians and health service managers for the provision of smoking cessation care at the jurisdictional, and if necessary, at the hospital level.

Of the individual trials identified in the review involving policies and guidelines, all but three reported an increase in provision of smoking cessation care. Two of the unsuccessful trials were conducted in NSW. In both trials, there were limited additional practice change strategies implemented to support the introduction of a policy. Further, in both trials, the intensity of delivery of the practice change strategies was limited.<sup>9,17</sup>

The policies and guidelines obtained in this review were either broad smoke-free hospital policies incorporating a smoking cessation care provision element, policies or guidelines for the provision of smoking cessation care specifically, or policies or guidelines for specific aspects of such care provision, such as the prescribing of NRT. Limited information was provided in most trials regarding how the policies and guidelines were developed, for instance if through a consensus process. In the majority of trials, dissemination of the policies and guidelines occurred through the provision of training, and in some trials through transmission via internet.

The manner in which policies and guidelines are developed (through consensus or by fiat), disseminated (passively or actively) and supported by other practice change strategies is likely to be a key consideration in their ability to contribute to an increase in the provision of smoking cessation care. In the absence of evidence, such decisions should be informed by analysis of the context in which the clinical practice change is to be implemented.

### *Tools, prompts and reminders*

International frameworks and guidelines<sup>28</sup>, including the Australian Tobacco Strategy<sup>48</sup>, recommend that tools and systems be implemented to prompt, aid, record and report clinician delivery of smoking cessation care. Such recommendations are particularly focused on the implementation of electronic tools and systems to support care provision.

A Cochrane systematic review of the use of electronic health record systems to prompt smoking cessation care provision, one approach to the implementation of such recommendations, found modest evidence that such systems improved the documentation of various forms of smoking cessation care and the referral of patients to cessation counselling.<sup>3</sup> All but two of the trials that involved the use of tools, prompts or reminders (electronic or otherwise) reported significant increases in the provision of smoking care. The single randomised controlled trial conducted in NSW that involved the use of electronically delivered and prompted smoking cessation care reported markedly significant increases in all targeted types of smoking cessation care.

The randomised controlled trial conducted in a single NSW pre-surgical clinic<sup>8</sup> involved not only computer prompts for clinician provision of brief advice and NRT, but also computer-based assessment of patient smoking status, the delivery of a brief computer-based cessation counselling program and the provision of tailored self-help materials to identified smokers. In the care delivery model, all patients attending the clinic were required to complete the computer-based smoking status assessment prior to their consultation.

The operationalisation of how tools, prompts and reminders were used to increase the provision of smoking cessation care varied markedly between included trials, ranging from the simple modification of manual or computer admission intake forms or templates<sup>15,18</sup> to the implementation of complex multi-function computer or web-based systems. Similarly, the scale of implementation of such strategies varied markedly, from a single clinic<sup>8</sup>, to a hospital network or system.<sup>16,24</sup> No evidence was identified regarding the comparative effectiveness of these various approaches in increasing the provision of smoking cessation care.

The tools, reminders and prompts described in the identified trials addressed a wide range of care delivery functions including:

- Recording of smoking status on admission, and of subsequent care delivery
- Prompts/reminders for the delivery and recording of targeted types of smoking cessation care
- Algorithms for the provision of pharmacotherapy
- Care delivery decision aids
- Ordering of pharmacotherapy and of specialist cessation care, including referral to specialist providers during the inpatient stay and post discharge (Quitlines)
- Access to provider information and training programs
- Access to patient self-help materials
- Care delivery audit and performance monitoring tools and templates.

No evidence was identified regarding the comparative effectiveness of these various approaches to increasing the provision of smoking cessation care.

The way in which tools, prompts and reminders are selected and implemented to promote the provision of smoking cessation care in hospitals is largely influenced by the scope of the smoking cessation care promotion initiative, and by the resources available in the setting in which the practice change initiative is to be implemented.

### *Training and provider information and resources*

Almost all identified best practice document sources, trials and jurisdictional information sources addressed the provision of training to clinicians as a strategy for increasing the provision of smoking cessation care in hospitals. In most trials, such training was supported by the provision of information and resources to practitioners.

A Cochrane systematic review of the effectiveness of training clinicians in increasing smoking cessation care found strong evidence of effect. The provision of training was found to increase: asking and prescribing a patient quit date; provision of counselling, self-help materials; and the making of a follow-up appointment.<sup>2</sup> A rapid review found no evidence regarding the type and intensity of training that would be most effective.<sup>4</sup>

The way in which training was provided to clinicians varied markedly between identified studies, ranging from a brief didactic training session to multiple sessions using a variety of learning strategies supported by supplementary training. Such approaches to training were commonly delivered face-to-face, increasingly by computer or web-based means, or a combination of both. The provision of information and resources to



providers commonly occurred in the context of training, and similarly were made available in a variety of forms, hard copy, and increasingly computer/web-based. No evidence was identified regarding the comparative effectiveness of these various approaches in increasing the provision of smoking cessation care.

In the successful trials implemented in NSW, training was delivered face-to-face, in-group or one-on-one formats, and separately for nurses and medical staff. For example, in the trial reported by Slattery et al (2016)<sup>16</sup>, group training was provided to nurses in half day workshops. In the trial reported by Freund et al (2009)<sup>15</sup>, group training was provided to nurses, one-on-one training was provided to medical officers, and allied health staff were provided with information and resources only. The selection of strategies for providing training was determined by the policy and clinical contexts in which the studies were conducted, and the resources available.

In the absence of evidence, the selection of training content and provision of associated information and resources should be informed by the types of smoking cessation care that are promoted in a practice change initiative. Similarly, the selection of the extent, frequency, audience and mode of training and information provision is best informed by the context and scale of the clinical practice change initiative, and best practice adult learning and professional behaviour change principles and evidence.

### *Audit and feedback*

International frameworks and guidelines consistently recommend that audit and feedback or similar strategies, such as academic detailing, be implemented to support enhancement of smoking cessation care provision, or as a care provision quality improvement strategy.

All but two of the trials included in this Evidence Check incorporating audit and feedback reported significant increases in the provision of smoking cessation care, including three of the five such trials conducted in NSW.

In these five NSW trials, audit and feedback strategies took the form of program or medical record audits, with monthly performance reports being provided for review and action in some studies.<sup>8,15,18</sup> In the trial reported by Slattery et al (2016)<sup>16</sup>, three patient bedside audits were conducted with reports being distributed at the ward, hospital and executive level. Audit and feedback of medical record (or equivalent data) data was a commonly reported approach in most other identified trials. In one trial, patient reported care feedback was used as the only clinical practice change, resulting in a significant increase in care provision.<sup>19</sup> No evidence was identified regarding the comparative effectiveness of these various approaches in increasing the provision of smoking cessation care.

In the absence of evidence, selecting the type of audit and feedback, and its operationalisation in terms of frequency and duration, is best informed by the context and scale of the clinical practice change initiative, and available data systems.

### *Practice change support/incentives*

A number of international guidelines recommended the provision of resources — funding, incentives and staff — to support the implementation of smoking cessation care practice change initiatives. All but one of the identified trials that included the use of such a strategy reported an increase in the provision of smoking cessation care. These included all four of the successful trials conducted in NSW.

The form of such support varied between trials and included: scheduled telephone support<sup>15,16</sup>, peer leaders<sup>25</sup>, practice change facilitators<sup>15,18,21,38</sup>, incentive payments<sup>20</sup> and accreditation.<sup>13,23</sup> Similarly, the form



of practice change support included in a number of Australasian jurisdictions and other countries has varied, including the use of incentive payments (Queensland, New Zealand<sup>51,54</sup>), staff positions (Tasmania), and accreditation (US<sup>44</sup>). No evidence was identified regarding the comparative effectiveness of these various approaches in increasing the provision of smoking cessation care.

The implementation of a multi-strategic practice change approach aimed at increasing the provision of smoking cessation care in hospitals, given the number and complexity of such strategies, appears likely to require the provision of additional resources over and above those allocated to routine care delivery.

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# 7 Appendices

## Appendix 1: Databases searched

Database	Pre-duplication results (2007-current)	Limited to English	After de-duplication (using "find duplicates") results	After removing duplicates by hand search
PsycINFO	223	221	107	85
Embase	1614	1575	1537	1432
MEDLINE	684	653	187	150
CINAHL	369	363	226	199

Total result after de-duplication with "find duplicates": 2057

Total result after removing duplicates by hand search: 1866

### Symbols used in this document:

.ab	Runs a search for the term through the abstract (ab) field of the database
/	A slash appearing after a search word/phrase in OVID database indicates search within the subject heading field
*	Truncation symbol — will retrieve all words beginning with the sets of letters appearing before the symbol
.mp	Keyword search in OVID databases. This is the broadest search possible
.tw	Retrieves records from the Text Word (TW)
.pt	Indicates a search for a publication type
?	Using a question mark (?) as a wildcard for alternate spellings eg 'randomi?ed' find 'randomised' or 'randomized'

## Appendix 2: Search strategies

### OID databases

(Searched on 30 November 2015)

#	Search strings	Results
1	hospital.ab. or Hospitals/	602058
2	health facility.ab. or Health Facilities/	13825
3	managed care.ab.	10625
4	emergency depart*.ab.	44262
5	health clinic*.ab.	4827
6	inpatient.ab. or Inpatients/	53715
7	outpatient.ab. or Outpatients/	82616
8	nicotine dependence.mp.	3781
9	nicotine withdrawal*.mp.	1039
10	smok*.mp.	242013
11	policy*.mp.	194466
12	program*.mp.	687266
13	intervention*.mp.	608624
14	strateg*.mp.	609921
15	nicotine replacement therapy.mp.	1756
16	NRT.mp.	1340
17	counsel*.mp.	93020
18	advice.mp.	32419
19	treatment.mp.	3407523
20	referral.mp.	102676
21	health education.mp.	72748
22	care.mp.	1523145
23	Patient education.mp.	83666
24	prevention.mp.	416106
25	implement*.tw.	250879
26	dissemination.mp.	46736
27	adopt*.mp.	148868
28	practice.mp.	702637
29	organi?ational change.mp.	1226
30	diffusion.mp.	146846
31	systems change.mp.	325
32	quality improvement.mp.	23686
33	translation.mp.	88599
34	uptake.tw.	260593
35	institutionali*.mp.	15788

36	routin*.mp.	268959
37	capacity.mp.	369827
38	adherence.mp.	45
39	quality.mp.	715115
40	scal*.mp.	567352
41	Randomi?ed controlled trial.pt.	417039
42	controlled clinical trial.pt.	92231
43	randomi?ed.ab.	371124
44	clinical trials.ab.	3
45	trial.tw.	381326
46	double blind.tw.	112440
47	single blind.tw.	9564
48	experiment*.tw.	1366174
49	(pre post or prepost).tw.	4890
50	(pretest or pre test).tw.	11262
51	(posttest or post test).tw.	11570
52	before after.tw.	2989
53	qua?i randomi?ed.tw.	2992
54	stepped wedge.tw.	144
55	natural experiment.tw.	834
56	(staggered enrolment trial* or staggered enrollment trial*).tw.	0
57	(non randomi?ed or nonrandomi?ed).tw.	15514
58	interrupted time series.tw.	1190
59	(time series and trial).tw.	450
60	multiple baseline.tw.	1393
61	1 or 2 or 3 or 4 or 5 or 6 or 7	734449
62	8 or 9 or 10	242855
63	11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40	7562619
64	41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60	2154779
65	61 and 62 and 63 and 64	1371
66	limit 65 to yr="2007 -Current"	684
67	limit 66 to english language	653

#### Internet search

Google search term:

Hospital (or physician or nurse or managed care) and smoking cessation (**and** NRT or smoking counselling/counselling or referral).

#### Appendix 3: Email to Australasian health jurisdictions

Subject: TPOG: Request for provision of information regarding managing nicotine dependence and smoking cessation [SEC=No Protective Marking]



Dear

I acknowledge not all of you may work in the smoking cessation area, however if you are able to assist by forwarding this to the most relevant colleague in your State/Territory or send their contact details to me, this would be greatly appreciated.

I am writing to seek your assistance with provision of information to assist the NSW Ministry of Health's project regarding managing nicotine dependence and smoking cessation in NSW Health facilities.

The Ministry, in collaboration with the Sax Institute, have commissioned the University of Newcastle to review the evidence regarding the management of nicotine dependence and provision of smoking cessation care to clients of health services. The review seeks to identify strategies (eg. policies, guidelines, performance management, accreditation, monitoring and feedback, incentives, training, resource provision etc.) that have been effective in, or have been implemented to increase the provision of such management.

In addition to reviewing the published and grey literature and implementation initiatives in this area, the review seeks to identify information from each Australian jurisdiction regarding policies, guidelines, plans, programs, initiatives and resource and related materials that have been used to increase the management of nicotine dependence and provision of smoking cessation care to clients of healthcare services.

The review findings will be used to inform the development of initiatives by the NSW Ministry of Health to support the implementation of its recently revised NSW Health Smoke-free Healthcare Policy (Policy Directive PD2015\_003). The review will be published by the Sax Institute and a version thereof may be submitted for publication in a peer-reviewed journal.

We kindly seek your jurisdiction's assistance with provision of any information regarding the above from your jurisdictional perspective. Specifically, would you be willing to provide for consideration for inclusion in the review:

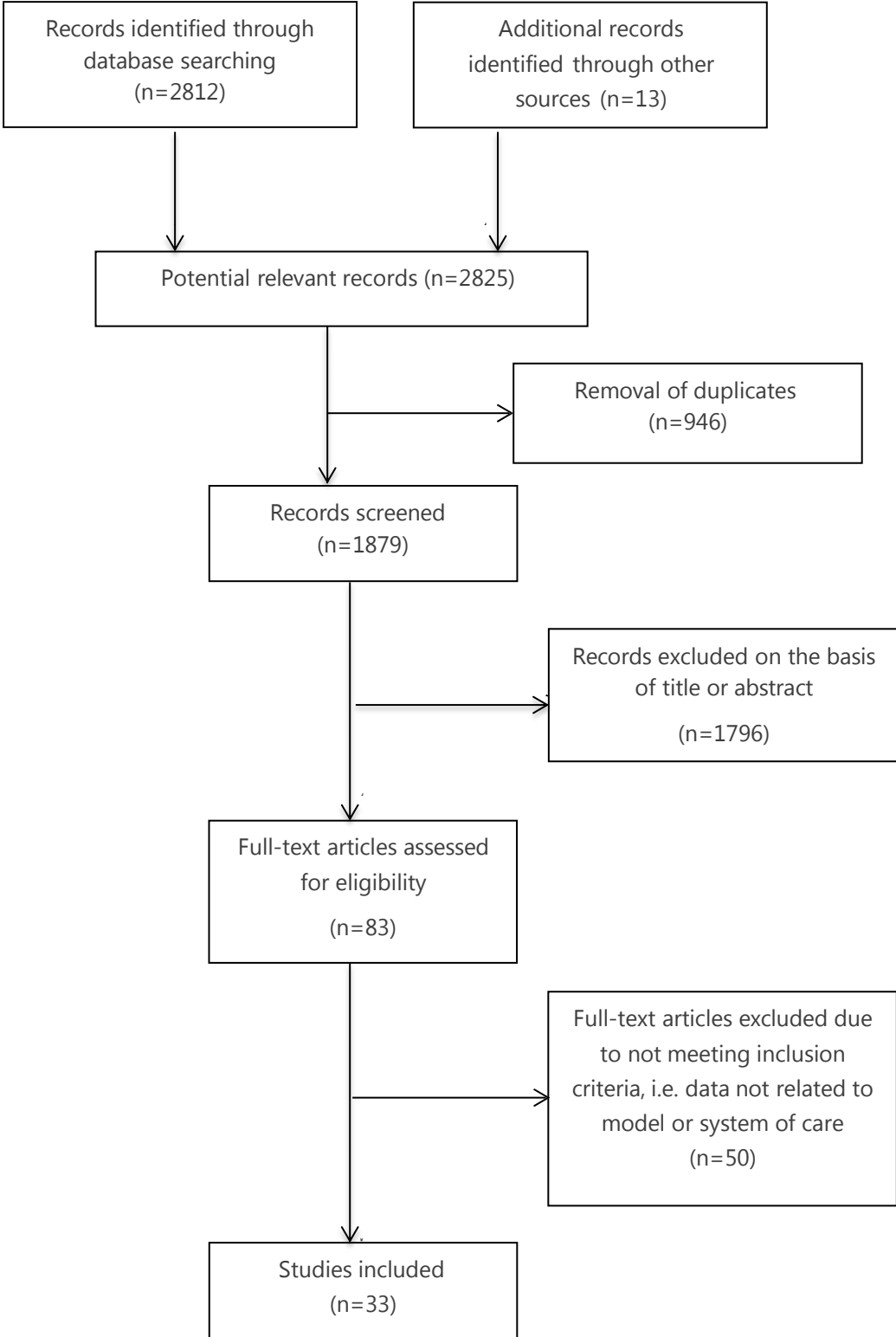
Any published, unpublished findings or monitoring or other data related to the impact of policies, strategies, programs etc on the management of nicotine dependence, and/or provision of smoking cessation care to patients/clients of hospitals/healthcare services in your jurisdiction.

Information regarding any policies, guidelines, plans, programs, strategies, initiatives and resource and/or related materials (eg training materials, manuals, forms, performance indicators etc) that have been implemented to increase the management of nicotine dependence or provision of smoking cessation care to patients/clients of hospitals/healthcare services in your jurisdiction.

I would be grateful if you could email any such information to myself, ccing my colleague Rhonda Matthews ([rhmat@doh.health.nsw.gov.au](mailto:rhmat@doh.health.nsw.gov.au)) by Monday 18 January 2016. This will be passed on to the Chief Investigator of the review (Professor John Wiggers).

Thank you for your assistance.

Appendix 4: PRISMA flow chart



## Appendix 5: Randomised controlled trials

Author / Aim	Study design	Setting	Participant	Clinical practice change strategies	Outcomes of interest	Data source	Result
<p>Wolfenden et al 2005<sup>8</sup></p> <p>Aim:</p> <p>To assess the efficacy, acceptability, and cost of a multifaceted intervention to facilitate the provision of comprehensive smoking cessation care to patients attending a preoperative clinic</p>	RCT (2 group)	Pre-surgical clinic in major teaching and referral hospital in NSW, Australia.	<p>Patients:</p> <p>Patient smokers awaiting surgery (n=1035)</p> <p>Practitioners:</p> <p>Nurses</p> <p>Anaesthetist</p>	<p>6-month intervention:</p> <p><i>Opinion leaders:</i> Director of Surgery, Director and Nurse Unit Manager of clinic endorsement</p> <p><i>Consensus:</i> Staff contribution to development of intervention strategies</p> <p><i>Prompts:</i> Computer provide prompts for nurse and anaesthetist</p> <p><i>Training:</i> Nursing and anaesthetist staff</p> <p><i>Patient self-help material:</i> Tailored cessation information provided to patients by computer program</p> <p><i>Audit and feedback:</i> Computer program data and audit of patient records presented in monthly reports.</p> <p><i>Resources:</i> Computer delivered assessment and cessation counselling program</p>	<p>8 primary outcome measures:</p> <p>Brief advice. Pre-op NRT offer. Post-op NRT, provision of self-help materials, receipt of all elements of care.</p>	<p>Computer program care provision data, audit of patient medical records, 3-month telephone follow-up survey</p>	<p>Significant differences in all measures:</p> <p><i>Nurse brief advice:</i> Patient reported provision (IV: 79%; Ctrl: 47%; P&lt;0.01), and recorded provision (IV: 93%; Ctrl: 67% P&lt;0.01)</p> <p><i>Anaesthetist brief advice:</i> Patient reported provision (IV: 60%; Ctrl: 39%, p&lt;0.01)</p> <p><i>Preoperative NRT:</i> Patient reported provision (IV: 82%; Ctrl: 8% p&lt;0.01), and recorded provision (IV: 89%; Ctrl: 0%, p&lt;0.01)</p> <p><i>Postoperative NRT:</i> Recorded provision (IV: 86%; Ctrl: 0%, p&lt;0.01)</p> <p><i>Self-help material:</i> 96% of IV patients received materials</p> <p>50% of IV patients received all care elements; 13% of Ctrl group patients received all care elements.</p>

<p>Campbell et al 2006<sup>9</sup></p> <p>Aim: To assess differential effectiveness of 2 methods of disseminating a smoking cessation program to public hospital antenatal clinics</p>	<p>Cluster RCT (2 group)</p>	<p>22 public antenatal clinics in New South Wales, Australia</p>	<p>Patients: Antenatal clinic patients (n=5145)</p> <p>Practitioners: Midwife Doctor</p>	<p>2 dissemination strategies tested:</p> <p>1) <i>Simple dissemination</i> (single mail out) Mailed program information Mailed resources — staff training video, patient video, flip charts, chart stickers and self-help kits</p> <p>2) <i>Intensive dissemination</i> (12 months) As above for simple dissemination, plus: Feedback on baseline levels of care, tools and provider materials, training visit (1 hour), proactive telephone support (midwife facilitator) (12 months)</p>	<p>6 primary outcome measures: Smoking status assessment, cessation advice, self-help materials</p>	<p>Patient self-report, 18-month follow-up</p>	<p>No significant differences between the groups on change on any outcome.</p>
<p>Warner et al 2011<sup>7</sup></p> <p>Aim: To test a clinician delivered intervention to facilitate Quitline use by adult surgery patients</p>	<p>RCT (2 group)</p>	<p>Mayo Clinic Rochester Pre-Operative Evaluation Center (POE), US.</p>	<p>Patients: Pre-operative patient who were smokers (n=300)</p> <p>Practitioners: Pre-operative clinicians</p>	<p><i>Unclear intervention length</i></p> <p><i>Specialist provider</i></p> <p><i>Provider materials:</i> Presentations, written materials, and videos of patient-clinician interactions</p> <p><i>Patient materials:</i> Brochures and related materials</p>	<p>Primary outcome: Quitline use</p>	<p>Patient self-report telephone survey re Quitline use. Audit of Quitline records 30- and 90-day follow-up</p>	<p>At 30 days follow-up, significant difference in reported receipt of Quitline: IV: 14.8% Ctrl: 1.3% (p&lt;0.0001) At 90 days follow-up significant difference in reported receipt of Quitline IV: 19.5% Ctrl: 2.6% (p&lt;0.0001). Quitline record review indicated 19.5% of IV group 0% of Ctrl group completed first Quitline</p>

<p>Gordon et al 2013<sup>6</sup></p> <p>Aim:</p> <p>To assess effect of a 3-hour, web-based, tobacco cessation education program – Web-Based Respiratory Education About Tobacco and Health [WeBREATHe] program for prevention of second-hand smoke exposure in children.</p>	<p>RCT (2 group)</p>	<p>2 large children's hospitals in the US</p>	<p>Patients: Parents, caregivers</p> <p>Practitioners: Respiratory Therapists, RNs, and Nurse Practitioners (n=215)</p>	<p><i>1 week intervention</i></p> <p><i>Training:</i></p> <p>Web-based WeBREATHe continuing education program tailored for paediatric RTs, RNs, and NPs, incl. video vignettes</p> <p><i>Provider Materials:</i></p> <p>Information materials and links to tobacco cessation resources</p> <p><i>Patient Materials:</i></p> <p>Information materials and links to tobacco cessation resources</p> <p><i>Practice change Support:</i></p> <p>Expert support on request</p>	<p>Primary outcomes:</p> <p>Smoking care practices – 4 measures based on 5As</p> <p>Ask, assess, advise, counsel, refer, care score</p>	<p>Practitioner self-report at baseline, 1-week and 3-months post (online)</p>	<p>3-month outcomes:</p> <p>Significant increase in score of all four behaviours for IV practitioners p&lt;0.001</p> <p>No change in 'ask', but significant increases in: 'advise' (p&lt;0.001); 'assess' (p&lt;0.001); 'assist', 'arrange' p&lt;0.001).</p>
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## Appendix 6: Non-randomised trials

Author/Aim	Study design	Setting	Participant	Clinical practice change strategies	Outcomes of interest	Data source	Result
Duffy et al 2009 <sup>10</sup> Aim: To describe the implementation of the Tobacco Tactics program for inpatients in the Veterans Affairs (VA).	Non-randomised control study	3 hospitals (2 interventions, 1 control).	Patients: General medical, surgical, intensive care, and extended care units (n=533) Practitioners: Nurses (n=145)	2-year intervention period The <i>Tobacco Tactics</i> program included: <i>Care delivery protocols:</i> pharmaceutical and behavioural care protocols <i>Tools:</i> Nurse toolkit, templates <i>Prompts:</i> Computer recording of care. Physician reminder re brief advice <i>Training:</i> 1-hour training of nurses <i>Patient Resources:</i> Toolkit and resources: smoking cessation brochure; videotape, manual	Provision of smoking cessation care – 6 measures: NRT patch, other medications, handout materials, video, follow-up calls.	Self-report patient survey. 6-month follow-up	Significant increases in 2 of 6 measures: 2.5 fold increase in patients in IV group receiving NRT (p=0.02) and 2-fold increase in other medications (p=0.03).
Duffy et al 2015 <sup>11</sup> Aim: To evaluate the effectiveness of the inpatient, nurse-initiated Tobacco Tactics program for psychiatric inpatient veterans	Non-randomised trial (2 group)	3 veterans hospital networks (11 hospitals), US	Patients: Psychiatric inpatient veterans who were smokers (n=289) Practitioners: Nurses (n=369)	Unclear intervention length The <i>Tobacco Tactics</i> program included: <i>Care delivery protocols:</i> pharmaceutical and behavioural care protocols <i>Tools:</i> Nurse toolkit, templates <i>Prompts:</i> Computer recording of care. Physician reminder re brief advice <i>Training:</i> 1-hour training of nurses <i>Patient Resources:</i> Toolkit	11 secondary measures: Doctor advice, nurse advice, Individual counselling, group counselling, NRT Patch, NRT gum, cessation medications, handouts, video, phone, gum or patch	Nurse self-report survey, 6-month follow-up	Significant differences on 2 of 11 measures: NRT patch p<0.0001) Gum or patch (p<0.0001)

				and resources: smoking cessation brochure; videotape, manual			
<p>Freund et al 2009<sup>15</sup></p> <p><b>Aim:</b></p> <p>To investigate the efficacy of a multi-strategic intervention in increasing the hospital-wide delivery of smoking care to nicotine dependent inpatients</p>	<p>Quasi-experimental matched-pair trial (2 group)</p>	<p>2 experimental and 2 control hospitals in NSW, Australia.</p>	<p><b>Patients:</b></p> <p>All patients who were smokers except psychiatric (n=2430-3117)</p> <p><b>Practitioners:</b></p> <p>Nurses, doctors and allied health staff (n= 229-302)</p>	<p><i>12 month intervention:</i></p> <p><i>Local leadership and consensus:</i> Hospital advisory group to develop, implement hospital action plan.</p> <p><i>Care guideline:</i></p> <p>Local smoking care guideline.</p> <p><i>Prompts and reminders:</i></p> <p>Prompt sticker for medical record</p> <p><i>Training:</i></p> <p>Nurse group-training session (0.5-4.5 hour sessions). Junior medical officers brief one-on-one training and group training; senior medical officers and allied health staff received an information package. Information folders were placed on wards.</p> <p><i>Monitoring and feedback:</i></p> <p>Monthly medical record audit and report</p> <p><i>Practice change support:</i></p> <p>Memo of support from senior manager to staff</p> <p><i>Communication:</i> Staff advised of progress via feedback sessions, noticeboard and hospital</p>	<p>Patient report — 11 primary outcome measures</p> <p>Medical record audit — 9 primary outcome measures</p> <p>Health professional survey: estimate % of patients provided care, 13 primary outcome measures</p>	<p>Patient telephone survey. 1 week post-discharge</p> <p>Medical record audit</p> <p>Health professional pen/paper survey</p>	<p><i>Patient Report and Record audit:</i></p> <p>Of 11 care practices assessed by patient report and record audit, 3 significantly different:</p> <p>Offer NRT – patient report: (p = 0.001) and record audit (p&lt;0.0001)</p> <p>Provided NRT – patient report: (p&lt;0.01); record audit: (p&lt;0.001)</p> <p>Provided written resources – patient report (p&lt;0.0001).</p> <p><i>Health professional-reported care:</i></p> <p>Of 13 care practices, 4 significantly different:</p> <p>Smoking Management discussed (p&lt;0.01); Offered or arranged NRT (p&lt;0.01); Asked intention to smoke post-discharge (p = 0.01); Provided with discharge NRT (p&lt;0.0001).</p>

				newsletter			
<p>Targhetta et al 2011</p> <p>Aim:</p> <p>To assess effect of training medical staff in provision of smoking cessation management on cessation rates</p>	<p>Non-randomised non-controlled study (2 group)</p>	<p>1 hospital</p>	<p>Patients:</p> <p>Hospitalised pneumology, cardiology, vascular surgery, gastroenterology, and digestive surgery patient who were smokers (n=358)</p> <p>Practitioners:</p> <p>Healthcare providers</p>	<p>5 month intervention</p> <p>Training: Staff volunteered to receive 3-hour training in smoking cessation management. Individual complementary training was offered on request. Training addressed motivational interviewing, measurement of tobacco dependency, algorithm of management and prescription of NRT.</p>	<p>Secondary outcomes:</p> <p>Delivery of motivational counselling and requested NRT.</p> <p>Rate of NRT prescribing</p>	<p>Patient self-report</p> <p>NRT orders from central pharmacy database</p> <p>3-month follow-up</p>	<p>No significant change in motivational counselling or request for NRT.</p> <p>Rate of NRT prescribing increased significantly (.48 vs -.24, p&lt;0.001)</p>
<p>Carpenter et al 2012<sup>12</sup></p> <p>Aim:</p> <p>To assess a Web-based educational and skill-building program for healthcare providers — Refer2Quit (R2Q)</p>	<p>Quasi-experimental (2008-2010)</p>	<p>4 healthcare organisations in Washington State, US</p>	<p>Patients:</p> <p>All</p> <p>Practitioners:</p> <p>Outpatient, inpatient and emergency providers (n=179)</p>	<p>10 months intervention</p> <p>Tools: Web-based guidelines, referral tools/forms</p> <p>Training: Web-based training program addressing: Quitline education, skills training</p> <p>Practitioner materials: Web-based information</p> <p>Patient materials: Web-based information</p>	<p>Fax referral rates</p>	<p>Audit of Quitline records</p> <p>12-month follow-up</p>	<p>Fax Referral Rates:</p> <p>Number of referrals (No greater than 5 per month)</p> <p>2.86-fold increase in referrals (1.52 to 6.00)</p>
<p>Schmaltz et al 2011<sup>13</sup></p> <p>Aim:</p> <p>To examine the association between Joint Commission accreditation status and hospital quality performance measures</p>	<p>Comparison group study (5-year follow-up)</p>	<p>3891 hospitals (accredited, not accredited), US</p>	<p>Patients:</p> <p>AMI, CHF, pneumonia</p>	<p>Ongoing intervention</p> <p>Accreditation with the Joint Commission.</p> <p>Annual self-audit of quality of care indicators, feedback from Commission</p>	<p>Provision of smoking cessation advice</p>	<p>Hospital self-audited medical record data</p>	<p>Accredited hospitals improved provision of smoking cessation care more than non-accredited hospitals for CHF and pneumonia patients.</p>



## Appendix 7: Non-controlled trials

Author/Aim	Study design	Setting	Participant	Clinical practice change strategies	Outcomes of interest	Data source	Result
<p>Bunik et al 2013<sup>34</sup></p> <p>Aim: To determine if a QI activity leads to changes in providers care behaviours affecting children's exposure to SHS</p>	Non-controlled (12-month follow-up)	Single hospital paediatric clinic, US	<p>Patients:</p> <p>Caregivers (n=150)</p> <p>Practitioners:</p> <p>Medical assistants/ paediatric providers</p>	<p><i>Leadership and Consensus:</i></p> <p>Team meetings in development of intervention.</p> <p><i>Recording, ordering and referral tools:</i></p> <p>Recording and referral forms, modification of EMR – prompts and reminders</p> <p><i>Training:</i></p> <p>New clinic trainees</p> <p><i>Audit and feedback:</i></p> <p>Review of EMR data</p> <p><i>Patient materials</i></p>	<p>3 primary outcomes:</p> <p>Ask child exposure to SHS, Advised to reduce exposure; Referred to Quitline</p>	Medical record audit	<p>Significant increases in all 3 outcomes:</p> <p>Ask: 24% to 70% (p&lt;0.001)</p> <p>Advised: 8% to 96% (p&lt;0.001)</p> <p>Referred: 8% to 48% (p&lt;0.001).</p>
<p>Katz et al 2014<sup>37</sup></p> <p>Aim: To evaluate the impact of a multi-modal intervention on nurses and physicians performance of the 5As Framework</p>	Non-controlled study (4-7 months follow-up)	4 veterans hospitals in US	<p>Patients:</p> <p>Smokers in medical units (n=460-360).</p> <p>Practitioners:</p> <p>Nurses and physicians</p>	<p>4-7 month multi-modal intervention:</p> <p><i>Guidelines:</i></p> <p>Smoking cessation care guideline for Veterans Hospitals</p> <p><i>Computerised prompts:</i></p> <p>System modified to prompt care, and to facilitate pharmacotherapy orders.</p> <p><i>Training:</i></p> <p>On-site instruction for 1/2 nurses and 30 min online tutorial</p> <p><i>Academic detailing:</i></p> <p>Performance feedback re 5As</p>	<p>25 primary outcomes – 11 5As measures and composite score for each of nurses and physicians:</p> <p>Smoking status, advise to quit, assess willingness to quit, assist quitting, provided self-help material, discuss plan to quit, offer NRT, discuss pharmacotherapy, arrange follow-up, of Quitline referral, recommend follow-up</p> <p>Pharmacy prescription</p>	Patient report (at discharge)	<p>Significant increase in 9 of 25 outcomes:</p> <p>a) Significant increases in nurse provision of 7 of 12 5As outcomes: Assess status (OR 2.3; 1.4-3.8), Assess willingness (OR 1.6; 1.1-21.1), assist quitting (OR2.3, 1.6-3.1), self-help materials (OR 3.4, 2.5-4.8), offer NRT (OR 1.7, 1.2-2.3), arrange follow-up (OR 1.5, 1.1-2.2), offer Quitline referral (OR2.1, 1.3-3.5),</p> <p>b) Significant increases in physician provision of 2 of 12 outcomes:</p>

				<p>based on EMR data.</p> <p><i>Provider Resources:</i></p> <p>Posters</p> <p><i>Patient Resources:</i></p> <p>Computer links to patient education materials, self-help materials, video</p> <p><i>Organisational support:</i></p> <p>Peer leader for each ward to provide point of care coaching re 5As, to support implementation strategy.</p>	of pharmacotherapy		<p>Assess status (OR 1.8; 1.2-2.7), advise to quit (OR1.4, 1.04-1.9)</p> <p>c) No significant increase in pharmacy prescribing.</p>
<p>Slattery et al 2016<sup>16</sup> (NSW)</p> <p>Aim:</p> <p>To assess the impact of an intervention on the provision of smoking cessation care to nicotine dependent smokers across a network of smokers</p>	Non-controlled (4-year interrupted time series; 12-month follow-up)	All 37 general hospitals in a single health district. NSW, Australia	<p>Patients:</p> <p>All smokers other than: mental health, intensive care, substance use and maternity (n=164,250)</p> <p>Practitioners: All nurses</p>	<p>2-year intervention implemented in context of introduction of hospital smoke free policy</p> <p><i>Executive leadership:</i></p> <p>Intervention accountable to, and supported by Chief Executive and Executive sponsors.</p> <p><i>Consensus:</i></p> <p>Development of smoking cessation care guideline</p> <p><i>Training:</i></p> <p>4x ½ day train-the-trainer workshops for nurses representing all wards. Trained staff trained all nurses.</p> <p><i>Tools and resources:</i></p> <p>Assessment tool; protocol for nurse-initiated NRT provision; medical record prompt; audit and reporting tools.</p>	7 primary outcomes: Quit advice, offer of inpatient, discharge NRT, Provision of inpatient, discharge NRT, Quitline referral, acceptance of Quitline referral	Medical record audit	<p>Significant increase in all 7 outcome measures during intervention phase:</p> <p>Significant increase six of 7 outcomes at follow-up:</p> <p>Quit advice (OR 3.23 2.03-5.13; p&lt;0.0001); Offer inpatient NRT (OR 3.50 2.67-4.58; p&lt;0.0001), provision of inpatient NRT (OR 2.54 1.87-3.45; p&lt;0.0001), offer discharge NRT (OR 1.8- 1.23-2.64; p&lt;0.0001), provision of discharge NRT (OR1.75 1.18-2.58; p&lt;0.0004), Offer Quitline referral (OR 6.27 2.84-13.85; p&lt;0.0246).</p>

				<p><i>Practice change support:</i> 4 telephone calls to ward nurse managers.</p> <p><i>Monitoring and feedback:</i> 3 bedside audits of all patients on a single day. Reports sent to ward nurse managers and Executive.</p> <p><i>Communication:</i> Reports, newsletters, presentations to meetings – ward level to Executive level.</p>			
Wye et al (under review) <sup>18</sup> NSW	Non-controlled (19-month interrupted time series)	2 psychiatric inpatient facilities	<p><b>Patients:</b> Psychiatric inpatients (2898)</p> <p><b>Practitioners:</b> Nurses, managers, allied health, medical/psychiatric staff</p>	<p><i>Leadership and Consensus:</i> Senior management and clinical leadership support, unit level meetings with staff, meetings with consumer advocates</p> <p><i>Guidelines:</i> Dissemination of state smoking treatment guidelines</p> <p><i>Tool and prompts:</i> Modification of admission form to prompt recording of smoking status and treatment</p> <p><i>Training:</i> Multiple staff group training workshops. Information sessions for clients and carers.</p> <p><i>Provider materials:</i> Treatment flow chart and recording guide, information regarding smoking and mental</p>	<p><b>4 outcomes:</b></p> <ul style="list-style-type: none"> <li>- Assessment of smoking status</li> <li>- Assessment of nicotine dependence</li> <li>- Provision of brief advice</li> <li>- Prescription of NRT</li> <li>- Provision of smoking treatment on discharge</li> </ul>	Retrospective audit of medical records post discharge	<p>Significant increases over time (pre to post) for all 5 outcomes:</p> <ul style="list-style-type: none"> <li>- Smoking status (OR 2.83; (1.47-5.44))</li> <li>- Nicotine dependence status (OR109.-67, 35.35-340.22)</li> <li>- Brief advice (OR 97.43, 30.99-306.30)</li> <li>- NRT (OR 21.29, 8.95-50.62)</li> <li>- Treatment at discharge (OR3.22, 1.25-8.32).</li> </ul>

				<p>health</p> <p><i>Patient materials:</i></p> <p>Educational resources for clients</p> <p><i>Audit and feedback:</i></p> <p>Medical record audit performance feedback —14 occasions</p> <p><i>Practice change support:</i></p> <p>0.5 practice change leader, local facility champions. Problem solving on an as needs basis</p>			
<p>Katz et al 2013 (May)<sup>36</sup></p> <p>Aim:</p> <p>To determine the impact of a guideline-based intervention on Nurses' delivery of the 5As.</p>	<p>Non-controlled study (8-month follow-up)</p>	<p>1 hospital, The Iowa City VA Healthcare System</p>	<p>Patients:</p> <p>Patient who were smokers in medicine unit. (n= 195)</p> <p>Practitioners:</p> <p>Nurses (n=40)</p>	<p><i>Guidelines:</i></p> <p>Smoking cessation care guideline for Veterans Hospitals</p> <p><i>Computerised prompts:</i></p> <p>System modified to prompt care, and to facilitate pharmacotherapy orders.</p> <p><i>Training:</i></p> <p>On-site instruction for 1/2 nurses and 30 min online tutorial</p> <p><i>Academic detailing:</i></p> <p>Performance feedback re 5As based on EMR data.</p> <p><i>Provider Resources:</i></p> <p>Posters</p> <p><i>Patient Resources:</i></p> <p>Computer links to patient education materials, self-help materials, video</p>	<p>Primary outcomes:</p> <p>5As</p> <p>Assess, advise to quit, advice, self-help materials, pharmacotherapy, follow-up, referral, and composite score</p>	<p>Patient self-report – interview</p>	<p>No change in three measures — ask, assess, and arrange follow-up.</p> <p>Significant increases in:</p> <p>Composite score (3.9 vs. 3.1 (OR 1.0, 95 % CI 0.5, 1.6).</p> <p>Advise to quit (OR 2.1, 95 % CI 1.2, 3.5)</p> <p>Assistance (advice) in quitting (adjusted OR 2.9, 95 % CI 1.6, 5.3)</p>

				<p><i>Organisational support:</i></p> <p>Peer leader for each ward to provide point of care coaching re 5As, to support implementation strategy.</p>			
<p>California Acute Stroke Pilot Registry Investigators 2005<sup>32</sup></p> <p>Aim:</p> <p>To determine if use of standard orders is associated with improvement in stroke care</p>	<p>Non-controlled study (2-year follow-up)</p>	<p>6 hospitals participating in Coverdell Acute Stroke Pilot Registry (CASPR) in California, US</p>	<p>Patients:</p> <p>Discharged stroke patients (n=413)</p> <p>Practitioners:</p> <p>Neurologists and residents</p>	<p><i>Leadership:</i></p> <p>Stroke champions</p> <p><i>Consensus</i></p> <p>Development of templates</p> <p><i>Tools, Prompts and Reminders:</i></p> <p>Admission and discharge orders, templates</p> <p><i>Training:</i></p> <p>Training of local neurologist and residents.</p> <p><i>Provider materials:</i></p> <p>Resource materials and guidelines.</p> <p><i>Audit and Feedback:</i></p> <p>Audit of medical records</p>	<p>Primary outcome:</p> <p>Counselling for smoking prior to discharge</p>	<p>Medical record audit</p>	<p>No sig difference in smoking cessation counselling — 5% to 8% of all patients (p=0.09).</p>
<p>Naudziunas et al 2005<sup>19</sup></p> <p>Aim:</p> <p>To introduce patient education about risk factors by physicians into a daily routine of the Cardiology Unit</p>	<p>Non-controlled study (1 month)</p>	<p>Cardiology Unit of the Kaunas 2nd Clinical Hospital, Lithuania</p>	<p>Patients:</p> <p>Cardiology patients (n=56-64)</p> <p>Practitioners:</p> <p>Physicians</p>	<p><i>Patient Feedback:</i></p> <p>Patient report of care feedback to clinicians</p>	<p>Primary outcomes:</p> <p>Patient informed of smoking risks</p>	<p>Patient self-report survey</p>	<p>Significant increase: 82% to 97% (p&lt;03).</p>

Williams et al 2005 <sup>55</sup> Aim: To examine hospitals' performance on standardised indicators of quality of care	Non-controlled study (2002-2004)	Joint Commission accredited hospitals (n=3087) US	Patients: Acute myocardial infarction, heart failure, and pneumonia	<i>Audit and Feedback</i> Comparative audit feedback reports on a quarterly basis, incl. control charts of performance over time against national averages  <i>Accreditation:</i> Joint Commission	Primary outcome: Smoking-cessation counselling	Medical record audit (hospital submission of performance data).	Smoking-cessation counselling increased significantly for acute myocardial infarction (65% to 84%, p<0.001); heart failure (39% to 72%, p<0.001); pneumonia (34% to 67%, p<0.001).
Zhang et al 2005 <sup>24</sup> Aim: To improve acute and discharge care of patients with acute myocardial infarction (AMI)	Non-controlled study (2001-2002)	The Tenet Healthcare Corporation, US (>100 hospitals)	Patients: AMI patients (n=2927, 4137 4330) Practitioners: All	<i>Local leadership:</i> Hospital senior management <i>Consensus:</i> Local process improvement teams <i>Tools:</i> Computerised care recording system <i>Training:</i> Web-based sessions <i>Performance review and feedback:</i> Local monthly meetings. National annual meetings <i>Practice change support:</i> Process improvement teams, plus full-time regional director of clinical process improvement.	Primary outcome: Smoking cessation counselling	Electronic data collection	Smoking cessation counselling increased from 35.1% to 80.6% (p<0.001).
Butler et al 2006 <sup>26</sup> Aim: To assess impact of computerised physician order entry (CPOE) tool in improving compliance with Center for Medicare and Medicaid Services (CMS)- and	Non-controlled study (2001-2003)	Vanderbilt University Medical Center, Nashville, TN, US	Patients: CHF and AMI (n-1827) Practitioners: All	<i>Tools, Prompts:</i> Computerised provider order entry tool (CPOE) and prescription writer. <i>Reminders:</i> Computerised point-of-care reminders <i>Patient resources:</i> Computerised access	Primary outcome: Smoking cessation counselling	Data from CPOE system	Smoking cessation counselling significantly increased for both CHF (1% to 43%, p<0.001) And AMI (21% to 62%, p<0.001).

Joint Commission.							
Stoeckle-Roberts et al 2006 <sup>27</sup>	Non-controlled study (6-month follow-up)	8 hospitals, US	<p>Patients: Stroke inpatients (n=375)</p> <p>Practitioners: Stroke clinicians</p>	<p><i>Leadership and consensus:</i> Local champions and hospital teams and improvement plans</p> <p><i>Tools and reminders:</i> We-based assessment and recording system.</p> <p><i>Training:</i> 3 Learning sessions – quality improvement initiative.</p>	Primary outcome: Smoking cessation counselling	Web-based data collection tool	Significant increase for smoking cessation (36.5% to 68.0%, p<0.001)
<p>Koplan et al 2008<sup>31</sup></p> <p>Aim: To assess effect of adding a tobacco order set to an existing computerised order-entry system</p>	Non-controlled study (4-month follow-up).	Brigham and Women's Hospital (BWH) in Boston, MA	<p>Patients: Medical patients, smokers (n=17,024 - 17,530)</p> <p>Practitioners: Medical staff</p>	<p><i>Tools and templates:</i> Computerised prescription orders and decision support</p> <p><i>Prompts:</i> Computerised prompts for assessment, counselling</p> <p><i>Training:</i> Brief 1-hr educational program, plus 2 emails,</p> <p><i>Provider resources:</i> Pocket card information re practice change.</p>	2 primary outcomes: NRT orders, smoking counsellor consultations	<p>NRT orders from pharmacy records.</p> <p>Smoking counsellor consultations from electronic database.</p>	<p>Significant increase in: NRT ordered (1.6% to 2.5% of all admissions p&lt;.0001)</p> <p>At follow-up, 38% and 95% of smokers received NRT order and consult respectively.</p> <p>Smoking consults (0.8% to 2.1% (p&lt;.0001)</p>

<p>Bernstein et al 2009<sup>30</sup></p> <p><b>Aim:</b></p> <p>To examine the effect of brief educational intervention on emergency physicians' knowledge, attitudes, and behaviour regarding screening for tobacco use, delivery of a brief intervention, and referral to treatment.</p>	<p>Non-controlled (1-month follow-up)</p>	<p>8 medical centres located throughout the US</p>	<p><b>Patients:</b></p> <p>ED patients, smokers (n=1168)</p> <p><b>Practitioners:</b> Residents and Emergency Physicians (n=206)</p>	<p><b>Training:</b></p> <p>1-hr lecture to physicians</p> <p><b>Patient Resources:</b></p> <p>Plastic wallet-sized card Quitline number.</p>	<p><b>Primary outcomes:</b></p> <p>Time on counselling, smoking status, advice to quit, brief counselling, refer to Quitline/other</p> <p>Smoking status, advice/referral documented, referral made</p>	<p>Physician self-report questionnaire; Chart review</p>	<p><b>Physician report:</b></p> <p>Significant increases in: Time spent on counselling (p&lt;0.001), advice to quit (p&lt;0.001), provide brief counselling (p&lt;0.001), refer to Quitline or other (p&lt;0.001)</p> <p><b>Chart review:</b></p> <p>Significant increases in: Smoking status: 66.2% to 69.8%, p=0.21, referral advice: 8.5% to 15.8% p=0.004, referral made: 3.5% to 12.6%. p&lt;0.001</p>
<p>Chang et al 2010<sup>20</sup></p> <p><b>Aim:</b></p> <p>To compare annual prevalence of receiving advice to quit smoking from health professionals –before and after incentive funding</p>	<p>Non-controlled study (2004-2007)</p>	<p>Taiwan National program</p>	<p><b>Patients:</b></p> <p>National population-based Taiwan Adult Tobacco Survey (n=approx. 16,600 per survey year)</p> <p><b>Practitioners:</b></p> <p>All national contracted doctors</p>	<p><b>Guidelines:</b></p> <p>National Guidelines — 5As National Smoking Cessation Outpatient Services Program</p> <p><b>Incentives:</b></p> <p>Increase in doctor incentive (US\$8 to US\$11) per patient in 2005, ceased in 2006.</p> <p>Increase in patient subsidies for pharmacotherapy in 2005, ceased in 2006</p> <p><b>Training:</b></p> <p>6-hr training for doctors</p>	<p>Receipt of advice to quit</p>	<p>Patient self-report — telephone interview</p>	<p><b>Quit advice:</b></p> <p>2004: 21.1% 2005: 26.8% 2006: 28.2% 2007: 27.6% (p&lt;0.001)</p>
<p>Moss et al 2009<sup>33</sup></p>	<p>Non-controlled</p>	<p>1 hospital-based paediatric clinic</p>	<p><b>Patients:</b></p>	<p><b>Tools and prompts:</b></p>	<p><b>Primary outcomes:</b></p>	<p>Patient/parent exit interviews in</p>	<p>Of 4 measures for paediatric clinic, 2</p>



<p>Aim: To assess change in obstetric and paediatric provider smoking cessation practices following implementation of a practice guideline driven office-based program.</p>	<p>study (2003-2006)</p>	<p>and 1 obstetric clinic, US</p>	<p><i>Paediatric:</i> Parents/care-givers (n=614) <i>Obstetric:</i> Patients (n=466) Practitioners: All staff</p>	<p>Smoking-as-a-vital-sign prompt chart, <i>Training:</i> 2-hr educational module <i>Provider materials:</i> On-site and telephonic referral information <i>Patient resources:</i> Patient/parent cessation handouts <i>Performance feedback:</i> Informal and formal data-based feedback via email, meetings and booster sessions</p>	<p>Smoker identification, advised, assist (advice)</p>	<p>paediatric and obstetric settings</p>	<p>increased significantly: 'Ask': 49% to 86%, p&lt;0.0001. <i>Smoker ID:</i> 47% to 83% (p&lt;.0001). Of 4 measures for obstetric clinic, 1 increased significantly: <i>Assist:</i> 28% to 62% (p&lt;0.05)</p>
<p>Reid et al 2010<sup>21</sup> Aim: To evaluate impact of implementing the Ottawa Model in nine hospitals in eastern Ontario.</p>	<p>Non-controlled study (1-year follow-up)</p>	<p>9 eastern Ontario hospitals, Canada</p>	<p>Patients: Inpatient smokers Practitioners: Nurses</p>	<p><i>Leadership and consensus:</i> Local facilitators, senior management support, 'staff-implementers' developed plan and strategies <i>Tools:</i> Standardised forms and order tools and systems <i>Prompts and reminders:</i> Point-of-care reminders – assessment and care plans <i>Training:</i> 1-hr training <i>Patient materials:</i> Standardised patient education materials <i>Audit and feedback</i> Baseline audit and feedback <i>Practice change support:</i></p>	<p>RE-AIM outcomes: <i>Reach:</i> % of patients that received intervention. <i>Adoption:</i> % of nursing units that implemented model <i>Implementation:</i> % of smokers for whom a consult form was completed (counsel), smoking cessation medications prescribed, and follow-up received.</p>	<p><i>Reach:</i> audit of consult forms entered in database. <i>Adoption:</i> meetings with hospital leaders. <i>Implementation:</i> data obtained from database.</p>	<p><i>Reach:</i> 69% received intervention (29% to 97%, median 60%). <i>Adoption:</i> 34% of units (4% to 100%). Greater in smaller hospitals. <i>Implementation:</i> 69% of patients had completed form; medications were prescribed to 29%, and 23% were enrolled in telephone follow-up.</p>

				Staff employed as facilitators (approx. 1:3 hospitals) to implement clinical practice change strategies			
Tran et al 2009 <sup>17</sup> (NSW) Aim: To examine effectiveness of clinical practice guideline on nurses screening patients for alcohol and other substance use, provision of a brief intervention, and referring patients.	Non-controlled study (3-month follow-up)	Medical and surgical wards of 2 metropolitan hospitals in Sydney, NSW, Australia.	Patients: Medical and surgical patients (n=79-84) Practitioners: Nurses	<i>Clinical practice Guideline and policies</i> <i>Training:</i> Workshops (2x1/2 day) <i>Provider Resources:</i> Training materials.	Primary outcome: Screening for tobacco use, brief intervention, referral	Medical record audit	No significant increase in any outcome
Kisuule et al 2010 <sup>29</sup> Aim: To assess impact of an academic detailing educational intervention documentation of tobacco dependence, counselling, and the initiation of NRT	Non-controlled study (4-month follow-up)	Johns Hopkins Bayview Medical Center	Patients: Medical (n=545-1119) Practitioners: Physicians, nurse practitioners, and physician assistants (n=28)	<i>Training:</i> 1-hr training with certified tobacco treatment specialist (TTS) for each clinician, involving role play and modelling of counselling a simulated patient <i>Audit and feedback:</i> Within the training session, peer-led audit of clinician's EMR cessation care performance data	Primary outcomes: Documentation of tobacco treatment, follow-up plan, NRT offered, appropriateness of NRT dose.	Medical record audit	Significant improvement all 4 measures: Documentation of tobacco treatment (36% to 44%; p<0.002) and follow-up plan (7.5% to 46.8%, p<0.0001) Offer of NRT (15% to 26%; p <0.0001) NRT appropriate dose (26% to 64%; p<0.0001)
Katz et al 2012 <sup>38</sup> Aim: To determine the effect of an emergency nurse initiated intervention	Pre-post (8-13 months follow-up)	2 EDs in Iowa, US.	Patients: ED Patients (n=650) Practitioners: All staff nurses, emergency physicians (n=156)	<i>Leadership:</i> ED medical director/Director Nursing support <i>Charting prompts/reminders and order tools:</i> Modifications to charting tool	Primary outcomes: 5As (7 measures) by ED nurse, and by physician: Assess, advise to quit, advice, follow-up	Patient telephone self-report survey re nurse, physician care	<i>Nurse care:</i> Increase in 4 of 7 measures: Asked smoking status (adjusted odds ratio [OR] 2.0, 95% confidence

<p>on</p> <p>1) delivery of smoking cessation counselling</p> <p>2) ED nurses' and physicians' perceptions of smoking cessation counselling.</p>				<p>to prompt and chart smoking status and care delivery</p> <p><i>Training:</i></p> <p>Training (20 min face-to face) of emergency nurses including. Performance data review, role-play and feedback. EPs, and PAs trained by lecture. Plus 45-minute online tutorial</p> <p><i>Provider Resources:</i></p> <p>Each ED nurse/EP received pocket card of algorithm, posters</p> <p><i>Performance feedback</i></p> <p>Feedback of baseline care delivery</p> <p><i>Practice change support:</i></p> <p>Local nurse facilitator – support and local coaching/problem solving and feedback re clinical practice change strategies implementation</p>			<p>interval [CI]1.3 to 2.9)</p> <p>Assessed willingness to quit (adjusted odds ratio [OR] 4.8, 95% confidence interval [CI] 2.9-7.9</p> <p>Assist quitting (adjusted odds ratio [OR] 5.1, 95% confidence interval [CI] 2.7-9.5)</p> <p>Arrange follow-up (adjusted odds ratio [OR] 7.1, 95% confidence interval [CI] 2.3-21.4)</p> <p><i>Physician Care:</i> Increase in 3 of 7 measures:</p> <p>Assessed willingness to quit (adjusted odds ratio [OR] 2.5, 95% confidence interval [CI] 1.7-3.8</p> <p>Assist in quitting (adjusted odds ratio [OR] 4.2, 95% confidence interval [CI] 1.9-9.1)</p> <p>Arrange follow-up (adjusted odds ratio [OR] 5.5, 95% confidence interval [CI] 1.8-17)</p>
<p>Katz et al 2013 (June)<sup>25</sup></p> <p>Aim:</p> <p>To determine the effectiveness of a multifaceted intervention to improve delivery of the 5As by ED staff</p>	<p>Pre–post implementation trial (6-month follow-up)</p>	<p>2 EDs in Iowa: 1 University hospital, 1 large community teaching hospital</p>	<p>Patients: ED Patient smokers (n=650)</p> <p>Practitioners: Emergency nurses, physicians, and PAs</p>	<p><i>Leadership:</i></p> <p>ED medical director/Director Nursing support</p> <p><i>Charting prompts/reminders and order tools:</i></p> <p>Modifications to charting tool to prompt and chart smoking status and care delivery</p>	<p>Primary outcome: 5As composite score.</p>	<p>Patient self-report interview</p>	<p>Significant overall improvement in the mean 5As composite score for emergency nurses (1.47 vs. 0.83, adjusted difference = 0.68, 95% CI [0.46, 0.89]) and for emergency physicians (1.15 vs. 0.76, adjusted difference = 0.36,</p>

				<p><i>Training:</i> Training (20 min face-to face) of emergency nurses including. performance data review, role play and feedback. EPs, and PAs trained by lecture. Plus 45-minute online tutorial</p> <p><i>Provider Resources:</i> Each ED nurse/EP received pocket card of algorithm, posters</p> <p><i>Performance feedback</i> Feedback of baseline care delivery</p> <p><i>Practice change support:</i> Local nurse facilitator — support and local coaching/problem solving and feedback re clinical practice change strategies implementation</p>			95% CI [0.12, 0.59]
<p>Sarna et al 2014<sup>22</sup></p> <p>Aim: To evaluate a brief smoking cessation educational program on the frequency of nurse interventions with smokers</p>	Non-controlled (3 month follow-up)	Hospital nurses in the Czech Republic	<p>Patients: Various</p> <p>Practitioners: Nurses (n=98)</p>	<p><i>Training:</i> 1-hr program for Nurses Practitioners (abbreviated Rx for Change program) delivered by nurses trained in 1-day train-the-trainer workshop, developed</p> <p><i>Provider materials:</i></p>	10 primary outcomes: Assess, Advise, Advice, Arrange follow-up, recommend Quitline, refer to community resources, provide medication recommendation, recommend smoke-free	Nurse self-report survey	<p>Significant improvement in 7 of 10 measures: Assess interest in quitting: p&lt;0.002 Assist patient to quit: p&lt;0.007 Recommend Quitline: p&lt;0.03</p>

				Educational/training materials	home		Refer to community services: $p < 0.03$ Recommend pharmacotherapy: $p < 0.0007$ Review barriers to quitting $p < 0.005$ Recommend smoke-free home: $p < 0.02$
Leuthard et al 2015 <sup>35</sup> Aim: To describe the implementation of the OHA intervention and Quitline referral initiative	Non-controlled (2010-2013)	21 hospitals and 12 clinics, US	Patients: All patient smokers Practitioners: Nurses	<i>Tools and prompts</i> Tools and systems (paper or electronic) to support and prompt assessment, recording of care, medication orders and referral and workflow <i>Training</i>	Primary outcome: Fax referrals to tobacco telephone helpline	Tobacco helpline data	> 150% increase in referrals (from zero base)
Moody-Thomas et al 2013 <sup>39</sup> Aim: To describe the development, implementation and evaluation of a multi-faceted program employing system strategies to integrate evidence-	Non-controlled (2007-2010)	7 hospitals (US)	Patients: All patients Practitioners: All practitioners	<i>Leadership:</i> Health system lead Tobacco Control Initiative including targets <i>Consensus:</i> Hospital teams established. <i>Tools and systems:</i> System-wide standardised processes (initially paper-based, subsequently	3 primary outcomes: Asked, Advised, Assisted	Electronic medical record audit	Increases in all 3 outcomes

<p>based cessation services into a public healthcare network.</p>				<p>electronic) for delivering and recording assessment, treatment and referral, including prompts/reminders, registry.</p> <p><i>Training:</i> Face-to-face and online</p> <p><i>Patient self-help material</i></p> <p><i>Practice change support:</i> Coordinate and oversee achievement of program goals</p>			
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