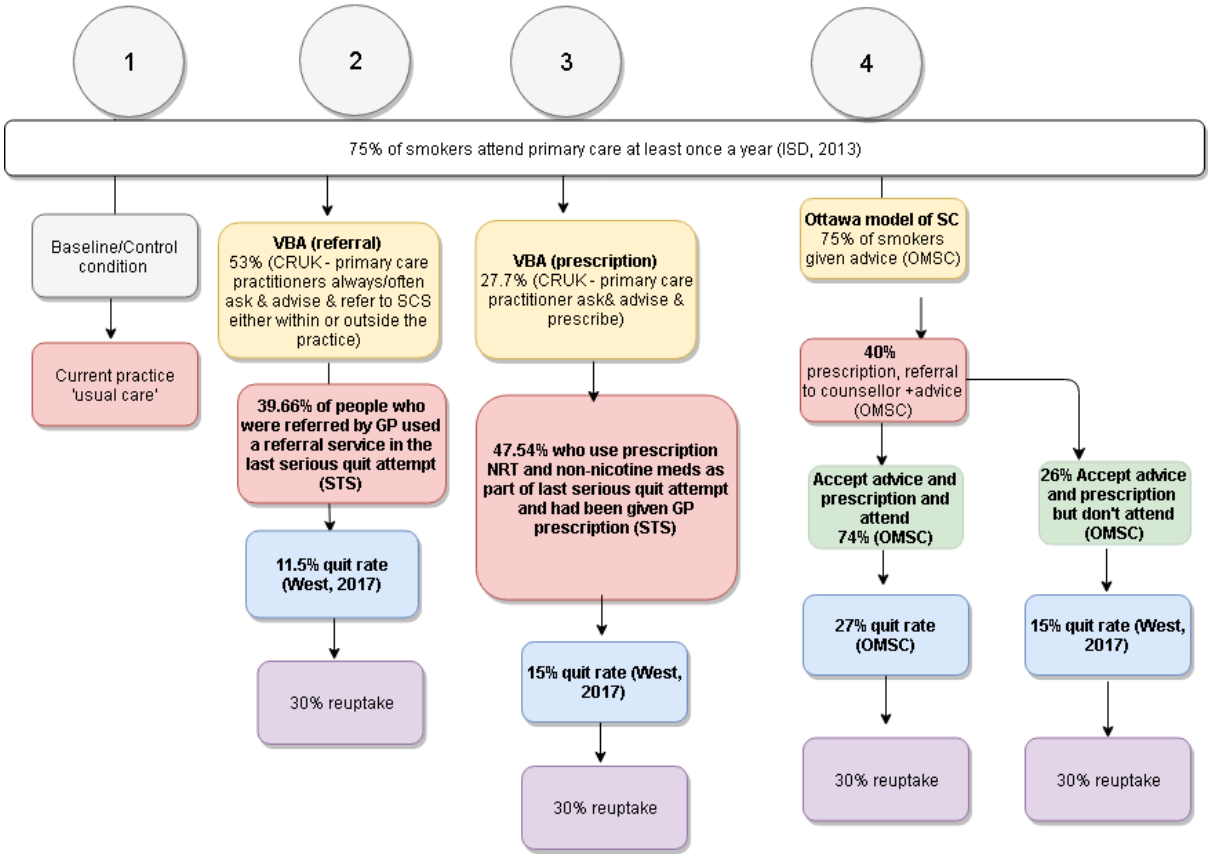
Appendix 2: Scenario assumptions and data

Modelling smoking cessation services in primary care

The microsimulation program enables different intervention scenarios to be tested so that policy makers can assess the impact of public health interventions on the epidemiology and health economy of diseases. A 'baseline' or 'usual care' scenario (scenario 1 in Figure 1) will be run based on current smoking trends (APS 2010-2017). In order to quantify the disease incidence and premature mortality related to smoking if trends continue ('attributable cases') we will compare the health and cost outcomes of the current smoking trends to a scenario where all individuals are either never smokers or ex-smokers. This scenario is not illustrated in Figure 1.

Figure 1 illustrates the 4 scenarios and suggested data for modelling individual smokers through each scenario. Table 1 to Table 3 provides more detail about the suggested data to be used for modelling each step of each scenario.

Figure 1: Flow diagram of intervention scenarios



Scenario 1: Baseline

This scenario illustrates a usual care scenario. Smoking trends are projected from 2019 to 2040 using Annual Population Survey data. All scenarios are compared to the baseline scenario to illustrate the modelled effects of each hypothetical scenario

Scenario 2. Very Brief Advice (VBA) + Referral

This scenario models the impact of VBA combined with a referral to NHS smoking cessastion services being delivered in a primary care setting. This scenario is offered to all smokers, regardless of attention to quit. . Table 1 detials the input data and sources for this scenario.

Scenario 3. Brief intervention – advice and prescription only

The third scenario couples VBA and a NRT prescription (including non-nicotine medication) for all patients regardless of whether they are ready to quit. All data required for this scenario are illustrated in Table 2.

Scenario 4. Modelling the Ottawa Model of Smoking Cessation in primary care to all smokers

The Ottawa Model for Smoking Cessation (OMSC) is a simple, systematic approach for addressing tobacco use with smokers and for supporting successful quitting using the best available evidence-based treatments. It emphasises interdisciplinary collaboration to permit fast-paced clinics to adopt the programme without noticeable impact on daily patient flow. This means a 30 second consultation with a nurse who asks a patient if they are a smoker, a 2 minute consultation with a GP or Nurse practitioner who provides advice on smoking cessation, a 30-60 minute session with a smoking cessation counsellor (nurse, pharmacist, nurse practitioner) (1). It is opt-out in the sense that patients are given advice and assistance regardless of whether they are ready to quit. Those who do not want to go the final 30-60 minute session are given a prescription anyway. Table 3 provides input data from the literature and personal communication with the OMSC team.

This scenario will be run twice:

1. where each smoker can go through the intervention just once over the course of the simulation
2. where each smoker can go through the intervention multiple times during the simulation, but just once in any given year

Table 1: Input data for VBA + referral

Scenario paramter	Data	Assumption	Reference and possible alternative data
Proportion of smokers who attend primary care	75%	Assumes the same number of smokers attend primary care as non-smokers. This might underestimate the number of smokers who attend primary care as smokers have more diseases, though smokers do tend to be younger. Assume 20% who do not attend primary care quit at usual care rate. This figure was supported by STS data which suggests 36% of smokers had not seen a GP in the last yr.	GP Consulations / Practice Team Information, 2013(2) Potential data limitation: Evidence suggests that there is a SES gradient in smoking, and potentially those from lower SES might experience higher barriers to primary care
Proportion of patients given advice to quit and referred to SCS	53%	CRUK tobacoo primary care study GPs responding to an online CRUK survey that they always/often ask & advise & refer to smoking cessation services either within or outside practice	CRUK report
Uptake of referral	39.66%	From the STS; as a % of smokers who have tried to quit in the last yr who had received VBA and referral	Smoking Toolkit Study, all waves. Dataset provided by personal communication from J.Brown. (3)
Quit rate (VBA+referral)	6.5% points + baseline quit rate ~ 11.5%	From academic ltierature: 3–10 percentage point increase in long-term quit success among those using it to try to quit for multi-session support delivered by trained specialists, the effect apparently being additive with pharmacotherapy Assume a mid point quit rate of 6.5% Quit rate is for 52 weeks	Robert West (2017) Tobacco smoking: Health impact, prevalence, correlates and interventions, available online: http://dx.doi.org/10.1080/08870446.2017.1325890(4)
Baseline quit rate	5%	Baseline quit rate 5% unaided are sucessful for 6mths Assume that this quit rate continues for 12 month period	STS top line fidnings Jan 19 – (stopped smoking in past 12 months ~5%)(3) Potential data limiation: quit rate for 12 months might be lower than the 6 month quit rate.

Relapse rate	30%	• As a % of those quitting	Lifetime relapse rate Stapleton, J.A., G. Sutherland, and M.A. Russell From http://www.smokinginengland.info/sts-documents/ (5) And also Etter and Stapleton 2006

Table 2. Possible data for VBA + NRT prescription

Scenario paramter	Data	Assumption	Reference and alternative data
Proportion of smokers who attend primary care	75%	• Assumes the same number of smokers attend primary care as non-smokers. This might underestimate the number of smokers who attend primary care as smokers have more diseases, though smokers do tend to be younger. Assume 20% who do not attend primary care quit at usual care rate. • This figure was supported by STS data which suggests 36% of smokers had not seen a GP in the last yr. • Potential data limitation: Evidence suggests that there is a SES gradient in smoking, and potentially those from lower SES might experience higher barriers to primary care	GP Consulations / Practice Team Information, 2013(2)
Proportion of patients given prescription	27.7%	• GPs responding to an online CRUK survey that they always/often ask & advise & refer to smoking cessation services either within or outside practice	CRUK report
Proportion of people who uptake of NRT	47.54%	• From the STS; as a % of smokers who have tried to quit in the last yr who had received VBA and NRT or non-nicotine medication (eg Bupropionor varenicline)	Smoking Toolkit Study, all waves. Dataset provided by personal communication from J.Brown. (3)
Quit rate (NRT)	Baselne + 10% points ~15%	• From the academic literature: 5–15 percentage point increase in quit success in those using it to try to quit (highest with varenicline and nicotine patches plus faster acting nicotine replacement therap • Assume a mid point quit rate of 10%	Robert West (2017) Tobacco smoking: Health impact, prevalence, correlates and interventions, available online: http://dx.doi.org/10.1080/08870446.2017.1325890(4)

		• Quit rate is for 52 weeks	
Relapse rate	30%	• As a % of those quitting	Lifetime relapse rate Stapleton, J.A., G. Sutherland, and M.A. Russell, How much does relapse after one year erode effectiveness of smoking cessation treatments? Long-term follow up of randomised trial of nicotine nasal spray. Bmj, 1998. 316(7134): p. 830-1. From http://www.smokinginengland.info/sts-documents/ And also Etter and Stapleton 2006

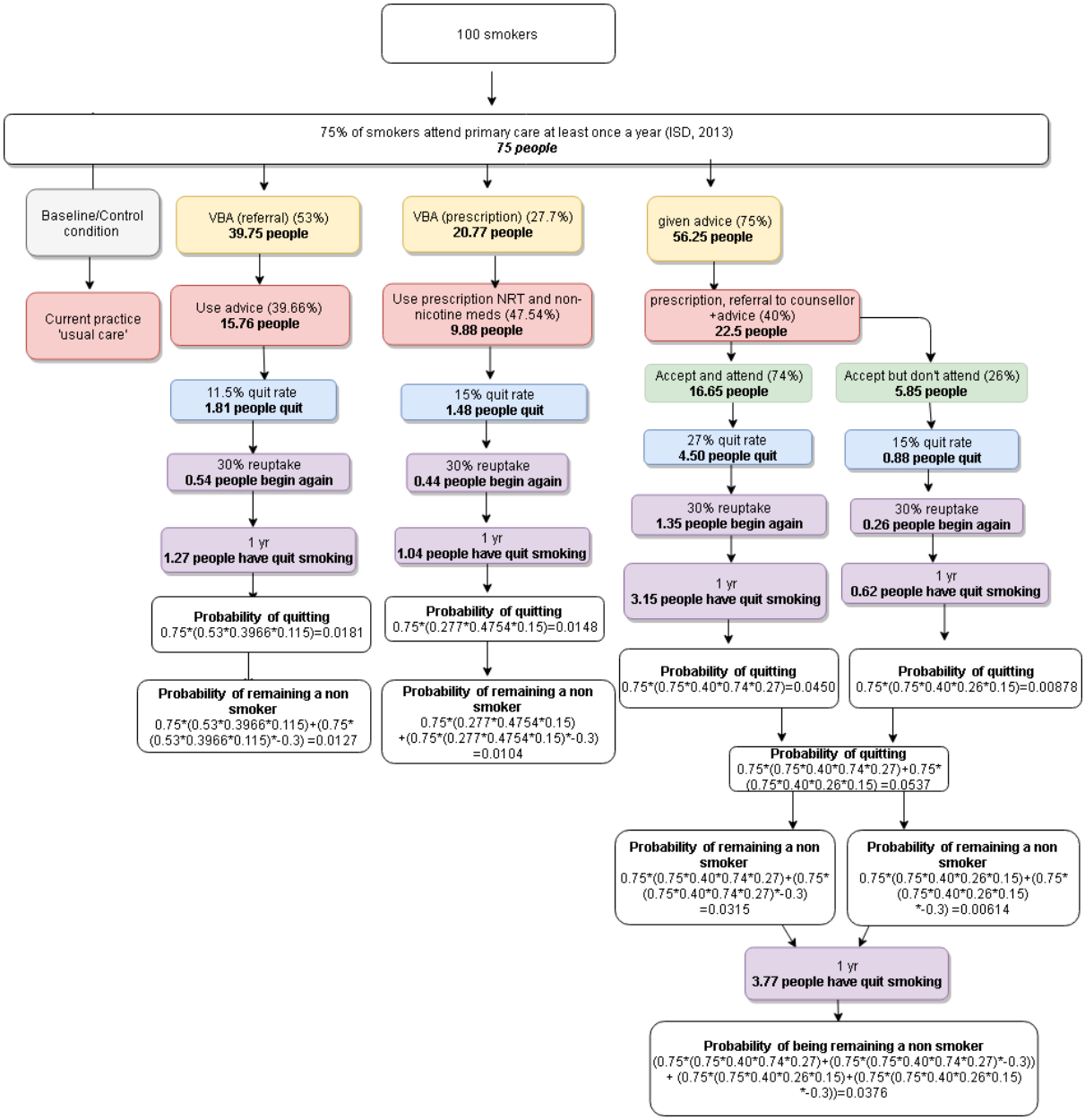
Table 3 Possible data for running an Ottawa Model of Smoking Cessatioin type scenario

Scenario parameter	Data	Assumption	Reference
Proportion of smokers who attend primary care	75%	• Assumes the same number of smokers attend primary care as non-smokers. This might underestimate the number of smokers who attend primary care as smokers have more diseases, though smokers do tend to be younger. Assume 20% who do not attend primary care quit at usual care rate. • This figure was supported by STS data which suggests 36% of smokers had not seen a GP in the last yr. • Potential data limitation: Evidence suggests that there is a SES gradient in smoking, and potentially those from lower SES might experience higher barriers to primary care	GP Consulations / Practice Team Information, 2013(2)
Proportion of smokers idenfied and offered smoking cessation	75%	• Last 12 months which would be the data that is comparable to model 1-3 is 75% (unpublished evaluation data collected from 39 primary care teams, n=22,489). The question was "In the last year did your doctor or another member of the team advise you to quit smoking?")	Personal communciation OMSC(6)
Prescription and referral to	40%	• Range has been 40% to 54% in various evaluations of the OMSC, recommended to use 40%	Personal communciation OMSC(6)

counsellor			
Proportion who accept but don't attend	26%	• Rate in 2018 was 26%. This data has fluctuated by year from 20-30%.	Personal communciation OMSC(6)
Proportion who accept and attend	74%	• 74% of patients who are referred successfully complete a dedicated smoking cessation consultation at the primary care clinic.	Personal communciation OMSC(6)
Quit rate for those that accept but do not attend	Baselne + 10% points ~15%	• From the academic literature: 5–15 percentage point increase in quit success in those using it to try to quit (highest with varenicline and nicotine patches plus faster acting nicotine replacement therap • Assume a mid point quit rate of 10% • Assume quit rate is the same as those that get a referral in model 3. • Quit rate is for 52 weeks	Robert West (2017) Tobacco smoking: Health impact, prevalence, correlates and interventions, available online: http://dx.doi.org/10.1080/08870446.2017.1325890(4)
Quit rate at 52 weeks for those that acccept and attend	27%	• 27% quit at 60 days based on initention to treat analysis which assumes anyone not seen in clinic or reached by phone for the assessment of smoking status has returned to smoking (conservative estimate as such and it would be important to ensure models 1-3 use the same method for calculating quit rate which is described in the Russell Standard – West et al.)	Personal communciation OMSC(6)
Relapse rate	30%	• As a % of those quitting	Lifetime relapse rate Stapleton, J.A., G. Sutherland, and M.A. Russell, How much does relapse after one year erode effectiveness of smoking cessation treatments? Long-term follow up of randomised trial of nicotine nasal spray. Bmj, 1998. 316(7134): p. 830-1. From http://www.smokinginengland.info/sts-documents/ And also Etter and Stapleton 2006

Probability diagram

Below is the probability of quiting for each step of each scenario, it is clear from this that the Ottawa Model is the most effective at reducing smoking prevalence. The references to people are an illustrative method to show how many smokers flow through each step.



References

1. University of Ottawa Heart Institute. Ottawa model for smoking cessation. Primary care. 2018.

2. Scotland I. GP Consultations / Practice Team Information (PTI) 2013 [January 2019]. Available from: https://www.isdscotland.org/Health-Topics/General-Practice/GP-Consultations/.

3. Doss S, Robertson J, Adam J. Lapatinib or trastuzumab in combination with an aromatase inhibitor for first-line treatment of metastatic hormone-receptor-positive breast cancer that overexpresses HER2. Lancet Oncol. 2012;13(8):766-7.

4. West R. Tobacco smoking: Health impact, prevalence, correlates and interventions. Psychology & health. 2017;32(8):1018-36.

5. Stapleton JA, Sutherland G, Russell MA. How much does relapse after one year erode effectiveness of smoking cessation treatments? Long term follow up of randomised trial of nicotine nasal spray. Bmj. 1998;316(7134):830-1.

6. Hickey M, Elliott J, Davison SL. Hormone replacement therapy. BMJ. 2012;344:e763.