CERTARA

Strategic Consulting

Summary Report

A Simulation Model to Evaluate the Impact of VLN™ Cigarettes on the Population as a Whole

(b) (6)

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CONTENTS

ABBREVIATIONS

Abbreviation	Definition
CC	Conventional cigarette
C-I	Rate CC smokers switch to VLN cigarettes
C-Im	Young adult (<25 years) multiplier for C-I
C-It	Time until peak rate C-I
CPD	Cigarettes per day
CPDf	Proportion of VLN smokers reducing CPD
CPDr	Average reduction in CPD among VLN smokers reducing CPD
ERR	Excess Relative Risk: proportion of CC smoker Excess Risk experienced by VLN smokers
I-S	Rate initial VLN smokers become sustaining VLN smokers
MRTP	Modified Risk Tobacco Product
NHIS	National Health Interview Survey
NSDUH	National Survey on Drug Use and Health
RR	Relative risk
S-C	Rate sustaining VLN smokers relapse to CCs
S-Fm	Quit rate for VLN smokers as proportion of CC quit rate
VLN	Very Low Nicotine (22nd Century product)
VLNC	Very low nicotine content

1 SUMMARY

A model was developed to simulate the impact on the US adult population as a whole of marketing 22nd Century's VLN™ cigarettes, which contain at least 95% less nicotine than conventional cigarettes. The target market is current smokers who wish to reduce their nicotine consumption. Possible consequences of switching to VLN cigarettes include reduced cigarette consumption and increased quitting, with corresponding gradual reductions in mortality rates. The model predicted effects on mortality through year 2100 of both conventional cigarette smoking and switching to VLN cigarettes with these consequences. Sensitivity analyses captured the effects of uncertainty in cigarette consumption, quitting, and other transition rates, including relapse rates from VLN to conventional cigarettes. Subpopulations were broken out by age, sex, and smoking status. Former smokers were tracked by the number of years since quitting. Mortality rates depended on age, sex, smoking status, cigarettes per day, and years since quitting for former smokers.

Model outputs included smoking prevalence, cumulative avoided cigarette-attributable deaths, and life-years gained with VLN cigarettes. Avoided cigarette-attributable deaths were calculated as the difference in cigarette-attributable deaths with versus without VLN cigarettes, where cigarette-attributable deaths arise from the increase in risk of death for smokers relative to never-smokers. Life-years gained in each year were calculated as the difference in the annual predicted adult population with versus without VLN cigarettes.

Based on recent rapid declines in US smoking initiation, the model predicted US adult smoking prevalence to decline to about 4.4% in 2050 and 0.8% by 2100, even without VLN cigarettes. Slightly lower prevalence levels were predicted with VLN cigarettes, which are assumed not to affect total

cigarette initiation. Assuming a final market penetration rate of 25%, VLN cigarettes were predicted to avoid about 340,000 cigarette-attributable deaths and add about 8.05 million life-years by year 2100. Avoiding these deaths would avoid $178 billion (in 2018 dollars) in morbidity costs, based on the cigarette-attributable fraction of recent US healthcare expenditures, and approximating these costs as proportional to cigarette-attributable mortality. Young adults showed the greatest long-term benefits, due to their longer opportunity to switch to VLN cigarettes. Benefits were sensitive to assumptions about relative quit rates, relapse rates to conventional cigarettes, and switch rates; reduction in cigarette consumption rate and time to peak market penetration had relatively small effects.

For comparison, an additional scenario was evaluated assuming a mandate in year 2020 reducing cigarette nicotine to minimally addictive levels, similar to Apelberg (2018). The Apelberg scenario assumed much higher baseline smoking prevalence, around 8% over 2050-2100, but similar final prevalence with the mandate, a little over 1%. Despite substantial model differences, the model here gave results similar to Apelberg's, with about 8.4 million avoided cigarette-attributable deaths and 158 million life-years gained by 2100.

2 INTRODUCTION AND MODELING OBJECTIVES

22nd Century Group, Inc. is submitting a modified risk tobacco product (MRTP) application to the U.S. Food and Drug Administration (FDA) to seek authorization to market VLN™ cigarettes containing at least 95% less nicotine than conventional cigarettes (CCs). As part of this application, a simulation model was needed to predict the impact on population health of introducing VLN cigarettes into the US market.

The US Family Smoking Prevention and Tobacco Control Act of 2009 requires FDA to use a public health standard in regulating tobacco products, considering the likelihood of population harms versus benefits. Assessing the public health impact of a tobacco product requires quantitative information on not only the health risks of the product but also users' projected behavior, including initiation, cessation, and switching. Therefore, a population dynamics model was developed and used to evaluate potential health impacts of introducing VLN cigarettes.

Simulation models are being used increasingly to predict population impacts of new tobacco products and tobacco control policies. The importance of model transparency, sensitivity/uncertainty analysis, and validation has been emphasized (IOM 2012 Chapter 6; USDHHS 2014 Appendix 15). In efforts to apply a public health standard, "simulation modeling will become an invaluable tool for FDA-related policymaking," but for this to be accepted, "standards of good practice are necessary for model documentation, transparency, verification, validation, reporting, sharing, and interoperability" (USDHHS 2014 Appendix 15). The objective of the modeling described here is to meet regulatory expectations for assessing the public health impact of VLN cigarettes.

The model first predicts annual smoking prevalence and all-cause mortality without VLN cigarettes and then predicts and compares mortality with them. The population is US adults (age 18 and over), considering subpopulations by age, sex, tobacco use state, and cigarettes per day (CPD) category, as they evolve through year 2100. Objectives are to:

1. Predict use of CCs and VLN cigarettes according to the current regulatory framework

2. Demonstrate the effect of potentially increased smoking cessation and reduced CPD by VLN smokers, with the primary endpoint being cigarette-attributable deaths avoided with VLN cigarettes through year 2100.

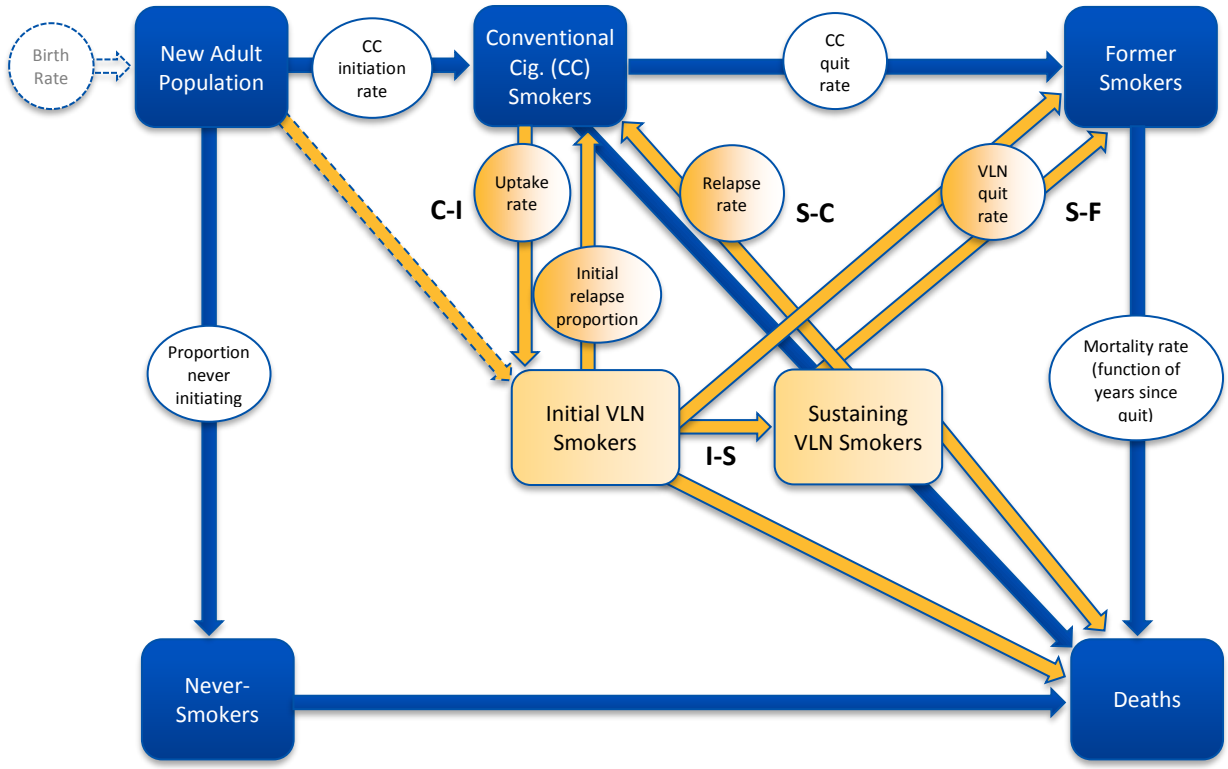
3 METHODS AND ASSUMPTIONS

3.1 METHODS

A Markov state dynamic population model, similar to the models of Apelberg (2018) and Warner (2018), was developed to predict the effects of CC and VLN smoking on the US population as a whole. **Figure 1** shows states of product use (boxes) and paths (arrows) without VLN cigarettes (in blue) and with them (in tan). The model represents VLN cigarettes becoming available in a specified year (2021), after which CC smokers switch to them at a specified rate. The proportion of the population in each box is tracked over time in one-year steps, by age (in integer years from 18 to 100+) and sex. The model also tracks CPD in six categories for current and former smokers, and the number of years since quitting (1 to 30+) for former smokers. The prediction time horizon to year 2100 is intended to capture long-term effects of VLN cigarettes on mortality.

Figure 1. Model Diagram

Blue boxes and arrows indicate states and paths without VLN cigarettes. Tan boxes and arrows represent potential new states and paths with VLN cigarettes.



The dashed arrow from New Adult Population to Initial VLN Smokers indicates that VLN initiation is modeled indirectly. Availability of VLN cigarettes is assumed not to increase total initiation, but could cause some movement from CC initiation to VLN initiation. The model allows for this switched initiation implicitly as CC initiation followed by switching to VLN. This is a conservative approximation because it defers VLN initiation and the associated potential benefits of an increased quit rate and reduced CPD.

In the model, VLN smokers differ from CC smokers in three ways: a specified proportion reduce their CPD by a specified percentage, they may quit at a higher rate than CC smokers, and their risk of death relative to never-smokers may differ from that of CC smokers. A specified proportion of new VLN smokers is assumed to relapse to CC after one year, while the remainder becomes "sustaining" with another (lower) specified annual rate of relapse to CC. These sustaining users are not necessarily exclusive VLN smokers, though they continue to have VLN-modified CPD, quit rates, and relative risk, e.g., they could be dual users retaining the lower CPD and higher quit rates assumed for VLN.

The relative risk of dying for former smokers declines slowly with years since quitting, toward never-smoker levels (Poland 2017). Mortality rates depend on smoking status, CPD, age, sex, and years since quitting for former smokers (**Section 4.5**).

The model steps through each year of the specified period (2015 to 2100), tracking the size of each subpopulation broken out by gender, integer age, and smoking or former smoking level. The arrows into and out from each box in Figure 1 represent the movement of subpopulations: incoming new adult population, never-smokers, current CC smokers, initial and sustaining VLN smokers, former smokers, and finally deaths. The subpopulation in each box is updated annually by adding the inputs and subtracting the outputs. Within each subpopulation, ages are incremented annually, as well as years since quitting if relevant.

Model outputs include cumulative avoided cigarette-attributable deaths and life-years gained with VLN cigarettes. Avoided cigarette-attributable deaths are calculated as the difference in cigarette-attributable deaths with versus without VLN cigarettes, where cigarette-attributable deaths arise from the increase in risk of death for smokers relative to never-smokers. Likewise, life-years gained in each year are calculated as the difference in the annual predicted adult population with versus without VLN cigarettes. Since the new product is introduced in year 2021, there are no avoided deaths or life-years gained before 2022. (In the 2020 mandate scenario below, the new product is introduced a year earlier.)

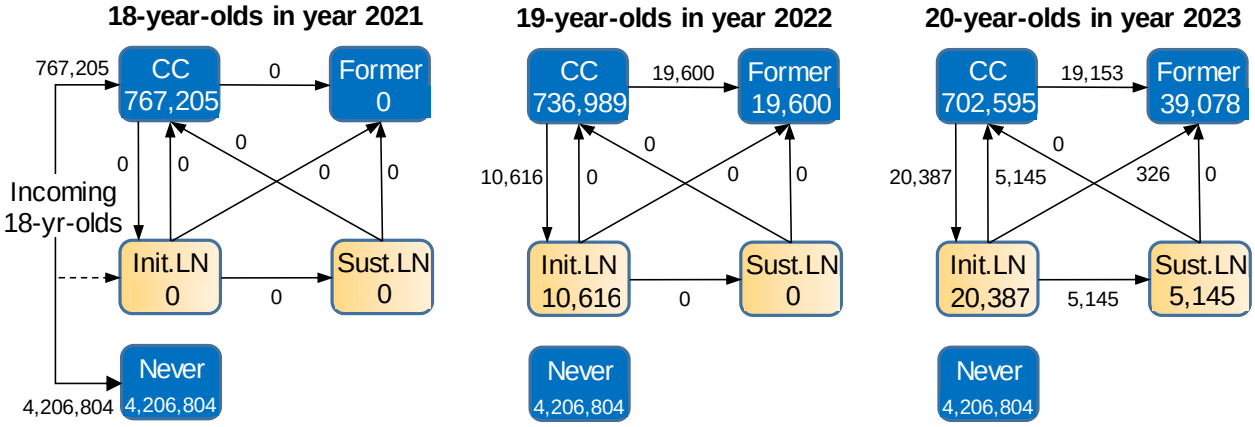
The model was designed with several simplifications to keep it tractable and reduce input requirements. The annual incoming population, of young adults first considering tobacco product use, is assumed to be 18 years old (approximately the median age of cigarette initiation in the US), representing a range of ages around that age. None of this population takes up VLN cigarettes initially; a small proportion takes up CCs and the rest becomes permanent never-smokers. Likewise, former smokers are assumed not to relapse, i.e., only permanent cessation is modeled. Former smokers are not attracted to VLN cigarettes (M/A/R/C Research 2018), so relapse to them is not modeled. Dual CC-VLN smoking is not modeled explicitly, but use of each product can be interpreted as predominant rather than exclusive. Likewise, non-combusted product use is not modeled explicitly, but the decline rate of CC smoking over time (even without VLN cigarettes) can reflect this. In contrast, the model of Apelberg (2018) pools conventional and VLN cigarettes as one product, with non-combusted forms of tobacco as the second product.

As an example, **Figure 2** illustrates transitions made by an 18-year-old cohort in year 2021, the assumed VLN product introduction year, as the cohort ages over 2021-2023. The population count in each state is the previous year's count plus inflows minus outflows. About 15% of the cohort takes up CC, and the remainder becomes never-smokers. In succeeding years, some become former smokers, initial VLN smokers, and sustaining VLN smokers. The count in each state in each year is shown, as well as flows representing counts of people who moved from state to state that year. The model tracks these states in more detail, including sex and CPD category.

The model is implemented in Microsoft Excel (**Appendix 4** lists model and data files), with the annual updates and summary statistics calculated in Excel's Visual Basic for Applications for efficiency.

Figure 2. Example of Incoming Cohort Transitions

The count in each state each year is the previous year's count plus inflows minus outflows (±1 due to rounding). VLN initiation (dashed arrow) is accounted for indirectly as CC initiation followed by switching.



Source: VLNDynStockFlowEx.xlsx

3.2 Assumptions

Key assumptions in the modeling include:

1. CC Initiation (that is, first-time transition to established CC smoking) occurs only at age 18. Rates of cigarette initiation are based on recent data on prevalence at age 18, plus any increases in prevalence through age 25. As a modeling simplification, these initiations are collapsed to occur at age 18, when new population enters the simulation.
2. Availability of VLN cigarettes does not change total cigarette initiation.
3. Quitting is defined as permanent cessation. Former smokers do not re-initiate smoking with CC or VLN cigarettes.
4. VLN smokers may differ from CC smokers in their quit rates, CPD, and relative risk of death compared to CC smokers.

5. A fixed percentage of CC smokers switch to VLN smoking each year.
6. CC smokers who switch to VLN initially use the product for one year, and then either quit (or die), relapse to their previous CC smoking and CPD, or continue as "sustaining" users, with another constant annual proportion relapsing to CC.
7. Like VLN smokers who relapse to CC after one year, sustaining users who relapse to CC relapse to their former CPD level.
8. CC initiation and quit rates are based on recent data (NHIS 2017, Holford 2015) and are constant over time, except for an annual percentage decline in CC initiation. Both sets of rates vary by sex, and quit rates increase with age.
9. Dual CC/VLN smoking is not modeled explicitly (but we can think of each product as predominant rather than exclusive).
10. VLN smokers do not compensate for reduced nicotine by increasing CPD (supported by studies such as Hammond 2014).
11. Each smoker has a fixed CPD level over time, except for CPD reduction by VLN smokers, and subsequent relapse to CC smoking at the former CPD level.
12. Mortality rates for cigarette ever-users increase (nonlinearly) with CPD, and decrease with time since quitting in the case of former smokers.
13. VLN cigarettes have the same toxicity as CCs, making their relative risk equivalent to CCs.
14. Population health risks of tobacco product use are reflected through mortality. Morbidity and reduced quality of life are assumed to be closely correlated with mortality.
15. Some flow rates between the subpopulations depend on age group and sex, but additional factors such as race and education are not modeled explicitly.

4 Model Inputs and Sources

4.1 National Surveys for Historical Cigarette Smoking Prevalence and Cigarette Use Levels

Data on cigarette smoking prevalence is needed to derive initiation rates, as well as to calibrate and validate the model (without VLN cigarettes). Two candidate US national surveys that include data on cigarette smoking prevalence and cigarette use levels are:

1) National Health Interview Survey (NHIS)
2) National Survey on Drug Use and Health (NSDUH)

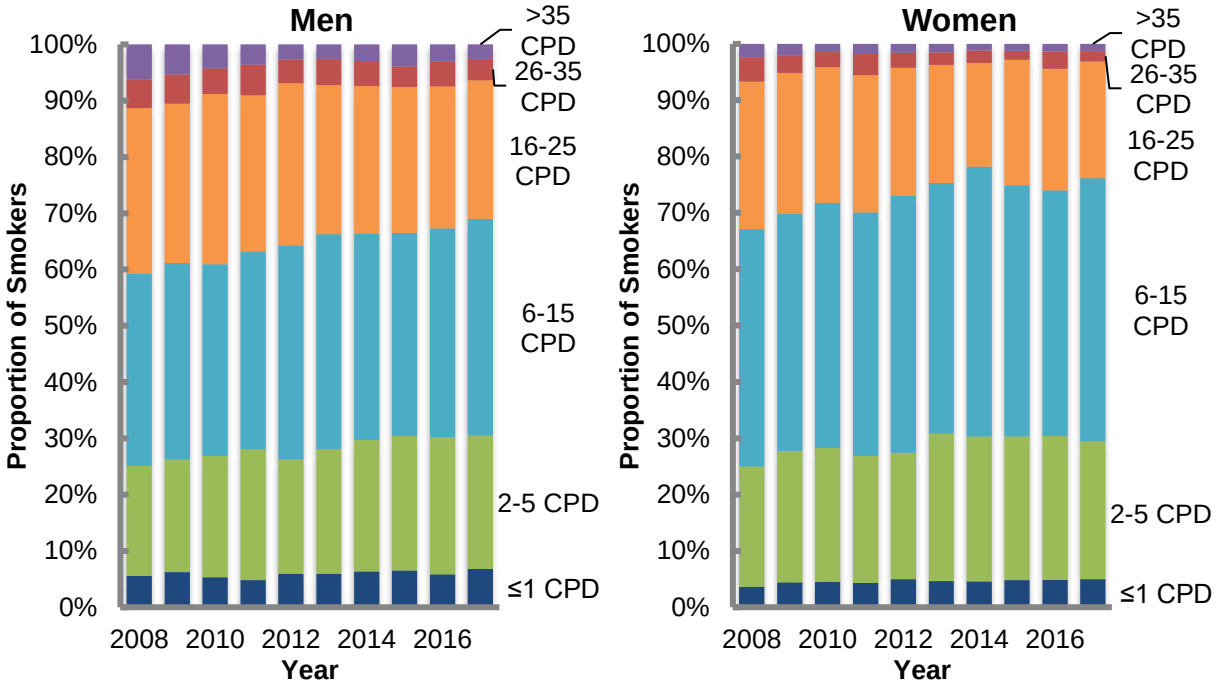
NHIS was selected as the preferred source, as it has been used in similar models (e.g., Apelberg 2018, Vugrin 2015, and Warner 2018), though it could be more subject to bias (Delnevo 2009). NHIS provided

annual smoking prevalence data (shown in **Section 5**) and CPD data over 2008-2017 by sex and year of age. CPD levels from NHIS were categorized as 0-1, 2-5, 6-15, 16-25, 26-35, and >35 CPD (**Figure 3**).

NHIS also provided the number of years since quitting by age and sex, which was used to model this quantity in the first simulated year in order to fully characterize the initial population of former smokers. After the first year, the model determines the number of years since quitting, by incrementing it in each successive year for surviving former smokers, and setting it to one for new quitters.

These surveys do not provide mortality rates. Longitudinal mortality analyses are discussed in **Section 4.5**.

Figure 3. Cigarettes per Day Distributions from 2008-2017 NHIS Surveys



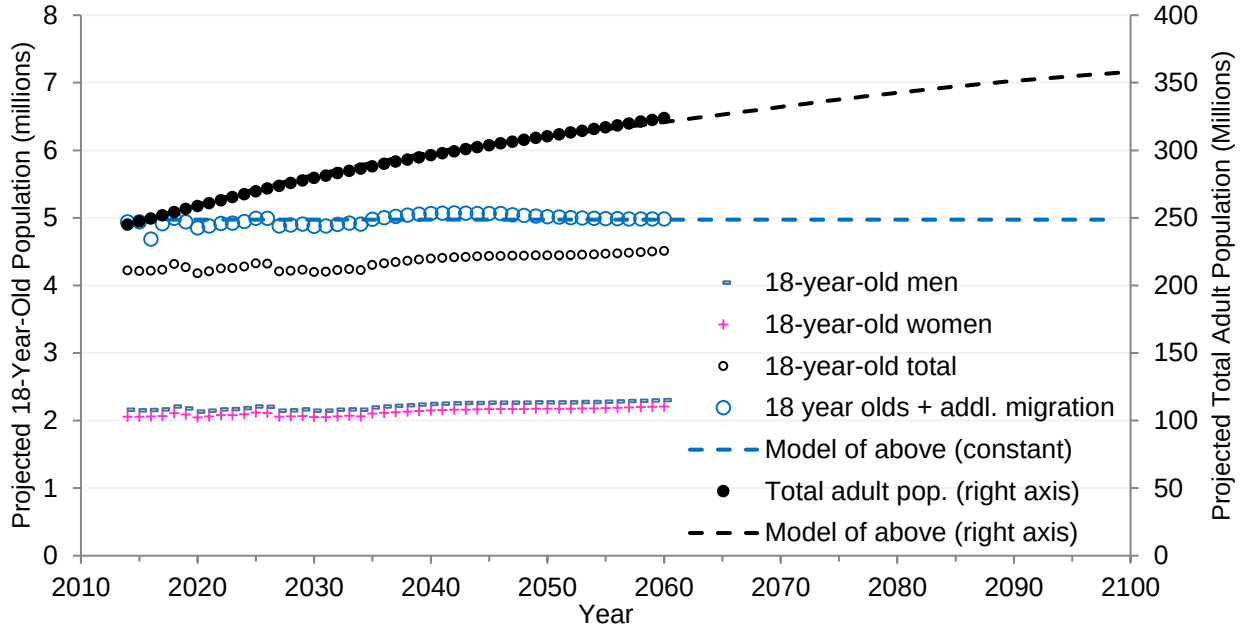
Source: NHIS2008-2017.xlsb

4.2 Initial and Incoming Population

US Census Bureau projections were used to model US population demographics over time. These projections are for years 2016-2060 by year of age (0-100+) and by sex. The initial 2015 population sizes by age (≥18) and sex, and annual (2016-2060) incoming population size of new 18-year-olds, were extracted. Net immigration was simply combined with this incoming population, as it was relatively small. NHIS data provided further breakdown of the initial population into current, former, and never smokers by sex and age group (simplified to 18-24, 25-64, and 65+ year olds). The Census Bureau projections were modeled as a constant annual influx of 18-year-olds plus net immigration. **Figure 4** shows that this modeling captured the Census Bureau projections well (note model predictions also incorporate death rates as discussed below).

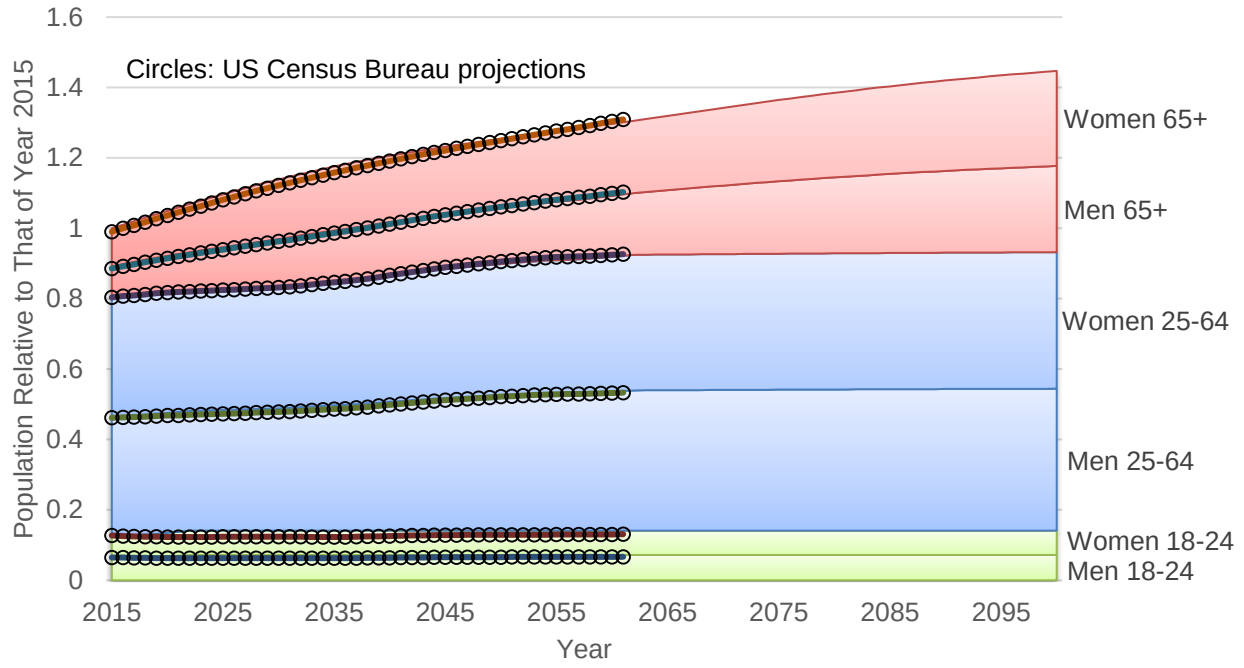
Figure 4. Projected US Population: US Census Bureau and Model

a. Incoming and Total



Source: USCensusProj_NP2017_D1_D3_Models.xlsx

b. Total by age group and sex



Source: VLNDyn2.15.xlsm

4.3 Initiation Rates

CC initiation was based on prevalence of established cigarette smoking ("every day" or "some days," with at least 100 cigarettes smoked over one's lifetime) starting at age 18, plus any prevalence increases up to a nominal cutoff of age 25, from year 2015 NHIS data. Since prevalence increased with age through age 25, this reduced to the prevalence at age 25. To simplify modeling, these initiations were collapsed to occur only at age 18. Men were found to initiate at a rate of 22.2% and women at 15.4% in year 2015. An annual decline in smoking initiation was fitted to 2015-2017 NHIS prevalence data by sex: 3.0% for men and 3.7% for women.

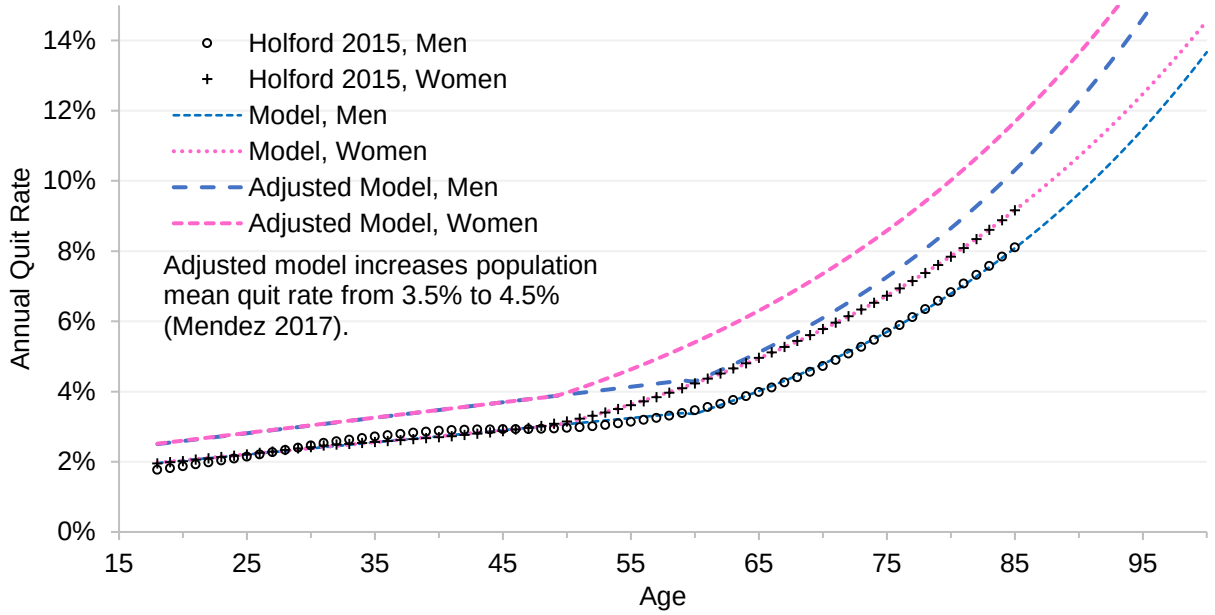
No initiation with VLN cigarettes, or relapse to them by former smokers, was modeled, since market research has indicated no interest from either non-smokers or former smokers in very low nicotine content cigarettes (M/A/R/C Research 2018). In two-product modeling, switch rates to VLN cigarettes are user-specified as an annual proportion of CC smokers, as described in **Section 4.6**.

4.4 Quit Rates

The most detailed recent characterization of CC quit (cessation) rates appears to be that of Holford (2015), who found smooth increases versus age and substantial sex differences. Holford's results for the most recent birth cohort (1980) were modeled as an increasing function of age for each sex. However, Mendez (2017) found that overall average annual quit rates increased over recent decades to 4.5% in 2014 based on NHIS data (or 4.2% based on NSDUH data). Considering this upward trend, the model used an adjustment of the Holford-based curves to an average of 4.5% (**Figure 5**).

Holford (2015) defined quitting as smoking abstinence for at least two years. To avoid complex modeling of relapse behavior, the model here assumes that quitting is permanent, following the precedent of Mendez (2011) and Mendez (2017).

Figure 5. Quit Rate Modeling by Age and Sex



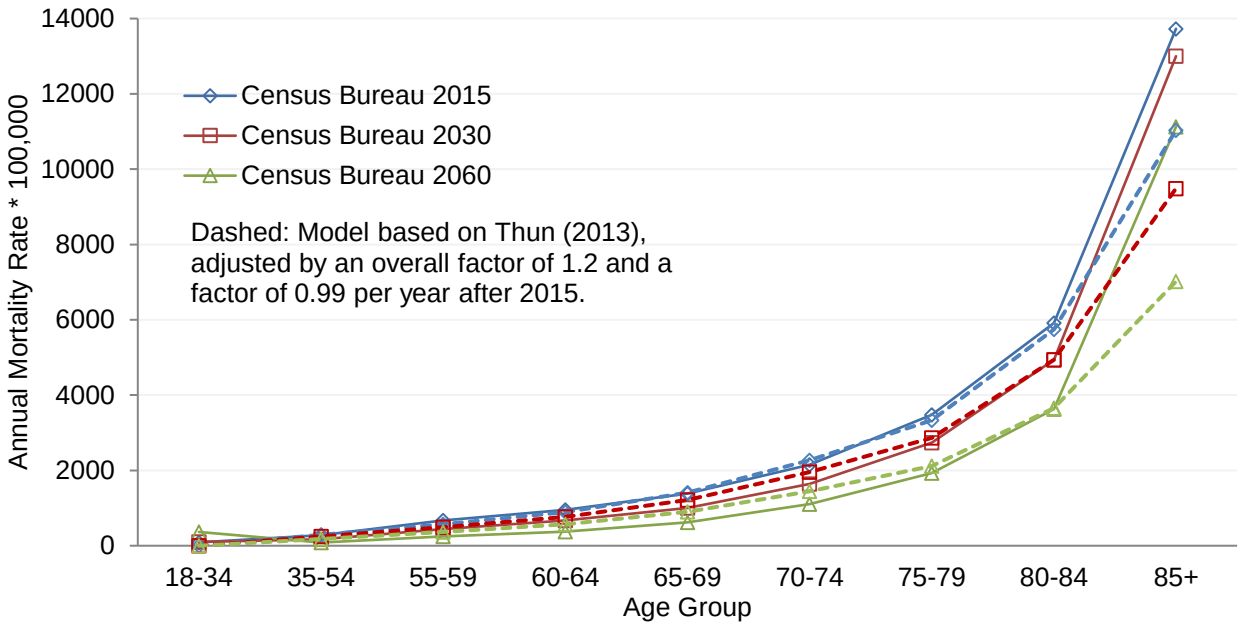
Source: Holford2015Cessation.xlsx

4.5 Mortality Rates and Link to CPD

All-cause mortality rates were modeled by age group, sex, and smoking status. Specific causes of death such as cancer were not modeled (but could be apportioned from total mortality). Mortality rates for never-smokers, and relative risks (RR) of death for smokers, are provided by sex and age group starting at age 55 in Thun (2013), which reports on "contemporary cohorts" of 956,756 subjects with mean age 67 years. USDHHS (2014) provides RR for 35-54 year old men and women. Never-smoker mortality rates for 35-54 year old men and women, unavailable in these two references, are taken from Woloshin (2008). Finally, mortality rates for 18-34 year olds are assumed to be zero, as they are relatively very low.

The cohorts in Thun (2013) were not representative of the overall older US population (e.g., education levels were higher), and none of the three references noted above fully reflects recent declines in overall mortality rates. An overall mortality rate multiplier of 1.2, together with a 1% annual decline over the forecast period, were found to adjust the Thun/USDHHS/Woloshin mortality rates close to those projected by the US Census Bureau in their 2016-2060 population projections. **Figure 6** shows the Census Bureau projections and the model's adjusted projections vs. age for selected years.

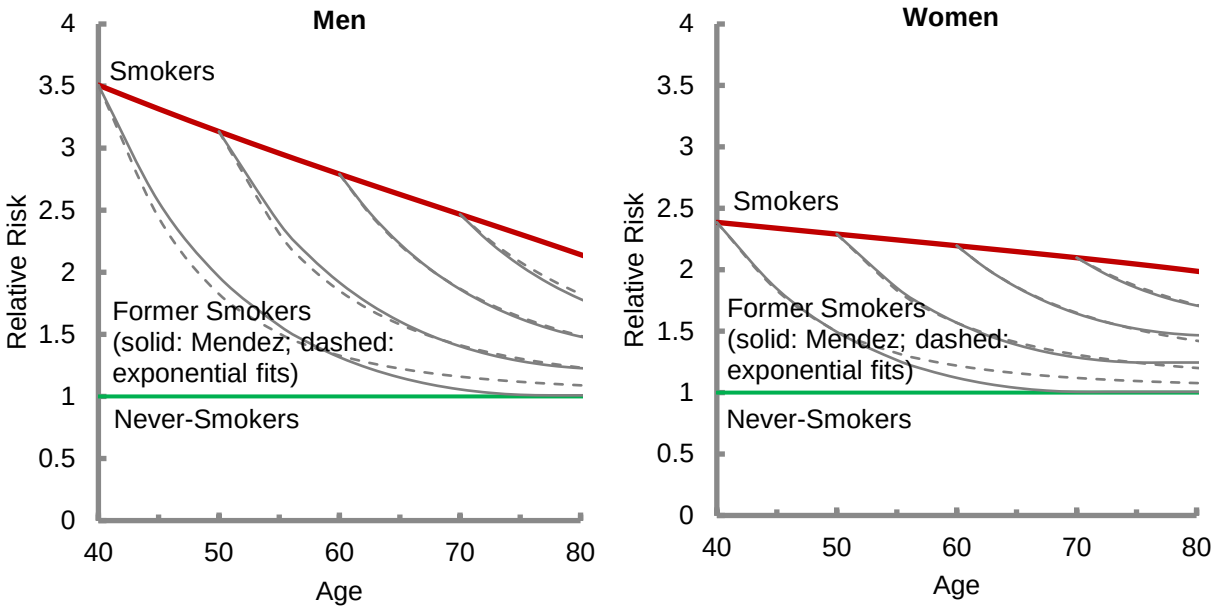
Figure 6. Projected Annual Mortality Rates: US Census Bureau and Model



Source: USCensusProj_NP2017_D1_D3_Models.xlsx

For former cigarette smokers, effects on mortality rates of time since quitting, as well as age when quit and sex, were accounted for with curves of RR versus these factors from Mendez (2001) (**Figure 7**). Though Thun (2013) shows former smoker RR by *either* age when quit *or* time since quitting, Mendez (2001) estimated RR curves versus both simultaneously, allowing more accurate modeling. As shown in **Figure 7**, RR decreases with age and decay approximately exponentially after quitting. (However, for any particular smoking status, absolute mortality risk still increases with age.) These decay rates become slower at older ages. The data used in the estimation is old, from the 1982-1988 Cancer Prevention Study II (CPS II). However, the model requires only the decay rates with time since quitting (by age when quit), which are less subject to change over time than the mortality rates themselves. These rates were modeled as exponential decline slopes and used to modify smoker RRs after quitting. The same exponential decay rates were used for men and women due to negligible differences.

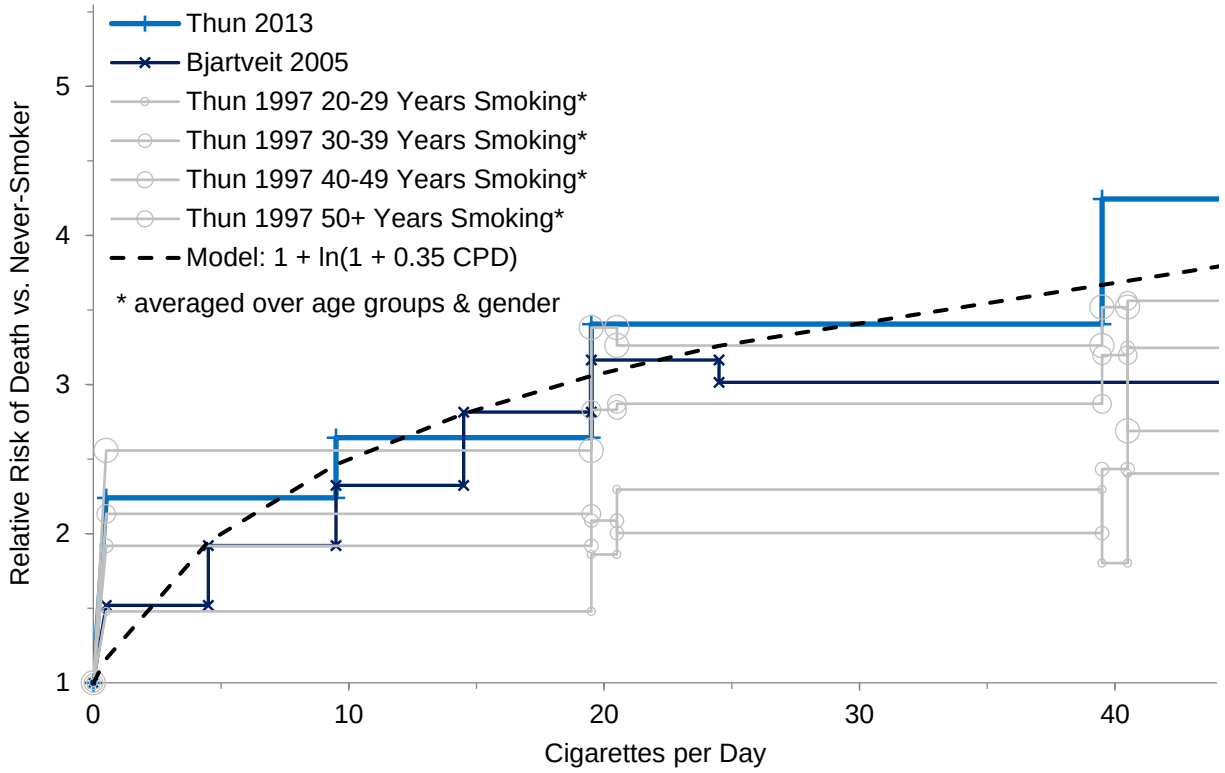
Figure 7. Former Smoker Relative Risks by Age, Age when Quit, and Sex from Mendez (2001)



Source: Mendez2001RRModel.xlsx

Smoker mortality rates were varied to reflect CPD, by adjusting RR at the midpoint of each CPD category. A logarithmic relation between CPD and RR was assumed based on data in Thun 2013, Thun 1997, and Bjartveit 2005 (see also Inoue-Choi 2018 for a recent confirmation that reducing CPD reduces mortality). The assumed relationship is: RR = 1 + ln(1 + 0.35 CPD) (**Figure 8**; details are in Poland 2017). This RR is scaled to preserve the overall smoker RRs by age and sex from Thun/USDHHS, and then multiplied into the corresponding Excess Risk (RR minus one) to incorporate CPD effects. Former smoker death rates accounted for CPD the same way, but with exponential decay of their previous CPD-adjusted Excess Risk before quitting.

Figure 8. Relative Risk vs. Cigarettes per Day, with Fitted Curve



Source: Thun2013RelativeRisks.xlsx

4.6 VLN Cigarette Transition Rates

Future transition rates to and from VLN cigarettes and CCs are highly uncertain, due to very limited experience with very low nicotine content (VLNC) cigarettes. Various VLNC cigarettes have been test-marketed, such as Philip Morris's Next and Vector Tobacco's Quest, but detailed transition information is not available. Hypothetical transition rates and other input assumptions were developed (Table 1 and Table 2) with broad ranges for sensitivity analysis (**Section 6)**.

The rate at which smokers switch to VLN cigarettes will depend on awareness of them in the market for nicotine replacement and smoking cessation aids. Every year about half of current smokers make a quit attempt (CDC 2011). About one-third of those attempting to quit try nicotine replacement therapy or prescription medication as a cessation aid (Pierce 2012). We assumed the VLN product is a successful alternative with a 25% maximum share of the cigarette smoker market.

VLNC cigarette smokers reduced their average CPD in various studies. The analysis here assumed 80% of such smokers reduce CPD about 50%, and the remaining 20% do not reduce CPD, approximated from Hatsukami (2018). Smaller studies with shorter time horizons showed somewhat lower reductions, such as Hatsukami (2010 Figure 2), which showed a reduction of about 37%, and Donny (2015), which showed a 33% reduction. However, Hatsukami (2018) was the largest and longest study (1250 subjects for 20 weeks).

Quit rates for VLN cigarette smokers are user-specified as a percentage that multiplies CC quit rates. An appropriate multiplier is difficult to select because the available studies suffer from short follow-up, as in Hatsukami (2010) and Hatsukami (2013), or were not designed to make conclusions about quit rates (Benowitz 2007), or studied only a specific regimen for reducing nicotine in smokers not interested in quitting (Benowitz 2015). The most relevant study of a quitting effect appears to be Walker (2012), which showed an increase in continued abstinence from 28% without VLNC cigarettes to 33% with VLNC at six months follow-up after initial quitting. The base case analysis here therefore multiplies the quit rate curves by the ratio 33/28 (118%).

Table 1. Base Transition Rates to and from VLN Cigarettes

Abbrev-iation	Input	Rate (%/year)
C-I	Peak rate conventional cigarette (CC) smokers switch to VLN cigarettes. *Rationale: tuned to produce a target 25% market penetration at equilibrium.*	7.1%
I-S	Proportion of initial VLN smokers sustaining use beyond one year (remainder quit or relapse to CC after one year). *Rationale: nicotine addiction will drive many VLN experimenters back to CC. We assume a relapse rate to CC similar to that of smokers who abstain completely at least half a year.*	50%
S-C	Rate sustaining VLN smokers relapse to CCs. *Rationale: We assume a relapse rate similar to that of CC quitters after one year. In a meta-analysis, Hughes (2008) found an annual relapse rate of 10% after one year, with high variability but a decrease over time. Krall (2002) found 2-4%/year relapse in the 2nd-6th years of abstinence, dropping to <1% after 10 years, but other studies have found somewhat higher relapse rates.*	10%

Table 2. Additional Inputs for VLN Cigarettes

Abbrev-iation	Input	Value
C-Im	Young adult (<25 years) multiplier for the rate that CC smokers switch to VLN cigarettes. *Rationale: though younger VLN smokers may find some VLNC cigarettes less satisfying (Cassidy 2018), sensitivity analysis showed little effect on long-run population endpoints, so it was not modeled.*	1
C-It	Time until peak rate that CC smokers switch (with linear growth). *Rationale: tuned to produce a moderate time to peak market penetration (varied from 2 to 10 years for fast and slow penetration; see **Figure 10** below).*	5 years

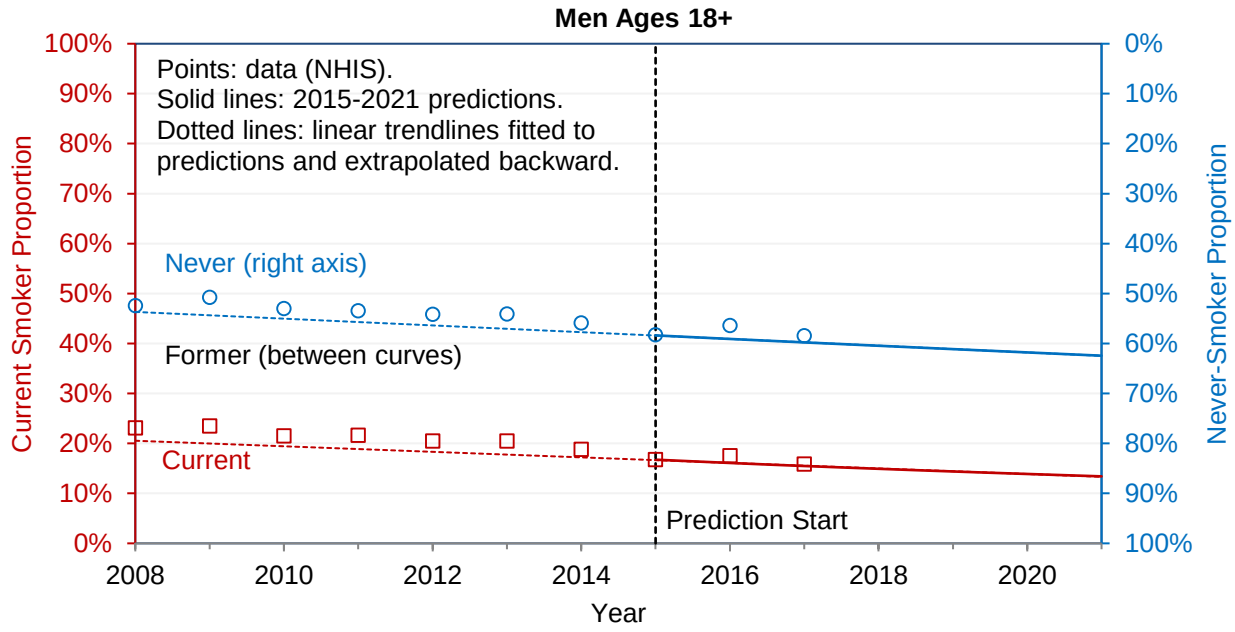
CPDf	Proportion of VLN smokers reducing CPD. *Rationale: the immediate nicotine reduction arm in Hatsukami (2018) Fig. 2 shows a slightly lower CPD 75th percentile, but higher upper bound, at 20 weeks versus 0 weeks, suggesting that about 80% of immediate-reduction smokers reduced CPD.*	80%
CPDr	Average reduction in CPD among VLN smokers reducing CPD. *Rationale: Hatsukami (2018) showed an increasing CPD reduction over time, reaching about 40% (median) at 20 weeks in Fig. 2 and roughly 50% (mean) over 16-20 weeks in eTable 14. Note that the downward trend had not slowed by 20 weeks, so 50% could be conservative as a long-run estimate.*	50%
S-Fm	Quit rate for VLN smokers as proportion of CC quit rate. *Rationale: this is the relative six-month quit rate as a seven-day point prevalence (with Quitline care) in Walker (2012). A high case of 150% is plausible, because the six-month quit rate as continuous abstinence reached 150% in this study, and a systematic review by Hartmann-Boyce (2018) found that nicotine replacement therapy increases quitting by 50-60%.*	118%
ERR	Excess Relative Risk (ERR): proportion of CC smoker Excess Risk experienced by VLN smokers. *Rationale: the VLN product is assumed to be have the same toxicant-induced risk profile as CC except for nicotine, which is not known to affect mortality.*	100%

5 Model Calibration and Validation

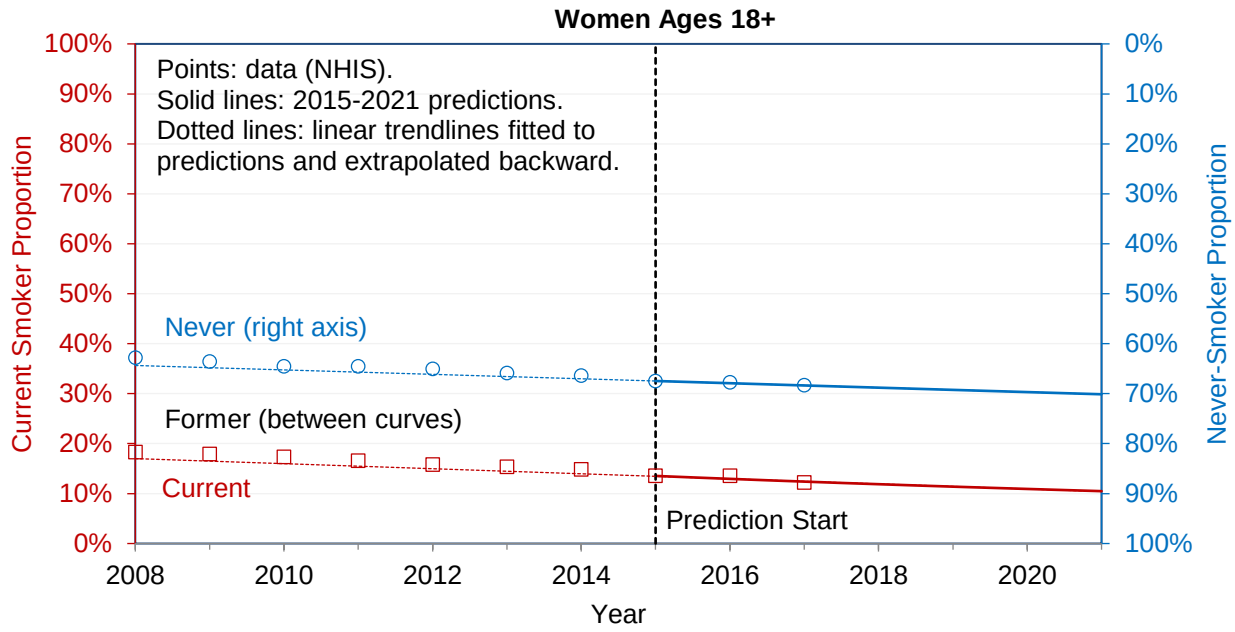
Calibration is the adjustment of uncertain parameters to improve the model's fit to historical data; validation is the demonstration that the model then fits other data not used in the calibration. The model was calibrated with year 2002-2014 NHIS data and validated with 2015-2017 NHIS data on prevalence of current, former, and never-smokers by age group and sex. An exception to the calibration period was that in order to represent recent trends as accurately as possible, an annual decline in male and female initiation rates was based on 2015-2017 NHIS prevalence data, as noted above. The calibration also adjusted quit rates from the two-year quit rates in Holford (2015) to the overall permanent quit rate estimated in Mendez (2017), as shown in **Figure 5** above. Validation then used back-extrapolation of prevalence predictions from 2015-2021 to the historical data for 2008-2014, by sex and age group, with comparison to NHIS results. **Figure 9** shows these results by sex, which together with similar results by subpopulation, were judged adequately accurate for use in the model.

Figure 9. Smoking Prevalence Validation against 2008-2017 Data

a. Men



b. Women



Source: VLNDyn2.15.xlsb

6 RESULTS AND SENSITIVITY ANALYSIS

Market penetration reached the target value of 25% by about 2050 in all market penetration cases (**Figure 10**). Without VLN cigarettes, the model predicted a gradual decline in smoking prevalence, reaching about 4.4% in year 2050 and 0.8% in year 2100; VLN cigarettes resulted in a marginally faster smoking decline while avoiding about 340,000 deaths and gaining about 8.05 million life-years through 2100 (**Figure 11**). A breakdown into three initial age group cohorts and incoming population suggests that younger adults receive greater long-term benefits, due to their longer opportunity to switch to VLN cigarettes (**Figure 12** and **Appendix 2**). In particular, initial 65+ year olds, who constitute about 19% of the initial population, contribute very little to cumulative results through 2100, which are dominated by the incoming new population (modeled at 18 years old) plus the initial 18-24 year olds.

Figure 13 uses a tornado chart to show sensitivity of avoided cigarette-attributable deaths to the various VLN inputs, as well as to additional inputs common to CC and VLN. The bars show how varying each input one-at-a-time affects the mortality endpoint. The bars are sorted in descending order of length to make the tornado shape. The base line shows the output with all inputs at their base values. For the specified input ranges, quit and relapse rates for VLN smokers had the greatest effect on the endpoint, indicating the relative importance of these inputs. Other inputs showed less sensitivity in the tornado chart, for example, market penetration rate (years until peak rate that CC smokers switch, varied from two to 10 years). **Appendix 3** provides detailed output for the 28 low and high cases shown in the tornado chart.

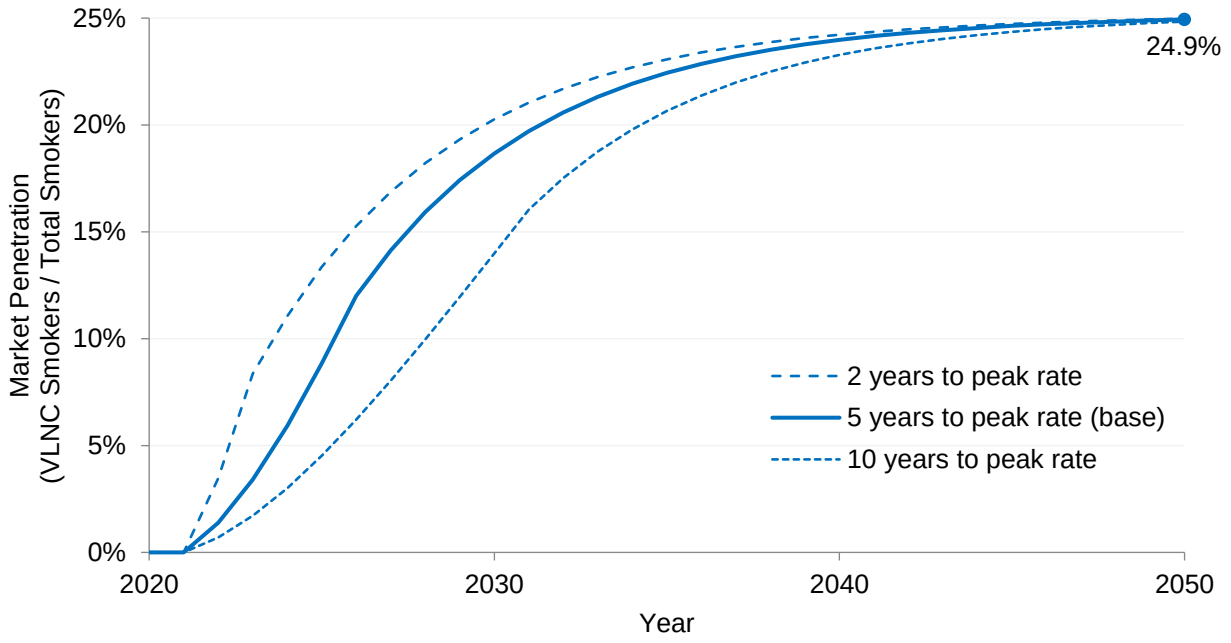
Table 3 shows avoided cigarette-attributable deaths and life-years gained under six scenarios; **Table 4** provides more detail for the base case, and **Appendix 1** provide further breakdown by year, age group, and sex. VLN cigarettes are predicted to avoid 340,000 cigarette-attributable deaths by year 2100 in the base case, with about a three-fold range above and below this (136,000 to 922,000) resulting from combinations of low and high values of quit and relapse rates for VLN smokers. Similarly, about 8.05 (range 4.10 to 18.7) million life-years could be gained. A sixth scenario, "Mandate in 2020," approximates the mandated nicotine reduction scenario modeled in Apelberg (2018). Though substantial model differences prevented a precise reproduction of this scenario, inputs were either set to values specified in the Apelberg paper or tuned to give similar results. **Figure 14** shows that results for this scenario fall within the 5%-95% prediction intervals provided in the paper. Delaying the mandate to 2030 has a relatively small effect (results not shown). The results for the mandate in **Table 3** are as much as 20 times more favorable than the base case, because the mandate forces smokers to switch to VLN or quit. See **Figure 15** for selected results versus time.

If morbidity and mortality from cigarettes are assumed proportional, the predicted cigarette-attributable deaths avoided with VLN cigarettes can be used to approximate how they might reduce morbidity. Morbidity will be measured here by the cigarette-attributable fraction of US healthcare expenditures. The 2014 Surgeon General's report (USDHHS 2014) estimated this quantity at about $170 billion in year 2010, in 2010 dollars. This becomes $240 billion in 2018 dollars, when inflated at the 4.4% average increase in healthcare expenditures predicted by the Centers for Medicare and Medicaid Services (CMS 2018). This estimate used a regression approach to calibrate the impact of smoking independently from the impact of other factors correlated with smoking that may affect health care expenditures. The report compared two other approaches: an aggregation of healthcare expenditures across age, sex, and smoking status, which

gave almost the same estimate, and an aggregation of smoking-attributable healthcare expenditures across types of medical services, which produced a lower estimate that was attributed to outdated smoking-attributable fractions. The report also estimated economic costs of lost productivity attributable to premature death from cigarette smoking, which almost doubled the total cost estimate, adding $151 billion per year over 2005-2009, but these indirect costs will not be considered here.

Under base case assumptions, the model predicts 459,000 cigarette-attributable deaths in 2018 (consistent with the estimate of 480,000 deaths from smoking and secondhand smoke in USDHHS 2014). The cigarette-attributable cost per death in 2018 is then $240 billion/459,000 = $523,000. VLN cigarettes were found above to avoid 340,000 cigarette-attributable deaths through year 2100. Thus, a simple approximation of the morbidity impact of VLN cigarettes, measured by potential healthcare cost savings through 2100, is 340,000 times $523,000, or $178 billion, in 2018 dollars. These savings accumulate over time as shown in the last row of **Table 4** and each table in **Appendix 1** to **Appendix 3**. These results have a very wide uncertainty range, due to uncertainty in both death and cost components as well as the simplifications of the approach.

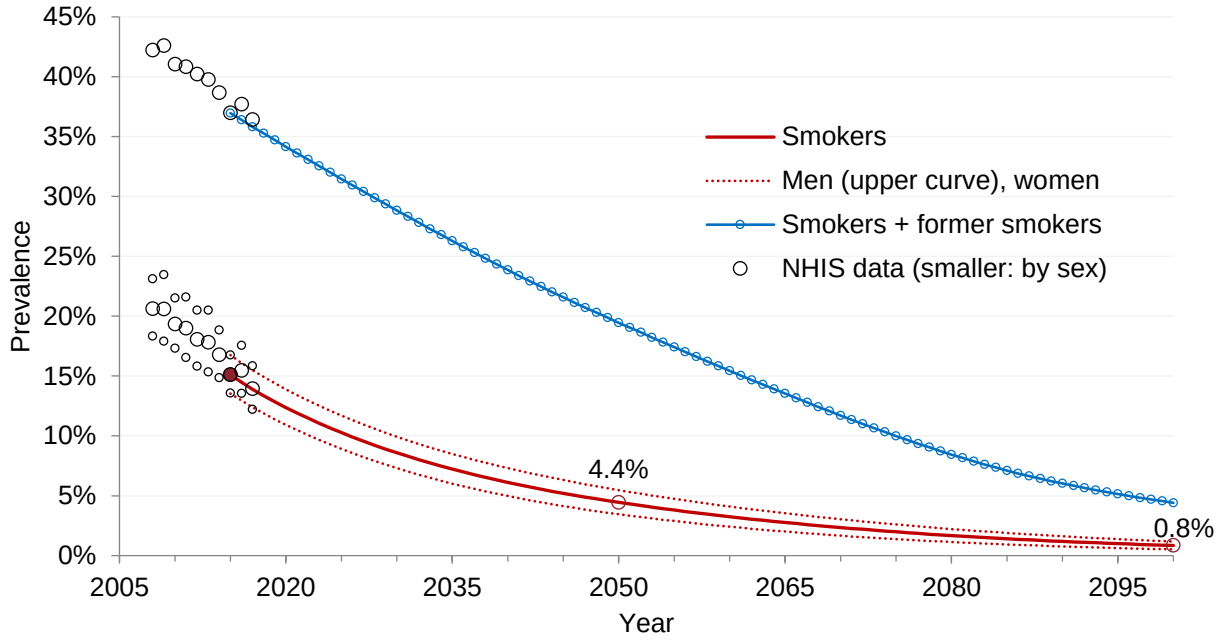
Figure 10. Predicted Market Penetration in Slow, Base, and Fast Penetration Cases



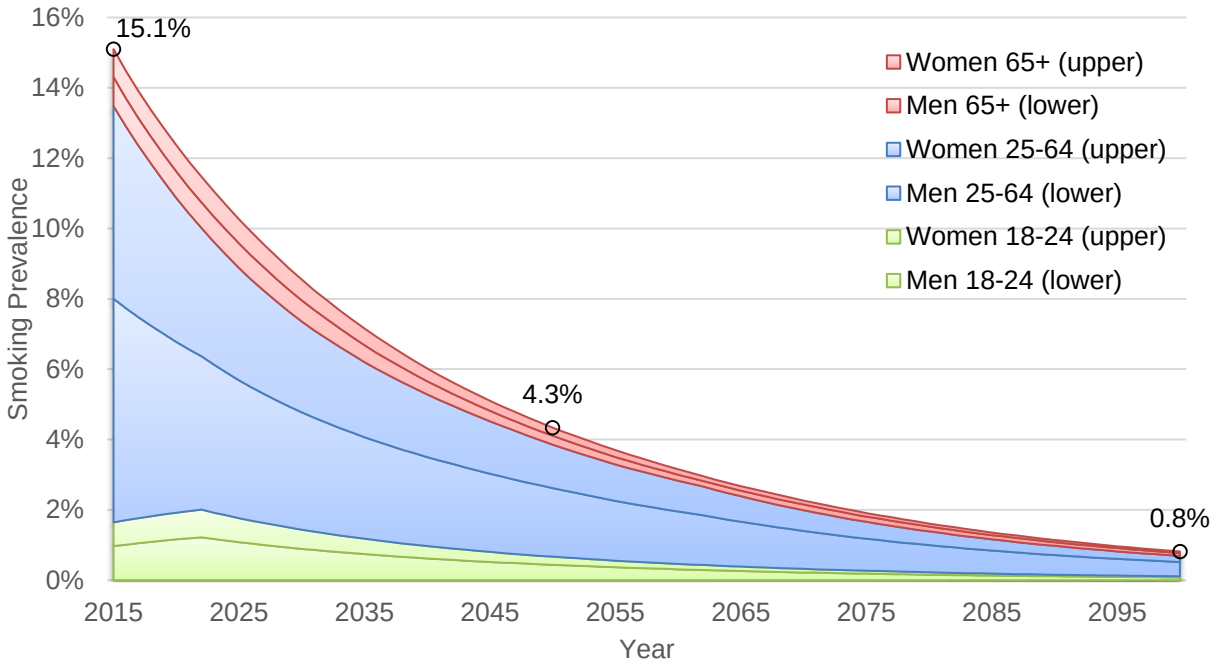
Source: VLNDyn2.15.xlsb

Figure 11. Smoking Prevalence and Mortality Predictions

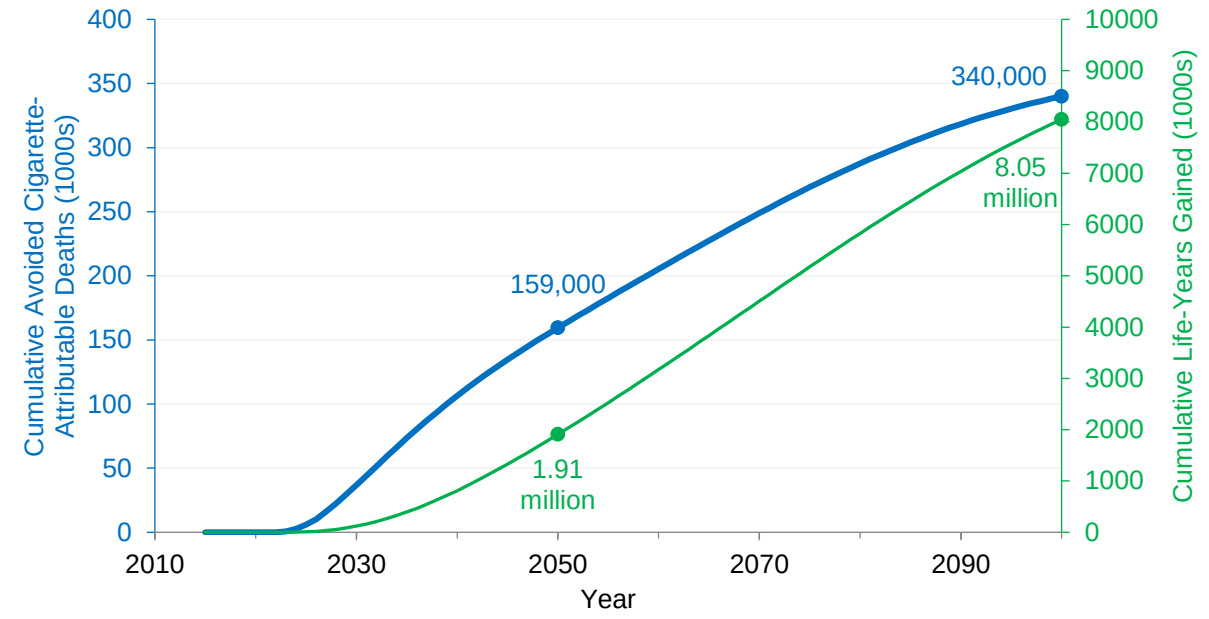
a. Smoking and former smoking prevalence without VLN cigarettes, and 2008-2017 Data



b. Smoking prevalence with VLN cigarettes, by age group and sex



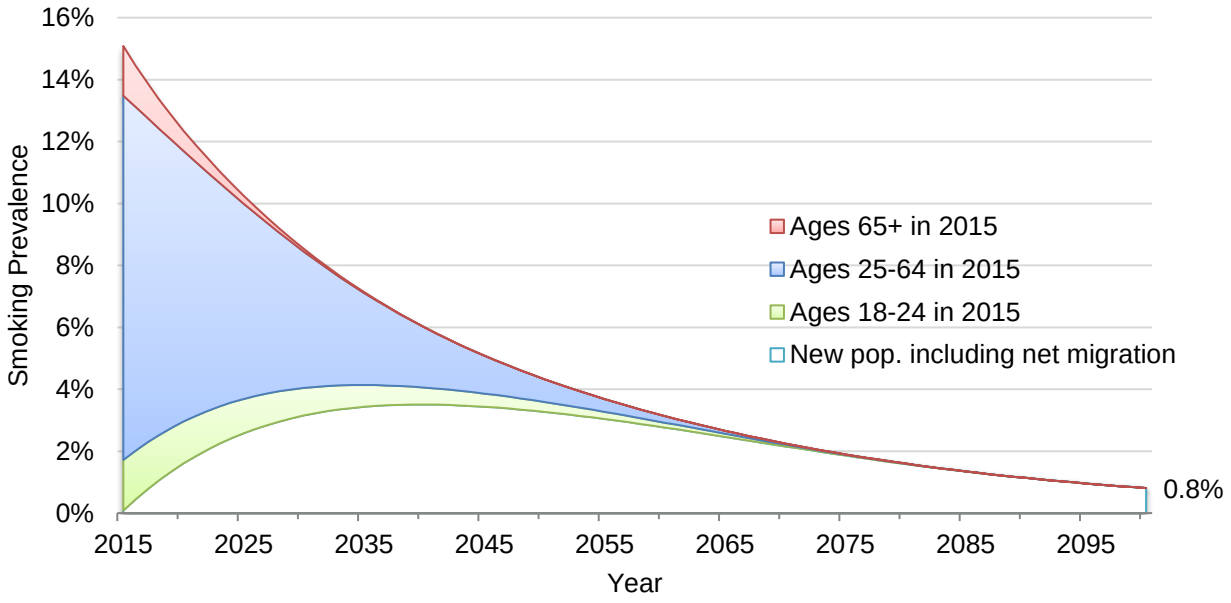
c. Avoided cigarette-attributable deaths and life-years gained



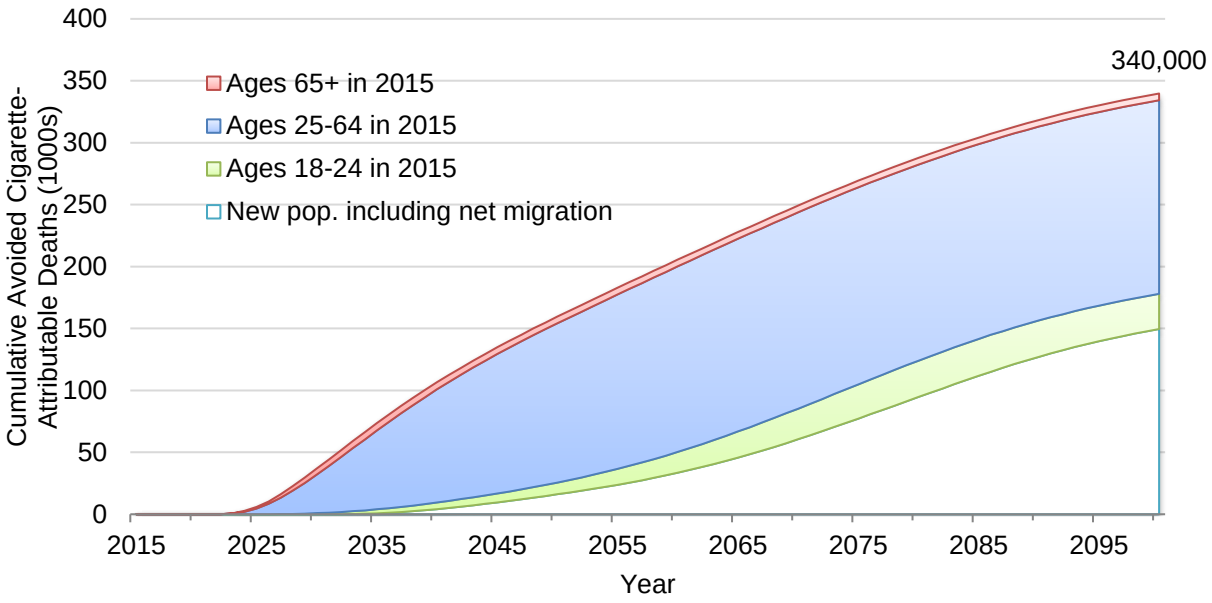
Source: VLNDyn2.15.xlsb

Figure 12. Predictions Divided into Three Initial Age Groups and New Population

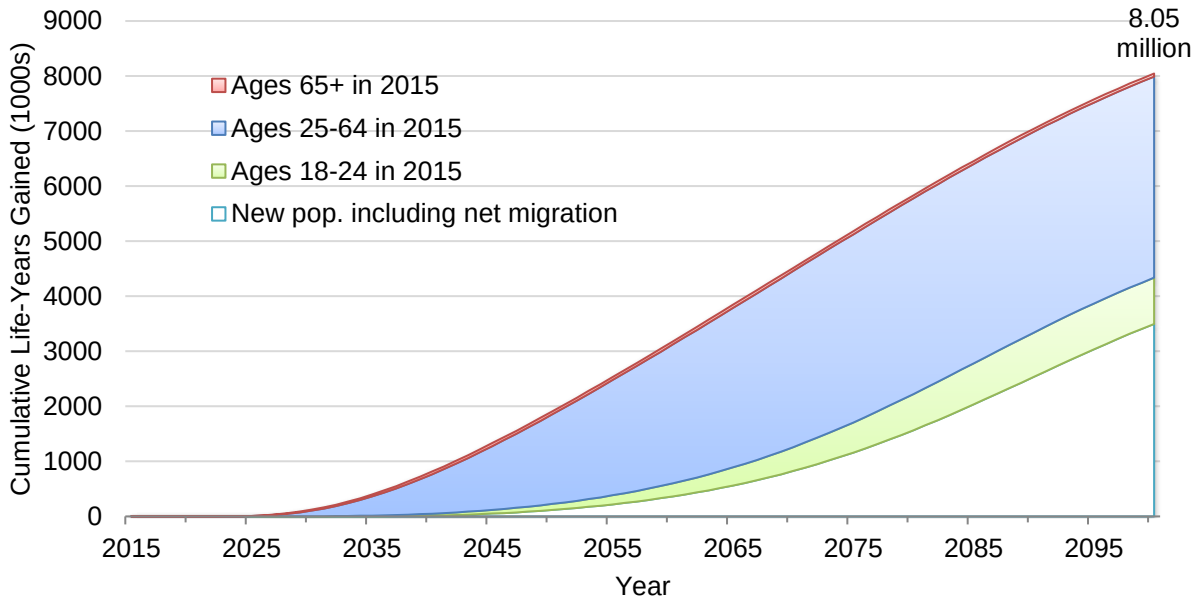
a. Smoking Prevalence



b. Avoided Cigarette-Attributable Deaths



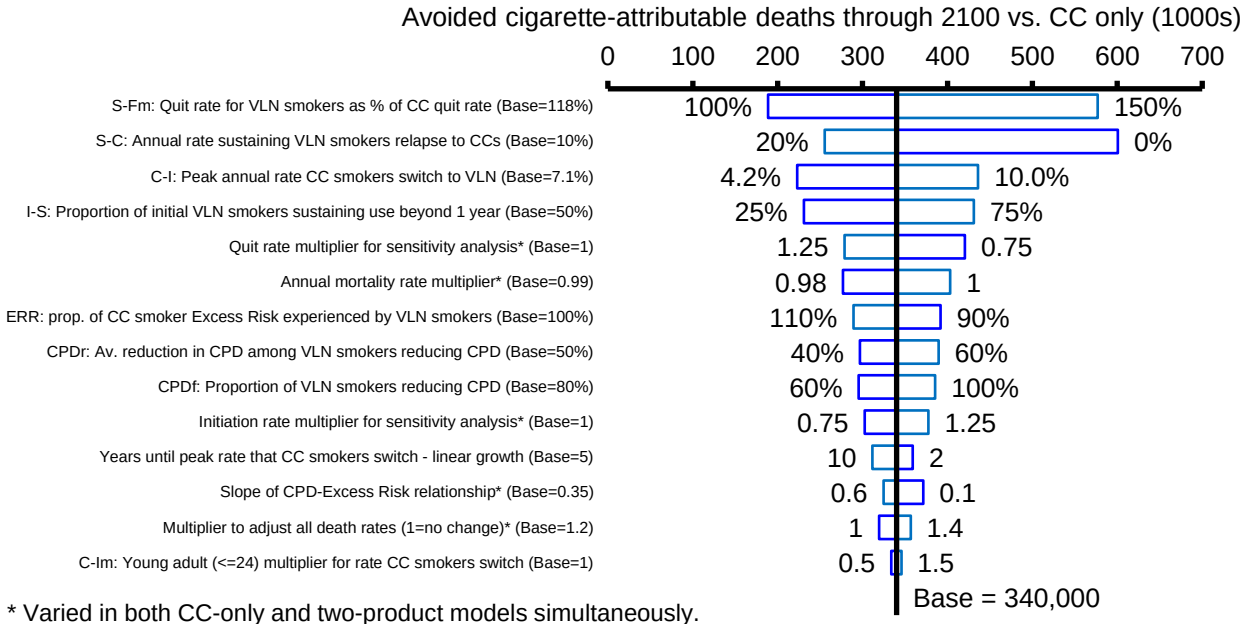
c. Life-Years Gained



Source: VLNDyn2.15.xlsb

Figure 13. Sensitivity Analysis: Tornado Chart for Avoided Cigarette-Attributable Deaths

The base line shows the output with all inputs at their base values; each input is swept one-at-a-time to its low and high cases.

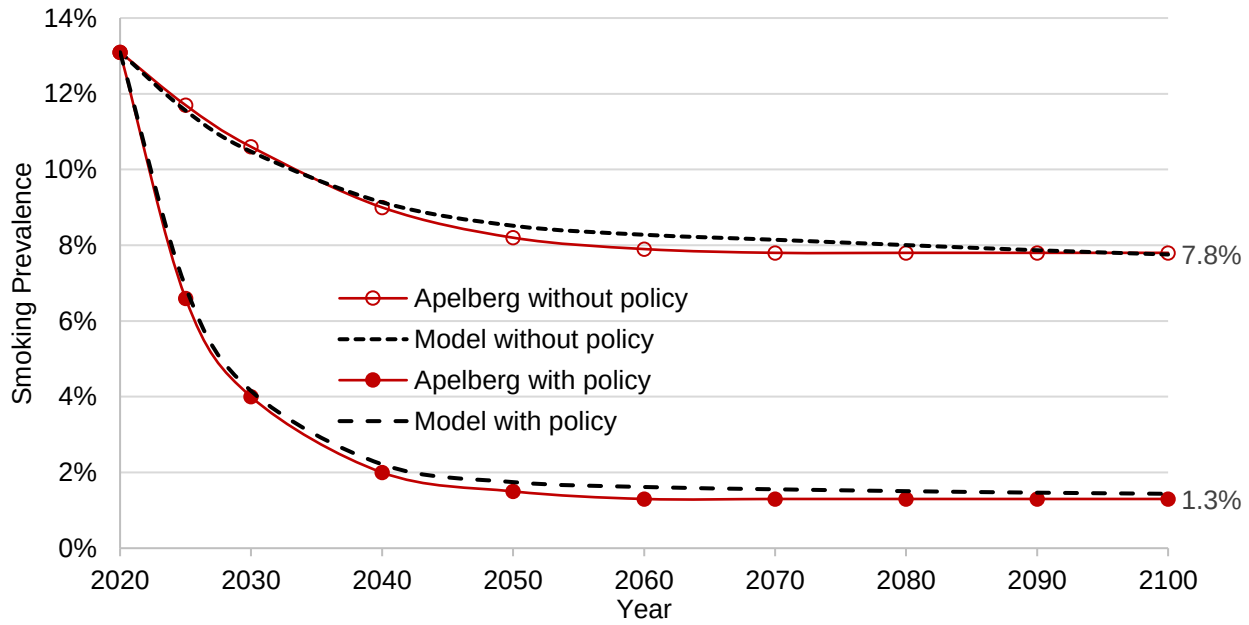


* Varied in both CC-only and two-product models simultaneously.

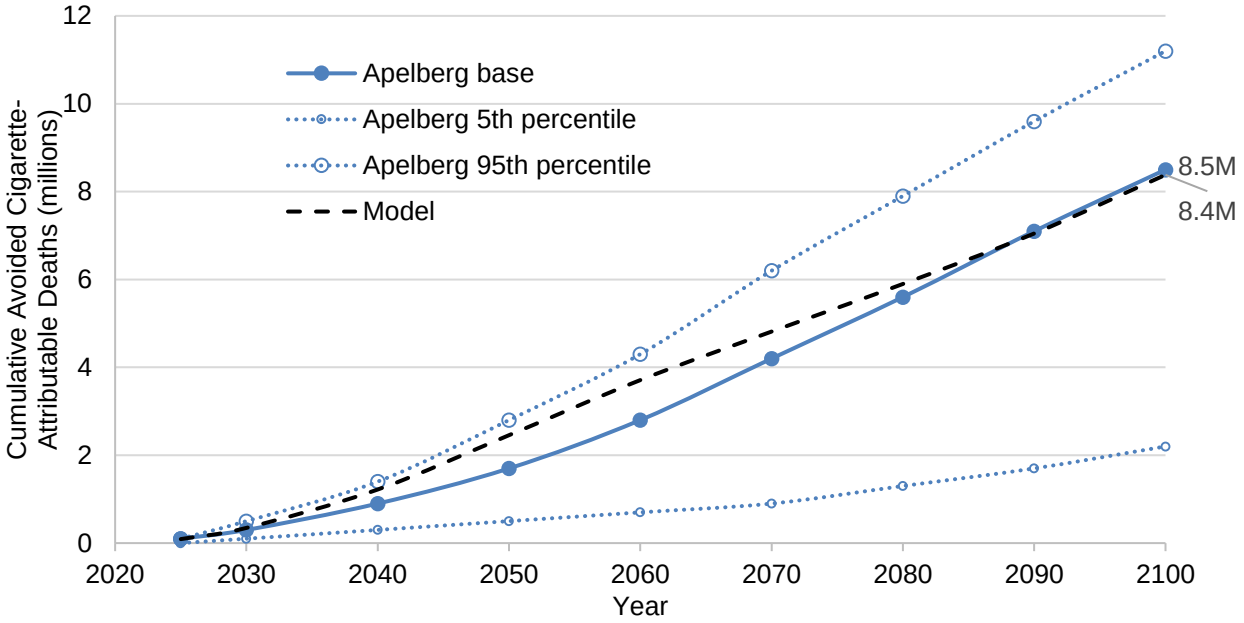
Source: VLNDyn2.15.xlsb

Figure 14. Mandated Nicotine Reduction: Model vs. Apelberg (2018)

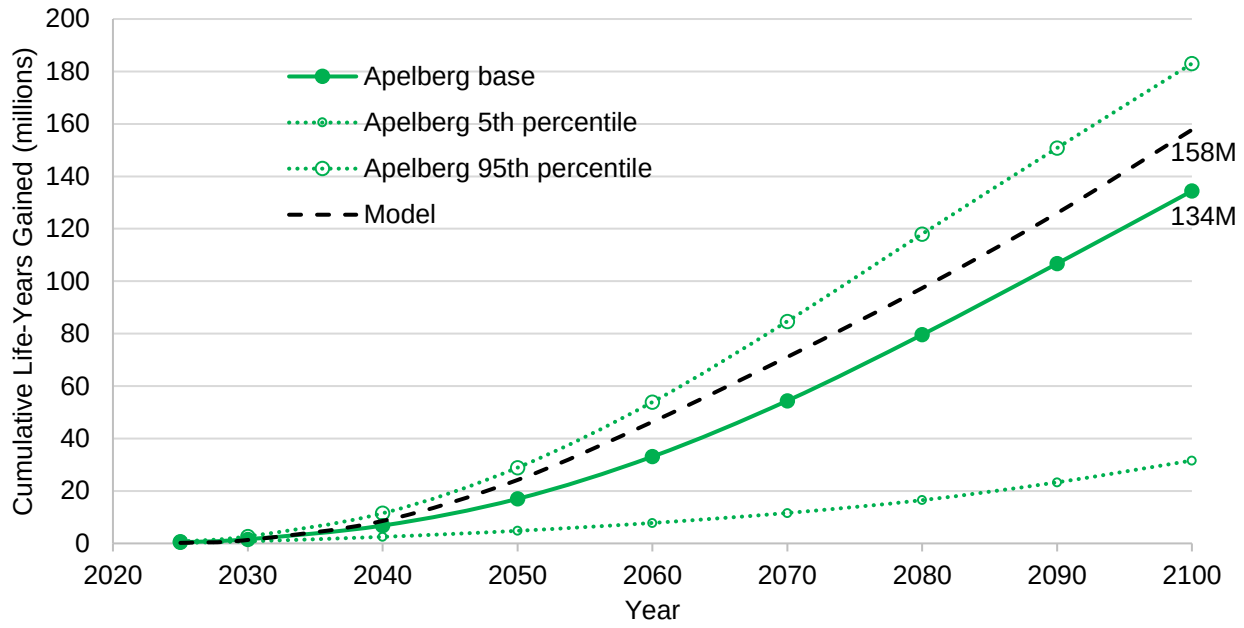
(a) Smoking Prevalence



(b) Cumulative Avoided Cigarette-Attributable Deaths



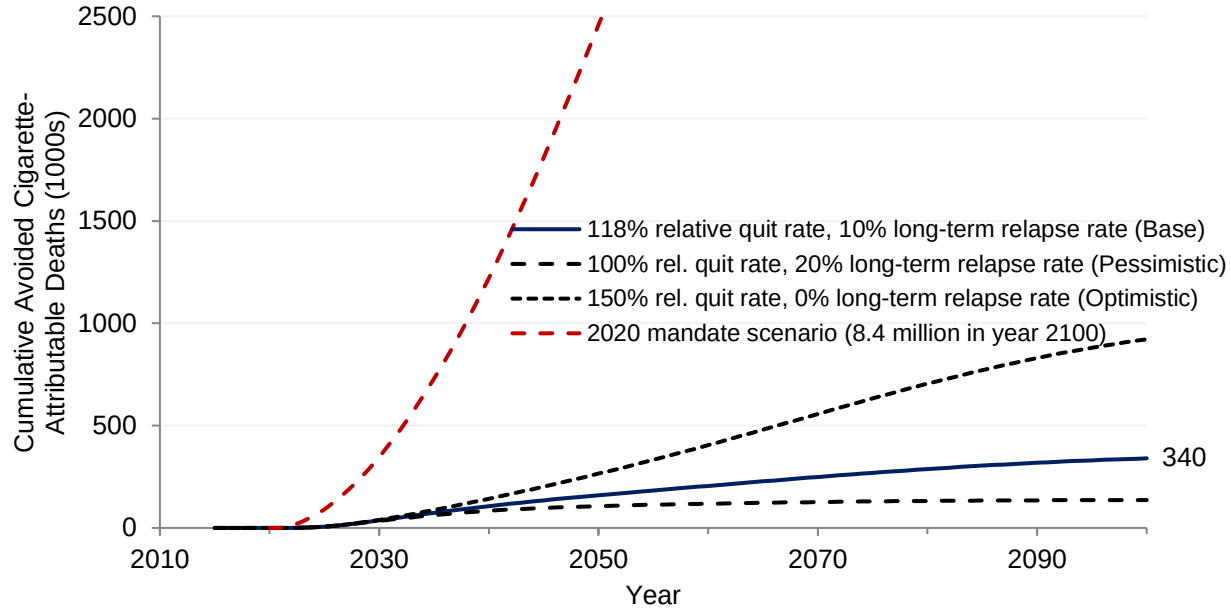
(c) Cumulative Life-Years Gained



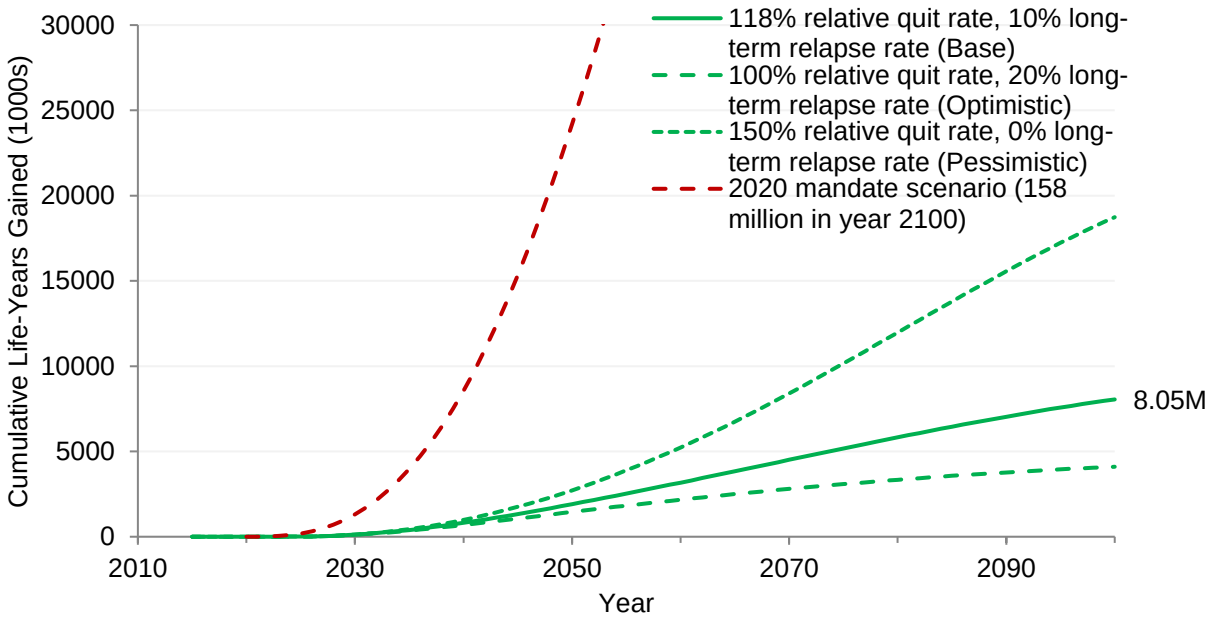
Source: VLNDyn2.15.xlsb

Figure 15. Avoided Cigarette-Attributable Deaths and Life-Years Gained in Four Scenarios

a. Avoided Cigarette-Attributable Deaths



b. Life-Years Gained



Source: VLNDyn2.15.xlsb

Table 3. Avoided Cigarette-Attributable Deaths and Life-Years Gained in Six Scenarios

Scenario:	**Base**	Low-Low (Pessi-mistic)	Low-Base (Inter-mediate 1)	High-Base (Inter-mediate 2)	High-High (Opti-mistic)	Mandate in 2020
Quit rate relative to CC smokers	118%	100%	100%	150%	150%	100%
Long-term relapse rate to CC	10%	20%	10%	10%	0%	0%
Year 2050						
Total population ≥18 years old (millions)	310.4	310.4	310.4	310.5	310.5	320.7
Cigarette-attributable deaths since 2015 (1000s)						
CC-only case	13934.1	13934.1	13934.1	13934.1	13934.1	9813.3
With new product	13774.6	13827.4	13793.7	13742.4	13669.1	12269.9
Avoided	159.5	106.7	140.4	191.7	265.0	2456.5
Life-years gained since 2015						
vs. CC-only (1000s)	1908.3	1449.8	1795.8	2101.4	2722.7	24196.0
Per avoided cigarette-attributable death	12.0	13.6	12.8	11.0	10.3	9.8
Year 2100						
Total population ≥18 years old (millions)	358.1	358.0	358.1	358.2	358.3	372.3
Cigarette-attributable deaths since 2015 (1000s)						
CC-only case	23364.9	23364.9	23364.9	23364.9	23364.9	17467.1
With new product	23024.8	23228.6	23176.1	22787.9	22443.3	25849.1
Avoided	340.1	136.3	188.8	576.9	921.6	8382.1
Life-years gained since 2015						
vs. CC-only (1000s)	8048.9	4102.6	5597.4	11957.6	18735.3	157743.2
Per avoided cigarette-attributable death	23.7	30.1	29.6	20.7	20.3	18.8

Source: VLNDyn2.15.xlsb

Table 4. Base Case Summary Results for Selected Years

Year:	2015	2020	2025	2050	2075	2100
Total population ≥18 years old (millions)	247.4	259.7	271.3	310.4	337.7	358.1
Smoking prevalence:						
CC	15.10%	12.37%	9.36%	3.26%	1.43%	0.61%
VLN	0.00%	0.00%	0.91%	1.08%	0.49%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**4.34%**	**1.91%**	**0.81%**
Former	21.86%	21.80%	21.20%	15.14%	8.12%	3.62%
Never (remainder)	63.04%	65.84%	68.53%	80.51%	89.97%	95.57%
Total current smoker breakdown:						
Men 18-24	0.97%	1.16%	1.08%	0.44%	0.19%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.23%	0.08%	0.03%
Men 25-64	6.36%	4.86%	3.92%	1.95%	0.91%	0.40%
Women 25-64	5.48%	4.10%	3.19%	1.24%	0.48%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.25%	0.15%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.23%	0.10%	0.04%
Cumulative results from 2015:						
Total adult deaths (millions)	0.0	12.6	25.8	111.1	208.2	312.1
Cigarette-attributable deaths (1000s)	0.0	2310.2	4494.1	13774.6	19585.4	23024.8
Avoided cig.-attributable deaths (1000s)	0.0	0.0	5.8	159.5	269.1	340.1
Life-years gained (1000s)	0.0	0.0	9.3	1908.3	5174.4	8048.9
Cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	83.4	140.7	177.8

Source: VLNDyn2.15.xlsb

7 DISCUSSION

A dynamic population model was developed to predict the impact of introducing VLN cigarettes on population health through year 2100. Based on recent rapid declines in US smoking initiation, the model predicted US adult smoking prevalence to decline to about 4.4% in 2050 and 0.8% by 2100 even without VLN cigarettes, and to slightly less with VLN. Assuming a final market penetration rate of 25%, VLN cigarettes are predicted to avoid about 340,000 cigarette-attributable deaths and add about 8.05 million life-years by year 2100, as well as avoid $178 billion (in 2018 dollars) of morbidity costs, assuming these costs are proportional to cigarette-attributable mortality. The youngest adult cohorts show the greatest long-term benefits, due to their longer opportunity to switch to VLN cigarettes. Benefits are especially sensitive to assumptions about relative quit rates, relapse rates to conventional cigarettes, and switch rates; reduction in cigarette consumption and time to peak market penetration have relatively small effects.

For comparison, an additional scenario was modeled assuming implementation of a proposed mandate to reduce cigarette nicotine to minimally addictive levels, similar to Apelberg (2018). The Apelberg scenario assumed much higher smoking prevalence than the model here in a reference case without the mandate, around 8% over 2050-2100, but similar smoking prevalence with the mandate, a little over 1%. Despite substantial model differences, the adjusted model here gave results similar to Apelberg's, with about 8.4 million avoided cigarette-attributable deaths and 158 million life-years gained by 2100. In conclusion, despite uncertainties in the effects on smokers' CPD, quit rates, and other factors, VLN cigarettes are likely to avoid several hundred thousand cigarette-attributable deaths, with the potential to avoid over 8 million cigarette-attributable deaths if coupled with FDA's planned reduced-nicotine mandate.

The FDA Modified Risk Tobacco Product Draft Guidance (FDA 2012) suggests analyzing seven population segments and exposure patterns. Two of these are outside the scope of our analysis: **"Tobacco users who opt to use the proposed product rather than an FDA approved tobacco cessation medication"** and **"Non-users who experience health risks from the product."** Non-users are expected to experience the same health risks from VLN as from CC, since the product is like CC except that it has less nicotine. A third segment, **"Tobacco users who opt to use the proposed product rather than cease tobacco use altogether,"** can be captured by setting the quit rate multiplier below 100%, but this pattern was seen as implausible given quit rate increases seen in studies.

The analyses here consider the other segments, directly or indirectly. **"Tobacco users who switch from other commercially marketed tobacco products to the proposed product"** are modeled as smokers switching from CCs to VLN. **"Tobacco users and non-users who, after adopting the proposed product, switch to or switch back to other tobacco products that may present higher levels of individual health risk"** are modeled as VLN users switching back to CCs. **"Non-users who initiate tobacco use with the proposed product, such as youth, never users, former users"** are approximated as cigarette initiation with early switching to VLN. **"Tobacco users who use the product in conjunction with other tobacco products"** are treated implicitly, i.e., CC smokers are thought of as including dual users who predominantly use CC, and VLN smokers as including dual users who predominantly use VLN.

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APPENDIX 1: DETAILED OUTPUT FOR SIX SCENARIOS

Base Case Scenario: VLN quit rates increase by 18%; 10% of VLN long-term smokers relapse to CC

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.6	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.85%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.60%	1.61%	1.44%	1.26%	1.08%	0.93%	0.79%	0.68%	0.57%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.16%**	**6.02%**	**5.10%**	**4.34%**	**3.70%**	**3.15%**	**2.68%**	**2.27%**	**1.91%**	**1.61%**	**1.36%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.29%	19.15%	17.85%	16.51%	15.14%	13.75%	12.32%	10.89%	9.48%	8.12%	6.86%	5.78%	4.91%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.39%	80.51%	82.55%	84.53%	86.44%	88.26%	89.97%	91.52%	92.86%	93.95%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.23%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.13%	0.11%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.1	130.7	150.2	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6591.2	8611.1	10523.1	12251.5	13774.6	15139.2	16383.4	17524.1	18585.7	19585.4	20504.7	21306.9	21976.3	22537.2	23024.8
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	36.8	73.5	106.5	134.6	159.5	182.7	205.4	227.5	248.9	269.1	287.6	304.1	318.5	330.4	340.1
Life-years gained (1000s)	0.0	0.0	9.3	121.1	396.4	812.8	1328.7	1908.3	2527.8	3173.8	3836.7	4507.1	5174.4	5826.4	6451.2	7037.6	7573.8	8048.9
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	19.3	38.4	55.7	70.4	83.4	95.5	107.4	119.0	130.2	140.7	150.4	159.0	166.5	172.8	177.8

Pessimistic Scenario: VLN has no effect on quit rates; 20% of VLN long-term smokers relapse to CC

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.6	320.9	326.5	332.2	337.6	342.7	347.2	351.3	354.9	358.0
Smoking prevalence:																		
CC	15.10%	12.37%	9.39%	7.20%	5.95%	5.01%	4.26%	3.64%	3.11%	2.66%	2.26%	1.92%	1.62%	1.37%	1.15%	0.97%	0.82%	0.69%
VLN	0.00%	0.00%	0.89%	1.40%	1.29%	1.12%	0.96%	0.82%	0.70%	0.60%	0.51%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.60%**	**7.24%**	**6.13%**	**5.22%**	**4.46%**	**3.81%**	**3.26%**	**2.77%**	**2.35%**	**1.99%**	**1.68%**	**1.42%**	**1.19%**	**1.01%**	**0.85%**
Former	21.86%	21.80%	21.19%	20.25%	19.06%	17.74%	16.38%	15.02%	13.62%	12.20%	10.77%	9.37%	8.02%	6.78%	5.70%	4.84%	4.15%	3.57%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.13%	78.40%	80.52%	82.56%	84.54%	86.46%	88.28%	89.99%	91.54%	92.88%	93.97%	94.84%	95.58%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.35%	2.92%	2.58%	2.27%	2.00%	1.75%	1.54%	1.32%	1.12%	0.94%	0.80%	0.68%	0.58%	0.49%	0.42%
Women 25-64	5.48%	4.10%	3.20%	2.60%	2.16%	1.81%	1.53%	1.28%	1.07%	0.91%	0.75%	0.61%	0.50%	0.41%	0.33%	0.27%	0.22%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.61%	0.49%	0.39%	0.31%	0.26%	0.23%	0.19%	0.18%	0.18%	0.17%	0.15%	0.13%	0.12%	0.10%	0.09%
Women 65+	0.79%	0.75%	0.69%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.16%	0.14%	0.13%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.9	111.1	130.7	150.3	169.6	188.8	208.2	228.1	248.4	269.1	290.4	312.2
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.2	6593.7	8621.8	10546.0	12288.6	13827.4	15208.6	16470.3	17628.9	18708.3	19725.2	20660.5	21477.3	22159.9	22731.8	23228.6
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	34.3	62.7	83.5	97.4	106.7	113.3	118.5	122.7	126.4	129.4	131.8	133.6	134.9	135.7	136.3
Life-years gained (1000s)	0.0	0.0	9.2	115.7	357.1	690.2	1066.3	1449.8	1821.0	2171.6	2499.1	2803.1	3083.1	3338.4	3568.3	3772.4	3950.3	4102.6
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	17.9	32.8	43.7	50.9	55.8	59.3	62.0	64.2	66.1	67.6	68.9	69.9	70.5	71.0	71.3

Intermediate Scenario 1: VLN has no effect on quit rates; 10% of VLN long-term smokers relapse to CC

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.5	332.2	337.6	342.7	347.2	351.3	354.9	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.97%	5.58%	4.63%	3.90%	3.32%	2.83%	2.42%	2.05%	1.74%	1.47%	1.24%	1.05%	0.88%	0.74%	0.63%
VLN	0.00%	0.00%	0.91%	1.63%	1.66%	1.51%	1.32%	1.14%	0.99%	0.85%	0.72%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.60%**	**7.24%**	**6.13%**	**5.22%**	**4.46%**	**3.82%**	**3.26%**	**2.78%**	**2.36%**	**1.99%**	**1.68%**	**1.42%**	**1.19%**	**1.01%**	**0.85%**
Former	21.86%	21.80%	21.19%	20.25%	19.06%	17.74%	16.38%	15.02%	13.63%	12.20%	10.77%	9.37%	8.02%	6.78%	5.71%	4.84%	4.15%	3.57%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.13%	78.39%	80.52%	82.56%	84.54%	86.45%	88.27%	89.98%	91.54%	92.88%	93.97%	94.84%	95.58%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.35%	2.92%	2.58%	2.28%	2.00%	1.75%	1.54%	1.32%	1.12%	0.94%	0.80%	0.68%	0.58%	0.49%	0.42%
Women 25-64	5.48%	4.10%	3.20%	2.60%	2.16%	1.81%	1.53%	1.28%	1.07%	0.91%	0.75%	0.61%	0.50%	0.41%	0.33%	0.27%	0.22%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.61%	0.49%	0.39%	0.31%	0.26%	0.23%	0.19%	0.18%	0.18%	0.17%	0.15%	0.14%	0.12%	0.10%	0.09%
Women 65+	0.79%	0.75%	0.69%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.16%	0.14%	0.13%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.2
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6591.1	8611.6	10526.5	12261.1	13793.7	15170.4	16428.6	17584.5	18661.6	19676.8	20610.6	21426.4	22108.2	22679.6	23176.1
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	37.0	73.0	103.0	125.0	140.4	151.5	160.2	167.2	173.0	177.8	181.6	184.6	186.6	187.9	188.8
Life-years gained (1000s)	0.0	0.0	9.3	121.5	396.0	802.1	1284.7	1795.8	2303.9	2793.5	3257.6	3693.3	4098.2	4470.3	4807.5	5108.3	5371.6	5597.4
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.1	19.3	38.2	53.9	65.3	73.4	79.2	83.7	87.4	90.5	93.0	95.0	96.5	97.6	98.3	98.7

Intermediate Scenario 2: VLN increases quit rates by 50%; 10% of VLN long-term smokers relapse to CC

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.5	315.7	321.1	326.6	332.3	337.8	342.8	347.4	351.5	355.0	358.2
Smoking prevalence:																		
CC	15.10%	12.37%	9.35%	6.92%	5.49%	4.50%	3.75%	3.16%	2.67%	2.26%	1.91%	1.61%	1.36%	1.14%	0.96%	0.81%	0.68%	0.58%
VLN	0.00%	0.00%	0.90%	1.54%	1.52%	1.35%	1.16%	0.99%	0.84%	0.72%	0.61%	0.51%	0.43%	0.36%	0.31%	0.26%	0.22%	0.18%
Total current	**15.10%**	**12.37%**	**10.25%**	**8.47%**	**7.01%**	**5.85%**	**4.91%**	**4.15%**	**3.52%**	**2.98%**	**2.52%**	**2.13%**	**1.79%**	**1.51%**	**1.27%**	**1.07%**	**0.90%**	**0.76%**
Former	21.86%	21.80%	21.22%	20.37%	19.29%	18.03%	16.70%	15.34%	13.95%	12.51%	11.06%	9.64%	8.26%	6.99%	5.89%	5.01%	4.30%	3.69%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.39%	80.51%	82.54%	84.51%	86.42%	88.24%	89.95%	91.50%	92.84%	93.93%	94.80%	95.55%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.43%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.30%	2.83%	2.46%	2.14%	1.86%	1.62%	1.41%	1.21%	1.02%	0.86%	0.73%	0.62%	0.53%	0.45%	0.38%
Women 25-64	5.48%	4.10%	3.19%	2.56%	2.09%	1.73%	1.43%	1.18%	0.98%	0.83%	0.68%	0.55%	0.45%	0.37%	0.30%	0.25%	0.20%	0.17%
Men 65+	0.83%	0.75%	0.69%	0.59%	0.46%	0.35%	0.27%	0.22%	0.19%	0.15%	0.14%	0.14%	0.13%	0.11%	0.10%	0.09%	0.08%	0.07%
Women 65+	0.79%	0.75%	0.69%	0.58%	0.45%	0.34%	0.26%	0.21%	0.17%	0.13%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.1	130.6	150.2	169.5	188.7	208.1	227.9	248.2	269.0	290.3	312.0
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.2	6591.4	8610.1	10516.9	12234.8	13742.4	15087.3	16309.0	17425.7	18462.9	19438.9	20335.8	21117.4	21768.3	22313.3	22787.9
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	36.6	74.4	112.6	151.3	191.7	234.6	279.8	326.0	371.7	415.7	456.4	493.6	526.5	554.2	576.9
Life-years gained (1000s)	0.0	0.0	9.2	120.4	397.3	832.2	1405.7	2101.4	2906.7	3810.3	4796.8	5845.6	6932.1	8027.4	9104.2	10136.6	11097.0	11957.6
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	19.1	38.9	58.9	79.1	100.2	122.7	146.3	170.4	194.4	217.3	238.7	258.1	275.3	289.8	301.7

Optimistic Scenario: VLN increases quit rates by 50%; no VLN long-term smokers relapse to CC

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.5	304.9	310.5	315.8	321.2	326.7	332.4	337.9	343.0	347.5	351.6	355.2	358.3
Smoking prevalence:																		
CC	15.10%	12.37%	9.33%	6.63%	4.90%	3.73%	2.92%	2.33%	1.90%	1.56%	1.29%	1.07%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%
VLN	0.00%	0.00%	0.92%	1.82%	2.07%	2.04%	1.88%	1.67%	1.46%	1.26%	1.08%	0.91%	0.77%	0.65%	0.55%	0.46%	0.39%	0.33%
Total current	**15.10%**	**12.37%**	**10.25%**	**8.46%**	**6.97%**	**5.76%**	**4.79%**	**4.01%**	**3.36%**	**2.82%**	**2.37%**	**1.98%**	**1.66%**	**1.39%**	**1.17%**	**0.98%**	**0.83%**	**0.70%**
Former	21.86%	21.80%	21.22%	20.38%	19.33%	18.12%	16.83%	15.50%	14.12%	12.69%	11.25%	9.81%	8.43%	7.15%	6.03%	5.13%	4.41%	3.79%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.38%	80.49%	82.52%	84.49%	86.39%	88.20%	89.91%	91.46%	92.80%	93.89%	94.77%	95.52%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.43%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.30%	2.82%	2.42%	2.09%	1.80%	1.55%	1.34%	1.14%	0.96%	0.81%	0.69%	0.58%	0.50%	0.42%	0.36%
Women 25-64	5.48%	4.10%	3.19%	2.56%	2.08%	1.70%	1.39%	1.14%	0.93%	0.78%	0.64%	0.52%	0.42%	0.34%	0.28%	0.23%	0.19%	0.16%
Men 65+	0.83%	0.75%	0.69%	0.59%	0.46%	0.35%	0.26%	0.21%	0.17%	0.13%	0.12%	0.11%	0.10%	0.09%	0.07%	0.06%	0.06%	0.05%
Women 65+	0.79%	0.75%	0.69%	0.57%	0.44%	0.33%	0.24%	0.19%	0.15%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%	0.03%	0.02%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.3	91.8	111.0	130.6	150.1	169.4	188.6	207.9	227.7	248.0	268.8	290.1	311.9
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6588.5	8596.8	10486.8	12184.1	13669.1	14989.5	16184.3	17271.8	18277.9	19222.1	20088.0	20840.3	21464.9	21987.2	22443.3
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	39.5	87.8	142.8	201.9	265.0	332.4	404.5	479.9	556.7	632.5	704.3	770.7	829.9	880.3	921.6
Life-years gained (1000s)	0.0	0.0	9.3	126.6	444.7	987.4	1751.0	2722.7	3888.4	5236.1	6749.0	8401.6	10158.4	11971.8	13790.8	15562.8	17230.1	18735.3
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.1	20.7	45.9	74.6	105.6	138.6	173.8	211.5	250.9	291.1	330.7	368.3	403.0	433.9	460.3	481.9

Mandate in 2020 Scenario: All CC smokers switch to VLN with no effect on quit rates

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	258.7	271.8	284.3	295.7	305.5	313.8	320.7	326.7	332.2	337.7	343.4	349.2	354.8	359.9	364.5	368.7	372.3	0.0
Smoking prevalence:																		
CC	13.10%	5.43%	2.75%	1.75%	1.37%	1.22%	1.15%	1.12%	1.09%	1.08%	1.06%	1.04%	1.02%	1.01%	1.00%	0.99%	0.98%	0.00%
VLN	0.00%	1.47%	1.40%	1.10%	0.84%	0.69%	0.59%	0.55%	0.52%	0.51%	0.50%	0.49%	0.48%	0.48%	0.47%	0.47%	0.46%	0.00%
Total current	**13.10%**	**6.90%**	**4.15%**	**2.85%**	**2.21%**	**1.90%**	**1.75%**	**1.66%**	**1.62%**	**1.58%**	**1.56%**	**1.53%**	**1.51%**	**1.49%**	**1.47%**	**1.45%**	**1.44%**	**0.00%**
Former	23.88%	26.63%	26.34%	24.91%	23.06%	21.14%	19.29%	17.57%	15.93%	14.37%	12.90%	11.55%	10.34%	9.31%	8.54%	8.07%	7.86%	0.00%
Never (remainder)	63.02%	66.47%	69.51%	72.24%	74.72%	76.96%	78.96%	80.77%	82.45%	84.05%	85.54%	86.92%	88.15%	89.20%	89.99%	90.48%	90.70%	0.00%
Total current smoker breakdown																		
Men 18-24	0.84%	0.59%	0.56%	0.54%	0.52%	0.51%	0.50%	0.49%	0.48%	0.47%	0.47%	0.46%	0.45%	0.44%	0.44%	0.43%	0.43%	0.00%
Women 18-24	0.55%	0.39%	0.37%	0.36%	0.35%	0.34%	0.33%	0.32%	0.32%	0.31%	0.31%	0.30%	0.30%	0.29%	0.29%	0.29%	0.28%	0.00%
Men 25-64	5.70%	3.08%	1.73%	1.08%	0.77%	0.62%	0.54%	0.51%	0.49%	0.48%	0.47%	0.46%	0.46%	0.45%	0.45%	0.44%	0.44%	0.00%
Women 25-64	4.78%	2.33%	1.23%	0.74%	0.51%	0.40%	0.35%	0.33%	0.32%	0.31%	0.31%	0.30%	0.30%	0.29%	0.29%	0.29%	0.28%	0.00%
Men 65+	0.66%	0.29%	0.16%	0.09%	0.05%	0.03%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 65+	0.57%	0.21%	0.09%	0.04%	0.02%	0.01%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.8	26.3	41.0	57.2	74.9	94.0	114.0	134.5	155.0	175.3	195.5	215.9	236.8	258.2	280.0	302.4	302.4
Cig.-attributable deaths (1000s)	0.0	2073.3	3912.3	5609.0	7177.2	8592.7	9813.3	10862.5	11825.2	12734.3	13592.3	14410.7	15201.3	15941.1	16578.0	17078.4	17467.1	17467.1
Avoided cig.-att. deaths (1000s)	0.0	91.1	346.1	729.2	1220.3	1809.5	2456.5	3106.3	3710.4	4274.0	4814.7	5352.3	5898.1	6457.4	7047.4	7687.6	8382.1	8382.1
Life-years gained (1000s)	0.0	188.2	1307.4	3965.9	8561.9	15327.9	24196.0	34758.6	46370.0	58546.2	71086.5	83994.7	97371.8	111322	125969	141446	157743	157743
Avoided cigarette-attributable morbidity ($billions)	0.0	47.6	181.0	381.3	638.1	946.1	1284.5	1624.2	1940.1	2234.8	2517.5	2798.6	3084.0	3376.4	3684.9	4019.7	4382.8	4382.8

Source: VLNDyn2.15.xlsb

APPENDIX 2: DETAILED OUTPUT FOR THREE AGE COHORTS AND NEW POPULATION

New population including net immigration (entering model at 18 years old)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	1.5	26.4	51.2	76.1	100.9	125.4	149.6	173.6	197.4	220.9	244.0	266.5	288.1	308.2	326.1	340.6	350.8	356.9
Smoking prevalence:																		
CC	13.00%	15.85%	12.64%	9.82%	7.98%	6.56%	5.42%	4.47%	3.69%	3.03%	2.48%	2.02%	1.63%	1.32%	1.07%	0.87%	0.72%	0.60%
VLN	0.00%	0.00%	1.07%	1.90%	1.97%	1.82%	1.62%	1.40%	1.19%	1.00%	0.83%	0.68%	0.55%	0.45%	0.36%	0.30%	0.25%	0.21%
Total current	**13.00%**	**15.85%**	**13.70%**	**11.72%**	**9.95%**	**8.38%**	**7.03%**	**5.87%**	**4.88%**	**4.03%**	**3.31%**	**2.70%**	**2.19%**	**1.77%**	**1.43%**	**1.17%**	**0.97%**	**0.81%**
Former	4.75%	1.20%	2.05%	2.86%	3.55%	4.11%	4.54%	4.87%	5.11%	5.26%	5.33%	5.33%	5.26%	5.11%	4.86%	4.51%	4.07%	3.56%
Never (remainder)	82.25%	82.95%	84.25%	85.43%	86.50%	87.51%	88.43%	89.26%	90.01%	90.71%	91.36%	91.97%	92.55%	93.12%	93.70%	94.31%	94.96%	95.62%
Total current smoker breakdown																		
Men 18-24	7.51%	9.43%	5.61%	3.24%	2.09%	1.44%	1.04%	0.77%	0.58%	0.44%	0.34%	0.27%	0.21%	0.17%	0.14%	0.11%	0.09%	0.08%
Women 18-24	5.49%	6.42%	3.70%	2.06%	1.28%	0.86%	0.59%	0.42%	0.31%	0.23%	0.17%	0.13%	0.10%	0.08%	0.06%	0.05%	0.04%	0.03%
Men 25-64	0.00%	0.00%	2.61%	3.84%	3.95%	3.68%	3.28%	2.86%	2.46%	2.08%	1.67%	1.32%	1.05%	0.84%	0.68%	0.56%	0.47%	0.40%
Women 25-64	0.00%	0.00%	1.79%	2.58%	2.61%	2.40%	2.12%	1.82%	1.54%	1.28%	0.99%	0.75%	0.58%	0.45%	0.35%	0.28%	0.22%	0.18%
Men 65+	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.08%	0.14%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.05%	0.09%	0.10%	0.09%	0.08%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	0.0	0.0	0.0	0.1	0.5	1.1	2.0	3.1	4.4	6.2	8.6	11.9	16.6	23.6	34.0	48.6	67.4
Cig.-attributable deaths (1000s)	0.0	0.0	0.0	0.0	16.2	77.7	167.5	272.2	390.1	534.5	712.0	928.5	1180.7	1460.3	1775.9	2146.1	2569.2	3010.4
Avoided cig.-att. deaths (1000s)	0.0	0.0	0.0	0.0	0.8	4.2	9.6	16.2	23.8	33.5	45.7	60.6	77.3	94.7	111.7	127.1	139.7	149.6
Life-years gained (1000s)	0.0	0.0	0.0	0.0	1.4	14.5	50.8	117.3	218.7	363.1	561.1	824.0	1159.5	1566.5	2033.5	2535.5	3035.5	3496.7
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	0.0	0.0	0.4	2.2	5.0	8.4	12.5	17.5	23.9	31.7	40.4	49.5	58.4	66.5	73.1	78.2

Cohort aged 18-24 in year 2015

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	31.2	31.2	31.2	31.0	30.6	30.2	29.9	29.5	29.0	28.3	27.3	25.9	23.6	20.1	15.1	9.2	4.0	1.3
Smoking prevalence:																		
CC	13.05%	11.34%	8.84%	6.52%	5.04%	3.96%	3.13%	2.42%	1.81%	1.28%	0.83%	0.50%	0.27%	0.13%	0.05%	0.02%	0.01%	0.00%
VLN	0.00%	0.00%	0.89%	1.65%	1.68%	1.48%	1.23%	0.97%	0.73%	0.52%	0.34%	0.20%	0.11%	0.05%	0.02%	0.01%	0.00%	0.00%
Total current	**13.05%**	**11.34%**	**9.73%**	**8.17%**	**6.71%**	**5.44%**	**4.35%**	**3.39%**	**2.54%**	**1.80%**	**1.17%**	**0.70%**	**0.38%**	**0.18%**	**0.07%**	**0.03%**	**0.01%**	**0.00%**
Former	4.76%	6.48%	8.09%	9.56%	10.87%	12.02%	13.01%	13.85%	14.54%	15.06%	15.42%	15.60%	15.60%	15.33%	14.69%	13.65%	12.33%	11.06%
Never (remainder)	82.18%	82.18%	82.18%	82.27%	82.42%	82.54%	82.64%	82.76%	82.92%	83.14%	83.40%	83.70%	84.02%	84.49%	85.24%	86.33%	87.66%	88.94%
Total current smoker breakdown																		
Men 18-24	7.70%	1.83%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 18-24	5.35%	1.27%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Men 25-64	0.00%	4.87%	5.74%	4.81%	3.92%	3.15%	2.51%	1.95%	1.47%	0.33%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 25-64	0.00%	3.37%	3.99%	3.36%	2.79%	2.29%	1.85%	1.44%	1.07%	0.23%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Men 65+	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.72%	0.68%	0.41%	0.21%	0.10%	0.04%	0.01%	0.00%	0.00%
Women 65+	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.52%	0.49%	0.30%	0.16%	0.08%	0.04%	0.02%	0.01%	0.00%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	0.0	0.0	0.2	0.6	0.9	1.3	1.6	2.1	2.8	3.8	5.3	7.6	11.1	16.0	21.9	27.2	29.9
Cig.-attributable deaths (1000s)	0.0	0.0	0.0	30.2	85.1	129.6	164.4	205.6	263.3	335.2	420.4	507.4	595.1	705.0	846.8	991.1	1090.7	1127.5
Avoided cig.-att. deaths (1000s)	0.0	0.0	0.0	0.9	3.2	5.3	7.2	9.5	12.8	16.8	21.0	24.7	27.6	29.4	29.8	29.3	28.7	28.4
Life-years gained (1000s)	0.0	0.0	0.0	1.9	13.0	35.2	67.0	108.5	164.0	236.7	328.0	434.4	547.9	657.0	746.9	805.3	832.1	840.0
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	0.0	0.5	1.7	2.8	3.8	5.0	6.7	8.8	11.0	12.9	14.4	15.4	15.6	15.3	15.0	14.8

Cohort aged 25-64 in year 2015

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	168.5	165.1	160.6	154.9	147.6	137.6	124.4	108.3	90.6	73.2	56.6	41.2	27.3	15.6	7.1	2.4	0.7	0.2
Smoking prevalence:																		
CC	17.38%	13.84%	9.73%	6.44%	4.43%	3.10%	2.17%	1.51%	1.02%	0.66%	0.40%	0.22%	0.11%	0.05%	0.02%	0.01%	0.00%	0.00%
VLN	0.00%	0.00%	0.98%	1.62%	1.47%	1.15%	0.85%	0.60%	0.41%	0.27%	0.16%	0.09%	0.04%	0.02%	0.01%	0.00%	0.00%	0.00%
Total current	**17.38%**	**13.84%**	**10.72%**	**8.06%**	**5.90%**	**4.25%**	**3.01%**	**2.11%**	**1.44%**	**0.93%**	**0.56%**	**0.31%**	**0.15%**	**0.07%**	**0.02%**	**0.01%**	**0.00%**	**0.00%**
Former	19.90%	23.05%	25.68%	27.81%	29.42%	30.55%	31.31%	31.85%	32.27%	32.55%	32.63%	32.45%	31.89%	30.80%	29.07%	26.75%	24.89%	23.68%
Never (remainder)	62.72%	63.11%	63.60%	64.13%	64.67%	65.20%	65.68%	66.04%	66.29%	66.52%	66.80%	67.24%	67.96%	69.14%	70.91%	73.24%	75.11%	76.32%
Total current smoker breakdown																		
Men 18-24	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 18-24	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Men 25-64	9.33%	6.72%	4.71%	3.22%	2.16%	1.41%	0.85%	0.39%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 25-64	8.04%	5.81%	4.10%	2.83%	1.91%	1.24%	0.74%	0.34%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Men 65+	0.00%	0.67%	0.97%	1.03%	0.93%	0.81%	0.73%	0.71%	0.75%	0.48%	0.29%	0.15%	0.07%	0.03%	0.01%	0.00%	0.00%	0.00%
Women 65+	0.00%	0.64%	0.93%	0.98%	0.89%	0.78%	0.70%	0.67%	0.69%	0.45%	0.28%	0.16%	0.08%	0.04%	0.02%	0.01%	0.00%	0.00%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	3.4	7.9	13.6	21.0	30.9	44.1	60.3	77.9	95.4	111.9	127.3	141.2	152.9	161.4	166.2	167.8	168.3
Cig.-attributable deaths (1000s)	0.0	1035.6	2287.1	3617.2	4963.6	6328.8	7695.4	8998.2	10177.6	11205.1	12084.0	12843.2	13503.8	14034.4	14381.4	14539.6	14579.9	14588.7
Avoided cig.-att. deaths (1000s)	0.0	0.0	4.6	31.2	63.7	91.4	112.6	128.6	140.9	149.9	155.6	158.5	159.1	158.3	157.2	156.6	156.4	156.4
Life-years gained (1000s)	0.0	0.0	7.3	102.0	345.4	714.8	1158.8	1630.1	2093.2	2522.9	2897.4	3199.5	3418.8	3555.0	3622.2	3646.2	3652.5	3654.4
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.4	16.3	33.3	47.8	58.9	67.2	73.7	78.4	81.4	82.9	83.2	82.8	82.2	81.9	81.8	81.8

Cohort aged 65+ in year 2015

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	47.7	38.6	29.8	21.3	13.3	6.7	2.4	0.5	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Smoking prevalence:																		
CC	8.39%	4.45%	2.12%	0.90%	0.37%	0.14%	0.05%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
VLN	0.00%	0.00%	0.21%	0.23%	0.12%	0.05%	0.02%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total current	**8.39%**	**4.45%**	**2.33%**	**1.13%**	**0.49%**	**0.19%**	**0.06%**	**0.02%**	**0.01%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**	**0.00%**
Former	39.92%	42.27%	43.04%	42.75%	41.38%	38.75%	34.79%	29.97%	26.45%	24.09%	22.06%	20.30%	18.77%	17.45%	16.30%	15.29%	14.41%	13.64%
Never (remainder)	51.70%	53.28%	54.63%	56.12%	58.13%	61.06%	65.15%	70.01%	73.54%	75.91%	77.94%	79.70%	81.23%	82.55%	83.70%	84.71%	85.59%	86.36%
Total current smoker breakdown																		
Men 18-24	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 18-24	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Men 25-64	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 25-64	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Men 65+	4.28%	2.16%	1.08%	0.48%	0.18%	0.05%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Women 65+	4.10%	2.29%	1.25%	0.65%	0.31%	0.14%	0.05%	0.02%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	9.1	17.9	26.5	34.4	41.0	45.3	47.2	47.6	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7	47.7
Cig.-attributable deaths (1000s)	0.0	1274.6	2207.0	2943.8	3548.1	3990.3	4227.8	4302.1	4312.0	4313.2	4313.4	4313.4	4313.4	4313.4	4313.4	4313.4	4313.4	4313.4
Avoided cig.-att. deaths (1000s)	0.0	0.0	1.2	4.8	5.9	5.7	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4
Life-years gained (1000s)	0.0	0.0	2.0	17.1	36.7	49.0	53.7	54.8	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0	55.0
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	0.6	2.5	3.1	3.0	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8	2.8

Source: VLNDyn2.15.xlsb

APPENDIX 3: DETAILED OUTPUT FOR TORNADO LOW AND HIGH CASES

Low-case S-Fm: 100%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.5	332.2	337.6	342.7	347.2	351.3	354.9	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.97%	5.58%	4.63%	3.90%	3.32%	2.83%	2.42%	2.05%	1.74%	1.47%	1.24%	1.05%	0.88%	0.74%	0.63%
VLN	0.00%	0.00%	0.91%	1.63%	1.66%	1.51%	1.32%	1.14%	0.99%	0.85%	0.72%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.60%**	**7.24%**	**6.13%**	**5.22%**	**4.46%**	**3.82%**	**3.26%**	**2.78%**	**2.36%**	**1.99%**	**1.68%**	**1.42%**	**1.19%**	**1.01%**	**0.85%**
Former	21.86%	21.80%	21.19%	20.25%	19.06%	17.74%	16.38%	15.02%	13.63%	12.20%	10.77%	9.37%	8.02%	6.78%	5.71%	4.84%	4.15%	3.57%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.13%	78.39%	80.52%	82.56%	84.54%	86.45%	88.27%	89.98%	91.54%	92.88%	93.97%	94.84%	95.58%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.35%	2.92%	2.58%	2.28%	2.00%	1.75%	1.54%	1.32%	1.12%	0.94%	0.80%	0.68%	0.58%	0.49%	0.42%
Women 25-64	5.48%	4.10%	3.20%	2.60%	2.16%	1.81%	1.53%	1.28%	1.07%	0.91%	0.75%	0.61%	0.50%	0.41%	0.33%	0.27%	0.22%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.61%	0.49%	0.39%	0.31%	0.26%	0.23%	0.19%	0.18%	0.18%	0.17%	0.15%	0.14%	0.12%	0.10%	0.09%
Women 65+	0.79%	0.75%	0.69%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.16%	0.14%	0.13%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.2
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6591.1	8611.6	10526.5	12261.1	13793.7	15170.4	16428.6	17584.5	18661.6	19676.8	20610.6	21426.4	22108.2	22679.6	23176.1
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	37.0	73.0	103.0	125.0	140.4	151.5	160.2	167.2	173.0	177.8	181.6	184.6	186.6	187.9	188.8
Life-years gained (1000s)	0.0	0.0	9.3	121.5	396.0	802.1	1284.7	1795.8	2303.9	2793.5	3257.6	3693.3	4098.2	4470.3	4807.5	5108.3	5371.6	5597.4
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.1	19.3	38.2	53.9	65.3	73.4	79.2	83.7	87.4	90.5	93.0	95.0	96.5	97.6	98.3	98.7

High-case S-Fm: 150%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.5	315.7	321.1	326.6	332.3	337.8	342.8	347.4	351.5	355.0	358.2
Smoking prevalence:																		
CC	15.10%	12.37%	9.35%	6.92%	5.49%	4.50%	3.75%	3.16%	2.67%	2.26%	1.91%	1.61%	1.36%	1.14%	0.96%	0.81%	0.68%	0.58%
VLN	0.00%	0.00%	0.90%	1.54%	1.52%	1.35%	1.16%	0.99%	0.84%	0.72%	0.61%	0.51%	0.43%	0.36%	0.31%	0.26%	0.22%	0.18%
Total current	**15.10%**	**12.37%**	**10.25%**	**8.47%**	**7.01%**	**5.85%**	**4.91%**	**4.15%**	**3.52%**	**2.98%**	**2.52%**	**2.13%**	**1.79%**	**1.51%**	**1.27%**	**1.07%**	**0.90%**	**0.76%**
Former	21.86%	21.80%	21.22%	20.37%	19.29%	18.03%	16.70%	15.34%	13.95%	12.51%	11.06%	9.64%	8.26%	6.99%	5.89%	5.01%	4.30%	3.69%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.39%	80.51%	82.54%	84.51%	86.42%	88.24%	89.95%	91.50%	92.84%	93.93%	94.80%	95.55%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.43%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.30%	2.83%	2.46%	2.14%	1.86%	1.62%	1.41%	1.21%	1.02%	0.86%	0.73%	0.62%	0.53%	0.45%	0.38%
Women 25-64	5.48%	4.10%	3.19%	2.56%	2.09%	1.73%	1.43%	1.18%	0.98%	0.83%	0.68%	0.55%	0.45%	0.37%	0.30%	0.25%	0.20%	0.17%
Men 65+	0.83%	0.75%	0.69%	0.59%	0.46%	0.35%	0.27%	0.22%	0.19%	0.15%	0.14%	0.14%	0.13%	0.11%	0.10%	0.09%	0.08%	0.07%
Women 65+	0.79%	0.75%	0.69%	0.58%	0.45%	0.34%	0.26%	0.21%	0.17%	0.13%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.1	130.6	150.2	169.5	188.7	208.1	227.9	248.2	269.0	290.3	312.0
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.2	6591.4	8610.1	10516.9	12234.8	13742.4	15087.3	16309.0	17425.7	18462.9	19438.9	20335.8	21117.4	21768.3	22313.3	22787.9
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	36.6	74.4	112.6	151.3	191.7	234.6	279.8	326.0	371.7	415.7	456.4	493.6	526.5	554.2	576.9
Life-years gained (1000s)	0.0	0.0	9.2	120.4	397.3	832.2	1405.7	2101.4	2906.7	3810.3	4796.8	5845.6	6932.1	8027.4	9104.2	10136.6	11097.0	11957.6
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	19.1	38.9	58.9	79.1	100.2	122.7	146.3	170.4	194.4	217.3	238.7	258.1	275.3	289.8	301.7

Low-case S-C: 20%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.5	332.2	337.7	342.7	347.3	351.4	354.9	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.38%	7.17%	5.90%	4.96%	4.20%	3.58%	3.05%	2.60%	2.21%	1.87%	1.58%	1.33%	1.12%	0.95%	0.80%	0.67%
VLN	0.00%	0.00%	0.88%	1.38%	1.26%	1.08%	0.92%	0.79%	0.68%	0.58%	0.49%	0.42%	0.35%	0.30%	0.25%	0.21%	0.18%	0.15%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.16%**	**6.04%**	**5.12%**	**4.37%**	**3.73%**	**3.18%**	**2.70%**	**2.29%**	**1.93%**	**1.63%**	**1.37%**	**1.16%**	**0.97%**	**0.82%**
Former	21.86%	21.80%	21.20%	20.29%	19.13%	17.83%	16.48%	15.11%	13.72%	12.29%	10.85%	9.45%	8.09%	6.84%	5.76%	4.89%	4.19%	3.60%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.13%	78.40%	80.52%	82.56%	84.54%	86.45%	88.27%	89.98%	91.53%	92.87%	93.96%	94.83%	95.58%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.54%	2.23%	1.96%	1.71%	1.50%	1.29%	1.09%	0.92%	0.78%	0.66%	0.56%	0.48%	0.41%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.79%	1.50%	1.25%	1.04%	0.88%	0.73%	0.59%	0.48%	0.40%	0.32%	0.26%	0.22%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.18%	0.17%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.37%	0.29%	0.24%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.08%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.8	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.2	6593.8	8620.9	10541.8	12278.4	13808.8	15179.9	16430.3	17577.0	18644.5	19649.9	20574.3	21381.2	22054.7	22619.0	23109.4
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	34.3	63.7	87.8	107.7	125.3	142.0	158.5	174.6	190.1	204.7	217.9	229.8	240.0	248.6	255.5
Life-years gained (1000s)	0.0	0.0	9.2	115.5	359.0	705.6	1117.4	1567.8	2041.0	2528.4	3023.6	3519.9	4010.0	4485.6	4938.6	5362.0	5748.0	6089.4
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	17.9	33.3	45.9	56.3	65.5	74.3	82.9	91.3	99.4	107.0	113.9	120.1	125.5	130.0	133.6

High-case S-C: 0%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.9	310.5	315.8	321.1	326.7	332.3	337.8	342.9	347.4	351.5	355.1	358.2
Smoking prevalence:																		
CC	15.10%	12.37%	9.33%	6.65%	4.92%	3.75%	2.93%	2.35%	1.91%	1.57%	1.30%	1.08%	0.90%	0.75%	0.63%	0.53%	0.44%	0.37%
VLN	0.00%	0.00%	0.93%	1.90%	2.22%	2.25%	2.13%	1.94%	1.73%	1.52%	1.32%	1.13%	0.96%	0.81%	0.69%	0.58%	0.49%	0.41%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.14%**	**6.00%**	**5.06%**	**4.29%**	**3.64%**	**3.09%**	**2.61%**	**2.21%**	**1.86%**	**1.56%**	**1.31%**	**1.11%**	**0.93%**	**0.79%**
Former	21.86%	21.80%	21.20%	20.30%	19.16%	17.89%	16.56%	15.22%	13.83%	12.41%	10.98%	9.57%	8.20%	6.94%	5.85%	4.97%	4.27%	3.67%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.38%	80.50%	82.53%	84.50%	86.41%	88.23%	89.94%	91.49%	92.83%	93.92%	94.80%	95.54%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.88%	2.52%	2.21%	1.93%	1.67%	1.46%	1.25%	1.06%	0.89%	0.76%	0.64%	0.54%	0.46%	0.39%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.13%	1.77%	1.47%	1.22%	1.01%	0.86%	0.71%	0.57%	0.47%	0.38%	0.31%	0.26%	0.21%	0.17%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.37%	0.29%	0.24%	0.21%	0.17%	0.15%	0.15%	0.14%	0.12%	0.11%	0.10%	0.08%	0.07%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.28%	0.23%	0.19%	0.14%	0.12%	0.10%	0.09%	0.08%	0.06%	0.05%	0.04%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.3	91.8	111.0	130.6	150.2	169.5	188.6	208.0	227.9	248.2	269.0	290.3	312.0
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6588.1	8596.4	10489.6	12196.0	13696.8	15039.4	16261.9	17381.1	18421.3	19400.4	20300.3	21084.9	21739.0	22287.0	22764.3
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.9	39.9	88.2	139.9	190.1	237.4	282.5	326.9	370.5	413.3	454.2	491.9	526.1	555.8	580.6	600.6
Life-years gained (1000s)	0.0	0.0	9.3	127.7	448.0	983.5	1707.4	2580.2	3566.3	4641.1	5785.6	6980.9	8205.4	9432.0	10632.5	11778.0	12837.9	13784.0
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.1	20.9	46.1	73.2	99.4	124.1	147.7	170.9	193.7	216.1	237.5	257.2	275.1	290.6	303.6	314.0

Low-case C-I: 4.2%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.6	321.0	326.5	332.2	337.6	342.7	347.3	351.4	354.9	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.72%	7.56%	6.15%	5.12%	4.32%	3.67%	3.12%	2.66%	2.26%	1.91%	1.61%	1.36%	1.15%	0.97%	0.81%	0.69%
VLN	0.00%	0.00%	0.55%	1.00%	1.03%	0.94%	0.82%	0.71%	0.61%	0.53%	0.45%	0.38%	0.32%	0.27%	0.23%	0.19%	0.16%	0.14%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.56%**	**7.18%**	**6.06%**	**5.14%**	**4.38%**	**3.74%**	**3.19%**	**2.71%**	**2.29%**	**1.94%**	**1.63%**	**1.38%**	**1.16%**	**0.98%**	**0.83%**
Former	21.86%	21.80%	21.20%	20.27%	19.11%	17.81%	16.46%	15.10%	13.70%	12.27%	10.84%	9.44%	8.08%	6.83%	5.75%	4.88%	4.19%	3.60%
Never (remainder)	63.04%	65.84%	68.54%	71.16%	73.71%	76.13%	78.40%	80.52%	82.56%	84.54%	86.45%	88.27%	89.98%	91.53%	92.87%	93.96%	94.83%	95.58%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.34%	2.90%	2.55%	2.24%	1.97%	1.72%	1.51%	1.29%	1.09%	0.92%	0.78%	0.66%	0.56%	0.48%	0.41%
Women 25-64	5.48%	4.10%	3.20%	2.59%	2.15%	1.79%	1.50%	1.25%	1.04%	0.89%	0.73%	0.60%	0.49%	0.40%	0.32%	0.27%	0.22%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.18%	0.17%	0.17%	0.16%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.37%	0.29%	0.24%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.08%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.9	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4496.5	6605.5	8638.7	10562.1	12300.0	13831.5	15203.9	16455.7	17603.8	18672.6	19679.1	20604.4	21412.1	22086.3	22651.0	23141.9
Avoided cig.-att. deaths (1000s)	0.0	0.0	3.5	22.6	45.9	67.4	86.1	102.6	118.0	133.1	147.8	162.0	175.5	187.8	198.9	208.5	216.5	223.0
Life-years gained (1000s)	0.0	0.0	5.5	73.5	244.6	507.5	837.3	1211.1	1613.2	2034.5	2468.7	2909.4	3349.5	3780.9	4195.3	4585.0	4942.0	5258.6
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	1.8	11.8	24.0	35.2	45.0	53.6	61.7	69.6	77.3	84.7	91.8	98.2	104.0	109.0	113.2	116.6

High-case C-I: 10.0%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.9	298.4	304.8	310.5	315.7	321.0	326.6	332.3	337.7	342.8	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.01%	6.41%	5.04%	4.13%	3.46%	2.93%	2.49%	2.11%	1.79%	1.52%	1.28%	1.08%	0.91%	0.76%	0.64%	0.54%
VLN	0.00%	0.00%	1.25%	2.13%	2.10%	1.86%	1.61%	1.38%	1.18%	1.01%	0.86%	0.73%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.53%**	**7.13%**	**6.00%**	**5.07%**	**4.31%**	**3.67%**	**3.12%**	**2.65%**	**2.24%**	**1.89%**	**1.60%**	**1.34%**	**1.13%**	**0.95%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.31%	19.17%	17.89%	16.54%	15.18%	13.79%	12.36%	10.92%	9.51%	8.15%	6.89%	5.80%	4.93%	4.23%	3.63%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.69%	76.12%	78.38%	80.50%	82.54%	84.52%	86.43%	88.25%	89.96%	91.51%	92.85%	93.94%	94.82%	95.56%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.88%	2.52%	2.21%	1.94%	1.69%	1.48%	1.27%	1.07%	0.90%	0.77%	0.65%	0.55%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.58%	2.13%	1.77%	1.48%	1.23%	1.02%	0.87%	0.72%	0.58%	0.48%	0.39%	0.32%	0.26%	0.21%	0.17%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.37%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.13%	0.12%	0.10%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.46%	0.36%	0.28%	0.23%	0.19%	0.14%	0.12%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.3	91.8	111.0	130.7	150.2	169.5	188.7	208.1	227.9	248.3	269.0	290.3	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4491.8	6577.9	8586.4	10489.0	12209.8	13726.4	15084.7	16322.8	17457.6	18513.4	19507.9	20422.3	21220.2	21885.9	22443.7	22928.8
Avoided cig.-att. deaths (1000s)	0.0	0.0	8.2	50.1	98.2	140.6	176.3	207.8	237.2	266.0	294.1	321.2	346.7	370.0	390.8	408.9	423.9	436.1
Life-years gained (1000s)	0.0	0.0	13.0	166.2	536.0	1086.9	1762.4	2515.7	3316.5	4148.1	4998.5	5855.9	6707.0	7536.5	8329.7	9073.0	9751.8	10352.7
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	4.3	26.2	51.4	73.5	92.2	108.6	124.0	139.1	153.8	167.9	181.3	193.4	204.3	213.8	221.7	228.0

Low-case I-S: 25%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.6	321.0	326.5	332.2	337.6	342.7	347.3	351.4	354.9	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.54%	7.47%	6.10%	5.09%	4.29%	3.65%	3.11%	2.65%	2.25%	1.90%	1.61%	1.36%	1.14%	0.96%	0.81%	0.68%
VLN	0.00%	0.00%	0.73%	1.09%	1.07%	0.96%	0.84%	0.73%	0.63%	0.54%	0.46%	0.39%	0.33%	0.28%	0.23%	0.20%	0.17%	0.14%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.56%**	**7.18%**	**6.05%**	**5.14%**	**4.38%**	**3.73%**	**3.18%**	**2.71%**	**2.29%**	**1.94%**	**1.63%**	**1.38%**	**1.16%**	**0.98%**	**0.82%**
Former	21.86%	21.80%	21.20%	20.28%	19.12%	17.82%	16.46%	15.10%	13.71%	12.28%	10.85%	9.44%	8.08%	6.83%	5.75%	4.88%	4.19%	3.60%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.13%	78.40%	80.52%	82.56%	84.54%	86.45%	88.27%	89.98%	91.53%	92.87%	93.96%	94.83%	95.58%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.34%	2.90%	2.54%	2.24%	1.96%	1.71%	1.50%	1.29%	1.09%	0.92%	0.78%	0.66%	0.56%	0.48%	0.41%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.79%	1.50%	1.25%	1.04%	0.89%	0.73%	0.60%	0.49%	0.40%	0.32%	0.27%	0.22%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.18%	0.17%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.37%	0.29%	0.24%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.08%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.9	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.9	6600.5	8632.8	10556.2	12294.0	13825.4	15197.5	16449.0	17596.9	18665.4	19671.7	20597.0	21404.5	22078.6	22643.3	23134.1
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.1	27.6	51.7	73.4	92.0	108.7	124.4	139.8	154.8	169.2	182.8	195.3	206.5	216.2	224.2	230.8
Life-years gained (1000s)	0.0	0.0	8.4	95.1	291.4	578.5	929.8	1322.6	1741.6	2178.0	2625.3	3077.2	3526.8	3965.8	4386.3	4781.1	5142.1	5462.1
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.7	14.4	27.1	38.4	48.1	56.8	65.1	73.1	80.9	88.5	95.6	102.1	108.0	113.0	117.2	120.7

High-case I-S: 25%

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.5	315.7	321.0	326.6	332.3	337.7	342.8	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.18%	6.47%	5.06%	4.15%	3.47%	2.94%	2.50%	2.12%	1.80%	1.52%	1.28%	1.08%	0.91%	0.77%	0.64%	0.54%
VLN	0.00%	0.00%	1.09%	2.07%	2.08%	1.85%	1.60%	1.37%	1.18%	1.01%	0.86%	0.73%	0.61%	0.52%	0.44%	0.37%	0.31%	0.26%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.54%**	**7.14%**	**6.00%**	**5.07%**	**4.31%**	**3.67%**	**3.13%**	**2.65%**	**2.24%**	**1.89%**	**1.60%**	**1.34%**	**1.13%**	**0.95%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.30%	19.17%	17.88%	16.54%	15.18%	13.79%	12.36%	10.92%	9.51%	8.15%	6.89%	5.80%	4.93%	4.23%	3.63%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.69%	76.12%	78.38%	80.50%	82.54%	84.52%	86.43%	88.25%	89.96%	91.51%	92.85%	93.94%	94.82%	95.56%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.88%	2.52%	2.21%	1.94%	1.69%	1.48%	1.27%	1.07%	0.90%	0.77%	0.65%	0.55%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.13%	1.77%	1.48%	1.23%	1.02%	0.87%	0.72%	0.58%	0.48%	0.39%	0.32%	0.26%	0.21%	0.17%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.37%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.13%	0.12%	0.10%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.28%	0.23%	0.19%	0.14%	0.12%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.3	91.8	111.0	130.7	150.2	169.5	188.7	208.1	227.9	248.3	269.0	290.3	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4493.4	6582.2	8590.8	10493.2	12214.0	13730.7	15089.2	16327.5	17462.4	18518.4	19512.9	20427.4	21225.3	21891.0	22448.8	22934.0
Avoided cig.-att. deaths (1000s)	0.0	0.0	6.5	45.8	93.7	136.3	172.1	203.5	232.7	261.3	289.2	316.2	341.7	364.9	385.7	403.7	418.8	430.9
Life-years gained (1000s)	0.0	0.0	10.2	146.5	496.4	1030.1	1691.1	2431.9	3221.7	4043.8	4886.1	5736.8	6582.6	7408.1	8198.2	8939.1	9616.1	10215.5
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.4	24.0	49.0	71.3	90.0	106.4	121.7	136.6	151.2	165.4	178.7	190.8	201.7	211.1	219.0	225.3

Low-case quit rate multiplier for sensitivity analysis (1.25)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.9	298.6	305.0	310.7	316.0	321.3	326.9	332.5	338.0	343.0	347.6	351.6	355.2	358.3
Smoking prevalence:																		
CC	15.10%	11.87%	8.70%	6.30%	4.94%	4.02%	3.34%	2.80%	2.37%	2.00%	1.69%	1.42%	1.19%	1.00%	0.84%	0.71%	0.60%	0.50%
VLN	0.00%	0.00%	0.84%	1.43%	1.40%	1.23%	1.06%	0.90%	0.77%	0.65%	0.55%	0.46%	0.39%	0.33%	0.28%	0.23%	0.20%	0.17%
Total current	**15.10%**	**11.87%**	**9.53%**	**7.73%**	**6.33%**	**5.25%**	**4.39%**	**3.70%**	**3.13%**	**2.65%**	**2.24%**	**1.88%**	**1.59%**	**1.33%**	**1.12%**	**0.94%**	**0.79%**	**0.67%**
Former	21.86%	22.29%	21.94%	21.13%	19.99%	18.67%	17.28%	15.86%	14.40%	12.91%	11.41%	9.94%	8.53%	7.22%	6.09%	5.18%	4.44%	3.82%
Never (remainder)	63.04%	65.84%	68.53%	71.14%	73.67%	76.08%	78.33%	80.44%	82.47%	84.45%	86.35%	88.17%	89.89%	91.44%	92.79%	93.88%	94.76%	95.52%
Total current smoker breakdown																		
Men 18-24	0.97%	1.14%	1.06%	0.88%	0.73%	0.61%	0.51%	0.43%	0.36%	0.31%	0.26%	0.22%	0.18%	0.15%	0.13%	0.11%	0.09%	0.08%
Women 18-24	0.67%	0.75%	0.67%	0.53%	0.43%	0.34%	0.28%	0.23%	0.18%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.69%	3.67%	3.04%	2.59%	2.23%	1.93%	1.68%	1.45%	1.27%	1.08%	0.91%	0.77%	0.65%	0.56%	0.47%	0.40%	0.34%
Women 25-64	5.48%	3.93%	2.95%	2.33%	1.88%	1.54%	1.27%	1.05%	0.87%	0.73%	0.60%	0.49%	0.40%	0.33%	0.27%	0.22%	0.18%	0.15%
Men 65+	0.83%	0.69%	0.60%	0.49%	0.38%	0.28%	0.22%	0.17%	0.15%	0.11%	0.10%	0.10%	0.09%	0.08%	0.07%	0.06%	0.06%	0.05%
Women 65+	0.79%	0.67%	0.57%	0.45%	0.34%	0.25%	0.18%	0.15%	0.12%	0.09%	0.07%	0.06%	0.06%	0.05%	0.04%	0.03%	0.03%	0.02%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.2	91.6	110.8	130.4	149.9	169.2	188.4	207.9	227.7	248.0	268.8	290.1	311.9
Cig.-attributable deaths (1000s)	0.0	2306.6	4470.8	6528.3	8487.5	10319.9	11955.7	13382.1	14654.1	15812.7	16874.9	17864.6	18799.2	19660.5	20411.2	21035.8	21558.7	22015.2
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.2	31.8	61.9	88.3	110.9	131.2	150.4	169.4	187.8	205.5	222.1	237.0	250.3	261.8	271.2	278.8
Life-years gained (1000s)	0.0	0.0	8.3	106.0	340.5	689.6	1119.6	1603.4	2123.2	2667.7	3227.9	3794.5	4357.5	4906.1	5430.2	5920.9	6368.8	6765.1
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.7	16.6	32.4	46.2	58.0	68.6	78.6	88.6	98.2	107.5	116.1	123.9	130.9	136.9	141.8	145.8

High-case quit rate multiplier for sensitivity analysis (0.75)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.7	290.7	298.2	304.5	310.1	315.3	320.6	326.2	331.8	337.3	342.4	346.9	351.1	354.7	357.8
Smoking prevalence:																		
CC	15.10%	12.89%	10.08%	7.70%	6.28%	5.27%	4.49%	3.85%	3.30%	2.83%	2.42%	2.06%	1.75%	1.48%	1.25%	1.06%	0.89%	0.75%
VLN	0.00%	0.00%	0.98%	1.79%	1.85%	1.71%	1.51%	1.32%	1.15%	0.99%	0.85%	0.73%	0.62%	0.53%	0.44%	0.38%	0.32%	0.27%
Total current	**15.10%**	**12.89%**	**11.06%**	**9.49%**	**8.13%**	**6.98%**	**6.00%**	**5.17%**	**4.45%**	**3.82%**	**3.27%**	**2.79%**	**2.37%**	**2.01%**	**1.70%**	**1.43%**	**1.21%**	**1.02%**
Former	21.86%	21.28%	20.39%	19.34%	18.14%	16.85%	15.54%	14.24%	12.91%	11.55%	10.19%	8.85%	7.56%	6.37%	5.34%	4.53%	3.88%	3.34%
Never (remainder)	63.04%	65.84%	68.54%	71.17%	73.73%	76.17%	78.46%	80.60%	82.64%	84.63%	86.54%	88.36%	90.07%	91.62%	92.96%	94.04%	94.91%	95.64%
Total current smoker breakdown																		
Men 18-24	0.97%	1.18%	1.10%	0.91%	0.76%	0.63%	0.53%	0.45%	0.38%	0.32%	0.27%	0.23%	0.19%	0.16%	0.14%	0.12%	0.10%	0.08%
Women 18-24	0.67%	0.78%	0.70%	0.55%	0.44%	0.36%	0.29%	0.24%	0.19%	0.16%	0.13%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%
Men 25-64	6.36%	5.02%	4.18%	3.65%	3.23%	2.88%	2.57%	2.27%	2.00%	1.76%	1.51%	1.28%	1.08%	0.92%	0.78%	0.66%	0.56%	0.48%
Women 25-64	5.48%	4.27%	3.45%	2.88%	2.43%	2.06%	1.75%	1.48%	1.24%	1.06%	0.88%	0.72%	0.58%	0.48%	0.39%	0.32%	0.26%	0.21%
Men 65+	0.83%	0.81%	0.80%	0.73%	0.62%	0.50%	0.41%	0.36%	0.32%	0.27%	0.26%	0.26%	0.24%	0.22%	0.20%	0.18%	0.15%	0.13%
Women 65+	0.79%	0.82%	0.83%	0.76%	0.65%	0.54%	0.44%	0.38%	0.33%	0.26%	0.23%	0.21%	0.19%	0.16%	0.14%	0.12%	0.10%	0.08%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.9	40.3	56.2	73.5	92.1	111.4	131.0	150.6	169.9	189.2	208.6	228.4	248.6	269.4	290.7	312.4
Cig.-attributable deaths (1000s)	0.0	2313.8	4518.7	6658.7	8746.3	10750.0	12587.9	14228.7	15709.2	17064.0	18308.9	19468.5	20559.2	21560.9	22437.5	23172.9	23790.2	24324.7
Avoided cig.-att. deaths (1000s)	0.0	0.0	6.5	42.8	87.8	129.6	165.5	196.8	225.5	253.2	280.2	306.4	331.3	354.3	375.0	393.1	408.2	420.6
Life-years gained (1000s)	0.0	0.0	10.3	138.7	463.4	963.9	1589.7	2293.0	3041.3	3817.4	4611.0	5412.7	6211.4	6993.3	7744.4	8450.9	9098.1	9672.2
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.4	22.4	45.9	67.8	86.6	102.9	117.9	132.4	146.5	160.2	173.2	185.2	196.1	205.5	213.5	219.9

Low-case annual mortality rate multiplier (0.98)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	260.0	272.4	284.1	294.8	304.4	313.0	320.8	328.2	335.5	343.1	350.8	358.6	366.3	373.7	380.8	387.7	394.3
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.54%	4.56%	3.82%	3.22%	2.73%	2.32%	1.96%	1.65%	1.39%	1.17%	0.98%	0.82%	0.69%	0.58%
VLN	0.00%	0.00%	0.91%	1.60%	1.60%	1.44%	1.25%	1.07%	0.92%	0.78%	0.67%	0.56%	0.48%	0.40%	0.34%	0.28%	0.24%	0.20%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.55%**	**7.14%**	**6.00%**	**5.07%**	**4.29%**	**3.65%**	**3.10%**	**2.63%**	**2.22%**	**1.87%**	**1.57%**	**1.32%**	**1.11%**	**0.93%**	**0.78%**
Former	21.86%	21.82%	21.28%	20.47%	19.43%	18.26%	17.02%	15.77%	14.50%	13.20%	11.89%	10.60%	9.33%	8.13%	7.02%	6.06%	5.28%	4.62%
Never (remainder)	63.04%	65.81%	68.45%	70.99%	73.42%	75.74%	77.91%	79.94%	81.85%	83.70%	85.48%	87.18%	88.80%	90.30%	91.66%	92.83%	93.80%	94.60%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.73%	0.61%	0.51%	0.42%	0.36%	0.30%	0.25%	0.21%	0.18%	0.15%	0.12%	0.10%	0.09%	0.07%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.43%	0.34%	0.28%	0.22%	0.18%	0.15%	0.12%	0.10%	0.08%	0.06%	0.05%	0.04%	0.03%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.32%	2.87%	2.51%	2.20%	1.91%	1.66%	1.45%	1.24%	1.04%	0.88%	0.74%	0.62%	0.53%	0.44%	0.38%
Women 25-64	5.48%	4.09%	3.19%	2.58%	2.12%	1.76%	1.46%	1.21%	1.00%	0.85%	0.70%	0.56%	0.46%	0.37%	0.30%	0.24%	0.20%	0.16%
Men 65+	0.83%	0.75%	0.71%	0.62%	0.51%	0.41%	0.33%	0.28%	0.24%	0.20%	0.19%	0.18%	0.17%	0.16%	0.14%	0.12%	0.11%	0.09%
Women 65+	0.79%	0.75%	0.69%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.16%	0.13%	0.12%	0.11%	0.09%	0.08%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.2	24.7	37.9	52.0	67.4	83.7	100.7	118.2	135.7	153.1	170.2	187.2	204.4	221.9	239.6	257.7	275.9
Cig.-attributable deaths (1000s)	0.0	2249.1	4298.0	6210.6	8018.2	9715.5	11251.2	12603.9	13808.5	14907.7	15919.0	16862.6	17756.6	18597.5	19365.3	20035.1	20597.1	21080.7
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.4	33.4	66.0	94.8	119.1	139.9	158.9	176.9	194.1	210.3	225.3	238.8	250.8	261.1	269.8	276.9
Life-years gained (1000s)	0.0	0.0	8.6	110.8	360.3	736.9	1204.2	1729.7	2290.1	2871.2	3462.9	4056.8	4644.6	5217.6	5767.2	6286.4	6769.5	7210.5
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.8	17.5	34.5	49.6	62.3	73.2	83.1	92.5	101.5	110.0	117.8	124.9	131.1	136.5	141.1	144.8

High-case annual mortality rate multiplier (1.00)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	260.0	272.4	284.1	294.8	304.4	313.0	320.8	328.2	335.5	343.1	350.8	358.6	366.3	373.7	380.8	387.7	394.3
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.54%	4.56%	3.82%	3.22%	2.73%	2.32%	1.96%	1.65%	1.39%	1.17%	0.98%	0.82%	0.69%	0.58%
VLN	0.00%	0.00%	0.91%	1.60%	1.60%	1.44%	1.25%	1.07%	0.92%	0.78%	0.67%	0.56%	0.48%	0.40%	0.34%	0.28%	0.24%	0.20%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.55%**	**7.14%**	**6.00%**	**5.07%**	**4.29%**	**3.65%**	**3.10%**	**2.63%**	**2.22%**	**1.87%**	**1.57%**	**1.32%**	**1.11%**	**0.93%**	**0.78%**
Former	21.86%	21.82%	21.28%	20.47%	19.43%	18.26%	17.02%	15.77%	14.50%	13.20%	11.89%	10.60%	9.33%	8.13%	7.02%	6.06%	5.28%	4.62%
Never (remainder)	63.04%	65.81%	68.45%	70.99%	73.42%	75.74%	77.91%	79.94%	81.85%	83.70%	85.48%	87.18%	88.80%	90.30%	91.66%	92.83%	93.80%	94.60%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.73%	0.61%	0.51%	0.42%	0.36%	0.30%	0.25%	0.21%	0.18%	0.15%	0.12%	0.10%	0.09%	0.07%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.43%	0.34%	0.28%	0.22%	0.18%	0.15%	0.12%	0.10%	0.08%	0.06%	0.05%	0.04%	0.03%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.32%	2.87%	2.51%	2.20%	1.91%	1.66%	1.45%	1.24%	1.04%	0.88%	0.74%	0.62%	0.53%	0.44%	0.38%
Women 25-64	5.48%	4.09%	3.19%	2.58%	2.12%	1.76%	1.46%	1.21%	1.00%	0.85%	0.70%	0.56%	0.46%	0.37%	0.30%	0.24%	0.20%	0.16%
Men 65+	0.83%	0.75%	0.71%	0.62%	0.51%	0.41%	0.33%	0.28%	0.24%	0.20%	0.19%	0.18%	0.17%	0.16%	0.14%	0.12%	0.11%	0.09%
Women 65+	0.79%	0.75%	0.69%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.16%	0.13%	0.12%	0.11%	0.09%	0.08%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.2	24.7	37.9	52.0	67.4	83.7	100.7	118.2	135.7	153.1	170.2	187.2	204.4	221.9	239.6	257.7	275.9
Cig.-attributable deaths (1000s)	0.0	2249.1	4298.0	6210.6	8018.2	9715.5	11251.2	12603.9	13808.5	14907.7	15919.0	16862.6	17756.6	18597.5	19365.3	20035.1	20597.1	21080.7
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.4	33.4	66.0	94.8	119.1	139.9	158.9	176.9	194.1	210.3	225.3	238.8	250.8	261.1	269.8	276.9
Life-years gained (1000s)	0.0	0.0	8.6	110.8	360.3	736.9	1204.2	1729.7	2290.1	2871.2	3462.9	4056.8	4644.6	5217.6	5767.2	6286.4	6769.5	7210.5
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.8	17.5	34.5	49.6	62.3	73.2	83.1	92.5	101.5	110.0	117.8	124.9	131.1	136.5	141.1	144.8

Low-case ERR (110%)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.5	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.84%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.59%	1.60%	1.44%	1.25%	1.08%	0.93%	0.79%	0.68%	0.57%	0.48%	0.41%	0.34%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.15%**	**6.02%**	**5.10%**	**4.34%**	**3.70%**	**3.15%**	**2.67%**	**2.26%**	**1.91%**	**1.61%**	**1.36%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.29%	19.14%	17.85%	16.50%	15.14%	13.75%	12.32%	10.88%	9.47%	8.11%	6.86%	5.78%	4.90%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.54%	71.16%	73.70%	76.13%	78.40%	80.52%	82.56%	84.54%	86.44%	88.26%	89.97%	91.53%	92.87%	93.95%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.22%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.69%	0.60%	0.48%	0.37%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.28%	0.23%	0.20%	0.15%	0.13%	0.11%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.8	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4495.9	6602.0	8632.1	10552.4	12286.6	13813.8	15181.2	16427.6	17570.0	18633.0	19633.9	20554.0	21356.9	22026.8	22587.9	23075.7
Avoided cig.-att. deaths (1000s)	0.0	0.0	4.1	26.0	52.4	77.2	99.5	120.3	140.7	161.2	181.7	201.6	220.7	238.2	254.1	268.0	279.7	289.2
Life-years gained (1000s)	0.0	0.0	6.5	85.4	281.0	581.1	960.2	1396.2	1873.6	2383.3	2917.3	3467.0	4022.6	4572.2	5104.5	5608.7	6073.2	6486.8
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.1	13.6	27.4	40.3	52.0	62.9	73.6	84.3	95.0	105.4	115.4	124.6	132.9	140.1	146.2	151.2

High-case ERR (90%)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.5	315.7	321.0	326.6	332.2	337.7	342.8	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.85%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.60%	1.61%	1.45%	1.26%	1.09%	0.93%	0.80%	0.68%	0.58%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.16%**	**6.03%**	**5.11%**	**4.35%**	**3.71%**	**3.16%**	**2.68%**	**2.27%**	**1.92%**	**1.62%**	**1.36%**	**1.15%**	**0.97%**	**0.82%**
Former	21.86%	21.80%	21.20%	20.29%	19.15%	17.85%	16.51%	15.15%	13.75%	12.32%	10.89%	9.48%	8.12%	6.87%	5.78%	4.91%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.69%	76.12%	78.38%	80.51%	82.54%	84.52%	86.43%	88.25%	89.96%	91.52%	92.86%	93.95%	94.82%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.23%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.3	91.8	111.0	130.7	150.2	169.5	188.7	208.1	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4492.4	6580.4	8589.8	10493.4	12215.8	13734.9	15096.6	16338.6	17477.5	18537.6	19536.2	20454.5	21256.0	21925.0	22485.6	22973.1
Avoided cig.-att. deaths (1000s)	0.0	0.0	7.6	47.7	94.7	136.1	170.3	199.2	225.3	250.2	274.1	297.0	318.4	337.7	355.0	369.8	382.0	391.8
Life-years gained (1000s)	0.0	0.0	12.0	157.0	512.6	1046.6	1701.0	2426.2	3189.5	3973.5	4766.7	5559.0	6339.2	7094.6	7812.9	8482.4	9091.1	9628.3
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	4.0	24.9	49.5	71.2	89.0	104.2	117.8	130.8	143.3	155.3	166.5	176.6	185.6	193.3	199.7	204.9

Low-case CPDr (40%)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.5	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.84%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.59%	1.60%	1.44%	1.25%	1.08%	0.93%	0.79%	0.68%	0.57%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.15%**	**6.02%**	**5.10%**	**4.34%**	**3.70%**	**3.15%**	**2.67%**	**2.26%**	**1.91%**	**1.61%**	**1.36%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.29%	19.14%	17.85%	16.50%	15.14%	13.75%	12.32%	10.88%	9.47%	8.11%	6.86%	5.78%	4.90%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.54%	71.16%	73.70%	76.13%	78.40%	80.52%	82.56%	84.53%	86.44%	88.26%	89.97%	91.53%	92.87%	93.95%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.22%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.69%	0.60%	0.48%	0.37%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.28%	0.23%	0.20%	0.15%	0.13%	0.11%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.8	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4495.6	6600.1	8628.5	10547.4	12280.8	13807.4	15174.4	16420.5	17562.7	18625.5	19626.2	20546.3	21349.1	22019.0	22580.1	23067.9
Avoided cig.-att. deaths (1000s)	0.0	0.0	4.4	27.9	56.1	82.1	105.3	126.7	147.5	168.3	189.0	209.1	228.3	246.0	261.9	275.8	287.5	297.0
Life-years gained (1000s)	0.0	0.0	7.0	91.8	301.4	621.5	1024.0	1484.3	1985.9	2518.9	3075.0	3645.6	4220.6	4788.1	5336.5	5855.0	6331.9	6756.3
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.3	14.6	29.3	42.9	55.1	66.3	77.1	88.0	98.8	109.4	119.4	128.6	136.9	144.2	150.3	155.3

High-case CPDr (60%)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.5	315.7	321.0	326.6	332.2	337.7	342.8	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.85%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.60%	1.61%	1.45%	1.26%	1.09%	0.93%	0.80%	0.68%	0.58%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.16%**	**6.03%**	**5.11%**	**4.35%**	**3.70%**	**3.16%**	**2.68%**	**2.27%**	**1.92%**	**1.62%**	**1.36%**	**1.15%**	**0.97%**	**0.82%**
Former	21.86%	21.80%	21.20%	20.29%	19.15%	17.85%	16.51%	15.15%	13.75%	12.32%	10.89%	9.48%	8.12%	6.87%	5.78%	4.91%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.69%	76.12%	78.38%	80.51%	82.54%	84.52%	86.43%	88.25%	89.96%	91.52%	92.86%	93.95%	94.82%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.23%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.3	91.8	111.1	130.7	150.2	169.5	188.7	208.1	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4492.5	6581.1	8591.1	10495.1	12217.8	13737.0	15098.8	16340.9	17479.8	18540.0	19538.6	20456.9	21258.4	21927.4	22487.9	22975.4
Avoided cig.-att. deaths (1000s)	0.0	0.0	7.4	47.0	93.4	134.4	168.3	197.1	223.1	247.9	271.8	294.6	316.0	335.3	352.6	367.4	379.6	389.5
Life-years gained (1000s)	0.0	0.0	11.8	154.6	505.1	1031.8	1678.0	2394.6	3149.5	3925.2	4710.5	5495.2	6268.4	7017.4	7729.7	8394.0	8998.2	9531.4
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.9	24.6	48.9	70.3	88.0	103.1	116.7	129.6	142.1	154.1	165.2	175.3	184.4	192.1	198.5	203.6

Low-case CPDf (60%)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.5	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.84%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.59%	1.60%	1.44%	1.25%	1.08%	0.93%	0.79%	0.68%	0.57%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.15%**	**6.02%**	**5.10%**	**4.34%**	**3.70%**	**3.15%**	**2.67%**	**2.26%**	**1.91%**	**1.61%**	**1.36%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.29%	19.14%	17.85%	16.50%	15.14%	13.75%	12.32%	10.88%	9.47%	8.11%	6.86%	5.78%	4.90%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.54%	71.16%	73.70%	76.13%	78.40%	80.52%	82.56%	84.53%	86.44%	88.26%	89.97%	91.53%	92.87%	93.95%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.22%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.69%	0.60%	0.48%	0.37%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.28%	0.23%	0.20%	0.15%	0.13%	0.11%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.8	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4495.6	6600.4	8629.0	10548.2	12281.8	13808.5	15175.6	16421.8	17564.0	18626.9	19627.7	20547.8	21350.6	22020.5	22581.7	23069.5
Avoided cig.-att. deaths (1000s)	0.0	0.0	4.4	27.7	55.5	81.3	104.3	125.6	146.3	167.0	187.6	207.7	226.9	244.5	260.4	274.3	285.9	295.4
Life-years gained (1000s)	0.0	0.0	6.9	90.9	298.5	615.6	1014.5	1471.0	1968.8	2498.1	3050.9	3618.4	4190.5	4755.3	5301.4	5817.7	6292.9	6715.6
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.3	14.5	29.0	42.5	54.6	65.7	76.5	87.3	98.1	108.6	118.6	127.8	136.1	143.4	149.5	154.5

High-case CPDr (100%)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.6	332.2	337.7	342.8	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.85%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.60%	1.61%	1.45%	1.26%	1.08%	0.93%	0.80%	0.68%	0.58%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.16%**	**6.03%**	**5.11%**	**4.35%**	**3.70%**	**3.16%**	**2.68%**	**2.27%**	**1.92%**	**1.61%**	**1.36%**	**1.15%**	**0.97%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.29%	19.15%	17.85%	16.51%	15.15%	13.75%	12.32%	10.89%	9.48%	8.12%	6.87%	5.78%	4.91%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.39%	80.51%	82.54%	84.52%	86.43%	88.25%	89.96%	91.52%	92.86%	93.95%	94.82%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.23%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.3	91.8	111.1	130.7	150.2	169.5	188.7	208.1	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4492.7	6582.0	8593.0	10497.7	12220.8	13740.4	15102.4	16344.6	17483.7	18543.9	19542.6	20461.0	21262.5	21931.5	22492.1	22979.6
Avoided cig.-att. deaths (1000s)	0.0	0.0	7.3	46.0	91.6	131.8	165.3	193.7	219.5	244.2	267.9	290.7	312.0	331.3	348.4	363.3	375.5	385.3
Life-years gained (1000s)	0.0	0.0	11.6	151.4	494.8	1011.3	1645.4	2349.5	3091.9	3855.6	4629.6	5403.7	6167.0	6906.8	7611.0	8268.0	8865.8	9393.7
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.8	24.1	47.9	68.9	86.4	101.3	114.8	127.7	140.1	152.0	163.1	173.2	182.2	189.9	196.3	201.5

Low-case initiation rate multiplier for sensitivity analysis (0.75)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.9	310.5	315.8	321.1	326.7	332.4	338.0	343.1	347.7	351.8	355.4	358.5
Smoking prevalence:																		
CC	15.10%	11.98%	8.77%	6.30%	4.86%	3.89%	3.18%	2.63%	2.19%	1.83%	1.53%	1.28%	1.08%	0.90%	0.76%	0.64%	0.54%	0.45%
VLN	0.00%	0.00%	0.86%	1.47%	1.44%	1.25%	1.06%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.18%	0.16%
Total current	**15.10%**	**11.98%**	**9.63%**	**7.76%**	**6.30%**	**5.15%**	**4.24%**	**3.52%**	**2.94%**	**2.46%**	**2.06%**	**1.72%**	**1.44%**	**1.21%**	**1.02%**	**0.86%**	**0.72%**	**0.61%**
Former	21.86%	21.77%	21.11%	20.11%	18.85%	17.43%	15.96%	14.47%	12.96%	11.42%	9.90%	8.41%	7.00%	5.72%	4.64%	3.81%	3.20%	2.72%
Never (remainder)	63.04%	66.25%	69.26%	72.12%	74.85%	77.42%	79.80%	82.01%	84.10%	86.12%	88.05%	89.87%	91.56%	93.07%	94.34%	95.33%	96.08%	96.67%
Total current smoker breakdown																		
Men 18-24	0.97%	0.92%	0.81%	0.67%	0.56%	0.47%	0.39%	0.33%	0.28%	0.23%	0.20%	0.17%	0.14%	0.12%	0.10%	0.08%	0.07%	0.06%
Women 18-24	0.67%	0.61%	0.51%	0.41%	0.33%	0.26%	0.21%	0.17%	0.14%	0.11%	0.09%	0.08%	0.06%	0.05%	0.04%	0.03%	0.03%	0.02%
Men 25-64	6.36%	4.86%	3.80%	3.07%	2.54%	2.14%	1.82%	1.54%	1.31%	1.12%	0.96%	0.81%	0.68%	0.58%	0.49%	0.42%	0.35%	0.30%
Women 25-64	5.48%	4.10%	3.12%	2.42%	1.92%	1.54%	1.24%	0.99%	0.80%	0.66%	0.54%	0.44%	0.36%	0.29%	0.24%	0.20%	0.16%	0.13%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.17%	0.15%	0.13%	0.12%	0.10%	0.09%	0.08%	0.07%	0.06%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.12%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.0	130.6	150.1	169.4	188.5	207.9	227.6	247.9	268.6	289.9	311.7
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6591.2	8607.5	10504.5	12210.5	13707.5	15042.6	16250.9	17347.5	18355.2	19292.2	20141.7	20865.5	21443.3	21898.9	22276.0
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	36.8	73.3	105.5	132.3	155.5	176.8	197.0	216.1	233.9	249.9	263.9	276.2	286.7	295.4	302.6
Life-years gained (1000s)	0.0	0.0	9.3	121.1	396.1	809.3	1316.4	1879.6	2473.9	3084.0	3697.7	4302.5	4886.2	5436.5	5944.4	6404.8	6815.3	7174.0
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	19.3	38.3	55.1	69.2	81.3	92.4	103.0	113.0	122.3	130.6	138.0	144.4	149.9	154.5	158.2

High-case initiation rate multiplier for sensitivity analysis (1.25)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.6	320.9	326.4	332.0	337.4	342.4	346.9	351.0	354.5	357.7
Smoking prevalence:																		
CC	15.10%	12.76%	9.94%	7.61%	6.24%	5.27%	4.51%	3.89%	3.35%	2.88%	2.47%	2.10%	1.78%	1.50%	1.27%	1.07%	0.90%	0.76%
VLN	0.00%	0.00%	0.96%	1.72%	1.77%	1.64%	1.45%	1.28%	1.12%	0.97%	0.83%	0.71%	0.61%	0.51%	0.43%	0.36%	0.31%	0.26%
Total current	**15.10%**	**12.76%**	**10.90%**	**9.33%**	**8.01%**	**6.90%**	**5.97%**	**5.16%**	**4.47%**	**3.85%**	**3.30%**	**2.81%**	**2.38%**	**2.02%**	**1.70%**	**1.43%**	**1.21%**	**1.02%**
Former	21.86%	21.82%	21.29%	20.47%	19.44%	18.27%	17.05%	15.82%	14.54%	13.22%	11.88%	10.54%	9.24%	8.01%	6.92%	6.00%	5.22%	4.51%
Never (remainder)	63.04%	65.43%	67.81%	70.19%	72.55%	74.83%	76.98%	79.02%	80.99%	82.93%	84.82%	86.65%	88.38%	89.97%	91.38%	92.56%	93.57%	94.47%
Total current smoker breakdown																		
Men 18-24	0.97%	1.39%	1.35%	1.12%	0.93%	0.78%	0.65%	0.55%	0.46%	0.39%	0.33%	0.28%	0.23%	0.20%	0.17%	0.14%	0.12%	0.10%
Women 18-24	0.67%	0.92%	0.85%	0.68%	0.54%	0.44%	0.36%	0.29%	0.23%	0.19%	0.16%	0.13%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%
Men 25-64	6.36%	4.86%	4.04%	3.59%	3.24%	2.92%	2.63%	2.36%	2.09%	1.86%	1.60%	1.35%	1.14%	0.97%	0.82%	0.70%	0.59%	0.51%
Women 25-64	5.48%	4.10%	3.27%	2.76%	2.35%	2.02%	1.74%	1.49%	1.27%	1.09%	0.91%	0.74%	0.60%	0.49%	0.40%	0.33%	0.27%	0.22%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.17%	0.18%	0.19%	0.18%	0.17%	0.15%	0.13%	0.12%	0.10%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.14%	0.13%	0.12%	0.11%	0.09%	0.08%	0.06%	0.05%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.9	111.1	130.8	150.4	169.7	189.0	208.4	228.3	248.7	269.5	290.8	312.5
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6591.2	8614.6	10541.7	12292.4	13841.8	15235.8	16515.9	17700.7	18816.1	19878.7	20867.7	21748.2	22509.4	23175.5	23773.7
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	36.8	73.7	107.5	137.0	163.5	188.6	213.7	238.9	264.0	288.4	311.2	332.0	350.3	365.4	377.5
Life-years gained (1000s)	0.0	0.0	9.3	121.1	396.7	816.2	1341.0	1937.0	2581.7	3263.6	3975.8	4711.6	5462.6	6216.2	6957.9	7670.3	8332.4	8923.8
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	19.3	38.5	56.2	71.6	85.5	98.6	111.7	124.9	138.0	150.8	162.7	173.6	183.1	191.1	197.4

Low-case years until peak rate that CC smokers switch – linear growth (10)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.5	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.80%	7.37%	5.69%	4.63%	3.87%	3.27%	2.78%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.46%	1.20%	1.48%	1.41%	1.25%	1.08%	0.93%	0.80%	0.68%	0.58%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.56%**	**7.17%**	**6.04%**	**5.11%**	**4.35%**	**3.71%**	**3.16%**	**2.68%**	**2.27%**	**1.91%**	**1.61%**	**1.36%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.27%	19.12%	17.83%	16.49%	15.13%	13.74%	12.31%	10.88%	9.47%	8.11%	6.86%	5.78%	4.90%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.54%	71.16%	73.70%	76.13%	78.40%	80.52%	82.55%	84.53%	86.44%	88.26%	89.97%	91.52%	92.86%	93.95%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.34%	2.90%	2.54%	2.23%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.20%	2.60%	2.14%	1.79%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.22%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.37%	0.29%	0.24%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.4	91.8	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4497.0	6606.7	8631.8	10545.2	12274.2	13798.1	15163.7	16409.0	17550.8	18613.1	19613.4	20533.0	21335.3	22004.9	22565.7	23053.3
Avoided cig.-att. deaths (1000s)	0.0	0.0	2.9	21.4	52.7	84.3	111.9	136.0	158.2	179.7	200.9	221.5	241.1	259.3	275.6	289.9	301.9	311.6
Life-years gained (1000s)	0.0	0.0	4.7	66.0	253.2	578.1	1009.5	1513.0	2064.0	2648.5	3256.9	3880.4	4508.7	5129.8	5731.4	6301.6	6827.4	7296.9
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	1.5	11.2	27.6	44.1	58.5	71.1	82.7	94.0	105.0	115.8	126.1	135.6	144.1	151.6	157.9	162.9

High-case years until peak rate that CC smokers switch – linear growth (2)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.6	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	8.89%	6.81%	5.50%	4.56%	3.84%	3.25%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	1.37%	1.73%	1.65%	1.46%	1.26%	1.08%	0.93%	0.79%	0.68%	0.57%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.54%**	**7.14%**	**6.02%**	**5.10%**	**4.34%**	**3.70%**	**3.15%**	**2.68%**	**2.27%**	**1.91%**	**1.61%**	**1.36%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.21%	20.31%	19.16%	17.86%	16.51%	15.15%	13.75%	12.32%	10.89%	9.48%	8.12%	6.86%	5.78%	4.91%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.39%	80.51%	82.55%	84.53%	86.44%	88.26%	89.97%	91.52%	92.86%	93.95%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.22%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.58%	2.13%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.69%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.28%	0.23%	0.20%	0.15%	0.13%	0.11%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.1	73.3	91.8	111.1	130.7	150.2	169.5	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4487.5	6578.1	8596.3	10507.8	12235.8	13758.5	15122.3	16365.7	17505.8	18567.0	19566.5	20485.6	21287.7	21957.2	22518.0	23005.8
Avoided cig.-att. deaths (1000s)	0.0	0.0	12.5	50.0	88.2	121.7	150.2	175.7	199.6	223.1	245.8	267.6	288.1	306.7	323.3	337.6	349.5	359.1
Life-years gained (1000s)	0.0	0.0	20.9	186.3	524.7	1001.6	1572.6	2201.6	2865.4	3550.7	4247.5	4946.3	5636.4	6305.8	6943.0	7537.6	8078.6	8556.0
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	6.5	26.1	46.1	63.6	78.6	91.9	104.4	116.6	128.5	139.9	150.6	160.4	169.0	176.5	182.8	187.8

Low-case slope of CPD-Excess Risk relationship (0.6)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.7	290.8	298.4	304.8	310.4	315.6	321.0	326.5	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.95%	5.55%	4.58%	3.84%	3.26%	2.77%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.59%	1.60%	1.44%	1.26%	1.08%	0.93%	0.79%	0.68%	0.57%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.15%**	**6.02%**	**5.10%**	**4.34%**	**3.70%**	**3.15%**	**2.68%**	**2.26%**	**1.91%**	**1.61%**	**1.36%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.29%	19.14%	17.84%	16.50%	15.14%	13.74%	12.31%	10.88%	9.47%	8.11%	6.86%	5.78%	4.90%	4.21%	3.61%
Never (remainder)	63.04%	65.84%	68.54%	71.16%	73.71%	76.13%	78.40%	80.52%	82.56%	84.54%	86.44%	88.27%	89.98%	91.53%	92.87%	93.96%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.23%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.69%	0.60%	0.48%	0.37%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.28%	0.23%	0.20%	0.15%	0.13%	0.11%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.9	40.3	56.1	73.4	91.9	111.1	130.7	150.3	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2315.1	4510.3	6623.9	8662.4	10593.1	12338.6	13876.4	15253.3	16508.3	17658.4	18728.6	19736.3	20662.9	21471.8	22147.0	22712.7	23204.5
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.2	33.1	66.2	96.4	122.7	146.3	168.6	190.8	212.5	233.6	253.6	272.0	288.5	302.9	314.9	324.7
Life-years gained (1000s)	0.0	0.0	8.3	108.6	356.3	732.6	1201.7	1732.6	2304.2	2904.7	3524.9	4155.8	4786.9	5406.1	6001.6	6562.3	7076.5	7532.8
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.7	17.3	34.6	50.4	64.1	76.5	88.2	99.7	111.1	122.2	132.6	142.2	150.8	158.4	164.7	169.8

High-case slope of CPD-Excess Risk relationship (0.1)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.9	298.5	304.9	310.5	315.8	321.1	326.6	332.3	337.8	342.8	347.4	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.36%	6.96%	5.56%	4.59%	3.85%	3.26%	2.78%	2.36%	2.00%	1.69%	1.43%	1.20%	1.01%	0.85%	0.72%	0.61%
VLN	0.00%	0.00%	0.91%	1.60%	1.61%	1.45%	1.26%	1.09%	0.93%	0.80%	0.68%	0.58%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.37%**	**10.27%**	**8.56%**	**7.16%**	**6.03%**	**5.11%**	**4.35%**	**3.71%**	**3.16%**	**2.68%**	**2.27%**	**1.92%**	**1.62%**	**1.36%**	**1.15%**	**0.97%**	**0.82%**
Former	21.86%	21.80%	21.20%	20.30%	19.16%	17.87%	16.53%	15.17%	13.77%	12.34%	10.90%	9.49%	8.13%	6.88%	5.79%	4.92%	4.22%	3.63%
Never (remainder)	63.04%	65.83%	68.53%	71.14%	73.68%	76.10%	78.36%	80.48%	82.52%	84.50%	86.42%	88.24%	89.95%	91.51%	92.85%	93.94%	94.81%	95.56%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.23%	1.95%	1.70%	1.49%	1.28%	1.08%	0.91%	0.77%	0.66%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.88%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.61%	0.49%	0.38%	0.30%	0.25%	0.22%	0.18%	0.17%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.37%	0.29%	0.24%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.2	56.0	73.2	91.7	111.0	130.6	150.2	169.5	188.7	208.1	227.9	248.2	269.0	290.3	312.1
Cig.-attributable deaths (1000s)	0.0	2295.9	4448.7	6501.5	8471.7	10334.0	12016.8	13501.2	14832.8	16048.2	17163.3	18201.6	19179.7	20078.9	20862.8	21516.6	22064.3	22540.7
Avoided cig.-att. deaths (1000s)	0.0	0.0	7.2	45.2	89.5	128.4	160.6	188.0	212.9	236.6	259.4	281.3	301.7	320.2	336.6	350.7	362.2	371.5
Life-years gained (1000s)	0.0	0.0	11.4	149.0	485.6	990.3	1608.9	2295.5	3019.8	3765.3	4521.3	5277.7	6023.9	6747.2	7435.4	8077.2	8660.9	9176.1
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.8	23.6	46.8	67.2	84.0	98.3	111.3	123.7	135.7	147.1	157.8	167.4	176.0	183.3	189.4	194.3

Low-case multiplier to adjust all death rates (1.0)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	261.5	274.5	286.1	296.3	304.7	311.8	317.8	323.3	328.6	334.2	339.9	345.5	350.7	355.4	359.6	363.4	366.7
Smoking prevalence:																		
CC	15.10%	12.39%	9.37%	6.95%	5.54%	4.56%	3.82%	3.23%	2.75%	2.34%	1.98%	1.68%	1.42%	1.19%	1.00%	0.85%	0.71%	0.60%
VLN	0.00%	0.00%	0.91%	1.60%	1.60%	1.44%	1.25%	1.08%	0.92%	0.79%	0.67%	0.57%	0.48%	0.41%	0.34%	0.29%	0.24%	0.21%
Total current	**15.10%**	**12.39%**	**10.28%**	**8.55%**	**7.14%**	**6.00%**	**5.07%**	**4.31%**	**3.67%**	**3.13%**	**2.66%**	**2.25%**	**1.90%**	**1.60%**	**1.35%**	**1.13%**	**0.96%**	**0.81%**
Former	21.86%	21.92%	21.43%	20.62%	19.55%	18.30%	16.97%	15.61%	14.23%	12.81%	11.37%	9.95%	8.57%	7.28%	6.14%	5.20%	4.46%	3.83%
Never (remainder)	63.04%	65.70%	68.29%	70.83%	73.31%	75.70%	77.96%	80.08%	82.10%	84.07%	85.97%	87.80%	89.53%	91.12%	92.51%	93.66%	94.58%	95.36%
Total current smoker breakdown																		
Men 18-24	0.97%	1.15%	1.07%	0.88%	0.73%	0.61%	0.51%	0.43%	0.36%	0.30%	0.26%	0.22%	0.18%	0.15%	0.13%	0.11%	0.09%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.43%	0.34%	0.28%	0.23%	0.18%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.85%	3.91%	3.32%	2.87%	2.51%	2.20%	1.92%	1.68%	1.47%	1.26%	1.07%	0.90%	0.76%	0.65%	0.55%	0.47%	0.40%
Women 25-64	5.48%	4.08%	3.17%	2.56%	2.11%	1.75%	1.46%	1.22%	1.01%	0.86%	0.71%	0.58%	0.47%	0.38%	0.31%	0.26%	0.21%	0.17%
Men 65+	0.83%	0.78%	0.74%	0.64%	0.52%	0.41%	0.32%	0.27%	0.23%	0.19%	0.18%	0.17%	0.16%	0.15%	0.13%	0.11%	0.10%	0.08%
Women 65+	0.79%	0.76%	0.71%	0.61%	0.49%	0.38%	0.30%	0.24%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.08%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	10.8	22.7	35.9	50.6	67.0	84.9	103.7	123.1	142.6	161.9	181.1	200.4	220.1	240.2	260.8	281.9	303.5
Cig.-attributable deaths (1000s)	0.0	1978.2	3923.9	5839.3	7726.7	9554.8	11241.8	12744.8	14095.8	15333.9	16474.1	17538.8	18545.8	19481.0	20309.1	21006.3	21586.6	22089.5
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.1	32.8	66.4	97.2	123.7	147.2	169.2	190.6	211.6	231.9	251.1	268.6	284.4	298.3	310.0	319.4
Life-years gained (1000s)	0.0	0.0	8.1	107.7	356.7	738.9	1218.5	1761.7	2344.7	2953.7	3578.9	4211.5	4842.0	5459.4	6052.8	6612.4	7127.9	7588.9
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	2.7	17.2	34.7	50.8	64.7	77.0	88.5	99.7	110.6	121.3	131.3	140.5	148.7	156.0	162.1	167.0

High-case multiplier to adjust all death rates (1.4)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	258.0	268.3	277.8	285.9	292.8	298.7	304.0	309.2	314.5	320.0	325.7	331.1	336.0	340.4	344.4	347.8	350.9
Smoking prevalence:																		
CC	15.10%	12.35%	9.34%	6.95%	5.56%	4.60%	3.87%	3.28%	2.79%	2.37%	2.01%	1.70%	1.44%	1.21%	1.02%	0.86%	0.72%	0.61%
VLN	0.00%	0.00%	0.90%	1.59%	1.61%	1.45%	1.26%	1.09%	0.93%	0.80%	0.68%	0.58%	0.49%	0.41%	0.35%	0.29%	0.25%	0.21%
Total current	**15.10%**	**12.35%**	**10.25%**	**8.54%**	**7.16%**	**6.04%**	**5.13%**	**4.37%**	**3.72%**	**3.17%**	**2.69%**	**2.28%**	**1.92%**	**1.62%**	**1.37%**	**1.15%**	**0.97%**	**0.82%**
Former	21.86%	21.68%	20.99%	20.00%	18.79%	17.46%	16.10%	14.73%	13.33%	11.90%	10.47%	9.07%	7.73%	6.52%	5.49%	4.67%	4.01%	3.45%
Never (remainder)	63.04%	65.97%	68.76%	71.46%	74.05%	76.50%	78.77%	80.90%	82.95%	84.93%	86.84%	88.65%	90.34%	91.86%	93.14%	94.18%	95.02%	95.73%
Total current smoker breakdown																		
Men 18-24	0.97%	1.17%	1.10%	0.91%	0.75%	0.63%	0.53%	0.45%	0.38%	0.32%	0.27%	0.23%	0.19%	0.16%	0.14%	0.12%	0.10%	0.08%
Women 18-24	0.67%	0.77%	0.69%	0.55%	0.44%	0.36%	0.29%	0.24%	0.19%	0.16%	0.13%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.34%	2.91%	2.55%	2.25%	1.97%	1.72%	1.51%	1.29%	1.09%	0.92%	0.78%	0.66%	0.56%	0.48%	0.41%
Women 25-64	5.48%	4.11%	3.21%	2.61%	2.16%	1.80%	1.51%	1.26%	1.05%	0.89%	0.73%	0.60%	0.49%	0.40%	0.33%	0.27%	0.22%	0.18%
Men 65+	0.83%	0.72%	0.66%	0.56%	0.45%	0.35%	0.27%	0.23%	0.20%	0.16%	0.15%	0.15%	0.14%	0.13%	0.11%	0.10%	0.09%	0.08%
Women 65+	0.79%	0.73%	0.67%	0.57%	0.45%	0.35%	0.27%	0.23%	0.19%	0.14%	0.12%	0.11%	0.10%	0.08%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	14.3	28.8	44.2	60.9	78.9	97.9	117.5	137.2	156.8	176.1	195.3	214.8	234.7	255.2	276.1	297.5	319.3
Cig.-attributable deaths (1000s)	0.0	2627.1	5025.6	7279.5	9406.8	11381.0	13137.3	14674.6	16048.1	17295.2	18434.5	19491.5	20482.4	21385.1	22163.4	22810.1	23355.9	23831.0
Avoided cig.-att. deaths (1000s)	0.0	0.0	6.5	40.3	79.6	114.3	143.7	169.6	193.9	217.6	240.7	263.0	284.0	303.1	320.2	334.8	346.9	356.7
Life-years gained (1000s)	0.0	0.0	10.3	132.9	430.6	875.1	1420.3	2029.3	2678.5	3355.0	4049.1	4750.5	5448.0	6128.1	6778.0	7385.3	7936.9	8422.0
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.4	21.1	41.6	59.7	75.1	88.7	101.4	113.8	125.9	137.5	148.5	158.5	167.4	175.1	181.4	186.5

Low-case C-Im (0.5)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.6	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.43%	7.08%	5.68%	4.69%	3.95%	3.34%	2.84%	2.42%	2.05%	1.74%	1.46%	1.23%	1.04%	0.87%	0.74%	0.62%
VLN	0.00%	0.00%	0.84%	1.48%	1.48%	1.34%	1.17%	1.01%	0.86%	0.74%	0.63%	0.54%	0.46%	0.38%	0.32%	0.27%	0.23%	0.19%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.16%**	**6.03%**	**5.11%**	**4.35%**	**3.71%**	**3.16%**	**2.69%**	**2.27%**	**1.92%**	**1.62%**	**1.36%**	**1.15%**	**0.97%**	**0.82%**
Former	21.86%	21.80%	21.20%	20.29%	19.14%	17.84%	16.50%	15.14%	13.74%	12.31%	10.88%	9.47%	8.11%	6.86%	5.77%	4.90%	4.21%	3.61%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.39%	80.51%	82.55%	84.53%	86.44%	88.26%	89.97%	91.52%	92.86%	93.95%	94.83%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.54%	2.23%	1.95%	1.70%	1.50%	1.28%	1.08%	0.92%	0.78%	0.66%	0.56%	0.48%	0.41%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.25%	1.04%	0.88%	0.73%	0.59%	0.48%	0.39%	0.32%	0.26%	0.22%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.13%	0.12%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.1	130.7	150.2	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6591.2	8611.1	10523.2	12251.8	13775.3	15140.2	16384.8	17525.9	18588.0	19588.4	20508.4	21311.3	21981.5	22543.0	23031.1
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	36.8	73.5	106.4	134.3	158.8	181.7	204.0	225.7	246.6	266.2	283.9	299.7	313.3	324.6	333.8
Life-years gained (1000s)	0.0	0.0	9.3	121.1	396.4	812.5	1327.3	1904.4	2519.9	3160.0	3815.1	4475.2	5129.4	5765.4	6371.2	6936.4	7450.1	7903.2
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	19.3	38.4	55.6	70.2	83.1	95.0	106.7	118.0	128.9	139.2	148.4	156.7	163.8	169.7	174.5

High-case C-Im (1.5)

	2015	2020	2025	2030	2035	2040	2045	2050	2055	2060	2065	2070	2075	2080	2085	2090	2095	2100
Total pop. ≥18 years old (millions)	247.4	259.7	271.3	281.8	290.8	298.4	304.8	310.4	315.7	321.0	326.6	332.2	337.7	342.7	347.3	351.4	355.0	358.1
Smoking prevalence:																		
CC	15.10%	12.37%	9.29%	6.84%	5.44%	4.48%	3.76%	3.18%	2.71%	2.30%	1.95%	1.65%	1.39%	1.18%	0.99%	0.83%	0.70%	0.59%
VLN	0.00%	0.00%	0.97%	1.71%	1.71%	1.54%	1.34%	1.15%	0.99%	0.84%	0.72%	0.61%	0.51%	0.43%	0.36%	0.31%	0.26%	0.22%
Total current	**15.10%**	**12.37%**	**10.26%**	**8.55%**	**7.15%**	**6.02%**	**5.10%**	**4.33%**	**3.69%**	**3.14%**	**2.67%**	**2.26%**	**1.91%**	**1.61%**	**1.35%**	**1.14%**	**0.96%**	**0.81%**
Former	21.86%	21.80%	21.20%	20.30%	19.15%	17.86%	16.51%	15.15%	13.76%	12.33%	10.89%	9.48%	8.12%	6.87%	5.79%	4.91%	4.21%	3.62%
Never (remainder)	63.04%	65.84%	68.53%	71.16%	73.70%	76.12%	78.39%	80.51%	82.55%	84.53%	86.44%	88.26%	89.97%	91.52%	92.86%	93.95%	94.82%	95.57%
Total current smoker breakdown																		
Men 18-24	0.97%	1.16%	1.08%	0.89%	0.74%	0.62%	0.52%	0.44%	0.37%	0.31%	0.26%	0.22%	0.19%	0.16%	0.13%	0.11%	0.10%	0.08%
Women 18-24	0.67%	0.76%	0.68%	0.54%	0.44%	0.35%	0.28%	0.23%	0.19%	0.15%	0.12%	0.10%	0.08%	0.07%	0.05%	0.04%	0.04%	0.03%
Men 25-64	6.36%	4.86%	3.92%	3.33%	2.89%	2.53%	2.22%	1.94%	1.69%	1.49%	1.27%	1.07%	0.91%	0.77%	0.65%	0.56%	0.47%	0.40%
Women 25-64	5.48%	4.10%	3.19%	2.59%	2.14%	1.78%	1.49%	1.24%	1.03%	0.87%	0.72%	0.59%	0.48%	0.39%	0.32%	0.26%	0.21%	0.18%
Men 65+	0.83%	0.75%	0.70%	0.60%	0.48%	0.38%	0.30%	0.25%	0.21%	0.17%	0.16%	0.16%	0.15%	0.14%	0.12%	0.11%	0.09%	0.08%
Women 65+	0.79%	0.75%	0.69%	0.59%	0.47%	0.36%	0.29%	0.23%	0.20%	0.15%	0.13%	0.11%	0.10%	0.09%	0.07%	0.06%	0.05%	0.04%
Cumulative results from 2015:																		
Total adult deaths (millions)	0.0	12.6	25.8	40.3	56.1	73.3	91.8	111.1	130.7	150.2	169.6	188.8	208.2	228.0	248.3	269.1	290.4	312.1
Cig.-attributable deaths (1000s)	0.0	2310.2	4494.1	6591.2	8611.1	10523.0	12251.2	13774.1	15138.3	16382.2	17522.5	18583.6	19582.8	20501.4	21302.9	21971.7	22531.9	23019.1
Avoided cig.-att. deaths (1000s)	0.0	0.0	5.8	36.8	73.5	106.6	134.9	160.0	183.6	206.6	229.1	251.1	271.8	290.9	308.1	323.1	335.6	345.7
Life-years gained (1000s)	0.0	0.0	9.3	121.1	396.4	813.0	1330.0	1911.9	2535.1	3186.4	3856.4	4536.1	5215.2	5881.8	6523.7	7129.3	7685.8	8180.7
Avoided cigarette-attributable morbidity ($billions)	0.0	0.0	3.0	19.3	38.4	55.7	70.6	83.7	96.0	108.0	119.8	131.3	142.1	152.1	161.1	168.9	175.5	180.8

Source: VLNDyn2.15.xlsb

APPENDIX 4: MODEL AND DATA FILES

File	Purpose
VLNDyn2.15.xlsm	Model and main results
VLNDynStockFlowEx.xlsx	Stock and flow model figure and calculations
CMS_NHE-hist&proj_1960-2026.xlsx	Average annual increase in US healthcare spending 2010-2018
Holford2015Cessation.xlsx	Quit rate data and modeling
Mendez2001RRModel.xlsx	Former smoker relative risk data and modeling
NHIS2008-2017.xlsb	National Health Interview Survey prevalence data, 2008-2017
Thun2013RelativeRisks.xlsx	Relative risk data and modeling, including CPD effects
USCensusProj_NP2017_D1_D3_Models.xlsx	US Census Bureau population and death rate projections, and modeling