

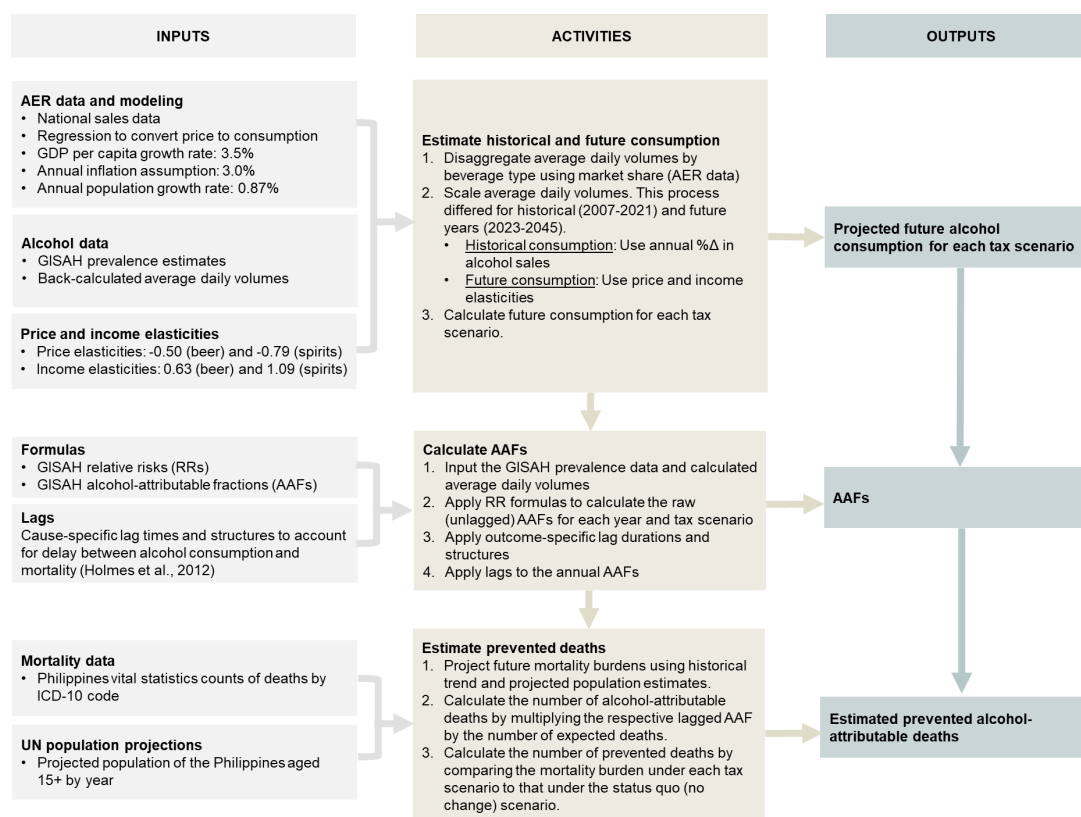
Alcohol-attributable fractions for Philippines tax scenarios (2026-2045)

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Overview

Alcohol consumption data, Action for Economic Reforms (AER) modeling, and elasticities from the peer-reviewed literature were combined to calculate alcohol-attributable fractions (AAFs) for 11 outcomes. Seven sets of AAFs summarized the mortality burden that would exist under seven corresponding alcohol tax scenarios (Figure 1). In doing so, the AAFs incorporate information about the estimated distribution and level of alcohol consumption that would occur under that tax scenario (i.e., potential reductions in consumption are “baked into” the AAFs). In addition, the AAFs incorporate outcome-specific lags to more accurately reflect the delay between changes in alcohol consumption and changes in mortality, ensuring resulting estimates do not overstate potential reductions in deaths.

Figure 1. Logic model



Tax scenarios

Effective in 2025, the Philippines began adjusting their beer and spirits excise taxes by 6 percent each year to account for inflation. This new policy is modeled as the status quo. Six alternative (counterfactual) tax scenarios selected by AER adjust tax rates more steeply:

1. Beer excise taxes increase by 10 percent each year
2. Beer excise taxes increase by 12 percent each year
3. Spirits excise taxes increase by 25 percent each year
4. Spirits excise taxes increase by 40 percent each year
5. Beer excise taxes increase by 10 percent and spirits excise taxes increase by 25 percent each year
6. Beer excise taxes increase by 12 percent and spirits excise taxes increase by 40 percent each year

Methods

As shown in Figure 1, the process for calculating AAFs involved six steps:

1. Obtain inputs
2. Convert data and apply elasticities
3. Calculate relative risks (RRs)
4. Calculate AAFs
5. Apply lags to AAFs
6. Estimate the number of alcohol-attributable deaths and deaths prevented

The following sections provide a brief description of each of these activities.

Inputs

The RR calculations required six main inputs that summarized the distribution of consumption:

- Annual prevalence of lifetime abstention (%)
- Annual prevalence of former drinkers (%)
- Annual prevalence of current non-HED drinking (%)
- Annual prevalence of current HED drinking (%)
- Average daily volume among non-HED drinkers (grams of absolute alcohol)
- Average daily volume among HED drinkers (grams of absolute alcohol)

The analysis obtained data for the four prevalence estimates (list items 1-4 above) from the WHO Global Information System on Alcohol and Health (GISAH).¹ The GISAH database contained prevalence estimates for 2007 through 2019, and these values were used directly. The analysis assumed that 2019 prevalence estimates would persist through 2045 to avoid using prevalence elasticities.

The average daily volumes for non-HED and HED drinkers were back-calculated by determining the values that would most closely approximate the WHO GISAH AAFs once

entered into RR formulas (see Supplemental Table S-1). These average daily volumes were then adjusted using data and formulas from AER, as described in the following step.

As described in the following sections, two sensitivity analyses tested the effects of the assumptions about alcohol consumption. Specifically, one sensitivity analysis assumed slightly higher average daily alcohol volumes at baseline. A second analysis made simple assumptions about how alcohol use prevalence would decrease in the six counterfactual tax policy scenarios.

Convert data and apply elasticities

Using AER projections, the analysis derived beverage-specific scaling coefficients to estimate historical and future changes in average daily volumes under each tax scenario. This process applied AER data and methods to adjust projected tax rates for inflation, transform taxes to prices via a reduced-form log-log relationship, and combine these with beverage-specific price and income elasticities to estimate annual percentage changes in consumption. The only modification to the AER methods at this stage was the removal of population and population growth terms when applying elasticities. This change was necessary because the calculations for the present study focused on individual-level volumes rather than per capita consumption.

Average daily volumes were disaggregated by beverage type using national market shares for beer and spirits (approximately 80 percent beer). This allowed the analysis to apply beverage-specific elasticities to estimated volumes of beer and spirits, and it assumes that beer and spirits are jointly responsible for most of the total recorded consumption in the Philippines.

AER inputs were then used to anchor 2016 average daily consumption volumes by beverage type. For years with national alcohol sales data (2007–2022), volumes were adjusted using the percent change in national alcohol sales relative to 2016. For future years (2023–2045), beverage-specific volumes were projected using the AER demand formula incorporating real prices, gross domestic product, and beverage-specific price and income elasticities. These analyses were performed in Excel.

Calculate relative risks (RRs)

RRs were obtained from the WHO Global Status Report on Alcohol and Health methodology appendix for 11 health outcomes (Table 1).² The RRs are typically continuous risk functions based on the average number of grams of alcohol consumed per day, and functions differ by drinker status (i.e., non-HED vs. HED drinker).

Table 1. Selected health outcomes and corresponding ICD-10 codes

Outcome	ICD-10 codes
Cancer, pharynx	C09-C10.9, C12-C13.9
Cancer, esophagus	C15-C15.9, Z85.01
Cancer, colon and rectum	C18-C19.0, C20, C21-C21.8, Z12.1-Z12.13, Z85.03-Z85.048, Z86.010
Cancer, liver	C22-C22.4, C22.7-C22.9, Z85.05
Cancer, larynx	C32 C32.9, Z85.21
Cancer, breast	C50-C50.629, C50.8-C50.929, Z12.3-Z12.39, Z80.3, Z85.3, Z86.000
Homicide	X85-Y09, Y871
Hypertensive heart disease	I10-15
Liver cirrhosis	K70, K74
Road traffic injuries	V01.1-9, V02.1-9, V03.1-9, V04.1-9, V06.1-9, V09.2, V09.3, V10.3-9, V11.3-9, V12.3-9, V13.3-9, V14.3-9, V15.4-9, V16.4-9, V17.4-9, V18.4-9, V19.4-9, V20.3-9, V21.3-9, V22.3-9, V23.3-9, V24.3-9, V25.3-9, V26.3-9, V27.3-9, V28.3-9, V29.4-9, V30.4-9, V31.4-9, V32.4-9, V33.4-9, V34.4-9, V35.4-9, V36.4-9, V37.4-9, V38.4-9, V39.4-9, V40.4-9, V41.4-9, V42.4-9, V43.4-9, V44.4-9, V45.4-9, V46.4-9, V47.4-9, V48.4-9, V49.4-9, V50.4-9, V51.4-9, V52.4-9, V53.4-9, V54.4-9, V55.4-9, V56.4-9, V57.4-9, V58.4-9, V59.4-9, V60.4-9, V61.4-9, V62.4-9, V63.4-9, V64.4-9, V65.4-9, V66.4-9, V67.4-9, V68.4-9, V69.4-9, V70.4-9, V71.4-9, V72.4-9, V73.4-9, V74.4-9, V75.4-9, V76.4-9, V77.4-9, V78.4-9, V79.4-9, V80.3-5, V81.1, V82.1, V82.8-9, V83.0-3, V84.0-3, V85.0-3, V86.0-3, V87.0-9, V89.2-3, V89.9, V99
Stroke, hemorrhagic	I60-62.9, I67.0-67.1, I69.0-69.298

Calculate alcohol-attributable fractions (AAFs)

Population-attributable fractions, such as AAFs, express the proportion of the risk of specific cause of death assumed to be caused by alcohol consumption. AAFs were generated using a Levin-based method described in the WHO Global Status Report on Alcohol and Health methodology appendix.² This method combines data on alcohol consumption with the associated RRs. R was used to apply the RR formulas to AAF calculations.

Apply lags to AAFs

Lag structures were obtained from Holmes et al. (2012; Table 2).³ For chronic diseases, the time-to-effect varies by disease. The effect for some outcomes (e.g., liver cirrhosis) begins immediately, while it may take 10 years to begin to see effects for other outcomes (e.g., cancer). Lags were applied to the AAFs in R, and the resulting lagged and raw AAFs were exported to Excel.

Table 2. Lag time and structure by outcome

Outcome	Time to first effect	Time to full effect	Lag structure
Cancer, pharynx	10 yrs	20 yrs	Linear
Cancer, esophagus	10 yrs	20 yrs	Linear
Cancer, colon and rectum	10 yrs	20 yrs	Linear
Cancer, liver	10 yrs	20 yrs	Linear
Cancer, larynx	10 yrs	20 yrs	Linear
Cancer, breast	10 yrs	20 yrs	Linear
Homicide*	Immediate	5 yrs	0.3 geometric
Hypertensive heart disease	Immediate	10 yrs	0.8 geometric
Liver cirrhosis	Immediate	20 yrs	0.85 geometric
Road traffic injuries*	Immediate	5 yrs	0.2 geometric
Stroke, hemorrhagic	Immediate	10 yrs	0.7 geometric

*Holmes et al. (2012) did not include most acute outcomes, such as homicide and road traffic injuries. The lag time and structure for these outcomes were informed by information for similar outcomes (e.g., homicide was informed by suicide) and adjusted depending on the importance of intoxication (vs. sustained volumes) in the outcome.

SOURCE: Holmes, J., Meier, P. S., Booth, A., Guo, Y., & Brennan, A. (2012). The temporal relationship between per capita alcohol consumption and harm: a systematic review of time lag specifications in aggregate time series analyses. *Drug and alcohol dependence*, 123(1-3), 7-14.

Estimate the number of alcohol-attributable deaths and deaths prevented

To estimating the number of preventable deaths, it was first necessary to project mortality estimates through 2045. To do this, deaths for the 11 health outcomes listed in Table 1 were identified for 2007 through 2022 using ICD-10 codes obtained from the Global Burden of Disease Study.^{4,a} Philippines Vital Statistics records were projected into the future by extending historical mortality trends (i.e., from 2007 through 2022) and accounting for UN estimated population counts. These analyses were conducted in Stata 16.1 and yielded the number of expected deaths by cause for 2023 through 2045.⁵

Next, the annual number of alcohol-attributable deaths was calculated by multiplying the expected total number of deaths by the corresponding AAF for each health outcome and year. These numbers of alcohol-attributable deaths were then summed over time and tax scenario. The estimated number of preventable alcohol-attributable deaths was calculated by subtracting estimates for each counterfactual tax scenario from those for the status quo (no change). These calculations were performed in Excel.

Key assumptions

These methods make several key assumptions:

- Tax pass-through. Models assume 100 percent of the tax is passed through to the retail price.
- Negligible contribution of wine. Given that wine accounts for less than 1 percent of the market share in the Philippines, data on beer and spirits sales combined is a suitable proxy for total consumption.

^aIschemic heart disease and ischemic stroke were excluded because the relative risks for these outcomes were negative or not significant up to 40 g per day of alcohol.

- Prices affect volume but not prevalence. All policy effects operate by reducing alcohol volumes among existing drinkers. The prevalence estimates for lifetime abstainers, former drinkers, non-HED drinkers, and HED drinkers are fixed across all tax scenarios to avoid using prevalence elasticities.
- Income effects will undercut tax elasticities: Alcohol consumption rises with income. AER models explicitly include an income elasticity in their calculations for future changes in national consumption volumes.
- Current mortality trends will continue. The number of deaths for each outcome for 2026 through 2045 can be estimated by combining historical mortality records, UN population projections, and UN projected age distribution (i.e., percent 65+ years).

Sensitivity analyses

Baseline average daily volumes: The first sensitivity analysis varied assumptions about the average daily grams of absolute alcohol consumed by non-HED and HED drinkers. Typical values range from 10 to 30 g (12.7 to 38.0 ml) per day for non-HED drinkers and 40 to 60 g (50.6 to 76.0 ml) per day for HED drinkers. The main models derived average daily volumes by identifying the values that would produce AAFs most similar to those reported in GISAH.¹ These values were 20 g (25.3 ml) per day for non-HED drinkers and 40 g (50.6 ml) per day for HED drinkers, which corresponds to an average of two standard drinks per day among non-HED drinkers and four standard drinks/day for HED drinkers.^b The first sensitivity analysis assumed that drinkers averaged 30 g and 60 g per day for non-HED and HED drinkers, respectively.

Incremental reductions in drinking prevalence: The second sensitivity analysis made simple assumptions about how the prevalence of each drinking pattern would change in the counterfactual tax scenarios. This analysis modeled the following for all six counterfactual tax scenarios:

- HED drinking prevalence: Decreases 0.2 percent each year
- Non-HED drinking prevalence: Decreases 0.3 percent each year
- Former drinking prevalence: Decreases 0.1 percent each year

In this sensitivity analysis, drinkers who no longer engage in HED are assumed to become non-HED drinkers, and those who stop non-HED drinking become former drinkers. This sensitivity analysis is intended to examine the effects of holding prevalence rates constant from 2026 through 2045 without relying on prevalence elasticities.

Raw (unlagged) AAFs: The final sensitivity analysis applied raw AAFs that did not incorporate the lag between consumption and deaths. In doing so, this sensitivity analysis assumes that current (rather than past) consumption levels shape current disease risk. This analysis is expected to increase the number of estimated preventable alcohol-attributable deaths because it reduces the assumed time between tax implementation and change in deaths, allowing gains to accrue over additional years.

^b Using the World Health Organization modal definition of a standard drink, which is 10 g of pure alcohol.

Results

Main models

The 2045 AAFs illustrate how the percent of cause-specific deaths that are assumed to be caused by alcohol differ by policy condition 20 years in the future (Table 3). Under the status quo in 2045, alcohol will cause just over half of homicides (67.39%) and liver cirrhosis deaths (67.06%) and a third of deaths from pharyngeal cancer (39.17%) and road traffic injuries (32.68%). Approximately one in every four deaths from laryngeal (24.39%) and esophageal cancer (23.16%) will be caused by alcohol, as will about one in every five deaths from liver cancer (20.45%) and hemorrhagic stroke (21.31%). Alcohol has a smaller, but still substantial, role in deaths from hypertensive heart disease (17.13%), breast cancer (15.11%), and colorectal cancer (11.70%).

Table 3. Alcohol-attributable fractions by cause, Philippines 2045

Outcome	Status quo*	Beer 10%**	Beer 12%**	Spirits 25%***	Spirits 40%***	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	15.11%	15.10%	15.09%	14.35%	13.81%	14.34%	13.81%
Cancer, colorectal	11.70%	11.69%	11.68%	11.15%	10.75%	11.14%	10.75%
Cancer, esophagus	23.16%	23.15%	23.14%	22.13%	21.38%	22.11%	21.37%
Cancer, larynx	24.39%	24.37%	24.36%	23.36%	22.62%	23.34%	22.61%
Cancer, liver	20.45%	20.45%	20.45%	20.14%	19.92%	20.14%	19.92%
Cancer, pharynx	39.17%	39.14%	39.12%	37.57%	36.39%	37.54%	36.38%
Homicide	67.39%	67.23%	67.16%	55.54%	48.22%	55.34%	48.13%
Hypertensive heart disease	17.13%	17.10%	17.09%	15.01%	13.29%	14.97%	13.27%
Liver cirrhosis	67.06%	66.92%	66.86%	57.91%	52.24%	57.76%	52.17%
Road traffic injury	32.68%	32.64%	32.62%	30.20%	28.87%	30.16%	28.85%
Stroke, hemorrhagic	21.31%	21.25%	21.22%	17.02%	14.67%	16.96%	14.64%

*The status quo policy scenario assumes a 6% annual increase on the beer and spirits excise taxes.

**The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

***The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

Table 4. Predicted number of alcohol-attributable deaths by cause and year, Philippines 2026 through 2045

Outcome	Status quo*	Beer 10%**	Beer 12%**	Spirits 25%***	Spirits 40%***	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	52,931	52,919	52,914	52,291	51,827	52,279	51,821
Cancer, colorectal	28,777	28,772	28,769	28,464	28,237	28,458	28,234
Cancer, esophagus	2,071	2,070	2,070	2,054	2,042	2,054	2,042
Cancer, larynx	1,863	1,863	1,863	1,850	1,840	1,850	1,840
Cancer, liver	24,646	24,645	24,644	24,585	24,541	24,584	24,541
Cancer, pharynx	3,439	3,438	3,438	3,405	3,380	3,404	3,380
Homicide	45,941	45,882	45,854	42,142	39,588	42,076	39,556
Hypertensive heart disease	259,768	259,458	259,311	238,559	222,016	238,131	221,808

Outcome	Status quo*	Beer 10%**	Beer 12%**	Spirits 25%***	Spirits 40%***	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Liver cirrhosis	102,168	102,063	102,013	95,540	91,179	95,427	91,125
Road traffic injury	111,758	111,688	111,656	107,357	104,708	107,287	104,675
Stroke, hemorrhagic	1,754	1,751	1,749	1,549	1,425	1,546	1,424
Total	635,117	634,550	634,281	597,796	570,784	597,096	570,445

*The status quo policy scenario assumes a 6% annual increase on the beer and spirits excise taxes.

**The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

***The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

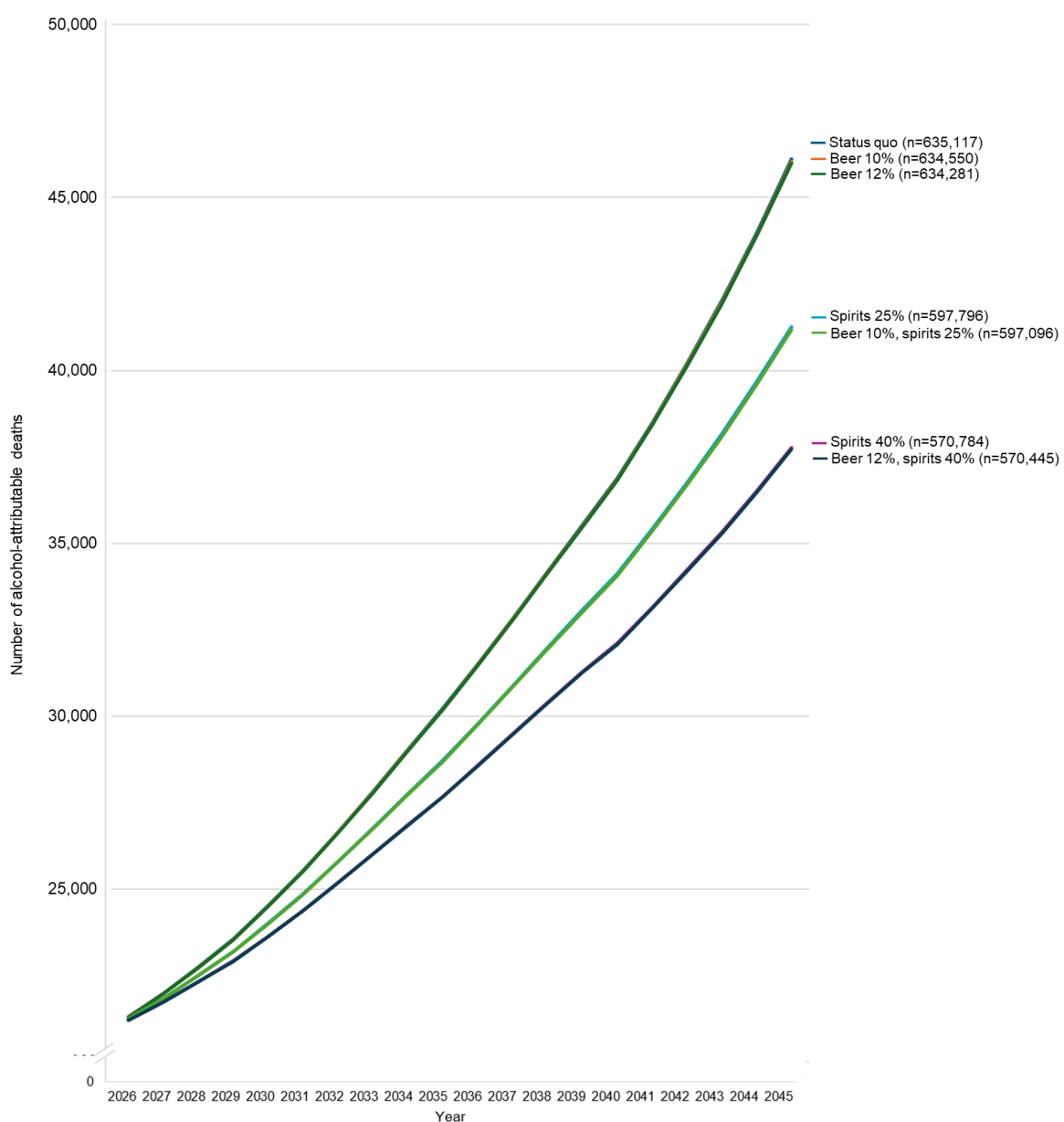
Table 5. Predicted number of prevented alcohol-attributable deaths by cause and year, Philippines 2026 through 2045

Outcome	Beer 10%*	Beer 12%*	Spirits 25%**	Spirits 40%**	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	12	18	641	1,104	653	1,110
Cancer, colorectal	6	9	314	541	320	544
Cancer, esophagus	0	0	17	29	17	29
Cancer, larynx	0	0	13	23	14	23
Cancer, liver	1	2	61	105	62	105
Cancer, pharynx	1	1	34	59	34	59
Homicide	59	87	3,800	6,353	3,865	6,386
Hypertensive heart disease	310	457	21,209	37,752	21,637	37,959
Liver cirrhosis	105	155	6,628	10,989	6,740	11,043
Road traffic injury	70	103	4,401	7,050	4,472	7,083
Stroke, hemorrhagic	3	5	205	329	208	330
Total	568	836	37,322	64,333	38,021	64,672

*The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

**The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

Figure 2. Predicted number of alcohol-attributable deaths by year, Philippines 2026 through 2045



NOTES: Graph y-axis begins at 20,000 to more clearly illustrate differences between the tax policy scenarios. The counts in the tax policy scenario labels indicate the total number of alcohol-attributable deaths over the 20-year time horizon.

Results from sensitivity analyses

2016 average daily volumes for non-HED and HED drinkers

A key assumption in the main analysis is the average daily alcohol intake among non-HED drinkers (20 g or two standard drinks) and HED drinkers (40 g or four standard drinks). The first sensitivity analysis tested the extent to which results were driven by

these starting values (Tables 6 and 7). It assumed non-HED drinkers averaged 30 g of absolute alcohol (i.e., three standard drinks) per day and HED drinkers averaged 60 g (i.e., six standard drinks) per day.

Overall, this sensitivity analysis resulted in approximately 115,000 to 155,000 more alcohol-attributable deaths from 2026 through 2045 than the main model, depending on the tax scenario. Results for the 10 percent and 12 percent annual beer tax adjustments were comparable to the main model, averaging only an additional 175 to 260 alcohol-attributable deaths prevented. The counterfactual spirits and combined beer and spirits tax scenarios resulted in approximately 10,000 to 13,500 additional alcohol-attributable deaths prevented.

Table 6. Predicted number of alcohol-attributable deaths by cause and year assuming 30 g/60 g average daily volumes, Philippines 2026 through 2045

Outcome	Status quo*	Beer 10%**	Beer 12%**	Spirits 25%***	Spirits 40%***	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	79,819	79,801	79,792	78,860	78,164	78,842	78,156
Cancer, colorectal	42,467	42,458	42,454	41,993	41,650	41,984	41,646
Cancer, esophagus	2,992	2,992	2,991	2,968	2,951	2,968	2,951
Cancer, larynx	2,633	2,633	2,633	2,615	2,601	2,615	2,601
Cancer, liver	28,066	28,065	28,064	27,973	27,906	27,972	27,905
Cancer, pharynx	4,790	4,790	4,789	4,750	4,719	4,749	4,719
Homicide	58,413	58,350	58,320	54,157	51,037	54,080	50,996
Hypertensive heart disease	314,927	314,493	314,289	287,721	271,420	287,288	271,216
Liver cirrhosis	128,944	128,833	128,781	121,412	115,808	121,273	115,736
Road traffic injury	124,437	124,334	124,286	117,936	114,007	117,832	113,958
Stroke, hemorrhagic	2,417	2,412	2,409	2,108	1,920	2,103	1,917
Total	789,904	789,159	788,808	742,493	712,185	741,704	711,801
Difference from main model	154,787	154,609	154,527	144,697	141,401	144,608	114,705

*The status quo policy scenario assumes a 6% annual increase on the beer and spirits excise taxes.

**The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

***The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

Table 7. Predicted number of prevented alcohol-attributable deaths by cause and year assuming 30 g/60 g average daily volumes, Philippines 2026 through 2045

Outcome	Beer 10%*	Beer 12%*	Spirits 25%**	Spirits 40%**	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	18	27	959	1,654	977	1,663
Cancer, colorectal	9	13	474	816	483	821
Cancer, esophagus	0	1	24	41	24	41
Cancer, larynx	0	0	18	32	19	32
Cancer, liver	2	3	93	160	95	161
Cancer, pharynx	1	1	41	71	41	72
Homicide	63	93	4,255	7,376	4,333	7,417
Hypertensive heart disease	433	637	27,206	43,506	27,639	43,710
Liver cirrhosis	111	163	7,532	13,136	7,671	13,208
Road traffic injury	103	151	6,501	10,430	6,605	10,479
Stroke, hemorrhagic	5	7	309	497	314	499
Total	745	1,096	47,411	77,719	48,200	78,103
Difference from main model	177	260	10,089	13,386	10,179	13,431

*The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

**The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

Simple assumptions to adjust prevalence rates

The second sensitivity analysis with simple assumptions about declining drinking prevalence also suggested results of the main model were conservative. The reductions in prevalence estimates were only applied to the counterfactual tax scenarios, so the overall burden in the status quo scenario did not change. Incorporating modest reductions in drinking prevalence resulted in approximately 6,000 to 6,500 additional preventable alcohol-attributable deaths over the 20-year time horizon (Tables 8 and 9).

Table 8. Predicted number of alcohol-attributable deaths by cause and year assuming decreasing prevalence rates, Philippines 2026 through 2045

Outcome	Status quo*	Beer 10%**	Beer 12%**	Spirits 25%***	Spirits 40%***	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	52,931	52,849	52,843	52,224	51,763	52,212	53,453
Cancer, colorectal	28,777	28,737	28,735	28,432	28,206	28,426	29,032
Cancer, esophagus	2,071	2,069	2,069	2,053	2,041	2,052	2,084
Cancer, larynx	1,863	1,862	1,862	1,849	1,839	1,849	1,875
Cancer, liver	24,646	24,652	24,652	24,593	24,550	24,592	24,681
Cancer, pharynx	3,439	3,435	3,435	3,402	3,377	3,402	3,466
Homicide	45,941	45,553	45,525	41,800	39,246	41,734	48,804
Hypertensive heart disease	259,768	255,273	255,129	234,755	218,516	234,335	279,586

Liver cirrhosis	102,168	101,746	101,696	95,267	90,956	95,156	106,692
Road traffic injury	111,758	109,960	109,927	105,674	103,055	105,604	116,024
Stroke, hemorrhagic	1,754	1,735	1,734	1,538	1,417	1,535	1,885
Total	635,117	627,871	627,606	591,586	564,966	590,896	667,580
Difference from main model	0	-6,679	-6,675	-6,210	-5,818	-6,200	-5,812

*The status quo policy scenario assumes a 6% annual increase on the beer and spirits excise taxes.

**The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

***The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

Table 9. Predicted number of prevented alcohol-attributable deaths by cause and year assuming decreasing prevalences rates, Philippines 2026 through 2045

Outcome	Beer 10%*	Beer 12%*	Spirits 25%**	Spirits 40%**	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	83	89	708	1,168	720	1,174
Cancer, colorectal	40	43	346	571	352	574
Cancer, esophagus	2	2	18	30	18	30
Cancer, larynx	2	2	15	24	15	25
Cancer, liver	-6 ^c	-6 ^c	53	96	54	97
Cancer, pharynx	4	4	37	61	37	62
Homicide	389	417	4,142	6,695	4,207	6,728
Hypertensive heart disease	4,495	4,639	25,013	41,252	25,433	41,455
Liver cirrhosis	422	471	6,901	11,212	7,012	11,265
Road traffic injury	1,798	1,831	6,084	8,704	6,154	8,737
Stroke, hemorrhagic	19	20	216	337	219	339
Total	7,247	7,512	43,531	70,151	44,221	70,484
Difference from main model	6,679	6,676	6,209	5,818	6,200	5,812

*The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

**The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

***The number of preventable liver cancer deaths likely rose in the spirits 25% scenario for this sensitivity analysis because this outcome has a larger RR for former drinkers (RR = 2.23). Thus, increasing the prevalence of former drinkers coupled with the smallest reductions in consumption volumes may have combined to increase burden.

Raw (unlagged) AAFs

The final sensitivity analysis used raw (unlagged) AAFs (Tables 10 and 11). In doing so, these results assume that reductions in alcohol-attributable deaths will be driven only by current consumption patterns, and they will be anti-conservative. As expected, the raw AAFs resulted in higher estimated AAFs, yielding approximately 12,000 to 60,000 more alcohol-attributable deaths and 450 to 50,000 more alcohol-attributable deaths prevented than the main model.

Table 10. Predicted number of alcohol-attributable deaths by cause and year using raw AAFs, Philippines 2026 through 2045

Outcome	Status quo*	Beer 10%**	Beer 12%**	Spirits 25%***	Spirits 40%***	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	81,202	80,968	80,859	66,427	57,650	66,193	57,540
Cancer, colorectal	43,070	42,952	42,897	35,657	31,259	35,539	31,204
Cancer, esophagus	2,984	2,977	2,974	2,547	2,277	2,540	2,273
Cancer, larynx	2,619	2,614	2,611	2,267	2,044	2,261	2,041
Cancer, liver	28,186	28,159	28,147	26,532	25,541	26,505	25,528
Cancer, pharynx	4,843	4,833	4,828	4,155	3,701	4,143	3,695
Homicide	46,312	46,250	46,220	42,316	39,638	42,247	39,603
Hypertensive heart disease	262,977	262,644	262,487	240,224	222,411	239,770	222,186
Liver cirrhosis	110,283	110,118	110,040	99,402	92,426	99,220	92,338
Road traffic injury	111,956	111,884	111,851	107,436	104,727	107,364	104,693
Stroke, hemorrhagic	1,836	1,832	1,831	1,583	1,434	1,579	1,432
Total	696,269	695,232	694,743	628,546	583,107	627,363	582,535
Difference from main model	61,152	60,682	60,462	30,750	12,323	30,267	12,090

*The status quo policy scenario assumes a 6% annual increase on the beer and spirits excise taxes.

**The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

***The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

Table 11. Predicted number of prevented alcohol-attributable deaths by cause and year using raw AAFs, Philippines 2026 through 2045

Outcome	Beer*	Beer 12%*	Spirits 25%**	Spirits 40%**	Beer 10%, Spirits 25%	Beer 12%, Spirits 40%
Cancer, breast	234	343	14,775	23,552	15,010	23,662
Cancer, colorectal	118	173	7,413	11,811	7,531	11,866
Cancer, esophagus	7	10	438	707	445	711
Cancer, larynx	6	8	352	575	358	578
Cancer, liver	27	39	1,654	2,645	1,681	2,658
Cancer, pharynx	10	15	688	1,142	700	1,148
Homicide	62	91	3,995	6,674	4,064	6,708
Hypertensive heart disease	334	491	22,753	40,567	23,207	40,791
Liver cirrhosis	166	244	10,881	17,857	11,063	17,945
Road traffic injury	72	105	4,519	7,229	4,591	7,263
Stroke, hemorrhagic	4	6	253	403	257	405
Total	1,037	1,526	67,723	113,162	68,906	113,734
Difference from main model	469	690	30,401	48,829	30,885	49,062

*The beer policy scenarios assume a 6% annual increase on the spirits excise tax.

**The spirits policy scenarios assume a 6% annual increase on the beer excise tax.

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Supplemental tables and figures

Estimating average daily volumes for non-HED and HED drinkers

Table S-1 summarizes the values for average daily volumes by drinker type (non-HED vs. HED) to most closely approximate the WHO GISAH AAFs.

Table S-1. Number of drinks per day to most closely approximate WHO AAFs

Outcome	Non-HED drinkers	HED drinkers	Notes
Cancer, pharynx	20	41	
Cancer, esophagus	20	39	
Cancer, colon and rectum	23	41	RR for former drinkers differs by sex
Cancer, liver	0	0	Large former RR and lower AAF
Cancer, larynx	26	44	
Cancer, breast	7	28	
Homicide	0.5	10	
Hypertensive heart disease	2	26	
Liver cirrhosis	26	52	
Road traffic injuries	30	72	
Stroke, hemorrhagic	10	30	

Calculating baseline AAFs assuming non-HED drinkers average 20 g/day and HED drinkers average 40 g/day results in an estimated 19,819 alcohol-attributable deaths in 2021 for the causes of interest. This is 568 fewer deaths than the WHO estimates for the causes. When examining specific causes of death, the largest difference between the present and WHO estimates are for hemorrhagic stroke (1,830 fewer deaths in the present analysis) and hypertensive heart disease (1,148 more deaths in the present analysis).

Tables S-2 through S-6 report lagged alcohol attributable fractions (AAFs) for the Philippines 2026-2045 by policy scenario:

Table S-2. Alcohol-attributable fractions for status quo policy

Year	Cancer, breast	Cancer, colorectal	Cancer, esophagus	Cancer, larynx	Cancer, liver	Cancer, pharynx	Homicide	Hypertensive heart disease	Liver cirrhosis	Road traffic injury	Stroke, hemorrhagic
2026	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.52%	12.84%	49.47%	28.60%	13.95%
2027	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	47.42%	13.03%	49.94%	28.75%	14.14%
2028	10.82%	8.55%	17.17%	18.35%	18.33%	29.52%	48.36%	13.25%	50.48%	28.92%	14.38%
2029	10.91%	8.62%	17.30%	18.48%	18.42%	29.71%	49.32%	13.47%	51.10%	29.09%	14.64%
2030	11.28%	8.89%	17.82%	19.01%	18.62%	30.55%	50.30%	13.70%	51.79%	29.26%	14.94%
2031	11.68%	9.19%	18.38%	19.58%	18.83%	31.48%	51.30%	13.93%	52.54%	29.44%	15.26%
2032	12.19%	9.56%	19.10%	20.32%	19.08%	32.67%	52.32%	14.18%	53.33%	29.62%	15.59%
2033	12.62%	9.88%	19.70%	20.93%	19.29%	33.66%	53.36%	14.43%	54.15%	29.81%	15.95%
2034	12.90%	10.08%	20.09%	21.32%	19.45%	34.29%	54.42%	14.69%	55.01%	30.01%	16.31%
2035	13.04%	10.19%	20.29%	21.53%	19.55%	34.62%	55.51%	14.93%	55.93%	30.22%	16.69%
2036	13.32%	10.39%	20.69%	21.92%	19.69%	35.25%	56.61%	15.15%	56.88%	30.42%	17.08%
2037	13.55%	10.57%	21.01%	22.25%	19.82%	35.77%	57.73%	15.35%	57.86%	30.64%	17.49%
2038	13.63%	10.62%	21.12%	22.36%	19.86%	35.94%	58.86%	15.55%	58.88%	30.86%	17.90%
2039	13.61%	10.60%	21.09%	22.33%	19.85%	35.90%	60.02%	15.75%	59.91%	31.10%	18.34%
2040	13.40%	10.45%	20.80%	22.03%	19.75%	35.46%	61.19%	15.96%	61.01%	31.33%	18.78%
2041	13.65%	10.63%	21.15%	22.39%	19.85%	36.02%	62.37%	16.17%	62.14%	31.58%	19.24%
2042	13.88%	10.80%	21.47%	22.70%	19.95%	36.52%	63.57%	16.40%	63.30%	31.83%	19.72%
2043	14.18%	11.02%	21.88%	23.11%	20.07%	37.16%	64.78%	16.62%	64.49%	32.09%	20.21%
2044	14.63%	11.34%	22.50%	23.72%	20.25%	38.13%	66.00%	16.86%	65.70%	32.36%	20.72%
2045	15.10%	11.69%	23.15%	24.37%	20.45%	39.14%	67.23%	17.10%	66.92%	32.64%	21.25%

NOTE: These status quo policy option assumes a 6% annual increase in the beer and spirits excise taxes.

Table S-3. Alcohol-attributable fractions for 10% annual increase in beer excise tax policy

Year	Cancer, breast	Cancer, colorectal	Cancer, esophagus	Cancer, larynx	Cancer, liver	Cancer, pharynx	Homicide	Hypertensive heart disease	Liver cirrhosis	Road traffic injury	Stroke, hemorrhagic
2026	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.52%	12.84%	49.47%	28.60%	13.95%%
2027	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	47.42%	13.03%	49.94%	28.75%	14.14%
2028	10.82%	8.55%	17.17%	18.35%	18.33%	29.52%	48.36%	13.25%	50.48%	28.92%	14.38%
2029	10.91%	8.62%	17.30%	18.48%	18.42%	29.71%	49.32%	13.47%	51.10%	29.09%	14.64%
2030	11.28%	8.89%	17.82%	19.01%	18.62%	30.55%	50.30%	13.70%	51.79%	29.26%	14.94%
2031	11.68%	9.19%	18.38%	19.58%	18.83%	31.48%	51.30%	13.93%	52.54%	29.44%	15.26%
2032	12.19%	9.56%	19.10%	20.32%	19.08%	32.67%	52.32%	14.18%	53.33%	29.62%	15.59%
2033	12.62%	9.88%	19.70%	20.93%	19.29%	33.66%	53.36%	14.43%	54.15%	29.81%	15.95%
2034	12.90%	10.08%	20.09%	21.32%	19.45%	34.29%	54.42%	14.69%	55.01%	30.01%	16.31%
2035	13.04%	10.19%	20.29%	21.53%	19.55%	34.62%	55.51%	14.93%	55.93%	30.22%	16.69%
2036	13.32%	10.39%	20.69%	21.92%	19.69%	35.25%	56.61%	15.15%	56.88%	30.42%	17.08%
2037	13.55%	10.57%	21.01%	22.25%	19.82%	35.77%	57.73%	15.35%	57.86%	30.64%	17.49%
2038	13.63%	10.62%	21.12%	22.36%	19.86%	35.94%	58.86%	15.55%	58.88%	30.86%	17.90%
2039	13.61%	10.60%	21.09%	22.33%	19.85%	35.90%	60.02%	15.75%	59.91%	31.10%	18.34%
2040	13.40%	10.45%	20.80%	22.03%	19.75%	35.46%	61.19%	15.96%	61.01%	31.33%	18.78%
2041	13.65%	10.63%	21.15%	22.39%	19.85%	36.02%	62.37%	16.17%	62.14%	31.58%	19.24%
2042	13.88%	10.80%	21.47%	22.70%	19.95%	36.52%	63.57%	16.40%	63.30%	31.83%	19.72%
2043	14.18%	11.02%	21.88%	23.11%	20.07%	37.16%	64.78%	16.62%	64.49%	32.09%	20.21%
2044	14.63%	11.34%	22.50%	23.72%	20.25%	38.13%	66.00%	16.86%	65.70%	32.36%	20.72%
2045	15.10%	11.69%	23.15%	24.37%	20.45%	39.14%	67.23%	17.10%	66.92%	32.64%	21.25%

NOTE: These AAFs assume the annual increase in the spirits excise tax remains at 6% (status quo).

Table S-4. Alcohol-attributable fractions for 12% annual increase in beer excise tax policy

Year	Cancer, breast	Cancer, colorectal	Cancer, esophagus	Cancer, larynx	Cancer, liver	Cancer, pharynx	Homicide	Hypertensive heart disease	Liver cirrhosis	Road traffic injury	Stroke, hemorrhagic
2026	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.52%	12.84%	49.47%	28.60%	13.95%
2027	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	47.42%	13.03%	49.94%	28.75%	14.14%
2028	10.82%	8.55%	17.17%	18.35%	18.33%	29.52%	48.35%	13.24%	50.47%	28.92%	14.38%
2029	10.91%	8.62%	17.30%	18.48%	18.42%	29.71%	49.30%	13.47%	51.10%	29.08%	14.63%
2030	11.28%	8.89%	17.82%	19.01%	18.62%	30.55%	50.28%	13.69%	51.78%	29.26%	14.93%
2031	11.68%	9.19%	18.38%	19.58%	18.83%	31.48%	51.28%	13.93%	52.53%	29.43%	15.25%
2032	12.19%	9.56%	19.10%	20.32%	19.08%	32.67%	52.29%	14.17%	53.31%	29.62%	15.58%
2033	12.62%	9.88%	19.70%	20.93%	19.29%	33.66%	53.33%	14.42%	54.14%	29.81%	15.94%
2034	12.90%	10.08%	20.09%	21.32%	19.45%	34.29%	54.39%	14.68%	55.00%	30.01%	16.30%
2035	13.04%	10.19%	20.29%	21.53%	19.55%	34.62%	55.47%	14.93%	55.91%	30.21%	16.68%
2036	13.32%	10.39%	20.69%	21.92%	19.69%	35.25%	56.57%	15.14%	56.86%	30.42%	17.07%
2037	13.55%	10.57%	21.01%	22.25%	19.82%	35.77%	57.68%	15.34%	57.83%	30.63%	17.47%
2038	13.63%	10.62%	21.12%	22.36%	19.86%	35.94%	58.81%	15.54%	58.84%	30.85%	17.89%
2039	13.61%	10.60%	21.09%	22.32%	19.85%	35.90%	59.97%	15.74%	59.87%	31.08%	18.32%
2040	13.39%	10.44%	20.80%	22.03%	19.75%	35.46%	61.13%	15.95%	60.97%	31.32%	18.76%
2041	13.65%	10.63%	21.15%	22.38%	19.85%	36.01%	62.31%	16.16%	62.10%	31.57%	19.22%
2042	13.88%	10.80%	21.47%	22.70%	19.95%	36.51%	63.51%	16.38%	63.25%	31.82%	19.70%
2043	14.17%	11.01%	21.87%	23.10%	20.07%	37.15%	64.71%	16.61%	64.44%	32.08%	20.19%
2044	14.62%	11.34%	22.49%	23.72%	20.25%	38.12%	65.93%	16.85%	65.64%	32.35%	20.69%
2045	15.09%	11.68%	23.14%	24.36%	20.45%	39.12%	67.16%	17.09%	66.86%	32.62%	21.22%

NOTE: These AAFs assume the annual increase in the spirits excise tax remains at 6% (status quo).

Table S-5. Alcohol-attributable fractions for 25% annual increase in spirits excise tax policy

Year	Cancer, breast	Cancer, colorectal	Cancer, esophagus	Cancer, larynx	Cancer, liver	Cancer, pharynx	Homicide	Hypertensive heart disease	Liver cirrhosis	Road traffic injury	Stroke, hemorrhagic
2026	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.26%	12.79%	49.41%	28.55%	13.91%
2027	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.79%	12.92%	49.77%	28.64%	14.04%
2028	10.82%	8.55%	17.17%	18.35%	18.33%	29.52%	47.31%	13.04%	50.14%	28.72%	14.17%
2029	10.91%	8.62%	17.30%	18.48%	18.42%	29.71%	47.81%	13.16%	50.55%	28.81%	14.31%
2030	11.28%	8.89%	17.82%	19.01%	18.62%	30.55%	48.30%	13.27%	50.97%	28.89%	14.48%
2031	11.68%	9.19%	18.38%	19.58%	18.83%	31.48%	48.79%	13.39%	51.42%	28.98%	14.64%
2032	12.19%	9.56%	19.10%	20.32%	19.08%	32.67%	49.27%	13.50%	51.86%	29.06%	14.81%
2033	12.62%	9.88%	19.70%	20.93%	19.29%	33.66%	49.75%	13.62%	52.29%	29.15%	14.98%
2034	12.90%	10.08%	20.09%	21.32%	19.45%	34.29%	50.23%	13.73%	52.72%	29.23%	15.14%
2035	13.04%	10.19%	20.29%	21.53%	19.55%	34.62%	50.70%	13.84%	53.18%	29.32%	15.31%
2036	13.32%	10.39%	20.68%	21.92%	19.69%	35.24%	51.18%	13.96%	53.63%	29.40%	15.48%
2037	13.54%	10.56%	21.00%	22.23%	19.81%	35.74%	51.65%	14.07%	54.07%	29.49%	15.64%
2038	13.60%	10.60%	21.08%	22.32%	19.85%	35.87%	52.13%	14.19%	54.52%	29.57%	15.81%
2039	13.55%	10.56%	21.01%	22.24%	19.83%	35.77%	52.61%	14.30%	54.96%	29.66%	15.98%
2040	13.29%	10.37%	20.66%	21.89%	19.70%	35.23%	53.09%	14.42%	55.44%	29.75%	16.15%
2041	13.48%	10.50%	20.91%	22.15%	19.78%	35.64%	53.57%	14.54%	55.92%	29.84%	16.32%
2042	13.61%	10.61%	21.11%	22.34%	19.84%	35.95%	54.06%	14.66%	56.41%	29.93%	16.49%
2043	13.79%	10.73%	21.34%	22.58%	19.91%	36.33%	54.55%	14.78%	56.91%	30.02%	16.67%
2044	14.08%	10.95%	21.75%	22.98%	20.03%	36.97%	55.04%	14.90%	57.41%	30.11%	16.84%
2045	14.35%	11.15%	22.13%	23.36%	20.14%	37.57%	55.54%	15.01%	57.91%	30.20%	17.02%

NOTE: These AAFs assume the annual increase in the beer excise tax remains at 6% (status quo).

Table S-6. Alcohol-attributable fractions for 40% annual increase in spirits excise tax policy

Year	Cancer, breast	Cancer, colorectal	Cancer, esophagus	Cancer, larynx	Cancer, liver	Cancer, pharynx	Homicide	Hypertensive heart disease	Liver cirrhosis	Road traffic injury	Stroke, hemorrhagic
2026	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.05%	12.76%	49.37%	28.51%	13.88%
2027	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.31%	12.83%	49.64%	28.54%	13.95%
2028	10.82%	8.55%	17.17%	18.35%	18.33%	29.52%	46.50%	12.88%	49.88%	28.58%	14.02%
2029	10.91%	8.62%	17.30%	18.48%	18.42%	29.71%	46.66%	12.93%	50.13%	28.60%	14.07%
2030	11.28%	8.89%	17.82%	19.01%	18.62%	30.55%	46.79%	12.96%	50.36%	28.62%	14.14%
2031	11.68%	9.19%	18.38%	19.58%	18.83%	31.48%	46.90%	12.99%	50.58%	28.64%	14.19%
2032	12.19%	9.56%	19.10%	20.32%	19.08%	32.67%	47.01%	13.01%	50.77%	28.66%	14.24%
2033	12.62%	9.88%	19.70%	20.93%	19.29%	33.66%	47.10%	13.03%	50.93%	28.68%	14.28%
2034	12.90%	10.08%	20.09%	21.32%	19.45%	34.29%	47.19%	13.06%	51.07%	28.69%	14.32%
2035	13.04%	10.19%	20.29%	21.53%	19.55%	34.62%	47.28%	13.08%	51.20%	28.71%	14.35%
2036	13.32%	10.39%	20.68%	21.92%	19.69%	35.24%	47.37%	13.10%	51.33%	28.72%	14.39%
2037	13.53%	10.55%	20.98%	22.22%	19.81%	35.72%	47.45%	13.12%	51.44%	28.74%	14.42%
2038	13.58%	10.58%	21.05%	22.29%	19.84%	35.83%	47.54%	13.14%	51.53%	28.75%	14.45%
2039	13.50%	10.53%	20.95%	22.18%	19.81%	35.67%	47.63%	13.16%	51.61%	28.77%	14.48%
2040	13.21%	10.31%	20.54%	21.78%	19.67%	35.05%	47.72%	13.18%	51.72%	28.78%	14.51%
2041	13.35%	10.41%	20.73%	21.97%	19.73%	35.36%	47.81%	13.20%	51.83%	28.80%	14.54%
2042	13.42%	10.46%	20.83%	22.07%	19.76%	35.51%	47.91%	13.22%	51.93%	28.81%	14.57%
2043	13.50%	10.52%	20.95%	22.18%	19.79%	35.70%	48.01%	13.25%	52.04%	28.83%	14.60%
2044	13.68%	10.65%	21.20%	22.43%	19.86%	36.10%	48.12%	13.27%	52.14%	28.85%	14.64%
2045	13.81%	10.75%	21.38%	22.62%	19.92%	36.39%	48.22%	13.29%	52.24%	28.87%	14.67%

NOTE: These AAFs assume the annual increase in the beer excise tax remains at 6% (status quo).

Table S-7. Alcohol-attributable fractions for 10% annual increase in beer excise tax and 25% annual increase in spirits excise tax policy

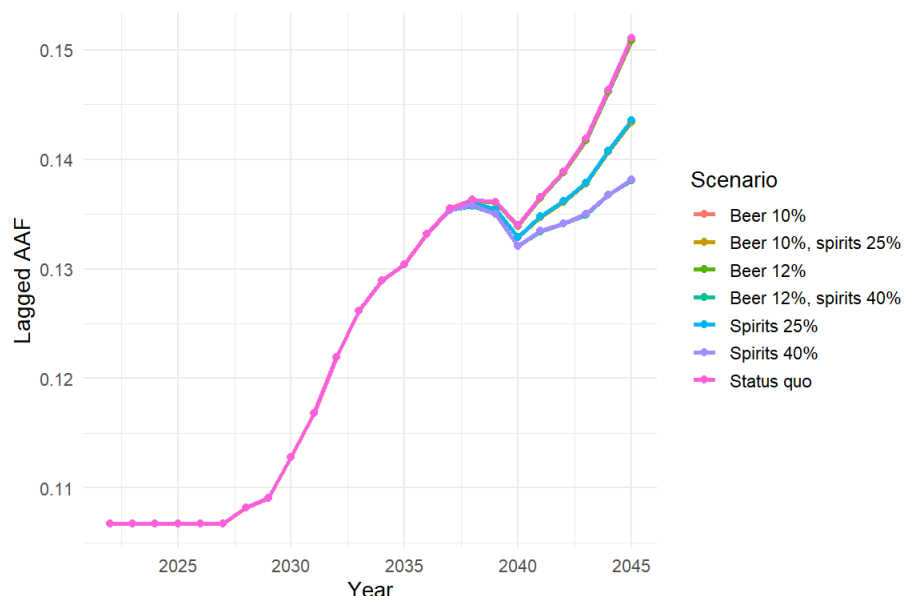
Year	Cancer, breast	Cancer, colorectal	Cancer, esophagus	Cancer, larynx	Cancer, liver	Cancer, pharynx	Homicide	Hypertensive heart disease	Liver cirrhosis	Road traffic injury	Stroke, hemorrhagic
2026	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.25%	12.79%	49.41%	28.54%	13.91%
2027	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.78%	12.91%	49.76%	28.63%	14.03%
2028	10.82%	8.55%	17.17%	18.35%	18.33%	29.52%	47.29%	13.04%	50.13%	28.72%	14.17%
2029	10.91%	8.62%	17.30%	18.48%	18.42%	29.71%	47.78%	13.15%	50.54%	28.80%	14.31%
2030	11.28%	8.89%	17.82%	19.01%	18.62%	30.55%	48.26%	13.27%	50.96%	28.89%	14.47%
2031	11.68%	9.19%	18.38%	19.58%	18.83%	31.48%	48.74%	13.38%	51.39%	28.97%	14.63%
2032	12.19%	9.56%	19.10%	20.32%	19.08%	32.67%	49.21%	13.49%	51.83%	29.05%	14.79%
2033	12.62%	9.88%	19.70%	20.93%	19.29%	33.66%	49.68%	13.60%	52.26%	29.14%	14.96%
2034	12.90%	10.08%	20.09%	21.32%	19.45%	34.29%	50.15%	13.71%	52.68%	29.22%	15.12%
2035	13.04%	10.19%	20.29%	21.53%	19.55%	34.62%	50.62%	13.82%	53.13%	29.30%	15.29%
2036	13.32%	10.39%	20.68%	21.92%	19.69%	35.24%	51.08%	13.94%	53.57%	29.38%	15.45%
2037	13.54%	10.56%	21.00%	22.23%	19.81%	35.74%	51.55%	14.05%	54.01%	29.47%	15.61%
2038	13.60%	10.60%	21.08%	22.31%	19.85%	35.87%	52.02%	14.16%	54.44%	29.55%	15.77%
2039	13.55%	10.56%	21.01%	22.24%	19.82%	35.77%	52.48%	14.27%	54.88%	29.64%	15.94%
2040	13.29%	10.37%	20.65%	21.89%	19.70%	35.22%	52.95%	14.39%	55.35%	29.72%	16.10%
2041	13.47%	10.50%	20.91%	22.14%	19.78%	35.63%	53.42%	14.50%	55.82%	29.81%	16.27%
2042	13.61%	10.60%	21.10%	22.33%	19.84%	35.94%	53.90%	14.62%	56.29%	29.90%	16.44%
2043	13.78%	10.73%	21.33%	22.57%	19.91%	36.31%	54.38%	14.74%	56.78%	29.98%	16.61%
2044	14.07%	10.94%	21.73%	22.97%	20.02%	36.95%	54.86%	14.86%	57.27%	30.07%	16.78%
2045	14.34%	11.14%	22.11%	23.34%	20.14%	37.54%	55.34%	14.97%	57.76%	30.16%	16.96%

Table S-8. Alcohol-attributable fractions for 12% annual increase in beer excise tax and 40% annual increase in spirits excise tax policy

Year	Cancer, breast	Cancer, colorectal	Cancer, esophagus	Cancer, larynx	Cancer, liver	Cancer, pharynx	Homicide	Hypertensive heart disease	Liver cirrhosis	Road traffic injury	Stroke, hemorrhagic
2026	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.05%	12.76%	49.37%	28.51%	13.88%
2027	10.67%	8.44%	16.97%	18.15%	18.22%	29.20%	46.30%	12.83%	49.64%	28.54%	13.95%
2028	10.82%	8.55%	17.17%	18.35%	18.33%	29.52%	46.49%	12.88%	49.88%	28.57%	14.02%
2029	10.91%	8.62%	17.30%	18.48%	18.42%	29.71%	46.64%	12.92%	50.13%	28.60%	14.07%
2030	11.28%	8.89%	17.82%	19.01%	18.62%	30.55%	46.77%	12.95%	50.35%	28.62%	14.13%
2031	11.68%	9.19%	18.38%	19.58%	18.83%	31.48%	46.88%	12.98%	50.57%	28.64%	14.18%
2032	12.19%	9.56%	19.10%	20.32%	19.08%	32.67%	46.98%	13.01%	50.75%	28.65%	14.23%
2033	12.62%	9.88%	19.70%	20.93%	19.29%	33.66%	47.07%	13.03%	50.91%	28.67%	14.27%
2034	12.90%	10.08%	20.09%	21.32%	19.45%	34.29%	47.16%	13.05%	51.05%	28.68%	14.31%
2035	13.04%	10.19%	20.29%	21.53%	19.55%	34.62%	47.24%	13.07%	51.18%	28.70%	14.34%
2036	13.32%	10.39%	20.68%	21.92%	19.69%	35.24%	47.32%	13.09%	51.30%	28.71%	14.37%
2037	13.53%	10.55%	20.98%	22.22%	19.81%	35.72%	47.40%	13.11%	51.40%	28.73%	14.40%
2038	13.58%	10.58%	21.05%	22.28%	19.84%	35.83%	47.48%	13.12%	51.49%	28.74%	14.43%
2039	13.50%	10.53%	20.95%	22.18%	19.81%	35.67%	47.57%	13.14%	51.57%	28.75%	14.46%
2040	13.21%	10.31%	20.54%	21.78%	19.67%	35.05%	47.65%	13.16%	51.68%	28.77%	14.49%
2041	13.34%	10.41%	20.73%	21.97%	19.73%	35.35%	47.74%	13.18%	51.77%	28.78%	14.52%
2042	13.41%	10.46%	20.83%	22.06%	19.76%	35.51%	47.83%	13.20%	51.87%	28.80%	14.55%
2043	13.50%	10.52%	20.94%	22.18%	19.79%	35.69%	47.93%	13.23%	51.98%	28.82%	14.58%
2044	13.67%	10.65%	21.19%	22.42%	19.86%	36.09%	48.02%	13.25%	52.08%	28.83%	14.61%
2045	13.81%	10.75%	21.37%	22.61%	19.92%	36.38%	48.13%	13.27%	52.17%	28.85%	14.64%

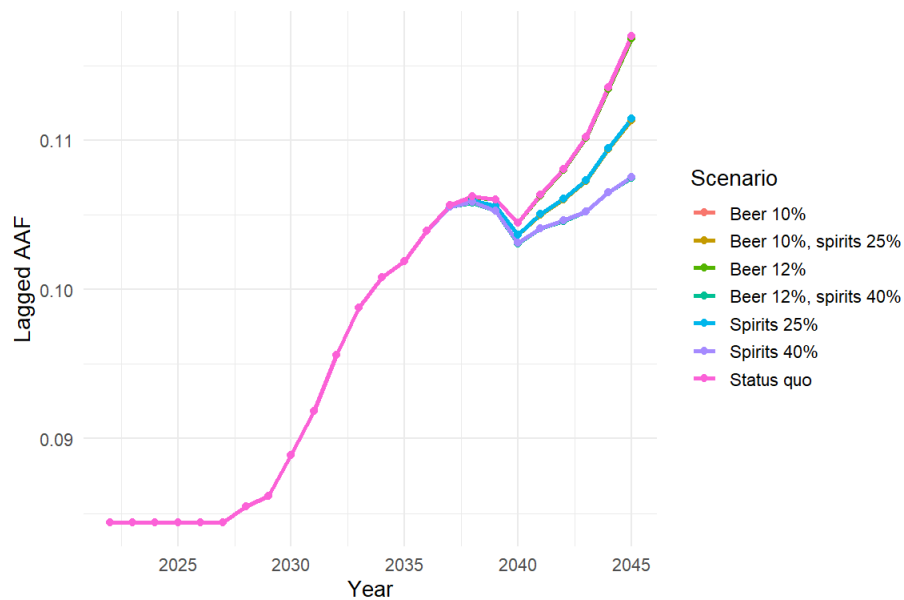
Figures S-1 through S-11 graph the lagged AAFs for each outcome and policy scenario by year:

Figure S-1. Alcohol-attributable fractions for breast cancer deaths, 2026 through 2045, by tax policy scenario



NOTE: Alcohol-attributable cancer mortality results from drinking patterns from roughly 10 to 20 years earlier, with greater weight placed on more distant consumption. Consequently, the sharp decline in alcohol consumption observed in 2019 leads to a pronounced reduction in estimated cancer AAFs around 2040.

Figure S-2. Alcohol-attributable fractions for colon and rectum cancer deaths, 2026 through 2045, by tax policy scenario



NOTE: Alcohol-attributable cancer mortality results from drinking patterns from roughly 10 to 20 years earlier, with greater weight placed on more distant consumption. Consequently, the sharp decline in alcohol consumption observed in 2019 leads to a pronounced reduction in estimated cancer AAFs around 2040.

Figure S-3. Alcohol-attributable fractions for esophageal cancer deaths, 2026 through 2045, by tax scenario

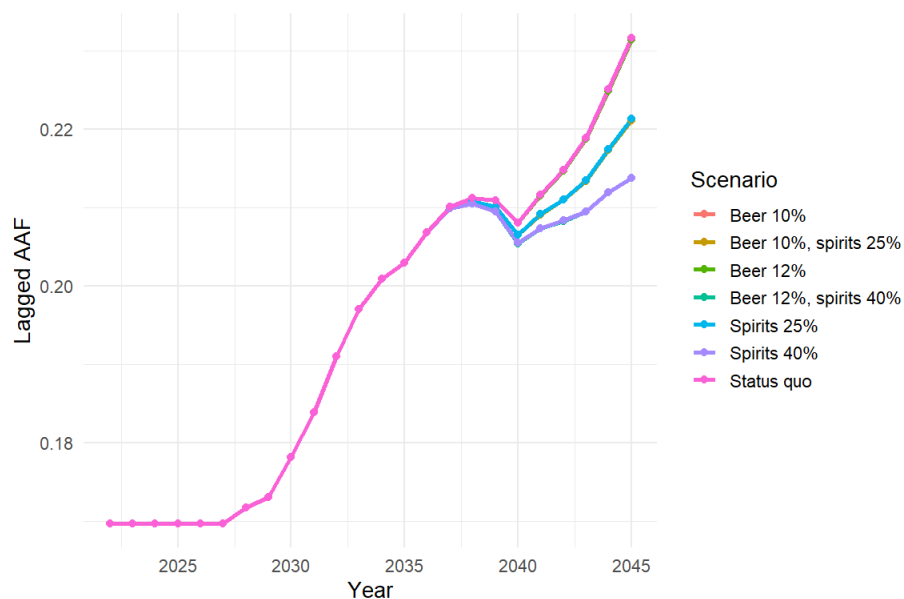
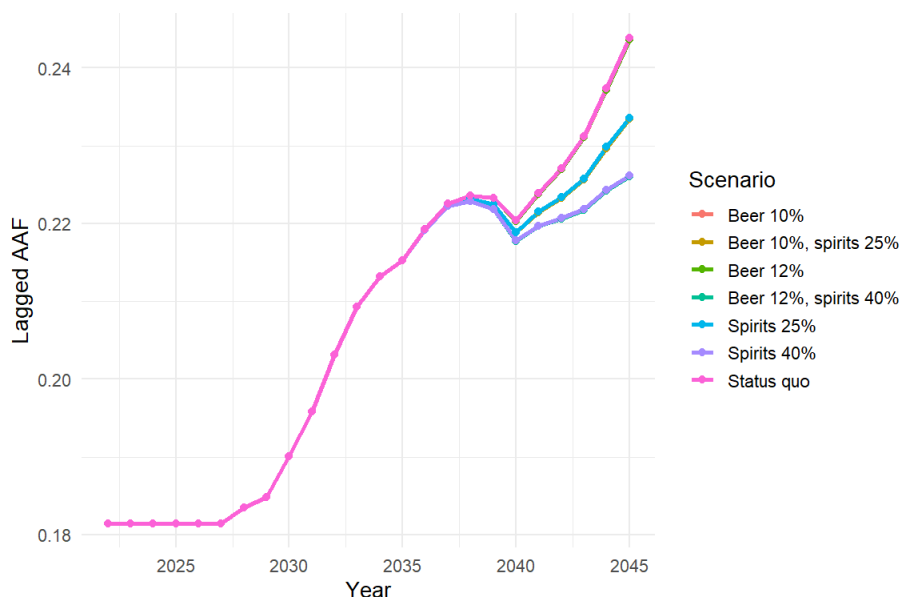
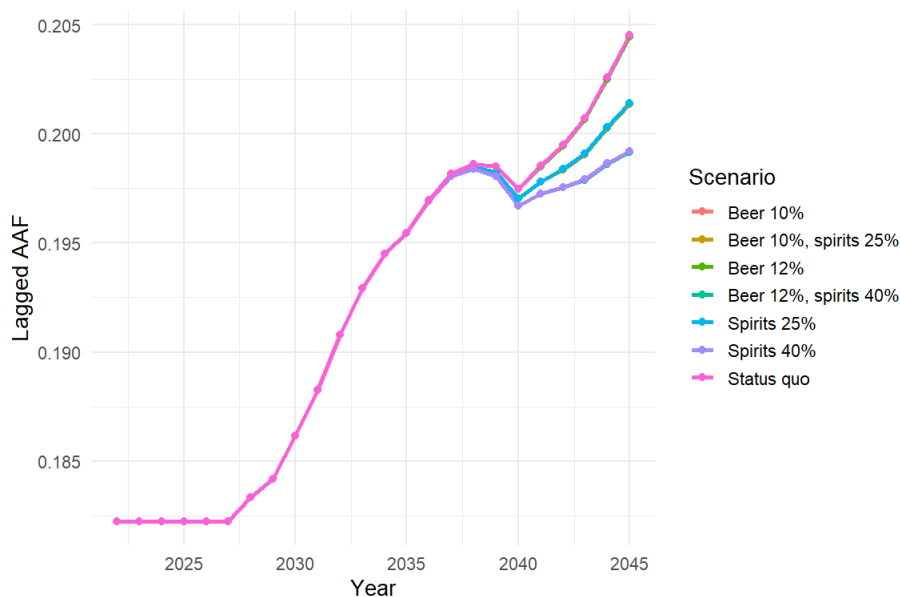


Figure S-4. Alcohol-attributable fractions for laryngeal cancer deaths, 2026 through 2045, by tax policy scenario



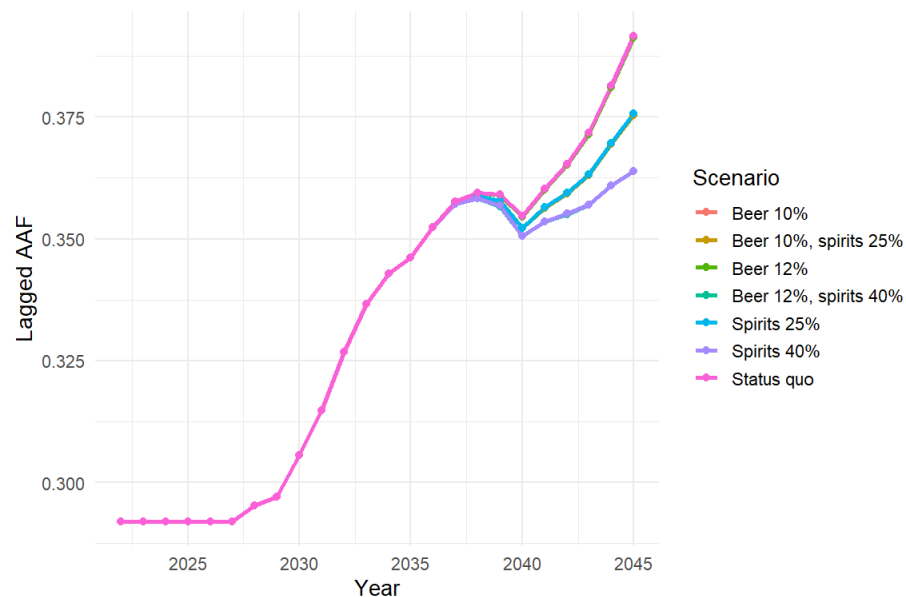
NOTE: Alcohol-attributable cancer mortality results from drinking patterns from roughly 10 to 20 years earlier, with greater weight placed on more distant consumption. Consequently, the sharp decline in alcohol consumption observed in 2019 leads to a pronounced reduction in estimated cancer AAFs around 2040.

Figure S-5. Alcohol-attributable fractions for liver cancer deaths, 2026 through 2045, by tax policy scenario



NOTE: Alcohol-attributable cancer mortality results from drinking patterns from roughly 10 to 20 years earlier, with greater weight placed on more distant consumption. Consequently, the sharp decline in alcohol consumption observed in 2019 leads to a pronounced reduction in estimated cancer AAFs around 2040.

Figure S-6. Alcohol-attributable fractions for pharyngeal cancer deaths, 2026 through 2045, by tax policy scenario



NOTE: Alcohol-attributable cancer mortality results from drinking patterns from roughly 10 to 20 years earlier, with greater weight placed on more distant consumption. Consequently, the sharp decline in alcohol consumption observed in 2019 leads to a pronounced reduction in estimated cancer AAFs around 2040.

Figure S-7. Alcohol-attributable fractions for homicides, 2026 through 2045, by tax policy scenario

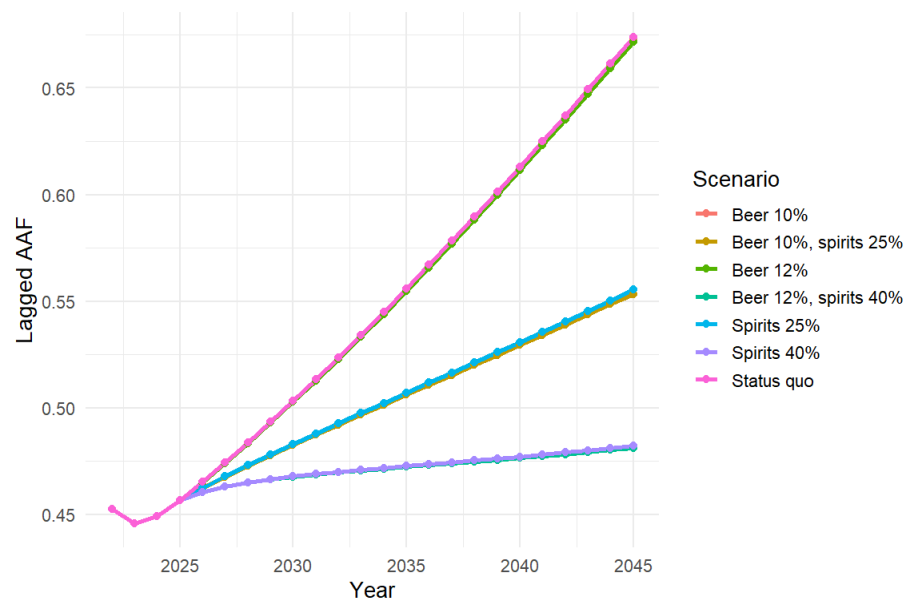


Figure S-8. Alcohol-attributable fractions for liver cirrhosis deaths, 2026 through 2045, by tax policy scenario

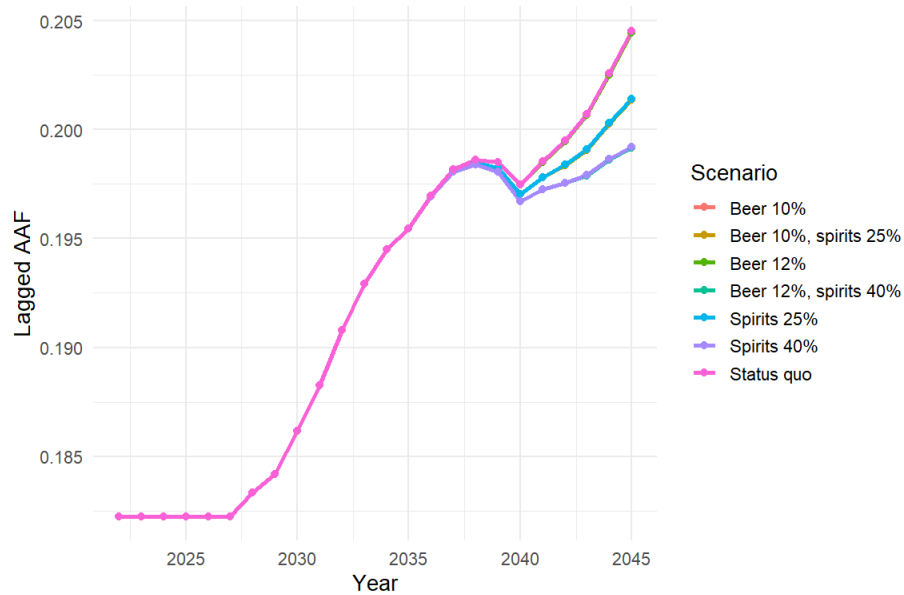


Figure S-9. Alcohol-attributable fractions for hypertensive heart disease deaths, 2026 through 2045, by tax policy scenario

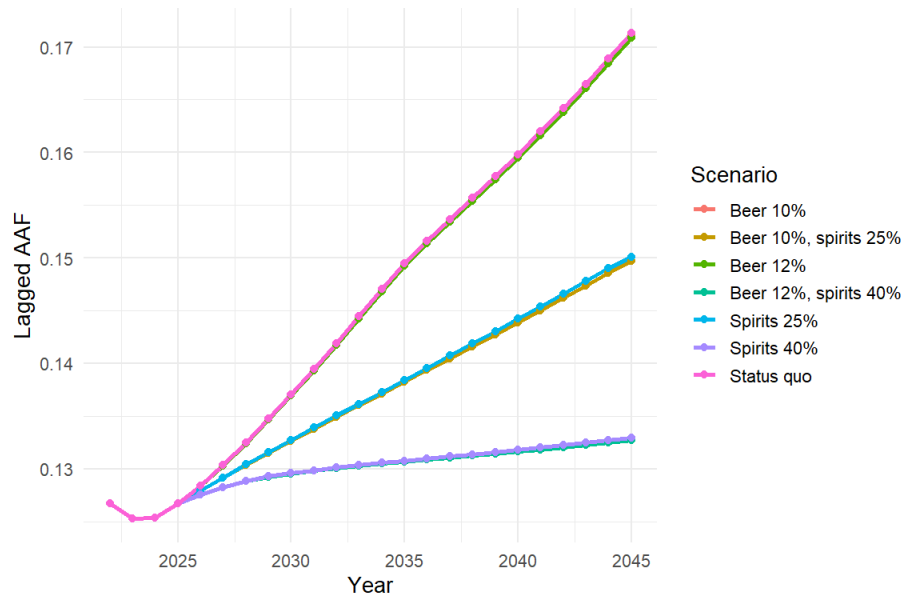


Figure S-10. Alcohol-attributable fractions for road traffic injury deaths, 2026 through 2045, by tax policy scenario

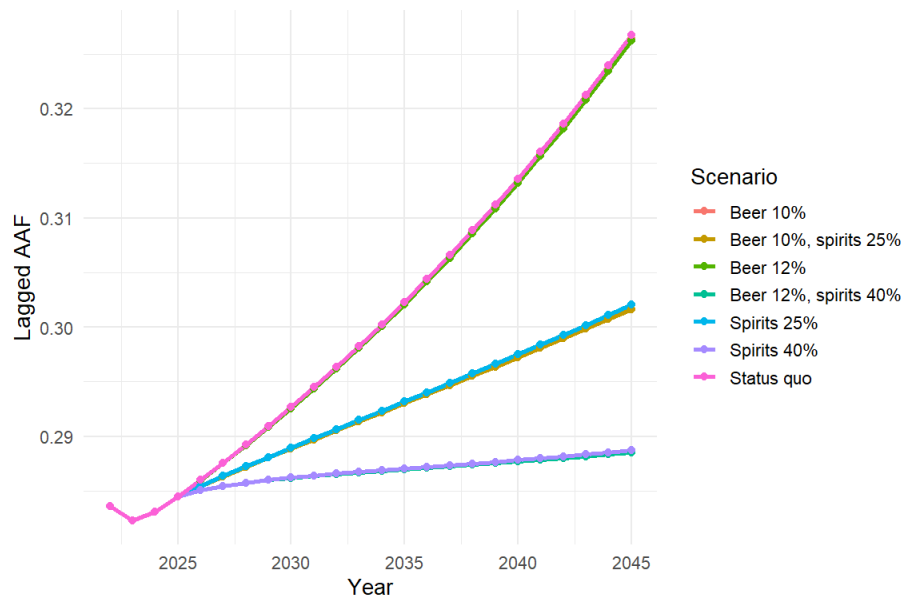
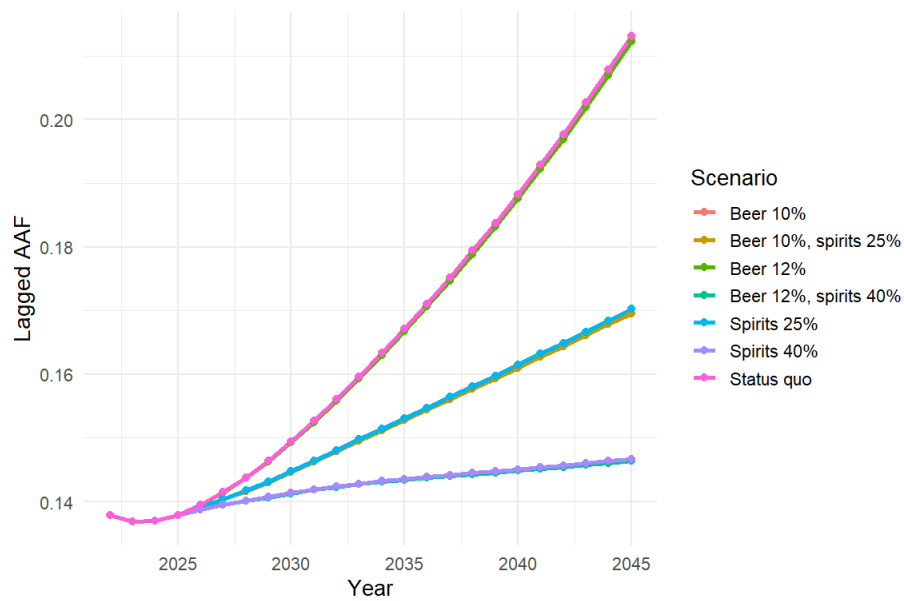


Figure S-11. Alcohol-attributable fractions for hemorrhagic stroke deaths, 2026 through 2045, by tax policy scenario



Predicted mortality burden by outcome in the Philippines, 2023 through 2045
These results assume the trends in cause-specific mortality from 2007 through 2022 continued through 2045 and account for population growth. Population estimates were obtained from the United Nations.^c

^c United Nations, Department of Economic and Social Affairs, Population Division. (2024). *World Population Prospects: The 2024 Revision*. <https://population.un.org/wpp/>.

Table S-9. Predicted number of deaths by cause and year, Philippines 2023 through 2045

Outcome	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035
2023 through 2035													
Cancer, pharynx	277	293	306	320	334	349	365	381	398	416	434	453	473
Cancer, esophagus	521	527	527	527	527	527	526	526	525	525	524	523	522
Cancer, colon and rectum	8,735	9,171	9,516	9,872	10,241	10,622	11,015	11,421	11,841	12,274	12,720	13,181	13,655
Cancer, liver	6,410	6,483	6,479	6,475	6,470	6,464	6,457	6,449	6,440	6,430	6,419	6,407	6,394
Cancer, larynx	473	476	473	471	468	465	463	460	457	454	451	448	445
Cancer, breast	11,505	12,153	12,686	13,241	13,819	14,421	15,046	15,696	16,371	17,073	17,802	18,558	19,343
Homicide	7,319	7,061	6,733	6,420	6,120	5,834	5,560	5,298	5,048	4,809	4,580	4,362	4,153
Hypertensive heart disease	43,576	46,360	48,744	51,244	53,867	56,616	59,497	62,514	65,673	68,982	72,447	76,071	79,861
Liver cirrhosis	8,111	8,270	8,333	8,395	8,458	8,519	8,580	8,640	8,699	8,757	8,814	8,869	8,923
Road traffic injuries	12,058	12,597	13,006	13,426	13,858	14,303	14,759	15,227	15,708	16,202	16,708	17,227	17,759
Stroke, hemorrhagic	277	293	306	320	334	349	365	381	398	416	434	453	473
Outcome	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045			
2036 through 2045													
Cancer, pharynx	493	514	536	559	583	607	633	659	686	713			
Cancer, esophagus	521	520	519	518	516	514	513	511	508	506			
Cancer, colon and rectum	14,144	14,646	15,161	15,690	16,232	16,788	17,358	17,942	18,539	19,150			
Cancer, liver	6,379	6,363	6,345	6,325	6,303	6,279	6,254	6,227	6,197	6,166			
Cancer, larynx	442	439	435	432	428	424	421	417	413	409			
Cancer, breast	20,157	20,999	21,870	22,771	23,701	24,663	25,655	26,679	27,735	28,824			
Homicide	3,953	3,762	3,579	3,403	3,236	3,076	2,923	2,776	2,636	2,503			
Hypertensive heart disease	83,820	87,954	92,263	96,754	101,434	106,309	111,384	116,666	122,159	127,869			
Liver cirrhosis	8,976	9,026	9,074	9,120	9,163	9,204	9,242	9,277	9,309	9,339			
Road traffic injuries	18,303	18,858	19,425	20,003	20,592	21,192	21,802	22,424	23,056	23,698			
Stroke, hemorrhagic	493	514	536	559	583	607	633	659	686	713			

Figures S-12 through S-22 graph the estimated number of alcohol-attributable deaths that would occur for each outcome and policy scenario by year. These estimates assume that current trends in outcome-specific mortality continue and account for underlying population growth.

Note that alcohol-attributable cancer mortality results from drinking patterns from roughly 10 to 20 years earlier, with greater weight placed on more distant consumption. Consequently, the sharp decline in alcohol consumption observed in 2019 leads to a dip in estimated cancer deaths around 2040.

Figure S-12. Estimated number of alcohol-attributable breast cancer deaths, 2026 through 2045, by tax policy scenario

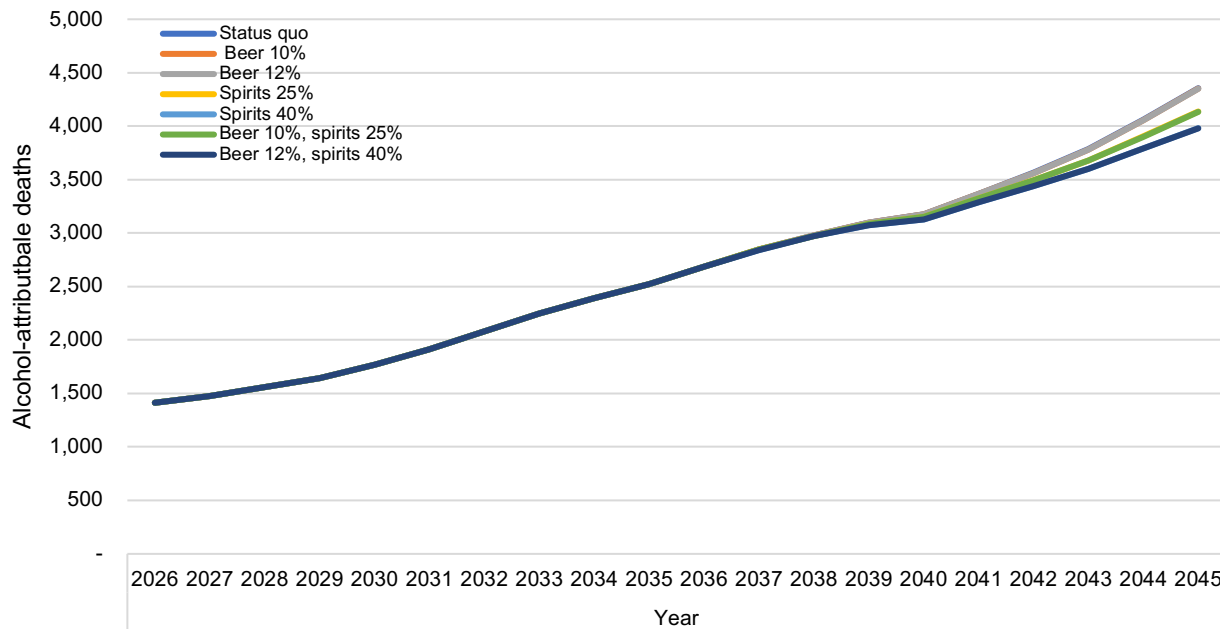


Figure S-13. Estimated number of alcohol-attributable colon and rectum cancer deaths

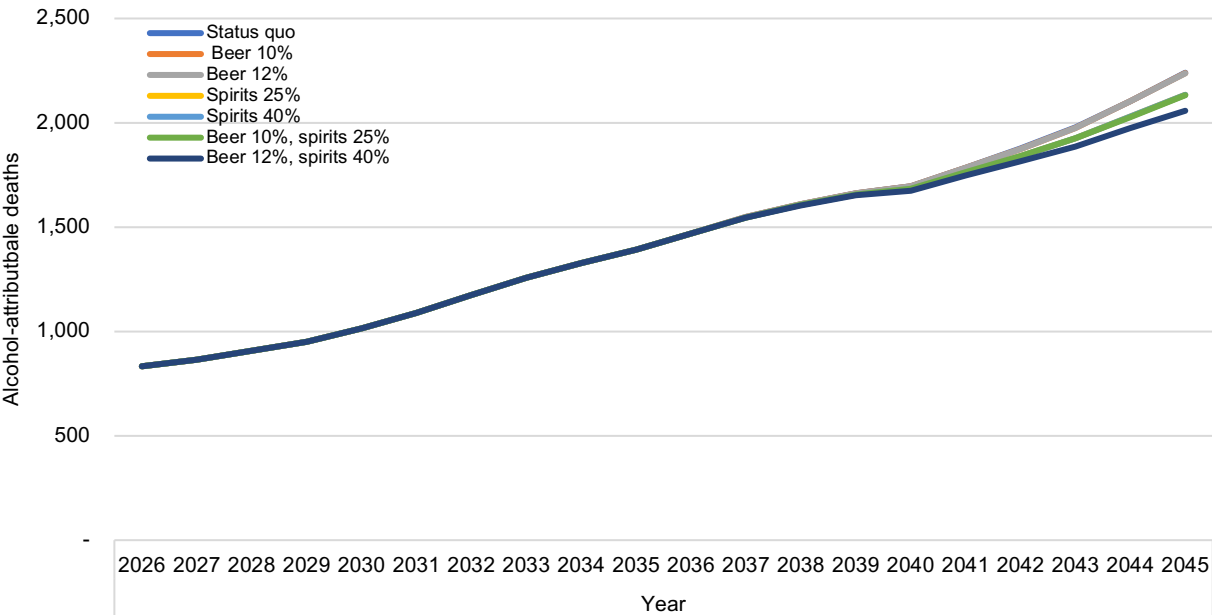


Figure S-14. Estimated number of alcohol-attributable esophageal cancer deaths, 2026 through 2045, by tax policy scenario

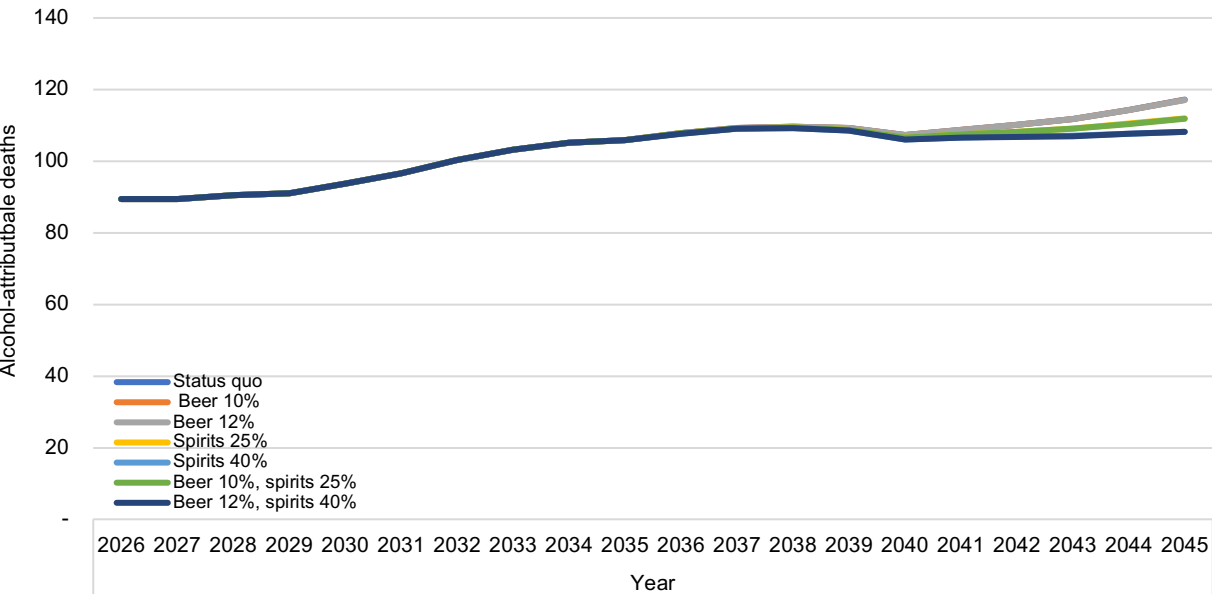


Figure S-15. Estimated number of alcohol-attributable laryngeal cancer deaths, 2026 through 2045m by tax policy scenario

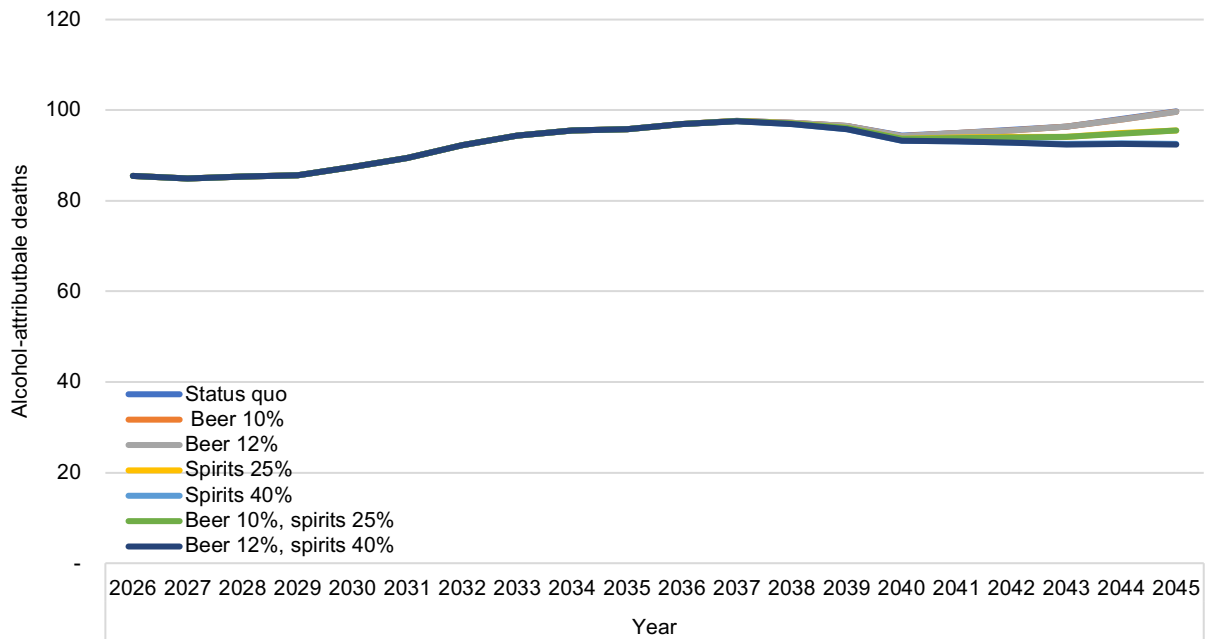


Figure S-16. Estimated number of alcohol-attributable liver cancer deaths, 2026 through 2045, by tax policy scenario

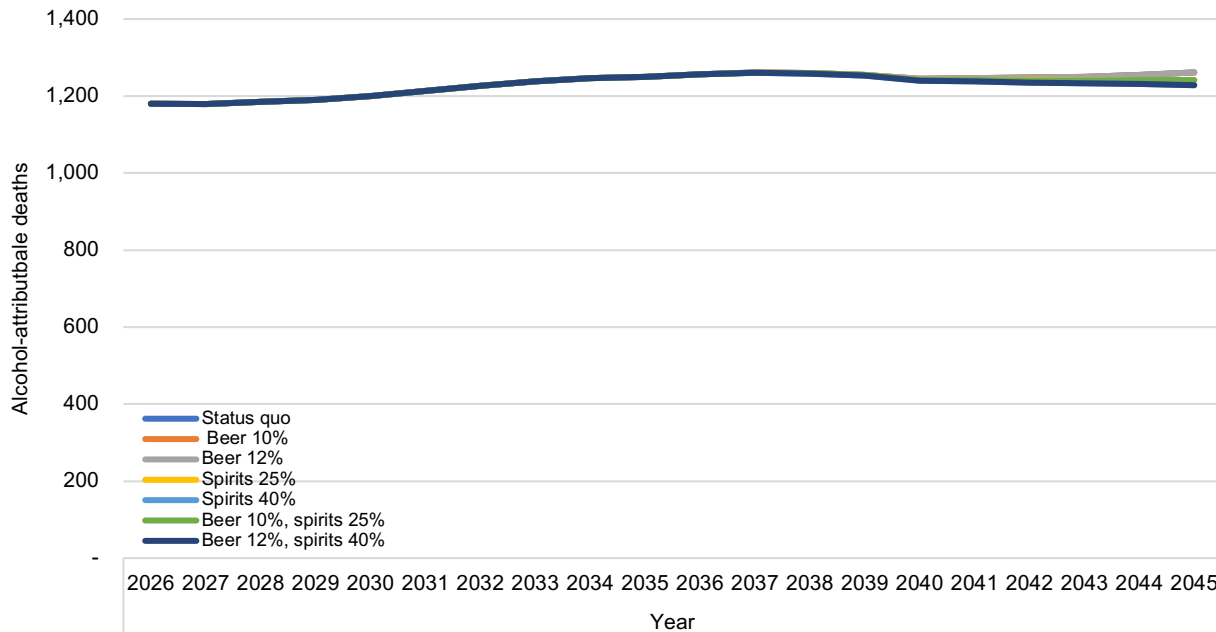


Figure S-17. Estimated number of alcohol-attributable pharyngeal cancer deaths, 2026 through 2045, by tax policy scenario

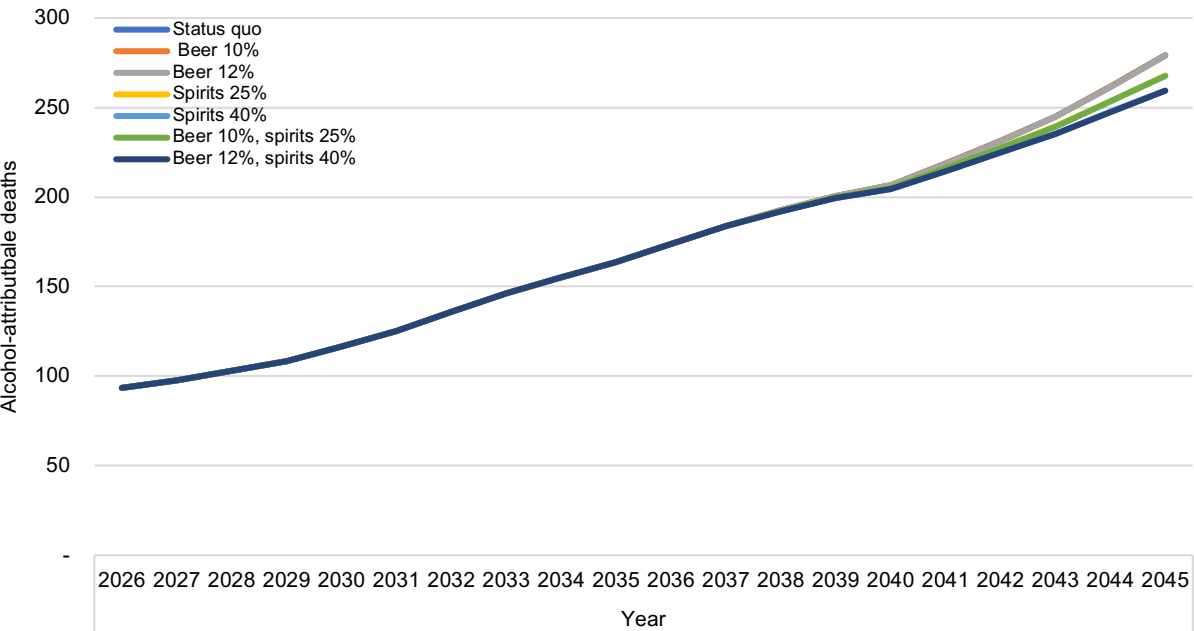


Figure S-18. Estimated number of alcohol-attributable homicides, 2026 through 2045, by tax policy scenario

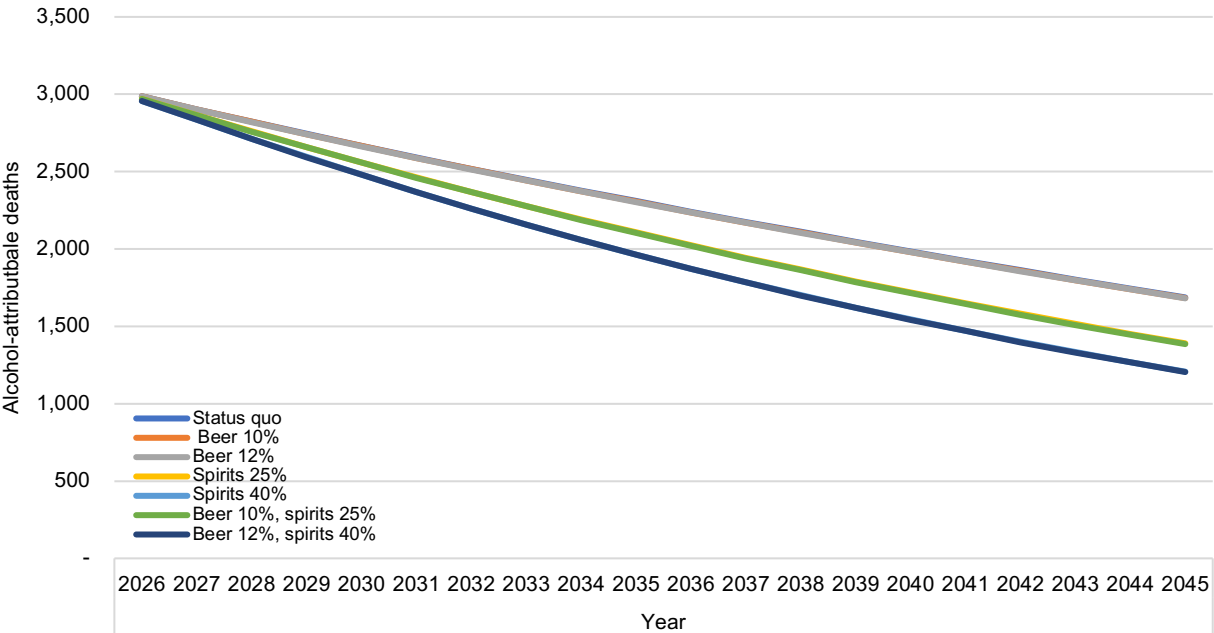


Figure S-19. Estimated number of alcohol-attributable hypertensive hearth disease deaths, 2026 through 2045, by tax policy scenario

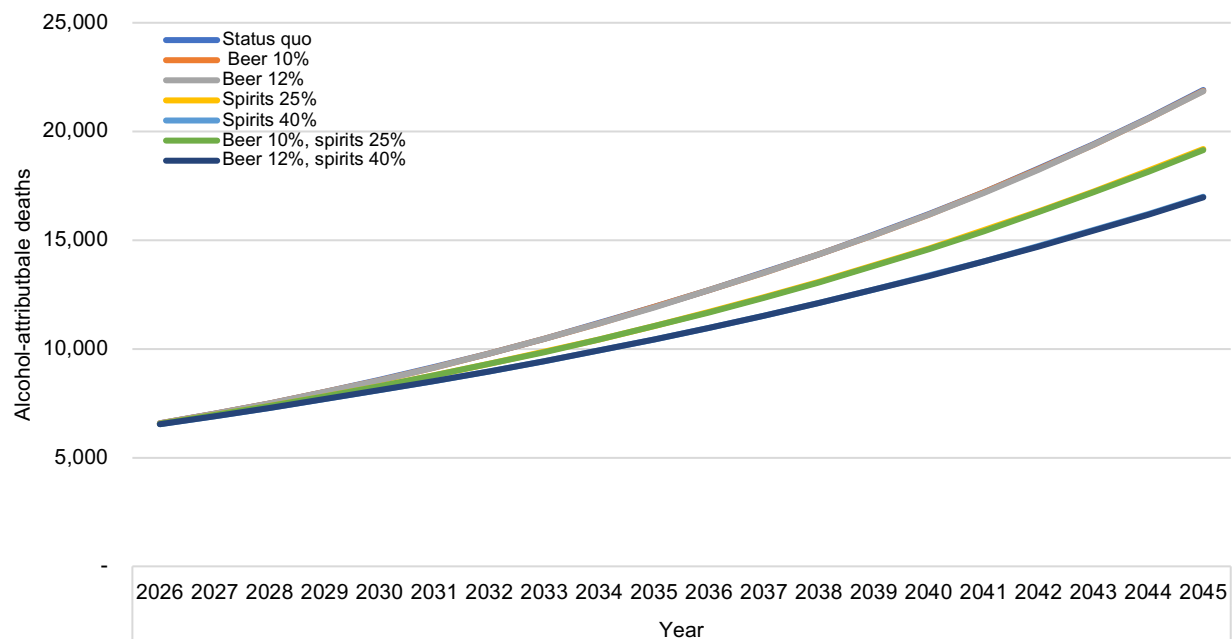


Figure S-20. Estimated number of alcohol-attributable liver cirrhosis deaths, 2026 through 2045, by tax policy scenario

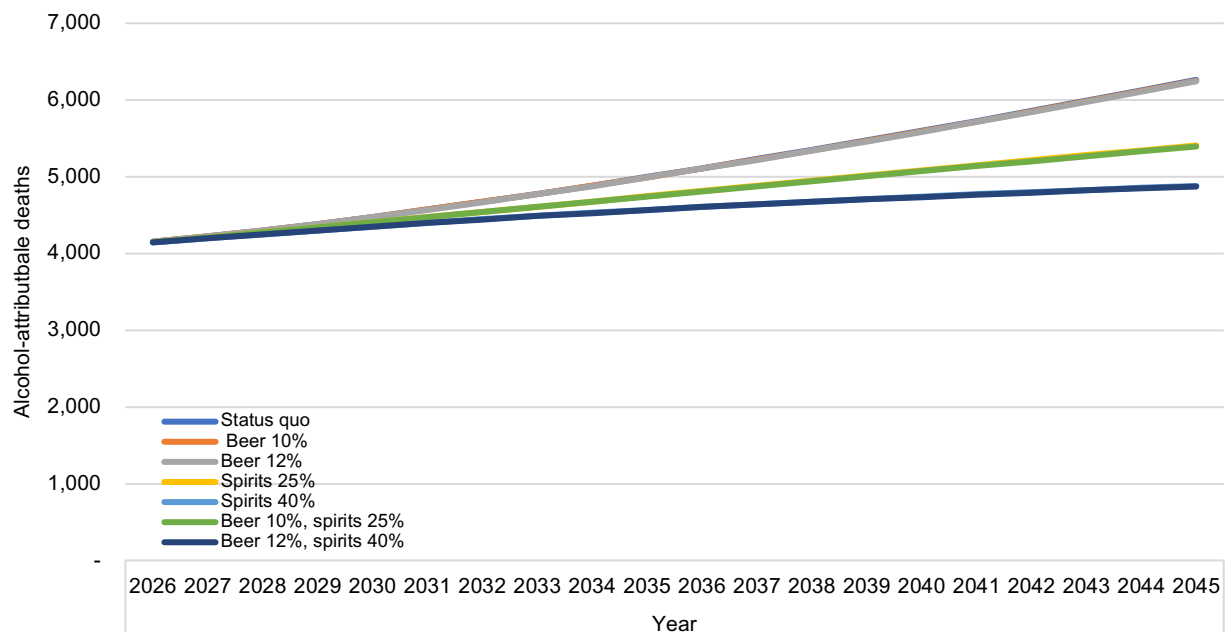


Figure S-21. Estimated number of alcohol-attributable road traffic injury deaths, 2026 through 2045, by tax policy scenario

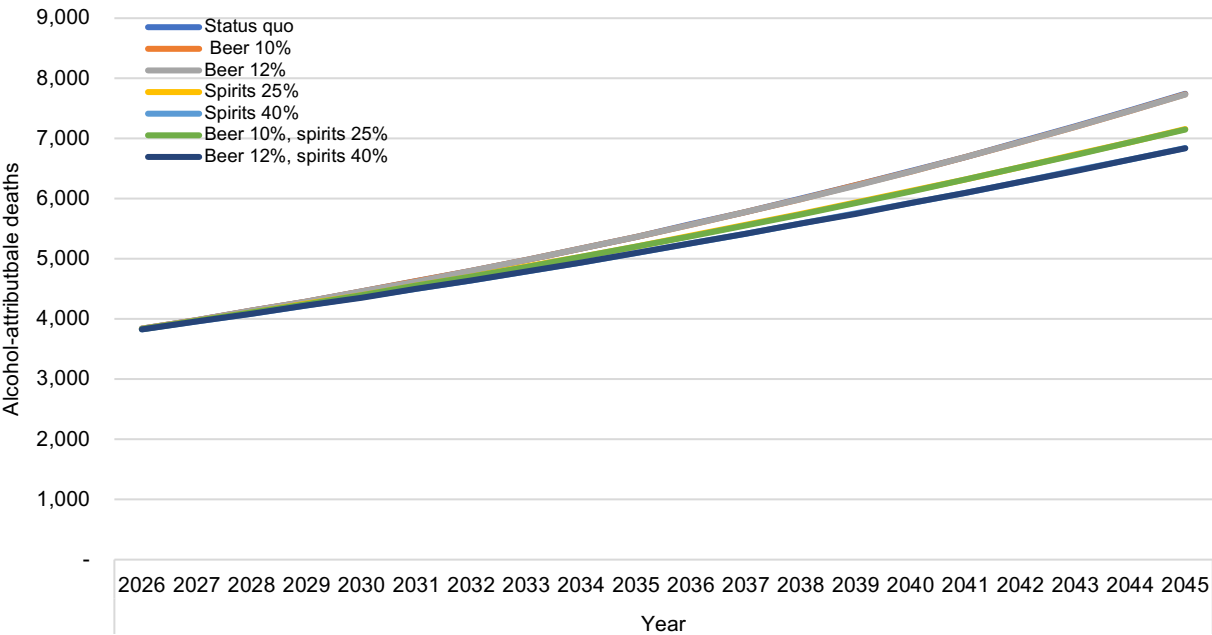
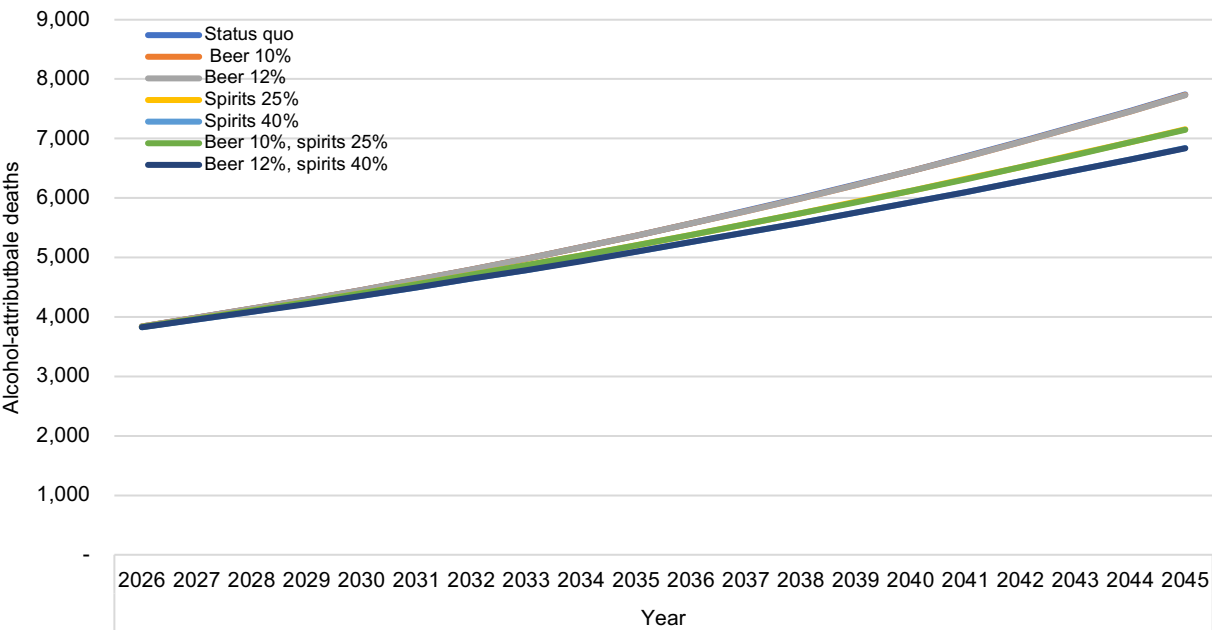


Figure S-22. Estimated number of alcohol-attributable hemorrhagic stroke deaths, 2026 through 2045, by tax policy scenario



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