

# Projecting the prevalence of obesity- and alcohol-related non-communicable diseases in France, the Netherlands and Romania from 2020 to 2030 using multi-risk microsimulation methods

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## Introduction

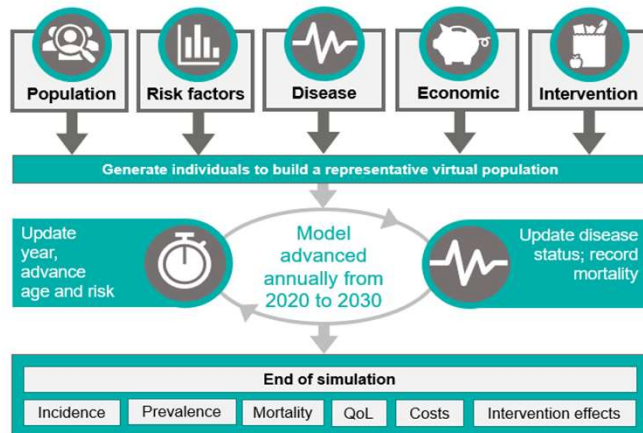
Obesity prevalence is increasing across Europe. This is contributing to an increase in the incidence of liver and cardiovascular disease, already adversely affected by relatively high levels of alcohol consumption. Quantifying the epidemiological and economic burden of body mass index (BMI) and alcohol consumption as risk factors for liver disease will provide evidence for governments, and other stakeholders, to design and implement appropriate interventions and policies.

**Study aim:** To quantify the current and potential future burden of liver diseases, and coronary heart disease (CHD), impacted by body mass index (BMI) and alcohol, in France, Netherlands, and Romania from 2020 to 2030.

## Methods

A validated multi-risk microsimulation model (illustrated in **Figure 1**) was employed [1]. Dynamic, representative virtual populations of the three countries were generated based on population data. Country-specific epidemiological and cost data for chronic liver disease (CLD), liver cancer, and CHD were extracted from published sources. Morbidity, quality-adjusted life years (QALY) and costs of diseases were projected to 2030, based on current trends in obesity and assuming static alcohol consumption over time (baseline scenario). The impact of an illustrative scenario in which population BMI is reduced by 1% and alcohol consumption by 5% was quantified.

Figure 1. Model schematic



## Results: France

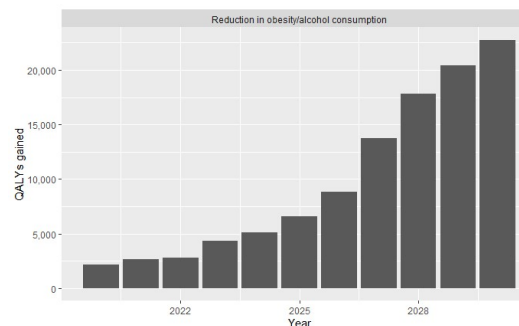
Obesity prevalence per 100,000 is projected to increase by 28.8% between 2020 to 2030. Annual incidence for 2030 for both the baseline scenario and the intervention are shown in **Table 1**. In total, the model predicted that over 24,000 new cases of disease would be avoided in 2030 in the intervention scenario.

Table 1. Annual disease incidence by scenario and cases avoided due to BMI/Alcohol reduction in France

Disease	New cases in 2030 (baseline)	New cases in 2030 (intervention)	Cases avoided
CLD	11,897 [±554]	7,560 [±442]	4,337 [±709]
Liver cancer	11,568 [±541]	8,653 [±468]	2,915 [±716]
CHD	91,310 [±1,520]	73,948 [±1,369]	17,362 [±2,046]

This reduced disease burden is projected to lead to over 22,000 QALY gained by 2030 (**Figure 2**), and over 8,000 premature deaths avoided by 2030.

Figure 2. Cumulative QALY gained with the BMI/alcohol reduction intervention in France



This reduced burden in disease incidence is predicted to result in direct cost savings of €1.5bn (liver cancer) and of €1.4bn (CHD).

## Conclusion

We demonstrate the effect of rising obesity prevalence on liver diseases, assuming no change in current alcohol consumption, and the associated economic burden to the French, Dutch and Romanian healthcare systems, as well as the potential benefits of reduced BMI and alcohol consumption in these countries. These data suggest that policies designed to impact on both risk factors may be of benefit to population health, and that even small changes in these risk factors can lead to significant outcomes.

## Results: Netherlands

Obesity prevalence per 100,000 is projected to increase by 25.9% between 2020 and 2030. Annual incidence for 2030 for both the baseline scenario and the intervention are shown in **Table 2**. In total, the model predicted that over 15,000 new cases of disease would be avoided in 2030 in the intervention scenario.

Table 2. Annual disease incidence by scenario and cases avoided due to BMI/Alcohol reduction in The Netherlands

Disease	New cases in 2030 (baseline)	New cases in 2030 (intervention)	Cases avoided
CLD	1,063 [±84]	883 [±77]	180 [±114]
Liver cancer	1,316 [±92]	1,062 [±83]	254 [±124]
CHD	81,412 [±725]	66,194 [±654]	15,218 [±976]

Under the intervention scenario, projected direct cost savings by 2030 were €6.7m (CLD), €28.9m (liver cancer), and €941.8m (CHD), compared to baseline.

## Results: Romania

Obesity prevalence per 100,000 is projected to decrease by 5.8% between 2020 and 2030. Annual incidence for 2030 for both the baseline scenario and the intervention are shown in **Table 3**. In total, the model predicted that over 31,000 new cases of disease would be avoided in 2030 in the intervention scenario.

Table 3. Annual disease incidence by scenario and cases avoided due to BMI/Alcohol reduction in Romania

Disease	New cases in 2030 (baseline)	New cases in 2030 (intervention)	Avoided cases
CLD	1,705 [±112]	1,387 [±101]	318 [±151]
Liver cancer	4,708 [±179]	3,753 [±160]	955 [±240]
CHD	178,648 [±1,123]	148,086 [±1,024]	30,562 [±1,520]

The reduced burden of CHD in the intervention scenario was predicted to result in a direct cost saving of €316.4m by 2030.

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References: [1] Pérez-Ferrer et al. Inequalities in smoking and obesity in Europe predicted to 2050: Findings from the EConDA project. Scand J Public Health. 2018 Jul;46(5):530-540. doi: 10.1177/1403494818761416.

Abbreviations: BMI, body-mass index; CHD, chronic heart disease; CLD, chronic liver disease; QALY, quality-adjusted life years; QoL, quality of life.