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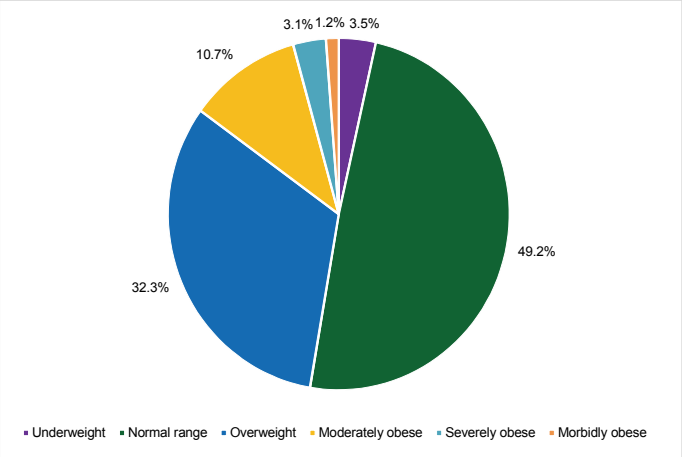
TRÉSOR-ECONOMICS

What are the economic consequences of obesity and how to tackle them?

- Overweight and obese people make up just under half of the French population, but they account for a disproportionate share of healthcare expenditure (56% for outpatient care and probably more for inpatient care). Excess bodyweight has particularly negative consequences for human health, raising morbidity by the heightened risk of chronic disease, and raising mortality, as 13% of deaths recorded in Europe in 2002 were attributed to obesity. Obesity also reflects major social inequalities, as it is disproportionately present among low-income households.
- In France, the social cost of excess bodyweight was approximately €20 bn (1% of GDP) in 2012–an amount comparable to the social cost of alcohol and tobacco. The cost per individual concerned, however, is substantially lower than for alcohol or smoking, because far more people are overweight. Furthermore, individual behaviours must not be stigmatised because-unlike alcohol and tobacco, which are matters of individual behaviour–obesity has multiple causes, such as the quality of food consumed and genetic factors.
- While appropriate actions have been undertaken in an attempt to limit the rise in the number of overweight people, they appear inadequate in light of the health risks involved, and more specifically the projected increase in the number of obese and overweight people (in France, 33.0 million in 2030, up from 24.6 million in 2012). In the past, prevention has focused on mass media campaigns. Measures could be taken both to strengthen incentives for physicians to expand prevention, and to make nutritional taxes more effective in changing behaviours.
- While behavioural taxation can be a welcome instrument in improving anti-obesity policies in France, other, innovative and economical anti-obesity measures could be promoted, including:
  - focusing on "unconscious" incentives in consumer decision-making, to bring about a healthier diet;
  - better-targeted prevention campaigns;
  - restricting or even banning advertising targeted at children for products whose over-consumption can be unhealthy;
  - strengthening nutritional labelling requirements.
- Lastly, organising intensive counselling of obese people by healthcare professionals appears to be highly promising but potentially costly in the short term. Two factors make such counselling difficult: lack of incentives for physicians and lack of resources in regions with low physician-to-population ratios.

Distribution of French adults by BMI category



Source: INSERM, Kantar Health and Roche (2012), Enquête épidemiologique sur le surpoids et l'obésité.

MINISTÈRE DE L'ÉCONOMIE
ET DES FINANCES

1. Increased prevalence makes obesity a major health issue

1.1 Definition and issues

Obesity is defined by the World Health Organisation (WHO)[1] as "abnormal or excessive fat accumulation that may impair health and reduce life expectancy". While this general definition has prompted debate over how obesity is measured, body mass index (BMI) is generally accepted as the most appropriate indicator.

Box 1: **Measuring obesity**

Body mass index (BMI) was recognized in 1997 by the WHO as the standard for evaluating the risks arising from excessive bodyweight in adults. It appears to be the most effective indicator for identifying epidemiological phenomena relating to excess bodyweight, a term that encompasses obesity and overweight. BMI has been used in its current form since 1972, after a landmark study[a] found that the index, first proposed by A. Quetelet in the nineteenth century, was more effective than other measures of obesity. Before 1972, the main reference was to an "ideal weight" determined from the probabilities of death calculated by actuaries for pricing insurance premiums. Since then, BMI–which is both easy to use and interpretable in the same way irrespective of an individual's height[b]-is generally accepted as the most effective indicator for predicting obesity-related morbidity and mortality[c].

Calculated using the formula, $\frac{Weight(kg)}{Height^2(m)}$, BMI enables individuals to be classified according to their level of risk.

Table 1: WHO international BMI classification

BMI range	Interpretation
$BMI < 18.5$	Underweight
$18.5 \; BMI < 25$	Normal range
$25 \leq BMI < 30$	Overweight
$30 \leq BMI$ Obesity	Moderately obese (obese class I): $30 \leq IMC < 35$
	Severely obese (obese class II): $35 \leq IMC < 40$
	Morbidly obese (obese class III): the greatest risks, for $BMI \geq 40$

Source: WHO.

However, BMI has significant limitations. It fails to take into account specific factors relating to age, sex or muscle mass. For example, because a highly muscular athlete could have a high BMI without being exposed to a health risk, other indicators are also used to measure obesity. Accordingly, while the shortcomings of BMI do not compromise its effectiveness for epidemiological studies, other indicators, which are harder to calculate–such as the waist-to-hip ratio–seem more appropriate for predicting individual risks, and more specifically cardiovascular and metabolic risk. For the purposes of measuring obesity-related discriminations, however, it appears more appropriate to use BMI, which measures deviations from an appearance-based social norm for obesity[d].

a. Keys, A., Fidanza, F., and Karvonen, M. J. (1972), "Indices of relative weight and obesity", *Journal of Chronic Diseases*, 25, pp. 329-343.
b. Except for special cases, such as dwarfism.
c. OECD (2010), *Obesity: Past and Projected Future Trends.*
d. In other words, an individual can be subjected to weight discrimination if (s)he appears bigger than the generally accepted standard for the group. Obese people may not be subjected to discrimination if obesity is the norm in their group, whereas a size 8 or 10 model could be harassed by colleagues although far from overweight by BMI standards.

Obesity can impact health in many ways, including as a factor in type 2 diabetes (80% of new cases are diagnosed in obese people), hypertension, cardiovascular disease, respiratory disease (including sleep apnoea), and joint disease such as arthritis[2]. It also increases the risk of developing certain cancers such as uterine cancer and colon cancer. In 2012, nearly 32% of obese people in France had an officially recognised chronic disease (*affection de longue durée* - ALD)[3], compared with only 15% in the general population. The direction of the causal relationship between obesity and disease, however, may be hard to determine because some diseases, such as hypothyroidism, can also lead to weight gain. Obesity can also have psychological and social consequences, notably owing to discrimination against obese people and the impact of being obese or overweight on a person's self-esteem[4]. The obese are also more likely to develop clinical depression than people in the normal range; the same is true of the formerly obese[5].

Table 2: Prevalence of selected diseases by BMI category (2012)

Population	Diabete	Heart attack	Hypertension	Depression	Low back pain
$BMI < 18.5$	2.1%	0.3%	3.9%	6.0%	13.9%
$18.5 < BMI < 25$	3.2%	0.3%	6.8%	3.6%	16.2%
$25 \leq IMC < 30$	9.6%	0.9%	15.6%	5.6%	22.0%
$30 \leq IMC$	19.3%	0.9%	26.7%	7.7%	24.6%
General population	**6.7%**	**0.6%**	**12.9%**	**4.5%**	**19.0%**

Source: ESPS 2012, DG Trésor calculations.

(1) WHO (2015), Obesity and overweight, Fact sheet no. 311.
(2) WHO (2015), *op. cit.* note 1.
(3) Percentage of obese adults affected by an officially recognised long-term condition, calculated from the Health, Healthcare and Insurance Survey (ESPS) by IRDES.
(4) Poulain, J.-P. (2009), Sociologie de l'obésité, Presses Universitaires de France.
(5) Herva, A. *et al.* (2006), Obesity and Depression, Results from the Longitudinal Northern Finland 1966 Birth Cohort Study.

We can observe the physical and psychological effects of excess bodyweight-and, more specifically, obesity-on human health by analysing the prevalence of various diseases as a function of bodyweight, using data from the Health, Healthcare and Insurance Survey (ESPS) by the French Institute for Research and Information in Health Economics (IRDES: see Table 2).

Along with the greater prevalence of chronic diseases, excess bodyweight reduces life expectancy. A recent study[6] estimated the number of years of life lost by overweight or obesity category as follows:

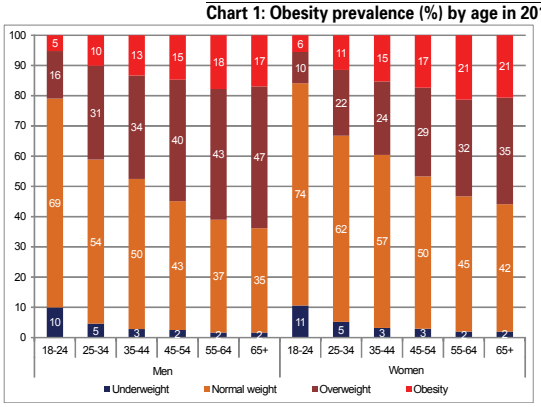
- 1.5 years for an overweight person;
- 3.5 years for a class I (moderately obese) person;
- 4.5 years for a class II obese (severely obese) person;
- 8 years for a class III (morbidly obese) person.

Another way to observe the phenomenon is to analyse mortality due to obesity. The WHO estimates that obesity is responsible for nearly 13% of deaths in Europe[7], making it a leading cause of mortality. A recent American study[8] finds that mortality associated with obesity and overweight is seriously underestimated, because previous studies counted only those were obese at the time of death, ignoring the excess mortality (27%) of individuals with normal weight who had been obese at one point in their lives, compared with those who had always had a normal weight.

1.2 Obesity prevalence has risen by over 4% a year in the past 15 years

In 2012, 15.0% of the French population were obese and 32.3% were overweight, according to the findings of the ObEpi (Obesity Epidemiology) survey[9], the periodical survey that serves as the benchmark for estimating obesity prevalence in France. At the opposite end of the spectrum, 3.5% of the population were underweight-which would indicate that over half of French adults have weight problems.

Chart 1: Obesity prevalence (%) by age in 2012



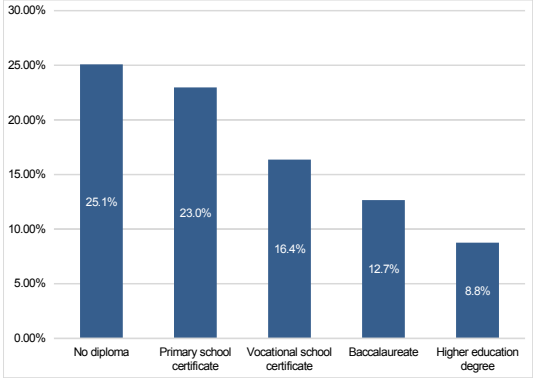
Source: INSERM, Kantar Health and Roche (2012), ObEpi.

The greater frequency of chronic diseases among people with excess bodyweight leads to disproportionate healthcare expenditure. Obese people account for 15% of the population but 22.1% of expenditures for non-hospital health products and services, and the 32.3% who are overweight account for 33.9%.

We can draw several conclusions from an analysis of the characteristics of obese people. While the percentage of obese people is the same for both sexes, more men are overweight (38.8% of men, versus 26.3% of women). Mean BMI also rises with age, from 22.4 for the 18-24s to 26.5 for the over 55s.

Another factor in obesity prevalence is social category, as evidenced, for instance, by educational attainment[10]. The lower the education level, the greater the prevalence of obesity, and the faster it rises-increasing nearly four times faster among farmers than white-collar managers (cadres) between 1992 and 2003[11]. This is explained in part by the correlation between high educational attainment and relatively high earnings that allow for a better balanced diet. (The energy cost of food is on the order of €0.1/MJ for fats, and over €1.2/MJ for fruits and vegetables[12].) These more affluent populations are also more responsive to prevention campaigns, and less susceptible to advertising for high-fat products[13]. Lesser access to healthcare by low-income households probably also impacts their obesity rate.

Chart 2: Obesity prevalence by educational attainment in 2012 in France



Source:INSERM, Kantar Health and Roche (2012), ObEpi.

From 1981 to 2003, the prevalence of obesity rose from 5.3% to 10.2%, or at an annual rate of 3.0%[14]. Data for 1997-2012 show even faster growth of 4.1% a year, but a slower increase in the prevalence of overweight alone of 0.8% a year, from 28.5% to 32.3%[15].

Changes in diet (such as larger servings and higher energy density) and a more sedentary lifestyle (using one's car or public transport for everyday travel; less physical activity) definitely contribute to the increased prevalence of obesity[16].

(6) The Lancet Diabetes & Endocrinology (2014), "Years of life lost and healthy life-years lost from diabetes and cardiovascular disease in overweight and obese people: a modelling study".
(7) WHO (2002), *The World Health Report 2002 - Reducing Risks, Promoting Healthy Life.*
(8) Stokes, A. *et al.* (2015), "Smoking and reverse causation create an obesity paradox in cardiovascular disease".
(9) INSERM, Kantar Health and Roche (2012), *Enquête épidémiologique sur le surpoids et l'obésité.*
(10) The same effect is observed for socio-occupational categories and income, which are highly correlated.
(11) DREES (Health Ministry statistical department, 2011), *L'état de santé de la population en France.*
(12) Darmont, N. (2005), "*Fruits et légumes, en a-t-on pour son argent?*".
(13) Nisbett, R. E. *et al.* (1968), "Obesity, food deprivation, and supermarket shopping behavior".
(14) de Saint Paul, T. (2007), "L'obésité en France: les écarts entre catégories sociales s'accroissent", *Insee Première* no. 1123.
(15) INSERM, Kantar Health and Roche (2009 and 2012), *Enquête épidémiologique sur le surpoids et l'obésité.*
(16) INSERM (2014), *Obésité*, Dossier d'Information.

There is also evidence that lack of sleep-a factor largely overlooked until now-raises the risk of obesity by over 40%[17]. An exhaustive study of obesity factors[18] evidences the impact of lower tobacco consumption (pointing to nicotine as an appetite suppressant) and family environment on the increased prevalence of excess bodyweight. But these factors are not enough to explain the entire increase in obesity prevalence. There are still unknowns, notably regarding genetic predispositions[19], which could explain some of the differences in weight gain between individuals. Similarly, deterioration in food quality over time[20] or environmental factors (stress, medicines or exposure to pollutants) may also be involved.

1.3 The prevalence of obesity is lower in France than in the other OECD countries

While the high prevalence of obesity in France is a challenge, the relatively moderate prevalence among children appears to be somewhat reassuring. The probability that an obese child will remain obese as an adult varies between 20% and 50% for obesity before puberty, rising to 50-70% for obesity after puberty, depending on the study[21]. In France, the excess bodyweight prevalence of 15% for children aged 5-17 is one of the lowest among OECD countries, as only Norway does better (14.5%) and the OECD average is 18%[22]. Indeed, international comparisons for young people over 15 tend to indicate that the situation in France is somewhat less preoccupying than in the other OECD countries[23], in particular the English-speaking countries. This may be due to genetic factors, a comparatively healthier lifestyle than in other countries, or the relative effectiveness of prevention policies.

2. The social cost of excess bodyweight appears to be comparable to that of alcohol or tobacco

2.1 How to estimate the social cost of obesity?

Obesity generates a series of social costs that are sometimes difficult to quantify. The most obvious relate to healthcare expenditure, but obesity also causes production losses at national level by excluding people from the labour market or through absenteeism for medical reasons. However, obesity can also reduce expenditures for retirement systems because obese people die younger, on average, thus reducing the cost of retirement benefits paid by the social security system. To determine the social cost of excess bodyweight, we use a standard model for measuring the socio-economic impact on public welfare[24] that compares a hypothetical situation in which all individuals have a normal BMI with the current situation:

$$\text{Social cost} = \Delta EC + (1+\alpha) \times \Delta G$$

Where: EC = External costs, G = cost to public finances and $(1+\alpha)$ = opportunity cost for the economy of raising tax revenues.

External costs are the costs that arise from obesity but do not appear directly in the public accounts. Here, they consist mainly of production losses linked to obesity in France[25]. The impact on public expenditure is increased by a coefficient α that corresponds to the opportunity cost to the economy of raising taxes, which signifies a deadweight loss for public welfare. The Quinet report estimates the value of the factor $(1+\alpha)$ at 1.2[26].

The extra healthcare expenditure due to excess bodyweight is the instantaneous extra cost measured at time *t*. It is not the lifetime extra cost for people with excess bodyweight. For example, because they die earlier than those with a normal BMI, their end-of-life healthcare costs occur at a younger age–especially the very high costs in the last year of life[27]. This could, however, be simply a matter of differences in expenditure timing.

While it may be reasonable to consider that someone who is ill throughout his or her life because of obesity incurs greater costs than someone in good health, no data are available that would allow a more precise quantification than the estimate in Table 3.

(17) Institut National du Sommeil et de la Vigilance (French National Institute of Sleep and Alertness) (2015), Enquête sommeil et nutrition (Sleep and Nutrition Survey). The causes are both hormonal–because lack of sleep is associated with a significant reduction in the production of leptin, known as the satiety hormone–and behavioural, because lack of sleep also leads to reduced physical activity.

(18) Keith, S. *et al.* (2006), "Putative contributors to the secular increase of obesity: exploring the roads less traveled", *International Journal of Obesity*, 30, pp. 1585-1594.

(19) Predispositions may be entirely innate or acquired because of the environment (but genetically coded). For instance, if a mother is undernourished during pregnancy but her child eats normally, the child could nevertheless become obese because his or her body adjusted to undernutrition during gestation.

(20) The impact of high consumption of substances such as pesticides, sugar substitutes (notably high fructose corn syrup, HFCS) and growth hormones in meat is not yet fully known.

(21) HAS (2011), *Surpoids et obésité de l'enfant et de l'adolescent. English-language summary in Quick Reference Guide, Overweight and obesity in children and adolescents.*

(22) OECD (2014), *Obesity update.*

(23) This observation applies to obesity only. Comparable data for overweight are not available.

(24) Quinet, E. (2013), "L'évaluation socioéconomique des investissements publics", *France Stratégie.*

(25) Our estimate does not take into account the loss of utility due to the reduction in expectancy or lower quality of life caused by obesity.

(26) Quinet, E. (2013), "L'évaluation socioéconomique des investissements publics", *France Stratégie.*

(27) Geay, C. and de Lagasnerie, G. (2013), *Projection des dépenses de santé à l'horizon 2060, le modèle PROMEDE*, *Documents de Travail de la DG Trésor*, no. 2013/08. Healthcare expenditures during the last year of life are six to seven times higher, on average, than in the preceding year.

The social cost of obesity and overweight in 2012 is estimated at €20.4 bn (see Table 3). For a more limited scope, restricted to reimbursements of healthcare costs by French National Health Insurance, plus daily sickness benefits, IRDES estimated the cost in 2002 at €4.2-6.2 bn[28]. The most recent review, conducted by the IGF in 2008[29], put the cost–reduced because hospital expenditures had been understated in the 2002 ESPS survey–at €8.1-10.3 bn for 2006. Our own estimate is that the costs for this limited scope came to €13.4 bn in 2012 (the top three rows in Table 3), a figure that seems consistent with the previous studies.

Table 3: Social cost of obesity and overweight (€bn in 2012)

Type of costs	Amount related to obesity	Amount related to overweight	Total
Extra cost for French National Health Insurance (outpatient care)	2.8	2.7	5.6
Extra cost for French National Health Insurance (inpatient care)	3.7	3.3	7.0
Daily sickness benefits	0.5	0.3	0.8
Disability pensions	1.7	1.9	3.6
Prevention costs	0.1	0.0	0.1
Nutritional taxes	−0.2	−0.2	−0.4
Lower pension expenditures	−4.0	−3.2	−7.2
Cost for public finances (G)	4.5	4.9	9.5
Production losses due to absenteeism by obese workers	1.2	0.9	2.1
Production losses due to exclusion of obese women from labour market	5.0	0.0	5.0
Unreimbursed medical care expenditures (outpatient care)	0.7	0.6	1.3
Unreimbursed medical care expenditures (inpatient care)	0.4	0.3	0.7
External costs (EC)	7.3	1.8	9.1
Social cost = $(1+\alpha)\times G + EC$ [a]	12.8	7.7	20.4
Total extra cost for outpatient care	3.6	3.3	6.9
Total extra cost for inpatient care	4.1	3.6	7.7

a. α = opportunity cost of raising taxes and social contributions.

Source: DG Trésor calculations.

2.2 The components of social cost

2.2.1 2.2.1 Healthcare and related costs (contributing to an increase in the public deficit, except unreimbursed healthcare expenditure)

These costs fall into five main categories:

- Expenditures for inpatient care: this is the extra cost associated with excess bodyweight, after controlling for a series of other factors (see Box 2), determined on the basis of the 2012 ESPS survey;

Box 2: Estimating the obesity-related extra cost for outpatient care

The 2012 Health, Healthcare and Insurance Survey (ESPS) survey estimated the average annual expenditure for an individual of normal weight at €1,320; for an overweight individual €1,760; and for an obese individual €2,190[a]. However, it is not enough to simply compare these average costs. Part of the difference is explained by other factors–for example, the fact that obese people tend to be older, and differences in social-occupational status.

Accordingly, to estimate the extra cost, a set of parameters must be controlled[b]. This is done using the following model:

For individual *i* :

$$log\,(Outpatient\ expenditure_i + A) = \alpha + \sum_{j=1}^{10} \beta_j X_{ij} + \varepsilon_i$$

Where X_1 = BMI, X_2 = age, X_3 = sex, X_4 = number of cigarettes smoked per day, X_5 = dummy for alcohol misuse, X_6 = binary value for private supplementary health insurance, X_7 = binary variable for coverage by CMU-C (*couverture maladie universelle complémentaire*), X_8 = region, X_9 = number of people in household, X_{10} = income bracket, A = value that maximises the marginal likelihood of the logarithm (constant determined *a priori*), ε = residual and α = constant.

Coefficient β_1 (estimated at 0.0296) allows us to see the impact of an increase in BMI, other things being equal: if the BMI increases by one point, expenditure will rise by 2.96%. We can thus use the difference in average BMI of overweight or obese individuals, compared with individuals of normal weight, to calculate the extra cost attributable to obesity: in 2012, €160 a year for overweight people and €365 for obese people. To this result, we must add the extra cost of hospital care (see §2.1.1), to determine the total of €330 a year for overweight people and €785 a year for obese people. This finding seems consistent with the extra cost determined by IRDES[c] using data from the 2002 ESPS survey: €506 a year for total healthcare expenditure (outpatient and inpatient care combined) for obese people. Outpatient care accounted for 72% of the total healthcare costs in the 2002 ESPS survey.

The extra cost calculated above corresponds to total expenditure, including the portion paid by individuals, their supplementary health insurance, and National Health Insurance. The same model was used to estimate the extra cost of obesity for National Health Insurance, by replacing total cost for outpatient care by the amount reimbursed by mandatory National Health Insurance for outpatient care. The extra cost for National Health Insurance is €296 a year for an obese individual and €128 a year for an overweight individual.

a. For the scope covered by "Consumption of medical care and medical goods" (*Consommation de Soins et Biens Médicaux*: CSBM) in the French National Health Accounts, exclusive of hospital expenditures.
b. Only the significant variables are included here.
c. IRDES (2007), *Évaluation du coût associé à l'obésité in France.*

(28) Institut de Recherche et Documentation en Économie de la Santé (IRDES) (2007), *Évaluation du coût associé à l'obésité in France.*
(29) IGAS and IGF (2008), Rapport sur la faisabilité d'une taxe nutritionnelle.

- Expenditures for inpatient care: these data were not included in the 2012 ESPS survey, so we have estimated the extra cost based on the portion of hospital expenditures in the obesity-related extra cost calculated by IRDES in 2007[30], adjusted for 2012 inpatient care expenditure;
- Daily sickness benefit paid by the social security system during sick leave: the IRDES study indicates the probability of sick leave and average daily sickness benefits by BMI, and thus allows the parameters for people with normal range BMI to be applied to those with excess bodyweight;
- Disability pensions: the same methodology is used as for daily sickness benefits, with the probability of receiving a pension and the average amount taken from the 2012 ESPS survey. Because data on the individual amounts of disability pensions are not available, we need to assume that all disability pensions are the same amount[31];
- Prevention expenditures: detailed below.

2.2.2 Revenues and avoided costs (contributing to a decrease in the public deficit)

In examining obesity-related financial gains, we take two factors into account:

- Revenues from nutritional taxes;
- Retirement benefits that are not paid because of early death: this can be particularly complicated to determine because of the many factors affecting the estimate, and the absence of relevant data. A number of heroic assumptions must be made regarding, for example, the impact on survivor pensions and pension payment amounts. The resulting figures are therefore subject to considerable uncertainty.

2.2.3 Costs in terms of lost production (external costs)

This involves determining the number of number of working days lost due to the prevalence of obesity. We make two assumptions here:

- Production is divided as follows: 67% labour (total labour cost, including wages, employee and employer contributions and taxes) and 33% capital[32] ;
- Obese people are paid at the minimum monthly wage (SMIC)[33].

Obesity-related production losses have two main causes:

- Higher absenteeism by the obese. The extra days' absence associated with obesity is determined by dividing the obesity-specific extra cost in daily sickness benefits by the average cost of the benefit. The resulting number of days is multiplied by the total labour cost per day, including wages, employee and employer contributions and taxes;
- Exclusion of part of the obese population from the labour market: the figures are based on a recent study[34] that found no significant effect of obesity on male employment, but a fairly strong effect for females (the employment rate of obese women is 10% lower than for other women; after adjusting for other factors, there remains a 7% difference). Overweight has no significant effect on employment for either sex.

The French Monitoring Centre for Drugs and Drug Addiction (*Observatoire Français des Drogues et Toxicomanies* - OFDT) recently published estimates for alcohol and tobacco[35]. We make adjustments to provide a comparable scope, notably by excluding expenditures associated with loss of quality of life and mortality, which are largely based on the conventionally defined cost of a year of life lost. After these adjustments, our estimated obesity-related expenditures are comparable to those for alcohol and tobacco. However, the actual ranking of costs for alcohol, tobacco and obesity is unclear, for two main reasons:

- The assumptions required for this type of estimate yield approximations of varying accuracy for the amounts involved. In particular, the savings from unpaid retirement benefits for obese and overweight people are overestimated;
- The number of individuals considered can be an explanatory factor: figures for obesity include everyone with excess bodyweight, whereas figures for tobacco include only those who smoke daily, and figures for alcohol include only "problem users" as defined in an OFDT study[36].

In addition, a comparison of costs per alcoholic, smoker or obese person shows that alcohol and tobacco have greater health impacts than obesity or overweight: the cost per smoker is two to three times greater than for someone with excess bodyweight, and the cost per alcoholic is nearly five times higher.

(30) IRDES (2007), *op. cit.* note 28.
(31) Because disability pensions are a percentage (depending on the degree of disability) of the average earnings from the best ten years of one's career, and because obese people are on average paid less than others, this assumption leads to a slight overestimation of the extra cost, which is limited, however, by the existence of a cap and floor.
(32) INSEE (2009), *Partage de la valeur ajoutée, partage des profits et écarts de rémunérations in France.*
(33) This assumption takes into account the fact that obesity prevalence is far higher in low-income households, but it tends to yield lower results.
(34) Coudin, E. and Souletie, A. (2015), "Obésité et discrimination sur le marché du travail", Dossiers solidarité et santé, *Actes du colloque DRESS/DARES*, p. 29.
(35) Kopp, P. (2015), *Le coût social des drogues in France,* Note de synthèse, OFDT.
(36) OFDT (2011), *Les niveaux d'usage des drogues en France en 2010*; English-language version: *Levels of drug use in France in 2010*.

Table 4: Comparison of annual social costs of legal drugs and excess bodyweight (€bn, unless otherwise specified)

Item	Obesity and overweight	Of which obesity	Of which overweight	Alcohol	Tobacco
Production losses	7.1	6.2	0.9	9.0	8.6
Cost of unreimbursed medical care	2.0	1.1	0.9	0.0	0.0
(1) External costs	9.1	7.3	1.8	9.0	8.6
Cost of publicly funded healthcare expenditure (incl. daily sickness benefits and disability pensions)	16.9	8.7	8.3	8.6	25.9
Savings on retirement benefit[a]	−7.2	−4.0	−3.2	−0.7	−0.8
Prevention and law enforcement	0.1	0.1	0.0	0.2	0.3
Taxation	−0.4	−0.2	−0.2	−3.1	−10.4
(2) Public deficits	9.5	4.5	4.9	5.0	15.0
(1) +1,2*(2)=(3) Total social cost	**20.4**	**12.8**	**7.7**	**15.0**	**26.6**
(4) Number of individuals concerned (millions)	30.9	9.8	20.1	3.8	13.4
(3) / (4)=(5) Social cost per individual concerned (€)	**660 €**	**1 300 €**	**360 €**	**3 950 €**	**1 990 €**
Findings restated for comparability with scope studied by Kopp[b]					
Social cost on a comparable basis	**27.0**	**17.0**	**11.1**	**15.8**	**27.6**
Social cost per individual concerned on a comparable basis	**870 €**	**1 730 €**	**550 €**	**4 470 €**	**2 060 €**

Source: Kopp P. (2015), « Le coût social des drogues en France » and DG Trésor for obesity.

Note : Expenditures relating to mortality and lower quality of life are not taken into account here. This explains the difference between our figures and the €120 bn reported by P. Kopp for the social cost of tobacco and alcohol.

Note a : The costs presented here are broadly comparable, but with two qualifications. The cost of unreimbursed medical care is included here but not in Kopp, and our figure for savings on retirement benefits is based on years of life lost by obese people rather than on years of life lost by obese people because of their obesity.

Note b : The cost of unreimbursed medical care and savings on retirement benefits are excluded from the comparison in order to estimate social cost on a basis comparable to Kopp.

3. Despite the measures already in place, obesity prevalence is expected to keep rising

3.1 A variety of actions have already been undertaken to slow the increase in obesity

3.1.1 Nutritional taxes in France

Overweight people do not bear all the costs of obesity. Because the two main causes of obesity are poor diet and lack of physical activity, and the second is not readily taxable, a standard solution in economic theory[37] is to internalise the negative externalities by taxing high-fat, high-salt and high-sugar foods that contribute to increasing obesity. Because it only takes into account the economic determinants of price, the market sets a sub-optimal price that fails to include all components of the social cost of these foods.

In France, several taxes were recently introduced in an attempt to channel some food-related behaviours and to fight obesity. This is part of a general trend in OECD countries. The tax on sugary and sweetened drinks introduced in 2012 raised just under €400 m for the social security system in 2014. A tax introduced in 2014 to reduce consumption of energy drinks yielded only €3 m that year–far less than the expected €65 m–because the manufacturer cut the caffeine content in its leading product to below the taxable threshold. Despite this, the tax can be seen as successful in terms of public health.

In addition to these behavioural taxes, the rate of value added tax (VAT) can also be a lever for action on the relative prices of food. This instrument is used sparingly in France, as only alcohol-containing food products, caviar, sugar confectioneries and vegetable fats are taxed at the standard VAT rate of 20%, while all other foods in general are taxed at the reduced rate of 5.5%. Historically, only the VAT rate on alcohol thus seems linked to public health considerations.

3.1.2 Obesity prevention

The most broadly accepted definition of prevention is the one proposed by the WHO[38], which defines it as "all measures to avoid or reduce the number and severity of illness, accident and disability". Prevention can be divided into three main levels:

- Primary prevention, which attempts to avoid occurrence of a disease or health problem by acting on its causes (such as vaccinations or health prevention campaigns);
- Secondary prevention, which, through early detection of a disease or health problem, allows time for appropriate treatment (such as screening for prostate cancer);
- Tertiary prevention, which seeks to reduce the complications and subsequent effects of a disease (such as prevention of cancer recurrence).

France spends less on prevention than the OECD average, as institutional prevention expenditures come to 0.2% of GDP, versus the OECD average of 0.3%. The comparison must, however, be interpreted with great caution because the scope may vary across countries, and it fails to include prevention carried out either during outpatient care (estimated at €8.5 bn in 2012[39]) or during inpatient care.

The cost of institutional prevention directly related to obesity was estimated to be €58 m in 1998[40]. Our estimates suggest that it was close to €100 m in 2012[41]. While the fragmentary financial data in this area make it hard to determine the

(37) Pigou, A. C. (1920), *The Economics of Welfare, Library of Economics and Liberty.*

(38) WHO (1948), *Constitution of the World Health Organisation.*

(39) DREES (Health Ministry statistical department, 2014), *Une estimation partielle des dépenses de prévention au sein de la consommation de soins et biens médicaux.*

(40) DREES (Health Ministry statistical department, 2003), *Les dépenses de prévention dans les Comptes nationaux de la santé.*

breakdown of preventive actions undertaken in France, it is clear that the amounts for obesity are relatively small.

In France, obesity prevention has been broadly based on National Nutrition and Health Programmes (PNNS) that focus on information campaigns but also work with industry-as seen in the publication of 37 voluntary nutritional commitment charters allowing an at least marginal improvement in the quality of products sold in France.

Nevertheless, as the French National Institute of Health Education and Prevention (*Institut National de Prévention et d'Éducation pour la Santé: INPES*) observed in a 2011 colloquium, France is hindered by the absence of ex-post assessment of prevention policies[42]. A study published in 2012[43] investigated the effectiveness of one of the messages of the National Nutrition and Health Programme: "For your health, eat at least five fruits and vegetables a day". An experiment in fast-food restaurants found that displaying the health message on the photograph of a hamburger encouraged people to eat less healthily. The author explains that a health message in an advertising context, instead of encouraging health eating, actually satisfies a psychological need for justification: "If I do as the message says, I can overindulge today."

3.2 Nearly 8 million more French people will be obese or overweight by 2030

The obesity rate rose by 4.1% a year between 1997 and 2012, accounting for 85% of the increase in the number of obese people (as numbers grew by 4.7% a year), with the remaining 15% due to demographic factors (population increase and ageing). The situation for overweight is similar, as the number of overweight persons rose from 17 million to 21 million in the same period (at a 1.4% annual rate) and nearly 60% of increase was due to increased prevalence.

Using INSEE population data, the age- and sex-specific prevalence data from the "ObEpi" Survey, and data on expenditures by age, sex and BMI category from the ESPS survey, we designed a projection model specifically to measure the effects of the expected increase in the number of obese and overweight people.

We simulated rises in prevalence under three scenarios: (1) a baseline scenario that extrapolates from trends in recent years but–because the trends cannot continue indefinitely[44]–provides that the annual increase in prevalence slows by 10% each year; (2) a pessimistic scenario in which the increase slows by only 2% each year; (3) a purely demographic scenario in which the age- and sex-specific prevalences remain the same as in 2012.

Under the baseline scenario assumptions, 23% of the French population over the age of 15 would be obese and 36% overweight in 2030. By way of comparison, the most recent WHO projections foresee a prevalence of 25% for obesity and 41% for overweight in 2030[45].

In the baseline scenario, the share of overweight and obese persons in inpatient care expenditures rises from 56% in 2012 to 69% in 2030[46]. Despite anti-obesity efforts, obesity will remain a health challenge and an economic challenge for France. Efforts to limit the increase must continue.

4. What interventions would be most effective in fighting obesity?

The primary aim of prevention is to improve human health and thus quality of life-but this does not have to be inconsistent with cost savings.

Not all the generally recommended anti-obesity measures are equally effective. Some, particularly those directed at children, may have short-term costs but generate long-term gains. While physician counselling seems by far the most effective approach[47], it is also the most expensive, incurring costs in the short term, but generating substantial gains in the long term. Nutritional taxes are the only way to generate healthcare savings in the short term that exceed the cost of implementation.

This section analyses the potential impact of the leading anti-obesity interventions if they were to be implemented in France, and describes practical considerations that would contribute to maximizing their effectiveness. The interventions that appear to be the most cost-effective are presented first.

4.1 Intervention 1: make nutritional taxes more pertinent

Turning to nutritional taxes seems justified, especially for sugar because of the major impact of sugar consumption on obesity[48]. The initial assessments of the many nutritional taxes in the OECD countries provide the basis for recommendations to optimise their effectiveness.

Regarding what should be taxed, two options have been tried: nutrient taxes, for example on sugar, and product taxes, for example on sugary drinks. Taxing a specific nutrient limits the substitution effect, when consumers turn to other, untaxed products that may be equally unhealthy. A soda tax, for instance, can lead to substitution by high-calorie fruit juice or juice drinks. Nutrient taxes are more efficient but cost more to administer[49]. An interesting option could involve taxing products above a certain calorie level, as Mexico has done since 2014, or taxing on the basis of nutritional quality.

Another major parameter to consider is the rate of the tax. If too low, the tax would have an extremely limited impact. A number of studies on the U.S. population concluded that a

(41) Expenditures included here are for the Obesity Plan ("Plan Obésité", €38 m in 2012), the National Nutrition and Health Programme (PNNS, €19 m) and the Food and Nutrition section at the French Agency for Food, Environmental and Occupational Health & Safety (ANSES, €42 m).
(42) INPES (2011), *Comment mesurer l'impact des dépenses de prévention.*
(43) Werle, C. *et al.* (2012), "The boomerang effect of mandatory sanitary messages to prevent obesity", *Marketing Letters*, pp. 1-9.
(44) Otherwise, the entire population would eventually be overweight or obese.
(45) WHO projections with UK Health Forum released in May 2015.
(46) The share is 57% in the optimistic scenario and 81% in the pessimistic scenario.
(47) OECD (2010), *Obesity and the Economics of Prevention.* The costs of these interventions are taken directly from the OECD study, and are according stated in USD PPPs per capita.
(48) Lustig, Dr. R. (2013), *Fat Chance: Beating the Odds Against Sugar, Processed Food, Obesity, and Disease.*
(49) WHO (2015), *Using price policies to promote healthier diets.*

20% soda tax reduces consumption by 3.5%[50], whereas lower taxes (from 1% to 8% of the price) have no significant impact[51]. This evidence suggests that the tax rates on sugary and sweetened beverages in France are probably too low to significantly change behaviours and have a genuine impact on public health[52]. They are too low to significantly change relative product prices[53], especially given that the products taxed remain inexpensive.

In addition, there are two main risks involved in implementing these taxes:

- Nutritional taxes are inherently regressive because food accounts for a larger portion of poorer households' budgets, and those households consume more in the way of unhealthy products[54]. However, there is nothing to prevent these taxes from including a redistributive mechanism (possibly a means-tested allowance) to restore the purchasing power of the poorest households;
- Care must be taken to comply with World Trade Organisation (WTO) rules. Nutritional taxes are encouraged by the WHO[55], and their implementation should not raise problems so long as they are not used to protect domestic production.

Another way to ensure greater consistency in nutritional taxes could involve adjusting the value added tax rate. This is done in the UK to encourage healthier eating by using a zero rate of VAT for food in general, and taxing what are considered unhealthy products at the standard rate. In France, while EU rules prevent cutting VAT on healthy products below the 5.5% reduced rate[56], a higher rate could be used to raise the price of unhealthy products.

4.2 Intervention 2: allocate resources so healthcare professionals can focus more on obesity prevention ($5-20 per capita)

Numerous studies have found that the most effective way to fight obesity is counselling by a primary care physician, with a dietician if possible. The role of obstetrician/gynaecologists shouldn't be overlooked, as they are often the only physicians whom their patients see on a regular basis; because their appointments are longer, they often perform the largest share of obesity prevention among women.

While current anti-obesity efforts often focus on diet, the lack of physical activity must not be overlooked. Patients could be encouraged to exercise. Progress in this area may be achieved through Article 144 of the 2016 Healthcare System Modernisation Act, which allows primary care physicians to prescribe suitable physical activities to patients with a recognized chronic disease.

While counselling by healthcare professionals appears to be a particularly attractive approach, several factors make it difficult to implement:

- To be effective, it requires intensive monitoring by the physician, which is very costly in the short term;
- For physicians to undertake intensive counselling, they must be able to allow enough time for these appointments–something that seems particularly difficult in areas with low physician-to-population ratios;
- There is no system of incentives–such as fixed annual per-patient amount, or additional income–to encourage physicians to expand their obesity prevention activity.

4.2.1 Option 1: introduce a payment system for prevention

This option could take the form of an explicit objective in the Payment for Public Health Objective (ROSP) programme[57] or a fixed annual per-patient payment to primary care physicians for each registered patient with a high BMI, along the same lines as the annual €40 payment per patient with a recognised chronic disease. Experiments in which the primary care physician[58] can prescribe appointments with dieticians or psychologists for young people with excess bodyweight–as permitted under the 2016 Social Security Financing Act (LFSS 2016)–seem potentially useful and should be encouraged. This would be easy to implement, but if it creates new incentives, the resulting costs to the public could prove to be high. Nor would this approach resolve the problems due to physicians' tight schedules.

4.2.2 Option 2: Encourage coordination among healthcare professionals

A less costly alternative would be to encourage cooperation among healthcare professionals, as in the case of the ASALEE[59] initiative, which recently developed a protocol for monitoring childhood obesity. The initiative allows nurses to work with five or so primary care physicians, in their private practices–a thousand physicians are currently involved–in monitoring chronic diseases, with a predetermined allocation of tasks. All reviews to date of similar protocols for chronic diseases[60] (reviews conducted by CNAM, HAS, IRDES and France Stratégie) point to better patient counselling, reflected in significantly improved patient health in subsequent years[61].

The increased cost it generates for outpatient care is offset by the reduction in hospitalisations–over 50%, in some cases. As a result, the overall cost to French National.

(50) Lin, B. *et al.* (2011), "Measuring weight outcomes for obesity intervention strategies: the case of a sugar-sweetened beverage tax", *Economics and Human Biology* 9(4):329-41.
(51) Powell, L. *et al.* (2009), "Associations between state-level soda taxes and adolescent body mass index", *Journal of Adolescent Health* 45: S57-S63.
(52) Etilé, F. (2013), *Obésité - Santé public et populisme alimentaire*, Éditions Rue d'Ulm.
(53) Berardi, N. *et al.* (2016), *The Impact of a 'soda tax' on prices. Evidence from French Micro Data,* Banque de France Working Paper no. 415.
(54) INSEE (2011), "Enquête budget de famille" (Household Budget Survey), *Insee Résultats* no. 158.
(55) WHO (2015), *Using price policies to promote healthier diets.*
(56) Directive 2006/112/EC.
(57) ROSP: Rémunération sur Objectifs de Santé Publique.
(58) This measure will be facilitated by the opportunity to designate a primary care physician for children under the age of 16, introduced by Article 76 of the 2016 Healthcare System Modernisation Act.
(59) French acronym for Health Action by Teams of Self-Employed Health Professionals, (Action de Santé Libérale En Équipe).
(60) The childhood obesity protocol was introduced too recently to be assessed.
(61) IRDES (2008), *La coopération médecins généralistes/infirmières améliore le suivi des patients diabétiques de type 2 - Principaux résultats de l'expérimentation ASALEE*. English-language abstract: "Assessment of teamwork by self-employed health professionals in the management of type 2 diabetes patients: the ASALEE project".

Health Insurance appears, at best, to be reduced by 10%[62] or, at worst, to hold stable in the short term. More substantial savings are likely to be generated in the longer term. This type of protocol thus seems particularly worth expanding.

4.3 Intervention 3: redirect individual mechanisms affecting dietary choices

Each individual is subject to a series of mechanisms that guide his or her choices, without necessarily being aware of them. These "hidden persuaders" have long been used in food marketing. They could also be used by health officials to guide individuals towards a healthier diet.

4.3.1 Option 1: restricting the display of the most unhealthy foods

The literature is consistent in recognising that seeing or smelling a food significantly increases the probability that it will be consumed. For example, storing fatty foods at the back of the cupboard significantly reduces the probability that they will be consumed[63]. A physiological process is certainly at work as well: the sight of food activates the "reward circuitry" and elicits salivation[64] (the Pavlovian reflex). Simply making healthy products more visible would thus encourage their consumption, without any conscious effort. A fairly recent experiment[65] allows us to quantify the potential impact of this type of measure: eating in a red plate (which reduces contrasts and makes food less appetizing) can reduce intake by 21%.

Based on this, one can imagine a good number of measures that would cost very little, such as a ban on any candy vending machine with a glass window enabling consumers to see products, combined with an incentive for companies to offer fruit rather than candy in vending machines, or a ban on large packages for fatty foods that encourage consumers to stockpile, thereby encouraging greater consumption (especially during sales promotions).

4.3.2 Option 2: action to restrict the size of portions

Portion size is another factor that can have a major impact on food intake. There is considerable evidence of a causal relationship[66] between portion size and intake volume, for two main reasons. First, portion size signals a social norm for eating, which it encourages the consumer to adopt. Second, a biased size impression causes us to underestimate volume if height increases (as the human brain perceives more readily length and width). To estimate the portion-size effect, one study examined the impact of various behaviour changes on weight loss; the most effective was found to be using smaller plates at least one-third of the time, with a reported weight loss of approximately 0.9 kg per month[67]. Conversely, using large plates was found to increase food intake by 9 to 31%, depending on the person[68].

This finding could lead to other simple, low-cost measures such as establishing a "standard portion" in mass catering establishments or requiring manufacturers to indicate that a given size of package indicate a larger number of portions. For example, a package could indicate "4 servings" instead of "2 servings".

4.4 Intervention 4: carry out and evaluate targeted prevention campaigns

Informing people is a necessary first step towards getting them to understand the dangers of excess bodyweight and encouraging them to take action. As a general rule, maximising the impact of information campaigns calls for periodic testing of their effectiveness in influencing the targets' behaviour–something that is not done enough in France. Measuring the effectiveness of messages could be done at virtually zero cost and make a significant contribution, by optimising the impact of existing investments.

The information can be disseminated through two main channels:

4.4.1 Option 1: mass media campaigns ($0.50-2 per capita)

Mass media campaigns are one of the most common primary prevention instruments in France. While it has been clear since the 1990s, and increasingly so since the 2000s, that French dietary behaviours are changing, the causal impact of media campaigns is hard to establish because there is no credible counterfactual[69]. However, it is logical to think that improved access to information helps consumers to make rational choices.

4.4.2 Option 2: actions targeting a category of the population ($1-5 per capita)

A second option for disseminating nutritional information would be to target smaller, homogeneous groups with worksite or school-based interventions. While their impact is greater, these actions are generally more costly. Nor, in the case of messages to school children, should one ignore the timing difference between cost (immediate) and benefits (in 20 or 30 years' time). Given the hysteresis effects that these interventions make it possible to avoid–i.e., significant persistence of childhood obesity into adulthood–this approach appears to be well worth trying.

4.5 Intervention 5: limit children's exposure to advertising for unhealthy food

Action regarding advertising for children could have an impact on young people, without cost to public finances.

There appears to be a causal relationship between commercials directed at children for unhealthy foods and increased consumption of those foods. For example, a 2008 publication reported on a natural experiment involving differences in

(62) CNAM (2010), *Expérimentation de coopération entre médecins généralistes et infirmières en cabinet libéral. Analyse économique du dispositif ASALEE.*

(63) Chandon, P. *et al.* (2006), "How Biased Household Inventory Estimates Distort Shopping and Storage Decisions", *Journal of Economics*, vol. 70, pp. 118-135.

(64) Coelho, J. S. *et al.* (2009), "Eating Behavior in Response to Food-Cue Exposure: Examining the Cue-Reactivity and Counteractive-Control Models", *Psychology of Addictive Behaviors*, vol. 23, no. 1, pp. 131-139.

(65) Van Ittersum, K. *et al.* (2011), "Plate Size and Color Suggestibility: The Delboeuf Illusion's Bias on Serving and Eating Behavior", *Journal of Consumer Research*, vol. 39, no. 2, pp. 225-228.

(66) Fisher, J. O. *et al.* (2008), "Super-size me: Portion size effects on young children's eating", *Physiology and Behavior*, 94 (1), pp. 39-47.

(67) Wansik, B. (2009), "Mindless Eating and Healthy Heuristics for the Irrational", *American Economic Review*, 99, pp. 165-169.

(68) See Van Ittersum, K. *et al.* (2011), *op. cit.* note 65 above.

(69) Grignon, C. (1999), "Long-term trends in food consumption: A French portrait", *Food and Foodways*, 8(3), pp. 151-174.

American children's exposure to television fast-food restaurant commercials, depending on geographic location and time spent watching television. The study concluded that a ban on advertisements targeted at children would reduce the number of overweight children by 10% and the number of overweight adolescents by 12%[70].

This raises the issue of defining advertising directed at children. All advertising broadcast during programs for children could obviously be considered to be aimed at them. But this definition is probably too narrow, because advertising for products intended for children can be broadcast at other times.

Quebec has banned all advertising directed to children under 13 since 1980[71]; this has resulted in lower consumption of high-fat foods than among children in the English-speaking Canadian provinces, who are more exposed to advertising on U.S. networks[72]. Given that a large proportion of food commercials directed at children in France are for unhealthy products[73], a full or partial ban on advertising targeted at children could have a major impact, all the more as individuals who are obese in childhood and adolescence are more likely to remain obese for the rest of their lives.

In concrete terms, there are two main ways this measure could be implemented:

- A tax system to deter producers from broadcasting commercials for food too high in fat, sugar or salt. This could be seen as the more flexible option, but if the tax rate is set too low, there is a danger of negatively affecting only the smallest companies. Moreover, collecting the tax would have a cost for public finances.
- Prohibition on broadcasting any commercial directed to children, combined with fines for violations. This option is more radical, and would probably cost less to implement.

4.6 Intervention 6: Make food labelling more relevant ($0.3-1.1 per capita)

A landmark study[74] showed that nutritional labelling in supermarkets can have a significant impact on healthier food consumption for a large number of food groups. On the other hand, because individuals' representations are often binary (good/bad product), manufacturers can easily subvert nutritional labelling by making health claims[75]–for example, that a product "strengthens your natural defences".

To maximise the impact of this measure, which costs very little, it is important to choose a very simple, concise form of labelling that consumers can quickly grasp, and that producers' advertising cannot distort. This is why, pursuant to Article 14 of France's 2016 Healthcare System Modernisation Act, different types of labelling-including colour coding-will be tested to compare their effectiveness.

For this voluntary labelling to comply with WTO rules, it must avoid introducing differences in treatment between imported products and similar domestic products. The experiments carried out in the framework of the 2016 Healthcare System Modernisation Act should enable conclusions to be drawn on these subjects.

Daniel CABY

(70) Chou, S. Y. *et al.* (2008), Fast-Food Restaurant Advertising on Television and Its Influence on Childhood Obesity, *NBER Working Paper* no. 11879. The calculations include the additional sedentariness associated with television watching time.
(71) Article 248 of the French Consumer Protection Act provides that "no person may engage in commercial advertising directed at persons under thirteen years of age".
(72) Goldberg, M. E. (1990), "A Quasi-Experiment Assessing the Effectiveness of TV Advertising Directed to Children", *Journal of Marketing Research*, 27, pp. 445-454.
(73) Almost 90%, according to the consumer protection magazine *UFC Que Choisir* (2007), "Audit du marketing alimentaire à destination des enfants".
(74) Teisl, M. F. *et al.*, (2001), "Measuring the welfare effects of nutrition information", *American Journal of Agricultural Economics*, 83.
(75) Etilé, F. (2010), "Food Consumption and Health", *Oxford Handbook of the Economics of Food Consumption and Policy*.

Counterpoint by... Didier Maillard

The topic of obesity and anti-obesity policies raises interesting ethical and economic issues. Obesity is the delayed outcome of individual choices regarding diet and lifestyle-at least to some extent, because genetic factors can doubtless cause different degrees of obesity in people with the same diet and lifestyle. Obesity has extremely negative consequences for human health and life expectancy. Countering obesity can be considered to fall within the protective role of the State. But protection that goes beyond objective information would fly in the face of personal freedom. A strong preference for the present and a pronounced taste for sweet and fatty foods, and for physical inactivity, can be the basis for perfectly rational decision-making by individuals. Information campaigns can, at the very least, contribute to decisions being taken with full knowledge of the facts and the consequences of those decisions.

The most important point is that obesity has an equally important negative impact on the financial balance of public health insurance systems. On the other hand, it has a positive impact on public pension systems owing to the reduction in life expectancy, but this effect is surely smaller in absolute value terms. Unlike most other kinds of insurance, premiums for French mandatory national health insurance are not risk-adjusted, and there is no difference in coverage. Premiums are either flat amounts or earnings-based (in France, the burden of financing national health insurance rests for the most part on skilled labour and capital). This leaves room for obvious moral hazard, as decisions that increase risk do not result in higher payments into the system or reduced coverage.

Given these circumstances, we must resign ourselves to seeking a second-best solution, working on fiscal, social and legal considerations, to maximise cost-effectiveness. That's what this paper does with its subtle analysis of existing and potential government policies. It should be noted that resistance by multiple lobbies is a potential obstacle to achieving efficiency.

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