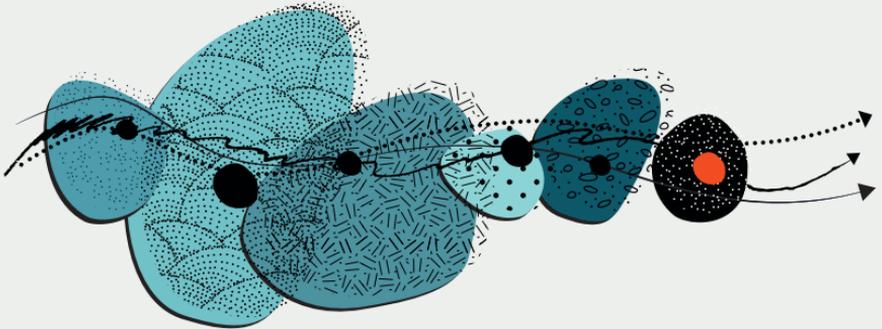




Inserm

La science pour la santé
From science to health

EXPERTISE COLLECTIVE



Summary and recommendations

**Reducing the harm
associated with
alcohol consumption**

**Reducing the harm
associated with
alcohol consumption**

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EXPERTISE COLLECTIVE
Summary and
recommendations

**Reducing the harm
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alcohol consumption**

This document was translated into English from the original French version of the collective expert report published in June 2021.¹

It presents the summary and recommendations of the work of a group of experts brought together by the French National Institute of Health and Medical Research (Inserm) as part of the collective expertise procedure (see Annex 1). In response to a request by the Interministerial Mission for Combating Drugs and Addictive Behaviors (Mildeca) and the French Ministry of Health, Inserm carried out this collective expertise examining the reduction of harm associated with alcohol consumption, prevention strategies and support.

This work is primarily based on data from the scientific literature available in the first half of 2020. Nearly 3,600 documents were compiled through the interrogation of different databases (PubMed, Web of Science, Scopus, SocINDEX, Cairn, Pascal, Francis, EconBiz, JSTOR, OpenEdition Journals, Isidore, Persée; see Annex 2).

This report was coordinated by Collective Expert Reports Unit of Inserm, which is part of its Public Health Thematic Institute.

How to cite this document:

Inserm. Reducing the harm associated with alcohol consumption. Summary and recommendations. Collection Expertise collective. Montrouge: EDP Sciences, 2022.

Access collective expert reports online at:

<https://www.ipubli.inserm.fr/handle/10608/1>
<https://www.inserm.fr/expertise-collective/>

1. Inserm. Réduction des dommages associés à la consommation d'alcool. Collection Expertise collective. Montrouge: EDP Sciences, 2021.

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The group of experts and the Collective Expert Reports Unit would like to pay tribute to Michel REYNAUD, Psychiatrist and University Professor, who passed away on June 26, 2020.

Acknowledgements

For their contribution to the writing of certain chapters:

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For their critical reading and advice:

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Executive summary

Alcohol consumption is a major health risk factor with effects throughout society. In 2016, the French Court of Accounts highlighted the need for collective awareness of this burden and proposed developing research and using the results as a basis for public action. Inserm has coordinated a collective expert review to critically analyze the latest scientific knowledge in this field and to draw up findings and make recommendations aimed at reducing the risks and harm to health associated with alcohol consumption. The disciplines involved include clinical research, epidemiology, sociology, economics, and social marketing. The work addresses behaviors, the health effects of alcohol, the health impact at the population level, the associated economic costs, and it discusses the main prevention strategies.

Behaviors

In France, alcohol consumption is ubiquitous with 42.8 million consumers as well as high levels of consumption among youth and seniors. Data show that while alcohol use during pregnancy has decreased over the last decades, 20% of women concerned report having consumed alcohol. Among those who first experiment with alcohol during adolescence, drinking becomes regular (10 or more times/month) for 8% of 17-year-olds, while 40-50% have at least one heavy drinking episode per month. Approximately 25% of young people with at-risk alcohol consumption continue this type of consumption when they enter adulthood. Among adults in France, the average daily consumption is 27 g of pure alcohol per person.

Health effects

Recent studies and new methodologies such as Mendelian randomization point to a harmful effect of alcohol starting at low

levels of consumption (10 to 15 g/d or 1 to 1.5 drinks/d) and the absence of a “protective” effect of low alcohol consumption, refuting the concept of the “French paradox”. Thus, it is now established that all consumption is harmful to health. The level of alcohol consumption for which the risk of harm is minimal is zero drinks per week. Alcohol consumption is directly or indirectly responsible for about sixty diseases including liver cirrhosis, certain cancers (liver, colorectal, breast and upper aerodigestive tract), cardiovascular disease, digestive disease, mental illness, as well as accidents and suicides. It was the 7th leading cause of loss of healthy life years in the world in 2016, and also the leading cause of hospitalization in France. Alcohol-attributable mortality, which is higher in France than elsewhere in Europe, accounts for 11% of deaths of men and 4% of those of women aged 15 and over, namely 41,000 deaths (30,000 for men and 11,000 for women). Mortality attributable to alcohol by different age groups is 7%, 15% and 6% for those aged 15-34, 35-64 and 65 and over, respectively. Of these deaths, 16,000 are from cancer, 9,900 from cardiovascular diseases, and 6,800 from digestive diseases. Approximately 8% of new cancer cases are linked to alcohol, and alcohol consumption at low (defined by the WHO as less than 20 g/d for women and 40 g/d for men) to moderate levels (20-40 g/d and 40-60 g/d, respectively) contributes particularly to this health burden as it is involved in more than one third of these new cancer cases. While women consume less alcohol on average, the incidence of alcohol-attributable cancers is similar between the sexes, with a significant number of alcohol-attributable breast cancers particularly at low to moderate levels of consumption. In addition, fetal alcohol exposure can cause disorders and malformations in children, the most serious form of which is fetal alcohol syndrome (FAS). Its prevalence in Europe, which is higher than elsewhere in the world, is estimated at 37 per 10,000 people.

Social costs

Estimated at €118 billion in 2010 in France, or a loss of 6% of GDP, the very high social cost of alcohol is principally attributed to mortality (€66 billion) and morbidity (€39 billion). The alcohol industry is an important but declining economic sector. This industry is subject to a tax system that does not maximize its potential, with annual tax revenues of €4 billion/year representing only one thirtieth of societal costs. In addition, the fiscal contribution and the volumes consumed are not in line with each other, with spirits generating 81% of the tax revenue while beer and wine contribute 12% and 4%, respectively. There is an economically viable space between proactive policies for combatting alcohol-related harms aimed at minimizing its social cost while preserving the know-how, the economy, and the identity of certain territories.

Risk factors for alcohol consumption

The price of alcohol, its availability, as well as norms for alcohol use are associated with positive perceptions of alcohol and drinking patterns. Alcohol consumption is influenced by structural and collective factors (the context of consumption as well the level of production, distribution and regulation of alcohol, socio-economic difficulties, cultural influence and the influence of peers and parents) and also by individual and psychological factors (life experiences, behavioral problems, sensation seeking). Alcohol marketing with its classic tools (product, price, advertising, access to the product) influences consumption levels and patterns and plays a major role in young people's drinking behavior. Alcohol producers are especially involved on the internet and social networks, which are frequented by young people and where advertising is poorly regulated. Exposure to pro-alcohol content significantly increases the desire to drink, the quantities consumed and the trivialization of excessive drinking.

Risk management

Self-regulation proposed and implemented by the industry is ineffective in protecting youth from alcohol marketing. More and more countries are resorting to increasingly restrictive regulations. In France, the 1991 “Évin law” provides a framework for combatting harms related to alcohol (and tobacco) consumption, but in its current form, in addition to not always being respected, it has been considerably modified and weakened through the lobbying of alcohol producers. It does little to protect minors from exposure to alcohol brand advertising, particularly on the internet, street displays, and in supermarkets. In addition, alcohol lobbyists run prevention campaigns and/or promote so-called “responsible drinking” and thwart the implementation of effective regulation.

In France, to limit or prevent damage to the health of consumers, it is essential to establish a Harm Reduction (HR) policy based on reducing consumption as this has a major influence on reducing harm. Moreover, promoting the implementation of interventions that have proven their effectiveness is essential. The recommended measures concern both the population and public authorities. Alcohol use should be prevented, for example, by increasing public knowledge and communicating more clearly about the risks associated with alcohol consumption through reiteration of low-risk consumption guidelines (such as that of the French Public Health Agency that advises “no more than 2 drinks per day, and not every day”) as well as messages on the greater vulnerability of women to alcohol and the importance of zero alcohol particularly during the prenatal and preconception periods. In addition to strengthening health warnings, campaigns to stop drinking should be promoted such as “Dry January”, whose benefits have been demonstrated.

It is also necessary, through legislation, to limit access to alcohol and reduce its attractiveness and the positive messages it conveys through various measures including: increasing the price (as with the “soda tax”) through a tax per gram of alcohol

or a minimum price as in Scotland, by better and automatic control of access by minors, by reducing alcohol availability (selling hours and number of shops or licenses), by reinforcing the Évin law to prohibit advertising on the internet and public spaces and to counteract the effects of marketing with better visibility of health warnings. A priority issue for prevention is the reinforcement of protective factors from the beginning of the life course of individuals.

Prevention interventions aimed at strengthening users' knowledge and skills should be developed, particularly through digital communication and technological persuasion. Early interventions aimed at strengthening generic protective factors such as parenting and psychosocial skills are effective in schools, with parents or families, and in the workplace. These preventative actions must be complemented by a strategy of systematic screening for risky alcohol consumption during a consultation with a health professional. This screening should make it possible, if necessary, to propose treatment for at-risk consumers. Brief interventions, which are often beneficially associated with screening, have a clearly established positive cost-effectiveness ratio and can be conducted using electronic media adapted for community interventions (schools, armed forces, etc.). Primary care professionals should be better trained in screening strategies and effective intervention methods. Management of alcohol-dependent patients, who are in the most severe stage of alcohol use and at greatest risk for chronic evolution, must be improved by reinforcing the quality of long-term compliance to avoid relapse and by promoting effective therapeutic strategies (psychotherapy, medication, cognitive remediation, social rehabilitation and management of co-morbidities).

The major health, social and financial consequences of alcohol consumption, even at low levels, represent a burden for French society yet the resources allocated to combat them are not up to the challenge. The measures recommended here, which have proved their effectiveness and are intended for the general public and public authorities, must be integrated at the heart of a HR policy based on reducing alcohol consumption.

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Foreword

A report of the French Court of Accounts on policies to combat harmful alcohol consumption³ stressed the need for collective awareness and proposed in particular to develop research and to build on its results. In France, there are currently 42.8 million drinkers with different drinking profiles. The levels of alcohol consumption in the general population, and particularly among young people, remain high, and the health and social consequences remain a major concern for the public authorities: there are 49,000 deaths per year at an estimated social cost of €118 billion.

As part of the government's 2013-2017 strategy to combat drugs and addictive behaviors, Mildeca and the Ministry of Health asked Inserm to carry out a collective study to update scientific knowledge on alcohol, its effects on health, the levels and methods of use associated with its consumption in France and effective prevention strategies. This collective expertise has enabled the authors to issue recommendations for actions and research that could contribute to improving knowledge of the social and health effects of alcohol consumption with the aim of reinforcing prevention among the population at various levels.

Given that a collective expertise on alcohol and its effects on health was conducted by Inserm and published in 2001,⁴ this new expertise focuses on the latest published data.

It was decided not to address the issue of drug management of alcohol use.

Recent studies show that all alcohol consumption is harmful to health and that there is no “protective” effect, contrary to what

3. *Cour des comptes. Les politiques de lutte contre les consommations nocives d'alcool. Cour des comptes, juin 2016.*

4. *Inserm. Alcool. Effets sur la santé. Collection Expertise collective. Paris: Éditions Inserm, 2001.*

has long been claimed. That is why this report covers all levels of alcohol consumption.

The multiplicity of terms used to describe alcohol consumption can make it difficult to compare results between studies. In this report, we have chosen to use the term “risky drinking” in order to make the discussion more uniform.

We then proposed three distinct groups of use, using the following terminology: low-risk use, risky use (without dependence) and dependence (among risky users).

In response to the request from Mildeca and the Ministry of Health, the Inserm collective expertise procedure was implemented after preparatory work consisting of an inventory of the international scientific literature and the compilation of a bibliographic corpus, enabling an analysis of the scientific literature by a multidisciplinary group of 12 experts based on a scientific program.⁵

The experts are researchers and/or clinicians in the fields of epidemiology, social psychology, economics, social marketing, public policy, physiology, alcoholology and psychiatry.

The 18 chapters of the full collective expert report are based on the analysis of the literature carried out by members of the expert group in each of their disciplines. This analysis, together with the collective reflection, led to the formulation of recommendations. The complementary contribution of external speakers who came to present their work appears in the form of communications at the end of the report.

The analysis covers recent data on consumption levels, the health and socio-economic damage caused, including that specific to the perinatal period, risk and protective factors for consumption, and aspects related to the marketing and lobbying activities of alcohol manufacturers. This is followed by two chapters devoted to the analysis of measures to prevent alcohol

5. For more details on the collective expertise process and on the constitution of the bibliographic corpus, please refer to Annexes 1 and 2.

consumption through the construction of a public action program and its main measures, the evaluation of measures to restrict supply and demand, and in the following chapters, recent data on primary and secondary alcohol consumption prevention actions and programs. Finally, the treatment of alcohol dependency is discussed.

The analysis is completed by a summary and recommendations drawn up and validated collectively by the group of experts.

Summary

A report published in 2016 by the French Court of Accounts on policies to combat harmful alcohol consumption⁶ stressed the need for collective awareness and proposed, in particular, that research be developed and based on its results. In France, there are currently 42.8 million consumers with different drinking profiles. The levels of alcohol consumption in the general population, and particularly among young people, remain high, and their health and social consequences remain a major concern for the public authorities: there are 49,000 deaths per year at an estimated social cost of €118 billion.

As part of the government's 2013-2017 strategy to combat drugs and addictive behaviors, Mildeca and the Ministry of Health have asked Inserm to produce a collective expert report to update scientific knowledge on alcohol (Inserm, 2001 and 2003),⁷ its effects on health, the levels and methods of use associated with its consumption in France, and effective prevention strategies.

Recent studies show that all alcohol consumption is harmful to health and that there is no “protective” effect, contrary to what has long been claimed. That is why this report covers all levels of alcohol consumption.

This summary presents the main findings of the literature review carried out by the members of the expert group in each of their disciplines. Each expert analyzed a part of the corpus and then presented its analysis to the group. The collective recommendations of this expertise were born from the exchanges resulting from these presentations. In this summary of the collective

6. *Cour des comptes. Les politiques de lutte contre les consommations nocives d'alcool. Cour des comptes, juin 2016.*

7. *Inserm collective expert reports dealing with alcohol: Inserm. Alcool. Effets sur la santé. Collection Expertise collective. Paris: Éditions Inserm, 2001; Inserm. Alcool. Dommages sociaux: Abus et dépendance. Collection Expertise collective. Paris: Édition Inserm, 2003.*

expert report, recent data on consumption levels, the health and socio-economic damage caused, including that specific to the perinatal period, the risk factors of consumption, and aspects linked to the marketing and lobbying actions of alcohol manufacturers are addressed in order. This is followed by sections on the analysis of primary prevention measures through the evaluation of supply and demand restriction measures, the construction of a public action program and its main measures, recent data on primary prevention actions and programs, and the benefits of alcohol-free periods. The final sections deal with secondary prevention of alcohol consumption and the care of alcohol-dependent people.

Alcohol consumption levels

France has 42.8 million current consumers with different drinking profiles. Although alcohol consumption is ubiquitous in France as in other countries, levels of alcohol consumption vary widely, and it is necessary to distinguish between different definitions used to measure the frequency, volume and impact of these drinks. Among young people, the frequency of binge drinking and of heavy drinking episodes (binge drinking, most often defined as 6 or more drinks on one occasion) are also measured.

In light of evidence suggesting that addictions follow a continuum, definitions of problematic alcohol use have recently evolved, with previous notions of abuse and dependence become alcohol use disorder.

One type of problematic use is identified in the DSM-5 (Diagnostic and Statistical Manual) as psychoactive substance use disorder – including alcohol. This disorder is identified by 11 symptoms and can be mild (2-3 symptoms), moderate (4-5), or severe/addictive (6 or more symptoms). The multiplicity of terms can make it difficult to compare results across studies. In this report, for the sake of clarity, we will refer to risky drinking

(without dependence) for alcohol use disorder and to dependence (for the most severe risky drinking).

France has a well-established system for monitoring the consumption of alcohol, as well as other psychoactive products. Among adults, the Health Barometer surveys conducted by the French Public Health Agency have been providing regular information on habitual alcohol consumption and problem drinking among 18-65 year olds for the past 25 years. Among adolescents, the HBSC (Health Behavior in School-aged Children) surveys of the World Health Organization and ESPAD (European School Project on Alcohol and Other Drugs) and ESCAPAD (*Enquête sur la Santé et les Consommations lors de l'Appel de Préparation À la Défense*) carried out by the *Observatoire français des drogues et toxicomanies* (OFDT) since the 2000s, the first two of which have recently been merged into the EnCLASS system, record the level of alcohol consumption of young people aged 12 to 17 on a regular basis (every 2 to 4 years).

These follow-up studies show that adolescence (12-18 years) is the period during which young people experiment with alcohol for the first time. The figures from the EnCLASS study and the ESCAPAD survey are consistent: by the end of adolescence, regular consumption (10 or more times in a month) concerns between one in ten young people in the second year of secondary school and one in four in the final year of secondary school, and about 8% of 17-year-olds in France, while between 40 and 50% report having had at least one major binge drinking episode (BDE) and 16% at least three BDEs in the month prior to the survey. These figures, while high in absolute terms and compared to those observed in other European countries, are in net decline compared to the 2008-2014 period. With regard to consumption trajectories, it would appear that among young people (before the age of 18) who have consumed at risk, around 25% continue with the same type of consumption when they enter adult life.

The most frequently consumed alcohols by adolescents are hard liquor (whisky, vodka – between 70 and 80% of those who say they have drunk in the past month have done so), followed by

beer (about 70%), champagne (less than 60%) and then wine (over 50%). Young people who report drinking alcohol do so mostly at weekends (90%), with friends (90%), at home or at friends' houses (65%). The proportion of those who report drinking alcoholic beverages in a bar/restaurant or discotheque has decreased significantly over time (between 2005 and 2017, from 36% to 29% and from 32% to 19% respectively).

On average, during adolescence, boys still drink more than girls, but the ratio between the sexes has decreased over time, particularly for experimentation (sex ratio in 2017=1.02), use in the year (1.07), and use in the month (1.11), or BDE in the last month (1.30). Boys, on the other hand, still tend to have higher levels of regular use, i.e., 10 or more times in a month (sex ratio in 2017=2.62), or to have repeated BDE, i.e., 3 or more times in a month (1.99), or regular BDE, i.e., 10 or more times in a month (4.28).

Beer (27% of weekly consumption) and wine (24%) are the most consumed alcohols among young adults (after 18) in France. In addition to the type of alcohol consumed, recent research in various industrial countries has described the spread of the consumption of mixtures of alcohol and energy drinks. In parallel, the consumption of alcohol mixed with diet sodas seems to have widespread, particularly in the United States. This type of blending presents particular risks, as energy drinks mask the taste of alcohol and reduce its sleep-inducing effects, which may lead to increased consumption. It should be noted that in France this type of practice is not recorded in general population surveys and no figures are available concerning its frequency.

Alcohol consumption among adults in France is about 27 g of pure alcohol (i.e. the amount of alcohol consumed independently of the drink) per person per day according to the latest estimates. It is estimated that about 23% of the population would have a one-time risk consumption according to the AUDIT (Alcohol Use Disorders Identification Test) score and about 7% a chronic risk consumption or with the possibility of

dependence. In 2014, the estimated prevalence of risky drinking in the CONSTANCES cohort were highest for subjects under 35 years of age: 30.7% of them had a dangerous use of alcohol. In this age group, students seem to be particularly at risk of heavy drinking. As in the case of adolescents, among young adults, alcohol consumption by women increased and the sex ratio decreased accordingly, which is consistent with the results of studies in other industrialized countries.

Among people over 50, the proportion of risky drinking is high: 69% of 55-64 year olds and 62% of 65-75 year olds drink more than 2 glasses of alcohol per day, and 80 and 81% respectively drink more than 5 days a week, and a total of 13 and 14% of women and 35 and 37% of men in these age groups exceed the problem drinking guidelines (more than 2 glasses of alcohol per day or more than 5 days of drinking per week).

Since 2013, levels of alcohol consumption among people over 50 have increased, including levels of BDE and risky drinking. Drinking by people over 50 poses specific medical problems, especially due to the presence of comorbidities and drug treatments.

If the trend towards a change in drinking patterns in France – from daily consumption to more occasional consumption, but marked by a level of consumption that can be significant – is confirmed, the monitoring of alcohol consumption by people over 50 and its possible effects on health will need to be reinforced.

In France, data on the frequency of consumption during the perinatal period are irregular and sketchy in terms of consumption patterns. In 2010, approximately 20% of women said they had drunk alcohol during their pregnancy and 2.5% had drunk 3 or more glasses on one occasion.

The consumption of alcoholic beverages during pregnancy has decreased in recent decades. The period of early pregnancy, especially when women are unaware of their pregnancy, is sensitive; 8% of women have had at least one occasional heavy

drink during early pregnancy. About 7% of women have consumed alcoholic beverages while breastfeeding. Consumption is more frequent in the more privileged social groups and by older women.

Health and socio-economic damage

Mortality and social cost of alcohol in France *versus* the economic scope of the sector

Alcohol consumption is the 7th cause of disability-adjusted years of life lost (in good health) worldwide in 2016. Analysis of data from the Program for Medicalization of the Information System (PMSI) in 2012 shows that alcohol consumption is the leading cause of hospitalization in France.

Alcohol is a drug, a carcinogenic and toxic molecule for many organs, whose toxicity is partly relayed by its metabolite, acetaldehyde. Its consumption is directly or indirectly responsible for some sixty diseases and alcohol is found in 200 items of the International Classification of Diseases (ICD-10) used in the PMSI. The effects of alcohol on health depend on the quantity and frequency of consumption, as well as the pattern of consumption (episodic, chronic). Alcohol consumption is responsible for a significant morbidity and mortality and is one of the main factors responsible for the loss of years of healthy life. The risk of alcohol-related morbidity and mortality is higher in women than in men.

The latest figures for alcohol-attributable mortality in France are for 2015. They are 41,000 deaths, of which 30,000 in men and 11,000 in women, i.e. 11% and 4% respectively of the mortality of adults aged fifteen and over. This includes 16,000 deaths due to cancer, 9,900 deaths due to cardiovascular diseases, 6,800 to digestive diseases, 5,400 to an external cause (accident or

suicide) and more than 3,000 to another disease (mental illness, behavioral disorders, etc.).

The mortality attributable to alcohol by age group is 7, 15 and 6% respectively for the 15-34, 35-64 and 65+ age groups. These mortality figures were calculated by estimating alcohol consumption from a representative sample of 20,178 French individuals aged 15 and over interviewed about their drinking habits by the National Institute of Statistics and Economic Studies (Insee). However, there is a discrepancy between the alcohol consumption reported in this sample (11 g/d) and the data on alcohol sales (27 g/d in 2009) which leads to a correction of the declared alcohol consumption by a factor of 2.4. The sensitivity study (taking into account the difference in the uncertainty in the reported consumption, loss or waste of alcohol on the market) then indicates that this uncertainty contributes to an estimate of alcohol-attributable deaths in 2015 of between 28,000 and 49,000. When this uncertainty is taken into account for all years, it is difficult to compare changes in mortality figures over time. For example, alcohol-attributable mortality was estimated at 49,000 in 2009, 33,000 in 2006, 45,000 in 1995 and 52,000 in 1985.

The proportion of alcohol-attributable deaths among men and women is higher in France than in other European countries. The 2009 figures for alcohol-attributable morbidity in France indicate a harmful effect of alcohol at low levels of consumption (between 1 and 1.5 drinks per day). The risks of morbidity and mortality are higher in women than in men. Concerning mortality due to alcohol-related liver disease, the risk of mortality is increased for very low levels of consumption (from the first drink).

There is a statistically-significant association between alcohol sales and cancer mortality in most countries that persists after adjusting for tobacco consumption. A study published in 2017 analyzed the relationship between alcohol consumption trends in 17 countries and cancer mortality. For example, the authors show a correlation with a decrease (for France), stagnation (in

England) or increase (for Romania) in both alcohol sales and mortality from cancers of the oral cavity, pharynx and larynx.

Regarding the cost of alcohol consumption, the countries of the continental model, with a social protection system similar to France, would lose 1% of GDP each year (from 0.54% to 1.49%). American, Canadian, French and Scottish studies carried out between 1997 and 2002 show a certain regularity in the economic burden of alcohol in relation to the wealth of these developed countries (approximately 1% of respective GDPs). However, the latest French studies report a social cost that is much higher: 6% of GDP in 2010. This inflation would be due to the increase in the value of a statistical life in France as well as to an improvement in the information system allowing for better identification of the costs attributable to alcohol.

Estimated at €118 billion in 2010 in France, the social cost of alcohol consists mainly of costs related to attributable mortality (€66 billion) and morbidity (€39 billion). When the pensions not paid out due to morbidity and the tax revenues from alcohol products are included in the public finance balance, the latter shows a deficit of €3 billion. Alcohol brings no net benefit to the state, it cuts into the public finances. Moreover, in this latest exercise to estimate the social cost, certain elements, such as fetal alcohol syndrome and outpatient and hospital care, are not or are poorly taken into account, which means that the social cost of alcohol could be even greater than currently estimated.

The cost-benefit analysis of alcohol in France shows that the monetized satisfaction derived from alcohol consumption and the profits of French producers fail to exceed the cost of disease and mortality. Similarly, the profits made in the French alcohol sector thanks to monopolistic positions do not exist: the domestic and international markets appear rather competitive, suggesting a “normal” profitability of the sector. While alcohol consumption in France has decreased significantly over the last sixty years (Figure 1), reflecting a contraction of the market,

8 international competition is actually gaining market share. In

the 2000s, the French alcohol sector still boasted a high level of employability: almost 800,000 direct and indirect jobs were recorded in metropolitan France. Today, the sector claims 500,000 jobs, i.e. 300,000 fewer in fifteen years. With €4 billion in annual tax revenue, the alcohol might appear to be a significant contributor to the state coffers, however, given the particular taxation of wine products, the current tax system does not maximize revenue potential.

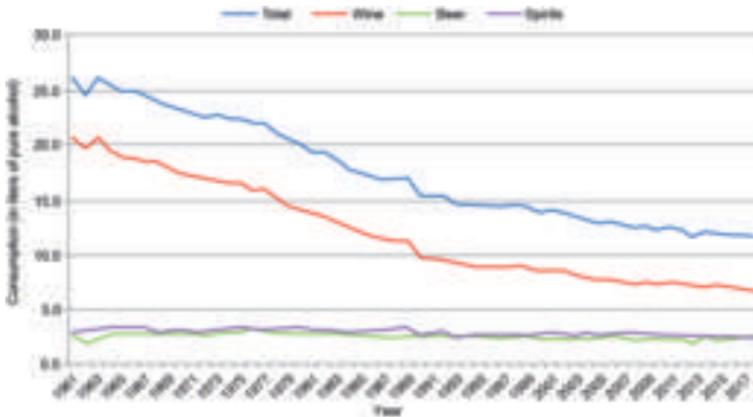


Figure 1: Amount of alcohol consumed per person aged 15 years and over per year since 1961 in France (in liters of pure alcohol equivalent)

Source: OFDT. *Drogues et addictions, données essentielles: Alcool*. Paris: OFDT, 2019, 200 p. (reproduced with permission).

Ultimately, alcohol has a very high social cost and represents an important but shrinking economic sector. An economic space thus seems to be emerging where, on the one hand, voluntary policies against alcohol consumption would aim at minimizing the social cost of alcohol in France and where, on the other hand, the know-how and identity of certain territories would be preserved.

Health consequences of low levels of alcohol consumption

Breast, oral cavity, oropharynx, hypopharynx and colorectal cancers contribute the most to new cases of alcohol-attributable cancers. The largest proportion of alcohol-related cancers is in the esophagus and liver.

Esophageal cancer has the largest fraction of all cancers attributable to alcohol (57.7%). In men, cancers of the oral cavity and pharynx are the most common. While men consume more alcohol than women, the incidence of alcohol-attributable cancers is similar between men and women because of the large number of new cases of breast cancer in women. Light, moderate and heavy drinking accounted for 1.5, 1.3 and 4.4% of new cancer cases respectively. Former drinkers accounted for 0.6% of new cancer cases. Low to moderate levels of consumption contribute significantly to new cancer cases in France in 2015 (Figure 2). Low to moderate consumption levels contribute significantly to new cases of breast cancer, while high consumption levels contribute to liver cancer.

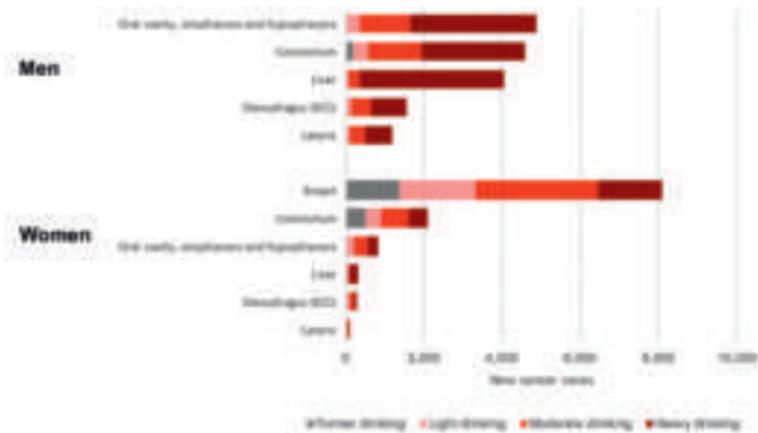


Figure 2: Incident cancer cases as a function of alcohol consumption levels in men and women in France in 2015

Source: Shield KD, Marant Micallef C, Hill C, *et al.* New cancer cases in France in 2015 attributable to different levels of alcohol consumption. *Addiction* 2018; 113: 247-256 (reproduced with permission).

It can be seen that a 10% reduction in alcohol consumption would have prevented 2,178 [95% CI: 1,687-2,601] new cases of cancer in 2015 in France. It bears reminding that France is one of the Member States that has ratified one of the objectives of the WHO action plan on non-communicable diseases, which aims to reduce alcohol consumption by 10%. Another study, carried out in Australia, suggests that stopping alcohol consumption or drastically reducing alcohol consumption over five years to the level of national recommendations would make it possible to prevent 4% or 2% of cancers respectively over a period of 25 years.

Approximately 8% of all new cancer cases are alcohol-related, and low-to-moderate levels of consumption contribute particularly to this health burden. Indeed, in 2018, the new cancer cases attributable to different levels of alcohol consumption in France in 2015 were estimated and the impact of a 10% decrease in alcohol consumption was measured. For this purpose, a latency period of 10 years was chosen for the time between exposure and diagnosis. The levels of alcohol consumption used (Figure 2) correspond to the WHO consumption risk levels: low (less than 20 g/d for women and less than 40 g/d for men), moderate (20 to 40 g/d for women and 40 to 60 g/d for men), high (40 g/d or more for women and 60 g/d or more for men). The results show that 27,894 [95% CI: 24,287-30,996] or 7.9% of all new cancer cases are attributable to alcohol.

Even low alcohol consumption is associated with an increased risk of breast cancer independently of tobacco consumption. An analysis of 53 studies with 58,515 women with breast cancer was one of the first to reveal this. The British “Million Women” study showed an excess incidence of 15 per 1,000 cases of cancer with each increase of one standard drink per day, 11 per 1,000 being breast cancer. This increased risk of certain cancers in women due to the consumption of low levels of alcohol has been shown by numerous studies, with some studies pointing to breast cancer as a major contributor.

In England, the increase in alcohol consumption over the past decade has been suggested as a key factor in the 30% increase in breast cancer incidence (36,509 in 2003 *versus* 55,122 in 2015). Alcohol consumption is associated with increased risk of several cancers including breast cancer at doses as low as 10 g of pure ethanol, or one drink per day. Research on the threshold level of alcohol consumption at which a significant risk of all-cause alcohol-related mortality arises has converged on the threshold of 10 drinks per week (i.e., less than 1.5 drinks per day). New data on the risks of low levels of alcohol consumption have prompted several countries, including France, to review their recommendations and to set acceptable and scientifically credible benchmarks. It is striking that the results of scientific studies converge on this benchmark of ten standard glasses per week and two standard glasses per day.

Potential “protective” effects of low levels of consumption have been reported in studies of quantity-dependent effects of alcohol that follow a “J-curve”. However, even if these “protective” effects existed, they would be out of proportion to the overall mortality caused by alcohol consumption. The “protective” effects at the root of the famous “French paradox” are in fact due to methodological problems in the studies and in particular to the presence of numerous confounding factors, the most critical of which are the definition of the control group and the declarative nature of alcohol consumption. A meta-analysis involving more than 4 million people showed that when former drinkers are excluded from the reference group and when the studies are controlled for their quality, no “J-curve” type association that might suggest a “French paradox” is found in subjects with a low level of alcohol consumption (1.3 to 24.9 g of ethanol per day, i.e. less than 2.5 standard glasses per day). Of the 87 studies included in this meta-analysis, 65 included former drinkers in the reference group of abstainers, 50 included occasional drinkers and only 13 were free of this bias in the classification of abstainers. This last meta-analysis is one of the few to have analyzed not only the usual confounding factors but also

the influence of the design (construction) of the studies. It shows quite clearly that taking into account most of the confounding factors (smoking, ethnic or racial origin, abstainers, outliers, etc.) statistically explains the reduced risk of mortality in users with low levels of consumption (“protective” effects that form the basis of the famous “French paradox”). Similarly, this study also shows that the design of the studies influences the risk and that, alone, higher quality studies show no reduction in risk (Figure 3). However, it has been pointed out that this meta-analysis may have excluded several high-quality studies and its validity has been called into question by authors, some of whom have declared conflicts of interest.

Studies using new methodologies such as Mendelian randomization confirm this hypothesis of the absence of “protective” effects. This type of methodology does not take into account declared consumption, but allows people to be categorized according to polymorphisms in the genes coding for alcohol-degrading enzymes and thus to estimate the level of alcohol consumption. Studies using this type of methodology, and comparing it to the classical methodology, show that the “J-curves” disappear and become linear in the same population, thus showing the absence of “protective” effects.

Together, new data and new methodologies applied to the study of the association between alcohol use and health risks have advanced the state of knowledge particularly regarding low levels of alcohol consumption. The level of alcohol consumption for which the risk of harm is minimal is therefore zero standard drinks per week.

At the international level, various institutions in the cancer field have changed their message in recent years, stating that there is no safe level of alcohol consumption and that not drinking is the best option to prevent cancer. Moreover, potential “protective” effects of alcohol can no longer be put forward, because even if these did exist, on the one hand, when the health risks are considered in a global way, these effects would be largely compensated by the deleterious effects of alcohol.

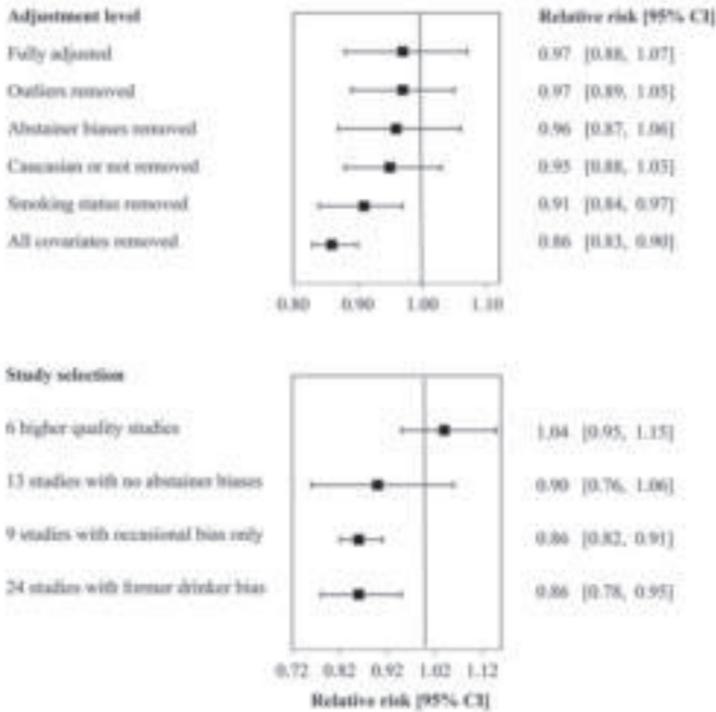


Figure 3: (Top) Relative risk estimates for all-cause mortality among low-level drinkers compared to lifetime abstainers with and without covariates in 81 studies. (Bottom) Relative risk estimates for all-cause mortality among low-level drinkers compared to lifetime abstainers after controlling for study characteristics by study selection

Source: Stockwell T, Zhao J, Panwar S, *et al.* Do “Moderate” Drinkers Have Reduced Mortality Risk? A Systematic Review and Meta-Analysis of Alcohol Consumption and All-Cause Mortality. *J Stud Alcohol Drugs* 2016; 77: 185-198 (adapted with permission).

On the other hand, they would be obtained for consumption that does not exceed the new consumption benchmarks built around the notion of low risk to health. Finally, many experts agree and recommend against advising nondrinkers to begin consuming even low levels of alcohol with the supposed aim of

improving their health. New evidence on the effects of low levels of drinking should alert us to the need to reinforce information, awareness and prevention messages. Reducing alcohol consumption even when levels are already low to moderate could prevent a significant number of deaths and reduce the incidence of certain diseases.

Damage specific to the perinatal period

Prevalence of fetal alcohol syndrome (FAS), identification of affected children and training of professionals

In Europe, the prevalence of fetal alcohol syndrome (FAS) is estimated at 37 per 10,000 people, making it the highest prevalence region in the world. In France, there is no overall estimate available and data from EUROCAT (European network of population-based registries for the epidemiological surveillance of congenital anomalies) show that there are major differences depending on the regions covered by the registry. The evolution of knowledge in neurodevelopment has led to an extension of the definition of the syndrome, from FAS to FASD (for fetal alcohol spectrum disorder). The identification of affected children can be late, up to 6 years of age or more, making it difficult to distinguish between the role of exposure in utero and that of the early family environment.

For the identification and management of affected children, there are professional issues, from neonatology to general medicine, and great diagnostic complexity. Progress in the field of direct biomarkers has been significant over the last two decades; the most effective for attesting prenatal alcohol exposure (PAE) are meconium markers. Work needs to continue to improve these biomarkers, which may be needed for surveillance purposes, in specific subgroups, or for research purposes. It is difficult to advocate for widespread use of these tests based on the

available knowledge. Pediatric professionals are trained in various ways to identify affected children. Apart from extreme and rare cases, the identification of PAE-related disorders requires detailed clinical examinations, from birth and at key stages of development, by pediatricians trained in the first line and/or professionals qualified in neurodevelopment. Not all children with several disorders (learning, behavioral, sensory, etc.) can currently benefit from rehabilitative care at the right age, which could reduce the damage caused by fetal alcohol.

Health care teams, organized in perinatal health networks or pediatric networks, must maintain the knowledge and training of their members in order to optimize this identification and specific care. In addition to doctors, psychologists, nursery nurses, occupational therapists and educators are part of these teams and must benefit from and contribute to this training and awareness. The affected children may grow up in vulnerable families, with a low standard of living, or they may be entrusted to the child welfare services. Their disability due to FASD may be compounded by pathologies that are more frequent in this context (chronic pathologies, obesity, malnutrition, for example).

The risk in the period before pregnancy is still poorly documented and scientific knowledge is limited: is there a period when the drinking behavior of adults who want to become parents is dangerous for the embryo and the fetus? How long would this period last? And is there a risk to the future fetus from the father's drinking in the period before conception? These questions are raised by some observational data, but further research (etiology, biochemistry, etc.) is needed before precise prevention messages based on scientific evidence can be formulated.

Because the brain is biologically complex and its development and functioning in adulthood are tightly controlled by epigenetic mechanisms, it is necessary to focus on the specific damage to the perinatal period of fetal alcohol spectrum disorders and its epigenetic impact on the brain.

New advances through the impact of epigenetic data

Epigenetic data opens up diagnostic and therapeutic possibilities as well as possibilities for prevention and harm reduction in relation to risky alcohol consumption. Epigenetic mechanisms play a role in the development of the brain through their ability to make certain parts of the genetic information contained in the DNA accessible or not, thus allowing the cell to “express” a particular gene or not. The accessibility of the genetic information contained in DNA is managed by a winding of this long molecule more or less tightly, which leads to the exposure of parts of the molecule (and therefore of genes). The cellular machinery is then able to read this information, transcribe it and translate it into proteins or, on the contrary, work to compress it. DNA is wrapped around a basic unit that consists of a small protein complex (the nucleosome, composed of histones). It is a code of chemical “decorations” of these histones (acetylation, methylation, phosphorylation, etc.), as well as the methylation of the DNA itself, that will determine the more or less compact nature of the winding. All these chemical decorations are called “epigenetic marks”. These marks can be transmitted from a mother cell to a daughter cell during cell divisions (this is epigenetic memory). It is these codes that allow certain gene expression programs crucial to brain development to be turned on or off in very specific time windows.

It is tempting to imagine that by influencing the activity of the enzymes involved in the deposition of these marks on the genome, we could erase these marks and return to a normal conformation of the chromatin and of the expression of these genes. The problem is not simple because it is not enough to excise the aberrant marks, but also to promote the deposition of normal, physiological marks. Importantly, epigenetic mechanisms are reversible and this reversibility could be the subject of therapeutic approaches. All stages of brain development are under very tight control of epigenetic mechanisms and neuronal activity itself is capable of modifying epigenetic marks.

Any deregulation of epigenetic mechanisms during brain development is likely to increase the risk of developing neuropsychiatric diseases. Whether due to mutations in epigenetic components, capable of depositing epigenetic marks, excising them, or of “reading” and “interpreting” them, or due to exposure to environmental stresses during the fetal or perinatal stages or in adults. Among these assaults, prenatal alcohol exposure is a major cause of neurodevelopmental abnormalities because it is capable of damaging all stages of brain development. These defects contribute to a broad spectrum of deficits of varying severity, referred to as FASD.

PAE, FASD and epigenetic perturbations: towards biomarkers of exposure or prognosis?

Alcohol disrupts epigenetic mechanisms in a number of ways: by altering the availability of “decorations” deposited on histones or DNA, by altering the abundance or activity of the enzymes that deposit or remove them, and by altering the activity of the epigenetic actors that read and interpret them. As a result, alcohol disrupts epigenetic mechanisms by altering the epigenome, i.e., the profile of epigenetic marks on a genome-wide scale.

The determination of PAE-induced epigenetic perturbations is crucial both to understand at the molecular level the effects of PAE on the epigenome and on gene expression or to identify biomarkers of PAE in young children. Indeed, FASDs are very difficult to diagnose because of their complexity. Detection of pregnant women at risk due to their alcohol use remains complicated and limited (and that of their fathers even more so) and the history of PAE is often unknown. One prospect is also to identify therapeutic strategies to reverse the deposition of aberrant epigenetic marks, to normalize gene expression in the brain after PAE. The techniques for detecting epigenetic marks have benefited greatly from high-throughput DNA sequencing approaches to detect methylation of the DNA itself or to map

chemical changes in histones on a genome-wide scale. These may allow the identification of biomarkers exposure or even prognosis.

The studies are still very imperfect and there are still many obstacles to drawing lasting conclusions. Cohorts of children or collections of fetal biological samples (FASD) are still very small and poorly characterized in terms of demographics, gender, age, ethnicity, and mode of recruitment for alcohol use or withdrawal. It is not possible to exclude the influence of genetic factors or confounding factors (such as economic and educational problems, sexual abuse and maltreatment, maternal depression, addiction to other psychotropic substances, etc.). Animal models have made it possible to avoid confounding factors, but the doses and modes of alcohol intake (chronic or acute), and the time windows after alcohol intake are very different in the different studies and it is difficult to draw general conclusions. Nevertheless, it seems that certain gene regions or clusters of genes carrying aberrant epigenetic marks following PAE are being identified in a growing number of studies and constitute areas of interest with real biomarker potential. Another obstacle to the determination of epigenetic biomarkers of PAE is the inaccessibility of the brain to invasive studies. However, a growing number of studies show that there is an imperfect, but exploitable, parallel between the epigenetic perturbations induced in the developing brain by PAE and those observed in peripheral tissues.

There is also the question of early deposition of epigenetic marks after exposure (especially for PAE) and their persistence over time. Indeed, the vast majority of investigations of the epigenome after PAE have been carried out in adults. It is therefore not clear whether the aberrant epigenetic marks observed are derived from the PAE and are persistent or whether they result secondarily from altered neuronal activity following the PAE.

Finally, the vast majority of studies lack formal demonstration of the functional impact of these epigenetic disturbances on the expression of key developmental genes and brain function, a

demonstration necessary for their validation as biomarkers. Such validation is technically possible in the future thanks to the new approaches known as “epigenome editing”. All of these considerations also apply to risky alcohol consumption in adults (at the time of use or withdrawal).

Despite the rapid advances in the emerging field of epigenetics and the therapeutic potential of reversing epigenetic mechanisms, there are still obstacles to development of therapeutic strategies. Although very promising technological breakthroughs have been made based on epigenome editing approaches that seek to restore epigenetic marks in a targeted manner on the genomic regions concerned, without modifying the DNA sequence, such strategies are actually technically and ethically very challenging to implement. Non-medicinal remediation strategies aimed at reducing the risk of developing neurodevelopmental disorders or improving the cognitive and social interaction abilities of FASD patients are very attractive (education and learning strategies that rely or not on video games and virtual reality, cognitive control therapy, language and linguistic therapy, etc.). However, the small size and still imperfect definition of the cohorts, on the one hand, and, on the other, the limited number of quality studies, which are disparate in terms of methodology and the quality of the statistical analyses of the results, make it impossible to draw definitive conclusions about their utility and their impact on epigenetic marks.

Risk factors for alcohol use

Alcohol consumption, like other health-related behaviors, is multifactorial, and due to both structural/collective factors and individual factors. As for many health behaviors, alcohol consumption is distributed across the population in a normal or near-normal pattern, which means that to reduce heavy drinking it is necessary to reduce average consumption in the

population. However, most studies on risk or protective factors do not focus on average consumption but on higher levels of consumption: heavy, risky or problematic.

Collective risk factors include the level of development of the country of residence (the higher the level of development, the higher the level of alcohol consumption), the alcohol culture, the context of alcohol consumption, and the level of production, distribution, and regulation of alcohol products. In particular, factors such as alcohol sales legislation, the price of alcohol products, the availability of alcohol as measured by, for example, the density of sales outlets or nightclubs, or norms regarding alcohol consumption, are associated with positive perceptions of alcohol and drinking patterns. In addition, alcohol advertising and marketing can influence consumption levels and patterns (see the section “Marketing of alcohol products” in this summary). It has also been shown that worsening socio-economic conditions, such as increased unemployment, can lead to heavy binge drinking. Finally, societal characteristics such as the level of gender equity or discrimination against people belonging to ethnic or sexual minorities are also associated with high levels of alcohol consumption – and particularly hazardous drinking – at the population level.

In addition to collective factors, family characteristics or characteristics of the people around them can also influence alcohol consumption.

With respect to family/environmental risk factors, a large body of research documents the excess risk of problem drinking among individuals with a family history of alcohol-related problems. Among adolescents, socio-economic or psychosocial difficulties within the family or lack of parental supervision, family conflict and exposure to intrafamily violence, and parental alcohol offering are associated with youth drinking. Finally, peer drinking is also an established risk factor for drinking, which may be due in part to the fact that young people who are interested in drinking surround themselves with other young people who have similar interests. While teenage drinking is a group

behavior, research shows that in adults it is more likely that social isolation leads to a higher risk of problem drinking.

Among the individual risk factors associated with alcohol consumption, especially risky drinking, genetic factors are the most important. Studies estimate that between 50 and 70% of the risk of alcohol addiction is heritable, with monozygotic twins being more likely to have problematic drinking than dizygotic twins. Some genes associated with increased or decreased risk of problem drinking have been identified (e.g. *ALDH2*), but overall susceptibility to alcohol problems seems to be paralleled with other forms of addictive behaviors, in relation to genes that determine neurotransmitter systems (e.g. dopaminergic, opioidergic, GABAergic, serotonergic, cholinergic, glutamatergic systems). Nevertheless, it should be noted that among the SNPs (Single Nucleotide Polymorphisms) identified to date, none explains more than 1% of the risk of problem drinking. Overall, the importance of genetic factors increases with age up to about 25 years and seems to be more important in a permissive context. In addition, genetic factors interact with people's life experiences and environmental characteristics, and current research is exploring in detail the epigenetic mechanisms that may contribute to drinking difficulties (see the section "New advances through the impact of epigenetic data" in this summary).

In addition to genetic factors, many characteristics of people's experiences or personality traits are associated with alcohol use. It is useful here to distinguish between the individual risk factors identified in adolescence. For example, among the factors most strongly associated with drinking problems are experiences of maltreatment or sexual abuse – particularly in childhood.

Homosexual or bisexual orientation is also associated with high levels of alcohol consumption from adolescence and throughout adulthood – particularly among girls and women – and this is probably due in part to the discrimination they experience and to certain lifestyles that are more community-based (meetings in bars or social places, gatherings of association activists, etc.).

Homosexual or bisexual men are also more likely than heterosexual men to drink heavily, particularly during adolescence. The difference is, however, smaller than for women.

Among the psychological factors, behavioral problems and impulsivity/low self-control have been identified as being associated with addictive behavior, including problematic alcohol consumption. This is also the case for sensation seeking, which can lead to early experimentation and disinvestment in school. The data concerning the role of emotional problems are less consistent, although studies have reported that anxiety symptoms predict alcohol consumption. In addition, recent studies highlight the predictive effect of sleep difficulties – late sleep onset or sleep problems. Finally, it has been observed in recent years that the consumption of energy drinks predicts alcohol consumption – whether or not in conjunction with it, although it is not yet known whether this relationship is causal.

In addition, specific risk factors for adulthood have been observed and concern psychological factors, hostility and more generally negative affectivity and symptoms of depression/anxiety. While the links between social situation and alcohol consumption in adolescents are complex, marked social inequalities in this area are observed in adults, whether we take into account self-reported socio-economic difficulties or the fact of being unemployed. Finally, among working conditions, some are associated with the likelihood of drinking excessively, notably a high number of working hours (48 hours or more/week), being in contact with the public, and unfavorable psychosocial factors (low support at work, conflicts, harassment). Finally, certain leisure activities, and in particular the extensive use of social networks, could also be associated with high levels of alcohol consumption, as well as other products.

Protective factors for alcohol consumption can also be found at a collective, family or individual level. The main collective protective factors are the price of alcohol, regulation of the number and concentration of sales outlets, reduction of sales hours and compliance with the ban on sales to minors. Finally, for

adolescents, access – physical and financial – to health-promoting social and recreational activities is associated with a reduction in problematic consumption of alcohol and other psychoactive substances. At the family level, parental support and parenting support appear to be highly effective in preventing or reducing alcohol use among youth.

At the individual level, investment in the schooling or in social or recreational activities that health promoting (artistic, sports) appear to be protective. Finally, the development of coping skills (e.g. self-esteem, the ability to manage conflicts), or spirituality and religious practice are major protective factors.

Marketing of alcohol products

In order to change drinking patterns at the population level, public policies aimed at reducing access to alcohol have been shown to be effective – particularly among young people – and should be strengthened, particularly with regard to the marketing of alcohol products.

The classic marketing tools (the four “P”s: product, price, place, promotion) are used by alcohol producers to encourage a wide target audience to buy and consume their brands.

Specific marketing techniques are also deployed to reach particular consumer profiles: young people, who represent the future of alcohol consumption (targeting with flavored products, low prices, single unit sales, digital advertising, etc.), and women, who are under-consumers compared to men (targeting with light alcohol products, fruity flavors, support for women’s causes, etc.).

According to an analysis of the alcohol industry’s marketing investments in France carried out by Kantar Media for the French Public Health Agency, it is estimated that the advertising budgets of alcohol brands, which represent only a part of marketing expenditure, amounted to 454.6, 369.2 and 208.5 million euros in 2016, 2017 and 2018, respectively.

Scientific studies conducted since 2000 have analyzed the effect of alcohol marketing on young people. These studies examined in particular the impact of advertising, which is a component of marketing. The vast majority of the research summarized in three literature reviews reveals a positive and significant link between exposure to alcohol marketing and advertising, attitudes, and then drinking behaviors of young people (initiation for non-consumers, increased consumption for young consumers).

Thus, in addition to the influence of peers, parents and culture, the current state of research indicates that the marketing of alcohol companies also plays a role in explaining the drinking behavior of this population.

As a result, and in order to protect minors, national and international health actors recommend regulating the commercial practices of the alcohol industry. To this end, some countries have opted for self-regulation: the industry and/or its representatives (trade unions, etc.) propose codes of conduct that they undertake to follow in terms of advertising to minors. It is now established in the literature that this solution is not effective in protecting young people from alcohol marketing. This is why more and more countries are committing themselves to the implementation of laws, following the example of France, a forerunner in this area in 1991 with the Évin law regulating advertising for alcoholic beverages (among other things).

However, it appears that in its current version, the Évin law does little to protect minors from exposure to alcohol brand advertising, particularly in certain media (advertisements and promotions in supermarkets, the internet, street posters, etc.). There are several reasons for this. First, the Évin law is not always respected: the courts regularly condemn advertisements deemed illegal. Second, this regulation has been considerably modified and weakened since its establishment in 1991 under the influence of lobbying by the alcohol industry (advertising in public and on the internet are now authorized), which shows that the law fails to fully meet its role in protecting youth.

In addition to traditional marketing and advertising, alcohol producers are investing in the internet, a medium that is very popular with young people. The digital advertising formats of alcohol brands are many: brand sites, social networks, emails, competitions, stories, etc. On the internet, researchers distinguish between commercial content originating from alcohol producers (sites, support of events, use of celebrities) and pro-alcohol messages disseminated by third parties and/or internet users. In the latter case, it is not uncommon for bars, nightclubs, festivals, sports events, internet users or groups of internet users to spread pro-alcohol messages. Without a declared official link between the disseminators of these messages and the alcohol producers, it is very difficult to say whether the content published is personal or a paid sponsorship.

Furthermore, one of the specificities of digital marketing is to encourage internet users to engage and interact with the publications of alcohol brands. This interaction and engagement is done through comments, shares, likes, contest entries, etc. These are referred to as “active” users (they engage personally: they tweet, re-tweet, “like”, comment, post and share pro-alcohol content) as opposed to “passive” users (who only receive pro-alcohol content via messages from their peers, advertisements on their news feed, etc.).

Research has been conducted on the effect of these different advertising formats on the internet, whether or not they originate officially from alcohol producers, and whether or not they engage internet users. Four literature reviews have been published on the influence of digital alcohol marketing. The vast majority of the studies reviewed establish a positive and significant link between exposure to pro-alcohol content on the internet and the desire to consume, current or past declared consumption, the trivialization of excessive drinking and the problems encountered by young people with alcohol. As this research has generally not analyzed the directionality of the associations, further studies are needed to characterize these more precisely.

The most recent academic research has focused on the effect of pro-alcohol messages that are officially disseminated by internet users (and not by alcohol producers), based on the observation that while young people are critical of and rarely participate in the marketing techniques used by alcohol brands on the internet, they are more receptive to, and more willing to engage with, peer-generated content. The results of these studies, which are few in number at present, suggest that engaging in pro-alcohol messaging oneself (as opposed to participating in the marketing of producers) would have a greater impact on one's consumption of alcoholic beverages and would be favorable to one's image and identity. In addition, exposure to pro-alcohol messages and commentary from peers would influence the perceived norm of alcohol consumption towards trivialization.

The particularities of the internet make it difficult to regulate advertising on this medium. The system of age barriers exists: it consists of blocking access to alcohol brand sites or their social networks as soon as the internet user declares himself to be a minor. Studies have shown that this system is not very effective because young people often lie about their age in order to access the digital content that interests them.

Some countries have very specific laws on the digital marketing of alcohol. This is the case in Finland, which in 2015 adopted regulations that specify that all forms of marketing solicitations to engage internet users are prohibited (incentives to "like", post comments, react on brands' social networks, sign up for contests, games, sweepstakes, etc.), regardless of whether these incentives come from the alcohol industry and/or business partners (bars, nightclubs, paid influencers, etc.). This law is interesting because it assimilates modern forms of advertising on the internet, but it also raises the question of the traceability of links between alcohol producers and pro-alcohol message senders.

Lobbying by the alcohol industry

The literature on lobbying in the alcohol industry has developed since the 2000s. It analyzes the strategies, techniques and arguments used to influence political decision-makers in favor of the commercial interests of these firms.

Various forms of organizations have been identified as actors in alcohol lobbying. These include alcohol producers, professional associations (unions, industry representatives), Social Aspects and Public Relations Organizations (SAPRO) financed by the alcohol industry and whose stated mission is to carry out prevention campaigns and/or promote responsible alcohol consumption, and any other actor who in the short, medium or long term joins forces with the alcohol industry to prevent the implementation of regulations (hospitality sector, media, advertising and marketing agencies, distributors, etc.).

The published works explore the strategies deployed by these different organizations to prevent, mitigate, delay or withdraw measures adopted or envisaged by governments or the WHO and identified as the most cost effective, such as tax increases, minimum price per unit of alcohol, regulation of advertising, restriction of access to alcohol products (sale in certain distribution networks), etc. A review of the literature shows that the alcohol industry specifically positions itself to influence political decisions. The industry players position themselves as key partners in prevention and as responsible economic players (wrongly demonized by actors in the health sector) and they play down the harm caused by the product by pointing out that it affects a minority of the population and that moderate consumption of the product brings health benefits. Consequently, the measures proposed by these lobbying actors to solve the problem are based on education for moderation and interventions targeted at at-risk groups (pregnant women, young people, etc.), while they are hostile to measures that affect the entire population (taxes, marketing regulation, etc.).

It is interesting to note the similarity between the lobbying strategies and arguments identified in the international literature and those adopted by the actors of the alcohol industry in France (producers, unions, SAPROs financed by the alcohol industry).

Part of the work identified on lobbying is devoted in particular to the involvement of the alcohol industry in scientific research. The tools identified for this purpose are multiple: the creation of research institutes financed by alcohol producers, direct financing of university centers and researchers, the carrying out of internal research (on the benefits of alcohol consumption on health for example) or in connection with market research companies, and then the dissemination of “scientific” information with the aim of reaching various targets (politicians, journalists, health actors, the general public, etc.) through symposiums, reports and/or the websites of the alcohol industry.

The motives of the alcohol companies to interfere in the academic world are threefold: *i*) to publish research to influence societal debates by confronting findings unfavorable to alcohol with the results of their own research; *ii*) to lend credibility to the results of alcohol industry-funded research published by researchers; *iii*) to collaborate with the academic world and thus reach out to opinion leaders to improve the image of the alcohol industry among these audiences.

Biases and risks of abuse caused by the involvement of the alcohol industry in research have been uncovered. These include methodological biases, the orientation of the research topics financed by the alcohol industry (the work supported focuses on individual pathways while environmental factors are “forgotten”), the emergence of a feeling of reciprocity on the part of the researchers financed, and a lack of transparency on the work published and financed by the alcohol industry.

Research has also focused on how the alcohol industry in particular is attempting to counteract the alcohol marketing regulations that have been introduced in some countries over the

past few decades and that have been advocated by the WHO. A systematic review was published on this topic. It reveals the existence of five strategic axes deployed by the alcohol industry to influence decisions on marketing regulations: *i*) the dissemination of information on the subject in favor of alcohol (via direct or indirect meetings with decision-makers, collaborations with governments, publications that omit and/or refute the scientific literature on the impact of marketing on young people); *ii*) the constitution of interest groups and alliances (internal and/or external to the alcohol industry) to weigh against the measure; *iii*) proposing alternative measures to marketing regulation (self-regulation, corporate social responsibility programs, and alcohol education for young people); *iv*) turning to the law (questioning the legality of the measure, mobilizing international laws to counter the local measure); *v*) financial incentives/disincentives (stopping funding in sports, funding political parties that are hostile to marketing regulation, gifts).

In addition to these strategies, the researchers also identified the arguments used by the alcohol industry to counter marketing regulations. They are of several types: *i*) the measure is judged to be useless and redundant (auto-regulation already exists); *ii*) there is a lack of evidence on its effectiveness; *iii*) it will have negative economic consequences (employment, attractiveness of the country); *iv*) reducing alcohol-related harm is a complex problem that cannot be solved by marketing regulation.

These different arguments were found in the speeches made in the British media by the alcohol industry regarding the *Évin* law at a time when Ireland and Scotland were considering adopting similar regulations (marketing regulations finally voted in Ireland in 2018).

Finally, some researchers have found a similarity between the lobbying strategies and arguments of the alcohol industry and tobacco companies in their attempts to influence policy decisions. This has been noted in terms of overall strategies, involvement in research, and opposition to marketing regulations.

Primary prevention

Construction and main measures of a public action program

With an estimated social cost of €118 billion attributable to alcohol consumption, some people denounce the inequalities in the treatment of the various products of addiction. Current public policies do not reflect the dangerousness of the product “alcohol”. Often, the economic weight of the sector and the strength of alcohol lobbying are put forward to explain this specificity of alcohol: the French market is no exception, whether on the domestic or export markets. One of the major obstacles to the development of a public policy to fight alcohol-related harm is thus emerging: the divide between public health and economics.

Is an ambitious and coherent national policy between these two extremes possible? To overcome the divide, there is a move towards an approach based on reducing the risks and harm associated with alcohol consumption. More specifically, four areas emerged through a critical analysis of the existing literature and are outlined below.

First, the most cost-effective measures are: supply and demand control policies; advertising bans; policies to combat drinking and driving; and complementary measures specifically aimed at minors.

Second, the situation in countries regarding the adoption of guidelines varies widely (whether or not they have been adopted, whether they are specific to alcohol or part of a more general approach to addictions or nutrition, etc.), but it seems that their impact is greater when there is significant communication about the reasons for them, including the link between alcohol and cancer.

Third, the literature on health warnings is fairly convergent on the fact that there is a lack of studies on the impact of affixing of prevention messages or pictograms on containers and that

research in this area should be developed. Nevertheless, it can be said that health warnings should be part of a comprehensive and coherent strategy, with the following points: warnings seem to fail to reach the most risky drinkers; specific messages (by risk, by type of alcohol, by gender, etc.) would be more effective than universal messages; the rotation of messages is necessary to prevent habituation and a loss of effectiveness; the size, location, and even color of the message should be reviewed, as well as the possibility of nutritional labeling. Finally, this labeling should not be left to the voluntary efforts of the alcohol industry but should be the subject of a binding, mandatory and uniform public policy.

Fourth, consensus recommendations emerge from the literature such as developing a comprehensive plan that combines several types of cost-effective measures in a coherent manner; increasing resources for alcohol research, education and prevention; making regulations around prevention and health warnings compulsory rather than leaving this to self-regulation (voluntary); training all types of professionals involved, including in early identification and brief intervention (see “Brief interventions” in the section “Secondary Prevention: screening, brief interventions, other interventions” of this summary).

In contrast, the debate remains open as to the most appropriate type of approach (focused on alcohol or more generally on addiction, targeted or universal, individual or collective), and on the utility of drawing inspiration from what is being done for other substances, first and foremost for tobacco (firstly, for example, considering the idea of “passive drinking” that refers to the effects of alcohol use on the consumer’s entourage; secondly, an international treaty, etc.).

Finally, there are a number of elements necessary for the construction of these policies to reduce alcohol-related harm and risks, such as the fact of conducting a broad social and political debate; seeking to act on cognitive and cultural aspects; the necessary political will to maintain the coherence of messages and public policies in the face of a powerful lobby; the

fact that the measures must be long-term and that the means must be found to make their implementation effective; the fact that this global approach must be built by placing the health care system and health professionals at the heart of reflection and public action.

Actions on supply and demand, as well as pricing

Supply and demand control policies are among the most important cost-effective measures in a public policy program (see above). The evaluation of these measures in the scientific literature suggests that measures to restrict the supply of and demand for alcohol are effective means of limiting alcohol use.

Limiting the supply of alcohol

In terms of limiting the supply of alcohol, three key measures have been implemented and evaluated in different countries. These measures are outlined below, with emphasis on the situation in France.

One means of restricting the number of alcoholic beverage outlets is through fixing the conditions under which new outlets can be established in a given territory. In France, licensing decisions are currently the unilateral prerogative of mayors and prefects, with legislation that has just been relaxed concerning the migration of type IV licenses to tourist areas. In contrast, in England, the decision to grant a license is multi-party and is made by stakeholder committees that decide whether or not to approve new pubs. The effect of these procedures is to change the sociology of the pubkeepers and to put strong public order concerns on the agenda of the licensing decision. It also appears that, since the establishment of these commissions, the number of alcohol-related hospital admissions has decreased in the geographical areas for which these commissions are responsible.

Similarly, in France, mayors and prefects set the opening and closing hours of take-away and on-premises drinking

establishments by decree, within the limits of national legislation. There are territorial differences concerning the closing hours of pubs. Different experiences in other countries with restricting or extending the hours of sale of alcohol shed light on the impact that such changes can have on alcohol use and related harm. In the Netherlands, Germany, Norway, Switzerland and Australia, the scientific literature, using different evaluation methodologies, all agree on the benefits, in terms of public health and order indicators (lower consumption, fewer violent attacks, lower levels of impaired driving, etc.), of restricting the hours of sale of alcohol, whether for takeaway or for sale to be consumed on the premises.

The benefits of limiting alcohol consumption by young people are also clearly documented. Bans on the sale of alcohol to minors are associated with lower road traffic accidents, lower alcohol consumption and fewer negative consequences of alcohol use among adolescents and young adults. Research also tends to show the long-term health benefits of such bans. Thus, the scientific evidence for the benefits of higher age limits on access to alcohol is now clear. In this sense, the gradual increase in the legal age of access to alcohol in France seems judicious. Nevertheless, the fact remains that these restrictive measures must be respected. Dutch alcohol retailers (both on- and off-premises) have benefited from training on this issue and have been provided with tools to check the age of customers, which have helped them to implement such a measure. Experimental evidence thus shows a continual improvement in compliance with the law on the sale of alcohol to minors over the past few years in the Netherlands. Nevertheless, some studies also stress the importance of dissuasive sanctions and frequent checks.

Limiting the demand for alcohol

When it comes to limiting the demand for alcohol, tax mechanisms are the most widely used and evaluated internationally, and in Europe in particular.

The aim is to increase the price of alcoholic beverages, through an increase in taxes and excise duties on them, so that consumers restrict their purchases and therefore their consumption. The scientific literature is focused on the impact of price increases on the intensity of alcoholic beverages, on the categories of the population that are most likely to be sensitive to these price variations, and finally, on the impact in terms of public health.

From this work it has emerged that individuals are indeed sensitive to variations in the price of alcoholic beverages. Collectively, individuals are very sensitive to price variations of spirits, sensitive to these for wine and slightly less so for beer. Despite these differences, when prices rise, individuals consume less.

However, the price elasticity of alcohol demand differs between individuals. In the latest research on this subject, young people appear to be less sensitive to increases in the price of alcoholic beverages and, in particular, the most intensive in their use of alcohol, even if the tax is applied to types of beverages targeted at young consumers, such as ready-to-drink. Young people, and especially young heavy drinkers, thus implement strategies to circumvent tax increases: they try to minimize their expenditure per gram of alcohol by reducing the quality of the alcohol purchased, for example. Adult heavy drinkers would have the same strategies as young people. The latest research indicates that heavy drinkers respond to price increases by substituting products according to their price. They tend to spend as much as possible per unit of alcohol per price paid, either by buying more to takeaway than to consume on premises, or by buying cheaper brands of alcohol.

The fact that some population groups are much less sensitive to price increases than others certainly does not disqualify the tax tool as a public health policy. At most, it implies that further research is needed on, among other things, the way in which the alcohol industry promotes the effects of substitution between products on the one hand, and on the way in which fiscal mechanisms and designs could limit them on the other. With

regard to the latter, there is a large body of literature studying the effects of taxing a gram of pure alcohol or imposing a minimum price to alcoholic beverages.

Based on experiments and international evaluations it can be concluded that tax design matters: policies based on a minimum price, and in particular the imposition of a minimum price per unit of alcohol, are likely to reduce alcohol consumption and alcohol-related morbidity and mortality, both in the general population and among young people and those with heavy drinking habits. In France, such a tax mechanism already applies to sugar added to non-alcoholic beverages, a mechanism known as the “soda tax”. It therefore seems possible to set up such a system for the units of alcohol contained in drinks.

Mechanisms of preventive actions: messages, behaviors

Information and/or awareness campaigns are regularly conducted in many countries. Most often, the designers of these campaigns rely on changing people’s minds (beliefs, motivations, knowledge, attitudes) to change opinions and behavior. It has been shown that behavioral and other change outcomes are rarely satisfactory when campaign designers rely on information and persuasion. This does not mean that informing or arguing is useless.

Information and argumentation allow, over time, to modify knowledge and attitudes and to raise awareness. However, raising awareness is not a lever for change. Effective interventions to reduce alcohol consumption are therefore needed. In this sense, the requirement for health warnings that are imposed on alcohol manufacturers are an interesting measure from a public health perspective, as they do not cost governments anything, unlike media campaigns, which are costly if they are nationwide. Moreover, the literature shows that depending on their format and content, these messages are effective on different persuasive elements (increased knowledge of risks, memorization, effect on drinking intentions, etc.). In France, these messages, combined with other measures,

are an opportunity to increase the population's knowledge of the risks associated with alcohol consumption – some of which are poorly known: breast cancer, cardiovascular disease, etc. – and to change drinking behavior.

Meta-analyses show that a change in intention, estimated between medium and high, produces a change in behavior estimated between low and medium. Thus, interventions must produce the greatest changes in intention to lead to behavioral changes. Furthermore, change in intention is not a good predictor of behavior change when the latter is assessed approximately three months after the intention measure.

It is important to identify risk factors related to personality traits (impulsivity, etc.) and mood changes (depression, anxiety) in order to understand their interaction and to build preventive and curative intervention programs.

Michie's behavior change wheel model outlines the various steps involved in addressing a behavioral problem: from identifying the problem (choosing priorities based on relevance and ability to change, what to change, when to change, and who must change), to identifying the intervention and the behavior. In general, researchers agree that studies of adherence to alcohol risk recommendations lack reference to attitude change theories and behavior change techniques to make recommendations for reducing alcohol consumption as effective as possible. However, some techniques are particularly effective at reducing consumption, such as providing feedback on one's own performance (e.g., by graphically displaying one's consumption and mentioning the equivalent money spent or calories consumed), eliciting commitment, and social comparison. Moreover, encouraging the formulation of specific plans (e.g. in the form of implementation: "where, when, how?" or in the form of "if... then").

Researchers have compared the effect of implementing plans generated by professionals (e.g., by an experimenter or therapist) to those developed by the participants themselves. The implementation is generally more effective when directed by a

professional. When aiming for large-scale behavior change interventions, it is best that they be combined with other strategies such as the use of a “Volitional Help Sheet” where the individual chooses the type of achievement they wish to implement. These are only effective when incorporated into a brief intervention. We conclude that implementations are effective in reducing alcohol consumption with lower consumption in the month following the intervention.

Few studies have assessed the development of perceived norms in adolescence, yet perceived social norms for drinking are strong predictors of adolescent drinking. Descriptive (conforming to others’ behaviors) and injunctive (approving drinking) norms increase significantly during adolescence and increase further with age. The results suggest, therefore: *i*) the need for interventions targeting perceived norms of drinking in early and mid-adolescence which is experienced as a dynamic period in the study of drinking norms. Prevention programs should include feedback on injunctive norms to improve their effectiveness; *ii*) that Protective Behavioral Strategies (PBSs), i.e., behaviors that individuals can perform to limit the negative consequences of drinking have the potential to reduce alcohol-related harm by reducing the total amount of alcohol consumed.

The use of persuasive technology, that aims to change behavior in a desirable way through reinforcement of behavior and/or attitude, is today being successfully developed (e-health, M-health). This is happening in practically all areas of health and well-being (websites, messages on mobile devices, etc.). Applications aimed at reducing alcohol consumption can be successfully developed provided that they use tools supported by theories of behavior change (“Digital Behavior Change Interventions” or DBCIs). This requires the use of various techniques for measuring engagement, profiling the intervention, and communication. There are several scales that can be used to measure involvement or engagement in DBCIs.

In the end, traditional information campaigns have little effect in changing behavior. Beyond the main moderating variables

(for example, social environment or individual characteristics), change is brought about with the help of proven models that make traditional and nowadays mostly digital communication campaigns more effective. This section identifies the main techniques that enable these changes as well as the possible sources of resistance leading to inertia and distrust. The dissemination of this information, whether traditional or digital or based on persuasive technology, should use, at least in part, techniques of proportionate universalism. In other words, that allow for equity in the intervention through the application of universal measures for the whole population while also applying specific measures aimed at more vulnerable groups.

Effectively informing pregnant women, or those who want to become pregnant, about preventing alcohol use during the perinatal period poses numerous difficulties. This is the case whether the prevention message is to not start drinking or to stop consuming alcohol during this time. The “zero alcohol” message advocated by various health agencies in many countries including France, is not heeded by many pregnant women. In France, obstetric professionals are less vigilant with their patients about the risk of alcohol than about the risk of smoking. On the whole, prevention campaigns achieve their goal in terms of information – with respect to dissemination and knowledge – but they are not really effective (in quantity or duration) in reducing consumption. Among women, campaigns with explicit messages about the medical risk that alcohol poses for the unborn child seem to be more dissuasive than positive messages encouraging them not to consume without reference to the fetal risk.

Interventions conducted in different countries and evaluated as effective in preventing alcohol consumption: in schools, in families, in the workplace

Within the field of alcohol prevention interventions, some approaches have been shown to be beneficial for reducing experimentation with and/or consumption of alcohol by target

audiences and for minimizing the negative consequences of alcohol consumption. These interventions, which have been selected and evaluated as effective in preventing alcohol use, have been grouped into five broad categories: 1) school-based (or higher education) interventions; 2) interventions conducted with parents or families; 3) interventions in the workplace; 4) multi-component or multi-setting interventions; and finally 5) other interventions including social marketing interventions.

Interventions in schools or in higher education

- ***Generic interventions to develop students' psychosocial skills***

This category of interventions consists of developing social skills (including the ability to resist peer pressure to consume alcohol), and cognitive and emotional skills that act as protective factors against a large variety of risky behaviors. These interventions are most often conducted in schools during the first years of middle/intermediate school and are aimed at all the pupils in a class (programs include, for example, “Life Skills Training” and “Unplugged”). The interventions are structured around a work program that takes place over several weeks (generally weekly workshops of 1 to 2 hours over a period of 6 to 14 weeks), led by trained professionals (teachers, educators, etc.). Skills are worked on in groups through role-playing and simulation. Knowledge is also provided on the short-term negative effects of products and on social norms of consumption (the perceived prevalence of consumption among their peers is generally over-estimated and activities are aimed at rectifying these beliefs). Other interventions, such as the “BRAVE” program, are aimed at students with risk factors and address specific topics depending on the problems encountered (violence, gender norms, professional orientation) and offer mentoring by older peers.

- ***Student skill-building interventions focused on reducing the negative consequences of alcohol use***

These programs work to develop psychosocial skills among 13- to 15-year-olds through role-playing and discussions focused on risky drinking situations, identification of the harm associated with such consumption, and the development and implementation of strategies to avoid or reduce such harm (SHAHRP, DEVS, CLIMATE Schools).

- ***Interventions to prevent problematic student behavior in the classroom***

These programs are often initiated earlier in the school curriculum (kindergarten or primary school). They aim to reduce disruptive behavior (Good Behavior Game) or aggressive and anti-social behavior (Olweus Bullying Prevention) among pupils. These strategies are based on explicit teaching methods, positive reinforcement of expected behaviors, group influence, adult role models (positive models), and they aim to ensure that pupils take into account shared rules of good behavior in the classroom and within the school.

- ***Short interventions for high school and university students***

These interventions are mainly based on personalized normative feedback (PNF) techniques that can be combined with motivational interviewing (e.g. BASICS intervention).

- ***Other classroom interventions***

Other interventions, usually aimed at secondary school students who are already confronted with alcohol consumption, are based on simple commitment strategies (Keep a Clear Head), combine normative feedback with interventions by SMS (MobileCoach Alcohol), or use a serious game approach (Alcohol Alert – which confronts youth with different drinking scenarios and offers prevention messages adapted to these situations as well as action plans for reducing consumption). Another intervention,

Project Toward No Drug Abuse, combines multiple elements and is notably aimed at institutions for students outside the traditional educational curriculum. It involves development of psychosocial skills, work on motivation, improvement of knowledge about the consequences of consumption and correction of normative beliefs.

- ***School-based interventions delivered outside the classroom***

In this category, brief interventions (1-7 sessions) conducted by nurses or educators combine different intervention techniques such as personalized feedback (Project SPORT, STARS, CHOICE), information dissemination (STARS), normative belief correction (ATLAS, CHOICE), motivational work (CHOICE, STARS, Project SPORT), role-playing to develop skills for resisting peer pressure (CHOICE, ATLAS, STARS), planning behavioral goals to reduce consumption (ATLAS, InShape), and commitment techniques (behavioral contracts as in the STARS program).

Interventions with parents and families

- ***Early parenting interventions***

An early intervention (Nurse-Family Partnership) offers vulnerable pregnant women, most of whom are primiparous, a follow-up initiated during pregnancy and up to the child's second birthday. Through home visits conducted by early childhood professionals, it aims to prepare a favorable environment for the arrival of the child, to support the establishment of a secure bond of attachment between mother and child (observations and guidance) and to help women deal with the other problems they face (health, employment, housing, etc.). This program has shown significant effects on the alcohol consumption of adolescents whose mothers have benefited from the program.

- ***Parenting education interventions***

Educational programs that have shown a benefit on alcohol use generally aim to change parents' attitudes towards alcohol (information on risks, parental influence, correction of parents normative beliefs), to help parents of teens apply rules for no alcohol consumption (advice, communication techniques) and to engage with them in leisure activities. This type of program is aimed at parents of children in middle/intermediate schools (Örebro Prevention Program – ÖPP), and of high school students (FITSTART, Parent Handbook). They can be implemented over a number of years using parent-teacher meetings, letters to parents, or through the use of handouts or manuals.

- ***Family skills strengthening interventions***

These interventions (Strengthening Families Program, Preparing for the Drug Free Years) combine children's psychosocial skills development components (children's workshops) with parenting skills development (parent workshops) and family skills development (parents and children). They use the same techniques as the children's psychosocial skills development programs (acquisition of cognitive, emotional and social skills through structured interactive workshops). These programs aim to develop skills that enable parents to be more effective in performing their support and supervisory functions and to improve the quality of interactions within the family.

Workplace interventions

- ***Psychosocial interventions***

Some of these interventions, lasting from 4 to 8 hours over 1 to 3 sessions (Team Awareness, Team Awareness for Small Business [TA^{SB}], Team Resilience), aim to increase the ability of peers to identify problem drinkers and provide them with support and guidance, and to work on drinking norms and the professional setting. Developed in various contexts (municipalities, small and medium-sized businesses or the restaurant industry) they are based

on interactive activities and knowledge development. Other interventions focused on stress management, including the Yale Work and Family Stress Project (15 weekly 90-minute sessions: problem solving, reappraisal of stressful situations, and stress management techniques) have shown effects on reducing recent alcohol use up to 2 years after the intervention.

- ***Brief interventions***

Studies on brief interventions in the workplace, particularly those based on personalized normative feedback (PNF) alone, have not produced convergent results regarding their beneficial impact on consumption. However, some interventions have proven to be effective. Among them, an intervention that combined PNF with an educational component (knowledge about alcohol use and its consequences) and a psychosocial skills development component has shown an effect on reducing the negative consequences of alcohol consumption among women who drink at risk.

- ***Digital interventions***

Administered via the internet in various professional environments, and notably in the army (PATROL), these interventions are based on normative feedback to which other components are added, such as motivational interviewing, goal planning, problem-solving and emotional management. Two of the three interventions evaluated showed greater benefits among the most at-risk consumers.

- ***Environmental interventions***

These interventions do not focus on individual factors, but rather on collective and environmental factors, including psychosocial risks (stress, low latitude for decision making, workload, etc.) and norms for the consumption of and access to alcoholic beverages in the workplace. These programs could be combined with more individualized offers of help (testing, screening, treatment), particularly for high-risk drinkers.

Multi-component or multi-media interventions

- ***Interventions in schools and with parents or family***

These programs are generally based on a psychosocial skills development component for children and a parenting or family skills development component (SFP 10-14 + LST, Montreal Preventive Treatment Program) or parenting education component (ÖPP, Parent Handbook + BASICS, PAS, STAMPP) to which other components are added. Most of these programs are conducted face-to-face, but some offer CD-ROM versions (SODAS). The other components mobilized in these interventions are many: work on the school environment and management of recreational activities, tools aimed at fostering parent-teacher relations and communication (LIFT program), tutoring systems to strengthen academic skills (Fast Track, Raising Healthy Children – RHC), teacher training (Seattle Social Development Project – which includes interactive teaching, proactivity, positive reinforcement of students), or home visits for the most troubled students (RHC, Fast Track). These programs have proven to be effective, particularly in the most disadvantaged environments.

- ***Community interventions***

Community-based programs are usually the result of the integration of programs with a school-based psychosocial skills development component, a parenting skills development component and environmental actions (e.g. limiting access to alcoholic beverages) at the neighborhood, city or larger geographical area (region, clusters of schools, cities or universities). The majority of these programs (PROSPER, Communities That Care, LUMA) do not a priori propose interventions. They are based on the constitution of a coalition of actors and the elaboration of a joint assessment. On the basis of this assessment, the group chooses an intervention or a combination of interventions from a list of promising programs or those that have already proven their effectiveness in responding to the problems identified.

Other interventions

- ***A specific prevention intervention for reducing the risk of alcohol-exposed pregnancies***

One intervention (CHOICES) has been shown to be effective in reducing the risk of alcohol-exposed pregnancy. It offers a 14-week follow-up (4 counseling sessions using a motivational approach and a medical consultation on contraception) to women of childbearing age identified as having risky alcohol consumption and ineffective contraception.

- ***Interventions aimed at preventing alcohol use by older adults***

Brief interventions have shown benefit in terms of reducing alcohol consumption, however the studies are few in number and of poor methodological quality. One intervention, conducted over one or more sessions, involves multiple components including an interview with a nurse or doctor, personalized feedback, information on the risks associated with alcohol consumption, advice on reducing consumption, and a list of available resources and help. Another, Project SHARE, involves three sessions of motivational therapy, personalized feedback, educational material, medical and health education, and a consumption diary.

- ***Social marketing interventions***

Although several reviews point out the methodological weakness of the studies available in this field, social marketing interventions have shown their relevance in changing a number of behaviors related to alcohol consumption (reduction of alcohol consumption, reduction of drinking and driving, increase in the number of “designated drivers”). To be most effective, however, social marketing must meet a number of criteria, in particular having a behavioral objective, segmenting and targeting the intended population and taking into account the balance between the effort required and the expected benefits.

The prevention of alcohol consumption would benefit from the development of early interventions aimed at strengthening generic protective factors such as parenting skills and psychosocial skills in children, and from working more broadly on social environments (particularly the school environment). In addition to the positive long-term effects observed on the use of psychoactive substances, these interventions help to reduce social inequalities in health and prevent a wide range of risky behaviors. These approaches can be developed for various populations including: *i*) pregnant women with vulnerability factors (isolation, primiparity, etc.) to provide psychological and social support and help the development of a strong attachment bond; *ii*) parents who express a need for parenting support with the aim of strengthening their capacities and their feeling of effectiveness in the exercise of their parental functions (emotional support and supervision); *iii*) education professionals, to develop tools for managing groups, for shaping behaviors and for providing positive influences that value their students, encourage learning and enable students to internalize the rules of conduct in a group; *iv*) for students, in the school environment, in order to effectively develop their social and emotional skills in addition to cognitive skills.

These interventions, which are mainly aimed at preventing people from starting to use alcohol or preventing problematic use, must be supplemented by interventions to help them stop or to reduce the risks for people who are already consuming alcohol, whether they are young people or other populations (the elderly, women at risk of an alcohol-exposed pregnancy).

Benefits of “alcohol-free” periods

Dry January is an annual awareness campaign which originated in England and that encourages people not to consume alcohol during the month of January. Overall, the success of Dry January is associated with changes in consumption and a higher level of self-efficacy that persists for up to 6 months afterwards, without

any rebound effects. The Dry January campaign, as shown by this British example, offers more advantages than disadvantages for reducing alcohol consumption.

There are many alcohol-free month challenges around the world. In recent years, campaigns have been launched in many countries (United Kingdom, Australia, New Zealand, Canada, Belgium) inviting people to abstain from alcohol for a specific period of time, usually one month. Participants who take part in such a challenge want to reduce their consumption or abstain or both. Unlike tobacco campaigns, which are aimed at cessation, these campaigns are aimed at improving quality of life, reducing alcohol-related harm, and encouraging long-term reduction in consumption.

The aim of these campaigns is to raise awareness and encourage people to question their relationship with alcohol and their consumption. Dry January in the United Kingdom and the “*Tournée Minérale*” in Belgium have been very successful in terms of participation, thanks in particular to their resonance in media and social networks and “social contagion” effects that increase the number of participants and also the dissemination of knowledge about the effects of alcohol and the benefits of abstinence.

Dry January provides a number of support and counseling tools including a website, blogs, communication via social networks and e-mail, and a mobile application (“Try Dry”). This app includes a year-round drinking diary and advice on the effects of alcohol and the benefits of quitting. In particular, it includes information on calories avoided, savings made and the possibility of setting drinking targets. Participants who use the tools provided the most are more likely to be able to stay sober for a month.

Motivation to quit seems to increase in January, suggesting that this month seems ideal for initiating a population-based intervention such as Dry January. It is possible that the potential excesses during the December holiday season and the desire to “detox” following these excesses, combined with good resolutions at the beginning of the year, could be the best option for

mobilizing a maximum number of participants around an “alcohol-free” campaign in January with the launch of a challenge to abstain from alcohol.

The benefits of temporary cessation of alcohol consumption are numerous. This is especially true in a context where several studies, including those using Mendelian randomization (see the section “Health and socio-economic damage” in this summary), have demonstrated the absence of “protective” effects of low levels of consumption, and even an increased risk of developing certain diseases, particularly cancer. Among the beneficial effects of abstaining for one month, we can note improvements in physiological, cognitive, well-being and quality of life parameters. The surveys report improvements (Figure 4) in terms of savings, well-being, certain physiological parameters (insulin resistance, blood sugar [better glucose homeostasis], blood cholesterol, skin and hair tone, liver elasticity, weight and BMI, better sleep quality, more energy and improved blood pressure). From a cognitive point of view, improvements in concentration and work performance are reported.

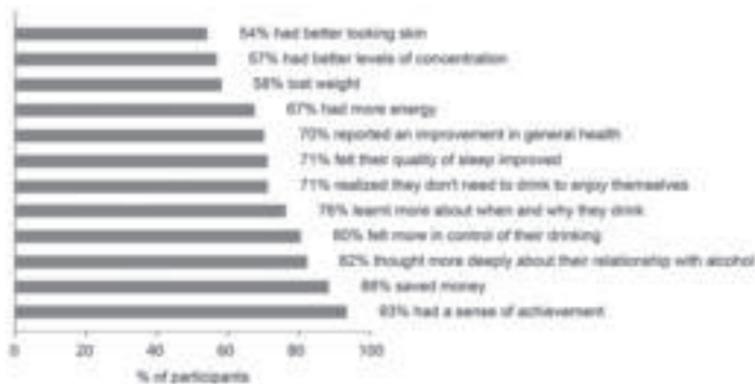


Figure 4: Benefits reported by Dry January participants based on online surveys in 2018

Source: Naassila M. Quels bénéfices des défis “sans alcool”? *Alcoologie et Addictologie* 2019; 41: 297-307 (adapted with permission).

While the scientific literature is rich in clinical studies that have demonstrated the role of alcohol consumption in many diseases, fewer studies exist on the effects of abstinence. The demonstration of a causal relationship between alcohol consumption and a disease does not necessarily mean that cessation of alcohol consumption is accompanied by a reduction in the risk of that disease. Most studies therefore focus on populations of people with diseases. Nevertheless, it has been suggested that abstinence and management of alcohol use disorder may be important for the survival of patients with liver cancer. Furthermore, abstinence significantly reduces the recurrence of atrial fibrillation, increases the time to recurrence and reduces the duration of fibrillation episodes.

These campaigns are aimed at the general public and in particular at people who consume above the consumption guidelines. Even if they do not target people with risky alcohol consumption, these individuals can nevertheless participate in this type of challenge with the assistance of a health professional. These campaigns should be accompanied by complementary interventions, such as other information campaigns (normative feedback) and intervention programs (such as early identification and brief intervention), in order to achieve long-term abstinence targets.

The benefits of alcohol-free challenges are an opportunity to be seized. The strengths of operations such as Dry January are multiple, with the opportunity to experience all the benefits of stopping drinking (embodiment), and to become aware of one's own ability to control one's behavior (empowerment). An essential objective is to change one's behavior in the long term after having better understood one's relationship with alcohol consumption (why do I drink? when do I drink?) and having better understood how to deal with the social pressure to drink. It is therefore a question of experiencing the impact of abstinence on one's physical and mental state, one's self-awareness and one's ability to change. "Social contagion" is a key factor in the success of this type of campaign and it is interesting to

note that participants who sign up for Dry January but who do not succeed in the abstinence challenge for a month also show long-term benefits.

The positive message of the possibility of improving health through abstinence (even temporary) is a real lever for addressing the challenge of reducing the societal burden of alcohol consumption. Indeed, it is important to realize that this type of operation is seen as a means of positive regulation that is not based on negative consequences or moralization and that aims to change people's behavior in the long term. Other complementary regulations target, notably, reminding people of the risks associated with drinking (prevention campaigns), access, availability, publicity or even repressive measures (drinking and driving). This type of campaign represents an unprecedented opportunity to mobilize around a month of prevention of alcohol-related harm and risk in France, as is already the case in many other countries. Interestingly, an inverse correlation was observed between the number of participants in Dry January in the United Kingdom and the number of alcohol-related emergency room visits. This reduction in emergency room visits due to alcohol-related problems would therefore be an interesting criterion for assessing the effectiveness of the campaigns implemented. The success of this type of campaign could also be measured in terms of increased productivity and reduced absenteeism from work when employers encourage their employees to participate in Dry January.

At the end of 2019, the French Public Health Agency, which was committed to the organization of a Dry January in 2020, had to give up its implementation after government decisions. This decision triggered a strong reaction from associations and federations involved in the field of addictology. They decided to launch their own campaign called The January Challenge (*#LeDéfiDeJanvier*) – with tools similar to those developed for the Dry January.

Finally, it is important to remember that the current benchmarks for alcohol consumption recommend not consuming

alcohol for at least two days a week, which represents 104 days of abstinence per year, or more than three months of “zero alcohol” per year. Research is needed to establish the benefits of these days of non-consumption spread throughout the year compared to temporary but continuous abstinence over several weeks. Promoting abstinence and valuing non-consumption require the development of attractive alternatives to alcoholic beverages. It is not simply a matter of recommending avoidance of alcohol but also of experimenting with new non-alcoholic beverages that are good, or at least not harmful, to health.

Secondary prevention: screening, brief interventions, other interventions

Overall, risky alcohol consumption (excluding alcohol dependency) causes more harm than dependence in terms of morbidity and mortality. The former population is 5 to 8 times larger than the latter, whether it be men or women.

It is therefore highly desirable to take measures to promote systematic screening for risky drinking, which allows for the implementation of brief intervention. This is all the more important as the cost-effectiveness of brief interventions is much higher for at-risk drinking than is the case for treatment of alcohol dependence.

The evidence for the effectiveness of implementing screening and brief intervention is well established when it is practiced in the community (e.g. schools), in general practice and in emergency departments.

The application of systematic screening measures also makes it possible to identify alcohol-dependent people. Although this screening is very effective, it is very little practiced, particularly in France.

Screening

There are many arguments for its widespread use. Screening for alcohol use (whether for risky consumption or dependency) can be done at different times. It is recommended in primary care, but has also been proposed in emergency departments, during pregnancy monitoring, in occupational medicine and via new technologies for large populations. Different tools are available and include questionnaires but also biological markers.

The reference questionnaire is the Alcohol Use Disorders Identification Test (AUDIT). A validated French version is available, as well as a short version (AUDIT-C) including the first 3 questions: frequency of drinking, quantity per occasion and frequency of heavy drinking.

While the screening tools are valid, very little screening is done routinely. For it to be done, implementation strategies are needed. Encouraging results have been shown, in the case of screening integrated into the care process, reminders in the electronic medical record, and performance measures and controls on physician use of screening. National campaigns to promote screening have also shown good results, for example with the provision of training and support for physicians and financial reimbursement for services. The use of biological markers in screening is more controversial and depends on the type of marker and the area of use. New direct markers (ethyl glucuronide [EtG] and phosphatidylethanol [PEth]) of alcohol consumption offer better results in terms of sensitivity and specificity, but are not yet widely used in clinical practice. In the general population, questionnaires perform better than biological markers in terms of sensitivity and specificity.

Brief interventions

Brief (short) interventions provided as part of a “stepped care” approach have a clearly established cost-effectiveness.

Despite evidence of their effectiveness, screening and brief interventions are only provided when health systems routinely offer them. If risky or problematic use is identified, a brief intervention is usually offered next. The term “brief intervention” is a general term that includes different types interventions through which the clinician provides counseling and/or psychological support to help people understand the risks and negative effects of substance use and to explore ways of reducing it. The different models of brief intervention share for the most part the same theoretical foundations, i.e. the social-cognitive and motivational theories. They also share practical features: they are designed to be carried out during regular consultations that generally last 5 to 15 minutes with physicians or 20 to 30 minutes with nurses, and although short in duration, can be delivered in one to five sessions.

One of the modalities used, digital brief interventions, is low cost and can be used in the community (schools, armed forces, etc.) and in general medicine, etc. It is therefore necessary to prioritize these interventions (internet, mobile applications) for the general population using, for example, a screening and brief intervention in the waiting room of a primary care consultation. This allows for a reduction in consumption among non-alcohol dependent people and the identification of alcohol-dependent people who benefit from this initial measure, and the establishment of long-term follow up in general practice, with or without the support of specialized services.

The practice of brief intervention for at-risk drinkers effectively includes people with alcohol dependence. For people with alcohol dependence, brief intervention cannot change behavior, but it might start a discussion and be a first step in the management of alcohol dependence (discussed in the section “Management of alcohol dependency” of this summary). It is essential to use addictology services for people with severe alcohol problems.

Other interventions

The treatment of people with risky alcohol consumption or dependence presents several difficulties. First, the number of meetings between these patients and healthcare professionals needs to be increased. The treatment plans offered to patients are based on the imperative for abstinence, and a broader range of services will facilitate their involvement in the treatment process. Moreover, and for many years now, the aim is to develop and use new therapeutic techniques that have shown their effectiveness. Abstinence has benefited from its own protective therapeutic methods, but HR (harm reduction) when it comes to alcohol, by imposing itself as a principle, has had to take over certain tools and practices, as well as create new ones. The idea here is to consider risk reduction along the continuum of alcohol-related problems, while keeping in mind that there is a distinction between drinking that poses a health risk and alcohol dependence. For all drinking profiles, contact with a primary care professional is the primary goal. HR can be conceptualized as prevention – and interventions – during and throughout the consumption behavior, which implies different adaptations and techniques depending on the stage of the user's life (whether it be someone with risky alcohol consumption, with or without dependency). Thus, HR does not make abstinence an imperative, yet it is not “anti-abstinence”.

With respect to treatment, the reduction of consumption is achieved through various techniques and methods of support, focusing in particular on the precise quantification of the drinks consumed and the setting of realistic objectives, adapted to the individual's possibilities. Medication may be prescribed. The patient plays an integral part in the approach and the objectives. To do so, they must be appropriately informed of the interest and prospects of HR, and be accompanied by professionals trained and committed to this practice. Individual support also makes it possible in a consultation to address “drinking patterns” such as schedules, rituals, etc., and to lay out individualized

plans. This is an important way of carrying out real-life HR interventions, but evaluating their effectiveness is complex. HR has its limitations and it must also be specially adapted for the most vulnerable groups. In several clinical situations, even low levels of consumption are not recommended: certain psychiatric or somatic pathologies, severe cognitive disorders, and people who experience a loss of control at the slightest stimulation by alcohol. Similarly, certain populations such as workers in high-risk jobs or pregnant women, people taking certain types of medications, and minors should not be advised to drink in moderation. As with illicit drugs (and, certainly in a manner not planned by the public authorities, for tobacco with the advent of the electronic cigarette), the aim is to establish with a HR for alcohol, a cross-cutting pillar that is a vector for a policy of prevention, care and the application of the Évin law in France.

For at-risk drinkers, psychotherapy and drug therapy are the mainstays of treatment, but many other possibilities are described. These other interventions need to be evaluated in a sound manner to avoid disappointment and lost opportunities. The way in which professionals, or committed and/or trained individuals, apply these methods also plays an important role – experience and interpersonal skills being decisive factors of effectiveness, even for validated techniques. However, the behavior of healthcare workers often reveals their negative presuppositions about addictions: their initial training and their social reality interfere greatly with their openness and the therapeutic tools offered (such as interventions involving associations of current and former drinkers). Changing this fact is a priority for improving addiction care.

Our analysis of publications exploring the therapeutic benefits of techniques including transcranial direct current stimulation (tDCS) and repetitive transcranial magnetic stimulation (rTMS) of the brain, acupuncture and neurofeedback found these are for the most part disappointing, in both at-risk drinkers and dependent patients. The number of subjects, the

standardization and therefore the replication of the methods, and the duration of follow-up, are most often insufficient to allow conclusions to be drawn as to their constant and lasting effectiveness.

Physical activity in the context of HR has a positive role on risk factors and therefore indirectly on consumption. A frequent message in clinical practice is to promote physical activity in prevention and treatment of addictions. In a 2017 meta-analysis, physical exercise seemed to have a positive impact on alcohol consumption and abstinence rates. However, the activity itself is poorly defined and heterogeneous in the studies, the elements arguing its effectiveness on the reduction of consumption in the medium and long term are weak: the improvement of associated comorbidities and of the type of social relationships seems essential. In fact, a study by Inserm⁸ explores in detail the links between depression and physical activity. Risky alcohol consumption is often associated with social withdrawal, and observational studies establish a strong relationship between physical inactivity and depressive disorders. This evidence supports the value of helping people to engage in physical activity, which has a positive impact on mood and somatic status, and indirectly on consumption.

In addition to these approaches and techniques, two forms of intervention stand out and are of major interest: interventions using the internet or applications, on a computer or smartphone, and self-help groups. Their effectiveness is supported by a substantial literature.

The quantitative and qualitative development of digital interventions is massive, and facilitates the dissemination of information and the possibilities for prevention and support. The evidence is positive for secondary prevention among at-risk drinkers in terms of reducing consumption. There is a wide range of interventions on offer, but the criteria for their quality and

8. Inserm. *Activité physique: Prévention et traitement des maladies chroniques. Collection Expertise collective*. Montrouge: EDP Sciences, 2019.

hence their effectiveness have not been defined. The coming years should see the systematization of criteria for the design and monitoring of applications; moreover, their use with dependent patients remains to be defined.

Self-support groups, such as Alcoholics Anonymous in the United States and the 12-step method, are a cornerstone in the treatment of addiction. There are many articles studying their method and their effectiveness. One notes the orientation of a part of them to demonstrate the interest of Faith and divine references; the others insist on solidarity and constant help to change behaviors – thus, they are like therapeutic techniques, applied successfully by non-professionals. An analysis of the role of these groups must in fact address spirituality, and at the same time, emancipate itself from it: the supports of the groups are “spiritual, informational, emotional, instrumental”. These groups, which sometimes involve families, act on the feelings, capacities and emotions of the participants, enabling them to develop positive visions of themselves in a context of close relationships.

All these techniques contribute to better access to care (access to the internet in particular multiplies the possibilities of messages and consultations), and to limiting consumption; their use and development should meet quality criteria in order to allow their application in routine clinical practice.

Management of alcohol dependency

Alcohol dependence is the most severe stage of risky drinking. As a reminder, dependent subjects constitute a minority subgroup of all subjects with risky alcohol consumption, and the majority of alcohol-related harm involves subjects who do not meet the diagnostic criteria for dependence.

There is a major lack of access to care for alcohol-dependent patients, as only 10% of them receive addiction care. Contrary

to popular belief, the lack of motivation to change one's behavior towards alcohol is not the only explanation for this situation. In fact, about half of the patients go to an addictology consultation recommended to them during their stay in an emergency department. Moreover, it has been shown that motivation to seek care increases with the severity of the disorder. In particular, when the severity of the disorder increases, the probability of mentioning denial as a reason for not seeking care decreases in favor of other reasons directly related to difficulties in accessing care.

Alcohol dependence is characterized by its chronic course, even though less severe forms of risky alcohol use can be resolved without relapse. Thus, the perception of alcohol dependence as a chronic disease makes it possible to apply all the strategies used in other chronic diseases to optimize its management. Particular attention should be paid at the time of diagnosis.

Alcohol dependence therefore requires long-term care aimed at preventing the risk of relapse. However, care aimed at preventing relapse after the initial phase of treatment is often insufficient in both intensity and duration, with very high relapse rates, likely around 40% to 60% within a year. A major challenge is therefore to improve long-term compliance in order to prevent relapse.

The literature shows that a goal of cessation of use, compared to a goal of reduction, is associated with a better chance of success in the management of dependent subjects. Furthermore, for subjects wishing to stop alcohol use, a withdrawal strategy compared to gradual reduction would be associated with a better chance of success. However, about half of the dependent patients do not wish to stop alcohol use completely. It therefore appears to be a priority to facilitate their entry into care, with pragmatic therapeutic objectives depending on what the subject is prepared to accept. For these patients, an initial objective of reduction rather than cessation of use should therefore be proposed. Reducing consumption has indeed shown many advantages, including the possibility of motivational interviews

designed to encourage motivation towards more ambitious objectives, the management of social, somatic, psychiatric and addictive comorbidity, and harm and risk reduction. However, as many alcohol-dependent patients are unable to maintain a controlled level of consumption over the long term, stopping use remains the final objective to be promoted for these patients.

It is now well established that alcohol dependence follows a biopsychosocial model that requires comprehensive treatment. The treatment of alcohol dependence is therefore based on a multimodal approach. The main components of treatment strategies are psychotherapy, medication, cognitive remediation, social rehabilitation and treatment of co-morbidities: co-addictions, concurrent psychiatric disorders and somatic pathologies.

With regard to co-addictions, smoking cessation is associated with a reduction in alcohol consumption among those who still consume alcohol as well as with a reduction in the risk of relapse among abstainers. Cannabis withdrawal is also associated with more effective management of alcohol dependence, even for minor cannabis consumption. In general, an assessment of all addictive behaviors, including behavioral addictions, should be carried out in all subjects with alcohol dependence in order to manage the addictive pathology as a whole. Among the co-morbidities to be treated, the literature has become increasingly dense concerning the attention to be paid to the treatment of sleep disorders and pain. In order to take all these aspects of management into account, the literature reports the benefits of integrative management, as opposed to sequential or parallel uncoordinated management. However, there is no consensus on the definition of integrative care. For example, it may mean that all care should take place in the same unit of time and place, or that there should be coordination between the different actors involved in care. In all cases, it is a question of taking care of the patient as a whole, with the aim of improving the quality of life of patients and their access to care, as well as facilitating their recovery. This type of approach is associated with improved patient satisfaction with care, better use of

resources, higher rates of discontinuation of use and better overall functioning in the long term. Finally, it is important that integrative care is not disconnected from the overall care system and primary care, in particular to facilitate early identification, access to specialized care and avoid stigmatization of patients.

With regard to psychotherapeutic strategies, the motivational approach makes it possible to improve the effectiveness of the more intensive psychosocial interventions to be offered to people with alcohol dependency. Among these interventions, cognitive behavioral therapy (CBT), contingency therapy⁹ and mindfulness meditation have been the focus of numerous studies that have shown their effectiveness.

The effectiveness of CBT in the treatment of alcohol dependence has been demonstrated in numerous studies and meta-analyses. Access to CBT could be improved, in part, through online CBT programs. Remote supervision by a caregiver could, however, improve effectiveness. Numerous publications have shown the effectiveness of contingency therapy in the treatment of alcohol dependence, including in the presence of co-occurring psychiatric disorders. Contingency therapy has also been shown to be effective in reducing the level of consumption in heavy users who are not seeking treatment. It could also be useful in improving compliance with treatment. Finally, a literature has emerged recently concerning the effectiveness of programs based on mindfulness meditation in preventing relapse in alcohol-dependent patients. As this therapeutic strategy does not focus directly on alcohol use, it may be suitable for subjects who have failed with other strategies or who are ambivalent in their desire to change. As for exposure therapy,¹⁰ this behavioral therapy has not yet shown any effectiveness in the treatment of alcohol dependence and could reduce inhibitory control

9. A therapy based on the principle of use of reinforcement, mostly positive (rewards) to condition a subject's choice in the aim to make them choose a more attractive option than abstinence alone.

10. Behavioral therapy aimed at modulating behavioral responses conditioned upon exposure to stimuli associated with substance use.

capacities in the face of environmental stimuli linked to alcohol consumption. As such, it is not recommended.

For those who are ready to do so, therapeutic alcohol withdrawal allows the beginning of a complete and lasting cessation process. In other words, there is no indication for withdrawal in the following situations: absence of a treatment plan after withdrawal, absence of the patient's desire to stop drinking, current social, professional or emotional distress without a prior in-depth evaluation of the benefits expected from the implementation of withdrawal in this context.

Indeed, the benefit-risk balance of repeated withdrawals without any plan to stop using is not favorable. Repeated withdrawals lead to increasingly severe symptoms and the risk of complications increases with the number of withdrawal episodes. Repeated withdrawals may also lead to alterations in executive functions, including motivational control, inhibitory control, cognitive flexibility and decision making, and decrease social cognition. Consequently, it seems essential to prepare for therapeutic withdrawal, in particular by planning in advance the care to be implemented after withdrawal. In the absence of addiction care after withdrawal, at least 80% of patients would relapse. However, between 40 and 50% of patients do not begin addiction treatment after their hospitalization for withdrawal. Several studies have suggested that anticipating addictive care prior to therapeutic withdrawal could significantly improve compliance and, consequently, maintenance of cessation of use. For example, participation in alcohol cessation groups prior to withdrawal could promote compliance at the time of withdrawal. Preparing for therapeutic withdrawal should also include reducing consumption, or failing that, stabilizing consumption with the help of motivational strategies. This strategy could allow for a strengthening of self-esteem and a sense of self-efficacy, which could reinforce the motivation to change. Furthermore, at least for heavy drinkers, even a small reduction in alcohol consumption is associated with a reduction in alcohol-related mortality and morbidity. Thus, this strategy reduces

alcohol-related harm and improves the quality of life of patients awaiting therapeutic withdrawal. Finally, when alcohol consumption has been reduced, or at least stabilized, prior to withdrawal, withdrawal symptoms are less severe and the risk of complications is reduced.

Alcohol-related cognitive impairment is estimated to affect at least half of patients with at-risk consumption. The most common cognitive impairments relate to executive functions (planning, problem solving and inhibitory control), episodic memory, visual-constructive skills and social cognition. These impairments can affect their motivation for behavioral change as well as create learning difficulties. Consequently, they can reduce the effectiveness of therapeutic strategies used in addiction therapy, particularly motivational interviewing. In addition, the development of alternative scenarios to automatic behavior has a high cognitive cost. When there are cognitive disorders, this work involved is therefore more difficult to carry out. The identification of alcohol-related cognitive disorders should therefore be systematically carried out in all patients with risky alcohol consumption. Scales such as the MoCA (Montreal Cognitive Assessment) can be used for this purpose. If disorders are identified, a neuropsychological assessment should be performed. This assessment makes it possible to evaluate the severity of the disorders and to specify the cognitive functions that are impaired. When the disorders are mild to moderate, the objective of cognitive remediation is the recovery of cognitive functions, particularly executive functions and working memory. Cognitive remediation should then be started as soon as the withdrawal period is over. When the disorders are more severe, the aim is to preserve cognitive functions in order to maintain autonomy and improve quality of life.

There are two-way relationships between hazardous alcohol use and homelessness. Even in subjects with a severe mental disorder, the existence of a substance use disorder is associated with an additional risk of homelessness. In addition, all-cause mortality in subjects with risky alcohol use would be at least

doubled if they were homeless. Numerous studies, including meta-analyses, have shown the effectiveness of interventions focusing on having a fixed abode in mental health improvement, including for substance use. Since it is particularly difficult to enroll a homeless patient in addiction treatment because of the difficulty of compliance, access to a home should be a prerequisite for the provision of addiction treatment (“Housing First” theoretical model), rather than making access to housing conditional on compliance with treatment. Unconditional access to housing should be combined with intensive multidisciplinary support in the spirit of an integrative approach.

For certain homeless, marginalized people who, for example, drink alcohol unsuitable for human consumption or in dangerous conditions, and who are unable to limit their use, creating and maintaining a connection and prioritizing “sheltering” has led to proposals for offering them alcoholic drinks (like the Canadian “Managed Alcohol Program”, or MAP), in an organized manner where the quantity, type and times are agreed upon. This HR is not based around on reducing consumption, but instead helps people to manage their consumption, and by preventing accidents linked to dangerous drinking, for example in isolated individuals. The benefits assessed are social and not addictive, and open up perspectives for interventions in clinical practice.

Finally, a literature has recently emerged concerning the search for predictive factors for successful management. Certain determinants such as gender, age, intensity of psychological distress and the existence of cognitive biases could be taken into account in the adaptation of therapeutic strategies. This research should be pursued in order to lead to more personalized management, particularly aimed at intensifying care in subjects with a higher risk of relapse.

Recommendations

The synthesis of the literature by the expert group covers a wide field including the different levels of alcohol consumption, the inherent health and socio-economic damage, the different levers for action that exist around consumption (risk factors, marketing, lobbying, public action programs) and that can operate on different levels, from primary prevention to the management of people with alcohol dependence.

As the aim was to specifically address the issue of reducing alcohol-related harm in terms of a public health objective, the data on alcohol consumption have been updated herein. In a context where health authorities have lowered consumption guidelines and where new international scientific studies demonstrate the health risks and harms associated with alcohol use, even at low levels of consumption, it is important to take these new data into account in order to improve prevention and management of these harms.

To facilitate the reading of the recommendations in this summary, it is worth recalling the simple terminology adopted in this expert review regarding three distinct groups of alcohol consumption associated with levels of health risk:

- Low-risk consumption;
- At-risk consumption without dependency;
- At-risk consumption with alcohol dependence (the most severe stage of risky drinking).

It was decided in this expert review not to address the issue of drug management of alcohol use.

After the analysis and synthesis of the literature in this new collective expert review on alcohol, the experts propose recommendations for action and research in public health to reduce the harm associated with alcohol consumption. The expert

group wishes to point out that previous Inserm collective expert reviews¹¹ made recommendations on alcohol consumption and dealt with subjects related to the present work, and that these were consulted by the group.

The recommendations set out in this collective expert review are part of a broader context and complement the recommendations issued by the World Health Organization.¹² In addition, several recommendations incorporate existing elements in the conclusions of the report on policies to combat harmful alcohol consumption submitted by the Court of Accounts in 2016.

Current state of the problem and general recommendations

This section presents a summary of the principle findings arising from this collective expert review, followed by general recommendations.

In France, there are 42.8 million alcohol consumers with the average adult drinking of about 27 grams of pure alcohol per day. There is a high proportion of risky drinking among people over 50 years of age, and young people first experiment with alcohol during adolescence (12-18 years).

The consequences of this consumption represent a significant social and economic cost: it is the leading cause of hospitalization in France. Estimated at €118 billion in 2010, the social cost of alcohol in France is attributable mainly to mortality (€66 billion) and morbidity (€39 billion). Thus, in France, the financial returns that could be derived from alcohol consumption, added to the profit of producers, does not manage to

11. These include the following Inserm collective expert reviews: *Éducation pour la santé des jeunes (2000)*; *Alcool. Effets sur la santé (2001)*; *Alcool. Dommages sociaux: Abus et dépendance (2003)*; *Conduites addictives chez les adolescents. Usages, prévention et accompagnement (2014)*; *Agir sur les comportements nutritionnels (2017)*.

12. World Health Organization. Global status report on alcohol and health, 2018.

outweigh the cost of diseases and mortality. Continental European countries, with a social protection system similar to that of France, would lose 1% of GDP each year due to alcohol consumption (0.54% to 1.49%).

With regard to current public policies, given the level of consumption of the French population, the dangers of alcohol and its €118 billion social cost, and faced with a powerful alcohol lobbying, there is a real need to define a political framework in order to maintain the coherence of messages and public policies. Moreover, it appears that some laws already in place are not sufficiently respected, such as the prohibition on the sale of alcohol to minors, and have lost their effectiveness over time. This is the case of the Évin law which, in its current version, does not protect minors sufficiently, particularly from exposure to alcohol brand advertising.

A roadmap, at both national and international levels, is needed to strengthen anti-drinking programs and it must be implemented in full and coupled with political will and a minimum of associated resources.

In order to develop more effective public policies, the World Health Organization's Framework Convention on Tobacco Control (FCTC) should be used as an example: indeed, it has proven to be relevant to lowering global smoking prevalence since it came into force in 2005 (even more so in countries where its implementation was stricter). Northern European countries have implemented a number of tobacco demand reduction policies and have experienced significant reductions in smoking prevalence (7.1 points) between 2005 and 2015. Thus, France now has nearly 2 million fewer smokers since 2016 following its implementation.

The expert group therefore recommends:

- Establishing a national framework similar to the Framework Convention on Tobacco Control to help countries adopt effective measures to reduce alcohol consumption;

- Encouraging the European Union to put in place directives inspired by those on tobacco products but adapted to alcoholic beverages.

It is therefore essential to bring to the forefront policies that are evidence-based, and that rely on the most cost-effective measures acting on both supply and demand.

Thus, in terms of limiting the supply of alcohol, three key measures have been implemented and evaluated in various countries and could be implemented and/or better respected in France:

- Restriction of the number of alcoholic beverage outlets;
- Regulation of the opening and closing hours of the same establishments;
- Banning sales to minors (see the Inserm collective expert review “*Conduites addictives chez les adolescents. Usages, prévention et accompagnement*”, 2014).

In terms of limiting the demand for alcohol, the measures that are most widely used and evaluated internationally, and in Europe in particular, are price increases via fiscal mechanisms:

- Regulation of advertising;
- Policies to combat drunk driving (see the Inserm collective expert review “*Alcool. Dommages sociaux: Abus et dépendance*”, 2003).

Recommendations for action

The recommendations for action formulated by the expert group respond to different rationales that are not mutually exclusive. Indeed, these recommendations are founded on the evidence-based effectiveness of interventions reported in the scientific literature; they are also founded on theory-based models (this is generally the case for prevention campaigns) that propose a list of health determinants on which it is possible to act.

To promote healthier behavior, a comprehensive approach is needed, integrating both health information via the various communication channels and actions aimed at providing favorable and motivating environments for behavioral change. It is necessary to encourage the development of approaches ranging from prevention aimed at the general population, to the treatment of at-risk drinkers, to treatment of alcohol dependency.

This is an urgent priority that must be the subject of a national plan that includes actions for reducing alcohol consumption in the French population. To this end, **the group of experts recommends:**

- Limiting access to alcohol and reducing its attractiveness through legislation and enforcement;
- Improving the clarity of communication by public authorities to the general public on the risks associated with alcohol consumption;
- Preventing risky alcohol use by increasing the knowledge and skills of users;
- Training primary care professionals in effective intervention methods;
- Encouraging screening for risky drinking and implementation of brief intervention;
- Improving the effectiveness of treating alcohol dependency.

Limiting access to alcohol and reducing its attractiveness through legislation and enforcement¹³

Various actions, detailed below, are available to public health actors to limit access and reduce the attractiveness of alcohol.

Limiting access to alcohol

- ***Raising of prices***

Raising the price of alcoholic beverages through an appropriate taxation system (by setting a minimum price per unit or gram

13. Notably among teens: See the Inserm collective expert review "*Conduites addictives chez les adolescents. Usages, prévention et accompagnement*", 2014.

of alcohol) is control policy and fiscal tool that has proven to be effective in terms of reducing alcohol consumption and public safety, particularly in Scotland (this measure has also recently been adopted in Wales).

Therefore, **the expert group recommends** that the taxation of alcoholic beverages should be used as a public health tool to change behavior by introducing a minimum price for alcohol-containing beverages and/or taxing them according to the amount, in grams, of alcohol contained. The level of tax should be high enough to avoid spill-over effects to other beverages (less alcoholic but consumed in greater quantities).

This recommendation is in line with the recommendation for the establishment of a government fund financed by alcohol producers to fund research and prevention activities in France (as is the case for tobacco), at a level in keeping with the damage (i.e. burden of disease) associated with alcohol consumption.

- ***Controlling access by minors***

With regards to access to alcohol products, the law prohibiting the sale of alcohol to minors and requiring verification of their age is not respected in France. It is therefore necessary to improve compliance and to provide staff who are in contact with customers with tools to facilitate this control. The literature shows that such checks, when carried out remotely (for example, with an ID scanning machine), are the best suited for controlling alcohol sales and thus limiting the access by minors to these products (and thus enforce the law). Therefore, **the expert group recommends**:

- Carrying out regular and frequent checks of compliance with law prohibiting the sale of alcohol to minors, notably through test purchases;
- Implementing an automated and systematic customer age verification system to improve compliance with the law prohibiting the sale of alcohol to minors.

In connection with the previous recommendation, the law should be made more effective by increasing the penalty incurred and the likelihood of being checked. The literature in this area shows that strict enforcement is effective.

Therefore, **the expert group recommends** considering increasing the penalties for those who fail to comply with restrictions by selling alcohol to minors.

- ***Reducing availability***

The literature establishes a link between the number of premises selling alcohol, the hours of availability of alcohol, and the incidence of short- and long-term harm from alcohol consumption. In France today, the market for type IV licenses and the hours for alcohol sales are the prerogatives of prefects and mayors alone.

Following the example of the British experience of collegial management of these issues, these decisions should be extended to stakeholders such as regional health agencies (ARS) and civil society.

Therefore, **the expert group recommends** restricting the hours for the sale of alcohol, whether for take away or for consumption on the premises, as well as the number of approved vendors (number of licenses II and IV) when a local assessment has identified problems in terms of safety or public health. This should be done by strengthening the competences of prefects and mayors in this domain through the creation of wider decision-making commissions. To this end, the reduction of alcohol-related risks and harm should be included in so-called “local health contracts” (CLS) in France, which help to build territorial health dynamics.

Reducing the attractiveness of alcohol

Research has analyzed the effect of alcohol marketing on young people, particularly the impact of advertising as a component. The vast majority of research shows a positive and significant

link between exposure to alcohol marketing and advertising and young people's drinking attitudes and behaviors (initiation for nondrinkers, increased consumption for young drinkers, and heavy binge drinking). Thus, beyond the influence of peers, parents and culture, the current state of research highlights the fact that the marketing of alcohol manufacturers plays a role in explaining the drinking behavior of this population.

In France, legislators wanted to regulate the modalities of advertising alcohol. The Évin law of January 10, 1991 established the principle of restricting certain media and regulating the content of advertisements and packaging of alcohol products in order to reduce their attractiveness.

However, lobbying by the alcohol industry has considerably softened and reduced the effectiveness of the Évin law (authorization to promote alcohol on posters in public places and on the internet, etc.) and communication methods have changed considerably since 1991, as exemplified by the explosion in the use of social networks.

Moreover, circumventions of the Évin law by alcohol producers have been observed in France. Consequently, **the expert group recommends:**

- Amending the Évin law on the regulation of advertising in a way that is favorable to public health in order to better protect minors and young people;
- Strengthening controls for compliance with the Évin law;
- To better understand, identify and therefore counter marketing strategies that promote drinking and alcohol products to young people;
- Implementing actions to counter, reduce and denounce the effect of marketing by alcohol producers;
- Establishing a principle of transparency of the alcohol industry's influence relationships.

These recommendations are described in more detail below.

- ***Amending the Évin law on the regulation of advertising in a way that is favorable to public health to better protect minors and young people***

We must, therefore, return to a version close to the Évin law passed in 1991 in France, that is:

- Banning advertising of alcohol brands in all public places (posters in the street, on public transport, etc.);
- On the internet (which was only in its infancy in 1991):
 - Only allow brand homepages that present products in an objective and informative manner, as required by law;
 - Ban advertising and pro-alcohol messages on social networks because they are very popular with young people, and ban forms of marketing that encourage users to react (share content, enter contests, “like” content, leaving comments, posting photos, etc.).
- For the press and radio, authorize these advertising media when their audiences are predominantly (at least 80%) composed of adults over 18 years of age (the alcohol producer must provide proof of this);
- Specify that advertisements for “alibi” brands of alcohol (brands created for specific occasions that reuse alcohol brand identity – color, graphic style, etc. – without explicitly mentioning it writing) used by alcohol producers to circumvent the legislation in the context of events (sports, concerts, etc.) are subject to this law, just like “classic” alcohol brands.

- ***Strengthening controls for compliance with the Évin law***

Controls for compliance with the Évin law should be strengthened to ensure that it plays its full role: measures should be put in place to monitor and control compliance, particularly on the internet, at points of sale, in the context of sponsored events and on the content of advertising and packaging by alcohol brands.

- ***Better understand, identify and therefore counter marketing strategies that promote alcohol abuse and use among young people, by setting up regular surveys***

The expert group recommends that regular surveys be set up to:

- Estimate the budgets spent on marketing and advertising by alcohol producers and distributors in France (by analysis of marketing investments¹⁴) and draw inspiration from their use to develop prevention levers;
- Analyze the types and contents of marketing and advertising deployed by alcohol producers and distributors in France.

- ***Implementing actions to counter, reduce and denounce the effect of marketing by alcohol producers, including:***

- Running counter-marketing campaigns on advertising manipulation by alcohol producers in educational programs in schools (primary, secondary and high schools) and prevention campaigns in the media to strengthen young people's psycho-social skills;
- Improving the visibility of health warnings on advertisements and packaging of alcoholic products to counteract and reduce the attractiveness of these two marketing tools;
- Providing training programs for health students to increase their awareness of alcohol industry marketing and lobbying.

- ***Establishing a principle of transparency of the alcohol industry's influence relationships***

It has been shown in the literature that the influence and lobbying strategies of the alcohol industry are effective in making laws evolve in a direction unfavorable to public health. Consequently, and following the example of Article 26 of the law of January 26, 2016 on the modernization of the French health system that establishes a principle of transparency of the tobacco

14. Surveys for identifying marketing campaigns carried out on one or more direct marketing channels (e-mail, mail, etc.) or medias.

industry's influence relationships, it would be important to establish the same principle for the alcohol industry. Therefore, **the expert group recommends** taking inspiration from this and:

- Requiring an annual declaration to the French Ministry of Solidarity and Health of all expenses related to direct influence and lobbying activities (formal and informal contacts with members of Parliament, the Senate or the Government) of the alcohol industry (producers, industry representatives);
- Requiring information and transparency on “indirect” lobbying activities identified in the literature (not directly related to contacts with members of Parliament, the Senate or the Government), in particular on:
 - Funding and programs for research and teaching at schools and universities (chairs, academic projects, doctorates, scientific prizes);
 - Prevention actions implemented by the alcohol industry (producers, industry representatives);
 - Presence and participation of the alcohol industry (producers and industry representatives) in commissions and public working or expert groups.

Clarifying the communication to the public by authorities on the risks associated with alcohol use

It is crucial to strengthen the public's knowledge about the link between alcohol consumption and the development of cancers, cardiovascular disease, etc., and also on the fact that alcohol is the leading cause of hospital admissions (as shown by the analysis of data from the French Program for Medicalization of Information Systems [PMSI]).

Firstly, with regards to communicating effectively on drinking guidelines, **the expert group recommends** continuing to inform and raise awareness about the consumption guidelines established by the French Public Health Agency and the National Cancer Institute in 2017, that advise:

- Not to drink more than 10 standard glasses per week (1 standard glass = 10 grams of pure alcohol);
- No more than 2 standard drinks per day;
- Not to drink every day of the week.

In France, the drinking guidelines have been lowered for men. For women, only the weekly benchmark has been reduced from 14 to 10 standard drinks per week. The guideline of two drinks per day remains unchanged for women. The new benchmarks therefore no longer distinguish between the sexes. **The expert group recommends** continuing to raise awareness of women's greater vulnerability to alcohol compared to men with the same level of consumption.

The expert group recommends the use of prevention messages that are designed with the literacy level of different population groups in mind, that are aimed at the whole population, that are understandable, specific and easy to implement. These messages should also be personalized and/or segmented for the most vulnerable groups. **The expert group recommends** revitalizing the warnings not to consume alcoholic beverages for women who are contemplating pregnancy, and for expectant mothers up to and including birth and during the breastfeeding period.

At the international level, the International Agency for Research on Cancer (IARC) recommends abstinence to prevent the development of cancer. All alcohol consumption, even low levels, carries a health risk. Recent studies, including both those analyzing methodology (i.e., biases and confounding factors) and those using Mendelian randomization methodology (i.e., data are not affected by confounding factors or biases), invalidate the existence of "protective" effects of low alcohol consumption.

Therefore, **the expert group recommends** encouraging the reduction of alcohol consumption even when levels are already low.

In keeping with reducing alcohol consumption even when it is low, challenging people to abstain for a month has been shown

to be effective in terms of physiological improvements, quality of life, and feeling more confident in one's ability to refuse to drink alcohol. Therefore, **the expert group recommends** that communication about existing prevention campaigns be complemented by new schemes. This can be done, for example, through operations that invite the population to experience the benefits of stopping drinking such as "*Le Défi de Janvier*" ("Dry January" in Great Britain or the "*Tournée Minérale*" in Belgium).

With regard to the health warnings currently used in France – a text message placed at the bottom of advertisements for alcohol brands and a pictogram or text placed on alcohol containers, introduced in France in 1991 and 2007, respectively – the literature shows that they have lost their impact over time and that their content and format are not optimal. As these messages are essential to informing consumers about risks and are inexpensive for governments, **the expert group recommends:**

- Changing the messages currently used in France because, first, they are no longer noticed; second, the content of the message "alcohol abuse is dangerous for health" is inaccurate in the light of recent scientific literature; and third, the terms "abuse" and "moderation" are vague and are not understood, or are even misused by the alcohol industry;
- Expanding the format, size and prominence of messages on alcoholic beverage advertisements and containers so that they are more visible and stand out from the marketing content in which they are inserted;
- Including various messages on advertisements and packaging about the health and social risks of alcohol consumption (to reach people with different sensibilities);
- Devising a system of rotating different messages, for example every 6 months, to avoid fatigue and repetition;
- Inserting new information on alcohol product packaging indicating the calories, the amount in grams of pure alcohol contained, the consumption guidelines recommended by public authorities, the number of standard glasses (units) contained in a bottle, the ingredients, the nutritional quality, etc.;

- Using visuals and/or pictograms combined with text to increase the impact of messages and reach the entire population.

Preventing risky alcohol use by increasing the knowledge and skills of users

A priority issue for prevention is the strengthening of protective factors from the beginning of the life course of individuals. The literature suggests developing early interventions aimed at strengthening generic protective factors such as parental skills (e.g. positive interactions, communication, effective discipline) and children's psychosocial skills, as well as working more extensively on social environments (particularly the school environment). In addition to the positive long-term effects observed on the use of psychoactive substances, including alcohol, these interventions help to reduce social inequalities in health and prevent a wide range of risky behaviors.

Psychosocial skills encompass cognitive resources (decision-making, problem-solving, critical thinking, etc.), emotional resources (stress management, emotions, etc.), and social resources (communication, assertiveness, ability to influence, resilience, etc.) that enable people to cope with the demands of daily life, to interact in an effective manner with one's environment and to exert a positive influence on oneself and one's surroundings.

Strengthening skills to prevent taking up drinking alcohol

It is essential to encourage factors that can prevent the onset of problematic alcohol consumption (actions to support parenting starting from the earliest child's age, support for schooling and the educational success of students, development of positive social, cultural and sporting activities, etc.).

Therefore, **the expert group recommends**, through the use of programs that are validated and adapted to needs:

- Helping to put in place interventions for pregnant women with vulnerability factors (isolation, primiparity, etc.) through home visits by trained professionals. The aim is to provide psychological and social support and to accompany the development of a secure attachment bond between mother and child;
- Encouraging interventions to develop parenting skills for parents who express a need for support. The objective is to strengthen their abilities and their sense of effectiveness in the exercise of their parental functions (emotional support and supervision);
- Developing interventions to develop students' psychosocial skills. These interventions should be accompanied at the beginning of middle/intermediate school by information on the risks of short-term alcohol consumption and work on correcting normative beliefs;
- Setting up training for education professionals to develop tools for managing groups, for shaping behavior and for positive influencing. The objective is to improve their professional well-being, so they can encourage learning, value their students and enable students to internalize the rules of group conduct.

Methods for implementing this prevention strategy

In the field of psychosocial skills development, the interventions found to be effective those which are structured, have a certain intensity (a minimum of 6 to 8 sessions per year), concern the three main categories of skills, use experiential methods (role-playing) and are conducted by previously trained facilitators.

The dissemination of prevention messages using mass media combined with personalized interventions using SMS has shown very positive results on opinions and behavior. While mass media can be used to reach a large number of people, it can also be accompanied by actions tailored for those most affected by the problems of alcohol consumption and who have given their consent to receive personalized messages. Therefore, **the expert group recommends:**

- Using digital communication and technological persuasion (e.g., news platforms, social media, text and SMS, SMS combined with the web) to elicit new behaviors aimed at reducing alcohol use. Technological persuasion consists of interactive computer systems, platforms, or interfaces designed to change opinions and behaviors towards alcohol;
- Setting up, developing, testing and evaluating e-health and digital applications (web, smartphone, SMS) for disseminating alcohol-related information based on behavior change theories from behavioral sciences (e.g. feedbacks, norms, etc.) (see the section “Recommendations for research” in this summary).

Since the effects and mechanisms of influence can vary greatly according to psychosocial and individual characteristics, it is important to have a good understanding of these characteristics in order to better adapt the messages. Therefore, **the expert group recommends** developing the use of messages modulated according to the target audience, that can be transmitted via information and communication technologies (ICT: web, mobile, connected objects, etc.) or media and/or supports allowing segmentation according to the target audience.

Training of primary care professionals in effective intervention methods

The objective here is to promote initial and ongoing training on risky alcohol consumption for all professionals involved in primary care of users. This is essential in order to improve the detection of such behavior.

The Declaration of Alma-Ata was the outcome of the 1978 World Health Organization International Conference on Primary Health Care. Article 6 of the Declaration states: “Primary health care is essential health care based on practical, scientifically sound and socially acceptable methods and technology made universally accessible to individuals and families in the

community... It is the first level of contact of individuals, the family and community with the national health system bringing health care as close as possible to where people live and work, and constitutes the first element of a continuing health care process”.

Therefore, **the expert group recommends** that primary care professionals, in particular general practitioners, emergency physicians, pediatricians, occupational physicians, school physicians and nurses, pharmacists, and university preventive medicine departments, should be able to identify risky alcohol consumption. In this respect, **the expert group recommends**, at the very least, training in early identification and brief intervention (EIBI) – which also includes referral to a suitable structure/health care actor – health professionals involved in the primary care of users.

Particular attention must be paid to expectant mothers, beginning from the time of conception, because the frequency of fetal alcohol syndrome (FAS) and fetal alcohol spectrum disorders (FASD) is of concern given the seriousness of harm to the child. Primary prevention consists of not consuming alcoholic beverages for future mothers, as soon as a pregnancy is considered. To this end, **the expert group recommends**:

- Developing training for professionals (midwives, gynecologists, general practitioners, etc.) on how to inform and support women on the imperative of “zero alcohol” during pregnancy or when contemplating pregnancy;
- Fostering the training of professionals in childcare and pediatrics to identify FASD at early stages. This requires a real political will on the part of regional health agencies (ARS) and teams (networks, hospital staff) to maintain a level of training, skills and vigilance on the FAS and FASD.

Encouraging screening for alcohol use and implementation of brief intervention

Patients with at-risk alcohol consumption are under-identified by the health care system and are therefore under-treated. The widespread implementation of screening and brief intervention in primary care medicine is among the most effective and least costly public health measures for reducing alcohol-related harm. Therefore, **the expert group recommends:**

- Promoting the systematic identification of people with at-risk alcohol consumption and offering them brief intervention;
- Encouraging screening for any use of alcohol during pregnancy.

The additional workload created by implementing EIBI (Early Identification and Brief Intervention) needs to be valued. The expert group is in favor of public authorities introducing a financial recognition for this technical act (priced as an act of “preventive medicine”).

Electronic screening and brief interventions using a tablet in the community (schools, military, etc.) or, for example, in medical waiting rooms provide an opportunity to reach a larger population and a less expensive alternative to a face-to-face interview. This can also overcome some of the frequently observed barriers to implementation, such as time constraints for health care personnel and reducing the stigma that exists around alcohol use. This integrative, step-by-step model would allow for a combination of electronic screening and brief intervention for more people in the public sector, schools, hospitals, waiting rooms, and during one-on-one interventions for situations of greatest concern or when requested by the user. In this way, a step-by-step solution would not only reduce the consumption (and associated harms) of non-dependent, at-risk drinkers, but also identify and refer those who are dependent on alcohol for specialized follow-up. Accordingly, **the expert group recommends** putting in place a 3-step screening and brief intervention model that involves:

1. Prioritizing brief electronic interventions (internet, mobile applications) for the general population;
2. Providing brief intervention in primary care for those at risk who need it;
3. Initiating a discussion with alcohol-dependent people and referring them to specialized addiction services.

Primary health care professionals must be able to refer patients who screen positive and are at-risk drinkers. For this reason, **the expert group recommends** that specific addiction teaching modules be created and integrated as part of the base curriculum of health and medico-social education programs. This includes students of medicine, pharmacy, dentistry, nursing, physiotherapy, occupational therapy, psychomotor therapy, as well as social workers, educators, etc.

Furthermore, primary care professionals need to be familiar with the various alcohol harm reduction (HR) techniques for these to be applied to the population. Some examples include the Alcochoix program, information on the equivalence of alcohol content and volume of drinks, drinking diaries, some knowledge of motivational interviewing for example, etc. The tools exist, but they are little known and underused. **The expert group recommends**, and relying on the coordination of Addiction Care and Liaison Teams (ELSA) and Centers for Care, Support and Prevention in Addictology (CSAPA) in France:

- Facilitating the meeting between alcohol support groups and professionals by integrating within physician continuing education programs work with a group of current or former drinkers;
- Implementing brief interventions by trained health professionals.

It is necessary to train paramedical personnel and non-specialists in addictology (particularly within associations) in the many HR techniques available to non-physicians. **The expert group recommends** that brief intervention tools be made available to people involved in associations.

Improving the effectiveness of the management of alcohol dependence

Alcohol dependence is characterized by its chronic course, requiring long-term management to treat acute episodes and prevent relapses. Its management therefore requires reinforcing the quality of long-term compliance. This is why **the expert group recommends**:

- Promoting a medical approach to alcohol dependence similar to that of other chronic diseases;
- Developing public health strategies to facilitate access to care for people with alcohol dependence, including coordination with primary care and access to care for co-addictions and co-occurring psychiatric disorders;
- Encouraging the development of multimodal approaches for the management of alcohol dependence;
- Encouraging approaches aimed at an initial therapeutic objective based on a pragmatic approach in line with the patient's motivational stage, while considering cessation of use as the final objective to be encouraged;
- Anticipating the care plan designed to prevent relapse before implementing therapeutic alcohol withdrawal;
- Promoting the implementation of evidence-based treatment strategies such as motivational interviewing, cognitive behavioral therapy (CBT), contingency therapy and relapse prevention through mindfulness meditation;
- Promoting the role of physical activity and positive social contacts in preventing relapse. Physical activity should be a routine part of treatment programs for people with alcohol dependency;
- Considering the acquisition of housing as a therapeutic emergency for all alcohol-dependent homeless patients without making access to housing subject to prior compliance with addiction care. In effect, there are reciprocal links between risky drinking and homelessness.

Integrative management of co-occurring disorders is to be favored, particularly with regard to co-addictions, psychiatric disorders, cognitive disorders, sleep disorders and chronic pain. Failing this, close coordination between complementary therapies must be ensured.

Alcohol-related cognitive impairment is thought to affect at least half of patients with at-risk alcohol consumption. These disorders may impair motivation to change behavior and create learning difficulties. As a result, they can reduce the effectiveness of the therapeutic strategies used in addiction treatment, particularly motivational interviewing. **The expert group recommends** encouraging the systematic identification and management of alcohol-related cognitive impairment in all patients with alcohol dependence.

Recommendations for research

Funding for alcohol-related research appears insufficient in relation to the health and social costs of alcohol consumption as well as in relation to the needs. Research recommendations must be backed by strong public funding, that could be achieved by allocating to research organizations a fixed and substantial share of the taxes on alcoholic beverages collected by the state. In addition to this taxation system, in order to finance alcohol research, which is currently underfunded, **the expert group recommends** reinstating what was initially provided for in the Évin law (1991): setting up a government fund financed by alcohol producers to support research and prevention actions in France (following the example of that for tobacco), and this to a level that is in keeping with the harm associated with alcohol consumption, the burden of disease and the social cost.

This fund would allow the implementation of a national research plan with research axes that aim to:

- Improve knowledge on the practices, risk factors and health and social effects of alcohol consumption;
- Develop, evaluate and validate prevention and screening tools;
- Develop, evaluate and validate management strategies;
- Develop basic research, notably on markers for exposure to alcohol (and in the particular case of epigenetics);
- Create research consortia to compete on a global level.

Better knowledge of practices, risk factors and health and social effects

Better collection and use of data on consumption and practices

Data on alcohol use, including risky drinking and drinking practices, come from a variety of sources that meet different objectives. Cross-referencing and analyzing these different data is a research task in its own right. In particular, there is a lack of reliable data on the proportion of people in France with at-risk consumption. Therefore, **the expert group recommends:**

- Conducting regular population-based surveys of new drinking patterns among adolescents and young adults (e.g., mixing alcohol with diet soda);
- Evaluating in a precise and regular way the levels of alcohol consumption and its comorbidities in the elderly population;
- Improving population-based epidemiological surveillance data on alcohol use during pregnancy and by fathers-to-be, in the 3 months prior to the onset of pregnancy and after birth – particularly during breastfeeding.

Improving the understanding of consumption trajectories and practices

A key question is that of consumption trajectories, i.e. the risk of developing an addiction in the medium or long term among young people who consume excessively. Unfortunately, few studies are able to provide accurate estimates. For this reason, **the expert group recommends:**

- Supporting, over the long-term, development of robust monitoring tools on a local and national scale;
- Supporting longitudinal research to assess drinking trajectories over time and the associated individual, family, and contextual risk and protective factors.

Improve understanding of motivations and perceptions

The role of motivations and of perceptions on consumption trajectories is not well known. However, addictive behaviors are also social practices; they make sense to consumers, satisfy needs, and perceptions and expectations regarding a practice are generally socially constructed, particularly within the family or peer group. A better understanding of the perceptions and motivations of alcohol consumption would make more appropriate and effective prevention possible.

The expert group recommends developing research in the humanities and social sciences on the understanding of drinking practices in order to:

- Better understand the motivations and context (in particular individual and collective psychological and social factors) of risky alcohol consumption;
- Improve knowledge of social perceptions, beliefs, attitudes and stereotypes related to alcohol among the different populations and groups concerned;
- Develop theoretical and applied research on processes and techniques involved in behavior change in the context of alcohol consumption.

The objective is to better know and understand our opinions and the conditions for changing our opinions, to know and understand the links between our thoughts and actions, the conditions for changing behavior, and the resistance to change so that it can be more easily circumvented.

Better assess the impact of alcohol industry marketing and lobbying on attitudes, perceptions and behaviors

Research on the impact of marketing and industry lobbying on alcohol consumption would improve the reach of prevention policies implemented to change behavior in a French cultural context.

The expert group recommends that they be developed to:

- Evaluate the effect of marketing and advertising by alcohol producers in France on vulnerable targets, in particular on the current forms of marketing developed by these manufacturers to reach young people: internet, social networks, point-of-sale marketing, packaging and products, sponsorship of events, brand presence and alcoholic products in films, series and music videos, price promotions in stores and on the internet;
- Analyze the lobbying strategies and arguments developed by alcohol producers and their partners in France and how these strategies influence public policy.

One of the alcohol industry's strategies is to position itself as a "prevention actor" with public authorities in order to be able to disseminate its own prevention messages, which are essentially based on the individual responsibility of consumers and the message of "moderation" in alcohol consumption. **The expert group recommends** that these "corporate social responsibility" (CSR) strategies be studied, documented and clarified so that their content and objectives are better known and understood by public authorities, health actors and citizens.

To ensure the effectiveness of "counter-marketing" measures implemented by public authorities to reduce alcohol consumption and to change positive perceptions of alcohol products, **the expert group recommends** that studies be carried out on:

- The effectiveness and impact on the population and on specific targets (young people, women, etc.) of health warnings placed on alcohol advertisements and containers;

- The value of inserting an informative logo and/or specific prevention messages concerning the presence of brands and alcohol products in films, series and music videos;
- The effectiveness of measures protecting minors and vulnerable targets from alcohol producer advertising and marketing.

Improving our understanding of health and social damage

Work on the social cost of alcohol aims to inform on the extent of the phenomenon, but also to point out all the missing knowledge that alters the quality and magnitude of the estimate.

There is a discordance between reported consumption and alcohol sales leading to a correction factor (of 2.4) and the consumption figures are dated. Therefore, **the expert group recommends:**

- Improving the measurement of alcohol consumption, in particular to better estimate alcohol-related morbidity and mortality;
- Supporting research that allows longitudinal monitoring of health insurance data to quantify changes in alcohol-related hospitalizations and using other databases to study patient care (management and treatment).

The negative health and social impacts of large-scale phenomena are increasingly being assessed from an economic perspective. The most important criticism of social cost studies of alcohol is the failure to account for certain types of costs. **The expert group therefore recommends:**

- Re-evaluating estimates of the direct and indirect costs of alcohol to the community, taking also into account the hardship and suffering of the relatives of those who died prematurely;
- Improving knowledge of the actual use of the health care system attributable to alcohol consumption: in terms of short-term impacts (accidents, violence, etc.) and long-term impacts (attributable diseases).

Develop, evaluate and validate prevention and screening tools

Prevention tools

Preventing alcohol consumption is not just a matter of conducting research on the practice itself, as research is also needed on how to prevent such conduct. For this reason, **the expert group recommends** that public funding for research on alcohol-related health issues and consequences, as well as for interventional research in this field, be strengthened and made sustainable.

- ***Supply/demand***

Policies to control the supply of and demand for alcohol are effective in reducing the health and social burden of alcohol consumption on society. In order to take this further, **the expert group recommends**:

- Assessing the health impacts of banning sales to minors, taxing pre-mixes or even banning the sale of alcohol;
- Measuring the price elasticity of demand for alcohol in France for different populations according to different types of beverages, and also to measure price elasticities for different products (tobacco, drugs, cannabis and other psychoactive substances);
- Studying tax avoidance strategies and possible carry-over effects of the alcohol trade;
- Studying the benefit/risk ratio of regional transfers of type IV licenses (authorized in 2015) to areas considered as tourist areas in the short term (via measures of the use of emergency services, violent crime, mobilization of rescue services, etc.) as well as in the long term (in terms of alcohol consumption).

- ***Information***

Research shows that awareness and information campaigns, while necessary, are not sufficient to bring about behavioral change. In order to communicate more effectively on proven risks and to move towards the construction of effective health

messages leading to behavioral changes, **the expert group recommends** developing research mobilizing different disciplines (behavioral sciences, psychology, sociology, social neurosciences, social marketing, etc.) to identify strategies and develop prevention, and to systematically evaluate the effectiveness of these prevention strategies (pre-testing them as much as possible using control groups).

Psychological research, and in particular some meta-analyses, point to a discrepancy between intention and behavior, especially over the medium and long term. Thus, it is important to conduct controlled studies that include behavioral measures. Therefore, **the expert group recommends:**

- Encouraging the implementation of interventions using behavior change techniques with population-based measures:
 - Personalized normative feedback on current consumption (e.g. graphic display, etc.);
 - Descriptive norms (what most people do in a given situation) combined with injunctive norms (what others like or dislike, and that refer to what people approve or disapprove of);
 - Intention implementation (concrete planning of action), if possible with the help of a professional. An intention implementation is intended to reinforce the intention behind the behavior, to strengthen the link between intention and behavior. This reinforcement is done in particular by asking three questions: when, where and how to do it.
- Ensuring the participation of the target group in the design and implementation of studies can also contribute to the sustainability of the results and their transfer into effective public health policies and practices.

- ***Interventional research***

To support the implementation of effective alcohol prevention programs, interventional research (the objectives of which are the design, implementation, and scientific evaluation of public health interventions among given populations) must be

developed in France. In general, too few studies have been published that provide information on the effectiveness of prevention measures deployed in France.

When evaluations are implemented, the protocols do not always provide the conditions necessary to conclude that the interventions being evaluated are effective or to inform the conditions for their effectiveness.

This is why, beyond the methodological aspects necessary to provide evidence (sufficient sample size, availability of a control group comparable to the intervention group, before-and-after measurements, application of a statistical analysis plan adapted to the data set), **the expert group recommends** systematically introducing the following into intervention evaluation protocols:

- Impact indicators (consumption behavior or damage related to these behaviors) to provide information on the public health benefits of these programs;
- Intermediate indicators, those on which the interventions seek to act (for example: attitudes, motivations, etc.) in order to validate the intervention model (it is by acting on the determinants targeted by the intervention that we ultimately obtain an impact on consumption);
- Implementation indicators (fidelity, intensity, assiduity) in order to provide information on the effectiveness of the programs implemented.

Finally, interventions to prevent alcohol consumption among the elderly remain particularly heterogeneous (in content and intensity) and poorly described, therefore, **the expert group recommends** that research be developed on alcohol prevention interventions for elderly persons.

As for workplace interventions, little data is available. Analysis of interventions suggests, however, that the most promising interventions address workplace climate, stress management, drinking norms and limit access to alcoholic beverages in the workplace. Thus, **the expert group recommends** that more

research be carried out to identify, test and evaluate programs to prevent alcohol consumption in the workplace.

Furthermore, in France we do not have sufficiently long prevention campaigns (at least one month) during which the population would receive personalized advice on the health damage associated with alcohol consumption. Therefore, **the expert group recommends:**

- Evaluating and strengthening knowledge on the impact of a long and repeated yearly Dry January campaign in the French context to inform the population on alcohol-related morbidity and mortality;
- Developing tools in this framework for monitoring consumption by participants who could also receive personal advice (helping them to achieve their objectives).

Screening and diagnosis

The adaptation and evaluation of screening measures for alcohol use and addiction must rely on basic research on behavior and on the effectiveness of different approaches in relation to individual characteristics. With regard to measures for screening and diagnosis, **the expert group recommends** that:

- For disorders linked to alcohol consumption during the perinatal period:
 - Encourage further refinement of methods for testing of meconium and placenta to identify children exposed to alcohol in late pregnancy;
 - Develop screening strategies, such as in-depth interviews with mothers or mothers-to-be about alcohol use if there is a clinical indication or positive biomarkers;
 - Conduct a large-scale evaluation of the utility of routinely asking about alcohol consumption at the beginning of pregnancy (or at the cessation of contraception). This evaluation should be conducted on a population basis, locally, regionally, or nationally;

- To develop specific re-education/rehabilitation programs for children with FAS and FASD up to the age of learning acquisition. Work on the content of the programs, their implementation and the evaluation of their effectiveness.
- For Early Identification and Brief Intervention (EIBI): better evaluate the active components of this intervention, in particular those integrating personality and the quality of the intervener, but also the questionnaires chosen, AUDIT and FACE, and to define the populations on which this intervention is most effective;
- For HR approaches, which must be developed with a requirement for evaluation and criteria for effectiveness:
 - Assess the relationship between HR and suicide risk. An intervention to reduce consumption could be associated with a decrease in risk of suicide, but the studies pointing to this correlation are few;
 - Assess the relationship between HR and cognitive disorders;
 - Assess the interactions between the use of HR actions for a given individual, and the experience of their community and those around them.

Develop, evaluate and validate management strategies

There are many strategies for managing patients with at-risk consumption or alcohol dependency, some of which are still being developed. It is important that these different strategies be evaluated, both in terms of changes in alcohol consumption and the impact on mortality, morbidity and quality of life. In addition, early diagnosis, improved access to care and the personalization of the strategies implemented are major challenges.

Therefore, **the expert group recommends:**

- Developing new strategies for early diagnosis and intervention and to evaluate their effectiveness, including in the medium and long term;
- In studies evaluating the effectiveness of non-medicinal strategies, distinguish between strategies that can be used for risky

drinking and those that are suitable for alcohol dependency. In addition, these strategies should be prioritized according to their effectiveness, in particular by updating the Anglo-Saxon data from NICE (National Institute for Health and Care Excellence) and MESA GRANDE;¹⁵

- Defining specific research objectives regarding the effectiveness of HR techniques, in particular on reducing consumption, improving quality of life and duration of effects of these techniques;
- Promoting research into the evolution of mortality and morbidity of risky drinkers and those with alcohol dependency when using HR techniques;
- Promoting the evaluation of measures to improve access to care for alcohol-dependent patients;
- Standardizing physical activity programs to improve analysis of their benefits for risky drinkers and those with alcohol dependency;
- Promoting research aimed at better understanding the factors that predict the maintenance of abstinence after therapeutic withdrawal;
- Evaluating the techniques of transcranial magnetic stimulation (rTMS) and direct current stimulation (tDCS) by modeling the techniques (positioning of electrodes for tDCS, choice of brain region, stimulus frequencies) on sufficient numbers of alcohol-dependent patients to allow for long-term follow-up. Better understand their mode of action, direct or indirect (action on mood);
- Continuing the evaluation of acupuncture for management of alcohol-dependent patients and identify a technique and points that might be used in a standardized way.

Develop basic research, particularly on biological markers indicating exposure to alcohol: the particular case of epigenetics

Results in the very new research field of epigenetics have highlighted and uncovered molecular mechanisms critical to our

15. A project reviewing clinical trials of treatments for alcohol use disorders.

understanding of how alcohol consumption during pregnancy can damage brain formation, function and integrity in adulthood. Studies have revealed the deposition of aberrant epigenetic signatures in the brain that could be biomarkers of exposure, in combination with other biomarkers. Furthermore, the reversibility of epigenetic mechanisms raises the hope of restoring an unaltered epigenetic landscape in patients by correcting the expression of genes important for neurodevelopment and neuronal function, through highly targeted epigenome “editing” techniques.

The expert group recommends supporting research into epigenetics related to FASD and more generally related to risky alcohol consumption with the goal of identifying robust biomarkers and strategies for remediation, whether medicinal or not.

Create research consortia in order to compete

With a view to the establishment of a national research plan, it is important to include this effort in a broader structuring approach with a view towards developing collective principles and know-how.

For this reason, **the expert group recommends:**

- Setting up large-scale national projects specifically on the theme of alcohol and with cutting-edge technologies (massive data, cohorts, longitudinal and translational follow-up, imaging, phenomics and “omics” in general);
- Forging partnerships with large international cohorts to overcome limitations posed by recruitment and underlying confounding factors (history of exposure to alcohol, diagnosis, prognosis, management strategies).

Annex 1: Inserm Collective Expert Reviews: principles and methods

The aim of Inserm Collective Expert Reviews¹⁶ is to summarize scientific knowledge on topics in the health sector through a critical analysis of the international literature. They are conducted at the request of institutions (ministries, health agencies or insurance bodies, etc.) who want up-to-date research data relevant to their public policy decisions.

Since their inception in 1994, over 80 collective expert reviews have been conducted on numerous subjects. Inserm is responsible for the conditions under which the expert reviews are performed (selection of source documents, constitution of expert groups based on the qualifications and independence of its members, transparency of the process, etc.) in accordance with its Charter of Expertise, which sets out its ethical principles.¹⁷

The Collective Expert Reports Unit of Inserm, which is part of its Public Health Thematic Institute, manages the scientific and technical coordination of the expert reviews following a defined procedure consisting of six main stages.

Commission of the collective expert review

The first stage involves *i*) working with the commissioning body to ensure the request is clearly defined, *ii*) verifying that sufficient scientific literature exists on the topic in question, and *iii*) drawing up an agreement outlining the scope and principal

16. Brand name registered by Inserm

17. Inserm Charter of Expertise available from:

https://pro.inserm.fr/wp-content/uploads/2020/08/INSERM_DISC_CharteExpertise.pdf

topics of the expert review, as well as the project duration and budget. During this stage the commissioning body's request is translated into scientific questions that will be addressed by the experts.

Literature searching

A document base is assembled from articles identified through searches of international bibliographic databases, along with other documents identified from the gray literature (institutional reports, etc.) relevant to the scientific questions posed. This document base is provided to the experts, and updated during the expert review and is complemented by the experts according to their area of expertise.

Constitution of a multidisciplinary expert group

For each expert review, a group of 10 to 15 experts is formed whose composition is determined by the scientific fields required to analyze the literature and answer the questions asked, while also ensuring the complementarity of approaches and disciplines.

Experts are selected from across the French and international scientific community. The selection is based on scientific expertise as demonstrated by their publications in peer-reviewed journals and by peer recognition. The experts must be independent of the commissioning body and of recognized lobbying groups. Prior to the start of the expert review, all the experts are required to complete and sign a declaration of interests that is kept on file by Inserm. The composition of the expert group is approved by the executive management of the Inserm Public Health Thematic Institute.

The experts' work lasts from 12 to 18 months depending on the amount of literature analyzed and the complexity of the topic.

Critical analysis of the literature by the experts

Over a series of expert group meetings, each member presents their critical analysis of the literature on a given topic, which is then discussed by the group. This analysis leads to the drafting of the various chapters of the expert report, that is constructed through collective discussion to ensure its coherence and articulation.

Individuals outside the group of experts may be invited to participate in these meetings to provide a complementary approach or viewpoint. Depending on the topic, meetings with civil society organizations may also be arranged by the Collective Expert Reports Unit in order to learn about their issues of concern and to identify other sources of data.

Summary and recommendations

A summary is produced that brings together the key points of the literature analysis and outlines the principal findings and overarching themes. Most collective expert reports include recommendations for action or research intended for decision-makers. These recommendations, formulated by the group of experts, are based on scientific arguments resulting from the analysis. The collective expert review procedure does not generally include an assessment of their feasibility and social acceptability. Such assessment may be subject to other types of expert review.

Publication of the collective expert report

After submission to the commissioning body, the collective expert report, consisting of the analysis, summary and recommendations, is published by Inserm. In agreement with the commissioning body, various communications strategies may be used, such as press releases, press conferences, or seminars open to various stakeholders including patient organizations, professionals, researchers, and institutions.

The expert reports are available from bookstores and can be accessed from the Inserm website.¹⁸ The full collection is also available from iPubli,¹⁹ which provides free access to Inserm publications.

18. <https://www.inserm.fr/information-en-sante/expertises-collectives>

19. <http://www.ipubli.inserm.fr/handle/10608/1>

Annex 2: Literature search strategy

Given the breadth of the subject and the abundance of literature, the literature search focused on the most recent data (2016-2020). Only meta-analyses and systematic reviews were searched over a broader period (2014-2020).

Bibliographic databases surveyed

Medline-PubMed, Web of Science, PsycInfo, Scopus, Cochrane, Cairn, SocINDEX and *Banque de données en santé publique* (BDSP).

Main sites surveyed

Observatoire Français des Drogues et des Toxicomanies (OFDT), European Monitoring Centre for Drugs and Drug Addiction (EMCDDA), *Mission Interministérielle de Lutte contre les Drogues et les Conduites Addictives* (Mildeca), *Santé publique France* (SPF), *Société Française d'Alcoologie* (SFA), WHO Europe (World Health Organization), Alcohol research UK, Reducing Alcohol Related Harm (RARHA), National Institute for Health and Care Excellence (NICE), Centers for Disease Control and Prevention (CDC), National Institute on Alcohol Abuse and Alcoholism (NIAAA).

Main keywords used

Depending on the databases used, the search strategy was carried out either with the words of the thesaurus or the index of the queried databases, or in words of the text (Title, Abstract). **The**

sequences between the quotation marks indicate a sequence of words searched *in extenso* and the symbol * indicates the keywords used with a truncation.

The query for the theme “Alcohol” was crossed with the different sub-themes.

Alcohol

Alcohol, Ethanol, “Alcoholic beverages”, “Alcohol drinking”, “Alcoholism”, “Alcohol abuse”, “Alcohol misuse”, “Alcohol-related disorders”, “Alcohol use disorders”, Alcoholic, “Alcohol dependen*”, “Binge drinking”, “Hazardous drinking”, “Heavy drinking”, “Energy drink”, Drunkorexia, “Alcoholic beverage”, “Drinking behavior”, “Underage drinking”

Perinatal exposure

“Prenatal ethanol exposure”, “Fetal alcohol spectrum disorders”, Pregnan*, Breastfeed*, Maternal, “Alcohol-exposed pregnancies”

Epidemiology

Epidemiology, Prevalence, Incidence, Trends

“Cohort studies”, “Longitudinal studies”, “Follow up studies”, “Twin study”

Consumption

Consumption, Trajector*, Pattern

Risk factors, determinants

“Risk factors”, Determinant, Determining, Predictors, Prediction, Trajectories, Personality, “Family history”, Family, Social, Lifestyle, “Occupational status”, “Job characteristics”, Occupation*, Workplace, Employ*, Sport*, Athlet*, “Physical activity”, Training, Fitness, Gender, “Human sex differences”,

Lesbian, Gay, Bisexual, LGB, “Sexual minority”, Transgender, Age, Environment, Genetic

Advertising, Advertisements, “Text messaging”, Publicity, “Mass media”, Warning, Message, Marketing

Protective factors

“Protective factors”, Protector, Protecting, “Beneficial effect”, “Dose response”

Health consequences

“Alcohol-related disorders”, “Alcohol-induced disorders”, “Adverse effects”

“Neurodegenerative disease”, Dementia, Alzheimer, Parkinson, Depressi*, Psychiatr*, Anxiety, Mental, “Eating disorders”, Sleep, Insomnia, Cancer, Melanoma, “Heart diseases”, “Cardiovascular diseases”, “Heart failure”, Atherosclerosis, Liver, Diabetes, Obesity, “Metabolic diseases”

Mortality, Death

Effects of low doses

Low dose*, “Light alcohol”, “Light drinking”, “Light-to-moderate”, “Chronic exposure”

Cognitive functions

Cognition, Memory, “Cognitive ability”, “Cognitive development”, “Cognitive impairment”, “Cognitive dysfunction”, “Mental process”, “Executive function”

Epigenetics

Epigenetic, Epigenomic, Epigenesis, “Gene environment interaction”, “Environmental exposure”, Susceptibility

Transgeneration*, Intergeneration*, “Paternal exposure”, “Maternal exposure”, Heredit*, “Germ cells”, Germline, Germinal, Gamet, “Somatic cells”

“DNA Methylation”, RNA, miRNA, Histone, Phenot*, Chromatin*

Psychology

Psychology, Motivation, Willingness, Pleasure, Feedback, “Sensation seeking”, Perception, “Perceived norms”, Sensitivity, Personality, Coping, Impulsiv*, Vulnerabilit*, “Adolescent behavior”

Screening and diagnosis

Screening, Testing, Diagnos*, Biomarker*, Meconium, Scale, Questionnaire, Examination

“Screening and brief intervention”, SBI

Non-medicinal management

“Treatment Outcome”, Therapy, Rehabilitation

Psychotherapy, “Cognitive behavior therapy”, “Motivational therapy”, “Cooperative Behavior”, Counseling, “Peer Group”, “Mind-Body Therapies”, Mindfulness, “Complementary Therapies”, “Psychiatric Somatic Therapies”, “Physical Therapy Modalities”, “Psychological Techniques”, “Virtual Reality”, “Electric Stimulation Therapy”, “Transcutaneous Electric Nerve Stimulation”, “Transcranial Direct Current Stimulation”, “Transcranial Magnetic Stimulation”

“Self-Help Groups”, “Alcoholics anonymous”

Risk reduction

“Harm reduction”, “Harm minimization”, “Reduc* harm”, “Reducing consumption”, “Risk reduction behavior”

Prevention

Prevention, Program*, Intervention, Campaign

“Health promotion”, “Health education”, “Consumer health information”, School, Family, Parent*

“Social marketing”, “Mass media”, Media, “Text messaging”, Message

Internet, Network, eHealth, “Mobile application”, Smartphones, “Cell phone”, “Mobile Phone”

Efficacy, Effectiveness, Evaluation, Assessment, Outcomes, Model

Policy

“Public Health”, Political, “Policy making”, Policy, Policies, “Government policy making”, Government, Law

Labeling, Label, Warning, Pictogram, Pictorially

Price, Pricing, Taxe*, Taxation

Industry, Lobbying

Cost

Cost, Economics, “Cost effectiveness”, “Cost consequences”, “Social cost”, “Cost-benefit”, “Cost-utility”, “Cost of diseases”, “Health care cost”, “Cost of illness”, “Cost and cost analysis”, “Cost benefit analysis”, “Econometric models”

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ISBN 978-2-7598-3068-8
ISSN 1264-1782
DOI: 10.1051/978-2-7598-3068-8
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