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Impact of the Covid-19 pandemic on addictions in France: Perspectives for National Public Health Plans

Focus on alcohol related indicators

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This work represents the start of new perspectives I have been longing for, and I intend to be up to the expectations from my academic professors, my relatives and myself.

Preface

In order to respect the original wording of the French institutions or documents cited in this work, it has been decided in accordance with the Professional Advisor, to keep mainly the French wording in the text. Exceptions were made in the introduction, to explain the prerogatives of the cited institutions.

In the other parts of this work, acronyms are mostly used to refer to these institutions, and French names for associations, studies, or other documents were kept in French, written in italic font, as well as cited sources.

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List of acronyms and abbreviations:

ANJ	*Autorité Nationale du Jeux*
ANSES	*Agence Nationale de Sécurité Sanitaire de l'Alimentation, de l'Environnement et du Travail Alimentaire Nationale*
ANSM	*Agence nationale de sécurité du médicament et des produits de santé*
ARJEL	*Autorité de régulation des jeux en ligne*
ARS	*Agence Régionale de Santé*
ASUD	*Association d'autosupport des usagers de drogues*
CAARUD	*Centre d'accueil et d'accompagnement à la réduction des risques pour usagers de drogues*
CBD	Cannabidiol
CCSA	Canadian Centre on Substance Use and Addiction (Canada)
CEIP-A	*Centres d'Évaluation et d'Information sur la Pharmacodépendance-Addictovigilance*
CepiDc	*Centre d'épidémiologie sur les causes médicales de Décès*
CSAPA	*Centre de Soins, d'Accompagnement et de Prévention en Addictologie*
DGOS	*Direction Générale de l'Offre de Soins*
DGS	*Direction Générale de la Santé*
ERAS study	*Enquête Rapport au Sexe*
EROPP study	*Enquête Représentations, Opinions et Perceptions sur les Psychotropes*
FARE	Foundation for Alcohol Research & Education (Australia)
GDS	Global Drug Survey
GHB	gamma-Hydroxybutyric acid
ICD-10	10th International Statistical Classification of Diseases and Related Health Problems
INSERM	*Institut national de la santé et de la recherche médicale*
LSD	Lysergic acid diethylamide
MDMA	Midomafetamine
MILDECA	*Mission interministérielle de lutte contre les drogues et les conduites addictives*
OFDT	*Observatoire français des drogues et des toxicomanies*
ONS	Office for national Statistics (United Kingdom)
OSCOUR	*Organisation de la surveillance coordonnée des urgences*
PMSI	*Programme de médicalisation des systèmes d'information*
SpF	*Santé Publique France*
SWOT analysis	Strengths, weaknesses, opportunities and threats analysis
ViQuoP study	*Enquête Vie Quotidienne et Prévention*

Abstract

Introduction: The covid-19 pandemic has took a toll on health on several dimensions. Aside of the virus itself, the sanitary measures have had global impacts on the population. Mental health deterioration, restrained access to care and concerns regarding addictions were anticipated issues. Nevertheless, impacts and lasting effects of the pandemic on addictions are still to be comprehensively assessed.

Objectives: This work aims to gather the data available to this day, related to the impact of the sanitary crisis on addictions in France. The results will contribute to adapt or elaborate National Public Health Plans and related indicators, based on the limitations observed during the pandemic.

Methods: A literature review was conducted to investigate the quantitative and qualitative changes in addictions during the pandemic. Three databases (Pubmed, ScienceDirect and Cairn.info) were searched alongside the grey literature. An analysis of existing plans and indicators systems will be used to explore two main perspectives in the alcohol-related indicators field, based on identified shortcomings.

Results: Available data mainly relates to the changes in use during the first lockdown in March 2020. For the main substances, alcohol, tobacco and cannabis, global use decreased or stagnated. Being a frequent or polydrug user or poorer mental health, were associated with negative changes. Gambling and betting online activities have drawn mainly new young users with potential lasting and problematic uses. For other substances, changes linked to the pandemic were poorly documented at the exception of availability of substances, which remained high. Part of the literature underlined the challenges to access addictology care and support for vulnerable users. Factors associated with changes in use were previously identified in the literature, but the heterogeneity of users' situations has led to important difficulties for some of them.

Conclusion: The main conclusions that can be drawn is the lack of periodicity of the data to provide time-series analysis throughout the crisis, and the lack of objective data on addictions-related harm and potential lasting effects. In the perspective of an eventual National Plan against Alcohol-related harm, two recommendations were discussed to improve reporting of alcohol use prevalence and alcohol-specific mortality in crisis context.

Key words: Addictions, Covid-19, crise sanitaire, Indicators, Alcohol, Mortality, Prevalence, France

Résumé :

Introduction : La pandémie de covid-19 a fait des ravages sur la santé à plusieurs égards. Hormis le virus lui-même, les mesures sanitaires ont impacté globalement la population. La détérioration de la santé mentale, l'accès restreint aux soins et les préoccupations concernant les toxicomanies étaient des problèmes anticipés. Néanmoins, les impacts et les effets durables de la pandémie sur les dépendances doivent encore être évalués de manière exhaustive.

Objectifs : Ce travail vise à rassembler les données disponibles à ce jour liées à l'impact de la crise sanitaire sur les addictions en France. Les résultats contribueront à adapter ou à élaborer des Plans Nationaux de Santé Publique et des indicateurs associés, sur la base des limites observées pendant la pandémie.

Méthodes : Une revue de la littérature a été menée pour étudier les changements quantitatifs et qualitatifs concernant les addictions pendant la pandémie. Trois bases de données (Pubmed, ScienceDirect et Cairn.info) ont été interrogées, en plus de la littérature grise. Une analyse des plans et des systèmes d'indicateurs existants sera utilisée pour explorer deux perspectives principales dans le domaine des indicateurs liés à l'alcool, sur la base des lacunes identifiées.

Résultats : Les données disponibles concernent principalement les changements d'usage lors du premier confinement en mars 2020. Pour les principales substances, l'alcool, le tabac et le cannabis, la consommation a globalement diminué ou stagné. Être un consommateur fréquent ou polyusager, et une mauvaise santé mentale étaient associés à des changements négatifs. Les activités de jeux et paris en ligne ont attiré principalement de nouveaux jeunes utilisateurs avec des usages potentiels durables et problématiques. Pour les autres substances, les évolutions liées à la pandémie ont été peu documentées à l'exception de la disponibilité des substances qui est restée élevée. Une partie importante de la littérature a souligné les défis pour accéder aux soins et au soutien en addictologie, en particulier pour les utilisateurs vulnérables. Les facteurs associés aux changements d'usage avaient été précédemment identifiés dans la littérature, mais l'hétérogénéité des situations des usagers a conduit à des difficultés importantes pour certains.

Conclusion : Les principales conclusions qui peuvent être tirées sont le manque de périodicité des données pour bénéficier d'analyse chronologiques tout au long de la crise et des données objectives sur les dommages liés aux addictions. Dans la perspective d'un éventuel plan national de santé publique contre les dommages liés à l'alcool, deux recommandations ont été discutées pour améliorer le suivi de la prévalence de la consommation d'alcool et de la mortalité spécifiquement attribuable à l'alcool dans un contexte de crise.

Mots clés : Addictions, Covid-19, Crise sanitaire, Indicateurs, Alcool, Mortalité, Prévalence, France

A. Introduction:

I. DGS: context of the internship

1) -Missions

The French **Ministry of Solidarities and Health** (***Ministère des Solidarités et de la Santé, MSS***) is by definition in the law overseeing the design and enacting of the Government's policies in several fields: "solidarity, social cohesion and the organization of the health system" (1). The Minister assumes command over the constituting entities of the Ministry, which includes among others:

- **The General Directorate of Health** *(Direction Générale de la Santé, DGS)*
- **The General Directorate of the Organization of *Care*** *(Direction Générale de l'Organisation des Soins, DGOS)*
- **The Ministerial Delegates in charge of mental health and psychiatry, and digital for health**

The Minister also disposes of the an Interministerial Mission Against Drugs and Addictive Behaviors (*Mission interministérielle de lutte contre les drogues et les conduites addictives*, MILDECA).

2) - Organization

The General Directorate of Health *(Direction Générale de la Santé, DGS)* acts as an operative branch of the Ministry and is composed of several services, departments *(Sous-directions)* and offices *(Bureaux)* as written in the law « *Arrêté du 6 avril 2016 portant organisation de la direction générale de la santé » (2) »* . It includes **the Subdirectorate of Population Health and Chronic Disease Prevention** (*Sous-direction de la santé des populations et de la prévention des maladies chronique., SP*). This entity is divided in five thematic offices, among them the office in charge of the addictions.

3) - Bureau SP3

The Office called "Prevention of Addictions" (*Bureau SP3 Prévention des Addictions*) participates in the elaboration, consistency, and implementation of public policies regarding addictive behaviors and substance use in their sanitary dimension. Currently, it takes action on behalf of the National Strategy for health *(Stratégie Nationale de Santé 2018-2022).*

The DGS, through the Office SP3, works with public institutional partners in the addictions domain, and ensures the administrative supervision of several public agencies:

- ***Santé Publique France*** **(SpF*)*:** the national public health agency is in charge, among other missions, of epidemiologic surveillance, which includes addictions, and the development of prevention and health promotion.

- **The National Drug Safety Agency (ANSM)** is responsible of the evaluation of sanitary risks for drugs and other health products (including opioids used for substitution treatments, drug dependence, etc.).

- **The National Food and Environment Safety Agency (ANSES)**: responsible of the evaluation of sanitary risks related to food and environment, including the addictions field (Cannabidiol as a Novel Food, passive smoking, etc.).

- **The French Observatory for Drugs and Drugs Addictions (OFDT)**, providing monitoring for drug consumption and addictive behaviors.

- **Regional Health Agencies (ARS)**: responsible of the implementation of public health policies on the local level. They participate to the management of local projects with other actors (associations) which encompasses the addiction field.

Aside of public agencies, the DGS works closely with other ministries, especially through a dedicated entity:

- **The Interministerial Mission against Drugs and Addictive Behaviors (MILDECA)** is a body placed under the authority of the Prime Minister. It aims to coordinate public policies, including the Ministry of Health, Ministry of Interior and Ministry of Justice, among others. Its fields of action encompasses monitoring, implementing prevention actions and financially supporting operators.

Associative operators are also essential partners of the DGS, which bring them financial support for managerial for different kind of projects, missions and/or addiction care centers.

II. Covid-19 crisis:

1) Sanitary measures

The Covid-19 pandemic has led national governments to enforce various regulations and policies to prevent the spread of the virus, in particular during the first quarter of 2020. France has implemented, like many other countries, a strict lockdown from 17 March to 11 May (3), alongside mandatory masks measures and other sanitary recommendations. Such strong regulations were new for the French population (4). This unprecedented pandemic, aside of its infectious consequences, was expected to cause collateral damages. Drastic reduction of social interactions, massive teleworking implementation, and cessation of cultural and physical activities took a toll on both mental and physical health and emphasized social inequalities (5,6). The persistence of the sanitary crisis, with additional with additional restrictions (mask measures, curfew, travel restriction) being implemented from 30 October to 15 December 2020, and from 3 April to 1 May 2021, may contribute to lasting effects on health globally.

2) Expected impact on addictions:

Regarding addictions, the influence of mental health should be considered (7). In the scientific literature, the link between crises (economic and sanitary) and mental health issues has been a topic of interest (8,9). Accordingly, many public health actors were expecting a rise in stress levels, anxiety, and depression together with this particular pandemic (10). In addition to the impact

of the global context, the potential effects of regulations and policies (lockdown, curfew and other recommendations) like social relation deprivation, spatial isolation or irrational fear were concerning. As elements from the scientific literature suggest that worsened mental health influence negatively addictive behaviours, there is a need to assess the real effect of this dynamic and the Covid-19 pandemic (11–13). At the beginning of the pandemic, some publications tried to anticipate the impact of the sanitary crisis on addictions such as *Mengin et al.* (14). The influence of boredom, stress, mental health issues, lack of social opportunities, and a stronger decrease of use among the youth were expected.

III. Main Objective and research Question

The main objective of this work is to explore perspectives in terms of current or future National Health Plans regarding addicitons, based on the assessed impact of the pandemic in the addictions field, for the Office SP3. This proposal of actions will be supported by the findings of a literature review of the data available regarding the impact of the Covid-19 pandemic on addiction in France. The following topics were investigated, as they are the main topics of interest of the service: alcohol, tobacco, cannabis, gambling/betting, and other illicit drugs (cocaine, ecstasy, etc.), chemsex and opioids.

To address correctly this matter, several items were assessed through the following questions:

What was the measured impact of the pandemic on the prevalence and changes in use of addictive behaviors and addictive substances use?

- What was the measured impact of the pandemic on the prevalence and/or changes in use of addictive behaviors and addictive substances use?
- What were the factors associated with the eventual quantitative and qualitative behavioral changes during the pandemic? Including socio-demographic determinants and changes induced by the crisis (mental health, access to substances, etc.).

The first phase of this work will accordingly consist of a literature review on these questions. Its goal is to deliver a synthesis of available information to highlight the potential shortcomings of scientific and institutional data produced during the pandemic, and identify future prospects for improvements to include in further policies.

The findings could contribute to the improvement or adaptation of current National Health Plans and to the elaboration of future Plans. To fit the brief of the thesis work for EHESP, one main perspective will be developed in this regard: alcohol-related indicators. Recommendations will be issued based on an analytical work regarding Public Health Plans and the indicators systems existing.

B. Inventory of available data on the impact of the sanitary crisis on addictive behaviors: literature review

I. Method and Materials

A literature review was conducted between mid-February and mid-May 2021.

Grey literature was studied through formal institutional reports and publications, as well as publications made by users' associations, scholarly societies, polling institutes and journals. The main scrutinized sources were publications issued by the institutional partners of the DGS: *Observatoire Français des drogues et Toxicomanies* (OFDT) which produces literature like *Tendances*, *TREND*, *Tableaux de bord*, etc. and *Santé Publique France* (SpF) which performs surveys like *CoviPrev*, *ViQuoP*, *Baromètre Santé*, etc. *Mission Interministérielle de lutte contre les Drogues et Conduites Addictive* (MILDECA) and *Autorité Nationale du jeux* (ANJ) were also important sources.

The scientific literature was examined through international databases additional data, complementary or supplementary to the data issued in the grey literature. PubMed, ScienceDirect and Cairns.info databases were used to collect the articles in both English and French. The research was limited to the years 2020-2021 to focus on Covid-19 related articles and on publications based on or including data from French participants or French locations. Supplementary researches were conducted to assess briefly publications based on data available from other populations (other European countries or Anglo-Saxon Countries mainly) to test the consistence of the French data. As cultural contexts and pandemic measures differ between countries, a comparison of the pandemic's impact on addictions should be conducted as a proper research work, thus research done on this topic will not be detailed precisely in this work as no systematic method was applied to this intent.

The research protocol included diverse keywords in order to address broadly the literature: Covid-19 and Pandemic, France and French, Addiction, Alcohol, Tobacco, Cannabis, Gamblers, Opioids, Illicit drugs, Chemsex. Logical Boolean operators were used in the advanced research system of the databases, to gather articles including at least one of the addictions or substances of interest or the addiction field in itself. Two researches were conducted in the ScienceDirect database as Advanced Research was limited to 8 Boolean operators per research. Quality of the publications was taken under consideration with two main criteria: being published in a peer-reviewed journal and relying on references. Articles were used to perform a qualitative analysis of the data, this work do not aim to provide quantitative analysis or meta-analysis of the results presented in the publications. The search protocol is detailed in appendix n°1 and the selection flow chart in appendix n°2.

II. Results:

Findings of the literature review are displayed in seven sections, representing the six addictive behaviors or addictive substances under study and a general section dedicated to

addictology care and support. For each section, grey literature and scientific literature are detailed, and main qualitative findings are featured. A significant proportion of the literature addresses simultaneously several addictive behaviors, mostly tobacco and alcohol and others. Thus publications can be referred to multiple times. Regarding addictive behaviors prevalence data, changes over time were included when compared to the same time period previous years to include usual yearly variations (seasonality of sells, regular preventive events, etc.).

1) Alcohol:

Prevalence data:

Regarding the pandemic, prevalence data of alcohol consumption should be issued by SpF and its "*Baromètre Santé 2020*" by the end of 2021. Scientific studies were globally not interested in estimating prevalence of use but rather changes in use, as sampling method in study's design would be sources of biases. Most of the studies found between 60% and 65% of alcohol users in their sample, which is below the SpF's last estimate (86,7% of users in the last 12 months). This can be explained by the fact that it was more difficult for studies to rely on representative samples as they used widely access panel or open online surveys. Study design also varied from one study to another and being qualified as an "alcohol user" was not based on the exact same definition (users in the last 12 months, no time-related definition, self-assessment, etc.). In addition, the difficulty to include heavy drinkers in the samples is well known and may have impacted the accuracy of the findings. This was acknowledged and described by *Guignard et al*. (15) for SpF for instance.

The alcohol sales data can provide insightful data, but cannot allow to conclude. Increase or decrease in sales can be explained by change in prevalence or in changes in use for drinkers. Overall, data from diverse sources suggests that off-trade sales (retail) decreased during lockdowns and increased in the post-lockdown periods, compared to the previous year. The OFDT's publication "*Tendances*" 139th (16) issue, for instance, discusses the evolution of addictive substance use during the lockdown. Based on fiscal data (retail sells and Café/Hotels/Restaurants), it estimates a 4% decrease in alcohol retail sales during the lockdown.

Although sources of data are fragmented between the different categories of alcoholic beverages, numerous sources (FranceAgriMer, Nielsen panel publications, etc.) concluded to a slight decrease overall of alcohol consumption in France. Overall they reach the same conclusion, the slight increase of off-trade alcohol sales did not compensate the strong decrease of on-trade sales (café, hotels, restaurants, bars, etc.) over 2020. Users imported from outside part of their consumption to their home.

This trend in sales should be monitored in 2021 to assess if it will last, as the alcohol off-trade sales increased significantly during the first months of the year and the re-opening of on-trade sales in June may contribute to increased uses. Fiscal data exploited by the OFDT over the year will give more precise data regarding the global alcohol beverage sales (on-trade and off-trade).

Changes in use:

Regarding prevalence and changes in use of alcohol, the institutional partners of the DGS have carried out quantitative surveys during the lockdown, especially SpF, the MILDECA and the OFDT. Overall, they come to the same findings: a slight decrease overall, but an increase for some populations.

SpF has conducted the *CoviPrev* Survey (17), a self-administered based on quota sampling addressing behavioral &and health items (compliance with sanitary measures, mental health, etc.). It was administered throughout the pandemic to provide time-series analysis, inclusion of items varied along time. It included once alcohol consumption during the confinement, in its second wave. 11% of participant drinkers increased their alcohol intake, when it decreased for 24%. This data will be completed as said earlier with results of the yearly survey “Baromètre Santé”, which preliminary results for the year 2020 are supposed to be released to the DGS by the end of June.

The MILDECA has commissioned a survey regarding addictive substance use among workers, conducted by the polling organization IPSOS (18). The results show a decrease in alcohol consumption (frequency) for 14% of the participating drinkers during the first lockdown, and a decrease for a similar proportion in addition to 4% who ceased their alcohol use. However, 5% of drinkers were not consumers prior to the lockdown.

Studies tend to confirm the data observed by the institutional partners of the DGS. For example *Constant et al.* (19) assess an increase for 14,8% of participating drinkers, and a decrease for 21,1% during lockdown (D21 to 34). These results are consistent with other publications, such as the paper from *Beck et al.* with 14% of users drinking more, used as a reference in the OFDT’s publications, or *Guignard et al.* (15) with 10.7% of drinkers who increased their use when 24.4% decreased it.

Although, some studies have observed higher rates of increase than decrease. *Rolland et al.* (18) for example conducted a survey at the beginning of the lockdown (D8 to D13), with 24,8% of drinkers increasing their use and 16,4% decreasing it. Similar results were suggested by *Rossinot et al.* (20) in the last weeks of the lockdown (D37 to D51) with 22,7% of the drinkers who increased their alcohol intake versus 12,2% who decreased it.

Factors associated with changes:

Several scientific studies were conducted with the aim to assess the impact of lockdown on alcohol use for defined groups or regarding identified factors.

Part of the studies on the subject target specific parts of the population. For example in the paper from *Bourion-Bedes et al.* (21) among students at the end of the lockdown in the Region Grand Est (predominantly female, mean age of 22 years) more than 1 out of 2 participants had reduced its alcohol use and 1 out of 5 had increased it. A study by Husky et al. (22) dealing with students

(predominantly female, mean age of 19 years) and mental health shows that 9,8% of users increased their consumption. The *Cannabis Online* survey (23), from the OFDT, shows that younger age groups were associated with significant decreases in alcohol consumption, compared to other age groups.

Health professionals can as well be more vulnerable regarding addictive substance use during sanitary crisis as described for other pandemic. *Hilmi et al.* (24) conducted a sudy among french oncology residents. The results suggest that 29% of participants increased their alcohol use, but did not explore furthermore the linked factors. Further studies should focus on this aspect as health professionals may particularly suffer from the lasting effects of the pandemic and thus may be more vulnerable to changes in mental health and addictive behaviors (25).

Another study conducted, after the lockdown, among users of an addiction care center (CSAPA) by *Chappuy et al*. (26), shows a significant increase for alcohol consumption. In this sample, with a high rate of multiple male drug users, and vulnerable people, the proportion of participants increasing their use (29,2% of drinkers) is higher than those who decreased it (20,8% of drinkers). *Association Addiction* France released a publications based on a survey conducted with the BVA polling institute, which underlines that polydrug users increased their alcohol consumption more than twice as much as others (45% versus 21%). The *Cannabis Online* study (23), conducted among cannabis users, shows an increase for 26% of its participants, when 29% decreased.

Regarding multiple drug users, the *Global Drug Survey (GDS)* (27) provides insightful findings. It is a wide study which aims to estimate behavioral changes in several countries, mostly European or developed, regarding addictive behaviors, including alcohol. With 6.100 French participants, it do not intend to provide nationally representative sample but bring interesting data regarding multiple drug users (half of the French participants are cannabis users, 96% are drinkers and 19% cocaine users) (28). Among participants in France, it shows a global increase of the number of drinking days for 47,1% of the drinkers, with almost 1 out of 3 considering their increase to be high. Around 30% have decreased their drinking frequency. In addition, 27,3% of the French participants have increased their binge drinking frequency when around 35% decreased it, and 30.9% started to consume earlier in the day. The *GDS* (27) also provides potential comparison points between countries. Regarding France, the behavioral modifications related to alcohol are very slightly higher than the global mean of the survey, although significant differences have not been assessed in this regard in the related publications. These findings suggest that multiple drug users were particularly vulnerable to alcohol use increase, with possibly negative impacts.

In addition to the assessment of global trends in use, scientific publications bring insight on factors that may be associated with these behavioral modifications. The roles of these diverse factors were assessed mostly during the first lockdown.

The role of mental health has been included in many studies. Overall, the literature mainly links the deterioration of mental health with an increased alcohol use. *Bourion-Bedes et al.* (21) suggest a link between the increase of alcohol consumption and the increase of anxiety levels among students. *Rossinot et al.* (20) identify the negative changes in mental health as a risk factor for increased alcohol consumption, especially among women. Depression rates are associated with higher use of alcohol by *Guignard et al.* (15). The link between poorer mental health and alcohol consumption increase is reported in numerous studies conducted in other countries (*Jacob et al.* (29) in the United Kingdom, *Chodkiewicz et al*.(30) in Poland, the *Canadian Centre on Substance Use and Addiction* (31), etc.). These findings are unanimous, at the exception of *Husky et al.* (22) who reported no significative difference in alcohol use for students comparing those who stayed confined alone and those who relocated with family, although the later was associated with lower levels of anxiety. These results are strongly supporting what have been already underlined by the Inserm expertise and the literature outside of the sanitary crisis context.

A specific focus should be done on the influence of stress. Ambivalent effects have been highlighted. Stress can be either a motivation to quit or reduce an unhealthy behavior or a motivation to increase it in order to reduce the perceived stress or its negative effects (17). Findings suggest that age plays an important part in these relations and alcohol use. The older groups of the population (above 50 years) tend to decrease their use, when younger populations show more behavioral changes overall, with both higher rates of increased and decreased consumptions.

For the younger populations, increases seem to be associated with coping mechanism to deal with stress levels, especially among men, according to *Flaudias et al*. (32), whereas decreases can be linked to the lack of social opportunity to consume (19,20).

For the older groups, the reduced levels of increased alcohol consumption could be partly explained by the fact that this population is more vulnerable to the Covid-19, which may have pushed them to reduce their risky behaviors (19).

These results seem overall consistent with articles from other countries for the overall impact of stress such as Anne et al. in Germany (33) and the Canadian Center on Substance Abuse (34). Some sources support more specifically the age-depending role of stress such as Chodkiewicz et al. in Poland (30) and the *FARE* Data Report for Australia (35). Although, the influence of gender on the impact of stress is still discussed and may vary depending on the socio-cultural context.

Inactivity or boredom were factors recorded as participating to the rise of consumption. These factors were identified in the SpF's studies *CoviPrev* (17) and *ViQuoP* (36). Few scientific publications addressed the influence of these factors in the French population, but other foreign studies or surveys are supporting their role in alcohol use. In the overall results of the GDS (27), boredom and inactivity were the most cited reasons for increased alcohol use, and reports from Australian (35) and Canadian (34) institutions made the same observations.

Regarding work influence, few data is available, aside from the broad survey conducted by Ipsos for the MILDECA (37) put in perspective the fact that isolation rather than teleworking had a negative influence on alcohol consumption during and after lockdowns. Higher educational level was also associated to increased use by *Rolland et al.* (18). This effect was not highlighted by other studies, although few included specifically this aspect and other factors may play a role as a proxy.

The rumors that alcohol may have a protective effect regarding Covid-19 has not been explored explicitly in the studies, but in those who identified factors associated with increased use participants widely selected factors proposed in the surveys. For example in The GDS (27), "Other reasons" were only selected by 7.8% of respondents (multiple choices). Such impact was however reported in Iran, Orthodox Eastern Europe countries and Thailand (38), although other countries expressed strong concerns, in Italy for example (39). Thus it is not possible to exclude in France the potential effect on alcohol use of these rumors, although it did not seem to have a major impact.

These results are overall consistent with the 2021 expert report issued by the Inserm on the reduction of alcohol related risks. Which aims to provide decision makers an objective overview of alcohol consumption and risks and associated recommendations. The 6th chapter of the report details factors influencing alcohol consumption based on a substantial bibliographic work. Mental health, accessibility to alcoholic beverages, polydrug use, were identified as negative factors regarding alcohol consumption, which were also emphasized by the literature addressing the pandemic. However, regarding other factors highlighted in the report further studies should be conducted to assess the pandemic's impact. Working conditions and unemployment, conflictual contexts for the youth, and sexual orientation were not addressed by the literature to this date. A synthetic table regarding factors identified in the expert report and the factors studied in the pandemic-related literature is provided in Appendix n°3 and 3bis.

2) Tobacco :

Prevalence data:

Official prevalence data is issued by SpF yearly. The preliminary results of the "Baromètre Santé 2020" study show a non-significant increase of tobacco prevalence over the year 2020. It represents a stagnation of the decrease of the prevalence observed for the last decades.

The market sales data can give interesting information, although it is difficult to asses solely based on this data if eventual changes are due to change in prevalence or change in use (increased consumption for smokers). Based on fiscal data, the OFDT observed an important increase of tobacco purchase during the lockdown, which is linked to the closure of duty-free shops and the impossibility to access cross-borders tobacconists. This give interesting data regarding the usual part of tobacco market eluding the fiscal measures in France, and its impact on national purchases. However, this result is not instructive regarding prevalence or prevalence changes. It should be

noted that overall during 2020 tobacco sales declined very slightly (-1.3%), with a significant increase for products other than cigarettes (hand-rolling tobacco, cigarillos, etc.). This trend suggests that the pricing effect of fiscal dissuasive measures implemented for the last decade may be losing effectiveness, unrelatedly to the pandemic.

The OFDT also gives interesting insight on smoking cessation treatments, which are overall slightly increasing in 2020, with negative fluctuations during the lockdowns. Compared to other years it is an inflexion of the previous trend with high increase due to the eased access to prescription and reimbursement of nicotine replacements. The registered participation to the SpF program *"Moi(s) sans tabac "* has dropped by around 37% in 2020 (40). It still represents 125.000 smokers using the program as a smoking cessation support, and the e-coaching mobile app registered a similar download rate as previously.

Overall the data suggests that tobacco prevalence did not change, although changes in use may have put at risk part of the users. The impact on access to cessation support seems not significant.

Changes in use:

The institutional partners of the DGS have published numerous data on tobacco prevalence and the pandemic. They reach to the same conclusions. SpF provides the most enlightening data for tobacco use change of prevalence. The *CoviPrev* study (17) estimated during the first lockdown that 19% of smokers decreased their consumption versus 27% who increased it, with an average of 5 additional cigarettes per day. *The preliminary results of the "Baromètre Santé 2020" show a non-significant increase of tobacco prevalence over the year.* The MILDECA survey among workers shows as well higher proportions of increased tobacco use during the first lockdown, and overall reduced consumption post-lockdown.

The scientific literature supports these findings, with a diverse range of observed changes. *Rolland et al.* (18) assessed at the beginning of the lockdown (D8 to D13) an increase for 36% of smokers, including 9% of smokers experiencing "difficult-to-control manner" and a decrease for 21%, including 5% of smokers experiencing craving symptoms. *Constant et al.* (19) found an increased use for 21.8% of users and a decreased use for 16.7%.

At the end of the lockdown, *Rossinot et al.* (20) noted a higher consumption for 11% of the study's participants and a lower for 6%. The apparent decrease of behavioral change over time during the lockdown should not lead to the conclusion of a decreased impact of the lockdown. Many biases (methods, samples, etc.) could explain the difference in absolute terms, but it is interesting to see that they converge to the same conclusion regarding the fact that there was more increased than decreased use.

Factors associated with changes:

Regarding tobacco prevalence and behavioral changes, the first lockdown was associated with increased smoking, however the literature suggests that this effect did not have a significant impact overall over the year 2020. If it seems that the pandemic had globally little impact on tobacco prevalence, we should investigate the factors associated with changes in use and vulnerable populations, as part of users may have experienced problematic increases or withdrawal symptoms related to forced decreases or lack of support.

Part of the scientific literature scrutinized changes in specific populations. Unlike alcohol, gender was a significant factor for tobacco use changes in several studies, which linked being female to higher proportions of increased use. Such as *Rolland et al.* (18) or the *CoviPrev* study (17), although for the latter the publication from Grignard et al. (15) based on the *CoviPrev* data do not discuss this potential link.

Regarding the youth, *Bourion-Bédès et al*. (21) for example, conducted a study among students during the first lockdown, 45% of participant smokers experienced a rise of tobacco use when 39% decreased it. Other publications support the findings of a higher impact of lockdown on the young smokers. *Guignard et al*. (15) identify the age group 25-34 to be more at risk of increased consumption, as well as *Rolland et al.* (18) for the age group under 50. This is in line with the fact that the younger age groups show higher prevalences of smoking in France, and thus maybe more vulnerable to this addiction. However, these results can be nuanced, for example, in the *Cannabis Online* study (23), younger age groups were significantly associated with higher proportions of decreased use of tobacco. Some studies underline the fact that younger age groups are also more inclined to have decreased or ceased (23) their used or increased it. As it has been described for alcohol use, but probably through different mechanisms, such as the potential effect of stress on smoking cessation motivation, which was described in foreign studies (*Klemperer et al.* (41) and *Bommele et al.* (42)).

The impact of mental health has been repeatedly associated to negative changes in tobacco use, like alcohol consumption. The impact of depression symptoms was underlined by Guignard *et al*. (15) and backed by other studies interested in mental health more broadly, such as *Rossinot et al*. (20) or *Rolland et al.* (18). Stress was associated with increased use as well as decreased use as stated before. Regarding its negative impact, more studies are conclusive, such as *Bourion-Bédès et al.* (21)and *Flaudias et al*. (32) among students, and *CoviPrev*(17).

Vulnerable populations were as well under reviewed during the lockdown. Among polydrug users being patients from an Addiction Care Center, *Chappuy et al.* (26) observed similar trends compared to global population studies with 27% of participants increasing their smoking behaviors and 15% decreasing it (with a 85% prevalence rate). Among cannabis users, the *Cannabis Online*

study (23) found an increase in tobacco use for 27% of participants, and a decrease for 19%. These results are in line with other surveys conducted in the global population, although the sample is not representative (over representation of daily cannabis smokers and higher educational status).

Studies conducted with heart failure patients and chronic coronary syndromes suggests potential greater risks for increased tobacco use, in *Cransac-Miet et al.* (43) 26% of smokers increased by more than 25% their tobacco consumption, and in *Chagué et al*. (44) half of smokers had increased their use. In both studies, smoking prevalence was low, which is consistent with the age group of the patients (mean age 65-70 years). These findings suggests that vulnerable patients, among the elderly and chronic patients, tend to experience higher increases in smoking, when this age group globally seems to be motivated by health preservation and tend to experience less negative changes regarding tobacco. Further studies should be conducted to possibly generalize these results to other patients groups or age groups.

Regarding socio-professional and educational status, mixed results are displayed in the literature. For *Rolland et al.* (18) lower educational level was a risk factor for risen use, findings contradictory with *Guignard et al.*(15). Still, the latter acknowledges a negative impact of living in an overcrowded housing. In the results of the "*Baromètre Santé 2020*" (45), lower socio-professional status was linked to excessive prevalence of smoking, which may not be related to the pandemic impact and may reflect lasting trends. The authors indeed link this higherrates to the first 2020 quarter. Other studies did not highlighted significant differences regarding these factors. Teleworking was examined by the MILDECA with results consistent with alcohol use, with a greater impact of isolation, regardless of telecommuting. Living alone was negatively associated with increased smoking, by *Rossinot et al*. (20) and *Rolland et al.* (18) (impact of being single).

Overall, the results from the literature are consistent with the findings of the "*Bulletin Epidémiologique hebdomadaire"* from SpF (based on the 2017 data(46)). This publication is the latest report detailing the factors associated with smoking among the French population. However, it should be noted that this publication do not state causal relations, but only association. It highlights the link between poorer mental health and lower socio-professional status and smoking. One of the hypothesis formulated is that social inequalities may trigger tobacco consumption in order to cope with stress or daily impediments. The publication also acknowledges higher proportion of smokers being other drug users. Regarding mental health the literature based on the pandemic is supporting SpF previous findings. For other factors, mixed results were issued. Lower socio-professional categories have not been clearly identified to be more at risk of increased use during lockdown; some other variables may have been playing a proxy role regarding this aspect (risk of poorer mental health, etc.). Further studies should focus on the determinants and motives linked to the higher smoking rate in this category.

3) Cannabis:

Prevalence data:

Cannabis has not been studied as much as alcohol or tobacco in the context of the pandemic. Notwithstanding that it is the most illicit drug used, its use is less widespread than alcohol or tobacco. The principal sources of data are the institutional partners of the DGS. The data from the "*Baromètre Santé"* from SpF is the main source to estimate cannabis use prevalence in France, although the cannabis items are not part of the survey yearly. Results for 2020 should be available by the end of 2021.

Other surveys and studies have collected data regarding cannabis use, usually alongside other drugs. The most detailed studies were targeting specifically cannabis users and thus do not provide prevalence data but rather got interested in changes in use. This work will accordingly focus on changes in use and factors associated, as the estimatiosn of the prevalence of use in the studies was not a primary goal and cannot be used for comparison.

Changes in use:

The OFDT and the MILDECA have collected the most detailed data available regarding French cannabis users and Covid-19. The OFDT's survey *Cannabis Online* (23) gather answers from 2778 participants, if it is not suitable to provide precise prevalence data it gives interesting insight into the dynamics of consumption. It should be noted that the population in the survey is over representing daily cannabis smokers and higher educational status, compared to the usual cannabis smoker population. Thus, it is particularly interesting to understand how the pandemic impacted daily users in addition to other studies.

In this study,27% of cannabis smokers increased their consumption when 4% ceased it, and 16% decreased it, including in the sample the 27% of users who did not consume during the lockdown (occasional users) but did not quit. Thus, there was overall a decline in cannabis consumption among the participants. Overall 15% of the participants who were users before the lockdown did not consume during the 30 days before the data collection of the survey, other studies should be conducted to confirm the slight decrease of prevalence over time.

The Ipsos survey among workers for the MILDECA, is supporting these findings, with an increase of use for 20% of participants when 30% decreased or ceased it. The changes in behavior studied, lasted after the lockdown until the study's data collection, which took place in October. One significant finding for cannabis users, despite the high proportion of users experiencing a positive behavioral change, is that 19% of participants cannabis smokers began their use during the lockdown, which is twice a much as the new user rate for alcohol or tobacco in the survey.

Rolland et al. (18) showed an increased use for 31% of participant users and a decreased one for 29% during the lockdown. Among the psychoactive substances studied in the study, cannabis caused the higher rate of decrease with withdrawal or craving symptoms.

Associations linked to addiction care centers conducted several studies. In the *Cannavid* study for example (47), based on a 4279 participants smoking daily cannabis, 36% of participants increased their use when 35% decreased or ceased it. However, this is a higher proportion of decrease compared to the *Cannabis Online* study (23), which noted that 18% of daily smokers reduced or stopped their use during lockdown. This is however in line with the findings of the BVA survey for *Association Addiction France*, which estimates that 33% of cannabis users increased their use since the beginning of the pandemic, suggesting that for frequent users, lasting effects on the level of consumption may be observed.

The results available also provide information on qualitative changes in use. Another interesting finding of the *Cannabis Online* survey (23) for instance, is that 39% of users experienced exclusively consumption being alone during the lockdown, versus 6% before the lockdown, with higher proportions in the older age groups.

Solitary cannabis smoking is usually associated with high risk use, but the lockdown automatically forced smokers to cease social gathering outside their household. Thus, it is difficult to conclude on the potential lasting effects of the pandemic after the lockdown on solitary use. It should be noted that on average the hour of the first use was earlier during the lockdown, when it is usually predominantly in the evening, especially among daily users.

Factors associated with change:

The *Cannabis online* (23) study underlines the fact that frequent users were less susceptible to undergo a change in their behavior, whereas occasional smokers were more likely to decrease or temporarily stop their consumption. For example, 80% of users smoking less than once a month did not smoke cannabis at all during the lockdown.

The study also noted the behaviors of users at the time of the data collection (July 2020). Interestingly, frequent smokers maintained their high consumption, with little differences between lockdown and post-lockdown. Whereas non-frequent smokers who decreased strongly their use during lockdown were twice as much using cannabis in June as they were during the lockdown, almost reaching pre-lockdown use. The study also highlight the fact that women were as at risk as men to increased use during the lockdown.

As described earlier for alcohol and tobacco, multiple drug use data shows that the young cannabis users were more likely to have decreased their use of other psychoactive substances. The GDS (27) gives informative results in this regard. In this study 54% of French participants were cannabis smokers, with a high proportion of users of other illicit drugs (around 20% of cocaine users, and same proportion of MDMA users.). 36,5% of French users increased their consumption when 27%

of smokers reduced it.

This is consistent with the data from *Association Addiction France* based on users from addiction care center (mostly multiple drug users). However, if data was collected in the *cannabis Online* (23) survey regarding other illicit drugs use the study design do not allow comparison between lockdown and other periods.

The publication from *Chappuy et al.* (26). Conducted in an addiction care center it shows that, among the 45% participants who were cannabis users, almost 28% increased during lockdown their cannabis smoking frequency, when 17% decreased it. It represents a particularly negative behavioral change overall. It suggests that polydrug users maybe more vulnerable to negative changes in cannabis use during situation crisis such as a lockdown. More detailed socio-demographic data on usual frequency of users would be valuable to understand better the dynamics for this population, which could be linked to socio-economic determinants.

Users from the global sample of the *GDS* (27) cited boredom and inactivity predominantly as increase factors, other reasons were spending more time with people from the household (which is consistent with the fact that few smokers are solitary users), stress and loneliness or depression. These factors are consistent with other publications, they were for instance also highlighted in the Canadian survey from the *CCSA* (34), with a higher impact of stress on women, and of boredom for men. This study also explored reasons to decreasing cannabis consumption, which were will to improve health, lack of social opportunity, financial aspect or purchase issues were cited, although there was no predominant cause widely identified. If behavioral changes in French respondents from the GDS (28) are not so much different from the average, 46% wish to decrease their use, which is significantly higher than in the global sample (28).

Regarding age, the younger age group studied (18-25 years old) were more likely to have change their behavior during the lockdown, positively overall. However, the *Cannabis Online* (23) study shows that after the lockdown, the younger age groups increased more their consumption, closer to pre-lockdown levels, compared to older groups . In *Rolland et al.* (18) the older age groups were less likely to experience a negative behavioral change, and low level of education was associated with higher increases, as well as living in a housing without an outdoor space. These factors were not underlined by the other publications.

Among workers in the Ipsos survey, isolation was associated with higher rates of increased level of use, and also higher rates of decreased/ceased use in both frequency and level. Teleworking was associated with significant higher increase in level of consumption, which was not highlighted for other substances in the study.Hypothesis is that isolation had an ambivalent effect, with the reduction of social opportunities to consume and use as a coping mechanism.

Access remained easy globally during the lockdown, usual smokers were more likely to buy more cannabis before the lockdown in anticipation, and most of users did not have purchase

difficulties during the confinement. Although worries regarding purchase may have been a motive for occasional smokers to cease, at least temporarily, their consumption. The lockdown had little effect on the prices according to the OFDT, even if some local sources attested important rise in prices (48).

The results available also provide information on qualitative changes in use. Another interesting finding of the Cannabis Online survey (23) for instance, is that 39% of users experienced exclusively consumption being alone during the lockdown, versus 6% before the lockdown, with higher proportions in the older age groups. Solitary cannabis smoking is usually associated with high risk use, but the lockdown automatically forced smokers to cease social gathering outside their household. Thus, it is difficult to conclude on the potential lasting effects of the pandemic after the lockdown on solitary use. It should be noted that on average the hour of the first use was earlier during the lockdown, when it is usually predominantly the evening, especially among daily users. Boredom and inactivity could be linked to this change.

4) Other illicit drugs and opioids:

Prevalence data:

Other illicit drugs of interest (aside of cannabis) include mainly cocaine, ecstasy/MDMA and hallucinogens (LSD, ketamine). Substances studied regarding opioids were antalgic medications such as morphine, codeine, tramadol or fentanyl, opioid substitute such as methadone, or illicit drugs such as heroin.

The main source of data related to these substances regarding the pandemic are the addictovigilance reports issued by the CEIP-A network (Pharmacodependence and Addictovigilance Evaluation and Information Centers) in collaboration with the ANSM. Several alert systems were used to gather signals from patients, health professional or addiction care centers to provide feedback related to deaths, hospitalizations, medical issues, or drug use incidents. They were reinforced during the pandemic on behalf of the ANSM.

Overall the CEIP-A network reported a high number of incidents related to these substances, compared to previous year. Although, the number of event reported is underestimate, as all pharmacovigilance event and particularly when they are related to illicit drugs or misuse, the report's findings are interesting. The fact that a high amount of alerts was issued during the lockdown suggests that the availability of substances remained high.

Very few scientific studies got interested in these substances. The Cannabis Online (23) study asses that 13% of its respondents were users of these products during the first lockdown.

Changes in use:

The number of deaths (overdose) was not assessed to be significantly higher over time, taking into account previous trends (accessibility of methadone, etc.), and still mainly associated with methadone. Methadone sales were slightly increasing due to relative loosening of prescription

regulations to ensure continuity in care amidst the pandemic. Thus no strong or new signal was detected in this regard except the fact that these signals were associated with the lockdown (49) (50). Again, the persistence of similar level of overdose reported supports the conclusion that users did not encounter major difficulties to access substances, even if it was recorded by the CEIP-A in 14% of alerts between the lockdown and July. Difficulty to access care increased but did not represent a problematic alert (49); changes in use may have been responsible for this increased need (switch between substances, cravings, etc.), some users shifted from illicit substances to opioids substitute to ensure availability of the substance used (51). Cravings were reported on a higher level during the first lockdown

The GDS (27) shows for French participants an important decrease, between June 2020 and the pre-Covid period, in MDMA use with 51% of users who reduced their consumption, which is significantly higher than for the global sample. For cocaine, a significant decrease was also observed by the study with 48% of participants from France using less this substance.

The publication from *Chappuy et al*.(26) among patients from a CSAPA shows an increase of use for 40% of heroin users and 36% of psychostimulant users. Increases were not as important for substitution medications, with 14% of methadone users and 23% of buprenorphine users who rose their consumption during the lockdown. These negative changes in use are contradictory with the GDS, but they can reflect the heterogeneity of the situations and underline the need for part of users to be more supported. Associated factors were not scrutinized; the hypothesis of the impact of stress is discussed in the paper. One of its conclusion is that availability and capacity to purchase were not significantly impaired by the pandemic.

Factors associated with changes:

It is interesting to note that the CEIP-A signals related to access to care were reported independently during or outside the lockdown, probably because face-to-face interventions were still precluded during this period of time. Access to risk reduction facilities represented a minor concern in the report (49). Few craving situations were notified, which is consistent with the implementation of measures to ensure continuity of treatments with community pharmacies during the pandemic. Regarding switches, the main concern was changes from nitrous oxide use to other substances (cocaine, etc.), which support the recent strengthening of surveillance on this topic from the last few years (49).

However, the reports highlight the increase of signals issued by unusual sources, overdose by Addiction care center, and problematic use and craving by other users or relative for instance. This underlines the fact that for some users the pandemic caused problematic changes, which are difficult to quantify (52). The difficulties may have been due to lack of group consumption and support and eventual switches from an usual substance to another motivated by local supply dynamics.

Cocaine use prevalence for the participants of the *cannabis Online* survey (23) did not change between pre-lockdown (12 months period) and the confinement, but LSD and MDMA uses decreased, which could be explained by the lack of social opportunity to consume in group as usual. Regarding the GDS study (27), main reasons cited in the global sample for positive changes (cocaine and MDMA) were lack of occasions to consume, lack of social exposure to co-users, and reluctance to use at home.

5) Chemsex :

Prevalence data:

Chemsex is defined by sexual practices, usually group practices or with multiple partners, associated with the consumption of illicit substances, including injections and psychostimulants. Several substances are usually used during a chemsex session, to seek specific effect: psychostimulation, disinhibition and/or higher sexual drive. GHB and/or cathinones are mainly used in France, with the frequent addition of cocaine, methamphetamines, other psychostimulant or recreative drugs (cannabis, alcohol, poppers, ketamine, etc.). Main risks are overdose (especially with GHB), addiction to substances, and psychologic repercussions (impossibility to have sexual practices outside of chemsex, challenges regarding consent, consequence on daily life routine and work, etc.).

Currently, very few data on Chemsex practices in France is available, whatever the assessment period. During the sanitary crisis, SpF conducted its usual study *ERAS* (53), dealing with sexual practices among the gay male community. Chemsex items are explored by the survey, which should be informative as data collection occurred during the first half of 2021, with results pending later. It is supposed to provide estimates of Chemsex prevalence and Covid-19 impact on it. The association *AIDES* estimates that 30% of users suffer from an addiction linked to chemsex usually. Deaths related to chemsex practices are not well documented usually, thus no data is available at this time for the pandemic period.

Changes in use:

The *cannabis Online* (23) study has asked cannabis users about their use of other illicit drugs. Before the lockdown, 2% of the respondents used cathinones during the previous year, but none used it during the lockdown. The consumption of cathinones is strongly related to chemsex practices, and a majority of users practices at least once a month. If we extrapolate this result, it might suggest that chemsex practices decreased during the first lockdown, although this is not a primary result of the study and the sample may be inadequate to measure it. No other quantitative data was available regarding chemsex.

If we do not have strong quantitative data, several journal articles got interested in Chemsex during the pandemic, and especially during the lockdowns, as Chemsex is very strongly linked to group sex practices or multiple partners, which were precluded by the confinement.

The French lifestyle magazine NEON has published a series of articles (54) (55) (56) , gathering testimonies from users regarding chemsex during the pandemic and from medical professionals. It underlines the fact that substances contribute to the addictive nature of chemsex but are not the main factor. Some users expressed no difficulties to stop chemsex at the beginning of the lockdown, but declared that as the confinement went on they faced relapse. The main concern express by health professionals was that the restrictions of social gatherings may result for some users in a solitary consumption of the substances used in chemsex. This would put at high risk users to develop an addiction to the substances, independently to the usual socio-behavioral dimension of chemsex.

Factors associated with change:

The NEON testimonies highlight factors related to relapse, maintained or increased use, cited by interviewees. Inactivity, lack of usual regular schedule, anxiety and loneliness were factors cited as motivation, inspite of the recommendation to cease social gatherings.

It should be acknowledged that stigmatization and trauma linked to sexuality are main contributors to chemsex use usually, although it is difficult to assess a potential link between LGBTI+ situation in France during the pandemic (violences within or outside the household, public debate regarding the "*Loi de Bioéthique*", etc.) and chemsex changes in use.

If we are lacking quantitative data, there is a consensus among health professionals regarding the inadequacy of care for chemsex users. Users can seek care in various structures, ambulatory care (general practitioners, psychotherapist, etc.), hospital care (addictology consultations, etc.), addiction care centers (CSAPA), associations (peers support group, etc.). Usually it is difficult for users to reach the care they need as the structures lack notoriety and the fact that many health professionals are not trained to deal with chemsex issues or may even have a judgmental take on it. In addition to usual challenges in care, three elements linked to the pandemic should be considered to adapt care, and may have contribute to increase risky uses for some users:

- the potential rise of solitary problematic consumptions
- the relatively restrained access to usual psychological support (professional or associative) during the pandemic
- the stigma related to violations of sanitary recommendations.

6) Gambling and betting:

Prevalence data:

The sanitary crisis suppressed on-trade opportunities for gambling or betting activities (sports bets, casinos, etc.), the majority of the sports competitions were also suspended for an important part of 2020. Accordingly, online gambling and betting activities increased significantly. We have

little sources of data regarding this behavioral addiction. The "*Baromètre Santé"* from SpF did not address in 2020 this subject.

The ANJ (*Autorité Nationale des jeux*) provided quarterly reports analyzing online activities during 2020, including specific analysis of lockdowns periods, with a 3 months delay. Regarding the year 2020, almost 4.9 million active accounts were registered, taking into consideration that one person can have multiple accounts to access different product portfolios, this number represents a 17% increase compared to 2019 (57). Gross gaming revenue increased by 22% in 2020. 5% of gamers were new users in 2020. During the first lockdown, gross revenue for the industry decreased by 24%. These data are the most detailed available to this date.

Changes in use:

The ANJ reports are very helpful to understand the dynamics of use. During the first lockdown (58) sports bets were precluded by suspension of competitions, accordingly a 72% decrease in active gamers was observed and a 87% decrease of gross revenue for this category. For horserace betting, international competition and therefore bets were still possible. In this category, there was only a 17% decrease of active gamers, but they spent more money, with a gross revenue rising by 18%. Poker game on the other hand showed the strongest increase, with 89% more active gamers and 177% growth of gross revenue. Between the March and November lockdowns, the situation did not completely come back to normal, horserace and sports bet tend to come closer to usual levels, but poker activities remained high.

During the second lockdown (59), all categories are rising in both number of active gamers and gross revenue, poker activities are still overperfoming, but at lower levels compared to the first lockdown. Over the year 2020 Poker activities gained 53% more active gamers with the fourth quarter being the second most, 30% more for sports bet and 5% more for horserace bets.

It should also be noted that the proportion of gamers who are active in only one category continues to slowly decrease (lasting trend), and users of both poker and sports bets is significantly rising over the year with +70% for the second semester vs 2019, which represent 400.000 additional users. However, 2 out of 3 usual gamers estimated they did not change their consumption in time or money spent.

Half of the new gamers intend to continue gambling activities at least once a month (60), when only 21% expressed the desire to stop it in 2021. 39% of problematic users do not intend to reduce their level of use. They are 41% willing to discuss with their relatives their game-related issues and only one out of three are inclined to consider using supporting services such as "SOS joueurs". Although no comparison was made with previous years.

Factors associated with changes

Regarding age, 13% of users from the 18-24 age category were new gamers in 2020 (60), compared to 5% regardless of age. A significant part of these new users experienced online casino,

which are forbidden in France but accessible online. Inactivity, boredom, perceived need to play, and desire to spend money spared by the lack of social opportunities, were the cited factors for starting gambling or betting. The younger age groups were also associated with higher problematic use over the year 2020, regardless of the game category, with a peak during the second lock-down. New gamers. For usual gamers, financial gain and force of habit were the most quoted motives to play, followed by the need for entertainment, inactivity and boredom. The conclusion of the ANJ is that the pandemic has brought young new users with a higher risk of problematic use. For usual gamers, no alarming signal was detected.

7) Global access to addictology care:

Other publications did discuss the impact of the pandemic on a global scale, and especially addressed changes in care delivery. *L.Coquard et al.* (61) put in perspective the double burden on the youth's culpability to be users. Being forced to infringe the lockdowns to purchase substances added to the guilt of not being able to control its addictive behaviors. They highlight the sensitivity of the younger age groups who particularly faced difficulties to respond to the pandemic situation, hence the ambivalent coping mechanisms observed. The lack of face-to-face interventions impacted their care significantly. Further policies should be specifically interested in providing environment and interventions to foster positive changes in this population in this kind of event.

Authors, such as *A.Morel* (62), have stressed the imperative need in addiction care to benefit from face to face interventions as a social link during the sanitary crisis. Testimonies from associative partners of the DGS, collected during the yearly status reports related to Ministry's subsidies, suggested that the forced digitalization of support groups has overall been beneficial. An article from *Narcotics Anonymous* (63) develops the pros and cons to videoconference in this regard, as it has enabled participation for some users. Mainly, associative care or support operators have continued videoconference support or group talks, to complete their face-to-face services.

In some cases, the lockdown has even bring closer patients and professionals. The example described by *M.Besse and O.Milian* (64) within a therapeutic community shows the challenges experienced by users related to changes in their care and how the situation reinforced the social link with their professionals, possibly benefiting their self-esteem and capacity to respond to the crisis. Difficulties to adapt to the situation were higher among patients with scarce resources as detailed by *M.Blaise* (65) for the Marmottan care center or by *M.Velazquez* (51) from the association *ASUD*. They also underline the issues associated with the deconfinement with strains to resist reestablishment of habits. The first lockdown has also been an occasion for addiction care centers (CSAPA/CAARUD) to partner with other professionals (pharmacies for syringe programs for instance) to ensure continuity and try to take care of new patients despite the closing of facilities (66).

III. Synthesis of findings:

This literature review provides an overview of available data. Official prevalence data are expected to be released along the year 2021, although none are expected for illicit drugs. Time-series data were only issued for tobacco, off-trade alcohol sales and online gambling/betting. Studies focused on the quantitative and qualitative changes in use, based on surveys administered during the first lockdown or later (summer). They almost exclusively deal with the changes in use related to the first lockdown.

Overall, results are consistent with available knowledge. There was no major escalation of addictive substance use or addictive behaviors. Factors associated with changes in use were mostly coinciding with previously identified factors or factors observed abroad. This is reassuring. However, the data collected highlight the difficulties for parts of the high-risk users who experienced increased use, putting them more at risk than before the pandemic. Decreased use was also a concern, as users may lack proper care or support to handle the situation with potential repercussions, especially for tobacco, cannabis and illicit drugs. Access to addictology care was heterogeneously impacted, predominantly at the expense of the most vulnerable.

C. Discussion: limitations and perspectives, focus on alcohol-related indicators

I. Limitations of the data available:

Methodological limitations

Most of the available data is issued from self-administered surveys, which can present several methodological biases. Part of the surveys collected data months after the studied event (first lockdown) which put them at risk for recall bias. It may be difficult for respondents to recall correctly the changes in their use. The fact that the surveys rely on declarative data put them at risk for misclassification bias. Because participants assess themselves their use or changes in use, the estimate of their use can be altered by their own perception. Regarding drug users data collection, the predominant risk is to observe participants minimizing their use, or not realizing they experienced a change. However, this risk may be reduced by the surveys' design, widely focusing on qualitative changes, which precluded them to address precisely trends for the different types of users. Thus data available should be interpreted with cautions.

Relevance of results

These results are very valuable to identify populations which needed specific care or support related to their use during lockdown. Caution should however be exercise to use these results for extrapolation for the overall pandemic period until more and accurate data could be available. Whenever tobacco has been studied and results published, studies with prevalence data and

associated factors are still expected for alcohol and cannabis. It is hard to know if studies specifically conducted during the other lockdowns are still pending.. On the other hand, it is expected that further studies interested in the pandemic's impacts on addictions will be dealing with broader period of time as no conclusive results were found regarding the first lockdown. These further studies should get interested in potential lasting effects on addictive behaviors of the pandemic, as it is still ongoing. A scientific watch conducted by institutional partners of the DGS would be useful in this regard. These data could enlighten decision-makers and drive future public policies or interventions.

Finally, there is a clear lack of observable data related to addictions related harm. Need for care, hospitalizations or mortality can be relevant indicators to assess the clinical impact of modifications of use. Within the populations having experience a change, little is known regarding impacts on health associated to it.

The difficulty to generate updated or real-time data appears to be a challenge in the addiction field as a whole. The data available did not allow the detection of rapidly emerging risky use. Regarding chemsex for instance, data is lacking, whereas feedbacks from health professionals and users were concerning. Stakeholders and especially SpF and the OFDT should identify the obstacles (financial, practical, etc.) to design routine or crisis data systems integrating periodicity requirements. Reproducibility, accuracy and relevance are crucial challenges for data quality, and should be addressed in this regard, to provide useful indicators.

The persistence of high level of anxiety and depression observed by SpF and the return to usual social activities may cause significant changes in the near future. These potential lasting effects of the crisis will need to be scrutinized, therefore post-crisis data collection mechanisms should be implemented to collect and analyze it efficiently. Usual surveillance systems do not appear to be able to provide this kind of information, at the exception of tobacco and online gambling.

II. Perspective for a National health Plan against Alcohol-related risks:

Based on this literature review, recommendations linked to indicators could be developed for each substance studied in this document, although the crisis did not put in perspective new specific needs for all. However, we have chosen to focus in this work on alcohol-related recommendations. Hereafter is detailed the rationale behind this focus.

Regarding tobacco, risks are well known in both the decision-makers and the public eye and National Health Plans against Tobacco have been implemented since 2014. These plans focused for instance on improving cessation support and care, prevent the start of use especially among the youth and economic/fiscal measures. The design and implementation of these plans were supported by changes in indicators produced by SpF and OFDT for decision-makers. For instance: yearly inclusion of tobacco in the "*Baromètre Santé"* since 2016, regional data since 2019, quarterly analysis of sales by OFDT in addition to monthly data, etc.). Tobacco is, to this day, indubitably identified as a threat for public health by all actors and strong measures have been implemented

(reimbursement of cessation support medications, "*Moi(s) sans tabac*", plain packaging, rise of price, etc.). Anticipating a new Public health Plan against Tobacco, most of the urgent challenges regarding indicators, awareness and public policies interventions have been already.

Cannabis is, on the other hand, a sensitive topic in France. With a high prevalence of use, especially among the youth, cannabis is a rising public health issue. During the year 2021, the debate regarding legalization or decriminalization of this drug has stir up controversy in both the medical and public eye. Parliamentary reports were published to nourish this debate for recreational and therapeutic use together with CBD regulations. Potential politic trade-off in the context of election time and experts quarrel bring uncertainty to the eventual developments on the cannabis legislation and associated public health policies. The literature review showed that an interesting amount of data was available during the crisis respecting to cannabis changes in use, and public policies would benefit from reinforced routine surveillance. Anticipated that cannabis will be the target of several communication campaigns for the second semester of 2021. The OFDT could participate to improve the periodicity of detailed data on this topic, as the "*Baromètre Santé"* of SpF does not include it yearly (2016, 2017, 2020). Thus, this work will not develop further recommendations in this regard.

For other illicit drugs, the lack of data and clear vision during and outside of the pandemic context make this work unsuitable to develop further recommendations based on the crises analysis. The pandemic crisis only underlines the usual lack of data and indicators (for example for the emergent issue associated with chemsex), thus more global reflections should be conducted to implement solid data collection systems, maybe based on support facilities reporting. Regarding opioids misuse, alert systems have been reinforced and adapted to the sanitary crisis, and no strong signals were perceived. Opioids misuse policies are also made with the ANSM and plans such as the "Feuille de route opioides 2019-2022" has been issued by the Ministry. As data collection systems are well implemented and the topic has been identified as a major topic by decision-makers this work will not develop further recommendations, although data could be refined regarding needed care.

The gambling and betting regulation system has been modified recently. The ANJ has replaced in 2019 the ARJEL, created in 2011. If it provides detailed and precise data on uses, the health-related stakeholders are under-represented compared to the industry stakeholders in its activities. The ANJ consequently face a challenge to implement efficiently new measures independently from gaming companies' pressure (67). It is expected to publish a report in 2021 to assess the efforts made recently in the industry to prevent and provide support for problematic use, especially towards the youth. The "*Baromètre Santé"* from SpF does not include gambling and betting activities routinely, it was however the case for the 2014 and 2019 issues. The ESPAD study usually conducted every 4 years deals among other topics with gambling and betting concerning 16 years old, but,no results will be available regarding the pandemic. Therefore, the data from the ANJ is very

valuable, and indicators are not a major topic of improvement to this day, compared to challenges regarding interventions' design and implementation.

Considering alcohol in France, a majority of health stakeholders and decision-makers have identified alcohol consumption and more specifically "at-risk" alcohol consumption as a public health matter. The 2021 INSERM expertise report highlights the rising scientific evidence supporting risks due to alcohol on both the health and the socio-economic dimensions. The marketing and lobbying activities conducted by the industrial alcohol stakeholders are clearly identified as an obstacle to reduce alcohol consumption and related risks. They affect consumption (bypassing the Evin law defining alcohol advertising, targeting the youth, etc.) and decision-makers as they implemented a very strong lobby towards politicians, parliamentary members and the public eye. The economic and cultural importance of alcohol production and consumption in France is one of the main arguments use by industrial stakeholders and some political people to oppose new public policies. Thus, tremendous work is still to be done regarding alcohol related risks awareness.

However, as today's scientific evidence leave no place for doubt, an opportunity to conduct stronger political plan is emerging. In line with the "Ten-Year Strategy against Cancer" launched by the French President and Ministry of Health, a National Health Plan against alcohol-related risks was mentioned. It would be the first strategic plan to tackle specifically the alcohol issue. Although it was already a topic of interest of the "National Plan for the Mobilization Against Addictions 2018-2022" issued by the MILDECA, this plan provides recommendations, targeted to the Regional Health Agencies mostly. It focuses mainly for alcohol on improving the respect of the legislation related to sales to minors, advertising and fetal alcohol syndrome prevention, in addition to general recommendations towards the organization of addiction care.

This plan could include measures based on recommendations issued in the INSERM expertise report. These recommendations are addressing issues on the following items:

- the fiscal and pricing aspects of alcoholic beverage,
- revision of the Evin law regarding advertising and the industry transparency,
- regulation of access to off-trade sales,
- detection of at-risk use by health professionals,
- clarification of public health messages to the public eye.

However, working out of future plan will only be successful with strong political will associated with judiciary and economic means together.

The work related to this plan's design will need to address the structuration of indicators produced and their monitoring, as it was done for tobacco previously. The sanitary crisis has put in perspective the shortcomings of alcohol-related indicators to provide several types of valuable data.

"Alcohol" consequently appears to be a suitable topic to focus in this work, based on the fact that pandemic feedbacks associated with strong scientific corpus (INSERM expertise) and opportunities could lead to adapt or elaborate future health plan.

III. Overview of indicators related to alcohol in France:

A summary of usual indicators related to alcohol can be done to understand data available and the possible improvements underlined by the missing data during the pandemic.

1) Prevalence data:

As described earlier, prevalence data is issued by SpF through the "*Baromètre Santé"* survey. If this survey in itself is conducted yearly, the alcohol items are not included each year (they were in 2017, 2019 and 2020). The OFDT participates to the analysis of the data and provides through its publications detailed complementary results. Other studies are coordinated by the OFDT (EnCLASS, EROPP, etc.) but are not conducted every year and have important delays before publication. Thus, they will not provide data regarding the pandemic specifically.

2) Market / Sales:

In addition to estimates of prevalence of use from surveys, objective data is available to assess the quantities of alcohol consumed. Various sources address these indicators. Some polling institutes conduct routinely market measurements, such as the Nielsen panel, which provides data on off-trade sales with precise time-series analysis. No similar measurements are available for the on-trade sales. Sales data are also collected by other organization such as FranceAgriMer and the Fédération du Commerce et de la Distribution, but they are not complete and do not address on-trade sales. Most of the data is presented separately for the different types of alcoholic beverages (wine, beer, spirits, etc.) which can impair the global overview of the market.

The most accurate data is the fiscal data collected by the General Directorate of Customs and Indirect Duties and exploited by the OFDT. It provides data on global alcohol sales, including both on-trade and off-trade sales. This data is available on a month scale, but results are not showcased regularly. To this date only the amounts payed during the first semester of 2020 have been released to the public. Computations are usually made to take into account the different tax level depending on the type of beverage (wine being less taxed than spirits for instance), and present an estimation of pure alcohol unit sales. Such data is expected to be released later on as it is exploited yearly by the OFDT, although it do not provide detailed information and present biases, especially regarding time-serie analysis (delay between payment and actual consumption of the product).

3) Alcohol related morbidity:

Objective data can be found regarding care provided and associated morbidities. The OFDT exploit data from the "programme for medicalization of information systems" (*Programme de Médicalisation des Systèmes d'Information: PMSI*) gathering hospitalizations information. In its yearly publication "*Tableau de bord Alcool*", initiated in 2019, the OFDT presents an annual report

with a one year delay addressing alcohol-related morbidity. It showcases the number and evolution of hospitalizations with an alcohol-related diagnosis. The number of patients using Addiction care facilities (CSAPA) and the sales of medication related to alcohol withdrawal are studied but these data are not updated yearly. The OFDT underlines that variations should be analyzed on longer scales than year to year comparisons. No quarterly or monthly data, nor socio-determinants are included in these analyses.

The OSCOUR network gathers data regarding hospitalization motives (ICD10 codes) in emergency departments from a wide part of the French hospitals (93%), in addition to some socio-demographic information. Thus, it has been used in the past to monitor emergency cases related to alcohol, but the analysis of alcohol related data is not done on a regular basis. It can contribute to provide precise time-serie analysis, usually in retrospective reports. During the pandemic no OSCOUR bulletin analysed precisely emergency admissions due to ethyl alcohol intoxication, although alcohol may have been a factor in trauma admission for example.

4) Alcohol-related mortality:

Two types of mortality data exist. The global alcohol-related mortality provides an estimate of deaths caused directly or indirectly by alcohol, taking into account the cardiovascular risk and attributable fraction for cancers for example. This measure is the most mediatized. The computation is described in studies from SpF published in the "*Bulletin Epidémiologique Hebdomadaire*", the latest issue of this data was published in 2019 based on 2015 data. The previous and first release of this indicator was in 2013 based on 2009 data. It is useful to describe the global burden of alcohol, but it is not available routinely as the methodological computation are complex and may be sources of biases.

The alcohol-specific mortality intends to estimate the mortality induced directly by alcohol, fully attributable to alcohol consumption. It is less susceptible to suffer from bias as it relies only on death certificate data with no computation. Although the French definition of ICD10 items to be included in this indicator can differ from abroad studies. This data is provided in the same studies as the alcohol related mortality, but the OFDT showcases two detailed indicators in its annual report (mental and behavioral disorders due to use of alcohol, and cirrhosis) though last update of the data was 2015.

IV. Recommendations to improve reporting of alcohol-related harm during a crisis:

1) Prevalence:

As alcohol is a rising topic of interest, prevalence studies should be conducted yearly, as for tobacco, to enshrine monitoring of trends and socio-demographics determinants associated. Prevalence data are useful regarding harm as the Inserm expertise report has reaffirmed that no alcohol consumption is riskless. Thus, the "*Baromètre Santé"* from SpF should address alcohol consumption routinely. Jointed with fiscal data, a precise estimate of alcohol consumption can be established. To this day, the delay of data treatment was not short enough to provide for this work

complete year analysis. The first semester fiscal data was included in the September release of the "*Tendances*" review from the OFDT, proving that the data can be processed somehow in a short delay. Thus, it seems reasonable to say that the main obstacle to the exploitation of this data, with time-series analysis and short delay, is human resources and financial means. The data from the "*Baromètre Santé*" present incompressible delay due to data processing. However, preliminary data for tobacco use were released to the Ministry by the end of April 2021. If adequate human and financial resources were allocated to the exploitation of alcohol data it is sound to think that alcohol data could be displayed earlier. Participation of the alcohol industry, through financial support or data transparency could help in the regard.

In addition to the "*Baromètre Santé*" from SpF, the *CoviPrev* (17) study included only during the first lockdown changes in use for alcohol consumption, it would have been beneficial during the other lockdowns, and in between, to have time-series analysis.

Recommendation

Regarding the crisis context, shortening delays and increasing periodicity of releases could be an essential improvement point. First elements suggests a high increase in alcohol sales since the beginning of 2021, coincidentally with the comeback of social opportunities to consume as sanitary measure are lifted one by one. Thus the main source of concern could be the end or after pandemic rather than the lockdowns for instance. Relying on fresh data would be very beneficial to take early actions on sales regulations, care support, or sanitary messages during a crisis.

2) Alcohol-specific mortality:

Aside of prevalence data, which are useful as the Inserm expertise report has reaffirmed that no alcohol consumption is riskless, mortality data is an important topic. As described earlier no frequent report system has been implemented to provide updated mortality numbers. As for other indicators, the data is already collected, through the CepiDc death certificates system. Regarding global mortality due to alcohol, incompressible delays related to complex methodology and computations make this indicator not suitable in a crisis context.

However, frequent analysis of alcohol-specific mortality is achievable. No computations are needed, hence the data can be available quickly. Again, human resources and financial means are the main obstacle to frequent publication of this indicator. It present also the advantage to represent more short-term deaths than global mortality, which include cancer and cardiovascular risks that are often long-term threats, and may not be the most representative data when addressing the short-term impact of a crisis. ICD-10 items included in the definition of alcohol-specific mortality diverge between countries, see appendix n°4, but they include deaths assessed to be due 100% to alcohol and predominantly caused by short-term alcohol consumption (alcoholic liver disease such as hepatitis or cirrhosis due to alcohol, mental and behavioral disorders due to use of alcohol, etc.) (68) (69). Thus, it can be a very valuable indicator to monitor the clinical impact of increased consumption or the difficulties to access care during the pandemic for heavy drinkers. It is, in this regard,

potentially more insightful than an *OSCOUR* network frequent analysis of emergency cases of alcohol intoxications. Indeed, the *OSCOUR* hospitalizations data is not providing explicit information concerning renunciation to care, but is rather an indicator of the burden of alcohol on the emergency system.

The case of the United Kingdom: increased alcohol mortality during the pandemic

This indicator has been analyzed in other countries during the pandemic. In the UK, quarterly reports from the Office for National Statistics (ONS) routinely address alcohol-specific mortality, with detailed time-series analysis and socio-demographic determinants. If its methodology has been revised to adapt to Covid-19 context, these data were processed with a similar quality and timing. It showed for the three 2020 quarters of the pandemic a significant increase (around 20%) of alcohol-specific mortality. Important increases of alcohol-related hepatholgy consultations and deaths have also been recorded in United States hospitals (70).

The ONS estimates that this increase is presumably linked to chronic illnesses of dependent users or ex-drinkers who relapsed. It underlines the non-addressed need for care during the pandemic, which was exacerbated by increased use for some high-risk users (71). Which is supported by the fact that users from the most deprived area were significantly more at risk, as they experience lower access to healthcare usually. A more refined analysis of alcohol use in the United Kingdom during the pandemic should be conducted to assess the likeliness of similar trend in France. First elements suggests that trends in use were close in both countries. Regarding death certificate data collection during the pandemic, the French and British systems have been assessed to be similar amidst the sanitary crisis (72), supporting the feasibility of a comparable measure in France.

Benefit in crisis context

This frequent monitoring has allowed the identification of a significant clinical impact of the pandemic on alcohol use. This impact lasted and increased throughout the pandemic in the case of the UK. Scenarios of crisis responses could be designed to tackle important changes in this regard, addressing in this case mainly access to care and specific prevention interventions targeted to high-risk drinkers. However, measures to decrease access to alcohol could be helpful in the case of increased deaths among previously lower-risk drinkers. Regulations of access to alcohol have been in other countries assessed to decrease hospitalizations related to alcohol, we can thus imagine that such measures could be monitored through this indicator, or triggered when significant changes in mortality are observed.

Benefit outside of crisis context

However, as enlightening as this indicator can be, it would be fully useful in a crisis context if interventions were to be implemented in response. Although, it would still be a valuable indicator to design and evaluate interventions routinely. As it suffers minimized biases, it can be a powerful tool to use in communication and public health messages and raise awareness, especially for politicians

or parliamentary. It could be an interesting tool to better objectify alcohol-related harm in France, rather than relying only on global mortality assessed with an important delay (4 years for the last study). In addition, it could preclude the lobbying messages from the industry, criticizing the accuracy of global alcohol mortality estimations (73)(74). Monitoring this indicator can help the public eye to grasp the reality of alcohol mortality, with data periodically published and showcased.

Recommendation

The main recommendation we can establish is to dedicate human and financial resources to retrieve and exploit this data, and to clarify the definition of this indicator. Possibly through a consultation with scientific and users stakeholders, as it was done in the UK in 2017. It would help to have an indicator closer to other countries' definition, which would allow better comparisons, and address methodological uncertainty (inclusion of ICD-10 items). A SWOT analysis is provided in appendix n°5 to summarize the ins and outs of this measure.

D. Conclusion

The literature review performed for this work suggests that the pandemic had little impact overall on the addictive behaviors and substances uses studied. Although this is reassuring, this should not obliterate the heterogeneity of situations for users. Indeed, for high-risk users, consumptions often increased during the pandemic. The impact of worsening mental health, being a multiple drug user and the relative scarcity of care and support induced by the sanitary crisis were the main factors identified as putting users at higher risks of increased use. It has also highlighted the shortcomings of the data available in France regarding addictions. For some addictions, the lack of data in or outside of the crisis context makes it challenging to draw conclusions. Even for the most studied topics, we are missing data beyond the trends in use, regarding use-related harm for instance. Thus, the availability and relevance of data appears to be a major topic of improvement to design or adapt public policies in the addiction field, and especially lacked during the pandemic.

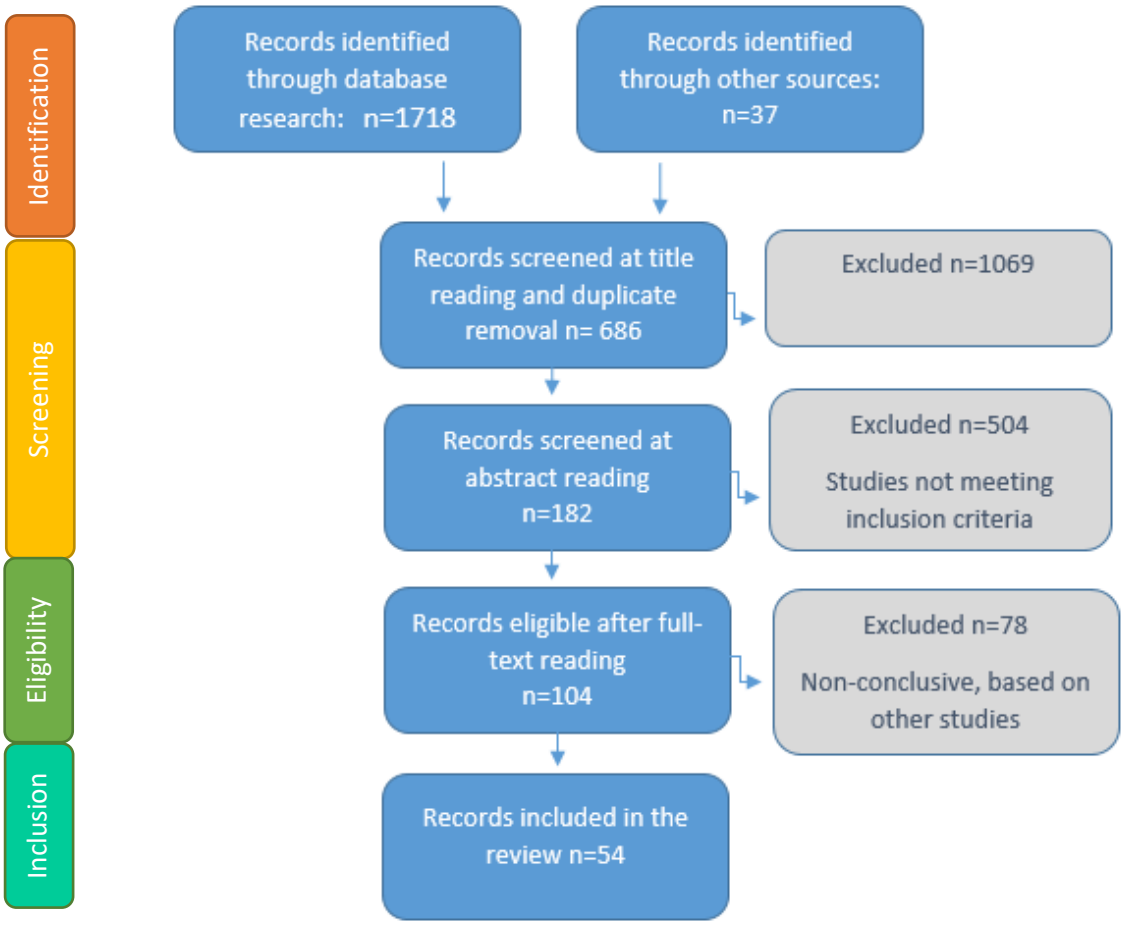
This work then intended to explore applications of these findings. In line with the perspective of a National Public Health Plan against Alcohol-related harm, it investigates two main prospects. For each topic, prevalence of use and alcohol-specific mortality, periodicity and quality of data are crucial issues. These indicators could be useful in a crisis context with a higher frequency and increased objectivity. Main obstacles being human and financial resources to dedicate to the exploitation of the data, as the corresponding data are already accessible in practice. In addition to emergency management, they can be used to improve interventions' evaluation and monitoring, and therefore be serviceable routinely outside of this particular context.

Appendix:

Appendix n°1 Research strategy

Online databases	Search strategy	Results	Final selection after duplicates removal
PubMed	((Covid) OR (Covid-19) OR (Coronavirus) OR (pandemic)) AND ((Addictions) OR (Addictive) OR (Tobacco) OR (Alcohol) OR (Cannabis) OR (Opioids) OR (opiates) OR (Gambling) OR (betting) OR (smoker) OR (drinker) OR (gambler) OR (bet) OR (Chemsex) OR (illicit drug)) AND ((France) OR (French)) Filters from 2020 - 2021	186	25
Cairns.info	(Covid OU covid-19 OU addiction) ET (tabac OU alcool OU cannabis OU chemsex OU addiction OU opioïdes OU jeux) ET (France OU français) SAUF économie. années 2020 - 2021	262	10
ScienceDirect	1st round: (Covid OR pandemic) AND (France OR French) AND (addiction OR Tobacco OR alcohol OR cannabis) 2nd round: (Covid OR pandemic) AND (France OR French) AND (gambling OR opioids OR illicit drug OR chemsex)	880 + 390	3

Appendix n°2 Articles selection flow chart



Appendix n°3 Working document for the Office SP3: Summary table of the data available on alcohol consumption and the Covid-19 health crisis, in relation to the items detailed in the Inserm 2021 expert report (Chapter 6)

Expertise Inserm	Literature data	**References**
The national level of consumption is dependent on the **accessibility of alcohol.**	During the pandemic, no restrictions in the retail trade but closed places of consumption (bars, restaurants, etc.).	
	Scientific publications: Containment - **More decrease than increase overall** among consumers in scientific publications (data collected in the form of a survey questionnaire, declarative bias, a few contradictory studies) - More increase in level than in frequency (not found everywhere) - **Need for objective data on the alcoholic beverages market** in addition to the effect of containment and the health crisis on 2020-21	Constant (19), CoviPrev (17), SPF (15)
	Alcoholic beverage market in France (CHR: Café, Hotels, Restaurants, etc.)	
	Lockdown : - **Slight drop in retail sales** (March 4%> October stable> April?. **Low consumption shift to off-trade use**, but increasing over time - 12% reduction in wine spending ((off-trade retail (95% ofsales) + CHR (5%)). Economic format (BIB) on the rise, low privileged prices (units <€ 3) and acceleration of online sales. **Deconfinement**: increase in retail sales (March = October <April?) With return of social occasions in part	OFDT (75), IRI (76), panel Nielsen (77) (78) (79), France AgriMer (80) (81), IRI (82) (83) (84), (85)
	1st half of 2020: slight drop in retail sales	OFDT (75)
	Figures for **the industry in the first 10 months of 2020** (producers = retail sales and CHR): - -13% sales revenue of the industry on distilled alcoholic beverages and wines - Of which -15% exports on wines and -23% on alcohols other than wines - -10% of industrial production in France	FCD (86)
	2nd semester 2020: - Autumn wine fairs -1.3% of sales revenue	LSA (87)
	2020 - **Retail: + 5% in volume** (excluding wine) (due to beer and spirits), slight increase in sales of still wine + 1.1% in volume (decrease for sparkling wines -5.1%). **Does not compensate for losses in CHR.** - **CHR: 1.5 billion losses over 9 months** 2020 on wine (missin the original source) - **Sustainable drop in consumption outside of home?** 5 points lower summer 2020 vs 2019	Panel Nielsen (77) (88), CNIV (89), FCD (90), France AgriMer (81)
	1 st quarter 2021: increase in retail sales (14% without wines)	Panel Nielsen (91)
	Data to be completed with OFDT dashboard and "*Baromètre Santé*" SpF (end of June 2021?).	

- **Alcoholic beverages market report:**
- Awaiting figures on **indirect rights 2020** to have the most **objective data** overall.
- **Numerous information bundles to support an overall drop in consumption** (slight increase in sales in supermarkets, decrease in sales in the CHR network). The decrease in the number of places of consumption / sale has led to a decrease in consumption.
- **Lockdown: decrease in the average price of wine** (BIB, online sales, units <3 €)

- **Vigilance over 2021 with a potential compensatory effect** - **Difficulties related to the data**: seasonality of various distribution channels (share of consumption in CHR difficult to obtain), many different types of products, inclusion of exports in certain figures, etc.

Increase in unemployment rate increases consumption	**Inactivity and boredom are among the factors frequently cited to explain an increase in consumption. Enough to make a connection during the crisis? Lack of data specifically on job seekers.**	CoviPrev (17), GDS (28)
	Increase for those worried about their financial situation	Rossinot (20)
Adolescents: Socioeconomic or psychological difficulties within the family, group consumption, with peers	**Decrease in consumption among young people due to lack of social opportunities.** - Example among Cannabis users Lockdown = 24% stopping consumption among 18-25 year olds vs. 13% on average. (but lower than the category> 45 years old) - **No data for minors,** but presumably decreased use	Cannabis online (23), [Bourrion-Bedes (21)], Rossinot (20), SPF (15)
Genetic factors: sensitivity shared with other addictive substances	Significantly greater increase in alcohol consumption among polyconsumers	Cannabis online (23), GDS (28), Chappuy (26), AAF (92)
Anxiety	**Anxiety: population at risk who increased their consumption more than the average**	GDS (28), Rossinot (20)
	Stress triggering factor for behavior changes: **- Increase for those who need to manage the stress** generated by the crisis by the consumption of SPA **- Decrease for those who have found with the pandemic a motivation to stop / decrease / stress for their health (high age category+)**	CoviPrev (17), GDS (28), Constant (19), Rossinot (20), Flaudias (32)
	Depression / dark thoughts / psychiatric treatment: population at risk who increased their consumption more than the average	Rolland (18), SPF (15)
Energy drinks (joint consumption or not)	13% increase in retail sales in 2020 (large-scale distribution major channel, but also party venues closed)	Panel Nielsen (77)
Working conditions (low support, conflicts, large number of hours), isolation among adults	Uncertain in the literature.	
	Increased consumption in the **high education category**.	Rolland (18), Mildeca (93), SPF (15)
	Among workers who have experienced isolation: - twice as many **new consumers** - More increase in consumption level than in frequency - **Fewer consumers have stopped** their consumption (More than 50% less)	Mildeca (93)

Inclusion of sources:

- French data to take into account the cultural and epidemiological context
- Increased and decreased compared to the same period in year n-1
- Scientific publications (in blue), gray literature (institutions, survey / data institutes, relays in magazine articles, etc.) (in green)

No data available for the following items discussed in the INSERM expert report:

- Difficulty to sleep
- Family violence / conflicts for young people
- Sexual orientation

Other factors:

- **No differences between women and men** demonstrated, but hypotheses of different mechanisms on consumption (mental health impact). Openness to the differences in care (20% of women in CSAPA, etc.).

- **Stronger decline in the highest age categories**, ahead of 18-25 year olds**, the intermediate age group between 30 and 50 (limits varying according to the study) is the one presenting the greatest risk of an increase in consumption.** Hypothesis that this age group, associated with the higher level of study, shows a greater increase in consumption in relation to his perception of alcohol versus tobacco and cannabis. Rolland (28), Constant (1).

- **Lack of data on usual consumption in restaurants** (volume estimates 11% of sales of spirits, 20% for beer (30) between 20-30% of sales of still wine (contradictory figures), 3% for sparkling wines, sometimes with large differences in value versus consumption at home). (29) (30)

- Experimentation of use (no data on minors)

- **Comparison with foreign countries** (European Union and Anglo-Saxon countries): various dynamics (overall increases in Canada, Australia, United States, United Kingdom, Germany, to be completed with institutional reports**), impact of mental health and boredom / inactivity are recurring elements in increases in consumption**, the most affected populations are diverse (young people, at-risk or problematic drinkers, lower level of education, etc.).

- We noted no observed impact in France of rumors of a **protective effect of alcohol consumption on Covid-19 infection.**

Appendix n°4: definition of alcohol-specific mortality (inclusion of ICD-10 items)

ICD-10 items		United-Kingdom 2017	France	Spain	Brazil	Americas	Mexico	Germany	U.S.A.	Italy
Alcohol-induced pseudo-Cushing's syndrome	**E24.4**	X		X		X		X		
Wernicke's encephalopathy	**E51.2**		X							
Niacin deficiency (pellagra)	**E52**							X		
Mental and behavioural disorders due to use of alcohol	**F10**	X	X	X	X	X	X	X	X	X
Degeneration of nervous system due to alcohol	**G31.2**	X	X	X		X	X	X	X	X
Alcoholic polyneuropathy	**G62.1**	X	X	X		X		X	X	X
Alcoholic myopathy	**G72.1**	X		X		X		X	X	X
Alcoholic cardiomyopathy	**I42.6**	X	X	X		X	X	X	X	X
Oesophagla varices	**I85**		X							
Alcoholic gastritis	**K29.2**	X	X	X		X	X	X	X	X
Alcoholic liver disease	**K70**	X	X		X	X	X	X	X	X
Chronic hepatitis, not elsewhere classified1	**K73**	X	X							
Hepatic fibrosis	**K74.0**		X		X					
Hepatic sclerosis	**K74.1**		X		X					
Hepatic fibrosis with hepatic scleros	**K74.2**		X		X					
Other and unspecified cirrhosis of li	**K74.6**		X		X					
Other diseases of liver	**K76**				X					
Alcohol-induced acute pancreatitis	**K85.2**	X				X	X	X	X	
Alcohol induced chronic pancreatitis	**K86.0**	X				X	X	X	X	X
Maternal care for (suspected) damage to fetus from alcohol	**O35.4**			X		X		X		
Fœtus and new-born affected by maternal use of alcohol	**P04.3**								X	
Fetal alcohol syndrome (dysmorphic)	**Q86.0**	X				X		X	X	
Excess alcohol blood levels	**R78.0**	X		X		X		X		X
Ethanol poisoning	**T51.0**							X		X
Methanol poisoning	**T51.1**									X
Toxic effect of alcohol, unspecified	**T51.9**							X		
Accidental poisoning by and exposure to alcohol	**X45**	X				X			X	
Intentional self-poisoning by and exposure to alcohol	**X65**	X				X			X	
Poisoning by and exposure to alcohol, undetermined intent	**Y15**	X				X			X	
Evidence of alcohol involvement determined by blood alcohol level	**Y90**					X				
Evidence of alcohol involvement determined by level of intoxication	**Y91**					X				

Appendix n° references: United Kingdom (94), France (95), Spain (96), Brazil (97), Americas (98), Mexico (99), Germany (100), U.S.A. (101), Italy (102)

Appendix n°5: extension of Alcohol-specific mortality indicator: SWOT analysis

Strengths	Opportunities
-Data collection is already operational -Minimized biases compared to global mortality -Useful in and outside of crisis context -Can be used to raise awareness for decision-makers	-Political will to design a National Health Plan -Scientific evidence is stronger -Possibility to benefit from fiscal measure for financing
Weaknesses	**Threats**
-Financial cost of routine exploitation and analysis of data -Biases related to inclusion of ICD-10 items	-Potential Cost/Utility compared to other interventions -Strong lobbies and cultural background -Lower numbers compared to global mortality could be used to minimize harm

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