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Gambling and the COVID-19 Pandemic in the Province of Quebec (Canada): Protocol for a Mixed Methods Study

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3 **Gambling and the COVID-19 Pandemic in the Province of Quebec (Canada):**
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ABSTRACT

Introduction

The COVID-19 pandemic has major collateral impacts on mental health. Gambling is among the major public health issues that seems to have been transformed by the pandemic.

In the province of Quebec in Canada, gambling is an important leisure activity. About two out of three adults in Quebec gamble. To date, among all Canadian provinces, the province of Quebec has been affected the most by the COVID-19 pandemic.

The objective of this study is to draw a portrait of the impacts of the COVID-19 pandemic on gamblers and to learn more about their experiences during the pandemic in the province of Quebec.

Method and Analysis

This study has a sequential explanatory mixed method design in two phases. The first phase will be a cross-sectional online survey with Quebec residents who are 18 years of age or older and have gambled at least once in the previous 12 months. The second phase will be a qualitative study. Semi-structured interviews will be conducted with gamblers, family members, addiction counselors, and state representatives selected through purposive sampling.

Ethics and Dissemination

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3 This study is one of the first mixed methods studies on the impacts of the COVID-19
4 pandemic on gambling. This study will generate new scientific knowledge on a worrisome
5 public health issue, i.e., gambling, and provide a better understanding of the experiences
6 and gambling behaviors of gamblers during the pandemic.
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14 This study is funded by the Ministry of Health and Social Services of the Government of
15 Quebec and was approved on October 27 2020 by the Scientific and Research Ethics
16 Committee of the CIUSSS de l'Estrie - CHUS. This is a two-year study that will be
17 completed in June 2022. Phase I will begin in February 2021.
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24 25 26 **ARTICLE SUMMARY**

27 **Strengths and limitations of this study**

- 28 • This is one of the first mixed methods studies on the impacts of the COVID-19
29 pandemic on gambling.
- 30 • The results will provide a more comprehensive view of gambler's experience
31 during the pandemic.
- 32 • Patients were involved in the development of the questionnaire and will be involved
33 in the implementation and the dissemination of the study.
- 34 • Patients were not involved in the development of the original design of this study.
- 35 • This study is funded by a recognised and an open access advocating research-
36 funding body listed by the JULIET project.
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INTRODUCTION

The coronavirus disease (COVID-19) pandemic is having a major impact on our daily lives. To help prevent the spread of the virus, health authorities have enacted various measures to protect citizens and mitigate the progression of the pandemic (physical distancing, lockdown, etc.). These public health measures are having major collateral impacts, particularly on mental health, which has quickly become a concern for the scientific community and policy makers [1–5]. An increase in anxiety and depressive symptoms has been observed in many countries [4] and similar observations have also been made about addictions (alcohol, cannabis, online gaming, use of pornography, etc.) [6–9].

Many concerns have also been raised about gambling, which is an important public health issue. Several stakeholders are concerned about the consequences of the pandemic on gambling (e.g., shift to online gambling because of the closure of physical gambling spaces and increase in gambling problems among individuals suffering from concomitant disorders, such as depression and anxiety) [10,11]. The situation is concerning because, in the past, it has been shown that gambling tends to increase during crises [12–14].

In the province of Quebec in Canada, gambling is an important leisure activity. In 2018, about two out of three adults (65.6%) engaged in at least one form of gambling, and nearly a third of the Quebec population (29.5%) reported gambling at least once a month up to once a week [15]. In March 2020, to enforce public health regulations, the Government of Quebec temporarily suspended several gambling activities (casinos, lotteries, etc.) to address the pandemic. This suspension of services has had major impacts. Gamblers'

1
2
3 assistance services became overwhelmed with requests for help, and several actors were
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5 concerned about the resurgence of online gambling that seems to be occurring [16–18].
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10 To date, the province of Quebec, with a population of 8.5 million [19], has been the most
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12 affected by the COVID-19 pandemic among all provinces in Canada [20].
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17 Since the beginning of the pandemic, few studies have been published on the impacts of
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19 the COVID-19 pandemic on gambling [10,21–29]. These studies are mainly quantitative
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21 and focused on gambling habits during the pandemic. In this context, it is possible to notice
22
23 a lack of qualitative and mixed method literature on the subject and realize that we know
24
25 very little about gamblers' experiences during the pandemic. The objective of this study is
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27 to fill these gaps.
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30 31 32 33 **METHODS AND ANALYSIS**

34 35 **Aim**

36
37 The objective of this study is to draw a portrait of the impacts of the pandemic on gamblers
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39 and to learn more about the experiences of gamblers during the pandemic in the province
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41 of Quebec.
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44 45 46 **Design**

47
48 This study utilizes a sequential explanatory mixed research design [30]. A mixed sequential
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50 and explanatory research design is a two-phase project that begins with the collection and
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52 analysis of quantitative data (phase I), followed by the collection and analysis of qualitative
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3 data (phase II). The objective of Phase II is to enrich and explain the information obtained
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5 in Phase I.
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10 The questions in the qualitative phase will be based on the information obtained in the
11
12 quantitative phase, and qualitative data are given priority in this study. The study design is
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14 presented in Figure 1.
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19 **Eligibility criteria**

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21 Participants must be 18 years of age or older, reside in the province of Quebec, and have
22
23 gambled at least once in the previous 12 months to be included in the study.
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28 **Phase I: Quantitative study**

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30 Phase I involves a cross-sectional online survey. The objective is to learn more about the
31
32 impacts of the COVID-19 pandemic on gamblers and to draw a portrait of their gambling
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34 habits.
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40 **Sample size and sampling method**

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42 The sample size will be 250 gamblers, which was determined based on the existing
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44 literature on gambling using mixed designs [31,32]. The sampling method will be non-
45
46 probabilistic, and participants will be recruited online voluntarily.
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51 **Data collection**

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3 The survey is divided into four sections: 1) Demographics; 2) General impacts of COVID-
4 19 (social relationships, family life, mental health); 3) Impacts of COVID-19 on gambling;
5 and 4) Health profile and experience of health care.
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12 The first section on the demographic characteristics of participants includes questions on
13 age, gender, first language, ethnic origin, region of residence, marital status, family status,
14 employment, annual income, and level of education. To determine the impact of COVID-
15 19 on the socio-demographic profiles of the participants, we will also examine the impact
16 of the pandemic on marital status, employment, and annual income.
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26 The second section includes questions on the general impacts of COVID-19 (social
27 relationships, family life, and mental health). This section was inspired by the Statistics
28 Canada survey on the impacts of COVID-19. It includes questions on the impact of
29 COVID-19 on lifestyle habits (sleep, nutrition and diet, tobacco, alcohol, drugs, cannabis,
30 use of pornography, physical activity, and social activities). The mental health status of
31 each participant will be evaluated by administering the Patient Health Questionnaire-4
32 (PHQ-4).
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45 The PHQ-4 is a validated screening scale used to screen for general anxiety and depressive
46 symptoms [33]. The PHQ-4 consists of an anxiety subscale (GAD-2) and a depression
47 subscale (PHQ-2), with two items for each. The four items are added up to produce the
48 PHQ-4 total score. A four-point Likert scale ranging from 0 = not at all to 3 = nearly every
49 day is used to rate the items. The PHQ-4 total score is used to classify the symptoms of
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3 anxiety and depression as follows: none (0-2), mild (3-5), moderate (6-8), and severe (9-
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10 The third section includes questions on the impacts of the COVID-19 pandemic on
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12 gambling behaviors (frequency of gambling, length of gambling sessions, and amount of
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14 money spent). It also includes an assessment of problem gambling through the
15
16 administration of the Problem Gambling Severity Index (PGSI) [34].

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21 The PGSI is a nine-item validated instrument designed to measure problem gambling in
22
23 the general population. For each item, respondents answer using a four-point scale from 0
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25 = never to 3 = almost always. The PGSI total score is used to classify gambling as follows:
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27 non-problem gambler (0); low-risk gambler (1-2), moderate-risk gambler (3-7), and
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29 problem gambler (8 and over).
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35 The fourth section aims to develop a health profile of the participants and learn more about
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37 their comorbidities (anxiety, depression, substance use, etc.) and their experiences of health
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39 care and services during the pandemic.
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45 **Data analysis**

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47 Quantitative data will be analyzed with SPSS software. Descriptive statistics will be
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49 generated, and multivariate logistic regression analysis will be used to establish
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51 associations. The level of significance will be set at $p < 0.05$.
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Phase II: Qualitative study

Phase II includes semi-structured interviews with gamblers. Complementary interviews will also be conducted with the gamblers' families, addiction counselors, Loto-Québec representatives, and policy makers from the Ministry of Health and Social Services of the Government of Quebec.

Sample size and sampling method

Gamblers will be selected by purposive sampling among the phase I participants who agree to be contacted for Phase II of the study. Gamblers will be selected to ensure a diversity of profiles. Certain criteria (age, gender, comorbidity, etc.) will be used to select participants to ensure maximum variability. Sampling will continue until data saturation is reached.

Participants for the complementary interviews will also be selected by purposive sampling. The information provided by these various sources will allow us to obtain a more complete picture of the experiences of gamblers during the pandemic.

Data collection

Data will be collected through online or in-person semi-structured interviews, depending on public health restrictions. The two main topics covered during the interviews will be the participant's experiences during the COVID-19 pandemic and the impacts of the pandemic on their health and gambling habits.

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3 Interviews with family members will be used to complete the information obtained by the
4 gamblers. The interviews with addiction workers, Loto-Québec representatives, and
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6 decision-makers from the Ministry of Health and Social Services will help us learn more
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8 about the decision-making process, the issues related to access to care for gamblers, and
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10 the impacts of the pandemic on them. We will also ask them what they believe are the best
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12 courses of action to take to improve health care and services for gamblers.
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19 The interviews will be recorded and transcribed verbatim. Data collection will continue
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21 until saturation is reached for gamblers and no new themes emerge in the interviews.
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26 **Data analysis**

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28 Data will be imported into NVivo software to carry out a thematic analysis. Thematic
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30 analysis is a methodology used to systematically identifying, organizing, coding, and
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32 offering insight on a data set by the creation of themes [35].
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38 The research team will read the transcripts and analyze them independently. The initial
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40 codes will be examined for similarities and differences during consensus meetings. The
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42 team will then organize codes into a hierarchy to create final themes. This team validation
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44 process will reduce subjectivity and increase the credibility of the work.
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49 **Integration of quantitative and qualitative data**

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3 After completing the two phases, the quantitative and qualitative data will be triangulated
4 to obtain a better understanding of the experiences of gamblers during the pandemic and
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6 the impacts of the crisis on their health and gambling habits.
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10 11 12 **Patient and Public Involvement Statement** 13

14 Patients are involved in the development the questionnaire and will be involved in the
15 implementation and the dissemination of the study. Patients were not involved in the
16 development of the original design of this study.
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24 **ETHICS AND DISSEMINATION** 25

26 This study has been approved by the Scientific and Research Ethics Committee of the
27 Integrated University Health and Social Services Centre of the Estrie region - University
28 Hospital Center of Sherbrooke (CIUSSS de l'Estrie - CHUS) under the number #2021-
29 3818. Electronic and/or written informed consent, depending on the data collection format
30 (online survey and online or in-person interviews), will be obtained from each participant.
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32 A copy of the consent form and contact information will be delivered to each participant.
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42 This research is funded by the Ministry of Health and Social Services of the Government
43 of Quebec in collaboration with the Quebec Research Fund and the Ministry of Innovation
44 and Economy as part of the COVID-19 call for solutions (funding number #20-CP-00309).
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46 The Quebec Research Fund is a recognised and an open access advocating research-
47 funding body listed by the JULIET project.
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3 The results of this study will be shared with the Ministry of Health and Social Services of
4 the Government of Quebec, Loto-Quebec, Gambling:Help and Refferal, researchers and
5 the general public, and will be submitted for publication.
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10 11 12 **CONCLUSION**

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14 This study is, to our knowledge, the first mixed methods study on the impacts of the
15 COVID-19 pandemic on gamblers. This study will generate new scientific knowledge on
16 a major public health issue, i.e. gambling, and provide a better understanding of the
17 experiences of gamblers during the pandemic. The results may be generalizable and
18 transferrable outside of the Province of Quebec (Canada), given that several countries face
19 the same issues regarding gambling and COVID-19.
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29 This study will fill a gap in the literature as there is a lack of qualitative and mixed studies
30 on the subject. The use of a mixed design will provide a more comprehensive picture of
31 gamblers' experiences during the pandemic and better knowledge about their gambling
32 habits. This study will also allow us to learn more about the general mental health status of
33 gamblers during the pandemic. Obtaining these data is crucial for the development of
34 public policies related to gambling to help this population during not only the remainder
35 of the pandemic but also future crises.
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49 This two-year study will end in June 2022. Phase I will begin in February 2021.
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ABBREVIATIONS

CIUSSS de l'Estrie - CHUS: Integrated University Health and Social Services Centre of the Estrie region - University Hospital Center of Sherbrooke

COVID-19: Coronavirus Disease

GAD-2: Generalized Anxiety Disorder 2-item

PGSI: Problem Gambling Severity Index

PHQ-2: Patient Health Questionnaire-2

PHQ-4: Patient Health Questionnaire-4

AUTHOR CONTRIBUTIONS

MB designed and wrote the original proposal. All authors participated in discussing the design of the study and developing the research protocol. MB was responsible for drafting this manuscript and was supported by SAC, ACS, and SK. All authors have read and approved the final manuscript. All authors are responsible for data collection and analysis.

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The funding body is not involved in the research and the researchers are independent.

COMPETING INTERESTS

The authors declare that they have no competing interests.

DATA STATEMENT

The datasets during and/or analyses during the current study are available from the corresponding author on reasonable request.

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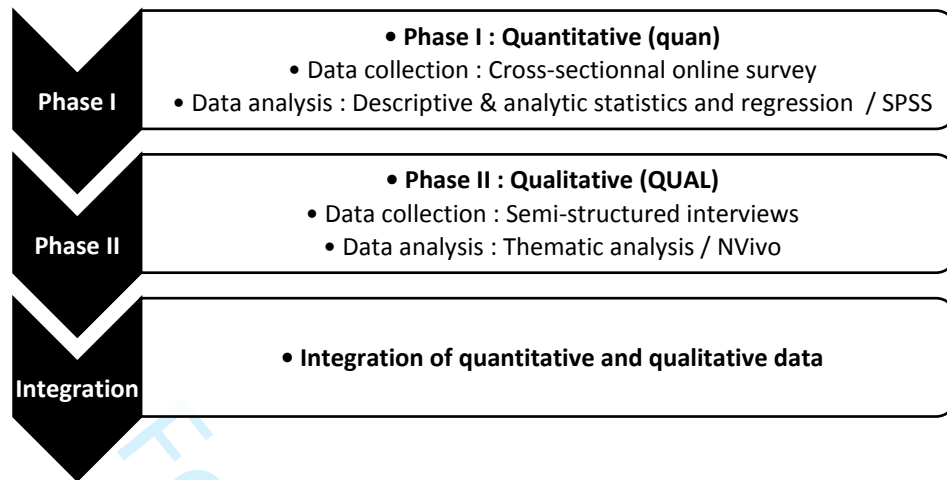
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Figure Legends

Figure 1: Study design visual



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Gambling and the COVID-19 Pandemic in the Province of Quebec (Canada): Protocol for a Mixed Methods Study

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Primary Subject Heading:	Addiction
Secondary Subject Heading:	Public health
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3 **Gambling and the COVID-19 Pandemic in the Province of Quebec (Canada):**
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5 **Protocol for a Mixed Methods Study**
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ABSTRACT

Introduction

The COVID-19 pandemic has major collateral impacts on mental health. Gambling is among the major public health issues that seems to have been transformed by the pandemic.

In the province of Quebec in Canada, gambling is an important leisure activity. About two out of three adults in Quebec gamble.

The objective of this study is to draw a portrait of the impacts of the COVID-19 pandemic on gamblers and to learn more about their experiences during the pandemic in the province of Quebec.

Method and Analysis

This study has a sequential explanatory mixed method design in two phases. The first phase is a cross-sectional online survey with Quebec residents who are 18 years of age or older and have gambled at least once in the previous 12 months. The second phase will be a qualitative study. Semi-structured interviews will be conducted with gamblers, family members, addiction counselors, and state representatives selected through purposive sampling.

Ethics and Dissemination

This study is one of the first mixed methods studies on the impacts of the COVID-19 pandemic on gambling. This study will generate new scientific knowledge on a worrisome

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3 public health issue, i.e., gambling, and provide a better understanding of the experiences
4 and gambling behaviors of gamblers during the pandemic.
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10 This study is funded by the Ministry of Health and Social Services of the Government of
11 Quebec and was approved on October 27 2020 by the Scientific and Research Ethics
12 Committee of the CIUSSS de l'Estrie - CHUS. This is a two-year study that will be
13 completed in June 2022.
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19 **ARTICLE SUMMARY**

20 **Strengths and limitations of this study**

- 21 • This is one of the first mixed methods studies on the impacts of the COVID-19
22 pandemic on gambling.
23
- 24 • The results will provide a more comprehensive view of gambler's experience
25 during the pandemic.
26
- 27 • Gamblers were involved in the development of the questionnaire and will be
28 involved in the implementation and the dissemination of the study.
29
- 30 • The quantitative phase is a cross-sectional survey and the sampling is non-
31 probabilistic.
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- 33 • Participants must be 18 years of age or older, reside in the province of Quebec, and
34 have gambled at least once in the previous 12 months to be included in the study.
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50 **INTRODUCTION**

51 The coronavirus disease (COVID-19) pandemic is having a major impact on our daily
52 lives. To help prevent the spread of the virus, health authorities have enacted various
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3 measures to protect citizens and mitigate the progression of the pandemic (physical
4 distancing, lockdown, etc.). These public health measures are having major collateral
5 impacts, particularly on mental health, which has quickly become a concern for the
6 scientific community and policy makers [1–5]. An increase in anxiety and depressive
7 symptoms has been observed in many countries [4] and similar observations have also been
8 made about the use of potentially addictive products (alcohol, cannabis, online gaming,
9 use of pornography, etc.) [6–9].

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22 Many concerns have also been raised about gambling, which is an important public health
23 issue. Several stakeholders are concerned about the consequences of the pandemic on
24 gambling (e.g., shift to online gambling because of the closure of physical gambling spaces
25 and increase in gambling problems among individuals suffering from concomitant
26 disorders, such as depression and anxiety) [10,11]. The situation is concerning because, in
27 the past, it has been shown that gambling tends to increase during crises [12–14].

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38 In the province of Quebec in Canada, gambling is an important leisure activity. In 2018,
39 about two out of three adults (65.6%) engaged in at least one form of gambling, and nearly
40 a third of the Quebec population (29.5%) reported gambling at least once a month up to
41 once a week [15]. In March 2020, to enforce public health regulations, the Government of
42 Quebec temporarily suspended several gambling activities (casinos, lotteries, etc.) to
43 address the pandemic. This suspension of services has had major impacts. Gamblers'
44 assistance services became overwhelmed with requests for help, and several actors were
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3 concerned about the resurgence of online gambling that seems to be occurring in the
4 province [16–18].
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10 Since the beginning of the pandemic, few studies have been published on the impacts of
11 the COVID-19 pandemic on gambling [10,21–29]. These studies are mainly quantitative
12 and focused on gambling habits during the pandemic. In this context, it is possible to notice
13 a lack of qualitative and mixed method literature on the subject and realize that we know
14 very little about gamblers' experiences during the pandemic. The objective of this study is
15 to fill these gaps.
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26 **METHODS AND ANALYSIS**

27 **Aim**

28 The objective of this study is to draw a portrait of the impacts of the pandemic on gamblers
29 and to learn more about the experiences of gamblers during the pandemic in the province
30 of Quebec.
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40 **Design**

41 This study utilizes a sequential explanatory mixed research design [30]. A mixed sequential
42 and explanatory research design is a two-phase project that begins with the collection and
43 analysis of quantitative data (phase I), followed by the collection and analysis of qualitative
44 data (phase II). The objective of Phase II is to enrich and explain the information obtained
45 in Phase I. "The overall intent of this design is to have the qualitative data help explain in
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3 more detail the initial quantitative results” [30]. The questions in the qualitative phase will
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5 be based on the information obtained in the quantitative phase.
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10 The use of a mixed-methods design combines the strength of quantitative and qualitative
11 methods [31]. These methods are frequently used in research on complex issues such as
12 mental disorders and gambling [32–34]. The study design is presented in Figure 1.
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19 **Eligibility criteria**

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21 Participants must be 18 years of age or older, reside in the province of Quebec, and have
22 gambled at least once in the previous 12 months to be included in the study. This
23 information is collected through a self-reported questionnaire at the beginning of the study.
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29 Participants must speak and understand French to participate in the study.
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33 **Phase I: Quantitative study**

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35 Phase I involves a cross-sectional online survey in French. The objective is to learn more
36 about the impacts of the COVID-19 pandemic on gamblers and to draw a portrait of their
37 gambling habits.
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45 **Sample size and sampling method**

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47 The sample size will be 1250 gamblers, which was determined based on the existing
48 literature on gambling [34–39]. The sampling method will be non-probabilistic, and
49 participants will be recruited online voluntarily using social media.
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Data collection

The survey is divided into four sections: 1) Demographics; 2) General impacts of COVID-19 (social relationships, family life, mental health); 3) Impacts of COVID-19 on gambling; and 4) Health profile and experience of health care.

The first section on the demographic characteristics of participants includes questions on age, gender, first language, ethnic origin, region of residence, marital status, family status, employment, annual income, and level of education. To determine the impact of COVID-19 on the socio-demographic profiles of the participants, we will also examine the impact of the pandemic on marital status, employment, and annual income by asking them about their situation before and after the beginning of the pandemic.

The second section includes questions on the general impacts of COVID-19 (social relationships, family life, and mental health). This section was inspired by the Statistics Canada survey on the impacts of COVID-19. It includes questions on the impact of COVID-19 on lifestyle habits (sleep, nutrition and diet, tobacco, alcohol, drugs, cannabis, use of pornography, physical activity, and social activities). The mental health status of each participant will be evaluated by administering the Patient Health Questionnaire-4 (PHQ-4).

The PHQ-4 is a validated screening scale used to screen for general anxiety and depressive symptoms [40]. The PHQ-4 consists of an anxiety subscale (GAD-2) and a depression subscale (PHQ-2), with two items for each. The four items are added up to produce the

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3 PHQ-4 total score. A four-point Likert scale ranging from 0 = not at all to 3 = nearly every
4 day is used to rate the items. The PHQ-4 total score is used to classify the symptoms of
5 anxiety and depression as follows: none (0-2), mild (3-5), moderate (6-8), and severe (9-
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12). This tool is validated in French [41,42].

The third section includes questions on the impacts of the COVID-19 pandemic on gambling behaviors (frequency of gambling, length of gambling sessions, and amount of money spent before and since the beginning of the pandemic). It also includes an assessment of problem gambling through the administration of the Problem Gambling Severity Index (PGSI) [43].

The PGSI is a nine-item validated instrument designed to measure problem gambling in the general population. For each item, respondents answer using a four-point scale from 0 = never to 3 = almost always. The PGSI total score is used to classify gambling as follows: non-problem gambler (0); low-risk gambler (1-2), moderate-risk gambler (3-7), and problem gambler (8 and over). This tool is validated in French [44].

The fourth section aims to develop a health profile of the participants and learn more about their comorbidities (anxiety, depression, substance use, etc.) and their experiences of health care and services during the pandemic.

Data analysis

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3 Quantitative data will be analyzed with SPSS and SAS software Descriptive statistics will
4 be generated to describe our sample. Categorical variables will be presented with
5 frequencies and percentages. Normally distributed continuous variables will be presented
6 with the mean and standard deviation (SD) or with the median and interquartile ranges
7 (IQR: 25th-75th percentiles).
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17 The PGSI score will be categorized into 4 levels. Sociodemographic variables, PHQ-4, and
18 gambling-related variables will be compared across the 4 levels of the PGSI using chi-
19 square for categorical variables or the exact Monte Carlo method if there are too small
20 frequencies. Continuous variables will be compared with ANOVA or Kruskal Wallis test
21 depending on whether the data are normally distributed or not respectively.
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31 A multivariate logistic regression will be performed to evaluate variables that could explain
32 a score PGSI ≥ 3 or <3 . Variables with $p < 0.1$ in the univariate analyses will be included in
33 the multivariate model. A stepwise selection will be performed to keep only the variables
34 with a $p < 0.05$ in the final model.
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42 As there are many variables analyzed, a false discovery rate correction will be used to
43 reduce the risk of error. After adjustment, a p-value < 0.05 will be considered significant.
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49 **Phase II: Qualitative study**

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51 Phase II includes semi-structured interviews with gamblers. Complementary interviews
52 will also be conducted with the gamblers' families, addiction counselors, Loto-Québec
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3 representatives, and policy makers from the Ministry of Health and Social Services of the
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5 Government of Quebec.
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10 **Sample size and sampling method**

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12 Twenty-five gamblers will be selected by purposive sampling among the phase I
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14 participants who agree to be contacted for Phase II of the study. Gamblers will be selected
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16 to ensure a diversity of profiles based on the results of the quantitative phase. Certain
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18 criteria (age, gender, comorbidity, etc.) will be used to select participants to ensure
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20 maximum variability. Sampling will continue until data saturation is reached.
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26 Participants for the complementary interviews (Ministry of Health and Social Services (1),
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28 Loto-Québec (1), addiction counselors (2), gambler's families (3)) will also be selected by
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30 purposive sampling in collaboration with Gambling: Help and Referral, the Ministry of
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32 Health and Social Services and Loto-Québec
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38 The information provided by these various sources will allow us to better understand the
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40 political, administrative, and social context related to gambling in Quebec during the
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42 pandemic.
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47 **Data collection**

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49 Data will be collected through online or in-person semi-structured interviews, depending
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51 on public health restrictions. The two main topics covered during the interviews will be the
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3 participant's experiences during the COVID-19 pandemic and the impacts of the pandemic
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5 on their health and gambling habits.
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10 The interviews with family members, addiction workers, Loto-Québec representatives, and
11 decision-makers from the Ministry of Health and Social Services will help us learn more
12 about the policy-making process, the issues related to access to care for gamblers, and the
13 impacts of the pandemic on gamblers. We will also ask all actors what they believe are the
14 best courses of action to take to improve health care and services for gamblers.
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24 The interviews will be recorded and transcribed verbatim. Data collection will continue
25 until saturation is reached for gamblers and no new themes emerge in the interviews.
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31 **Data analysis**

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33 Data will be imported into NVivo software to carry out a thematic analysis. Thematic
34 analysis is a methodology used to systematically identifying, organizing, coding, and
35 offering insight into a data set by the creation of themes [45].
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42 The verbatim of the interviews will first be coded and classified by themes, independently,
43 by two members of the research team. The initial codes will be examined for similarities
44 and differences during consensus meetings. These themes will then be organized into
45 similar groups to create a thematic tree structure. The team will then organize codes into a
46 hierarchy to create final themes. Iterative phases of analysis will be carried out. These
47 iterative phases will allow the team members to take ownership of the content of the
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3 analysis and the coding process, but will also help the team to develop a common
4 understanding of the context and the data being studied. This iterative and reflexive process
5 will allow the triangulation of team members' expertise (medical, psychological, social
6 work, etc.) and knowledge.
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14 **Interpretation of quantitative and qualitative data**

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16 After completing the two phases, the quantitative and qualitative data will be interpreted
17 in concert with each other, as expected in a mixed design [30], in order to obtain a better
18 understanding of the experiences of gamblers during the pandemic and the impacts of the
19 crisis on their health and gambling habits.
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28 **Public Involvement Statement**

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30 A gambler was involved in the development of the questionnaire and will be involved in
31 the implementation and the dissemination of the study. Gamblers were not involved in the
32 development of the original design of this study.
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40 **ETHICS AND DISSEMINATION**

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42 This study has been approved by the Scientific and Research Ethics Committee of the
43 Integrated University Health and Social Services Centre of the Estrie region - University
44 Hospital Center of Sherbrooke (CIUSSS de l'Estrie - CHUS) under the number #2021-
45 3818. Electronic and/or written informed consent, depending on the data collection format
46 (online survey and online or in-person interviews), will be obtained from each participant.
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54 A copy of the consent form and contact information will be delivered to each participant.
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5 This research is funded by the Ministry of Health and Social Services of the Government
6 of Quebec in collaboration with the Quebec Research Fund and the Ministry of Innovation
7 and Economy as part of the COVID-19 call for solutions (funding number #20-CP-00309).
8 The Quebec Research Fund is a recognised and an open access advocating research-
9 funding body listed by the JULIET project.
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19 The results of this study will be shared with the Ministry of Health and Social Services of
20 the Government of Quebec, Loto-Quebec, Gambling:Help and Referral, researchers and
21 the general public, and will be submitted for publication.
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28 **CONCLUSION**

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30 This study is, to our knowledge, one of the first mixed methods studies on the impacts of
31 the COVID-19 pandemic on gamblers [46,47]. This study will generate new scientific
32 knowledge on a major public health issue, i.e. gambling, and provide a better understanding
33 of the experiences of gamblers during the pandemic. This study has some limitations. First,
34 the quantitative phase is a cross-sectional survey. A longitudinal survey would have
35 provided a better understanding and a more complete description of the impact of the
36 pandemic on the gamblers. Second, the sampling is non-probabilistic and the results cannot
37 be generalized. Thirdly, this study only concerns gamblers aged 18 and over.
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51 Despite these limitations, this study will fill an important gap in the literature as there are
52 only few mixed studies on the subject [46,47]. The use of a mixed design will provide a
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3 more comprehensive picture of gamblers' experiences during the pandemic and better
4 knowledge about their gambling habits. This study will also allow us to learn more about
5 the general mental health status of gamblers during the pandemic. Obtaining these data is
6 crucial for the development of public policies related to gambling to help this population
7 during not only the remainder of the pandemic but also future crises.
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17 This two-year study will end in June 2022.
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21 **ABBREVIATIONS**

22
23 CIUSSS de l'Estrie - CHUS: Integrated University Health and Social Services Centre of
24 the Estrie region - University Hospital Center of Sherbrooke
25
26

27 COVID-19: Coronavirus Disease
28

29 GAD-2: Generalized Anxiety Disorder 2-item
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31 PGSI: Problem Gambling Severity Index
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33 PHQ-2: Patient Health Questionnaire-2
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35 PHQ-4: Patient Health Questionnaire-4
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42 **AUTHOR CONTRIBUTIONS**

43
44 MB designed and wrote the original proposal. All authors participated in discussing the
45 design of the study and developing the research protocol. MB was responsible for drafting
46 this manuscript and was supported by SAC, ACS, and SK. All authors have read and
47 approved the final manuscript. All authors are responsible for data collection and analysis.
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COMPETING INTERESTS

The authors declare that they have no competing interests.

DATA STATEMENT

The datasets during and/or analyses during the current study are available from the corresponding author on reasonable request.

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40 41 42 43 **Figure Legends**

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46 Figure 1: Study design visual
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