

## ORIGINAL RESEARCH

### A comparison of gambling behaviors and beliefs in rural and urban populations in Pennsylvania

#### AUTHORS



Gillian EH Russell<sup>1</sup> MSc Psychology, Assistant Research Professor \*



Glenn E Sterner<sup>1</sup> PhD, Assistant Professor



Kayla M Lopez<sup>1</sup> BS, Research Assistant



Amanda M Ferrara<sup>2</sup> PhD, Research Operations Manager



Miranda P Kaye<sup>2,3</sup> PhD, Director, Survey Research Center

#### CORRESPONDENCE

\*Asst Prof Gillian EH Russell [gxr5199@psu.edu](mailto:gxr5199@psu.edu)

#### AFFILIATIONS

<sup>1</sup> Criminal Justice Research Center, The Pennsylvania State University – Abington, Jenkintown, PA 19046, USA

<sup>2</sup> Survey Research Center, The Pennsylvania State University, University Park, PA 16802, USA

<sup>3</sup> Present address: Survey Lab, The University of Chicago, Chicago, IL 60637, USA

#### PUBLISHED

5 January 2025 Volume 25 Issue 1

#### HISTORY

RECEIVED: 2 March 2024

REVISED: 11 September 2024

ACCEPTED: 18 September 2024

#### CITATION

Russell GEH, Sterner GE, Lopez KM, Ferrara AM, Kaye MP. A comparison of gambling behaviors and beliefs in rural and urban populations in Pennsylvania. *Rural and Remote Health* 2025; 25: 9077. <https://doi.org/10.22605/RRH9077>

This work is licensed under a Creative Commons Attribution 4.0 International Licence

## ABSTRACT:

**Introduction:** Little is known about the differences between rural and urban gamblers and potential vulnerabilities that may be unique to either population. This exploratory study aimed to evaluate differences between rural and urban Pennsylvanians' gambling behaviors and beliefs.

**Methods:** A dual-frame random digit dial survey was conducted in the US state of Pennsylvania. The analyses included a final sample of 1934 Pennsylvanian adults, with nearly three-quarters of the sample residing in rural counties. The survey was designed to assess online and offline gambling prevalence, engagement in different gambling formats, risk for problem gambling, motivations to gamble online, beliefs about gambling, and demographic characteristics.

**Results:** Prevalence rates were higher in urban populations for

**Keywords:**

addiction, gambling, gaming, Pennsylvania, problem gambling, US.

both online and offline gambling. However, those living in rural areas tended to gamble on more gambling formats. Motivations were largely the same in both regions, and there were no differences in risk for problem gambling. Beliefs about gambling harms and benefits were similar in urban and rural populations, but those in rural areas were less likely to believe all forms of gambling should be legal. In addition, there were several demographic differences, which largely reflected existing differences between those living in rural and urban areas.

**Conclusion:** Findings suggest a need for provision of policies, treatment, and prevention targeting those living in rural areas, where individuals may be at a greater risk of developing a gambling problem due to less access to relevant service.

## FULL ARTICLE:

### Introduction

In recent decades, gambling has greatly expanded globally, in particular to online markets. This has been of concern due to the potential risks of gambling, such as problem or pathological gambling, as well as links to harms such as intimate partner violence, financial or career difficulties, association with mental health problems, and substance use<sup>1-4</sup>. Much of the literature has focused on gambling within populations generally, with very little research examining differences in rural versus urban areas. (For a limited narrative review see Tolchard (2015)<sup>5</sup>.)

A significant body of literature explores the contrasting life experiences of those residing in rural versus urban areas, revealing differential effects on population health. These disparities are regarding issues including smoking behaviors<sup>6</sup>, obesity rates<sup>7,8</sup>, access to medical and therapeutic specialists<sup>9-11</sup>, social connectedness<sup>12</sup>, religiosity<sup>13</sup>, government aid<sup>14</sup>, levels of air pollution<sup>15</sup>, physical activity among adolescents<sup>16</sup>, out-of-school programs for children<sup>17</sup>, limited broadband internet access<sup>18,19</sup>, transportation options<sup>20,21</sup>, access to health-related information<sup>22,23</sup>, and poverty rates<sup>24</sup>. These differences impact outcomes, such as varying COVID-19 survival rates<sup>25</sup>, mental health outcomes<sup>26</sup>, mortality rates<sup>27-30</sup>, and even homicide rates<sup>31</sup>. Similarly, there is reason to believe there may be differential behaviors and impacts of gambling on urban and rural populations.

Overall, there is a dearth of research examining potential differences in gambling behaviors in rural versus urban areas, and many findings are contradictory. Internationally, the results have been mixed on whether participation and problem gambling are higher in rural or urban areas. Even within individual countries, results have been mixed, such as in Australia where there have been indications of higher rates of participation and problems in rural communities by some<sup>32</sup> and lower rates, or equal rates, by others<sup>33</sup>. Several European countries have noted few differences in prevalence between rural and urban areas such as in Hungary<sup>34</sup>, or more outside of major urban areas such as in Sweden and Norway<sup>35,36</sup>. In the Canadian context, several provinces have

demonstrated increased rates of gambling participation and problem gambling in rural areas<sup>37,38</sup>. Looking to the US, the results have also been shown to be mixed, with some more remote rural areas demonstrating lower prevalence rates<sup>39</sup>, while some rural areas have higher rates of prevalence that may reflect a greater density of gambling opportunities in these areas<sup>40,41</sup>.

One weakness of many of these studies is that they were conducted prior to the widespread offering of online gambling and the legalization of gambling in the global landscape. In particular, an important consideration to address is that while some rural areas may have limited internet access, more recent technological advances in online gambling have expanded access to online gambling to mobile devices, making gambling participation in rural areas more accessible. Research has linked online gambling on mobile and other devices (eg laptops and smart televisions) to engagement in a greater number of different gambling activities as well as greater problem gambling<sup>42</sup>.

Looking to the factors that shape regional differences in gambling behaviors specifically, Vasiliadis et al<sup>43</sup> suggested that the physical accessibility of gambling venues plays a complex role in gambling involvement and problem gambling. Indeed, proximity to and density of gambling opportunities has been found to be associated with gambling participation and problem gambling rates<sup>44,45</sup>. There is a strong social gradient with gambling, where problem gambling is often higher in groups with lower socioeconomic status or for those who may be experiencing social deprivation<sup>46,47</sup>. Similarly, online gambling allows gamblers to choose their mode of access based on convenience and when they want to bet<sup>48</sup>. Combining these factors are findings that electronic gambling machines (EGMs) may be clustered in locations with lower area-level socioeconomic status<sup>49</sup>.

In some instances, leisure activities are limited in rural areas, so the motivation to gamble is due to a lack of alternative activities<sup>50</sup>. In many rural areas, gambling venues may become social hubs due to lack of competition. Complicating matters is that many of these communities may have large populations of individuals who have either drive-in drive-out or fly-in fly-out schedules, providing less

structured schedules and more time to engage in gambling, but also serving as a motivator to engage in gambling with the intention of changing this lifestyle.

### **Study aims**

Given the limited understanding of gambling behavior in comparing rural and urban areas, and the seemingly complex nature of gambling in rural areas, this study aims to further examine differences between gamblers residing in these locations. The data for this study are from the annual Interactive Gaming Assessment, a legislated annual assessment examining the impacts of legalized online gambling in Pennsylvania<sup>51</sup>, which included an oversampling of individuals living in rural areas during the second year of the report.

This exploratory study specifically aimed to determine if:

- there are any differences in the prevalence of online or offline gambling between urban and rural areas
- individuals living in urban and rural areas tend to gamble on different formats, as well as which region tends to engage in greater numbers of formats
- individuals that gamble online in urban and rural regions are more likely to present as being at risk for problem gambling
- there are distinct motivations for engaging in online gambling among individuals living in urban and rural areas
- there are different beliefs regarding the harms of gambling and the legality of gambling between individuals residing in urban and rural areas
- there are different demographic characteristics among those who gamble online and offline in urban and rural areas.

### **Methods**

#### **Sampling methodology**

A dual-frame random digit dial survey sampled a combination of landline and cell phone numbers to produce a probability-based sample of adults in Pennsylvania. Between October 2021 and June 2022, a total of 26 403 landline numbers and 30 472 cell phone numbers were drawn, with 17 028 and 22 350 numbers remaining respectively after screening.

To increase the likelihood of reaching potential respondents, phone calls were staggered over days of the week and times of day. With the exception of numbers that were confirmed disconnected numbers, fax machines, or businesses on the first call attempt, every number was dialed at least three times, covering each calling period: weekday daytime (Monday through Friday between 10 am and 5 pm), weekday evening (Monday through Friday between 5 pm and 9 pm), and weekend (Saturday and Sunday between 10 am and 9 pm). Voicemail messages, providing the name of the interviewer, the reason for the call, and a number for the participant to call back, were left when possible. If potential participants called back and indicated that they did not wish to be contacted further, calls to their number were discontinued. The number of call attempts to landlines was capped at 15 calls and for cell phones it was eight calls. The most recent birthday method was used to randomize the individual selected for landline calls. Cell phones were treated as belonging to an individual. All participants provided consent to participate.

A total of 154 962 calls were made to 39 179 numbers (22 349 to cell phones; 16 803 to landlines). An average of 4.59 (standard deviation (SD) 3.49) calls were made to landline numbers and 3.48 (SD 1.48) calls were made to cell phone numbers. The resolution rate (percentage of numbers in the total sample for which eligibility was determined) was 15.29% for landlines and 16.58% for cell phones. A total of 1953 individuals completed the survey; in addition, 43 individuals partially completed the survey. The overall response rate for the survey was 10.90% (12.70% landlines and 9.30% cell phones; American Association for Public Opinion Research (AAPOR) response rate 3, a measure that includes an estimate of cases of unknown eligibility<sup>52</sup>), while the cooperation rate was 54.40% (59.90% landlines and 49.40% cell phones; AAPOR cooperation rate 2, the number of complete interviews as a fraction of the sum of complete, partial and non-interviews and cases of unknown eligibility)<sup>52</sup>. In comparison, other dual-frame random digit dial studies conducted in Pennsylvania since 2020 have reported response rates of less than 1%<sup>53</sup> and 1–4%<sup>54</sup>. Similarly, a recent national study reported a response rate of 6%<sup>55</sup>.

### **Participants**

Of the 1996 individuals who either partially or fully completed the survey, 20 were excluded from analyses for not including the county that they currently reside in, and 42 surveys were excluded because of an incomplete section on either online gambling or offline gambling; leaving a final sample of 1934 participants (1021 cell phones; 913 landlines) comprising 53.1% women respondents (46.4% men; 0.3% another gender; 0.3% preferred not to answer). The average age of participants was 58.37 (SD 18.52; range 18–97) years.

Due to the unavailability of individual ZIP codes, we relied on county classifications as proxies for distinguishing between urban and rural areas. To do this, we utilized metropolitan statistical areas (MSAs) and non-MSA classifications, in conjunction with the rural and urban county definitions provided by the Center for Rural Pennsylvania<sup>56</sup>. MSAs are those regions characterized by the presence of at least one urbanized area with a population exceeding 50 000 as well as the neighboring regions with connections to the central area. Some further delineate into micropolitan statistical areas, those regions where the urbanized area has a population ranging from 10 000 to 49 999 – though, for the purposes of this study, we will consider these regions to be included with the non-MSAs. Our hybrid classification largely aligns with the rural and urban county definitions provided by the Center for Rural Pennsylvania, which includes micropolitan areas in their list of rural counties, albeit with the inclusion of certain MSA counties as well<sup>56</sup>. Utilizing this classification, we determined that the majority of the participants resided in rural counties in Pennsylvania (74.1%).

Among rural participants the average age was 53.34 (SD 17.71) years, 53.1% identified as women, 89.5% identified as being White only, 3.8% identified as being of Hispanic, Latino/a, or Spanish origin, 28.0% had a bachelor's degree or higher, and 50.2% were presently employed. Comparatively, among the urban participants the mean age was 46.04 (SD 17.42) years, 54.4% identified as men, 61.3% identified as White only, 18.0% identified as being of Hispanic, Latino/a, or Spanish origin, 37.8% had a bachelor's degree or higher, and 55.5% were presently employed.

## Measures

**Demographics:** In addition to their current age, gender identity, and county of residence, participants were asked to indicate race, ethnicity, highest level of education completed, current employment status, current marital status, and personal income over the previous 12 months.

**Online gambling participation:** Participants were read a list of online gambling formats and were asked to indicate which formats they had participated in over the previous 12 months. Formats included online table games, online poker, online slots, online sports betting, online fantasy sports, iLottery, other legal online gambling, offshore sports books, offshore poker sites, offshore casinos, and other offshore online gambling. Offshore online gambling was recoded for analyses to reflect whether individuals engaged in any offshore/illegal betting, combining the four options (ie an individual who engaged in one form of offshore or illegal gambling would be coded as '1' to indicate 'presence', as would an individual who indicated that they engaged in four types of illegal or offshore betting). A composite variable, ranging from 0 to 8, was calculated to determine the total number of online gambling formats engaged in by each individual (including any offshore betting).

**Offline gambling participation:** Participants were read a list of offline gambling formats and asked to indicate which they had participated in over the previous 12 months. Formats included Pennsylvania casinos, casinos outside Pennsylvania, Pennsylvania-based lotteries, Pennsylvania instant lotteries, fantasy sports, betting on sporting events, horse racing or off-track betting, private lotteries, bingo, private poker or card games, cash bashes, or other offline formats. A composite variable, ranging from 0 to 12, was calculated to determine the number of offline gambling formats engaged in by each individual.

**Brief Problem Gambling Screen (BPGS):** The BPGS<sup>57</sup> was used to assess whether individuals who engaged in online gambling in the previous 12 months had experienced any problems with their gambling. Given the primary aim of the original survey this measure was not provided to those who had not gambled online. This five-item screen for problem gambling assesses preoccupation with gambling, needing to gamble with larger amounts of money to achieve the same level of excitement, gambling longer than intended or with more money than intended, and borrowing and/or selling possessions to get money to gamble, as well as attempts to reduce or cease involvement in gambling. The measure has both high sensitivity and specificity, and a classification accuracy of 95.9%.

**Online gambling motivations:** Participants who had gambled online in the previous year were read a list of possible reasons that people may elect to gamble online and asked to indicate (yes/no) whether that was a reason that they had gambled online. Motivations included to win money, for enjoyment, because of the convenience, for the challenge, for competition, because of the availability, for stimulation, as an escape, because of the ability to bet at your own pace, because of anonymity, for the flexibility in stake size, for the high speed of play online, and other reasons<sup>58,59</sup>.

**Gambling attitudes measure:** Personal beliefs about gambling were assessed to measure attitudes toward gambling as they influence engagement and the development of gambling problems (RJ Williams 2003, unpublished data). Participants were asked two questions on their beliefs about gambling. First, they reported perceived harms and benefits of online gambling with five response options ranging from 0 ('the harms far outweigh the benefits') to 4 ('the benefits far outweigh the harms'). Second, participants reported perceptions on the legality of gambling (four response options: 'all types of gambling should be legal', 'all types of gambling should be illegal', 'some types of gambling should be legal and some should be illegal', and 'don't know/unsure').

## Data weighting

Data raking procedures were used to adjust the sample weights to match the known population characteristics of Pennsylvanian adult residents. Weights were calculated on age (18–64 years, 64–99 years, or not reported), race (White only, Black/African American only, Asian only, American Indian or Alaska Native only, other only, two or more, or not reported), ethnicity (Hispanic, Latino/a, or Spanish origin, non-Hispanic, or not reported), and gender (man, woman, some other gender, or not reported). The weighting schema achieved targets based on Pennsylvanian populations estimates<sup>60</sup> using complete data records. In the final sample 126 participants were missing data on one or more variables used in calculating their weights; missing data were replaced using the linear trend.

## Data analysis

Statistical analyses were conducted, including checks for normality assumptions on continuous variables. Descriptive statistics were summarized as counts and percentages. Chi-squared tests ( $2 \times 2$ ) were used to evaluate group differences using bivariate and nominal data, while Mann–Whitney *U*-tests were employed for analyzing continuous data, due to the violations of normality.

## Ethics approval

This research was declared exempt by the Pennsylvania State University Institutional Review Board.

## Results

### Online gambling

There was a significantly higher prevalence of online gambling in urban (14.1%, 95% confidence interval (CI) 11.41–16.70%) compared to rural regions (8.8%, 95%CI 7.25–10.38%),  $\chi^2$  (degrees of freedom (df) 1,  $n=1935$ )=12.713,  $p<0.001$ , odds ratio (OR) 1.69. Looking specifically at the rate of illegal or offshore online gambling, there was no difference between those in urban (2.9%, 95%CI 1.62–4.17%) than those in rural (2.0%, 95%CI 1.22–2.76%) regions,  $\chi^2$  (df 1,  $n=1933$ ) = 1.519,  $p=0.218$ , OR 1.46. Regarding the number of online gambling formats engaged in by people who do gamble online, we found that those in rural regions engaged in significantly more online gambling formats (median 2.00) than those living in urban regions (median 1.00), as determined by Mann–Whitney *U*-test,  $U=3169$ ,  $p<0.01$ . Table 1 shows a detailed breakdown of the reported engagement in each online gambling format by region. Online table games, online poker, online slots, and other online gambling were all significantly more popular among online gamblers in rural regions than in urban regions.

There was significant offline gambling participation among online gamblers, with 90.9% of online gamblers in urban regions and 89.5% of online gamblers in rural regions also gambling offline in the past year; there was no significant difference in these rates,  $\chi^2$  (df 1,  $n=206$ )=0.073,  $p=0.788$ , OR 1.13.

The median age of those who gamble online in urban regions (33.00 years) was not significantly different than that in rural regions (median 34.64 years),  $U=4437.00$ ,  $p=0.555$ . There was no significant difference between those in urban versus rural regions who gamble online in terms of gender, race, ethnicity, marital status, or income (Table 2). Individuals who gamble online in both regions were predominantly men, White, not currently living with a partner, and the majority reported a household income exceeding US\$50,000 (A\$66,500) per year. There were significant differences in the educational attainment of online gamblers based on region, with online gamblers living in rural regions having lower levels of education than online gamblers living in urban regions,  $p<0.001$ .

Examining differences in motivations to gamble online between those in urban versus rural regions, there was no significant difference in the number of reported motives between those in urban regions (median 9) and those in rural regions (median 7),  $U=2918.00$ ,  $p=0.057$ . An examination of the endorsement of specific motives to gamble online indicated that those living in urban regions were significantly more likely to report that their motivation to gamble online was to win money, for stimulation, because of the ability to bet at your own pace, and for the flexibility in stake size compared to those in rural regions of the state (Table 3).

When examining differences in scores on the BGPS, we found no significant differences in the proportion of individuals who gamble online and score 1 or higher on the BPGS. Specifically, 38.5% of those living in rural regions and 33.3% of those living in urban regions scored 1 or higher,  $\chi^2$  (df 1,  $n=205$ )=0.564,  $p=0.453$ .

**Table 1: Chi-squared tests examining the popularity of different online gambling formats in urban versus rural regions in Pennsylvania, US**

Online gambling format	Region		$\chi^2$	Degrees of freedom	Odds ratio	$p$ -value
	Urban (%)	Rural (%)				
Online table games	19.5	32.2	4.282	1	0.51	<0.05
Online poker	13.5	27.3	5.348	1	0.43	<0.05
Online slots	29.4	51.7	10.170	1	0.40	<0.01
Online sports betting	48.5	55.6	0.989	1	0.76	0.320
Online fantasy sports betting	24.8	36.0	3.030	1	0.58	0.082
iLottery	16.5	21.8	0.987	1	0.70	0.320
Other online gambling	1.3	17.7	15.563	1	0.05	<0.001

**Table 2: Demographic differences between online gamblers in urban versus rural regions in Pennsylvania, US**

Characteristic	Region		$\chi^2/U$	Degrees of freedom	$p$ -value
	Urban (%)	Rural (%)			
Gender			3.362 <sup>†</sup>	1	0.186
Man	73.4	61.7			
Woman	25.6	37.6			
Other gender	0.9	0.7			
Race			9.482 <sup>†</sup>	1	0.091
White	51.3	65.6			
Black or African American	37.2	23.1			
Asian	6.8	2.8			
American Indian/Alaska Native	0.9	0.7			
Other	0	0.7			
≥2 races	3.8	7.4			
Ethnicity			0.099 <sup>†</sup>	1	0.753
Hispanic, Latino/a, or Spanish origin	22.2	20.3			
Not of Hispanic, Latino/a, or Spanish origin	77.8	79.7			
Marital status			2.295 <sup>†</sup>	1	0.513
Married or living with a partner	37.4	41.8			
Divorced	7.9	5.3			
Widowed	1.8	6.6			
Single (never married)	35.2	44.1			
Education			4566.50 <sup>¶</sup>		<0.001
Less than high school	0	16.2			
High school or General Education Diploma	17.6	29.8			
Post-secondary education (up to and including a bachelor's degree)	53.1	43.0			
Professional, master's, or doctoral degree	11.6	10.0			
Income (US\$) <sup>§</sup>			2814.00 <sup>¶</sup>		0.304
<\$25,000	15.5	9.8			
\$25,000 to <\$50,000	10.7	29.9			
\$50,000 to <\$100,000	24.4	22.4			
≥\$100,000	22.3	21.6			

<sup>†</sup>  $\chi^2$  test.

<sup>¶</sup> Mann-Whitney  $U$ -test.

<sup>§</sup> 1.00USD = 1.33AUD.

**Table 3: Online gambling motivations among online gamblers in urban versus rural regions in Pennsylvania, US**

Motivation <sup>†</sup>	Region		$\chi^2$	Degrees of freedom	Odds ratio	p-value
	Urban (%)	Rural (%)				
To win money	60.3	56.2	5.117	1	2.26	<0.05
For enjoyment	73.7	78.6	3.406	1	3.92	0.065
Because of the convenience	65.6	68.1	1.877	1	1.77	0.171
For the challenge	34.1	49.7	2.013	1	0.64	0.156
For competition	26.9	37.9	1.006	1	0.73	0.316
Because of the availability	61.8	69.5	0.218	1	1.20	0.641
For stimulation	32.5	24.0	3.982	1	1.92	<0.05
As an escape	16.1	14.5	0.633	1	1.37	0.426
Because of the ability to bet at your own pace	59.5	51.3	7.165	1	2.52	<0.01
Because it's anonymous	30.4	45.0	2.580	1	0.60	0.108
For the flexibility in stake size	47.1	36.7	6.677	1	2.27	<0.05
For the high speed of play online	23.9	26.8	0.766	1	1.34	0.381
Other reasons	14.1	8.8	2.062	1	1.91	0.151

<sup>†</sup> Participants could endorse more than one motivation for gambling online.

**Offline gambling**

There was a significantly higher prevalence of offline gambling in urban (72.9%) versus rural (66.6%) regions,  $\chi^2$  (df 1,  $n=1935$ )=8.078,  $p<0.01$ . Examining the number of offline gambling formats engaged in by people who do gamble offline, we found that those in rural regions engaged in significantly more offline gambling formats (mean 2.69, SD 1.71; median 2.00) than those living in urban regions (mean 2.40, SD 1.49; median 2.00),  $U=107\ 586.00$ ,  $p<0.01$ . Table 4 shows a detailed breakdown of the participants who reported engagement in each offline gambling format by region. Among offline gamblers, urban residents reported significantly more engagement in gambling in Pennsylvania-based casinos and offline fantasy sports betting than rural residents, while PA Lottery, PA Instant Lottery, private

lotteries, cash bashes, and other forms of offline gambling were reported significantly more often among offline gamblers in rural regions than in urban regions.

The age of those who gamble offline in rural regions was significantly greater than in urban regions (rural median 55.00 years v urban median 44.00 years),  $U=99\ 634.00$ ,  $p<0.001$ . There was no significant difference between those in urban versus rural regions who gamble offline in terms of education or income (Table 5). In rural regions, offline gamblers were significantly more likely to be women ( $p<0.01$ ) and to be White ( $p<0.001$ ) than those in urban regions. Offline gamblers in urban regions were more likely to be of Hispanic, Latino, or Spanish origin ( $p<0.001$ ); they were also more likely to be currently living on their own ( $p<0.01$ ) than offline gamblers living in rural regions.

**Table 4: Chi-squared tests examining the popularity of different offline gambling formats in urban versus rural regions in Pennsylvania**

Offline gambling format	Region		$\chi^2$	Degrees of freedom	Odds ratio	p-value
	Urban (%)	Rural (%)				
Pennsylvania-based casinos	24.3	16.0	13.742	1	1.68	<0.001
Casinos outside Pennsylvania	13.6	15.4	0.815	1	0.86	0.367
PA Lottery	53.4	61.6	8.557	1	0.71	<0.01
PA Instant Lottery	58.6	71.7	23.691	1	0.56	<0.001
Fantasy sports	14.8	8.0	15.582	1	2.02	<0.001
Sports betting	8.9	8.2	0.181	1	1.09	0.671
Horse racetrack or off track	3.0	2.9	0.064	1	1.09	0.800
Private lottery	26.2	39.8	25.429	1	0.54	<0.001
Bingo	15.2	15.2	0.001	1	1.01	0.976
Private poker or cards	9.7	11.2	0.700	1	0.85	0.403
Cash bashes	10.0	14.0	4.700	1	0.68	<0.05
Other	2.3	5.4	7.636	1	0.40	<0.01

**Table 5: Demographic differences between offline gamblers in urban versus rural regions**

Characteristic	Region		$\chi^2/U$	Degrees of freedom	p-value
	Urban (%)	Rural (%)			
Gender			12.367 <sup>†</sup>	1	<0.01
Man	57.4	47.8			
Woman	42.1	51.9			
Other gender	0.4	0.2			
Race			194.790 <sup>†</sup>	1	<0.001
White	61.1	90.7			
Black or African American	26.8	3.8			
Asian	8.3	2.3			
American Indian/Alaska Native	0.2	0.2			
Other	0.5	0.9			
≥2 races	2.4	1.3			
Ethnicity			117.371 <sup>†</sup>	1	<0.001
Hispanic, Latino/a, or Spanish origin	22.7	3.7			
Not of Hispanic, Latino/a, or Spanish origin	76.8	95.8			
Marital status			18.970 <sup>†</sup>	1	<0.01
Married or living with a partner	56.2	60.2			
Divorced	6.5	9.2			
Separated	1.4	1.6			
Widowed	5.4	8.5			
Single (never married)	30.4	20.6			
Education			118 524.50 <sup>‡</sup>		0.120
Less than high school	4.6	5.0			
High school or General Education Diploma	27.9	33.2			
Post-secondary education (up to and including a bachelor's degree)	56.7	51.7			
Professional, master's, or doctoral degree	10.8	10.1			
Income (US\$)			69 189.50 <sup>‡</sup>		0.305
<\$25,000	18.2	16.4			
\$25,000 to <\$50,000	26.0	22.5			
\$50,000 to <\$100,000	25.9	35.0			
≥\$100,000	29.9	26.1			

<sup>†</sup>  $\chi^2$  test.  
<sup>‡</sup> Mann-Whitney U-test.  
<sup>§</sup> 1.00USD = 1.33AUD.

**Gambling attitudes**

Table 6 details the reported attitudes toward online gambling for urban and rural participants. There were no reported differences in perceptions about the harms of online gambling. On the other

hand, rural participants were less likely to endorse that all forms of gambling should be legal ( $p < 0.01$ ).

**Table 6: Beliefs about the harms versus benefits of online gambling and the legality of gambling types assessed via the Gambling Attitude Measure in urban versus rural regions**

GAM responses	Region		U	p-value
	Urban (%)	Rural (%)		
Harms versus benefits			193 507	0.954
Harms far outweigh the benefits	44.2	47.8		
Harms somewhat outweigh the benefits	23.1	19.6		
Harms and benefits are about the same	24.1	24.9		
Benefits somewhat outweigh the harms	6.3	4.7		
Benefits far outweigh the harms	2.4	3.0		
Legality			202 299	<0.01
All should be illegal	6.5	13.2		
Some should be legal and some illegal	53.8	56.7		
All should be legal	39.7	30.1		

**Discussion**

To date, little research has been devoted to the examination of differences in gambling between individuals who live in rural and urban communities. This study examined differences in gambling behaviors and beliefs among those living in urban versus rural regions in Pennsylvania. In particular, we examined differences between urban and rural residents in (1) prevalence of online and offline gambling, (2) total engagement and types of formats of online and offline gambling, (3) rates of problem gambling associated with online gambling, (4) number and motivations for engagement in online gambling, (5) attitudes toward gambling, and (6) demographic difference in online and offline gambling.

In regard to prevalence of online and offline gambling, prevalence rates of engagement, both online and offline, were higher in urban areas than they were in rural ones. Urban residents were 1.7 times as likely to engage in online gambling and 1.4 times as likely to

engage in offline gambling. In Pennsylvania, there are greater opportunities to gamble offline, with all Pennsylvania casinos located within urban areas. In terms of online gambling, there may be more restricted access to broadband connections, with 81% of rural residences lacking reliable internet services<sup>61</sup>. Interestingly, there were no differences in engagement in illegal or offshore online gambling where those living in rural communities may have been expected to have higher rates of engagement in illegal or offshore gambling due to being further away from legal gambling opportunities in metropolitan areas.

In regard to total engagement and types of formats of online and offline gambling, while urban residents were 1.6 times more likely to report online gambling and 1.1 times more likely to report offline gambling than those living in rural regions, rural residents engaged in a greater variety of formats of both online and offline gambling. This may be of particular concern due to findings that high involvement in gambling has been found to be positively

related to problem gambling; that is, those that participate in many types of gambling are more likely to experience a gambling problem<sup>62-65</sup>. This finding is analogous to findings in Australia that although there were lower participation rates in gambling, rural residents tended to spend larger amounts compared to those in urban areas – suggesting this greater level of involvement among those that do gamble in rural areas<sup>32</sup>. Rural residents were more than 95% as likely to engage in other forms of online gambling, 60% more likely to engage in online slots, 57% more likely to engage in online poker, and 49% more likely to engage in online table games than those who gamble online and live in urban regions. This engagement in online slots may be of particular concern, with slot play being consistently found to be predictive of problem gambling status<sup>62,66,67</sup>. The online table engagement may also be concerning due to findings of increased problem gambling rates among those playing online roulette and online blackjack<sup>59</sup>.

There were several differences with respect to engagement in different offline gambling formats. Those living in urban areas who gamble offline were more likely to gamble at Pennsylvania-based casinos and to engage in offline fantasy sports gambling than offline gamblers who reside in rural areas. This was unsurprising due to the distribution of casinos being exclusively in urban areas in Pennsylvania, giving those in urban areas easier access to this form of gambling. Offline gamblers in rural areas were more likely to engage in all forms of lottery (PA Lottery, PA Instant Lottery, and private lotteries), as well as to engage in cash bashes and other forms of gambling than offline gamblers in urban areas. This finding suggests that greater access to in-person gambling formats may increase the likelihood of engaging in gambling behaviors, and this should be monitored as other types of in-person gambling formats (eg video game terminals) become available in all areas.

In relation to rates of problem gambling associated with online gambling, we found that while more individuals who live in rural areas and gamble online tended to score a 1 or higher on the BPGS than those living in urban areas who gamble online, there were no significant differences in scores between those living in either area. It should be noted that this was only a problem gambling screen, and not a full assessment of problem gambling that categorizes individuals in multiple ways (eg recreational gambler, at-risk gambler, problem gambler), so it is not known whether there are differences in problem gambling prevalence between the two areas. Looking at the existing literature regarding problem gambling in rural versus urban areas, at least among Veterans Affairs service users, living in rural areas presented less risk of problem gambling<sup>39</sup>, though gambling has changed significantly following the timing of this study, in particular the expansion and legalization of online gambling. In other studies, within the US, access to opportunities was often confounded with location, with the number of opportunities to gamble within locations being predictive of gambling problems<sup>41</sup>. Despite there being no significant differences in scores on the BPGS, the increased number of formats engaged in by those living in rural areas, the preference for certain online gambling types (ie online slots and online tables) by rural online gamblers, and the increased (though non-significant) number of individuals who score 1 or higher on the BPGS, there are concerns about potentially higher rates of problem gambling or riskier gambling in these rural areas.

Our fourth aim was to examine whether there are different motivations for engaging in online gambling among individuals living in urban and rural areas. We found that those living in urban areas were more likely to endorse motivations to gamble online as being to win money, for stimulation, because of the ability to bet at your own pace, and for the flexibility in stake size. The motivations for winning money or stimulation may be considered enhancement motives. In the literature it has been proposed that motivations can be for enhancement, coping, monetary, recreation, or social motives<sup>68-71</sup>. Some literature has found that enhancement motives have been found to consistently predict greater gambling behavior, while both coping and enhancement motives predict gambling problems<sup>71</sup>. Looking at whether there are differences in motivations between men and women, it was found that enhancement motives are a better predictor of problem gambling in men, while coping motives are a better predictor among women<sup>71</sup>. With online gambling being more common among men, and motivations only being assessed among the online gamblers, seeing these motivations commonly endorsed is not surprising. Other studies have found that all motivations other than monetary motives are associated with engaging in greater numbers of gambling types, and that coping and enhancement motives are particularly associated with problem gambling severity<sup>69</sup>. What this suggests is that there may be a greater vulnerability to problem gambling among those living in urban areas due to increased endorsement of these motivations, though there were no significant differences in the endorsement of other motives that may be classified as coping or enhancement types.

In examining differences in beliefs regarding the harms of gambling and the legality of gambling between individuals residing in urban and rural areas, there was only one notable difference. In terms of beliefs about the harms and benefits of gambling, there were no significant differences – individuals in both urban and rural areas tended to believe that the harms of gambling outweigh the benefits. In terms of beliefs about the legality of all forms of gambling, it was found that in rural areas individuals were less likely to believe that all forms of gambling should be legal compared to those living in urban areas. A 2003 survey of rural Pennsylvanians found that 39% did not approve of legalized casino gambling, suggesting that approval has increased following legalization and gambling expansion<sup>72</sup>.

Finally, we did find several differences between those gambling online and those gambling offline who reside in urban and rural areas. Among online gamblers, it was found that the demographic profiles were largely the same; however, rural online gamblers tended to be less educated than online gamblers living in urban areas. For offline gambling, there were a number of demographic differences between rural and urban areas. There was less of a gender difference in gamblers in both regions; however, in rural areas a significantly greater proportion of women took part in offline gambling than those in urban areas. Offline gamblers in rural areas also tended to be older than those in urban areas, and the majority of offline gamblers in rural areas were White, while there were ethnically more Hispanic, Latino, and Spanish origin individuals who gamble offline in urban areas. Many of these demographic differences associated with gambling behaviors can be explained by existing differences between those living in rural versus urban areas; the average age of those living in rural areas was significantly greater than in urban ones, a greater proportion



of women lived in rural areas than in urban areas, those living in rural areas were more likely to endorse their race as being only White than those in urban areas, there were a greater proportion of participants of Hispanic, Latino/a, or Spanish origin in urban areas, and educational achievement was higher in urban areas than in rural ones.

### **Limitations**

A limitation of this study already alluded to is the lack of a full assessment of problem gambling with the study due to time constraints with the phone survey. This limits our ability to determine whether there is any difference in the prevalence of problem gambling between the two regions. While we can see that riskier behaviors are being engaged in, in terms of a greater number of formats being engaged in by both online and offline gamblers in rural regions, the problem gambling screen revealed no significant differences between the two groups, and perhaps a full assessment that better delineated between recreational, at-risk, and problem gamblers (such as the Problem and Pathological Gambling Measure)<sup>73,74</sup> would have found differences between these two groups. In addition, the problem gambling screen was only administered to those who had gambled online in the previous year, restricting the ability to determine whether there were any differences among those who gamble strictly offline; this was due to the original legislative motivation of the assessment, which was to assess the impacts of legalized online gambling in Pennsylvania, leading to a focus on gambling problems as they relate to online gambling. A second and related limitation is that the survey did not include full assessments of the frequency and expenditure for specific gambling formats, or even gambling generally, which again was due to restrictions in the length of the phone survey. While the number of formats individuals engage in is a demonstrated indicator of gambling involvement, as well as potential risk of problem gambling<sup>62,63</sup>, having this supplementary information would be valuable. Here too, motivations were limited to only the online gamblers and only motivations for gambling online. There may be differences in motivations, though prior literature has found those in rural communities to generally have the same motivations to gamble as those in non-rural communities<sup>50</sup>.

A third limitation was our use of telephone surveys, which, although we used both landlines and mobile numbers, had a low response rate of 10.90%, reflecting steadily declining response rates to telephone surveys<sup>75</sup>. To better approximate the Pennsylvania population, we weighted the data, based on gender, age, race, and ethnicity; however, it cannot be ignored that those who did participate in the survey may differ from those who did not in some significant ways. In addition, this use of phone surveys may have led to more pronounced response biases such as social desirability, in which participants may have responded in ways that they felt would seem more desirable to the interview or just (in their belief) generally more desirable than would be found if web-based survey methods were used<sup>76</sup>. Also, participants may have felt their responses would not be anonymous, which may have impacted decisions to answer specific questions, or even the entire survey. Additionally, this limited our final sample size, restricting the ability to better analyze certain subgroups including looking at potential differences between our mixed-mode gamblers (those who gamble online and offline) and our exclusively online gamblers from both urban and rural regions. Prior literature has

found that most who gamble online tend to be mixed-mode gamblers, with only a small proportion being exclusively online gamblers<sup>77,78</sup>, though there are some differences between these gambler types, particularly with regard to problems and intensity, with mixed-mode gamblers tending to see higher rates of problems and gamble more intensely.

Finally, the survey did not include questions enquiring about other potential differences that may exist between the regions. It would have been valuable to have included assessments regarding such factors as mental and physical health, substance use, religiosity, and even individual ZIP codes to better determine the socioeconomic status of areas that individuals reside in, to better determine whether any differences in gambling behaviors may be accounted for due to differences in these other determinants of behaviors.

### **Conclusion**

This study has a number of important implications for policy and practice. It is clear that gambling online and offline is present in both urban and rural regions. In addition, this study revealed that, at least within Pennsylvania, those in rural regions who do gamble tend to engage in gambling on a greater number of gambling formats both online and offline, which has been demonstrated to be associated with problem gambling<sup>62,63</sup>. However, for those in rural areas, it is often the experience that there are impediments to receiving help, due to issues such as the experience of social familiarity with the service providers or fears of being stigmatized when seeking help<sup>50</sup>. Furthermore, these communities are less likely to have many specialized services that can be accessed by those who may be experiencing a problem with gambling. Self-help methods are often less available in these areas as well; for example, within Pennsylvania only 49 listed in-person Gamblers Anonymous meetings are available, with only a single meeting available in a rural area<sup>79</sup>. In recent years, online meetings have become more available and popular; however, this option has been met with mixed results, with some developing new recovery strategies, while others have experienced a breakdown in the group dynamic and behaved in a less collectivistic way<sup>80</sup>. In some rural areas, access to this service may be limited due to lack of access to the high-speed broadband internet connections that may be required for telehealth-type treatment services<sup>18,81</sup>. In-person services should be made more available in these rural areas, including specialized training for GPs in identifying possible signs of problem gambling and including screening in their general assessments.

Looking to policy and prevention, the placement of messaging about gambling (both advertising and prevention messages) as well as the placement of gambling venues (including the placement of individual machines as well as gambling-dedicated venues such as casinos) should be considered. With the placement of gambling venues, several studies have found that a greater density of gambling availability (in particular EGMs), perceived or actual, is associated with higher problem gambling severity rates<sup>45,74</sup>. In rural areas with low populations this perception of availability may be exacerbated by limited options for social gathering, where the limited local shopping and dining options may also be locations that house gambling opportunities<sup>50</sup>. The often lower socioeconomic status of these areas may also make these individuals more vulnerable to gambling problems, and

increased concentration of gambling machines could expose an already vulnerable population to an augmented risk of harm<sup>82</sup>. Finally, the provision of school-based prevention should be made equally available in both urban and rural areas, providing equal opportunity to all youth to receive information about gambling, including how to identify which behaviors may constitute gambling and the potential risks associated with more involved gambling.

## Funding

Funding for this research was provided by the Pennsylvania Gaming Control Board through the Pennsylvania General Assembly Act 42 of 2017, relating to utilizing revenues generated from interactive gaming licensees.

## Conflicts of interest

The authors have no conflicts of interest to declare.

## REFERENCES:

- 1 Barrault S, Mathieu S, Brunault P, Varescon I. Does gambling type moderate the links between problem gambling, emotion regulation, anxiety, depression and gambling motives. *International Gambling Studies* 2018; **19(1)**: 54-68. DOI link
- 2 Cowlshaw S, Hakes JK. Pathological and problem gambling in substance use treatment: Results from the National Epidemiologic Survey on alcohol and related conditions (NESARC). *The American Journal on Addictions* 2015; **24(5)**: 467-474. DOI link, PMID:25950376
- 3 Dowling N, Suomi A, Jackson A, Lavis T, Patford J, Cockman S, et al. Problem gambling and intimate partner violence. *Trauma, Violence, & Abuse* 2014; **17(1)**: 43-61. DOI link, PMID:25477014
- 4 Lee BK, Merali NK. Employment stress and couple adjustment among clients with disorders of gambling and alcohol use: Themes of transfers in congruence couple therapy. *Substance Abuse: Research and Treatment* 2022; **16**: 117822182210807. DOI link, PMID:35340915
- 5 Tolchard B. The impact of gambling on rural communities worldwide: A narrative literature review. *Journal of Rural Mental Health* 2015; **39(2)**: 90-107. DOI link
- 6 Nighbor TD, Doogan NJ, Roberts ME, Cepeda-Benito A, Kurti AN, Priest JS, et al. Smoking prevalence and trends among a U.S. national sample of women of reproductive age in rural versus urban settings. *PLoS ONE* 2018; **13(11)**: e0207818. DOI link, PMID:30485376
- 7 Befort CA, Nazir N, Perri MG. Prevalence of obesity among adults from rural and urban areas of the United States: Findings from NHANES (2005-2008). *The Journal of Rural Health* 2012; **28(4)**: 392-397. DOI link, PMID:23083085
- 8 Trivedi T, Liu J, Probst JC, Merchant A, Jones S, Martin A. Obesity and obesity-related behaviors among rural and urban adults in the USA. *Rural and Remote Health* 2015; **15**: 3267. DOI link, PMID:26458564
- 9 Hart LG, Salsberg E, Phillips DM, Lishner DM. Rural health care providers in the United States. *The Journal of Rural Health* 2002; **18(5)**: 211-231. DOI link, PMID:12061515
- 10 Johnson ME, Brems C, Warner TD, Roberts LW. Rural-urban health care provider disparities in Alaska and New Mexico. *Administration and Policy in Mental Health and Mental Health Services Research* 2005; **33(4)**: 504-507. DOI link, PMID:16220242
- 11 Martin SL, Wood J, Soule S. A volunteer program in Maine to transport community members to health care appointments. *Preventing Chronic Disease* 2020; **17**. DOI link, PMID:32762808
- 12 Levasseur M, Naud D, Bruneau JF, G  n  reux M. Environmental characteristics associated with older adults' social participation: The contribution of sociodemography and transportation in metropolitan, urban, and rural areas. *International Journal of Environmental Research and Public Health* 2020; **17(22)**: 8399. DOI link, PMID:33202800
- 13 Chalfant HP, Heller PL. Rural/urban versus regional differences in religiosity. *Review of Religious Research* 1991; **33(1)**: 76. DOI link
- 14 Nielsen RB, Seay MC, Wilmarth MJ. The receipt of government food assistance: differences between metro and non-metro households. *Journal of Family and Economic Issues* 2017; **39(1)**: 117-131. DOI link
- 15 Clark LP, Millet DB, Marshall JD. National patterns in environmental injustice and inequality: Outdoor NO2 air pollution in the United States. *PLoS ONE* 2014; **9(4)**: e94431. DOI link, PMID:24736569
- 16 Euler R, Jimenez EY, Sanders S, Kuhlemeier A, Van Horn ML, Cohen D, et al. Rural-urban differences in baseline dietary intake and physical activity levels of adolescents. *Preventing Chronic Disease* 2019; **16**: <https://doi.org/10.5888/pcd16.180200>. 30605423
- 17 Sliwa SA, Calvert HG, Williams HP, Turner L. Prevalence and types of school-based out-of-school time programs at elementary schools and implications for student nutrition and physical activity. *Journal of School Health* 2018; **89(1)**: 48-58. DOI link, PMID:30506694
- 18 Drake C, Zhang Y, Chaiyachati KH, Polsky D. The limitations of poor broadband internet access for telemedicine use in rural America: An observational study. *Annals of Internal Medicine* 2019; **171(5)**: 382. DOI link, PMID:31108509
- 19 Quinton JK, Ong MK, Vangala S, Tetleton-Burns A, Webb A, Sarkisian C, et al. The Association of Broadband Internet access and telemedicine utilization in rural Western Tennessee: An observational study. *BMC Health Services Research* 2021; **21(1)**: 765. DOI link, PMID:34344377
- 20 Bittner J, Fuchs P, Baird T, Smith A. *Addressing elderly mobility issues in Wisconsin*. 2011. Available: [web link](#) (Accessed 4 August 2023).
- 21 Lamanna M, Klinger CA, Liu A, Mirza RM. The association between public transportation and social isolation in older adults: A scoping review of the literature. *Canadian Journal on Aging / La Revue Canadienne Du Vieillessement* 2019; **39(3)**: 393-405. DOI link, PMID:31328708
- 22 Chen X, Orom H, Hay JL, Waters EA, Schofield E, Li Y, et al. Differences in rural and Urban Health Information Access and use. *The Journal of Rural Health* 2018; **35(3)**: 405-417. DOI link, PMID:30444935

- 23** García CM, Gilchrist L, Vazquez G, Leite A, Raymond N. Urban and rural immigrant Latino Youths' and adults' knowledge and beliefs about mental health resources. *Journal of Immigrant and Minority Health* 2010; **13(3)**: 500-509. DOI link, PMID:20835762
- 24** Wang M, Kleit RG, Cover J, Fowler CS. Spatial variations in US poverty. *Urban Studies* 2011; **49(3)**: 563-585. DOI link, PMID:22512042
- 25** Karim SA, Chen H. Deaths from Covid-19 in rural, micropolitan, and metropolitan areas: A county-level comparison. *The Journal of Rural Health* 2020; **37(1)**: n124-n132. DOI link, PMID:33155723
- 26** Morales DA, Barksdale CL, Beckel-Mitchener AC. A call to action to address rural mental health disparities. *Journal of Clinical and Translational Science* 2020; **4(5)**: 463-467. DOI link, PMID:33244437
- 27** Blake KD, Moss JL, Gaysynsky A, Srinivasan S, Croyle RT. Making the case for investment in rural cancer control: An analysis of rural cancer incidence, mortality, and funding trends. *Cancer Epidemiology, Biomarkers & Prevention* 2017; **26(7)**: 992-997. DOI link, PMID:28600296
- 28** Cosby AG, McDoom-Echebiri MM, James W, Khandekar H, Brown W, Hanna HL. Growth and persistence of place-based mortality in the United States: The Rural Mortality Penalty. *American Journal of Public Health* 2019; **109(1)**: 155-162. DOI link, PMID:30496008
- 29** Kulshreshtha A, Goyal A, Dabhadkar K, Veledar E, Vaccarino V. Urban-rural differences in coronary heart disease mortality in the United States: 1999-2009. *Public Health Reports* 2014; **129(1)**: 19-29. DOI link, PMID:24381356
- 30** Rigg KK, Monnat SM, Chavez MN. Opioid-related mortality in rural America: Geographic heterogeneity and intervention strategies. *International Journal of Drug Policy* 2018; **57**: 119-129. DOI link, PMID:29754032
- 31** Siegel M, Solomon B, Knopov A, Rothman EF, Cronin SW, Xuan Z, et al. The impact of state firearm laws on homicide rates in suburban and rural areas compared to large cities in the United States, 1991-2016. *The Journal of Rural Health* 2020; **36(2)**: 255-265. DOI link, PMID:31361355
- 32** O'Neil M, Kosturjak A, Whetton S. *The impact of gambling machines on small regional economies*. 2004. Available: web link (Accessed 4 August 2023).
- 33** Storer J, Abbott M, Stubbs J. Access or adaptation? A meta-analysis of surveys of problem gambling prevalence in Australia and New Zealand with respect to concentration of electronic gaming machines. *International Gambling Studies* 2009; **9(3)**: 225-244. DOI link
- 34** Kun B, Balázs H, Arnold P, Paksi B, Demetrovics Z. Gambling in western and Eastern Europe: The example of Hungary. *Journal of Gambling Studies* 2011; **28(1)**: 27-46. DOI link, PMID:21360068
- 35** Abbott MW, Romild U, Volberg RA. Gambling and problem gambling in Sweden: Changes between 1998 and 2009. *Journal of Gambling Studies* 2013; **30(4)**: 985-999. DOI link, PMID:23832754
- 36** Bakken IJ, Gøtestam KG, Gråwe RW, Wenzel HG, Øren A. Gambling behavior and gambling problems in Norway 2007. *Scandinavian Journal of Psychology* 2009; **50(4)**: 333-339. DOI link, PMID:19298249
- 37** Cox BJ, Yu N, Afifi TO, Ladouceur R. A national survey of gambling problems in Canada. *The Canadian Journal of Psychiatry* 2005; **50(4)**: 213-217. DOI link, PMID:15898460
- 38** Smith GJ, Wynne HJ. *Measuring gambling and problem gambling in Alberta using the Canadian problem gambling index (CPGI): Final report*. 2002. Available: web link (Accessed 2 May 2023).
- 39** Edens EL, Rosenheck RA. Rates and correlates of pathological gambling among VA mental health service users. *Journal of Gambling Studies* 2012; **28(1)**: 1-11. DOI link, PMID:21331515
- 40** Volberg RA. *Gambling and problem gambling in North Dakota: A replication study, 1992 to 2000*. 2001. Available: web link (Accessed 7 November 2024).
- 41** Volberg RA, Nysse-Carris KL, Gerstein DR. *California problem gambling prevalence survey, August 2006, Final report*. 2006. Available: web link (Accessed 7 November 2024).
- 42** Gainsbury SM, Liu Y, Russell AMT, Teichert T. Is all internet gambling equally problematic? Considering the relationship between mode of access and gambling problems. *Computers in Human Behavior* 2016; **55**: 717-728. DOI link
- 43** Vasiliadis SD, Jackson AC, Christensen D, Francis K. Physical accessibility of gaming opportunity and its relationship to gaming involvement and problem gambling: A systematic review. *Journal of Gambling Issues* 2013; **28**: 1. DOI link
- 44** Barratt MJ, Livingston M, Matthews S, Clemens SL. Gaming machine density is correlated with rates of help-seeking for problem gambling: A local area analysis in Victoria, Australia. *Journal of Gambling Issues* 2014; **29**: 1. DOI link
- 45** Pearce J, Mason K, Hiscock R, Day P. A national study of neighbourhood access to gambling opportunities and individual gambling behaviour. *Journal of Epidemiology & Community Health* 2008; **62(10)**: 862-868. DOI link, PMID:18791042
- 46** Callan MJ, Ellard JH, Will Shead N, Hodgins DC. Gambling as a search for justice: Examining the role of personal relative deprivation in gambling urges and gambling behavior. *Personality and Social Psychology Bulletin* 2008; **34(11)**: 1514-1529. DOI link, PMID:18723773
- 47** Welte JW, Barnes GM, Wieczorek WF, Tidwell M, Parker J. Gambling participation in the U.S.: Results from a national survey. *Journal of Gambling Studies* 2002; **18(4)**: 313-337. DOI link, PMID:12514913
- 48** Hing N, Gainsbury S, Blaszczynski A, Wood R, Lubman D, Russell A. *Interactive gambling*. Melbourne: Gambling Research Australia by the Office of Liquor, Gaming and Racing, Department of Justice, Victoria, 2014.
- 49** Kristiansen S, Lund RL. The geography of gambling: A socio-spatial analysis of gambling machine location and area-level socio-economic status. *Journal of Gambling Issues* 2022; 44-67. DOI link
- 50** Gannon E, Delfabbro P, Sutherland C. Gambling in rural and remote South Australia. *International Journal of Mental Health and Addiction* 2020; **19(4)**: 1243-1260. DOI link
- 51** Sterner GE, Russell GEH, Kaye MP, Ahlgren MB. *Pennsylvania online gambling report 2022*. 2022. Available: web link (Accessed 24 March 2023).
- 52** American Association for Public Opinion Research. *AAPOR Response Rate Calculator 4.1*. 2020. Available: web link (Accessed 1 August 2022).

- 53** Catt AD, Hroncich C. *Survey methodology and data sources*. 2020. Available: [web link](#) (Accessed 1 August 2022).
- 54** Collins SR, Gunja MZ, Aboulafia GN. *Commonwealth Fund/SSRS Election 2020 Battleground State Health Care Poll: Which health care issues matter most to U.S. voters?* 2020. Available: [web link](#) (Accessed 1 August 2022).
- 55** Ferguson M, Lando AM, Fanfan W, Verrill L. Transitioning the FDA Food Safety and Nutrition Survey from RDD to ABS. *Survey Practice* 2022; **15(1)**. DOI link
- 56** Center for Rural Pennsylvania. *Rural urban definitions*. Available: [web link](#) (Accessed 1 August 2022).
- 57** Volberg RA, Williams RJ. *Developing a brief problem gambling screen using clinically validated samples of at-risk, problem and pathological gamblers*. Report to the Alberta Gaming Research Institute. Gemini Research. 2011. Available: [web link](#) (Accessed 1 September 2020).
- 58** McCormack A, Shorter GW, Griffiths MD. An empirical study of gender differences in online gambling. *Journal of Gambling Studies* 2012; **30(1)**: 71-88. DOI link, PMID:23097131
- 59** McCormack A, Shorter GW, Griffiths MD. An examination of participation in online gambling activities and the relationship with problem gambling. *Journal of Behavioral Addictions* 2013; **2(1)**: 31-41. DOI link, PMID:26165769
- 60** United States Census Bureau. *QuickFacts: Pennsylvania*. 2021. Available: [web link](#) (Accessed 1 August 2022).
- 61** Krupa CG, Warner R. *The digital divide in rural Pennsylvania: An urgent call for connectivity*. 2023. Available: [web link](#) (Accessed 17 December 2023).
- 62** Binde P, Romild U, Volberg RA. Forms of gambling, gambling involvement and problem gambling: Evidence from a Swedish Population Survey. *International Gambling Studies* 2017; **17(3)**: 490-507. DOI link
- 63** LaPlante DA, Nelson SE, Gray HM. Breadth and depth involvement: Understanding internet gambling involvement and its relationship to gambling problems. *Psychology of Addictive Behaviors* 2014; **28(2)**: 396-403. DOI link, PMID:23915365
- 64** Wall H, Berman AH, Jayaram-Lindström N, Hellner C, Rosendahl I. Gambler clusters and problem gambling severity: A cluster analysis of Swedish gamblers accessing an online problem gambling screener. *Psychology of Addictive Behaviors* 2021; **35(1)**: 102-112. DOI link, PMID:32614206
- 65** Wood RT, Williams RJ. *Internet gambling: prevalence, patterns, problems, and policy options*. 2009. Available: [web link](#) (Accessed 2 May 2023).
- 66** MacLaren VV. Video lottery is the most harmful form of gambling in Canada. *Journal of Gambling Studies* 2015; **32(2)**: 459-485. DOI link, PMID:26233645
- 67** Williams RJ, Leonard CA, Belanger YD, Christensen DR, el-Guebaly N, Hodgins DC, et al. Predictors of gambling and problem gambling in Canada. *Canadian Journal of Public Health* 2021; **112(3)**: 521-529. DOI link, PMID:33439477
- 68** Dechant K, Ellery M. The effect of including a monetary motive item on the Gambling Motives Questionnaire in a sample of moderate gamblers. *Journal of Gambling Studies* 2010; **27(2)**: 331-344. DOI link, PMID:20496161
- 69** Francis KL, Dowling NA, Jackson AC, Christensen DR, Wardle H. Gambling motives: application of the Reasons for Gambling Questionnaire in an Australian population survey. *Journal of Gambling Studies* 2014; **31(3)**: 807-823. DOI link, PMID:24705633
- 70** Lee H-P, Chae PK, Lee H-S, Kim Y-K. The five-factor gambling motivation model. *Psychiatry Research* 2007; **150(1)**: 21-32. DOI link, PMID:17270278
- 71** Stewart SH, Zack M. Development and psychometric evaluation of a three-dimensional gambling motives questionnaire. *Addiction* 2008; **103(7)**: 1110-1117. DOI link, PMID:18554344
- 72** Willits FK, Luloff AE, Higdon FX. *2003 Attitudinal Survey of Pennsylvania Rural Residents*. Harrisburg, PA: The Center for Rural Pennsylvania.
- 73** Williams RJ, Volberg RA. *Best practices in the population assessment of problem gambling*. 2010. Available: [web link](#) (Accessed 2 May 2023).
- 74** Williams RJ, Volberg RA. The classification accuracy of four problem gambling assessment instruments in population research. *International Gambling Studies* 2013; **14(1)**: 15-28. DOI link
- 75** American Association for Public Opinion Research. *The future of U.S. general population telephone survey research*. 2017. Available: [web link](#) (Accessed 18 November 2024).
- 76** Chang L, Krosnick JA. National surveys via RDD telephone interviewing versus the internet. *Public Opinion Quarterly* 2009; **73(4)**: 641-678. DOI link
- 77** Secades-Villa R, Krotter A, Aonso-Diego G. Prevalence and correlates of gambling disorder in Spain: Findings from a national survey. *International Gambling Studies* 2003; 1-16. DOI link
- 78** Hing N, Russell AMT, Black A, Rockloff M, Browne M, Rawat V, et al. Gambling prevalence and gambling problems amongst land-based-only, online-only and mixed-mode gamblers in Australia: A national study. *Computers in Human Behavior* 2022; **132**: 107269. DOI link
- 79** Gamblers Anonymous. *U.S. meetings*. Available: [web link](#) (Accessed 2 May 2023).
- 80** Penfold KL, Ogden J. Exploring the experience of Gamblers Anonymous meetings during COVID-19: A qualitative study. *Current Psychology* 2021; **41(11)**: 8200-8213. DOI link, PMID:34421284
- 81** Friedline T, Narahariseti S, Weaver A. Digital redlining: Poor rural communities' access to fintech and implications for financial inclusion. *Journal of Poverty* 2020; **24(5-6)**: 517-541. DOI link
- 82** Abbott M, Stone CA, Billi R, Yeung K. Gambling and problem gambling in Victoria, Australia: Changes over 5 years. *Journal of Gambling Studies* 2015; **32(1)**: 47-78. DOI link, PMID:25895650