Addiction

ADDICTION HISTORY

doi:10.1111/j.1360-0443.2008.02466.x

Homicide in Chicago from 1890 to 1930: prohibition and its impact on alcohol- and non-alcohol-related homicides

Mark Asbridge & Swarna Weerasinghe

Department of Community Health and Epidemiology, Dalhousie University, Halifax, Nova Scotia, Canada

ABSTRACT

Aim The aim of the current paper is to examine the impact of the enactment of constitutional prohibition in the United States in 1920 on total homicides, alcohol-related homicides and non-alcohol-related homicides in Chicago. **Design** Data are drawn from the Chicago Historical Homicide Project, a data set chronicling 11 018 homicides in Chicago between 1870 and 1930. Interrupted time–series and autoregression integrated moving average (ARIMA) models are employed to examine the impact of prohibition on three separate population-adjusted homicide series. All models control for potential confounding from World War I demobilization and from trend data drawn from Wesley Skogan's Time–Series Data from Chicago. **Findings** Total and non-alcohol-related homicide rates increased during prohibition by 21% and 11%, respectively, while alcohol-related homicides remained unchanged. For other covariates, alcohol-related homicides were related negatively to the size of the Chicago police force and positively to police expenditures and to the proportion of the Chicago population aged 21 years and younger. Non-alcohol-related homicides were related positively to police expenditures and negatively to the size of the Chicago police force. **Conclusions** While total and non-alcohol-related homicides in the United States continued to rise during prohibition, a finding consistent with other studies, the rate of alcohol-related homicides remained unchanged. The divergent impact of prohibition on alcohol- and non-alcohol-related homicides is discussed in relation to previous studies of homicide in this era.

Keywords Alcohol, homicide, Chicago, differential enforcement, prohibition, time series.

Correspondence to: Mark Asbridge, Department of Community Health and Epidemiology, Dalhousie University, 5790 University Avenue, Halifax, Nova Scotia, Canada B3H 1V7. E-mail: mark.asbridge@dal.ca

Submitted 21 February 2008; initial review completed 27 May 2008; final version accepted 24 October 2008

INTRODUCTION

Paul Burstein suggests that researchers interested in public policy and legal reform 'tend to divide themselves into those who study the causes of legislative change and those who study the consequences' ([1], p. 193). The current paper addresses the later question, with a specific focus on the 'Noble Experiment'—constitutional alcohol prohibition in the United States between 1920 and 1933. While prohibition has received considerable academic attention, particularly its impact on per capita alcohol consumption, the aim of the current paper is to examine a key social problem of the prohibition era—homicide. More specifically, this paper asks the following question: employing homicide data from Chicago for the years 1890–1930, what impact did the enactment of prohibition have on the total homicide rate and, more specifically, on alcohol- and non-alcohol-related homicides?

Brief historical context

The Temperance movement in the United States was a century old before constitutional prohibition came into force [2,3]. A number of jurisdictions flirted with statewide bans on alcohol production and consumption as early as the mid-19th century, and many other 'dry' counties and districts were established in states that were largely 'wet' [4,5]. Concerted national policy efforts around prohibition in the United States began in 1913 (facilitated by the Webb–Kenyon Act) followed, a few years later, with the enactment of the War Prohibition Act in 1918, banning the manufacture and sale of all beverages with more than 2.75% alcohol. On 16 January

1919, temperance support reached a critical mass and the Eighteenth Amendment was ratified by the necessary majority of states, prohibiting the manufacture, sale, transportation and importation of alcoholic beverages in the United States. This was followed by the Volstead Act in October of 1919, which defined as 'intoxicating liquor' any beverage containing more 0.5% alcohol. In January 1920, the Eighteenth Amendment took effect.

In Illinois, the adoption of state restrictions on alcohol consumption and production was largely limited until the Eighteenth Amendment was ratified in 1919, although this did not stop a number of jurisdictions, particularly in rural Illinois and communities in and around Chicago, from introducing Local Option laws and becoming 'dry' counties. The government and the people of Illinois, however, were reluctant players in national prohibition and alcohol continued to be available and consumed widely [5,6]. This was due, in part, to loopholes in the Eighteenth Amendment and the Volstead Act allowing for the purchase and personal consumption of alcoholic beverages and for the domestic production of low-alcohol beverages [7]. For Chicago, alcohol's link to organized crime was particularly troubling [5,8–10]. Not until the election of Mayor William Dever in 1923, a man who believed firmly in the letter of the law and who enforced prohibition stalwartly, did a formal attack on bootlegging and organized crime emerge; however, this led to intense territorial wars between organized crime gangs, including the famous Chicago Beer Wars that resulted in dozens of homicides [5]. Despite Dever's efforts, the citizens of Chicago failed to support the Eighteenth Amendment and the Volstead Act and the purchase and consumption of alcoholic beverages continued until the repeal of prohibition [6,8].

Prohibition lasted until 1933, when it was repealed with the enactment of the Twenty-first Amendment. A great many forces were behind the repeal of prohibition which included, but were not limited to, the onset of the Great Depression, poor enforcement of alcohol regulations, increased domestic consumption, concern over increased crime, concern over alcohol's increasing role in lives of women, a lack of support for alcohol regulations from the upper class, decreased voting power of prohibitionists and recognition of continued losses in tax revenue from alcohol sales [2,3,7,11]. As noted by the Wickersham Commission on the repeal of prohibition, 'It is therefore a serious impairment of the legal order to have a national law upon the books theoretically governing the whole land . . . which public opinion in many important centers will not enforce' ([11], p. 49).

Measuring the impact of prohibition

Exploration of the social, legal and cultural impact of prohibition, both during its enactment and in the aftermath, has been a focal point of much research. A number of excellent works have covered the socio-historical significance of prohibition on American society, as well as reviews of modern temperance and alcohol regulation [4,5,7,11–16]. However, fewer studies have been able to articulate the impact of prohibition on the key object of the legislation—alcohol consumption. This, in part, can be explained by the lack of data on per capita alcohol consumption in the years 1920–33 (sales and taxation data were not collected), forcing researchers to rely on proxy measures of alcohol consumption, such as liver cirrhosis rates.

There has been considerable debate as to whether prohibition achieved its primary aim of reducing alcohol consumption. Two camps exist. The first argues that prohibition clearly failed in its attempt to reduce the sale of intoxicating liquors, and that alcohol consumption during prohibition continued as before [4,7,12,14,17–22]. These authors point to the flagrant and open violation of prohibition by many citizens, increasing rates of liver cirrhosis and, as the Wickersham Commission noted, observational data suggesting that alcohol consumption rates remained high. Conversely, other scholars contend that prohibition clearly reduced alcohol consumption and killed saloon culture, and that such reductions remained well after prohibition was repealed [2,3,23–26]. Not only did alcohol consumption decline but, in essence, 'Prohibition wiped out an industry. In 1916, there were 1300 breweries producing full-strength beer in the United States; 10 years later there were none' ([3], p. 236).

Other researchers have examined alcohol-related problems as a means of gauging the effectiveness of prohibition, with a particular interest in violence and homicide [27–33]. Historically, fluctuations in per capita alcohol consumption have mirrored per capita rates of violence and homicide [28,30,31,33–38], and homicide has been offered as a useful indicator of the effectiveness of alcohol policy. Research on suicide and homicide rates in the United States during prohibition provides some interesting insight into this issue [21,26,39,40]. Miron and colleagues found that per capita homicides in the United States increased during prohibition, despite unchanging rates in alcohol consumption [19,21,41]. Employing a slightly different data set and modeling approach, Jensen similarly noted a rise in the homicide rate during prohibition, while noting that rates of alcohol consumption had decreased [26].

The current study

An essential question is whether the enactment of prohibition was responsible for the observed rise in the homicide rate. The divergent findings from previous

studies—that homicide rates increased regardless of the change in alcohol consumption—make this question difficult to answer. One argument offered by Jensen [26] and Miron [21] downplays the direct role of alcohol consumption, and argues that the homicide rate increased during prohibition due to a rise in alternative forms of conflict resolution. As noted by Miron, during prohibition 'market participants are likely to substitute from lawyers to guns in the resolution of commercial disputes' ([21], p. 742). The producers and consumers of alcoholic beverages, who work in a black market environment during prohibition, must rely on alternative forms of conflict resolution as the more formal mechanisms offered through the justice system remain largely closed to them [21,41–43]. As Jensen notes, 'Prohibition not only generates competition for control of new markets but increases the odds that disputes over control will be settled by violent means' ([26], p. 20). The very nature of business in a time of prohibition, as captured by the activities of black markets, bootleggers and organized crime, leads to an increase in violent incidents, the creation of lawlessness and the enabling of a culture of violence. In this instance, homicide is not a direct product of alcohol consumption, but is a systemic feature of the regulatory framework imposed [44].

The goal of the current study is to explore, in greater depth, why the homicide rate continued to rise during prohibition, drawing on data from the Chicago Historical Homicide Project. The Chicago Historical Homicide data capture whether alcohol played a role in a homicide, allowing us to disaggregate homicides further into those involving alcohol and those that do not. For instance, alcohol-related homicides would include those homicides where the offender, victim or both had consumed alcohol prior to the homicide, as well as homicides that occurred in drinking establishments or where connected with the production, sale or distribution of alcoholic beverages. The unique contribution of the current study is that we can examine whether alcohol-related homicides, and thus continued alcohol consumption, was a driving force behind the observed rise in homicides during prohibition. While we still lack data on per capita consumption in Chicago, our measure of alcohol-related homicide and the recognized sensitivity between fluctuations in per capita consumption and rates of violence suggest that our data may provide new insight into the direct impact of alcohol consumption on homicide rates during prohibition.

METHODOLOGY

Data and measures

Homicide data were drawn from the Chicago Historical Homicide Project, a data set chronicling 11 018 homicides in Chicago between 1870 and 1930. Police reports from all homicides, along with some demographic and contextual information, have been compiled into this data set to provide a unique and detailed historical source of data on homicide [45]. Homicides in the data set include both intentional deaths, such as those resulting from stabbing and shooting, but also unintentional or accidental shootings, stabbings and vehicular homicides. Characteristics describing each homicide, derived from police reports, were also part of the data set, including the date, time and location of the homicide, characteristics of the offender(s) and victim(s), court proceedings and the circumstances surrounding the homicide. Circumstances consisted of the relationship between victim and offender, whether the homicide was an accident, whether an automobile was involved, if organized crime was suspected and whether alcohol was involved in the homicide.

The primary shortcoming of the Chicago Historical Homicide data set is that it does not capture all homicides that occurred in Chicago during this time. This is confirmed through a comparison to vital statistics data for Chicago from the period 1890–1918, as well as 1920 and 1930 (Chicago Department of Health, 1919, 1984) [46,47]. Comparison of the annual number of homicides in each data set indicates a mean discrepancy of about 15%; however, in some instances the Chicago Historical Homicide data report a greater number of homicides relative to vital statistics. Discrepancies across homicide data sets from a single jurisdiction are not uncommon [48,49], and may result in blurred definitions of what constitutes a homicide versus accidents and suicides, whether infanticide is captured in homicide data, as well who captures and records the homicide (coroner or police). One of the strengths of the Chicago Historical Homicide data is that it includes direct transcripts of each homicide, as captured by the police, and provides specific details of each case and the circumstances surrounding death. Police report (arrest) data have been shown to be more accurate in counting homicide relative to registry records. In comparison, registry records are often fraught with errors in recording and interpretation through death certificates, leading to a greater chance of homicide misclassification [48,49]. Thus, while discrepancies in the Chicago Historical Homicide data probably paint a conservative portrait of homicide in Chicago, these inaccuracies should not detract from the value of the data [50,51].

We took a number of additional steps to increase the validity of the data. First, the data were re-examined to look for inconsistencies between the derived variables and the police report with respect to the circumstances involved in homicide, paying particular attention to when alcohol was involved. Information on the date and location of the homicide had few or no missing data.

Unfortunately, some variables, particularly age, the names of those involved and court proceedings, had a high proportion of missing data. Secondly, due to data quality and availability of additional control series, only homicides between 1890 and 1930 were included in the analysis. Thirdly, all homicides involving motor vehicle collisions and accidents were removed to avoid biasing our measure of prohibition and its impact on homicide rates [48]. Prior to 1900 there were few to no homicides that involved a motor vehicle, while a substantial portion of all homicides after 1920 did. These adjustments reduced the number of homicides in the data set from 11 018 to 8160 homicides.

Next, we constructed homicide measures to capture the total number of homicides ($n = 8160$), alcohol-related homicides ($n = 932$) and non-alcohol-related homicides ($n = 7228$). Alcohol-related homicides included those homicides in which either the victim and/or offender had been drinking or were intoxicated, that occurred in bar room settings or involved systemic events associated with the illegal alcohol trade. This information was drawn from either the data set or the narratives in the police report. The role of alcohol is likely to be under-reported in the data, and thus our analyses represent a conservative estimate of alcohol-related homicides. It should also be noted, however, that the presence of alcohol at the scene of the homicide does not infer alcohol as the causal, or even contributing, factor in the homicide. Thus, our intention is to measure homicides in which alcohol was and was not present during the event. All homicide series were captured on a monthly basis and were standardized to the annual population of Chicago for the years 1890–1930.

Below is an example of a narrative from the police report for a homicide involving alcohol:

> March 6, 1927
> Cunningham, John—Age 25—Fatally cut in the throat at 3:23 AM, 3/6/27, in a 'moonshine flat' at 209 E. 59th St., during a drunken fight when several men jumped him. Coroner unable to determine who cut him. 3/10/27 Chas Cousidine, owner, booked as accessory before and after the fact. On 3/24/27 he was exonerated and same day discharged by Judge Borelli. 3/28/27 bulletin Elmer Skoglund wanted. 3 Dist.
> Case number: 7827

Similarly, a number of homicides were imbedded in the illicit alcohol market, particularly through sales in saloons and bootlegging, in the purchase of moonshine, and through organized crime. For example:

> October 27, 1923
> Harnett, Lawrence C.—Patrolman—Age 28—Shot to death in passageway of 914 W. Polk St. by Joseph Montana Jr., when he, accompanied by Sergt. Stephen Barry and Patrolman F. Fuerst went to investigate a moonshine plant. Barry was wounded. On 12/14/23 the Coroner held Joseph Montana Jr. to the Grand Jury. The November G.J. indicted the whole Montana family as follows: Joseph Jr.—4/24/24—Acquitted—Lindsay Joseph Sr.—4/24/24—Acquitted—Lindsay John 4/24/24—Acquitted- Lindsay. Madelina 4/24/24—Acquitted—Lindsay Rosena—4/24/24—Acquitted—Lindsay.
> Case number: 7466

The key independent variable was Prohibition in the United States, captured as a stepwise intervention. Prohibition was coded 1 for the years 1920–30 when prohibition was in force, and 0 for all other years (1890–1919). While the Temperance movement lasted for a number of years in the United States and a number of States had passed state-wide prohibition, Illinois did not. It was not until constitutional prohibition came into force in January 1920, along with the Volstead Act (in October, 1919), that alcohol consumption was prohibited fully in Chicago.

Four additional control measures, used previously in the homicide literature, were taken from Wesley Skogan's 'Time Series Data for Chicago 1840–1973' to account for potential confounding [52]. First, as other scholars have noted, it is not enough to account merely for the existence of prohibition, but degree of enforcement is also likely to have a substantial impact on consumption and alcohol-related problems [21,40,41]. Two measures of enforcement were the annual expenditures by the Chicago Police between 1890 and 1930 and the number of police officers on the Chicago Police force between 1890 and 1930. Expenditures were expressed as expenditures on enforcement in 2000 US dollars [mean = $7.3 million, standard deviation (SD) = $4.5 million], while the number of officers was adjusted for the Chicago Population and expressed as a rate per 1000 citizens (mean = 2.05, SD = 1.72). It should be noted that the source of funding for the Chicago Police force during prohibition was undetermined, and thus we are unable to differentiate between local city or municipal expenditures and those funds provided directly by the federal government for prohibition enforcement.

The third control variable is the portion of the Chicago population under the age of 21 from 1890 to 1930 (mean = 38.3%, SD = 3.1%). Studies of homicide in the United States have generally found a strong relationship between the proportion of young, single males in the population and the homicide rate [53,54]. Our data include both young males and females, as data on males only was unavailable. We include a measure of the

United States unemployment rate from 1890 to 1930 (mean = 5.7%, SD = 3.9%). Previous research has found that rates of unemployed are related to homicide rates within a given jurisdiction, although the direction of this relationship has not been reported consistently [55–57]. Our final control variable is demobilization following World War I (WWI), which was treated as a step function coded 0 from the beginning of the series until the end of WWI (January 1890–November 1918), coded 1 from December 1918 until January December 1922 to mark the main period of military demobilization, and then coded 0 from January 1923 until the end of the series (December, 1930). There is a great deal of research on war demobilization and the social and economic impacts of soldiers returning home from the war [58]. WWI demobilization was problematic due to poor planning and operationalization that brought home too many young men too quickly, often to crowed cities, leading to an unemployment crisis and creating stress on local economies and on social order [59,60].

ANALYTICAL APPROACH

Univariate and multivariable time–series and linear models were fitted to the data depending on the autocorrelation structure. The Durbin Watson test was used to examine for serial dependence. For series of data exhibiting serial dependence, the association with prohibition was tested using interrupted time–series with autoregressive integrated moving average (ARIMA) modelling [61,62]. For data with no serial dependence a generalized linear model was fitted. Time–series analysis offers a statistical procedure with high levels of internal validity approaching that of randomized trials [63] for isolating the critical effects of an intervention and for ruling out a number of rival hypotheses, such as changes due to instability of data, seasonal variation or to long-range trends already occurring prior to the intervention [64]. A non-stationary series involves trends that may be unrelated to the effect of interest and which, if not taken into account, can cause a spurious estimation of the effect of an intervention-like prohibition. Time trend was removed from the data by fitting a linear regression model over time to the series exhibiting non-stationarity in the mean. ARIMA modelling involves an iterative process to achieve a white noise series, by taking into account noise parameters such as autoregressive and moving average terms in the data [65]. All homicide data were standardized prior to fitting models.

The total monthly homicide rate (mean = 0.69, SD = 0.29, range 0–2) before and after prohibition showed a steadily increasing trend; however, when parcelled separately into alcohol-related (mean = 0.08, SD = 0.07, range 0–0.40) and non-alcohol-related (mean = 0.60, SD = 0.28, range 0–1.88) homicides, the trend was driven mainly by the non-alcohol-related homicides (of 0.0014 homicides per month per 100 000 population). This trend was removed prior to fitting the ARIMA model. The total and non-alcohol related series exhibited statistically significant serial correlation, therefore ARIMA were fitted to identify the model [ARIMA (1, 1, 0), ARIMA (2, 1, 0), respectively], and both series were differenced to remove non-stationarity. Application of the Durbin–Watson test for autocorrelation of the residuals resulted in non-significant values for total (1.40) and non-alcohol (1.45) homicides and the Box–Ljung *Q*-statistic indicated that the residuals follow a white noise series. Additionally, 1 month (July 1919) exhibited an extremely high number of homicides ($n = 59$), which was treated as an outlier, and that data point was interpolated with a cubic spline function. After identifying the correct ARIMA model, an auto-regression model was fitted to the data to test the association between predictors and homicide rates. Meanwhile, the alcohol-related monthly series demonstrated no significant serial correlation, so a generalized linear model was fitted.

RESULTS

For visual clarity, Fig. 1 displays the US national homicide rate, as well as the rates for total, non-alcohol-related and alcohol-related homicides in Chicago. The total homicide rate in Chicago peaked at 13.5 per 100 000 population in 1925, 1928 and 1930, roughly three homicides per year higher than the US national average during this time. Beginning in 1919, the Chicago homicide rate was consistently higher than the nation homicide rate. This is not surprising, as the bulk of US homicides occurred in major urban centers [66]. The non-alcohol-related annual homicide rate generally mirrored the total rate, peaking at 12.5 in 1935, while the alcohol-related rate peaked at 2.2 in 1903 and generally displayed no consistent trend pre- or post-prohibition.

Model results are summarized in Table 1. The models for total homicides and non-alcohol-related homicides were similar and worth discussing in unison. Prohibition had a significant positive effect on both, which confirms existing research showing an increase in the national homicide rate during prohibition. Enforcement personnel, conversely, had a significant negative relationship on total and non-alcohol-related homicides, indicating that the presence of more police officers decreased the total number of homicides, regardless of prohibition. The proportion of the Chicago population aged under 21 had a positive effect on total and non-alcohol-related homicides, while the unemployment rate had a negative effect on total homicides. WWI demobilization had no effect on

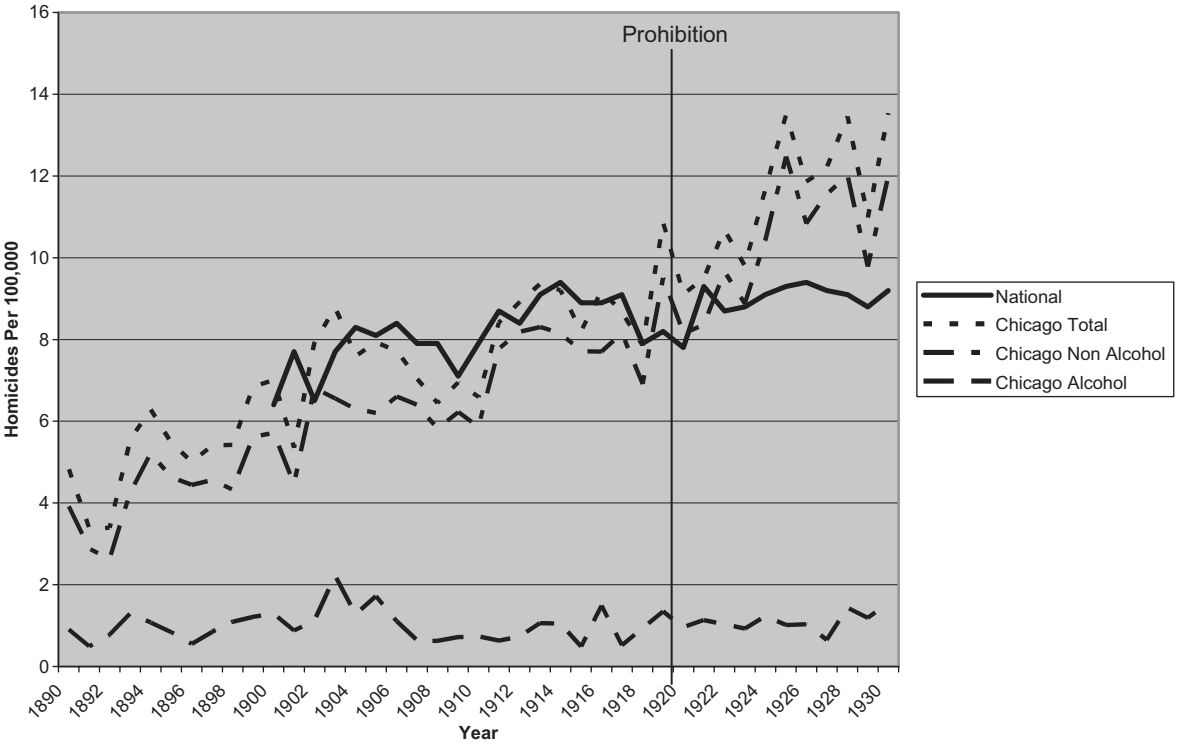

Figure 1 National and Chicago homicide rates, 1890–1930

Table 1 Estimated effects of prohibition, enforcement (police expenditures and police personnel), unemployment, the portion of the population under 21 years of age and World War I (WWI) demobilization, on total, non-alcohol-related and alcohol-related homicides in Chicago, 1890–1930.

	Total		*Alcohol-related*		*Non-alcohol-related*	
Measures	*Effect*	*t-Value*	*Effect*	*t-Value*	*Effect*	*t-Value*
Prohibition measures						
Prohibition	0.21**	3.85	0.01	0.86	0.11*	2.53
Trend measures						
Enforcement expenditure	9.5E-9**	12.38	0.00001*	2.10	4.9E-9**	8.63
Enforcement personnel	−0.32**	−3.79	−0.07**	−3.74	−0.18**	−2.81
Unemployment rate	−0.02**	−2.80	0.001	0.99	−0.01	−1.76
Population under 21	0.01*	2.21	0.006**	3.54	0.01	1.40
WWI demobilization	0.05	0.78	−0.02	−0.35	0.06	1.05
Noise parameters						
AR (1)	−0.27**	−6.27			−0.21**	−5.57
AR (2)					−0.16**	−3.51
Adjusted *R*-squared	0.77		0.08		0.76	

*$P < 0.05$; **$P < 0.01$. AR: alcohol-related.

the homicide rate. The adjusted *R*-squares for total and non-alcohol-related homicides were strong ($R^2 = 0.77$, 0.76).

The only significant correlates of alcohol-related homicides were enforcement expenditures and personnel (negative) and the proportion of the Chicago population aged under 21 (positive). Prohibition had no significant influence on alcohol-related homicides. In disaggregating non-alcohol-related homicides from alcohol-related homicides, we see that the positive effect of prohibition on the homicide rate was limited to non-alcohol-related homicides. However, the positive effect of enforcement expenditures and personnel demonstrates that increased monies and resources devoted to enforcement, whether

before or during prohibition, resulted in reductions in alcohol-related homicides. The *R*-square for alcohol-related homicides was poor ($R^2 = 0.08$).

DISCUSSION

Overall, the positive association between prohibition and the per capita homicide rate in Chicago between 1890 and 1930 was consistent with the findings from previous studies of US national homicide rates [21,40,41]. The homicide rate in Chicago rose significantly after prohibition came into force, and this effect was consistent after adjusting for enforcement, the age structure of the population, unemployment and demobilization. The total homicide rate in Chicago rose during prohibition by 21%. This rise, however, was not consistent when the role of alcohol was considered. When divided into alcohol- and non-alcohol-related homicides, the effect of prohibition was restricted to those homicides where alcohol was not involved. The rate of alcohol-related homicides did not change after prohibition was enacted, and thus the rise in the overall homicide rate was produced by an increase in non-alcohol-related homicides. What are we to make of the divergent trend in alcohol- and non-alcohol-related homicides? Do these findings offer a counterpoint to the claim that the enactment of prohibition was responsible for the rise in the US homicide rate? What do they suggest about the effectiveness of prohibition?

In probing these questions further we can speak to the explanation offered previously—that the homicide rate rose during prohibition due to an increase in non-legal forms of conflict resolution resulting from the emergence of black markets and organized crime tied to alcohol. Our finding that total and non-alcohol-related homicides rose during prohibition, coupled with no change in alcohol-related homicides, does not support this argument fully. If the rise in total homicides is due to an increase in violent forms of conflict resolution, the flat trend in alcohol-related homicides suggests that this increase is not a direct product of the illicit production and sale of alcohol. Some authors have noted that the systemic violence connected to alcohol production was already elevated prior to prohibition, and therefore the imposition of alcohol regulation did little to alter the alcohol black market, organized crime and its impact on violence. As Tyrell notes:

> Even the crime associated with illegal sale can be exaggerated. Crime became an influential part of the case against prohibition, but social historians have shown widespread political corruption, gang warfare and the existence of crime syndicates in the cities of America's north prior to 1910. The activity of the 1920s represented not something new but continuity in the consolidation of these forces, albeit augmented by the possibility of illicit games in alcohol. It would be naïve to think that crime in the 1920s grew only because of the opportunities that prohibition presented ([2], p. 1406).

The rise in non alcohol-related homicide during prohibition may be suggestive, instead, of a general shift in the tolerance and opportunities for violence, perhaps even the emergence of a subculture of violence [67]. The lawlessness experienced in some communities during the prohibition era has been well documented. Alcohol regulations during prohibition were difficult to enforce [11], police corruption was widespread and governmental bureaucracy was unable to respond adequately [9]. Cobbled together, these forces point to the increased lawlessness of the prohibition era; the observed increase in homicides should not seem unreasonable.

An alternative argument is that the divergent trends in the homicide rate during prohibition may be due to the differential enforcement of criminal law. In this instance, the emergence of prohibition led to a redirection of existing local police resources and efforts—buoyed by additional federal funds and resources—towards the enforcement of regulations on alcohol consumption, production, distribution and associated vice and, simultaneously, away from the regulation of other criminal acts. A policy of concurrent enforcement of prohibition was in place between local/state police forces and federal officials with respect to the costs and responsibilities for enforcing prohibition, although poor coordination often left local police confused about their enforcement priorities [3,21,68,69]. Disparities and shifts in enforcement practices are not uncommon, and often emerge due to changes in governmental and criminal justice priorities and adjustments to resource allocation practices. Examples of the selective enforcement of specific pieces of legislation include drug legislation, traffic safety legislation, prostitution and inequities in the application of law to marginalized populations [70–75]. The observed divergent trends in alcohol- and non-alcohol-related homicides and the direction of those trends offers some support for this argument.

Given the overwhelming evidence that links patterns of alcohol consumption with homicide [33,37], can the flat trend in alcohol-related homicides say anything about prohibitions' influence on per capita alcohol consumption? On one hand, the lack of change in the rate of alcohol-related homicides during prohibition might suggest that per capita alcohol consumption in Chicago also did not change dramatically [21]. This argument assumes that our measure of alcohol-related homicides captured the full spectrum of alcohol's involvement in violent crime, specifically, and in society in general. It is

highly likely, however, that the role of alcohol has been underestimated in our measures, and that many of the non-alcohol-related homicides probably involved alcohol in some capacity.

Conversely, in light of the overall rise in the homicide rate, the flat trend in alcohol-related homicides, in essence, indicates that prohibition was somewhat effective in curtailing alcohol-related violence and in reducing the drinking episodes (i.e. drunken altercations in public spaces, barrooms, etc.) that facilitate it. That non-alcohol-related homicides rose while alcohol-related homicides did not suggests that prohibition may have played a key role. Irrespective of a decline in consumption *per se*, prohibition changed American drinking patterns. There is considerable evidence that prohibition saw a shift in consumption away from beer, consumed in the saloon and other public places, to wine and distilled spirits that could be produced and consumed in the home or sold by bootleggers at a higher cost [2,20,21,23].

With respect to other measures, police enforcement, the population age structure of Chicago, the US unemployment rate and WWI demobilization were also considered as correlates of homicide. The effect of the age structure of the population behaved as expected—the greater the proportion of the population under the age of 21, the greater the homicide rate. Looking at the effects of police enforcement, the number of police per capita was related negatively to the homicide rate: an intuitive finding based on the principle of deterrence. The effect of unemployment was more challenging to decipher. The common assumption from theories of inequality, social deprivation and strain would suggest that higher unemployment leads to greater amounts of crime and violence—the argument that 'desperate times call for desperate measures'. Yet here, as demonstrated elsewhere [41], unemployment had a negative effect or no effect on homicide. One possibility is that our measure of unemployment was biased, as it reflected the national unemployment rate rather than the Chicago rate. A second argument, drawn from Parker, is that the unemployment rate interacts with alcohol consumption to produce homicide [36]. Parker argued that the homicide rate would be higher when poverty and alcohol consumption were both high, and the homicide rate would be lower when poverty was high but alcohol consumption was low [36]. The mechanism here is that if unemployment does not manifest itself in greater consumption violence will, in turn, remain low. If prohibition did lower alcohol consumption, or remained the same, then the unemployment rate would produce little or even a negative effect on the homicide rate.

In conclusion, our finding that the homicide rate in Chicago continued to rise during prohibition reinforces the conclusions drawn from other research employing data on national homicide rates in the United States [21,40,41]. That alcohol-related homicides remained unchanged represent an original contribution of this study, and muddies further our understanding of the role that the enactment of prohibition had in fostering violence and homicide and the role of alcohol. Non-alcohol-related homicides rose, suggesting that the mechanism by which prohibition affected rates of violence may have been indirect. The notion of selective enforcement, offered above, is just one potential interpretation. These findings open up further areas of inquiry for those interested in understanding the structural or political mechanisms that may have facilitated the divergent trends in alcohol- and non-alcohol-related homicides. To what extent did the emphasis on national enforcement of alcohol prohibition compete with local pressures and policing concerns? Do these divergent trends extend to the repeal of prohibition and in the years that followed? Particularly beneficial would be an analysis of these divergent trends in homicide with data that extends beyond the end of prohibition, a key limitation both of the data and of this study. Without the benefit of alcohol consumption data during the prohibition era, the conventional wisdom has been to blame prohibition policy for the rise in homicides. While the current findings do not acquit alcohol regulation of having a role in rising homicide rates during this era they suggest that, at the very least, a far more complex process was at work.

Declarations of interest

None.

Acknowledgements

This research was supported by a grant from AUTO21, a member of the Networks of Centres of Excellence (NCE) programme which is administered and funded by the Natural Sciences and Engineering Research Council (NSERC), the Canadian Institutes of Health Research (CIHR) and the Social Sciences and Humanities Research Council (SSHRC), in partnership with Industry Canada. The data (and tabulations) utilized in this (publication) were made available (in part) by the Inter-university Consortium for Political and Social Research. The Time Series Data for Chicago, 1840–1973, were collected originally by Wesley G. Skogan with the assistance of visiting fellowship grant from the National Institute of Law Enforcement and Criminal Justice, Law Enforcement Assistance Administration. Neither the original collector of the data nor the Consortium bears any responsibility for the analyses or interpretations presented here. The authors would like to thank Robert Nash Parker and Patricia Erickson for helpful comments on an earlier draft of this manuscript.

References

1. Burstein P. *Discrimination, Jobs, and Politics: The Struggle for Equal Employment Opportunity in the United States since the New Deal*. Chicago, IL: University of Chicago Press; 1985.
2. Tyrrell I. The US prohibition experiment: myths, history and implications. *Addiction* 1997; **92**: 1405–9.
3. Blocker J. S. Jr. Did prohibition really work? Alcohol prohibition as a public health innovation. *Am J Public Health* 2006; **96**: 233–43.
4. Kobler J., editor. *Ardent Spirits: The Rise and Fall of Prohibition*. New York: G. P. Putnam's Sons; 1973.
5. Duis P. *The Saloon: Public Drinking in Chicago and Boston 1880–1920*. Chicago, IL: University of Illinois Press; 1983.
6. Wigmore J. H. *The Illinois Crime Survey*. Chicago, IL: The Illinois Association for Criminal Justice; 1929.
7. Murdock C. G. *Domesticating Drink: Women, Mean, and Alcohol in America, 1870–1940*. Baltimore, MD: The Johns Hopkins University Press; 1998.
8. Landesco J. *Organized Crime in Chicago: Part II of The Illinois Crime Survey*. Chicago, IL: University of Chicago Press; 1968.
9. Skogan W. G., Hartnett S. M. *Community Policing, Chicago Style*. New York: Oxford University Press; 1997.
10. Leinwand G. *Mackerels in the Moonlight: Four Corrupt American Mayors*. Jefferson, NC: McFarland; 2004.
11. Levine H. G. The birth of American alcohol control: prohibition, the power elite, and the problem of lawlessness. *Contem Drug Probl* 1985; **12**: 63–115.
12. Sinclair A. *Prohibition: The Era of Excess*. London: Faber and Faber; 1962.
13. Clark N. *Deliver Us From Evil: An Interpretation of American Prohibition*. New York: W.W. Norton & Company; 1976.
14. Engelmann L. *Intemperance: The Lost War Against Liquor*. New York: Free Press; 1979.
15. Levine H. G. The alcohol problem in America: from temperance to prohibition. *Br J Addict* 1984; **79**: 109–19.
16. Levine H. G., Reinarman C. From prohibition to regulation: lessons from alcohol policy for drug policy. *Milbank Q* 1991; **69**: 1–43.
17. Fisher I. *The Noble Experiment*. New York: Alcohol Information Committee; 1930.
18. Nadelmann E. Drug prohibition in the U.S.: costs, consequences, and alternatives. *Science* 1989; **245**: 939–47.
19. Miron J.A., Zwiebel J. Alcohol consumption during prohibition. *Am Econ Rev* 1991; **81**: 242–7.
20. Morgan J. P. Prohibition is perverse policy: what was true in 1933 is true now. In: Krauss M. B., Lazear E. P., editors. *Searching for Alternatives: Drug-Control Policy in the United States*. Stanford, CA: Hoover Institution Press; 1991, p. 405–23.
21. Miron J. An economic analysis of alcohol prohibition. *J Drug Issues* 1998; **28**: 741–62.
22. Levine H. G., Reinarman C., editors. *Alcohol Prohibition and drug Prohibition. Lessons from Alcohol Policy for Drug Policy*. Amsterdam: CEDRO; 2004.
23. Warburton C. *The Economic Results of Prohibition*. New York: Columbia University Press; 1932.
24. Burnham J. C. New perspectives on the prohibition 'experiment' of the 1920s. *J Soc Hist* 1968; **2**: 51–68.
25. Kerr K. A. *Organized for Prohibition: A New History of the Anti-Saloon League*. New Haven, CT: Yale University Press; 1985.
26. Jensen G. Prohibition, alcohol, and murder: untangling countervailing mechanisms. *Homicide Stud* 2000; **4**: 18–36.
27. Room R. Alcohol control and public health. *Annu Rev Public Health* 1984; **5**: 297–317.
28. Pernanen K. *Alcohol in Human Violence*. New York: Guilford Press; 1991.
29. Graham K., Leonard K. E., Room R., Wild C., Pihl R. O., Bois C. *et al.* Current directions in research on understanding and preventing intoxicated aggression. *Addiction* 1998; **93**: 659–76.
30. Parker R. N., Auerhahn K. Alcohol, drugs and violence. *Annu Rev Sociol* 1998; **24**: 291–311.
31. Parker R. N., Cartmill R. S. Alcohol and homicide in the United States 1934–1995—or one reason why U.S. rates of violence may be going down. *J Crim Law Criminol* 1998; **88**: 1369–98.
32. Wells S., Graham K., West P. Alcohol-related aggression in the general population. *J Stud Alcohol* 2000; **61**: 626–32.
33. Bye E. K. Alcohol and violence: use of possible confounders in a time–series analysis. *Addiction* 2007; **102**: 369–76.
34. Collins J. J. Alcohol and interpersonal violence: less than meets the eye. In: Wolfgang M. E., editor. *Pathways to Criminal Violence*. Newbury Park, CA: Sage Publications; 1989, p. 59–67.
35. Parker R. N. *Alcohol and Homicide: A Deadly Combination of Two American Traditions*. Albany, NY: State University of New York Press; 1995.
36. Parker R. N. Bringing 'booze' back in: the relationship between alcohol and homicide. *J Res Crime Delinq* 1995; **32**: 3–38.
37. Rossow I. Alcohol consumption and homicide: a cross-cultural comparison of the relationship in 14 European countries. *Addiction* 2000; **96**: S77–92.
38. Pridemore W. A. Vodka and violence: alcohol consumption and homicide rates in Russia. *Am J Public Health* 2002; **92**: 1921–30.
39. Wasserman I. M. The effects of war and alcohol consumption patterns on suicide: United States, 1910–1933. *Soc Forces* 1989; **68**: 513–30.
40. Wasserman I. M. The impact of epidemic, war, prohibition and media on suicide—United States, 1910–1920. *Suicide Life Threat* 1992; **22**: 240–54.
41. Miron J. Violence and the U.S. prohibitions of drugs and alcohol. *Am Law Econ Rev* 1999; **1**: 78–114.
42. Black D. *Sociological Justice*. New York: Oxford University Press; 1989.
43. Gibbs J. P. *A Theory About Control*. Boulder, CO: Westview; 1994.
44. MacCoun R., Reuter P. *Drug War Heresies: Learning from Other Vices, Times and Places*. Cambridge: Cambridge University Press; 2001.
45. Bienen L. B., Rottinghaus B. Learning from the past, living in the present: understanding homicide in Chicago, 1870–1930. *J Crim Law Criminol* 2002; **92**: 437–554.
46. Chicago Department of Health. *General and Chronological Summary of Vital Statistics (Annual Report 1911–1918)*. Chicago, IL: Department of Health; 1919.
47. Chicago Department of Health. *The Epidemiology of Homicide in Chicago*. Chicago, IL: Department of Health; 1984.
48. Eckberg D. L. Estimates of early twentieth-century U.S. homicide rates: an econometric forecasting approach. *Demography* 1996; **32**: 1–16.
49. Monkkonen E. New standards for historical violence research. *Crime Hist Soc* 2001; **5**: 5–26.

50. *J Crim Law Criminol* 2002; **92**: 437–916.
51. Adler J. S. *First in Violence, Deepest in Dirt: Homicide in Chicago, 1875–1920*. Cambridge, MA: Harvard University Press; 2006.
52. Skogan W. G. *Chicago Since 1840: A Time-Series Data Handbook*. Urbana, IL: Institute of Government and Public Affairs, University of Illinois; 1976.
53. Cohen L. E., Land K. C. Age structure and crime: symmetry versus assymmetry and the projection of crime rates through the 1990s. *Am Sociol Rev* 1987; **52**: 170–83.
54. O'Brien R. M. Relative cohort size and age-specific crime rates: an age-period-relative cohort-size model. *Criminology* 1989; **27**: 57–78.
55. South S. J., Cohen L. E. Unemployment and the homicide rate: a paradox resolved? *Soc Indic Res* 1985; **17**: 325–43.
56. Almgren G., Guest A., Immerwahr G., Spittel M. Joblessness, family disruption, and violent death in Chicago, 1970–90. *Soc Forces* 1998; **76**: 1465–93.
57. Lester D. Regional studies of homicide: a meta-analysis. *Death Stud* 2001; **25**: 705–8.
58. Rasler K. War accommodation and violence in the United States: 1890 to 1970. *Am Polit Sci Rev* 1986; **80**: 921–44.
59. March P. C. *The Nation at War*. Garden City, NY: Doubleday and Company; 1932.
60. Demobilization after the First World War [commentary]. *Soc Ser Rev* 1944; **18**: 248–50.
61. Box G. E. P., Jenkins G. M. *Time Series Analysis: Forecasting and Control*. San Francisco, CA: Holden-Day; 1976.
62. Box G. E. P., Tiao G. C. Intervention analysis with applications to economic and environmental problems. *J Am Stat Assoc* 1975; **70**: 70–9.
63. Campbell D. T., Stanley J. C. *Experimental and Quasi-Experimental Designs for Research*. Chicago, IL: Rand McNally; 1967.
64. Cook T. D., Campbell D. T. *Quasi-Experimentation: Design and Analysis Issues for Field Settings*. Boston, MA: Houghton Mifflin; 1979.
65. Norström T. Deriving relative risks from aggregate data. *J Epidemiol Commun Health* 1988; **42**: 333–3.
66. Sherman L., Gatin P., Buerger M. Hot spots of predatory crime: routine activities and the criminology of place. *Criminology* 1989; **27**: 27–56.
67. Wolfgang M. E., Ferracuti F. *The Subculture of Violence: Towards an Integrated Theory in Criminology*. London: Tavistock Publications; 1967.
68. Merz C. *The Dry Decade*, 3rd edn. Seattle, WA: University of Washington Press; 1970.
69. Lindberg R. C. *To Serve and Collect: Chicago Politics and Police Corruption From the Lager Beer Riots to the Summerdale Scandal*. Westport, CT: Praeger; 1991.
70. Black D. *The Behavior of Law*. New York: Academic Press; 1976.
71. Johnson W. T., Petersen R. E., Wells L. E. Arrest probabilities for marijuana users as indicators of selective law enforcement. *Am J Sociol* 1979; **83**: 681–99.
72. Clay T. R., Swenson P. R. Selective enforcement of drunken driving in Phoenix, Arizona. *J Safety Res* 1978; **10**: 130–8.
73. Galliher J. F., Basilick L. Utah's liberal drug laws: structural foundations and triggering events. *Soc Probl* 1979; **26**: 284–97.
74. Larsen E. N. The effect of different police enforcement policies on the control of prostitution. *Can Public Policy* 1996; **22**: 40–55.
75. Beckett K., Nyrop K., Pfingst L. Race, drugs, and policing: understanding disparities in drug delivery arrests. *Criminology* 2006; **44**: 105–37.

