

Table 1. Evidence of the effects of limits of alcohol hours of sale on excessive alcohol consumption and related harm

Study/design/ execution	Population/study time period	Intervention/comparison	Analysis/outcome	Reported findings	Review/effect size
Policies allowing a change of ≥ 2 hours—Increasing hours					
El-Maaytah (2008) ²⁹ Design suitability: Least Pre/post, no control Quality of execution: Fair (4 limitations)	Location: University College Hospital, London, England, and Wales Dates: Intervention: November 24, 2005 Pre-intervention: November 24, 2004–April 30, 2005 Post-intervention: November 24, 2005–April 30, 2006	Intervention: Flexible opening hours: Potentially 24-hour opening, 7 days a week, dependent on special license Note: Granting of licenses subject to consideration of impact on local residents, businesses, and expert opinion Control: None	Analysis: Chi-square Outcome: ARMT (6 months before compared to 6 months after)	ARMT Pre: 1102 Post: 730	Relative % change (95% CI): –33.8% (–39.7, –27.3)
Newton (2007) ²⁷ Design suitability: Least Pre/post, no comparison Quality of execution: Fair (3 limitations)	Location: London Dates: Intervention: November 2005 Pre-intervention: March 2005 (9:00PM–9:00AM) Post-intervention: March 2006 (9:00PM–9:00AM)	Intervention: Experimental unrestricted hours Control: None	Analysis: Mann–Whitney <i>U</i> test for differences in proportions Outcomes: Numbers and percentages of “alcohol-related” ER admissions, injuries, and hospital referrals	Significant increases in number of alcohol-related admissions, alcohol-related assault, alcohol-related injury, and alcohol-related hospital admissions	Relative % change (95% CI): Alcohol-related assault: 129.6 (46.1, 260.8) Alcohol-related injury: 193.2 (108.2, 312.8)
Babb (2007) ²⁸ Design suitability: Least Pre/post, no comparison Quality of execution: Fair (3 limitations)	Location: London Dates: Intervention: November 2005 Pre-intervention: December 2004–November 2005 (9:00PM–9:00AM) Post-intervention: December 2005– November 2006 (9:00PM–9:00AM)	Intervention: Experimental unrestricted hours, along with fines/ penalties for service to drunk clients and children Control: None	Analysis: 30 of 43 home office police forces provide data on arrests for serious and less-serious violent crimes. Offenses not specified as alcohol- related	Moving averages calculated for nighttime arrests, 6:00PM to 5:59AM	Relative % change: Serious offenses (including homicide and manslaughter): –9.5% Less-serious offenses (with wounding): –5.4% Less-serious offenses (with wounding) in city centers and near licensed premises: –4.3% Assault without injury: –2.7% Assault without injury in city centers and near licensed premises: 3.1%
Ragnarsdottir (2002) ²⁶ Design suitability: Least Pre/post, no comparison Quality of execution: Fair (3 limitations)	Location: “relatively small” city center, Reykjavik Dates: Intervention: July 1999–July 2000 Pre-intervention: March 1999–April 1999 (8 weekend nights) Post-intervention: March 2000–April 2000 (8 weekend nights)	Intervention: Experimental unrestricted hours Control: Unchanged hours	Analysis: Percentages; no tests of significance Outcomes: ● Emergency ward admissions (not specific to city center) ● Suspected drunk driving cases	For all outcomes, location not specified as city center (the location of intervention) or outside city center. Emergency ward admissions: Weekend nights: 31% increase All-day: 3% increase Weekends (all day):	Relative % change: Weekend emergency ward admissions: 20%* Accidents and other mishaps: 23%* Fighting: 34%* Suspected drunk driving: 79.3% (13.8, 182.4)

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Table 1. (continued)

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	*Weekend nights defined as Saturday or Sunday from 12:00 MN to 7:00AM			20% increase Weekdays: 2% decrease Reasons for admission include incidents often related to drinking: Accidents and other mishaps: 23% increase Fighting: 34% increase Non-alcohol-related admission types: No change Suspected drunk driving: 1999: 29 2000: 52	
Smith (1988) ²⁵ Design suitability: Least Pre/post, no comparison group Quality of execution: Fair (3 limitations)	Location: Tasmania, Australia Dates: Intervention: August 10, 1977 Pre-intervention: July 1, 1971–June 30, 1977 Follow-up: October 1, 1977–September 30, 1978	Intervention: Unrestricted hours allowed throughout week. Smith reports numbers of actual hours did not change, but hours shifted to later times. Exceptions (mandatory closing): Sundays 5:00 AM–12:00NOON Sundays 8:00PM–12:00MN Good Friday Prior hotel opening hours: Monday–Saturday: 10:00 AM–10:00PM Sunday: 12:00NOON–8:00PM Control: Number of injury crash from 6:00 PM to 10:00PM	Analysis: Chi-square Outcome: Crash injury between 10:00PM and 6:00AM	Traffic injury crash: Increased between 10:00PM and 6:00AM. Although the number occurring directly after the former closing time decreased, both the proportion and the absolute number of traffic injury crash from 12:00MN to 6:00AM increased, for a total overall increase.	Relative % change (95% CI): Traffic injury crash: 10.8% (–1.5, 21.2)
Raymond (1969) ²² Design suitability: Greatest Pre/post, no comparison. Quality of execution: Fair (3 limitations)	Location: Melbourne, Victoria (Australia) Dates: Intervention: February 1, 1966 Pre-intervention: 1964–1965 Follow-up: 1966–1967 after period Note: data collection begins January 1, 1966	Intervention: Closing time extended from 6:00PM to 10:00PM Control: Sundays	Analysis: Outcomes: ● Casualty accidents ● Total accidents ○ Pedestrian accidents ○ Single-vehicle accidents ○ Multi-vehicle accidents	Summary of major findings: Total accidents: No change Hourly distribution of accidents occurring from 6:00PM to 11:00PM changed significantly: Sharp decrease from 6:00PM to 7:00PM and an increase from 10:00PM to 11:00PM.	Graphical comparison of weekdays and Saturday with hours change vs Sunday without change: No effect
Williams (1972) ²³ Design suitability: Moderate Interrupted time series	Location: Victoria, Australia Dates: Intervention:	Intervention: Closing time extended from 6:00PM to 10:00PM Control: None	Analysis: Maximum likelihood estimates Outcome:	Sales increase \$1.9 per quarter due to 10:00PM closing Equivalent to 12% increase	Consumption change: 12% (ns)* *CIs not calculable because of lack of data
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Study/design/ execution	Population/study time period	Intervention/comparison	Analysis/outcome	Reported findings	Review/effect size
Quality of execution: Fair (2 limitations)	January 2, 1966 Pre-intervention: 1958–1966 Follow-up: 1966–1969		Consumption of alcohol in Aus\$ sales per capita controlled for price of beer and consumer price index	Note: Author reports no significant effect because SEs are large	
Smith (1988) ²⁴	Location: Victoria, Australia Dates: Intervention: January 2, 1966	Intervention: Closing time extended from 6:00PM to 10:00PM Control: None	Injury crash change: Yearly vehicle crashes 3 years before and 1 year after the change in hours. No assessment of alcohol- relatedness of crashes	An increase of 11.5% in automobile crash injuries associated with the change in hours (not taking entire day into account)	Relative % change (95% CI): 3.6% (–16.6, 28.8)
Smith (1990) ³⁰ Design suitability: Least Pre/post, no comparison Quality of execution: Fair (3 limitations)	Location: Victoria, Australia Dates: Intervention: (1) July 13, 1983 (2) November 1984 Pre-intervention: January 1, 1980–December 31, 1983 Follow-up (1): January 1, 1984–December 31, 1984 Follow-up (2): January 1, 1985–December 31, 1985	Intervention: (1) Two 2-hour periods allowed on Sundays between 12:00NOON and 8:00PM (2i) Full hours allowed between 12:00NOON and 8:00PM on Sunday (2ii) Monday to Saturday sales extended from 10:00PM to 12:00MN (2iii) Sunday restaurant hours increased to 12:00 NOON to 11:30PM (12:00NOON–4: 00PM and 6:00PM– 10:00PM) Control: None	Analysis: Chi-squares Outcome: Traffic crash injury	Injury crash during the 4 hours after 8-hour Sunday session	Relative % change (95% CI): 8.5 (2.2, 15.2)
Briscoe (2003) ³¹ Design suitability: Least Cross-sectional Quality of execution: Fair (3 limitations)	Location: Victoria, Australia Dates: Intervention: July 1998–June 2000	Intervention: 24-hour permit granted to some on- premises alcohol outlets	Analysis: descriptive statistics Outcomes: Number of assaults within outlets during study period	Summary of major findings: Authors claim that there is an association between 24-hour permits and high rates of assaults. However, findings appear contradictory and do not allow re-evaluation.	Inconclusive
Policies allowing a change of <2 hours					
Chikritzhs (1997) ^{32–35} Design suitability: Greatest Before and after design with comparison Quality of execution: Fair (3 penalties)	Location: Perth, Western Australia (WA) Dates: Data collected from July 1, 1991 to June 30, 1995 for: ● Assaults Data collected from July 1, 1990 to June 30, 1996 for: ● Road-block breath testing ● Accidents	Intervention (1988): ETPs only (until 1:00AM instead of 12MN) Control: Hotels that served in standard hours (until 12: 00MN) throughout study period (non-ETPs)	Analysis to test for ETP association: ● Paired t-tests ● Repeated measures analysis ● Multiple Linear Regression Outcomes: ● Monthly assault rates ● Impaired driver BAL	Monthly assaults per hotel: ETP hotels: Pre: 0.121; Post: 1.87 Non-ETP hotels: Pre: 0.112; Post: 0.133 *Adjusting for alcohol sales eliminated effect of ETPs (e.g., increased consumption accounted for increased harm)	Relative % change: Monthly assaults per hotel: 30.1% Wholesale alcohol purchases: 10.5% Alcohol-related road crashes: 51.3%
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Study/design/execution	Population/study time period	Intervention/comparison	Analysis/outcome	Reported findings	Review/effect size
	<ul style="list-style-type: none"> Routine police patrols 		<ul style="list-style-type: none"> Alcohol-related crashes Wholesale alcohol purchase 	ETP hotels: Pre: 670,403; Post: 881,048 Non-ETP hotels: Pre: 686,094; Post: 815,822 Alcohol-related road crashes: ETP hotels: Pre: 0.0781; Post: 0.0808 Non-ETP hotels: Pre: 0.0731; Post: 0.0503	
Smith (1987) ³⁶ Design suitability: Least Before and after design, no comparison Quality of execution: Fair (3 penalties)	Location: New South Wales, Australia Dates: Intervention: Weekday/Saturday closing hours: changed from 10:00PM to 11:00PM Pre-intervention: 1976–1979 Follow-up: 1980–1981	Intervention: Hours: Weekday/Saturday evening closing hours extended from 10:00PM to 11:00PM December 1979 Sunday hours and outlet types also expanded December 1980 BAC levels lowered from 0.08% to 0.05% Control: No comparison group	Analysis: Percentage change Outcomes: Motor vehicle fatalities	Summary of major findings: Findings on this outcome not considered	Relative % change in motor vehicle fatalities: –2.7%
Knight (1980) ³⁷ Design suitability: Least Before and after study without comparison Quality of execution: Fair (4 limitations)	Location: 4 major cities and central belt of Scotland Dates: Intervention: Hours: December 13, 1976 Pre-intervention: October–November 1976 Follow-up: March 1977	Intervention: Hours: Evening closing hours extended from 10:00PM to 11:00PM in December 1977 (Sunday licenses issued October 1977) Control: No comparison group	Analysis: Percentage changes Outcomes: Consumption and patterns of consumption	Change in consumption (in standard units) from before to after the time change: Men: –0.9 units/week Women: 0.2 units/week	Relative % change in consumption following extended hour: Men: –4.9% Women: 3.8%
Bruce (1980) ³⁸ Design suitability: Least Before and after study with no comparison Quality of execution: Fair (2 limitations)	Location: 4 major cities and central belt of Scotland Dates: Intervention: Hours: December 13, 1976 Pre-intervention: October–November 1976 Follow-up: March 1977	Intervention: Hours: Evening closing hours extended from 10:00PM to 11:00PM in December 1977 (Sunday licenses issued October 1977) Control: No comparison group	Analysis: Percentage changes Outcomes: Beer sales in bulk barrels	Beer sales in bulk barrels Mean 1970–1976/1977 3,7856,143/40,262,000 3,264,000/366,800	Relative % change: Beer sales in bulk barrels 5.7%
De Moira (1995) ³⁹ Duffy (1996) ⁴⁰ Design suitability: Greatest	Location: England/Wales Dates: Intervention:	Intervention: Extension of opening and Sunday hours <ul style="list-style-type: none"> Opening hour changed from 11:00AM to 10:00AM 	Analysis: Logistic linear regression, analysis of deviance Outcomes:	Summary of major findings: Mortality: No increase in: <ul style="list-style-type: none"> Liver disease and cirrhosis 	Relative % changes (95% CI): Mortality from diverse alcohol-related diseases: no effect Convictions for sales to underage patrons:

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Table 1. Evidence of the effects of limits of alcohol hours of sale on excessive alcohol consumption and related harm (*continued*)

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Prospective data collection with intervention and control populations Quality of execution: Fair (2 limitations)	August 1988 Pre-intervention: 1980–1988 Follow-up: 1988–1991	<ul style="list-style-type: none"> ● Extra hour on Sunday (hours allowed from 12:00NOON until 10:30PM, with a mandatory break of 4 hours beginning at 3:00PM) ● Drinking-up time increased from 10 to 20 minutes (weekdays only) ● Off-premises sales allowed from 8:00AM Control: Scotland (positive control, having already extended hours several years previously)	<ul style="list-style-type: none"> ● Liver disease and Cirrhosis Mortality ● Pancreatitis mortality ● Alcohol poisoning ● Alcohol-dependent syndrome ● Alcohol psychosis ● Workplace absenteeism ● Workplace accidents ● Road accidents ● Positive breath tests ● Drunk driving convictions ● Drunkenness offenses ● Crimes of violence ● Underage drinking 	<ul style="list-style-type: none"> ● Pancreatitis ● Alcohol poisoning ● Alcohol-dependent syndrome ● Alcohol psychosis Workplace: No increase in: <ul style="list-style-type: none"> ● Workplace absenteeism ● Serious or fatal workplace accidents Increase in: <ul style="list-style-type: none"> ● Slight workplace accidents RR Scotland: 1.34 RR E and E: 1.01 Motor vehicle: No increase in: <ul style="list-style-type: none"> ● Drunk driving convictions ● Positive breath tests ● Fatal and serious road accidents Increase in: <ul style="list-style-type: none"> ● Slight road accidents Relative % change: 3.5% Public order: No increase in: <ul style="list-style-type: none"> ● Drunkenness offenses ● Crimes of violence ● Underage drinking 	64.1% (21.2%, 99.0%) Purchases by minors: –62.4% (72.9%, 46.5%) Recorded violent crime: 15.5% (14.0%, 17.0%)
Vingilis (2005) ⁴¹ Design suitability: Greatest Prospective data collection with intervention and control populations Quality of execution: Fair (3 limitations)	Intervention: May 1996 Pre-intervention: 1992–1996 Follow-up: 1996–1999	Intervention: On May 1, 1996, Ontario, Canada, amended the Liquor License Act to extended closing hours for alcohol sales and service in licensed establishments from 1:00AM to 2:00AM Control: Michigan and New York states, in which similar changes did not occur	Analysis: Supposedly interrupted time series, but results not given. Graphical analyses. Outcomes: Motor vehicle fatalities, alcohol-related and all Consumption	Summary of major findings: No significant change relative to controls Declines in consumption reported	Findings: No significant change relative to controls

*CIs not calculable due to the lack of data.

ARMT, alcohol-related maxillofacial trauma; ETP, extended trading permit