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## Harmonising alcohol consumption, sales and related outcomes data across the UK and Ireland: an insurmountable barrier to policy evaluation?

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### ABSTRACT

There is a need to ensure public health policies are robustly evaluated to establish their benefits and harms on the population and subgroups. We aimed to assess the comparability of Northern Ireland (NI) and Republic of Ireland (RoI) alcohol-related data to determine their suitability for evaluating the effectiveness of alcohol policies on alcohol consumption, sales, and related outcomes. A comparability analysis of NI and RoI alcohol-related hospital admissions, deaths, consumption, sales, and crime administrative and survey data was undertaken. Data sources were compared, where applicable, in terms of coding systems, population coverage, definitions, quality, response/completion rates, and question similarity. The NI and RoI consumption and sales data were found not to be comparable enough for use in a natural experiment study; comparability for hospital admission data was acceptable. Key barriers to comparability included variations in population coverage and lack of overlap in questionnaire topics. Data access issues made it difficult to fully determine data comparability for alcohol-related crime and deaths. By contrast, NI alcohol-related data were more comparable with other UK countries, making comparisons for the purpose of policy evaluation possible. RoI would benefit from identifying another economically and culturally similar country with comparable alcohol-related data.

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### KEYWORDS

Alcohol; policy;  
harmonisation; deaths;  
hospital admissions

Alcohol consumption has been implicated as a contributing factor in numerous health problems such as liver disease and some cancers (World Health Organisation, 2014). In England, the cost of high-risk drinking in terms of healthcare, crime, and lost productivity is estimated to be £21 billion annually (House of Commons Health Committee, 2012). Reducing harmful drinking is a key strategic priority in UK countries and Republic of Ireland (RoI) (e.g. Department of Health; DoH, 2011). In these countries, a range of alcohol policies designed to reduce harmful drinking have either been proposed or implemented such as health labelling, sponsorship/advertising restrictions, structural separation from other products, and minimum unit pricing (MUP) (e.g. DoH, 2015). Unfortunately, many public health policies are not evaluated to establish their benefits and harms at the population and subgroup levels (Katikireddi, Higgins, Bond, Bonell, & Macintyre, 2011). Although many of these population-level health interventions would be unsuitable for evaluation through experimental manipulation; a natural experiment approach may be a viable option (Craig, Katikireddi, Leyland, & Popham, 2017). Natural experiments take advantage of naturally occurring variations in exposure to interventions across similar groups, and where multiple natural experiments are possible this helps strengthen causal inference.

Beeston, Reid, and Robinson (2013) recognised that there is currently a wealth of routinely collected alcohol consumption, sales, and related outcomes data (e.g. survey/administrative datasets) in England, Scotland, and Wales that, if comparable, could be used in a natural experiment study. Their comparability analysis results showed that while there is limited harmonised alcohol-related crime data for England, Scotland, and Wales, comparable data for self-reported consumption, alcohol sales, alcohol-related hospital admissions, and alcohol-related deaths are available. In future, these data could be used to evaluate alcohol policy effectiveness, if introduced under different timescales in these countries. For example, a natural experiment approach could be used to evaluate the effectiveness of MUP (which sets the lowest price an alcohol unit can be sold at) which was introduced in Scotland on 1 May 2018. In support of introducing MUP a range of evidence sources have been cited, such as econometric modelling results (Angus et al., 2014). Interviews with policymakers have shown that while they recognise the value of econometric modelling, policymakers do have concerns over its ability to model the complexities of problem drinking, and also believe policy should be driven by evaluations using data from the implementation country and culturally/economically similar countries through methods

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such as natural experiments (Katikireddi, Bond, & Hilton, 2014; Katikireddi, Hilton, & Bond, 2016).

Besides the study by Beeston et al. (2013), assessments of comparability of alcohol-related data across countries are rare. Harmonised multi-jurisdiction surveys do exist (e.g. European Health Interview Survey); however, these tend to focus only on consumption, and on their own may not provide comprehensive policy evaluation. Establishing further geographical comparisons, with different cultural/economic contexts, strengthens causal inference, and allows contextual/implementation-related factors to be explored.

The present research will examine if NI and RoI routinely collected alcohol consumption, sales, and related outcomes data could potentially be used in a natural experiment study to evaluate local alcohol policy effectiveness. NI and RoI make good comparator countries as they belong to the Common Travel Area (alongside Scotland, England, and Wales), where free movement is permitted between jurisdictions for citizens thus promoting cultural similarity. Although being culturally similar, NI and RoI do diverge in terms of alcohol policy and timelines. For example, in RoI the Public Health (Alcohol) Bill 2015 sets out plans to introduce a range of measures which, if implemented, could lead to changes such as health labelling of alcohol products and MUP. Comparator data will be needed to evaluate these changes.

There are a number of key data requirements to conduct a robust natural experiment study (Craig et al., 2017). First, the range of alcohol consumption, sales, and related outcomes data available in both NI and RoI will be established to determine if a broad range of impacts is covered. These may include proximal impacts (e.g. consumption patterns changes), as well as more distal impacts (e.g. health harms, social disorder). Second, data accessibility will be checked – ideally data should be available at low cost and in a timely manner. Third, sub-population coverage will be ascertained – data sources need to be available in a way that allows inference about different population groups of specific policy interest, such as the general population, young people, dependent drinkers, and by gender. Furthermore, differences in how consumption may impact on different socioeconomic groups mean that indicators are required at multiple points along the causal pathway. Fourth, the quality of these data sources across time will be assessed (e.g. good response rates, representativeness). Finally, and crucially, the comparability of NI and RoI alcohol-related data will be detailed (e.g. similar survey questions and coverage). We aimed to assess how suitable available data from NI and RoI are for conducting natural experiment research.

## Methods

Consultations with NI Department of Health (DoH) policy-makers revealed a need for comparator alcohol-related health data from other similar jurisdictions (e.g. RoI). A scoping exercise was undertaken to identify NI and RoI alcohol-related hospital stays, deaths, consumption/sales, and crime data. Previous personal and public involvement with alcohol users and policy officials identified these as key areas and

highlighted the need to examine trends by subgroup (e.g. gender, age, and deprivation), to facilitate policy evaluation in terms of health inequalities. Datasets were identified through liaising with statisticians and policy officials from NI Statistics and Research Agency, Central Statistics Office, DoH, and Health Research Board.

### *Alcohol-related hospital stays*

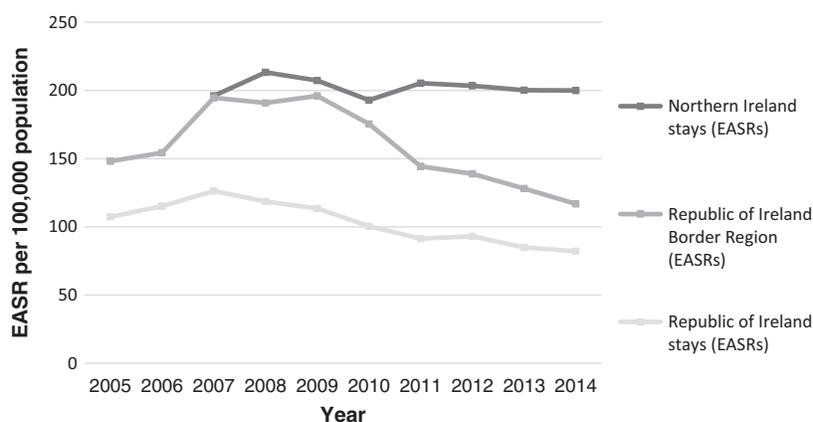
A hospital stay, also described as a continuous inpatient stay (CIS), is defined here as an unbroken time period spent as an inpatient. The figures exclude emergency admissions which are recorded in separate data systems from hospital admissions; where an emergency admission results in a hospital admission this is recorded in the inpatient figures alongside planned admissions. During a CIS a patient may have numerous episodes as they change consultant, significant facility, or speciality. See [Appendix 1](#) for ICD classification codes. The NI hospital admissions microdata (April 2006 to December 2014) were accessed through the Honest Broker Service. In RoI equivalent microdata (2005–2014) were sourced through the Health Care Pricing Office from the Hospital In-Patient Enquiry Scheme (HIPE) system. The NI and RoI datasets were compared in terms of coding systems, public/private hospital coverage, continuous period of stay (CIS) data, main field completion rates, and other quality issues raised in the documentation.

### *Alcohol-related deaths*

Defined here as a death where an alcohol-related condition is coded as the main cause of death. See [Appendix 1](#) for ICD classification codes. NI deaths microdata (1997–2014) were accessed through NI Statistics and Research Agency. Aggregated RoI deaths data were provided by Health Research Board. NI and RoI deaths data were compared in terms of the coding system used and main field completion rates

### *Self-reported alcohol consumption*

Given that the focus of the present research was on identifying future means of evaluating alcohol policy, surveys were only selected for further analysis if policy officials indicated they were likely to run again in the future. For example, the RoI National Alcohol Diary Survey had some comparable questions to the Adult Drinking Pattern Survey NI (ADPSNI) (Long & Mongan, 2014); however, as there are no current plans to run the National Alcohol Diary Survey in the future, this survey is unsuitable for future policy evaluation. For NI, DoH supplied data extracts for the annual Health Survey NI in 2010/11, 2011/12, and 2013/14 and four (ADPSNI) datasets for years 2005, 2008, 2011, and 2013. For RoI, The Healthy Ireland Survey (Ipsos MRBI, 2015) data were accessed through the Irish Social Science Data Archive. NI (ADPSNI; Health Survey NI) and RoI (Healthy Ireland Survey) surveys were compared in terms of coverage, design, and question similarity on levels of consumption (units), drinking



**Figure 1.** Alcohol-related stays (main diagnosis) in RoI (2005–2014) and NI (2007–2014) per 100,000. While some data were available for NI in 2006, coverage was partial and therefore figures for this year have been excluded from Figure 1 for NI; no data were available for NI prior to 2006.

patterns (e.g. binge), beverage types consumed, drinking risk profile (e.g. hazardous), and alcohol sources

### Alcohol sales data

In NI, DoH had previously purchased Nielsen NI and RoI aggregated off-sales data (2011–2013). With the permission of Nielsen, DoH shared these data with us for the purposes of the present research. NI and RoI off-sales data are reported by Nielsen through its Consumer Information Services for the Alcohol category for the time period 2011–2013, for NI and RoI (Copyright © 2011–2013, the Nielsen Company). See Appendix 1 for coverage details. The NI and RoI alcohol sales data were compared in terms of the methodology used to compute the data (e.g. market sector coverage).

### Alcohol-related crime

Through correspondence with Police Service for NI, it was possible to discern what alcohol-related crime statistics are currently recorded in NI, and subsequently obtain aggregate data. The relevant crime statistics recorded include crimes where alcohol was a contributory factor, violence against the person crimes where alcohol was a contributory factor, and drink-driving detections. By liaising with the Central Statistics Office it was established that of these crime statistic types, only drink-driving detection statistics were available for RoI. This part of the comparability analysis focused on comparing the respective definitions used to measure drink-driving detections.

For all of the above data sources, gender, age category and deprivation statistics were sought. The criteria used to compare NI and RoI alcohol-related data sources are detailed in Appendix 2.

## Results

In this section the NI and RoI data are assessed against the predefined comparability criteria; for a summary see Appendix 2. In addition, presented in this section are trends by country on the alcohol consumption, sales, and related

outcomes. Figures should be interpreted with the relative demographic profiles of NI and RoI in mind. Generally speaking, both countries have similar gender and age distributions (Central Statistics Office, 2017; Northern Ireland Statistics and Research Agency, 2017). RoI has a slightly smaller proportion of individuals aged 65+ than NI (13% vs 16%); although these differences were corrected for where it was possible to compute European Age-Standardised Rates. Analysis using the harmonised All-Island HP deprivation Index in 2011 compared NI and RoI on a composite measure of demographic growth, social class composition, and labour market deprivation (Haase, Pratschke, & Gleeson, 2014); this revealed that NI is generally more affluent than RoI, and RoI tends to have more extreme pockets of deprivation.

### Alcohol-related hospital discharges

#### Comparability

1. Coding system: Consistent with the rest of the UK, NI use ICD-10, whereas in RoI an Australian modification is used (ICD-10-AM).
2. Public hospital coverage: In RoI, the number of hospitals reporting to HIPE varied over time due to mergers or additional data being reported to HIPE; any mergers/changes in reorganisation have not resulted in reduced data. Only very small non-acute hospitals have ceased participating in this timeframe – the number of discharges they had reported was quite low when they were participating as only particular wards submitted. Coverage of HIPE has exceeded 99% since 2005 for public acute hospitals.
3. Private sector coverage: It was not possible to include alcohol-related hospital admissions in RoI that were to private hospitals. According to the Private Hospital Association (2016), member hospitals account for almost one-third of acute hospitals in RoI and employ ~20% of staff in that sector. The NI figures only include private hospital admissions contracted by the health and social care trust; Honest Broker Service does not hold data on hospital admissions to private sector hospitals in NI.
4. CIS data: In RoI a patient has one episode per CIS in hospital. By contrast, recording practices in NI mirror

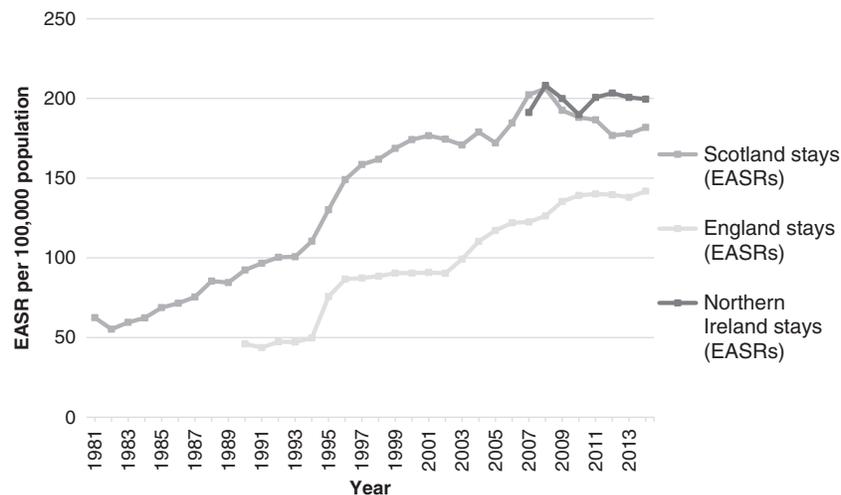


Figure 2. Alcohol-related hospital stays EASRs (main diagnosis) in NI, Scotland, and England: 1981–2014.

those in the rest of the UK; patients can have multiple episodes, and multiple main diagnoses per CIS (e.g. triggered by changes in consultant). Please note, in NI, where there are multiple episodes it is only included as one CIS if the total period of stay is unbroken; otherwise, it is treated as a new CIS. For NI, a CIS was classified as alcohol-related if any of the main diagnosis codes were alcohol related. Sensitivity analysis revealed a very high consistency in the application of alcohol-related main diagnosis codes within each CIS, thus suggesting comparable NI/Rol statistics can be computed.

5. Main field completion rates: Publically available metadata compiled in NI by Honest Broker Service (Health and Social Care Business Services Organisation, *n.d.*) show that most key fields used in the present analysis were of excellent quality (>98% complete), except for the main diagnosis field in 2009/10, 2010/11, 2012/13, and 2013/14 (96.6–97.5% completion rates). In the Rol data extract, all the key variables (dates, main diagnosis, and demographics) used in the analysis had 100% completion rates.
6. Factors affecting trends over time: No significant factors affecting NI hospital admission trends are highlighted in departmental guidance (DoH, *n.d.a*). A change occurred in 2012 in the number of Medical Assessment Units authorised for collection in HIPE; this was linked to an increase in emergency admissions (HIPE, *n.d.*)

### Data trends

European age-standardised rates (EASR) for alcohol-related stays are presented in Figure 1. From 2007 to 2014 (2007 was the earliest full year of data available for NI), main diagnosis alcohol-related hospitalisations remained fairly stable in NI, whereas a steady decrease occurred in Rol from 2007 onwards (126 to 82 per 100,000).

NI hospital alcohol-related stay statistics data were computed using comparable operational definitions to those used in data released by Beeston, McAdams, and Craig (2016) for Scotland and England, these figures included day cases and excluded transfers to other hospitals (see Figure 2). Rol data were unsuitable for this type of analysis.

Alcohol-related stay EASRs in NI closely mirrored EASRs in Scotland between 2007 and 2010. From 2010 onwards Scotland had lower alcohol-related stay EASRs.

### Alcohol-related deaths

#### Comparability

*Coding system used:* The ICD9 was replaced with the ICD10 in 2001 in NI and 2007 in Rol.

*Main field completion rate:* The NI deaths extract provided had 100% completion of the main fields (i.e. date of registration, main cause of death). Unfortunately, Rol deaths data were not available at microdata level, (access is off-limits to non-Rol researchers) so this could not be ascertained.

#### Data trends

Rol deaths data were obtained in aggregate form; however, due to disclosure control rules (values below 5 suppressed) the data were not provided in detailed enough form to derive EASRs; therefore, as they cannot be directly compared with other countries, Rol data are not included in Figure 3.

EASRs per 100,000 for alcohol-related deaths are presented in Figure 3 for NI, England/Wales, and Scotland. In all countries, males had considerably higher alcohol-related death rates than females from 2001–2014 (around twice as high in all countries). For males, rates in Scotland were considerably higher than in NI or England/Wales. For example, in 2003 when alcohol-related deaths peak in Scottish males (47.7 deaths per 100,000 population), the rates for NI (21.3) and English/Welsh (18.4) males were much lower. Non-standardised (not comparable with EASRs) alcohol-related death rates for Rol were relatively stable for males and females between 2007 (9.7 males; 4.8 females) and 2012 (9.8 males; 5.1 females).

### Consumption of alcohol

#### Comparability

*Coverage and design:* Response rates for NI and Rol in the surveys examined ranged from 61% to 66% (Ipsos MRBI,

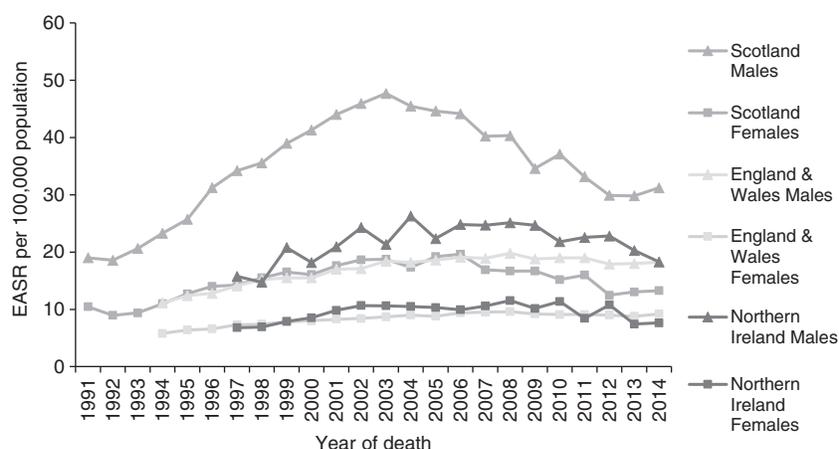


Figure 3. Alcohol-related death (underlying cause) EASRs in NI, Scotland, and England and Wales by gender from 1991 to 2014.

2015; DoH, n.d.b), and all the surveys sampled randomly from households (non-residential addresses excluded). There were some differences in age coverage of the surveys: ADPSNI (18–75); Health Survey NI (16 plus); Healthy Ireland Survey (15 plus). Healthy Ireland Survey and Health Survey NI have weights to adjust for differential response rates (e.g. age, gender; DoH, 2014; Ipsos MRBI, 2015). The ADPSNI does not have a survey weight; the ADPSNI survey gender distribution was comparable with the NI population, whereas 18–29-year-olds tend to be under-represented (DoH, August 2014). It has been argued that health survey weights are not sufficient to account for differential health behaviours within categories (Gorman et al., 2014; Gray et al., 2013). The representativeness (e.g. alcohol-related hospitalisations rates) of NI and RoI health datasets could be assessed and improved, if necessary, through linkage to administrative data. Indeed, adjustments to Scottish Health Survey datasets using linked hospital admission and death records led to higher (up to 17.8%) weekly unit consumption figures than figures weighted by socio-demographic data alone (Gorman, Leyland, & McCartney, 2017).

*Question similarity:* Although both the NI and RoI surveys cover many of the same topics (e.g. units consumed, binge drinking), question wording differences on these topics make geographical comparisons inadvisable. See Appendix 3 for an example difference.

### Data trends

This study, in conjunction with Beeston et al. (2013), shows that Health Surveys in NI, England, Wales, and Scotland are broadly comparable on the wording of alcohol consumption questions. The proportion of drinkers in NI exceeding the weekly guidelines (women over 14 units/men over 21 units; for the period studied) according to the Health Survey NI is shown in Figure 4. In addition, plotted on the graph are data previously published by Beeston et al. (2016) using data from the Scottish Health Survey and the Health Survey for England/General Lifestyle Survey. For NI males, levels exceeding the weekly guidelines are on a par with those reported in England, Wales, and Scotland. Scottish females were most

likely to exceed the weekly guidelines, followed by English/Welsh females, then NI females.

### Alcohol sales figures

#### Comparability

*Market sector coverage:* Data coverage varied between NI and RoI, meaning direct comparisons between the countries is not advisable. The data should also not be interpreted as showing absolute levels of alcohol consumption over time. Rather they provide an indication of consumption trends over time. As discounters such as Lidl are excluded from NI and RoI figures, trends should be interpreted with caution given that the grocery market share of discounters has been growing (Nielsen, 2017).

#### Data trends

Based on data captured by Nielsen, adults in NI consumed fewer litres of alcohol per year in 2013 (4L) than in 2011 (4.2L) through off-trade. In RoI, adults also consumed less in 2013 (2.1L) than 2011 (2.3L) through off-trade. It is not possible to make conclusions regarding whether consumption was higher in NI or RoI based on these figures, due to variation in coverage across countries. The data do, however, indicate that there may have been a small decline in consumption of off-sales alcohol over the period studied in both countries. These sales data add validity to the downwards trend in self-reported consumption evident in the survey data.

### Crime

#### Comparability

*Definition used:* Neither Police Service for NI and Central Statistics Office were able to provide details on differences between drink-driving statistics in NI and RoI, meaning comparability could not be established. Police Service for NI was knowledgeable about differences between NI and other UK countries. For example, the term ‘detected’ in NI means that the person was suspected of drink-driving by the police but may not necessarily have been found to be over the legal

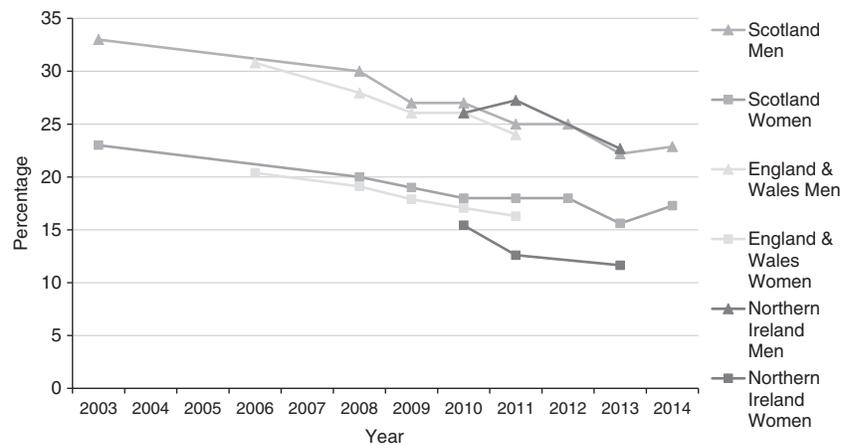


Figure 4. Percentage of adults categorised as exceeding the weekly guidelines in Scotland (2003–2014), England and Wales (2006–2011), and NI (2010–2013).

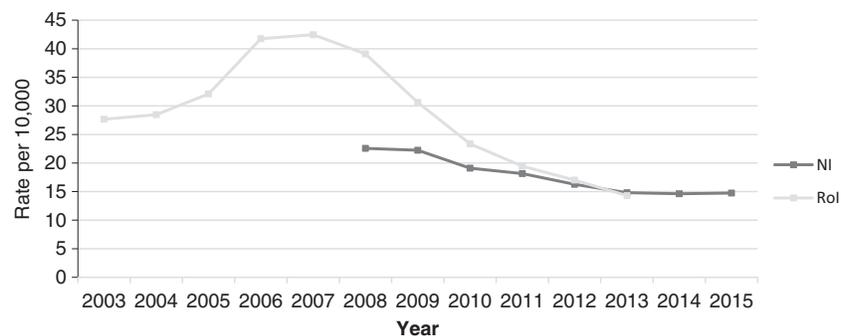


Figure 5. Rate per 10,000 population of driving under the influence detections in NI (2008–2015) and RoI (2003–2015).

drink-drive limit. It should also be born in mind that policy change over time (e.g. changes in the drink-drive limit) makes it difficult to compare drink-driving rates across countries. Finally, the drink-driving limits vary across UK countries, with Scotland having the most stringent limit.

### Data trends

Drink-driving detections for NI and RoI per 10,000 population are shown in Figure 5. In 2008, drink-driving detection rates were nearly twice as high in RoI compared with NI. However, due to a very sharp decline in drink-driving rates in RoI, rates were similar in both countries by 2013.

### Summary of demographic trends

In the preceding sections, gender trends were presented where such data were available. The hospital stays (main diagnosis) were not broken down by gender as we did not have access to these data for England and Scotland. In the separate detailed analysis, hospital stays (based on main and non-main diagnosis codes assigned) were broken down by gender for NI, and RoI, in line with similar analysis performed on Scottish data. This revealed similar trends over time for males and females, with consistently higher rates for males (e.g. in 2014; 994, 560, 973 per 100,000 in NI, RoI, and Scotland) than females (e.g. in 2014; 419, 201, 370 per 100,000 in NI, RoI, and Scotland) in all regions. Note, while the hospital admissions (based on main and non-main codes

assigned) can be used to compare gender patterns, comparisons across countries is inadvisable due to different numbers of diagnosis codes used across countries. In NI driving under the influence detections were considerably higher among males than females over the period examined, a decreasing trend was evident for males (reduced from 40.6 per 10,000 in 2008 to 25.0 per 10,000 in 2015) but not females (5.3 per 10,000 in 2008 and 4.9 per 10,000 in 2015). Comparable figures were not available for RoI.

In NI, all alcohol-related data sources discussed here (except for the sales data) were available broken down by age band and Northern Ireland Multiple Deprivation Super Output Area decile band (NI Multiple Deprivation Measure, Northern Ireland Statistics and Research Agency, 2010) in addition to gender. It should be noted that the NI Multiple Deprivation Measure cannot be directly compared with deprivation measures in other UK countries or RoI (ONS, 2015). In RoI, demographic breakdown availability was more limited. The RoI data sources with the greatest level of accompanying demographic information were the Healthy Ireland Survey, HIPE hospital stays data and to a lesser extent the deaths data. In general, the NI and RoI demographic data show higher risk of alcohol-related harm for males and those living in the most deprived areas. Alcohol-related hospital stays (main diagnosis) peaked in the 45–54 years age group in NI (rate 1301 per 100,000 in 2014) and the 55–64 years age group in RoI (rate 688 per 100,000 in 2014). The rate of alcohol-related deaths was highest among 55–64 year olds in NI and RoI. Younger people were most at risk of being

detected drink-driving (rate 35 per 10,000 24–34-year-olds in 2015) or being the victim of an alcohol-related crime (rate 201 per 10,000 for 15–24-year-olds in 2015/16) in NI.

## Discussion

The study represents the first comparability analysis of NI and RoI alcohol consumption, sales and related outcomes administrative and survey data. Access to a wide range of NI and RoI alcohol-related data was successfully negotiated for the study. Overall the comparability exercise revealed limited comparability between NI and RoI in terms of routinely collected alcohol-related data. Comparability analysis of hospital admissions data highlighted good comparability for NI and RoI public hospitals. Alcohol sales data are available for both countries; however, direct comparisons between NI and RoI is inadvisable (e.g. due to coverage differences). Currently, NI and RoI on-going health survey alcohol questions are not comparable. This is because NI surveys tend to be harmonised with other UK countries (UK Statistics Authority, January 2009; Principle 4), whereas RoI health surveys are designed to facilitate reporting to the EU, OECD, and the World Health Organisation (e.g. The Healthy Ireland Survey; Ipsos MRBI, 2015). Difficulties accessing microdata and metadata for RoI made it difficult to determine the comparability of NI and RoI deaths and drink-drive detections data. Consequently, on the basis of this comparative analysis, a comprehensive natural experiment study to evaluate the effectiveness of an alcohol-related policy using NI/RoI administrative data would not be possible.

In conjunction with previous work by Beeston et al. (2016), this paper provides a comprehensive picture of UK and RoI data comparability. More importantly, it is now clearer which data sources could be of value in cross national epidemiological and natural experiment policy evaluation studies across the UK and RoI. NI data were much more comparable with data collected in Scotland and England/Wales than to RoI. However, there were some areas where comparability was limited. For example, comparable statistics were lacking for an alcohol-related crime. In addition, given that NI and Scottish alcohol-related hospital admission rates were on a par, it is surprising that the alcohol-related death rates in Scotland were considerably higher than the NI rate. Although it is possible that there may be a legitimate reason for the different relationships between alcohol-related hospital admissions and deaths seen in Scotland and NI, this pattern may be due to an issue with one of these four datasets, and without further detailed investigation it is not possible to determine where the discrepancy lies. It should be emphasised that the present comparability analysis did not highlight any differences in the measurement of hospital admissions, deaths, and self-reported consumption across UK countries. A cautious approach using as wide a range of comparable data sources as possible (e.g. hospital admissions, deaths, and self-reported consumption data) is therefore advisable. Taken together the present findings suggest that if a significant new alcohol policy is introduced in a UK country, routinely collected data from the other UK countries

could be used for comparative purposes as part of the evaluation. The harmonisation approach used in the present study could also be used in other culturally and economically similar jurisdictions (e.g. US states) to determine if data are comparable enough for evaluation of alcohol-related policies. Although it is possible that RoI is more comparable with other countries (e.g. in EU) in terms of alcohol-related data collection methods than to NI, other countries are unlikely to have the same cultural and economic similarities that RoI has with NI due to being neighbouring countries with an open border. The extensive analysis would be needed to identify similar European countries to RoI to compare on routinely collected alcohol consumption, sales, and related data; possible candidates include other Western European countries with similar unemployment rates to RoI such as Sweden and Belgium (Statistica, 2018). Otherwise, to evaluate the effectiveness of a new alcohol policy in RoI primary data collection would be needed in RoI and a comparable country such as NI pre- and post-policy introduction. This approach would provide harmonised data but would require significant financial investment.

In conclusion, NI and RoI routinely collected data are not sufficiently harmonised to be used for comprehensive natural experiment studies to evaluate the effectiveness of NI or RoI alcohol policy. By contrast, our study highlights a range of comparable routinely collected data in NI, Scotland, England, and Wales exists. By using the identified datasets, alcohol researchers can boost the cost effectiveness of their evaluation research and minimise response burden. This research can be supplemented by primary data collection where the secondary data sources do not cover all the possible outcomes that the policy may have (e.g. financial burden, switching to illicit drugs). In RoI, prior planning for primary data collection is needed well in advance of policy implementation due to the lack of comparability between administrative data from RoI and other similar countries such as NI.

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## Disclosure statement

No potential conflict of interest was reported by the authors.

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## Appendix 1

### Alcohol-related hospital stay ICD codes

For all countries, a stay was classed as alcohol-related if at least one main diagnosis associated with that stay matched one of the following ICD 10 codes: F10, K70, X45, X65, Y15, Y90, Y91, E244, E512, G312, G621, G721, I426, K292, K860, O354, P043, Q860, T510, T511, T519, Y573, R780, Z502, Z714, and Z721. These codes are used by the Information Services Division (e.g. Information Services Division, 2013), and were chosen because they only include codes that are completely attributable to alcohol. The disadvantage of this approach is that the overall burden of alcohol on the health sector is underestimated.

## Alcohol-related deaths ICD codes

The deaths were classified using the World Health Organisation's International Classification of Diseases 9th Revision (ICD9) and 10th Revision (ICD10). For all countries, the following ICD 9 codes were used for reporting alcohol-related mortality: 291, 303, 3050, 4255, 5710, 5711, 5712, 5713, 5714, 5715, 5718, 5719, and E860. The corresponding ICD 10 codes used to define alcohol-related mortality were: F10, K70, K73, X45, X65, Y15, G312, G621, I426, K292, K740, K741, K742, K746, and K860. These codes are consistent with UK national statistics definition of alcohol-related deaths at the time of the analysis (Office for National Statistics, 2016). The selected ICD codes include only those that are wholly attributable to alcohol and therefore underestimate the total impact of alcohol on morbidity.

## Nielsen data coverage

NI Scantrack is defined as Census EPOS inputs from Tesco, Asda, Sainsbury, SuperValu, Centra, Co-Op, Iceland, M & S. Note this excludes Off Licences, where data is not available.

ROI Scantrack is defined as Census and sample and universe projections for Multis (Tesco, SuperValu, Superquinn, Eurospar, M & S), Symbols Groups & Forecourts, Specialist Off Licences. Note this excludes Discounters and Dunnes, where estimates are not robust at this level, and excludes independent off-licences where monthly data only available.

## Appendix 2

NI and Rol alcohol-related data comparison summary.

		Accessibility	Quality/comparability criteria	Comparability assessment
Alcohol-related hospital discharges	NI	Microdata available from Honest Broker Service. Small charge.	1) Coding systems used; 2) Coverage of public hospitals; 3) Private sector coverage; 4) Continuous period of stay (CIS) data; 5) Completion rates of main fields; 6) Other quality issues raised in the documentation	NI/Rol public hospital comparability acceptable
	Rol	Microdata available		
Alcohol-related deaths	NI	Microdata available	1) Coding systems used; 2) Completion rates of main fields;	Unable to establish due to access issue with Rol deaths microdata
	Rol	Microdata Restricted to those working in Rol		
Alcohol consumption	ADPSNI	Microdata available	1) Coverage; response rate; weighting adjustments; target population inclusion/exclusion 2) Design; sampling method 3) Questions similarity on levels of consumption (units), drinking patterns (e.g. binge), beverage types consumed, drinking risk profile (e.g. hazardous), and alcohol sources	NI/Rol comparisons not advisable
	Health Survey NI Healthy Ireland Survey	Microdata available Microdata available from Irish Social Science Data Archive		
Alcohol Sales	NI Rol	Purchase Through Nielsen Purchase Through Nielsen	1) Coverage of market sector	NI/Rol comparisons not advisable
Drink driving	NI	Aggregate data available from Police Service for NI	1) Drink drive definition used	Unable to establish comparability due to limited information available from Central Statistics Office. Police Service for NI were not aware of the differences between NI and Rol drink driving statistics
	Rol	Aggregate data available through Central Statistics Office website		

## Appendix 3

### Example difference of NI and Rol health survey coverage

The Healthy Ireland Survey asked how many standard drinks were consumed on a typical day in the last 12 months. By contrast, the ADPSNI collected detailed data on UK units consumed on each day in the past week. Although it is possible to convert Rol standard drinks (10g ethanol) to UK units (8g ethanol), it would be hard to compute 'typical day' as this was not operationally defined in the Healthy Ireland Survey. Furthermore, the diary style approach of the ADPSNI would not be appropriate for deriving 'typical day', as the previous week may not be representative of typical drinking. The Health Survey NI holds detailed data on drinks consumed on any one day in the last 12 months by drink type. However, it is not possible to know how this would equate to total drinks consumed on any one day, as it is not possible to determine the degree of overlap in daily consumption by drink type (e.g. are spirit and wine units consumed on same/different days?)



