Measuring Injury Related Health Inequalities using data from the European Injury Data Base (IDB)

BRIDGE-Health (WP9 – Injury Surveillance Platform)

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Contributions and Acknowledgments

This report was made possible by the contribution of many people and groups, including the EU Injury Data Base (IDB) steering group, the National Data Administrators from all the countries that participated and provided data, and the Injury-VIBES consortium that produced disability weights for the groups of disorders included in this report.

Executive Summary

- Injuries are a leading cause of disability, morbidity and mortality in Europe with more than 95% of all injury related child deaths occurring in low and middle-income countries.
- This report aims to establish current injury related health inequalities between different populations across Europe relating to gender and age inequalities using the European Injury Database (IDB), followed by area level social-economic status (SES) analyses using two SES indicators and two case studies containing area level SES analyses.

Summary of gender and age inequalities using the European Injury Database (IDB):

- For all injuries, males are at a greater risk of injury until the age of 60. Females are at a greater risk of injury from the age of 60 onwards which is complementary to the analysis for fall related injuries.
- 1-4, 10-19 and 80+ year olds have the greatest risk of injury related emergency department attendances.
- The risk of Home, Leisure, School and Sports (HLSS) injuries are higher for females from the age of 50 onwards compared to males.
- 10-14 year olds and 85+ year olds have the highest rate of HLSS injuries.
- Males have the highest rate of road traffic injuries compared to females for all age groups expect for 75-79 year olds.
- Road traffic injuries are most prevalent in 15-19 year olds.
- Females have the highest rate of self-harm injuries compared to males for all age groups expect for 65-69 year olds and 85+ year olds.

The At Risk Of Poverty or social Exclusion (AROPE) rate and GDP per capita in Purchasing Power Standards (PPS) country level SES indicators acquired from the Eurostat website have been used to explore area level SES analyses:

- The greater the proportion of the population living with a lower social-economic status the greater the risk of injury.
- Countries with a GDP per capita in PPS greater than the EU average of 100 had a higher rate of work related injuries.

Area level SES analyses carried out by the All Wales Injury Surveillance System (AWISS) unit and analysis carried out by the National Board of Health and Welfare (Socialstyrelsen) in Sweden have been included:

- Children living in the most deprived areas in Wales have greater rates of injury fatalities, injury hospital admissions andinjury related Emergency Department attendances.
- In Sweden, less well-educated individuals are more likely to be admitted to hospital for an injury, particularly self-harm and assault related injuries.

- This reports provides evidences of the risk of injury due to sex, age and socio-economic inequalities and highlights the need for preventable measures to target the at-risk demographic groups.

Introduction

Injuries are a leading cause of disability in Europe, and place a huge burden on individuals and society as a whole. However this burden is not distributed equally across the European region. Historically, injuries were thought of as random and unavoidable events. It is only in recent decades that injuries are now considered largely predictable and preventable events, due to a growing understanding of the underlying mechanisms of injury, and through observing the large inequalities in injury risk between different population groups.

Injury related health inequalities are most apparent at the global level, with more than 95% of all injury related child deaths occurring in low and middle-income countries [1]. However, injury related inequities are still evident across high-income countries [2,3]. Although injury related mortality and morbidity rates have fallen in Europe over the last couple of decades, large geographical inequalities remain, highlighting the need for enhanced preventative measures and improved targeting of interventions towards the highest risk groups. For example, in England and Wales, children from the most deprived families have been found to be 13 times more likely to suffer an injury related death, and 37 times more likely to suffer a fire related death, than children from the most affluent families[4].

The World Health Organisation defines health inequalities as the "differences in health status or in the distribution of health determinants between different population groups"[5]. The following report utilises data from the European Injury Data Base (IDB) to explore injury related health inequalities between different populations across Europe; focussing in particular on inequities by gender, age and socioeconomic status.

Data Sources and Inequality Indicators

Injury Incidence

Injury data collected in the European Injury Database (IDB: https://webgate.ec.europa.eu/idb/) as part of the BRIDGE-Health project (http://www.bridge-health.eu/) are utilised in this report. The IDB is used to support the development of targeted injury prevention policies and programs across the EU [7]. The IDB is a standardised database, collecting information on injury-related emergency department attendances in 26 countries across Europe. In most countries, a sample of hospitals submit data to the IDB. The database include information from large and middle sized hospitals from rural and urban areas and includes data from general and specialized hospitals. Data elements recorded include patient factors such as age and sex and injury factors such as type of injury, body part, intent, mechanism, place of occurrence and activity when injured. The data is categorised using standardised classifications as defined in the MDS and FDS data dictionaries. Since most countries supply data from a sample of hospitals, incidence rates and national estimates are derived using reference populations which represent the population covered by the sample of hospitals. In many countries, emergency department attendances are not available and only the number of hospital admissions are known; in these cases, the ratio of admissions from the sample is used to derive an estimate of all injuries. National population figures are then used to determine national estimates of injuries.

Inequality Indicators

The IDB inequality indicators presented in this report are based on three core inequality indicators which have been demonstrated to be associated with injury risk in the scientific literature:

1. Gender-related inequality
2. Age-related inequality
3. Socio-economic status (SES) inequality

As age and gender are collected at the individual level in the European IDB, individual level age and gender inequality analyses are presented in this report.

However, Socio-economic status (SES), defined as the "position of persons in society, based on a combination of occupational, economic and educational criteria"[6] is only possible to establish at the country level in the IDB. In some countries, SES status is based on individual level income, educational level or social class. However, individual level indicators are rarely available. More often countries use ecological SES measures at the household, small area,

region or country level, but no standardised approaches of classifying SES currently exist. Even when SES approaches are similar between countries (e.g. quintiles of small area deprivation) comparative analyses are often not possible, as the distribution of means and ranges which define quintiles often vary between countries and settings.

As no SES indicators are included in the IDB, the following report explores associations between injury incidence and two country level SES indicators acquired from the Eurostat website (http://ec.europa.eu/eurostat).

1. At Risk Of Poverty or social Exclusion (AROPE) rate: The AROPE indicator refers to individuals "at risk of poverty, or severely materially deprived or living in a household with a very low work intensity" (http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:At_risk_of_poverty_or_social_exclusion_(AROPE)). The AROPE rate refers to the percentage of the total population that is at risk of poverty or social exclusion.

2. GDP per capita in Purchasing Power Standards (PPS): The PPS index allows comparison of counties where the European Union (EU28) average is set to equal 100. Countries with an index higher than 100 have a level of GDP higher than the EU average and conversely countries with an index lower than 100 have a level of GDP lower than the EU average (http://ec.europa.eu/eurostat/web/products-datasets/-/tec00114).

Individual/Area level SES Analyses

Although it is currently not possible to undertake comparative individual/area level SES analyses across Europe, IDB member states have conducted their own individual/area level SES analyses, several of which are presented in this report.

Several case studies, demonstrating associations between individual/area level SES status and injury incidence are included in this report:

1. Area level SES analyses conducted for children aged 0-17 years, by the All Wales Injury Surveillance Unit (AWISS) in the UK
2. Area level SES analyses conducted for hospital admissions relating to educational status, by the National Board of Health and Welfare (Socialstyrelsen) in Sweden.

Results

Age and Gender Inequalities

To identify age and gender related inequalities associated with injury across Europe, European injury rates per 100,000 population were calculated by age, gender and type of injury using data recorded in the IDB Minimum Data Set (MDS). IDB data included in these European averages are detailed in Table 1.

Country	IDB-MDS data included in European Averages
Austria	2009-2014
Cyprus	2009 - 2010
Denmark	2009 - 2015
Estonia	2015
Finland	2010 - 2014
Germany	2011 - 2012
Iceland	2010 - 2013
Italy	2011
Lithuania	2013 - 2015
Luxembourg	2013 - 2015
Malta	2009 - 2013
Netherlands	2009 - 2014
Norway	2012 - 2014

Portugal	2011 - 2015
Romania	2013
Slovenia	2011- 2015
Spain	2013
Sweden	2009 – 2015
United Kingdom	2010 – 2015

Table 1: IDB-MDS data included in European averages

All Cause Injuries by Age and Gender

Figure 1 presents European IDB injury annual average rates per 100,000 population for all cause injuries by age and gender (European averages based on IDB data detailed in Table 1). It can be observed in Figure 1 that males are at greater risk of injury compared to females up until the age of 60. From the age of 60 onwards, women are at greater risk of injury, and this is likely due to an increased risk of falls and fractures in women resulting from osteoporosis. Osteoporosis is a condition that weakens bone strength, and is more common in elderly women. The greatest difference in gender related injury risk is observed in the 20-24 age group, with 2778 more males injured per 100,000 population compared to females (6513 per 100,000 and 3735 per 100,000 population respectively).

Age groups in Europe which appear to be at highest risk of an injury related ED attendance are the 1-4 age group, 10-19 age group and 80+. Young children aged 1-4 years are particularly susceptible to injury because of their lack of experience, strength and physical skill, combined with an increased curiosity and mobility. The spike in injury risk in the 10-19 age group is likely linked to an increase in risk taking behaviour in this age group. Finally, increasing injury risk in older age groups is predominantly linked to increasing frailty.

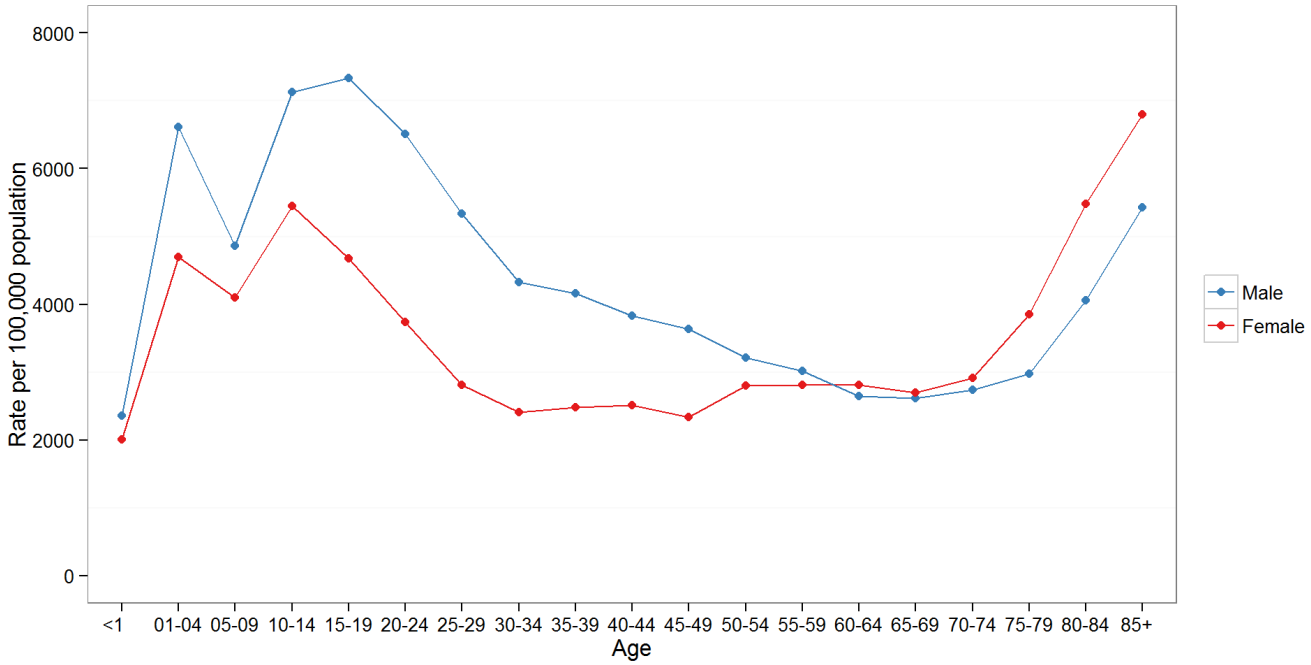

Figure 1: IDB based all cause injury annual average rates per 100,000 population by age and gender (data included in European averages detailed in Table 1)

Home, Leisure, School and Sports Injuries (HLSS) by Age and Gender

Figure 2 presents European IDB injury annual average rates per 100,000 population for home and leisure injuries by age and gender (European averages based on IDB data detailed in Table 1). It can be observed that the age and gender profile for home, leisure, school and sport injuries (HLSS) is quite similar to that of all cause injuries in Figure

1. The key differences being injury risk for females' increases above males at an earlier age (50+ instead of 60+) which may be associated with time spent in the home and leisure environment. Further, whereas in Figure 1 injury risk in 10-14 and 15-19 age group are quite comparable with a slightly higher risk observed in 15-19 age group; in the HLSS environment children and young adults in 15-19 age group are at a reduced risk compared to 10-14 age group. This decreased risk in 15-19 age group is again likely associated with a reduction in time spent in the home and leisure environment, and an increased risk of work and road traffic related injuries in 15-19 age group (discussed further down).

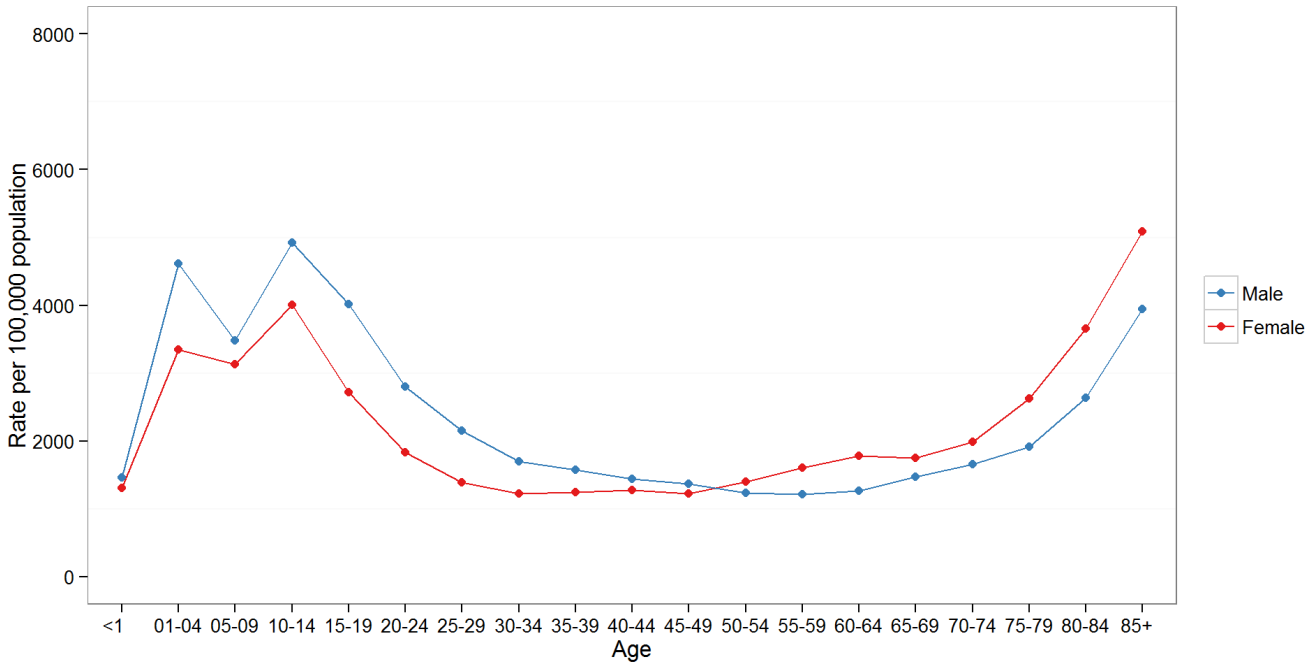

Figure 2: IDB based home and leisure injury annual average rates per 100,000 population by age and gender (data included in European averages detailed in Table 1)

Road Traffic Injuries by Age and Gender

Figure 3 presents European IDB injury annual average rates per 100,000 population for road traffic injuries (RTIs) by age and gender (European averages based on IDB data detailed in Table 1). Unlike HLSS injuries, males are at increased risk of RTIs throughout the life course (the only exception the 75-79 age group). The greatest difference in RTI risk between males and females occurs between the ages of 15-29, and children/young adults in the 15-19 age group are at greatest risk of a RTI in Europe. Unlike all cause and HLSS injuries, in which the rate of injuries increased in the older age groups; the risk of experiencing a RTI peaks in the 15-19 age group and then follows a downward trend for the remainder of the life course.

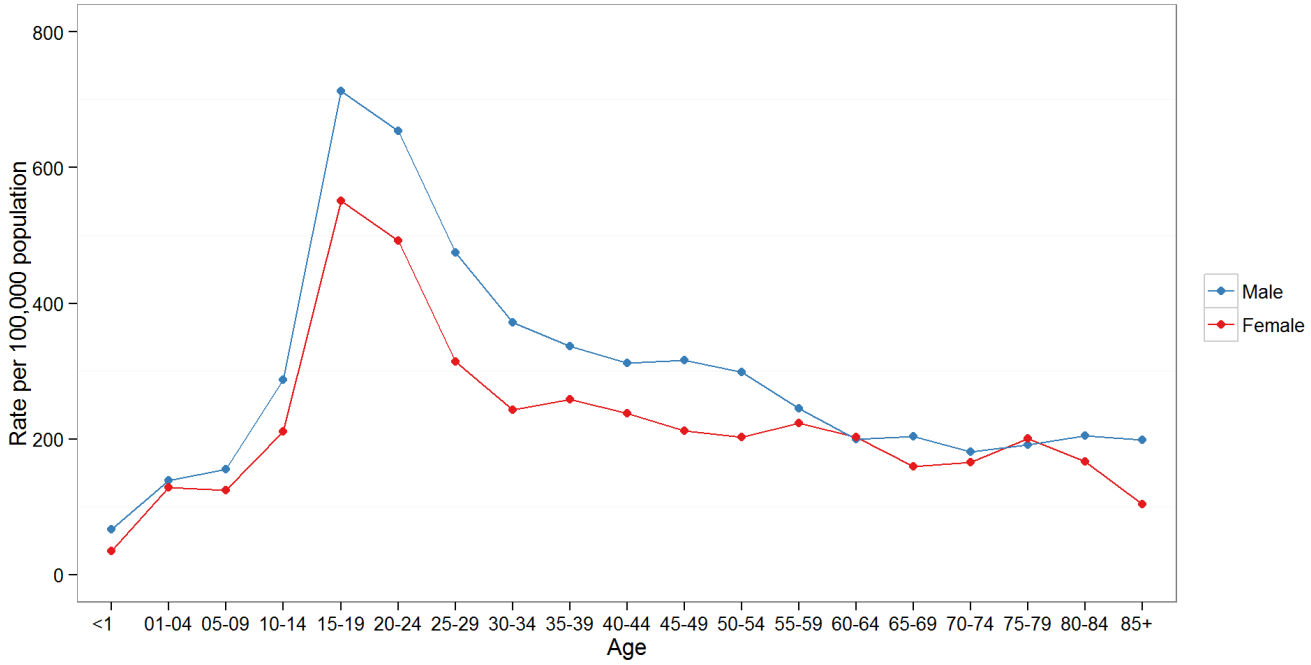

Figure 3: IDB based road traffic injury annual average rates per 100,000 population by age and gender (data included in European averages detailed in Table 1)

Self-Harm Injuries by Age and Gender

Figure 4 presents European IDB injury annual average rates per 100,000 population for self-harm injuries by age and gender (European averages based on IDB data detailed in Table 1). An opposite gender pattern emerges for self-harm injuries compared to the other injury types which have been explored so far in this report. Unlike HLSS and RTIs, females are at greater risk of a self-harm related injury throughout the majority of the life course (the only exceptions being 65-69, and 85+ age groups). The difference in self-harm risk is most apparent in 15-19 age group with 135 per 100,000 females attending ED with a self-harm injury, compared to 61 per 100,000 in males. Females are at greatest risk of a self-harm related injury in 15-19 age group and males in 20-24 age group. Risk of a self-harm related injury then decreases over the life course, other than in males in 85+ age group where a notable increase is observed.

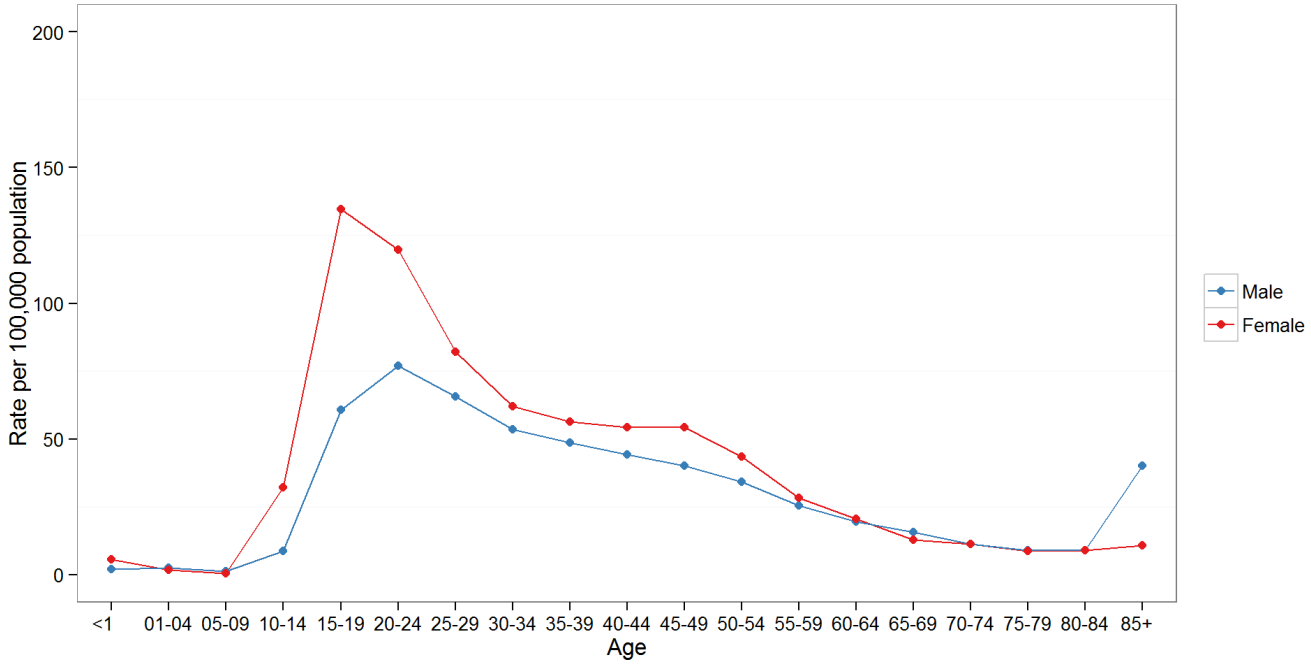

Figure 4: IDB based self-harm annual average rates per 100,000 population by age and gender (data included in European averages detailed in Table 1)

Fall Related Injuries by Age and Gender

Figure 5 presents European IDB injury annual average rates per 100,000 population for fall related injuries by age and gender (European averages based on IDB data detailed in Table 1). It can be observed that males are at an increased risk of falls compared to females in Europe up until the age of 50. As discussed previously, the increased risk observed in older women is linked to increased rate of osteoporosis in post-menopausal women which results in weaker bone strength and thus increased fall and fracture risk. In children, fall risk is greatest in the 1-4 year age group, and in older adults fall risk is greatest in the 85+ age group. However from the age of 70, fall risk increases steeply with increasing age for both males and females.

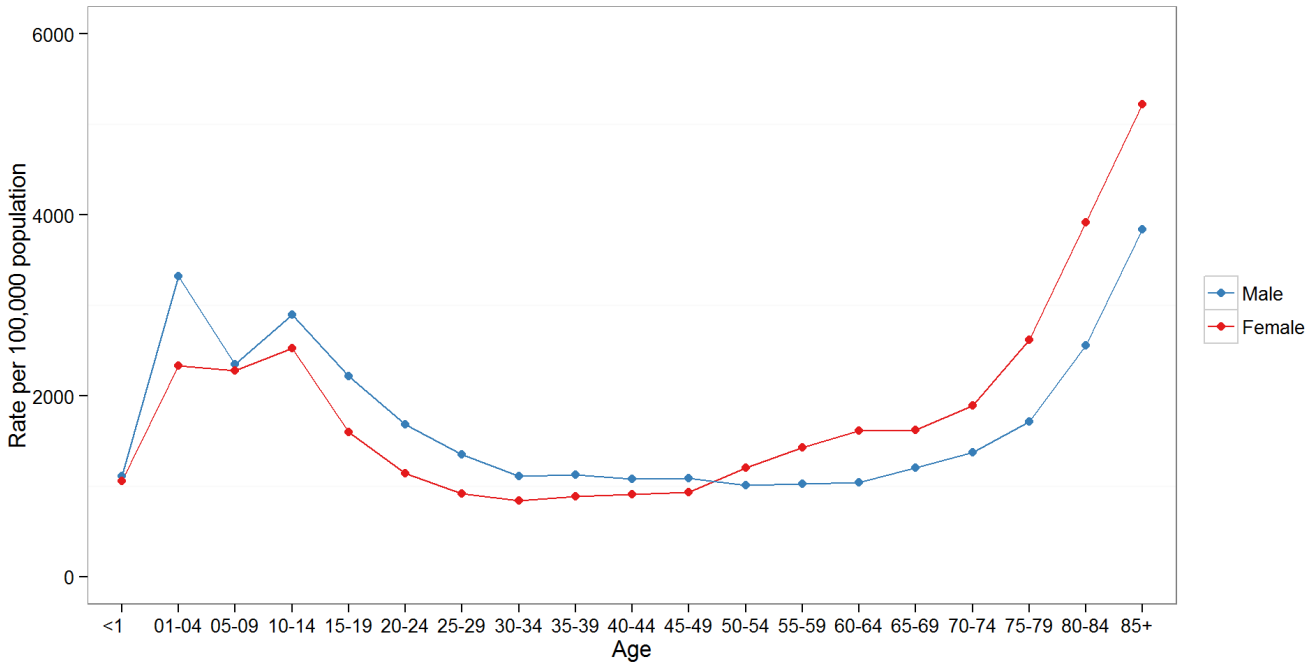

Figure 5: IDB based fall related injury annual average rates per 100,000 population by age and gender (data included in European averages detailed in Table 1)

Socio-economic Status (SES) Inequalities

Country Level SES Analyses

Currently, SES indicators are not included in the European IDB dataset. Therefore, to explore associations between injury incidence reported in the IDB and SES, two country level SES indicators were acquired from the Eurostat website (http://ec.europa.eu/eurostat)

1. % of Population At Risk Of Poverty or social Exclusion (AROPE)

2. GDP per capita adjusted for purchasing power

IDB incidence rates at the country level, have been plotted against the two SES indicators above, to explore whether there is an association between a countries AROPE or GDP per Capita, and population level injury risk. A regression line and coefficient of determination (R^2) are also presented, to identify the strength of the linear association (e.g. how close the data fit the regression line). R^2 values are between 0 and 1, and the higher the value, the better the linear regression model fits the data.

Figure 6 shows the relationship between country level European Age Standardised Rates (EASRs) for all cause injuries (IDB data) and the percentage of the country's population At Risk Of Poverty and social Exclusion (AROPE). It can be observed that a weak positive association exists between AROPE and all cause injury rates (R^2 0.0634).

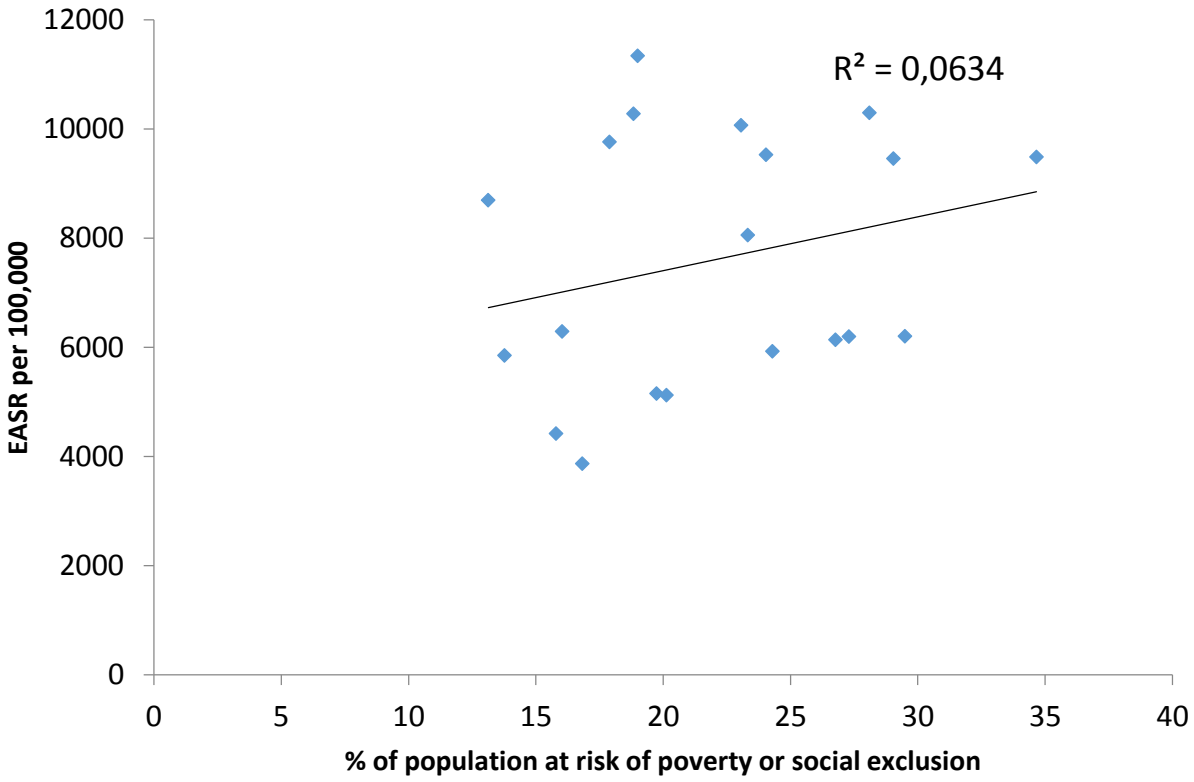

Figure 6: IDB country level EASR rates for all cause injury vs % of population at risk of poverty and social exclusion (for all participating IDB countries)

Figure 7 below shows the relationship between country level European Age Standardised Rates (EASRs) for child injuries (1-4 years) (IDB data) and the percentage of the country's population At Risk Of Poverty and social Exclusion (AROPE). It can be observed that a weak positive association exists between AROPE and child injury rates (R^2 0.0982).

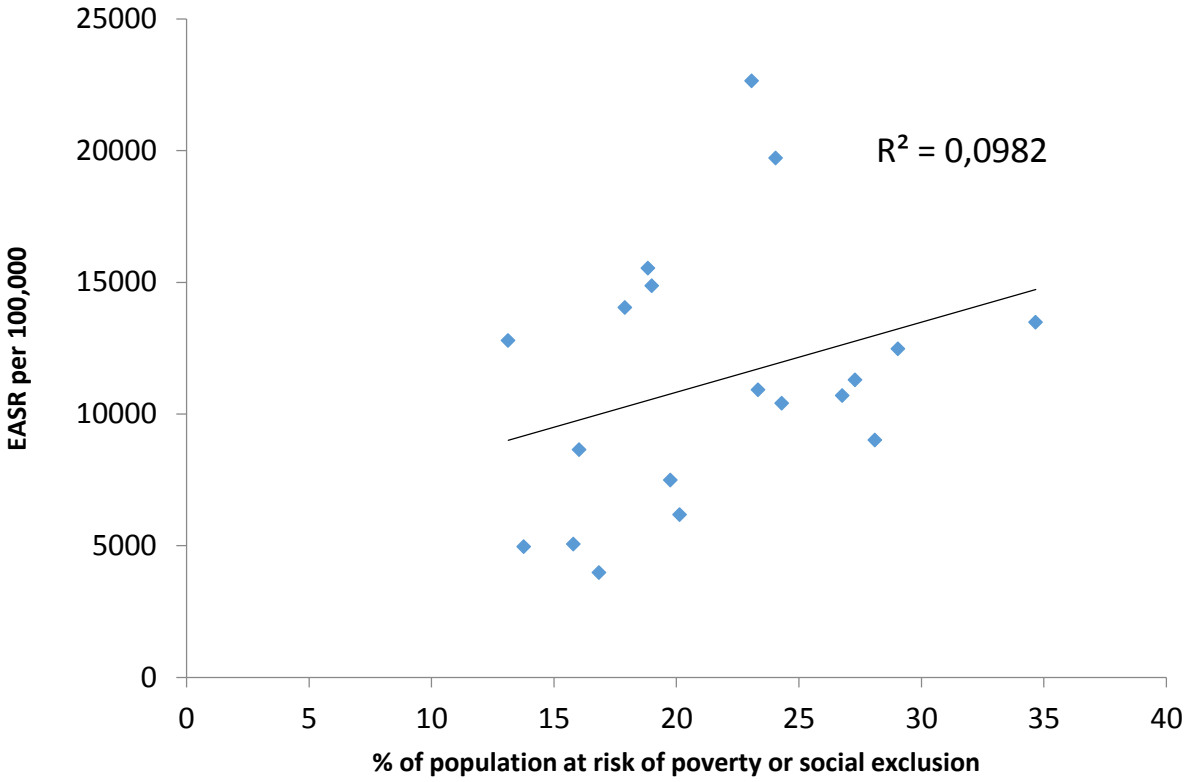

Figure 7: IDB country level EASR rates for child injuries (aged 1-4) vs % of population at risk of poverty and social exclusion (for all participating IDB countries)

Figure 8 below shows the relationship between country level European Age Standardised Rates (EASRs) for self-harm injuries (IDB data) and the AROPE rate. There is a weak positive correlation between the rate of self-harm injuries and AROPE rate (R^2 0.2023).

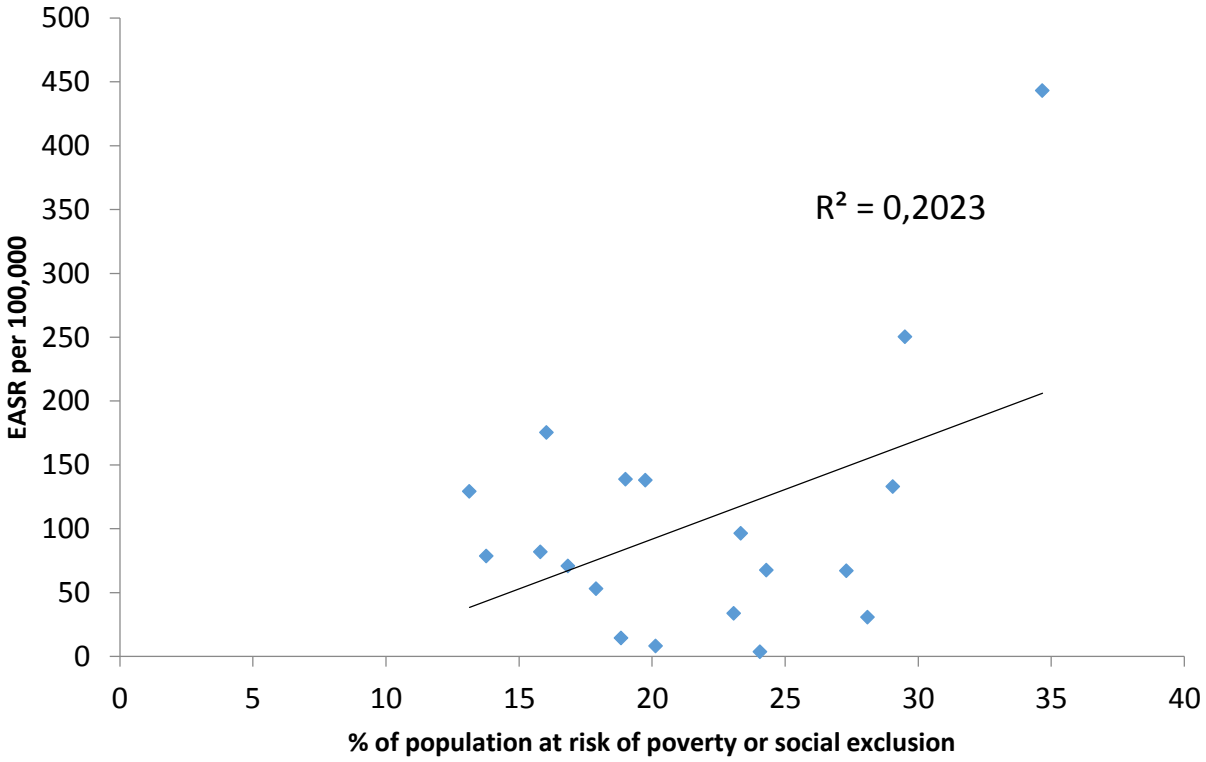

Figure 8: IDB country level EASR rates for self-harm vs % of population at risk of poverty and social exclusion (for all participating IDB countries)

Figure 9 below shows the relationship between country level EASRs for work related injuries (IDB data) and the GDP per capita in PPS. Countries with a GDP per capita in PPS that is lower than the EU average of 100 also have a lower rate of work related injuries (R^2 0.1427).

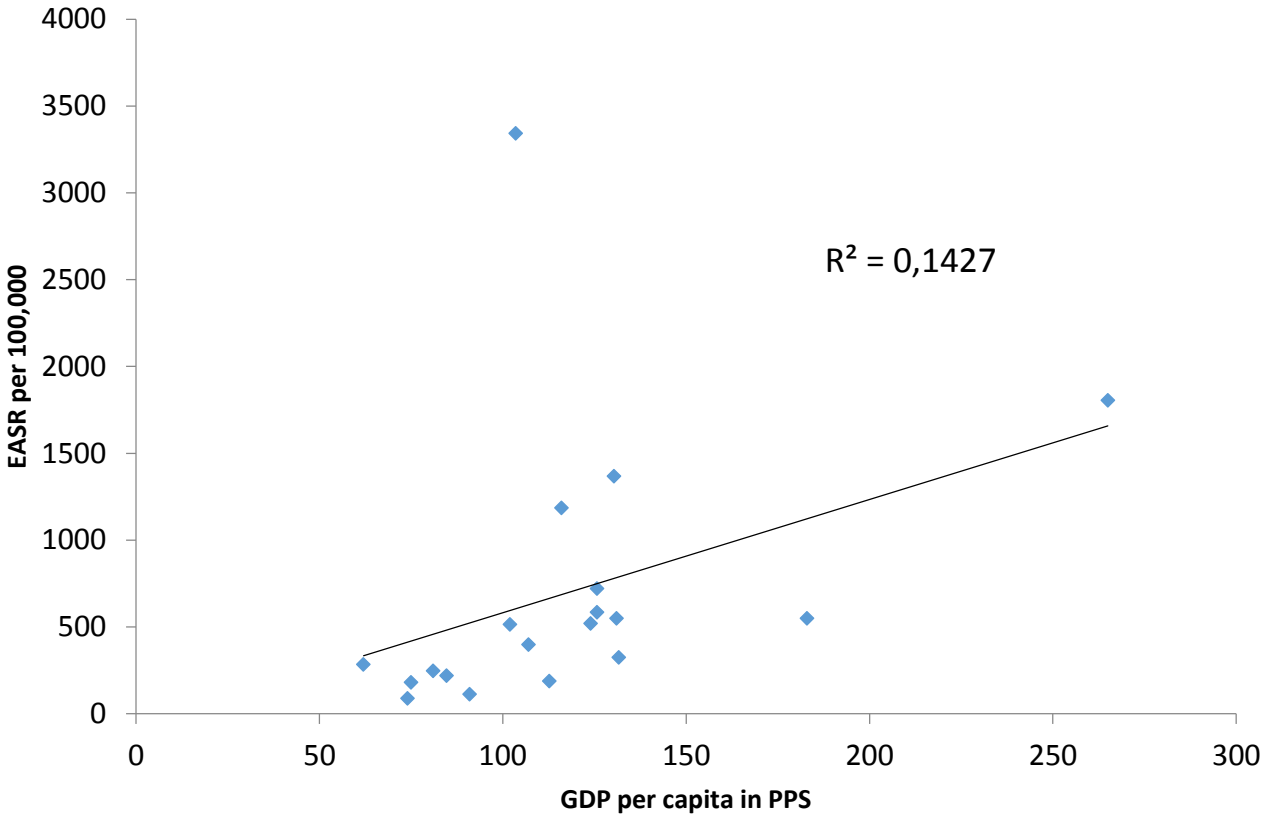

Figure 9: IDB country level EASR rates for work related injuries vs GDP per Capita in PPS (for all participating IDB countries)

Case Studies of Individual/Area Level SES Analyses

Case Study 1: *Area level SES analyses conducted in Wales, UK*

The All Wales Injury Surveillance System (AWISS) unit, Swansea University, recently conducted area level SES analyses for children aged 0-17 years as part of the Preventing Child Injuries in Wales: Needs Assessment report. The report contains epidemiological analyses for child injuries broken down by injury type, gender, age, local authority (LA), Health Board (HB) areas and area level deprivation. The Welsh Index of Multiple Deprivation (WIMD) is the official measure of multiple deprivation at the small area level [8]. Local Super Output Areas (LSOAs) are ranked by deprivation and categorised into five deprivation quintiles; quintile 1 representing the most deprived 20% of areas and quintile 5 representing the least deprived 20% (e.g. most affluent).

Epidemiological analyses for child injury fatality rates; injury related hospital admissions; injury related Emergency Department attendances; home injury hospital admissions in 0-4 year olds; burns in 0-4 year olds; road traffic injury Emergency Department attendances in 5-17 year olds; road traffic injury hospital admissions in 5-17 year olds; Self-harm Emergency Department attendances in 10-17 year olds; Self-harm hospital admissions in 10-17 year olds; Violence related Emergency Department attendances in 10-17 year olds and Violence related hospital admissions in 10 -17 year olds by deprivation level in Wales are presented below.

Child injury fatality rates

Figure 10 presents data showing that children living in the least deprived areas in Wales generally have the lowest injury fatality rates and children living in the middle quintile of deprivation (quintile 3) have the highest between 2010 and 2012. The rate of injury fatality has slightly increased over time (2010 – 2013) for children living in the second most deprived areas (quintile 2).

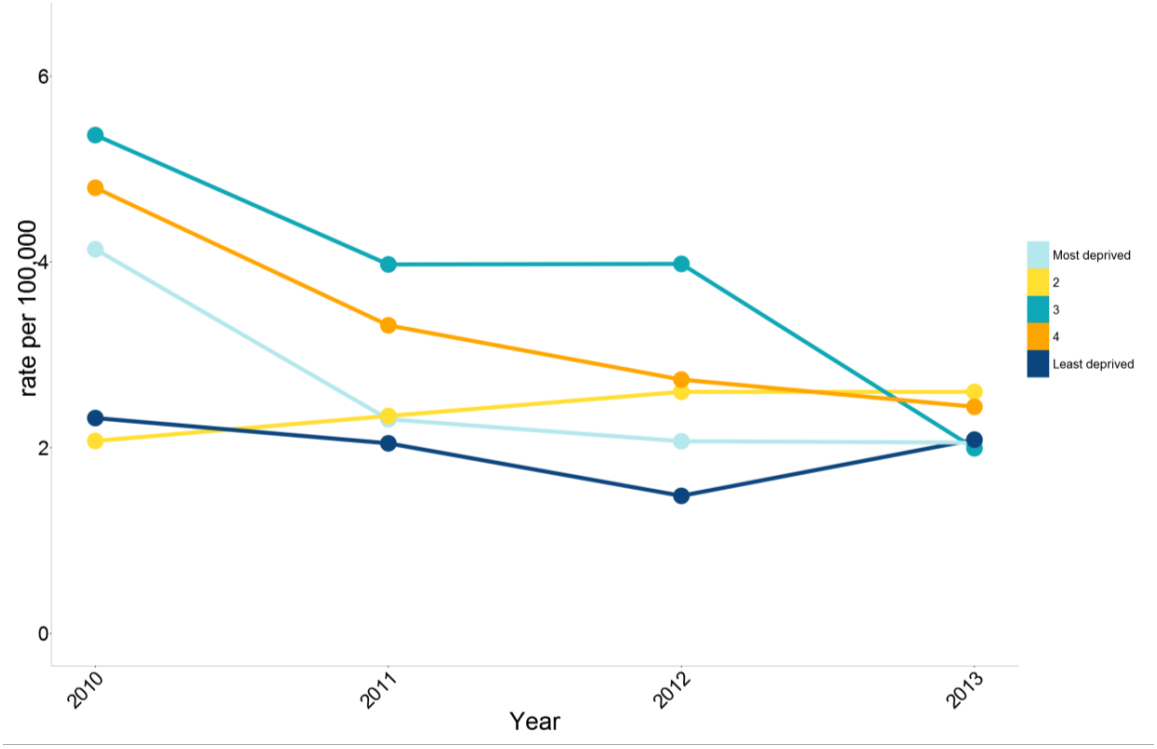

Figure 10 injury death rates for 0-17 year olds in Wales by area level deprivation (moving 3 year average; rate per 100,000 population)

Child injury hospital admissions

Children living in the most deprived area have the highest rate for an injury hospital admission, therefore, indicates a greater risk of suffering a severe injury compared to children living in the least deprived or more affluent areas (figure 11). The rate of injury admission decreases sequentially through the levels of deprivation.

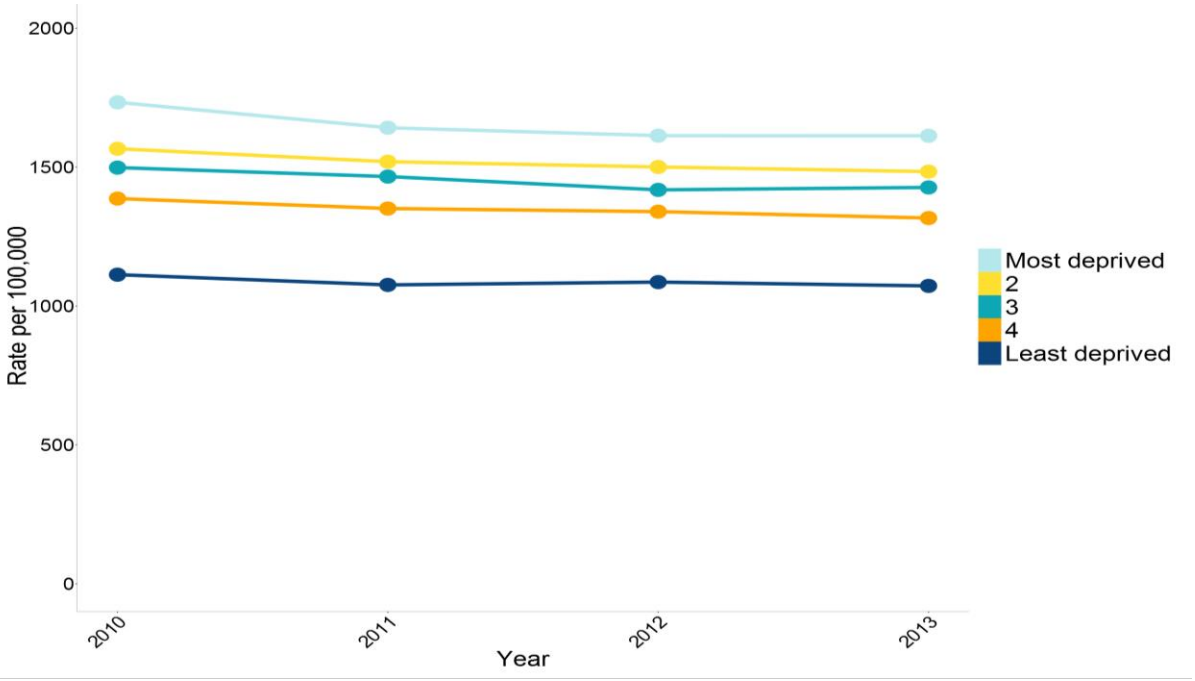

Figure 11 Injury Related Hospital Admission Rates in Children aged 0-17 years in Wales by Area Level deprivation (3 year moving average; rate per 100,000).

Child injury related Emergency Department attendances

Similarly to the above analysis, the rate of injury related Emergency Department attendances is highest in children living in the most deprived areas in Wales and conversely the lowest injury related Emergency Department attendance rates occur in the most affluent areas (figure 12). Over the reporting time the rate of injury related attendances have increased. This trend could be due to data quality improvements in Emergency Departments over time.

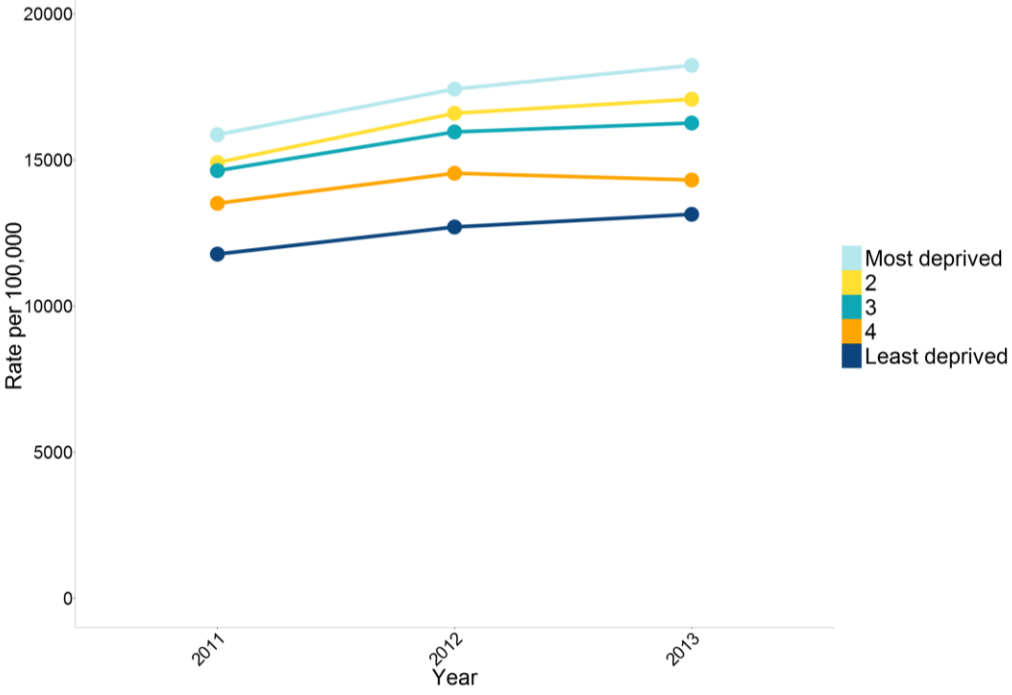

Figure 12 injury related ED attendance rates in Wales for 0-17 year olds by area level deprivation (3 year moving average, rate per 100,000 population).

Child hospital admissions from home injuries in 0 – 4 year olds

The highest rate of hospital admissions resulting from home injuries in 0-4 year olds, ranges from 2145.1 per 100,000 in 2010 to 2028.1 per 100,000 in 2013 (Figure 13) for young children living in the most deprived areas in Wales. In contrast, 0 – 4 year olds living in the least deprived areas of Wales have the lowest rate of home-injury hospital admissions.

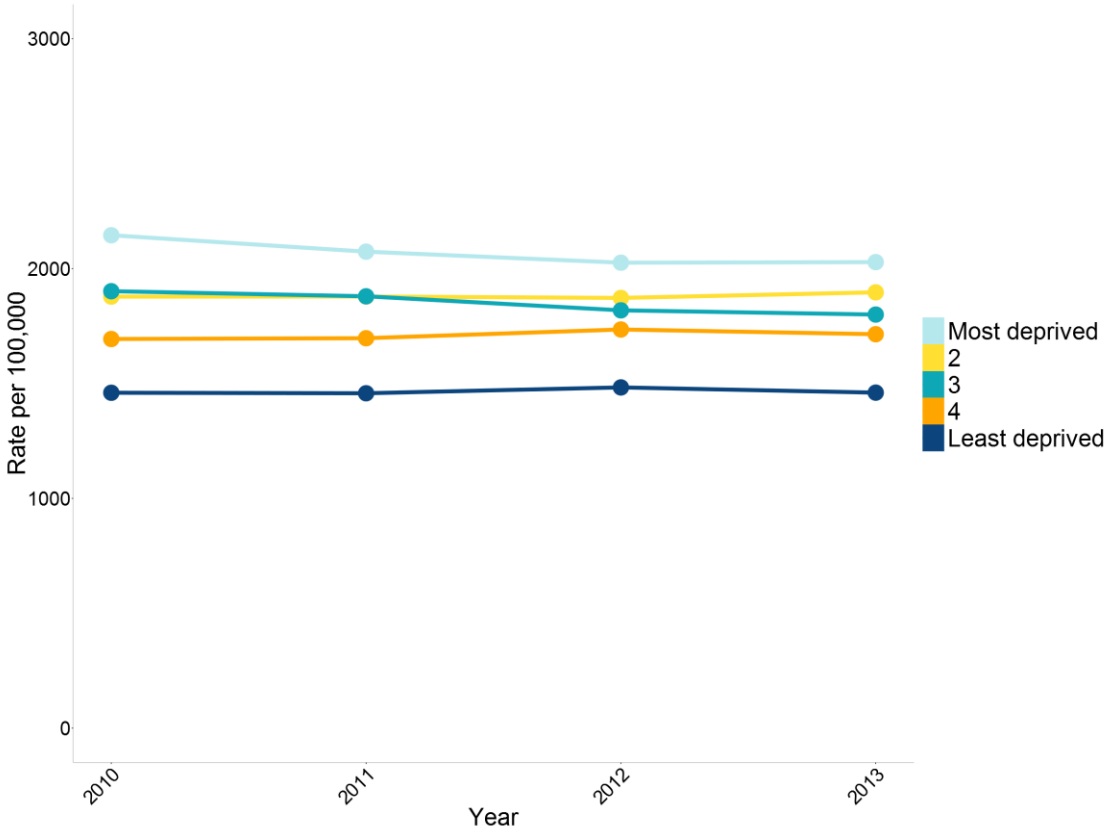

Figure 13 Hospital admission rates in children aged 0-4 years due to estimated home injuries in Wales by area level deprivation (3 year moving average; rate per 100,000 population)

Burn injuries in 0 – 4 year olds

The below bubble plot (Figure 14) presents data for 0 – 4 year olds treated at the Welsh Burns Centre between 2003 and 2012. The bubble size is proportionate to the size of the 0 – 4 year olds population in each deprivation quintile. Over time it can be seen that the difference in rates of burn injuries treated between the most and least deprived areas is reducing, this can clearly be seen between 2003 and 2012 (Figure 14). Over time, the rate burn injury treatments attending the Welsh Burn Centre is the highest for 0 – 4 year olds living in the most deprived areas of Wales, except for 2006, 2008 and 2010.

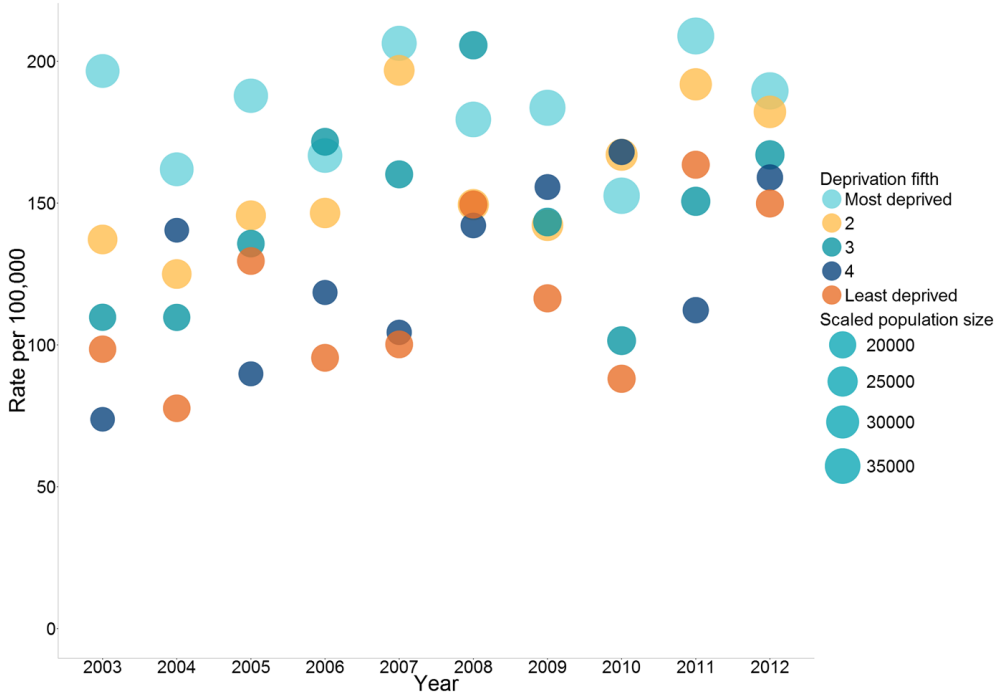

Figure 14 Rate of children aged 0-4 attending the Welsh Centre for Burns unit by area level deprivation (WIMD 2011), between the years 2003 and 2012.

Road Traffic Injury Emergency Department attendances in 5-17 year olds

Figure 15 below identifies that 15-17 years olds living in the most deprived areas in Wales have the highest rate of road traffic injury Emergency Department attendances (Figure 15). For all age groups, the rate of Emergency Department attendances due to road traffic injuries increases from the least to the most deprived areas in Wales.

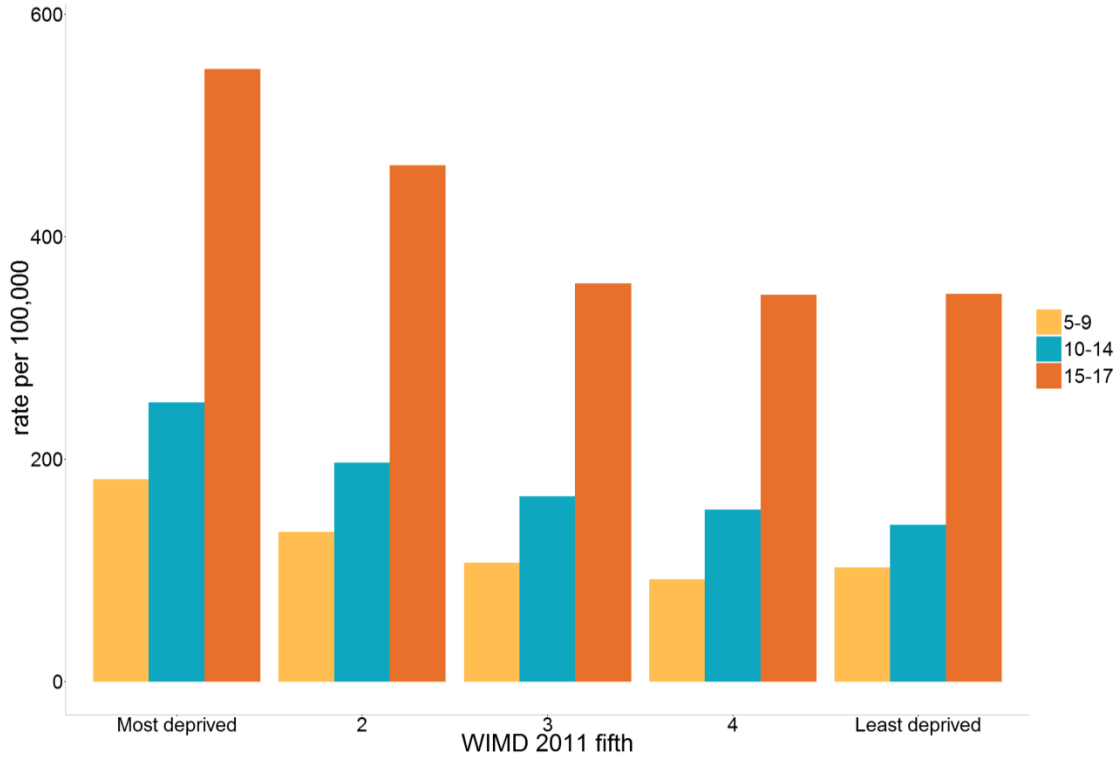

Figure 15 Emergency Department attendance rates due to RTIs for 5-17 year olds in Wales by area level deprivation (2012-2014 average; rate per 100,000 population).

Road Traffic Injury hospital admissions in 5-17 year olds

The highest road traffic injury hospital admission rates can be seen in children aged 10-14 years who live in the most deprived areas in Wales (185.7 per 100,000) (Figure 16). Overall, the highest rates of road traffic injury resulting in a hospital admission can be seen in children living in the most deprived areas in Wales and conversely the lowest rates occurring in children living the most affluent areas in Wales. However, for children aged 15-17 years, the highest rate of road traffic injury hospital admissions live in the middle quintile area of deprivation.

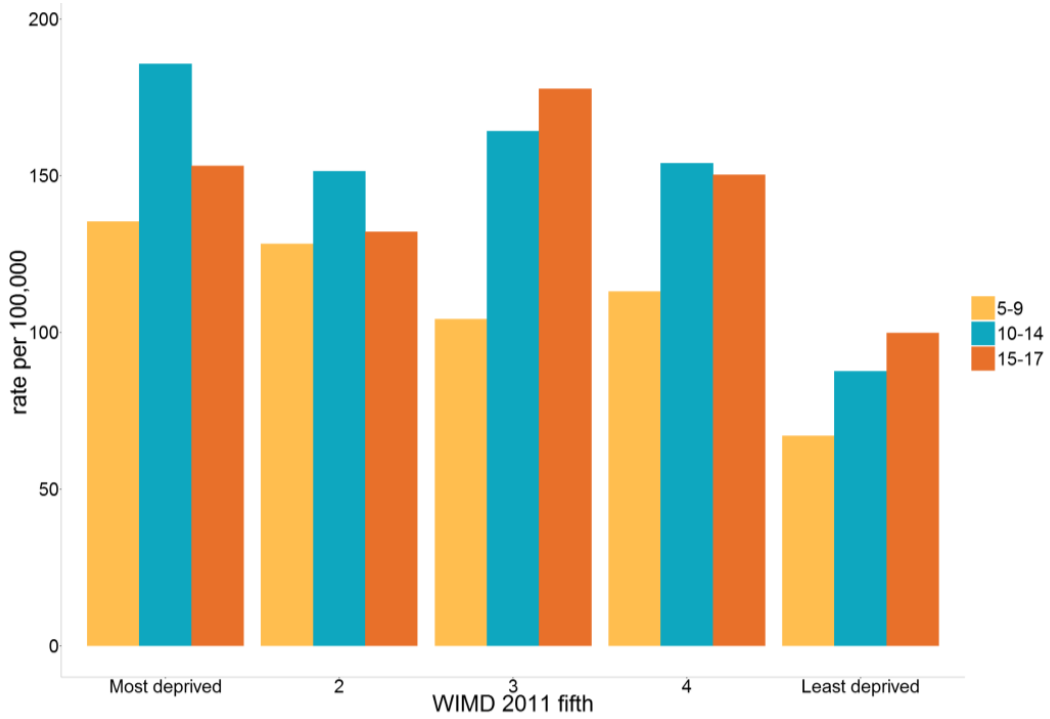

Figure 16 Hospital admission rates due to road traffic collisions for 5-17 year olds in Wales by area level deprivation (2012-2014 average; rate per 100,000 population).

Self-harm Emergency Department attendances in 10-17 year olds

The rate of self-harm Emergency Department attendances increase with increasing area level deprivation (Figure 17). The Emergency Department attendance rates for self-harm ranges from 44.6 per 100,000 for 10-14 year olds living in the least deprived areas and increases to 123.6 per 100,000 for 10- 14 year olds living in the most deprived areas. The ED attendance rates for self-harm ranges from 296.6 per 100,000 for 15-17 year olds living in the least deprived areas and increases to 448.3 per 100,000 for 15-17 year olds living in the most deprived areas.

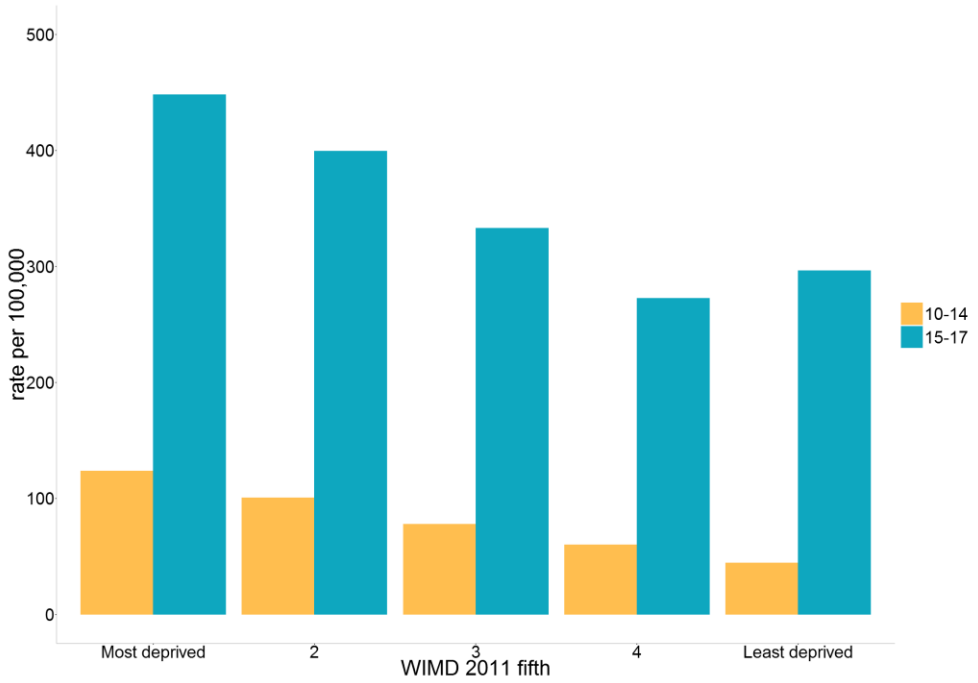

Figure 17 ED attendance rates in children aged 10-17 years due to self-harm in Wales by area level deprivation (2012 – 2014 average; rate per 100,000 population).

Self-harm hospital admissions in 10-17 year olds

As demonstrated previously, the rate of self-harm hospital admissions increase with increasing area level deprivation (Figure 18). The hospital admission rates for self-harm ranges from 165.6 per 100,000 for 10-14 year olds living in the least deprived areas and increases to 293.0 per 100,000 for 10-14 year olds living in the most deprived areas. The hospital admission rates for self-harm ranges from 483.7 per 100,000 for 15-17 year olds living in the least deprived areas and increases to 788.1 per 100,000 for 15-17 year olds living in the most deprived areas (Figure 18).

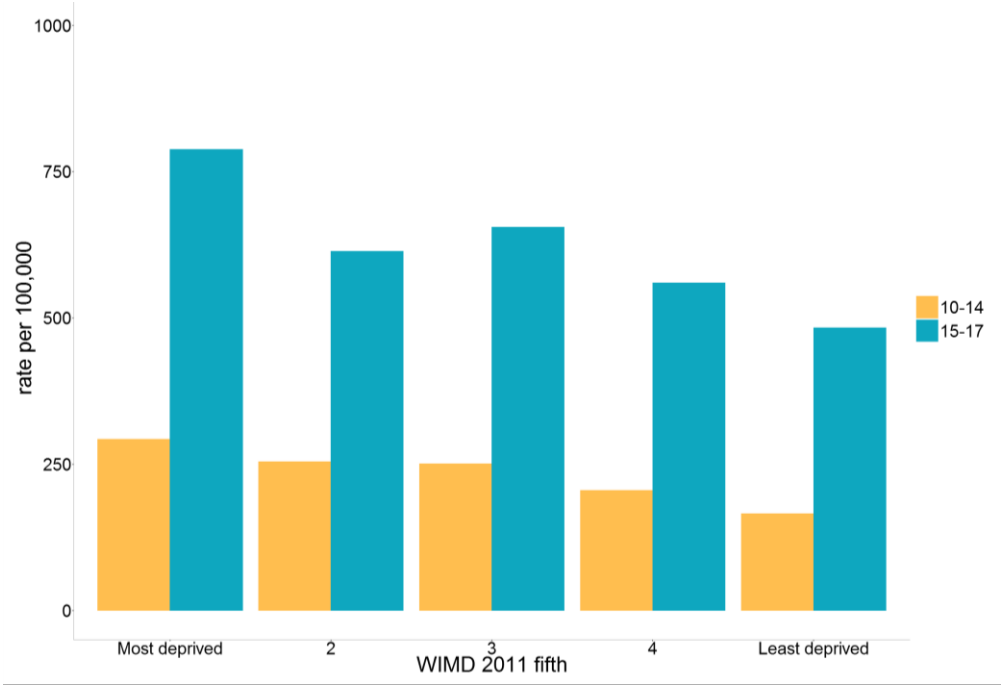

Figure 18 Hospital admission rates in children aged 10-17years due to self-harm in Wales by area level deprivation (2012-2014 average; rate per 100,000 population)

Violence related Emergency Department attendances in 10-17 year olds

The rate of violence related Emergency Department attendances increase with increasing area level deprivation (Figure 19) for children aged 10-14 and 15-17 respectively, (2012 – 2014 average). 15-17 year olds living in the most deprived areas in Wales were 3.3 time more likely to attend an Emergency Department for assault compared to 15-17 year olds living in the most affluent areas (least deprived).

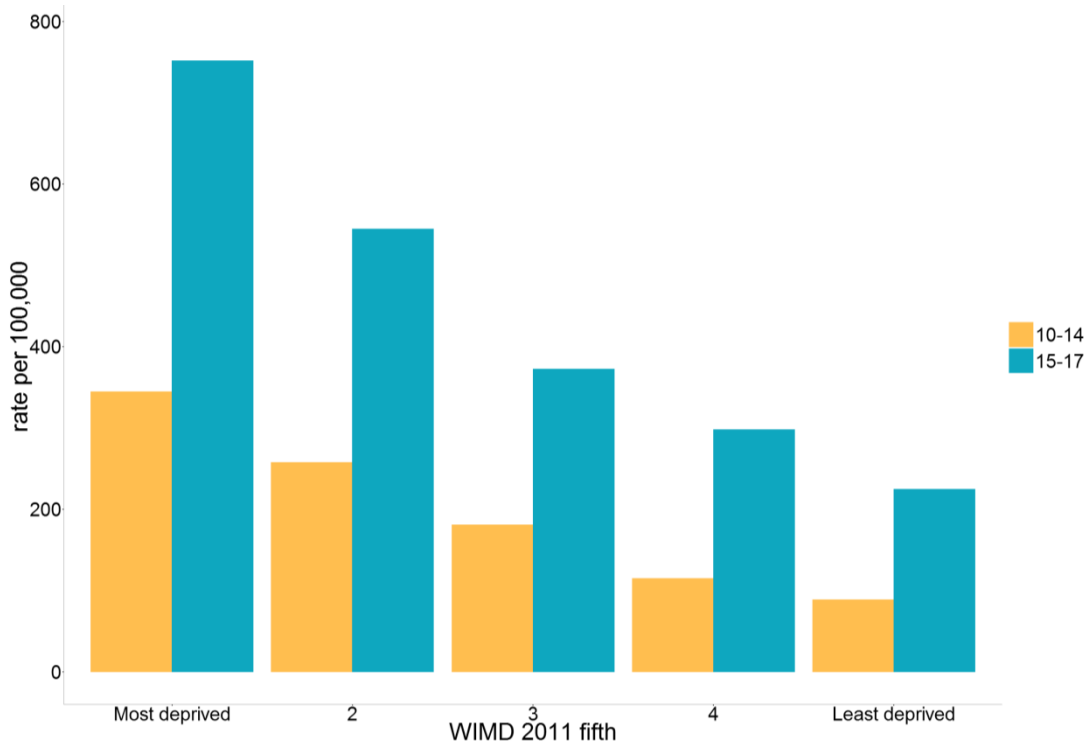

Figure 19 ED attendance rates due to assault for 10-17 year olds in Wales by area level deprivation (2012-2014 average; rate per 100,000 population)

Violence related hospital admissions in 10 -17 year olds

Similar to the previous analysis, the rate of violence related hospital admissions increased with increasing area level deprivation (Figure 20). It is 3.4 times more likely for a 15-17 year old living in the most deprived areas of Wales to be admitted to hospital for assault compared to 15-17 year olds living in the least deprived areas in Wales.

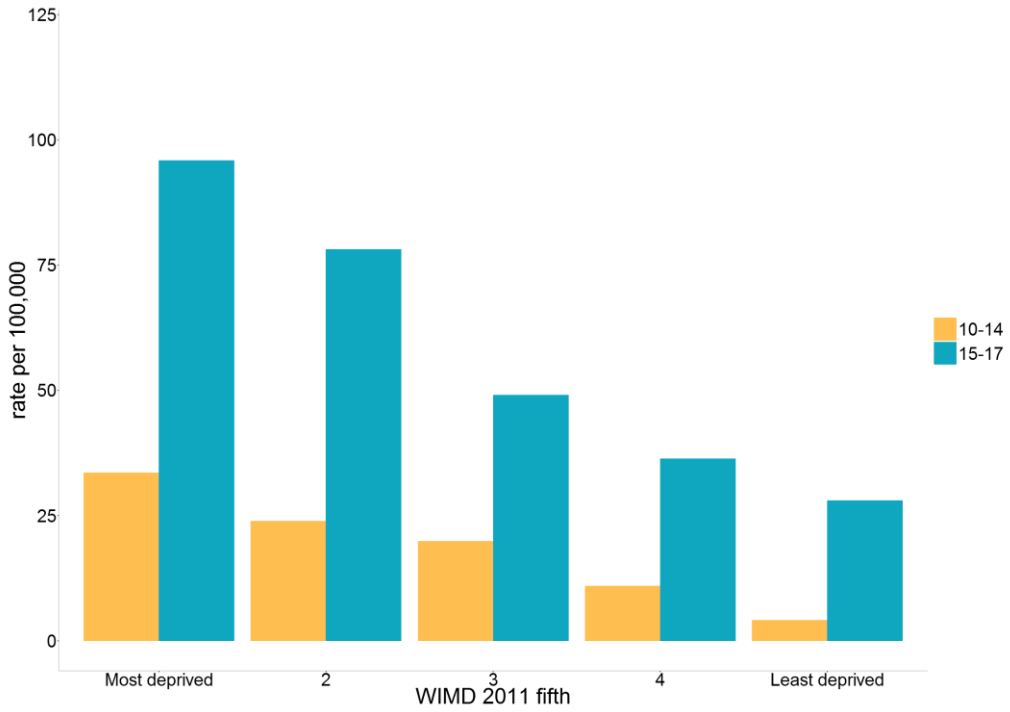

Figure 20 Hospital admission rates due to assault for 10-17 year olds in Wales by area level deprivation (2012-2014 average; rate per 100,000 population).

Case Study 2: Area level SES analyses conducted for hospital admissions relating to educational status, by the National Board of Health and Welfare (Socialstyrelsen) in Sweden.

The National Board of Health and Welfare (Socialstyrelsen) in Sweden have published statistics on hospitalisation from injuries and poisonings in 2015 [9]. This publication includes hospitalisation relating to educational status, the personal identification number in the Swedish patient register and register of education have been matched to carry out analysis.

Individuals aged 30-79 years of age who are less well-educated, primary education only, were more likely to be admitted to hospital as a result of an injury (Table 2). For self-harm injuries, it is five times more common to be admitted to hospital for individuals with only a primary school education compared to having a post-secondary education. Likewise, for assault injuries, it is seven times more common to be admitted to hospital for individuals with only a primary school education compared to having a post-secondary education (Table 2).

Regarding hospital admissions relating to road traffic accidents, there are similar rates for hospitalisation for women of differing education level. However, hospitalisation following road traffic accidents are more common in less well-educated men (Table 2).

Table 2: Number of patients per 100,000 inhabitants coded with an external causes by educational level and sex, 30–79 year, 2015 (age standardized)

	Women				Men			
External cause	Primary	Secondary	Post-secondary	Total	Primary	Secondary	Post-secondary	Total
All accidents V01-X59	898	779	647	747	1,081	869	630	825
Transport accidents inv olv ing v ehicle primarily intended for road traffic usage (V01-V79)	63	63	59	61	137	119	91	111
Fall accident (W00-W19)	629	543	441	524	611	503	374	485
Exposure to inanimate mechanical forces (W20–W49)	43	31	25	29	134	104	61	93
Exposure to animate mechanical forces (W50–W64)	25	23	16	20	28	23	13	20
Accidental poisoning by and exposure to noxious substances(X40-X49)	31	19	11	17	40	20	9	18
Intentional self-harm (X60-X84)	178	96	40	76	145	68	26	61
Assault (X85-Y09)	32	10	5	9	62	26	9	25
Ev ent of undetermined intent (Y10-Y34)	16	10	5	9	23	12	4	11

Source: Swedish Patient Register, National Board of Health and Welfare and the Swedish Register of Education, Statistics Sweden

Discussion and Conclusions

This report focuses on inequalities in gender, age and socioeconomic status (SES). The IDB Minimum Data Set was used to obtain injury incidence, gender and age data and Eurostat was used to obtain country level SES indicators. Area level SES case studies from Wales and Sweden have also been included as no SES indicators are currently included in the IDB.

The individual level for age and sex inequalities analyses were divided into four key areas of injuries: Home, Leisure, School and Sports Injuries (HLSS); Road Traffic Injuries; Self-Harm Injuries and fall related injuries as well as all causal factors of injuries.

Findings have shown that the risk of injury varies by age and gender. Males are at greater risk of suffering any injury until the age of 60 compared to women. Those most at risk of an injury related Emergency Department attendance are young children (1-4 years), teenagers (10 – 19) and older people (80+ years). The spike in these injury groups is likely to be related to developmental and mobility changes, risk taking and frailty, respectively. These findings are similar to injuries relating to HLSS, with the difference of females having an increased risk of injury from an earlier age (50+ instead of 60+ years) compared to males. This is also mimicked in fall related injuries which sees females having a higher rate of fall related injuries from the age of 50 onwards compared to males and is a contributing factor to the increase in all injuries in females. This increased risk observed is likely to be related to osteoporosis in post-menopausal women which is a risk factor for falls and subsequent fractures. Males are more likely to be involved in a road traffic injury throughout their life compared to women. There is a clear peak of injuries occurring in 15-19 year olds for both males and females and this is likely to be due to new and inexperienced drivers on the road. Females are at a greater risk of self-harm related injuries throughout the age groups except for the 65-69, and 85+ age groups.

The SES indicator analyses using the AROPE rate and GDP per capita in PPS indicators demonstrated that there is a positive correlation between the percentage of the population At Risk Of Poverty and social Exclusion (AROPE) and the rate of all causal injury rate, child (1-4 years) injury rates and self-harm injury rates. Therefore, the greater the proportion of the population living with a lower social-economic status the greater the risk of injury. The comparison of the GDP per capita in PPS presented similar results in that countries with a GDP per capita in PPS greater than the EU average of 100 had a higher rate of work related injuries.

To support this report, two more detailed cases studies containing area level SES analyses were included. Analyses carried out on Welsh data demonstrated that children living in the most deprived areas in Wales have greater rates of injury fatalities, injury hospital admissions and injury related Emergency Department attendances. Similarly, analyses carried on Sweden on injury hospitalisation relating to educational status demonstrated that individuals less well-educated are more likely to be admitted to hospital for an injury, particularly self-harm and assault related injuries. Therefore, these case studies have demonstrated the difference in socio-economic status in contributing to the risk of injury.

This reports provides evidences and raises awareness of the risk of injury due to sex, age and socio-economic inequalities. It highlights the different age and gender groups at risk of higher rates of injuries such as: young drivers, older women at risk of fall related injuries, and those from less affluent communities or who have lower educational levels that are particularly in need of preventative interventions. These preventative interventions could be developed as part of a multinational action plan to improve safety, monitor injuries over time to identify changes in prevalence and therefore, allow for the evaluation of these interventions. It would be helpful if the IDB contained individual measures of socio-economic disadvantage to evaluate the effectiveness of policies and interventions designed to reduce inequalities in injury occurrence.

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