

Assessing the burden of injury in six European countries

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Objective To assess injury-related mortality, disability and disability-adjusted life years (DALYs) in six European countries.

Methods Epidemiological data (hospital discharge registers, emergency department registers, mortality databases) were obtained for Austria, Denmark, Ireland, Netherlands, Norway, and the United Kingdom (England and Wales). For each country, the burden of injury was estimated in years lost due to premature mortality (YLL), years lived with disability (YLD), and DALYs (per 1000 persons).

Findings We observed marked differences in the burden of injury between countries. Austria lost the largest number of DALYs (25 per 1000 persons), followed by Denmark, Norway and Ireland (17–20 per 1000 persons). In the Netherlands and United Kingdom, the total burden due to injuries was relatively low (12 per 1000 persons). The variation between countries was attributable to a high variation in premature mortality (YLL varied from 9–17 per 1000 persons) and disability (YLD varied from 2–8 per 1000 persons). In all countries, males aged 25–44 years represented one third of the total injury burden, mainly due to traffic and intentional injuries. Spinal cord injury and skull–brain injury resulted in the highest burden due to permanent disability.

Conclusion The burden of injury varies considerably among the six participating European countries, but males aged 15–24 years are responsible for a disproportionate share of the assessed burden of injury in all countries. Consistent injury control policy is supported by high-quality summary measures of population health. There is an urgent need for standardized data on the incidence and functional consequences of injury.

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يمكن الاطلاع على الملخص بالعربية في صفحة 34.

Introduction

Injuries are a major cause of morbidity and mortality in developing and in industrialized regions.^{1,2} Rational choices for injury prevention need to rely on comparable indicators relating the burden of injury to other diseases, and determining the most prevailing and incapacitating types of injury. Summary measures of population health, such as the disability-adjusted life year (DALY) are designed for the comparative analysis of burden.³ The value of the DALY as a tool for health policy and planning purposes has been increasingly recognized.⁴ The DALY combines information on premature mortality and disability due to non-fatal health outcomes. It is a so-called 'health gap measure' of which the quantitations can be interpreted as the gap between the current population

health status and an ideal situation in which everyone would live into old age free of disease and disability.⁵ The DALY was designed to assess the burden of disease beyond mortality and was aimed for national and international health policies, to develop unbiased epidemiological assessments for major disorders, and to provide an outcome measure that could also be used for cost–effectiveness analysis.⁶

The human impact of injury in terms of DALYs in the World Health Organization (WHO) European Region by country, age, sex, injury type and external cause has been very little studied. Expected variation in the burden of injury among the European countries may be due to differences in exposure, injury risk and type of sustained injury, differences in demography, (socio)economic

and cultural factors, safety technology, injury-prevention strategies, and the effectiveness of trauma care. Assessment of the variation and its constituent components can be used to identify high-risk groups in Europe and in specific countries and to prioritize injury-prevention programmes.

We assessed the burden of injury — expressed in the summary measure of DALYs and its constituent components, namely premature mortality (years of life lost, YLL) and years lived with disability (YLD) — in six European countries. Data collection and analysis were done within a European collaborative effort, the EURO COST project. Comparative data on medical costs of hospitalized injury patients in Europe, based on the same incidence data, have been published elsewhere.⁷

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Table 1. Incidence and mortality due to injury in 1999 per country: absolute numbers and rates per 1000 persons

Country	Absolute numbers			Per 1000 inhabitants		
	Incidence		Deaths ^c	Incidence		Mortality rate ^c
	Not-admitted ED ^a patients	Hospitalized patients ^b		Not-admitted ED ^a patients	Hospitalized patients ^b	
Austria	483 269 ^d	187 225	8 798	39.6 ^d	21.7	1.9
Denmark	650 125 ^e	99 618	6 824	115.1 ^e	15.4	4.0
Ireland	115 696 ^d	58 196	3 206	23.7 ^d	12.5	2.0
Netherlands	1 100 455 ^f	102 768	10 378	63.6 ^f	5.2	1.9
Norway	417 309 ^f	66 962	4 962	79.7 ^f	12.9	3.3
England	5 755 936 ^d	632 179	33 078	105.0 ^d	9.1	1.3
Wales	323 606 ^f	48 266		97.3 ^f	12.3	

^a ED = Emergency department; data extrapolated.

^b Data from hospital discharge registers.

^c Data from WHO mortality database.

^d Home and leisure injury data included.

^e Unintentional injury data included.

^f All injury data included.

Materials and methods

General approach

We compared the number of lost DALYs attributable to unintentional and intentional injuries in the following European countries: Austria, Denmark, Ireland, Netherlands, Norway, and the United Kingdom (England and Wales). Comparable data sources in other European countries were either unavailable or could not be collected and analysed within the framework used. We used two primary data sources: hospital discharge registers with full national coverage to estimate the hospitalization rate; and emergency-department (ED) surveillance systems (both for the year 1999) for the incidence of non-admitted ED patients.^{7–9} Since ED systems did not have nationwide coverage, country-specific extrapolation factors were used to extrapolate the ED incidence for the respective types of injury by country towards national level. For Ireland, the Netherlands, and the United Kingdom (England and Wales), this extrapolation was based on the number of these two variables recorded in ED systems as a proportion of ED visits and hospital admissions in national statistics. In Austria, Denmark, and Norway, population data by age and sex from the catchment areas of participating hospitals were used to extrapolate ED surveillance data to national level.^{8,9} To adjust for differences in the demographic composition of the countries, we standardized incidence rates for age (5-year age groups) and

sex, using the direct method of standardization.

We computed YLL using a standard life table.^{3,10} YLD were obtained by multiplying frequency, duration and injury-specific severity weights of the injury. DALYs were the summation of YLLs and YLDs.³

Incidence of non-admitted and admitted patients and mortality data

We used the International Classification of Disease codes 800 to 999 (ICD, 9th revision)¹¹ and corresponding codes of ICD-10 for countries that used this revision to select and classify both unintentional and intentional injuries. We excluded 'misadventures to patients during surgical and medical care' (ICD-9 E996–999, E870–E876), 'surgical and medical procedures as the cause of abnormal reaction of patients or later complication, without mention of misadventure at the time of procedure' (ICD-9 E878–E879), 'drugs, medications and biological substances causing adverse effects in therapeutic use' (ICD-9 E930–E949), and late effects of injury (ICD-9 E905–E909), since these injuries are not usually included in the domain of injury prevention.¹²

Table 1 provides an overview of the data by country. Non-hospitalized injury patients included in the study were derived from ED systems, while hospitalized patients were derived from hospital discharge registers. Data on repeated hospitalizations of the same individual

were only available from the hospital discharge registers systems of Austria, Norway and the Netherlands, where 0.7%, 8.6%, and 2.6% respectively of hospitalized patients were readmissions. This will lead to an overestimate of the incidence and burden of injury. Also it was not feasible to standardize for the quality of health care, a major determinant of disability due to injuries. For the Netherlands, Norway and Wales, the ED surveillance system comprised all types of injuries, while for Denmark it was confined to all unintentional injuries; and for Austria, Ireland and England only to home and leisure injuries. Home and leisure injuries account for 70–78% of ED visits for the three countries with all injury data available.

For the mortality data, we used age- and sex-specific death rates from the WHO mortality database for the year 1999.¹³ These data included information on the external cause, while information on injury diagnosis (Appendix A, available in web version only) is not usually available.

YLD

The number of years lived with disability is obtained by multiplying the incidence of cases of injury (both hospitalized and non-admitted ED) by the average duration of the recovery, based on the weights per injury group as recommended in the Global Burden of Disease (GBD) study, performed at the request of WHO, and by a disability weight. Disability weights are valuations that represent the severity

Table 2. Disability, premature mortality, and burden related to injury by country (per 1000 persons)

Country	Disability			Premature mortality	Burden of injury	
	YLD ^a Not admitted short-term	YLD ^a Admitted short-term	YLD ^a Admitted lifelong	YLD ^a Total	YLL ^b	DALY ^c
Austria	0.2	0.2 ^d	7.7	8.2	17.1	25.3
Denmark	0.4	0.4 ^e	2.8	3.4	15.5	18.9
Ireland	0.1	0.1 ^d	4.1	4.3	15.3	19.6
Netherlands	0.2	0.2 ^f	2.8	3.1	9.4	12.6
Norway	0.3	0.3 ^f	2.6	3.2	14.1	17.2
England	0.3	0.3 ^d	2.0	2.4		12.2
Wales	0.3	0.3 ^f	2.1	2.5	9.8	12.3

^a YLD = years lived with disability.

^b YLL = years lost due to premature mortality.

^c DALY = disability-adjusted life years.

^d All injury data.

^e Unintentional injury data.

^f Home and leisure injury data.

of health status associated with specific diseases and injuries.³ The GBD weights and our data sources were compatible for thirty-three injury groups (Appendix A, available in web version only). Burns were excluded from the analyses since our data were not specific about the percentage surface area burned and/or severity of the wounds, while available data on recovery duration and disability are specific for wound severity. Concussions, whiplash, and superficial injury have an unknown disability weight. For patients with these conditions no YLD could be calculated.

The GBD determined a comprehensive set of short-term (first year after injury) and lifelong sequelae. It is assumed that not-admitted ED patients only suffered short-term disability. For hospitalized patients, the GBD formulated injuries with lifelong disability for at least a predefined proportion of the total admitted patients (skull-brain injury, 15%; spinal cord injury, 100%; injury of the nerves, 100%; amputations of the lower and upper extremity, 100%; fracture hip, 5%; and fracture femur shaft, 5%).³ Durations of permanent disability were estimated by multiplying the incidence by the age- and sex-specific life expectancies, derived from the standard life table used in the GBD study (West Level 26 life-table).³ Because the majority of patients with eye injury in industrialized countries have only minor temporary problems, we adopted the assumption of the Australian burden of disease study,¹⁴ which used the short-term disability weight of open wounds

for eye injury. Lastly, to avoid double counting with the YLL, the fraction of hospitalized injury patients who died in hospital was excluded from the YLD calculations.

YLL were calculated from the West Level 26 life-table and estimates of mean age at death by age groups¹⁰ (standard life expectancy at birth, 80.0 years for males and 82.5 years for females). To yield YLL due to injury, standard YLL were multiplied by mortality rates and population numbers. Age-weights or discounting were not applied in the calculations, because this practice is controversial.⁸

Results

DALYs by country

There were marked differences in the burden of injury among the participating European countries (Table 2). Austria lost the largest number of DALYs (25 DALYs per 1000 persons) resulting from injuries, followed by Denmark, Norway and Ireland with quite comparable estimates varying between 17 and 20 DALYs per 1000 persons, respectively. In the Netherlands and the United Kingdom, the total number of DALYs was relatively low (12 DALYs per 1000 persons). The variation in the burden of injury between the countries, as shown in Table 2, is due to high variation in premature mortality (YLL varies from 9.4 in the Netherlands to 17.1 per 1000 persons in Austria) and in disability (YLD varies from 2.4 in England to 8.2 per 1000 persons in Austria).

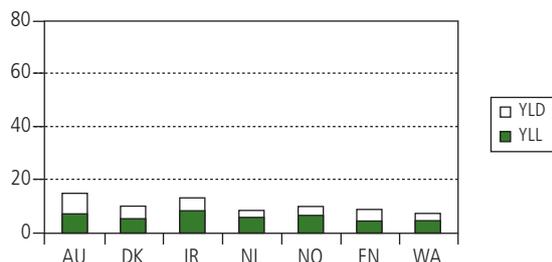
In all participating countries, 68–82% of the total burden was caused by premature mortality. The burden due to permanent (lifelong) disability was high compared with temporary (short-term) disability. The total burden of short-term disability of non-hospitalized patients is similar to hospitalized patients, because the number of non-hospitalized patients is much larger.

DALYs by age and sex

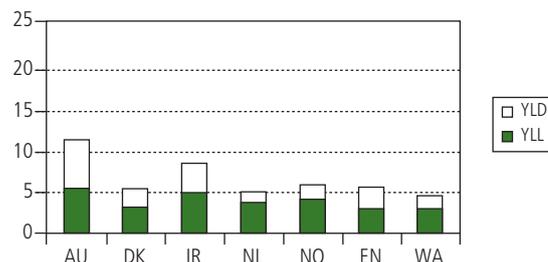
Fig. 1 gives an overview of the total DALYs (separated into YLL and YLD) by age and sex for all participating countries. Males were responsible for 65% of the total injury burden. The highest number of DALYs per 1000 persons is observed in males aged 15–24 years for all countries, which is caused by high premature mortality (YLL). However, males aged 25–44 years have the highest share in the total burden of injury, ranging from 46% in Wales to 24% in the Netherlands and Norway. In this age group, the burden of premature mortality is more than three times higher for males than for females in all countries. There are striking differences in total DALYs due to injuries by age and sex among European countries. Noteworthy is the high burden for children and adolescents in Austria and Ireland, middle-aged persons in Austria, and females above age 65 years in Denmark and Norway. The Netherlands, England, and Wales show a relatively low burden of injury across all age groups and for both sexes.

Fig. 1. The burden of injury as DALYs per 1000 persons, divided into YLL and YLD, by age, sex and country

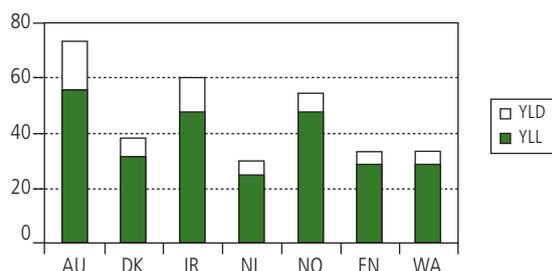
Males age 0–14 years



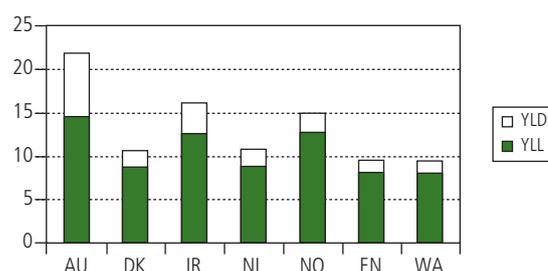
Females age 0–14 years



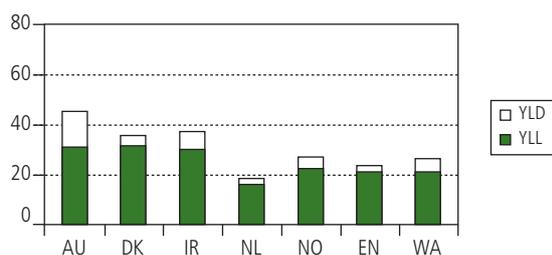
Males age 15–24 years



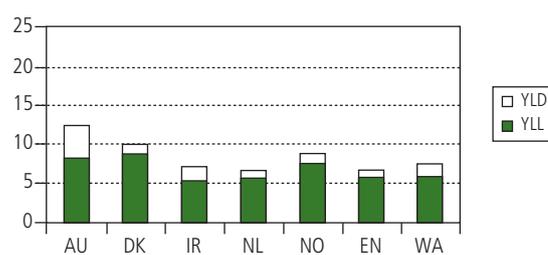
Females age 15–24 years



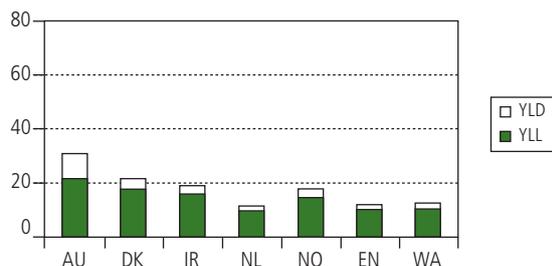
Males age 25–44 years



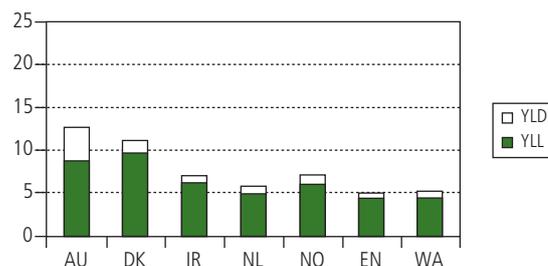
Females age 25–44 years



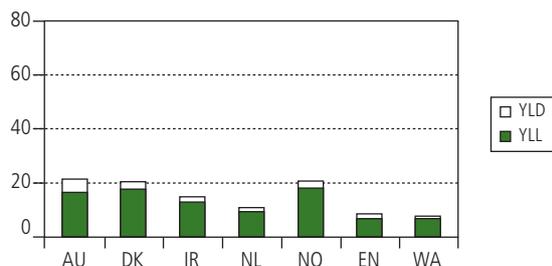
Males age 45–64 years



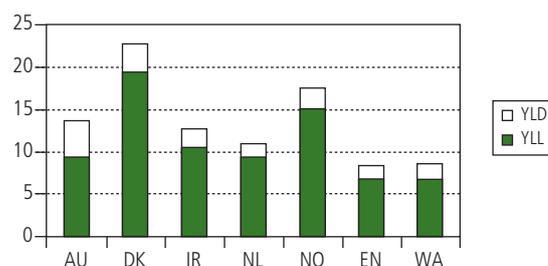
Females age 45–64 years



Males age 65+ years



Females age 65+ years

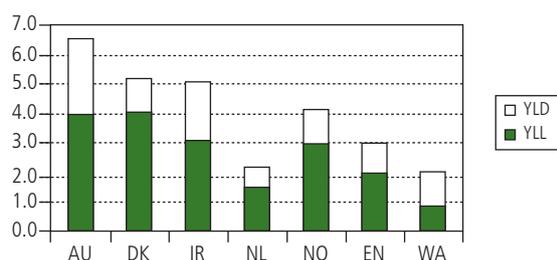


Note: the scale of the y-axis differs for males and females.

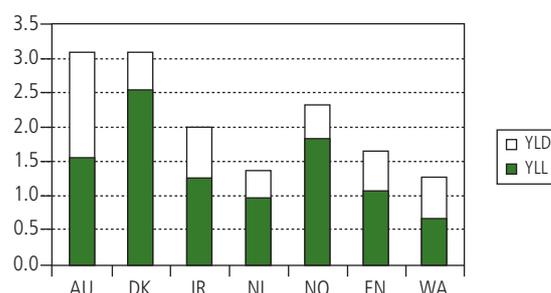
YLD = Years lived with disability; YLL = Years lost through premature mortality; AU = Austria; DK = Denmark; IR = Ireland; NL = Netherlands; NO = Norway; EN = England; WA = Wales.

Fig. 2. DALYs per 1000 persons by external cause, sex and country

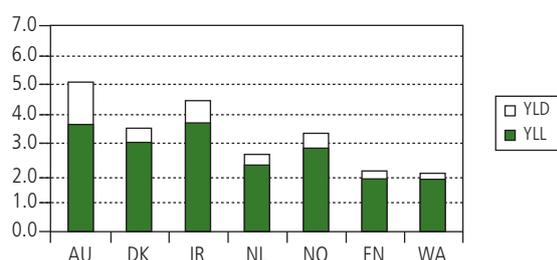
Non-traffic (unintentional) - Male



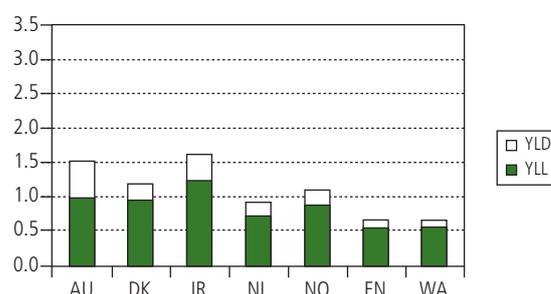
Non-traffic (unintentional) - Female



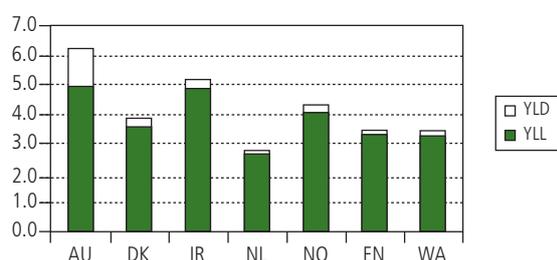
Traffic - Male



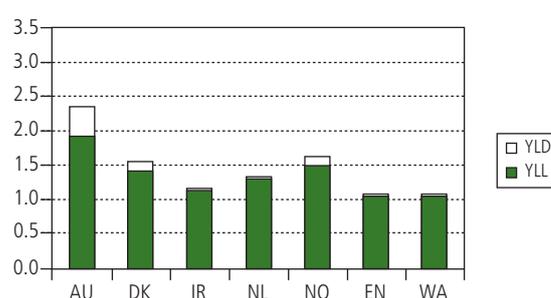
Traffic - Female



Intentional - Male



Intentional - Female



Note: the scale of the y-axis differs for males and females

YLD = Years lived with disability; YLL = Years lost through premature mortality; AU = Austria; DK = Denmark; IR = Ireland; NL = Netherlands; NO = Norway; EN = England; WA = Wales.

DALYs by external cause

The burden of intentional injuries is predominantly attributable to premature mortality (interpersonal violence and suicide). Traffic injuries lead to considerable morbidity and premature mortality (Fig. 2). The burden of unintentional non-traffic injury (mainly accidental fall) is for a large part caused by disability because of hip fracture. There exist striking differences in the total DALYs by external cause between the participating countries. Austria has the highest injury burden for all external cause groups, with a relatively high contribution of YLD. The Netherlands and the United

Kingdom have a low burden across all external causes. Ireland has a high burden of traffic injury for males and females. Males in Ireland also cause a high burden due to intentional injuries, compared with the other countries. In Denmark and Norway, the largest part of the total burden is caused by unintentional non-traffic injuries. Noteworthy is the relatively high mortality caused by non-traffic injuries for females in Denmark. The burden of intentional injury varies between countries, an observation that is mainly attributable to international differences in suicide rates.

YLD by injury group

The injury burden by injury group incorporates disability only, because injury-specific mortality data were not available (Table 3). Skull-brain and spinal cord injury resulted in the highest total YLD due to lifelong disability in a relatively young patient group. Hip fracture resulted in the highest short-term disability, due to a high clinical incidence. The high injury disability in Austria and Ireland, as shown in Table 2, is mainly caused by a high incidence of skull-brain injury due to traffic accidents in relatively young patients (data not shown).

Discussion

The differences in the burden of injury are large among the six participating European countries. Austria tops the table with the highest burden, and the Netherlands and the United Kingdom are at the bottom. Differences in premature mortality and disability both contribute to the variation in injury burden. In all countries the highest burden is observed among adolescents, and among persons aged 15–64 years the burden of injury for males is about three times higher than for females.

Our study has identified high-risk groups for premature injury-related mortality and/or disability. At the European level, males aged 25–44 years are a major high-risk group, since they cause one-third of the total injury burden (mainly because of traffic accidents and intentional injuries) in all participating countries. At the country level, specific combinations of external causes and types of injury deserve special attention. A high incidence of skull–brain injuries resulting from traffic accidents in young people, for example, appears to be one of the factors behind the unfavourable position of Austria in terms of YLD and DALYs.

Our results are mostly in agreement with the corresponding age-adjusted mortality rate based on WHO mortality data (Appendix B, available in web version only). Austria and Ireland present the highest mortality rates among the younger age groups (age 0–24 years), corresponding to the remarkably high YLL and the derivative DALYs for these countries. In contrast, although Denmark is by far the country with the highest injury mortality rate among the elderly (age 65+ years), this age group contributes only a small percentage to the estimation of the all-age YLL and DALYs as the life expectancy of persons in this group is much shorter than that of younger persons. The Netherlands and the United Kingdom present the lowest mortality rates in each age group, an observation that is in agreement with their relatively low numbers of DALYs.

Our findings for six European countries are similar to those for Australia, where males of age 25–44 years also had the highest share in the total burden of injury,¹⁴ and the burden of injury is dominated by intentional and traffic injuries.

On several issues, the assessment of the burden of injury and international

Table 3. Leading injury groups by clinical incidence and disability caused per 1000 persons (ranked by total YLD for short- and long-term disability)

Rank	Injury	Clinical incidence ^a	Disability		
			YLD short-term	YLD lifelong	YLD total
1	Skull–brain	25.1	1.4	85.4	86.8
2	Spinal cord	2.4	^b	82.6	82.6
3	Amputation upper extremity	27.6	^b	35.5	35.5
4	Fracture hip	125.9	6.8	23.5	30.4
5	Injury of nerves	5.7	^b	24.6	24.6
6	Amputation lower extremity	12.9	^b	22.0	22.0
7	Fracture femur shaft	10.9	0.6	7.6	8.2
8	Fracture knee/lower leg	57.8	1.0	^c	1.0
9	Vertebral column and spine	19.5	0.7	^c	0.7
10	Fracture elbow / forearm	41.2	0.7		0.7

^a From hospital discharge registers.

^b All patients have lifelong disability.

^c All patients have short-term disability.

variation therein needs to be improved. Injury mortality data are considered to be valid, except for the elderly, in whom mortality rates for unclassified injuries vary widely (from 4.9/100 000 for Ireland to 42.0/100 000 population for the Netherlands) and comorbidity is an issue of concern. Therefore, the estimated differences in YLL and DALYs in the elderly should be interpreted with caution.

In each country, cause-specific mortality was registered on a regular basis with national coverage, allowing cross-country comparisons by age, sex, and external cause. The availability of injury-specific mortality data (e.g. skull–brain injury, spinal cord injury) should further improve the possibilities to analyse and interpret international variation in YLL.

Incidence data for non-admitted ED patients with traffic and intentional injuries were not available in all participating countries. Although this hampered straightforward international comparisons of short-term YLD, its influence is probably modest, since the majority of the injuries of non-admitted ED patients are home and leisure injuries (75%),¹⁵ and their share in the total burden is low (for most countries, less than 2%). Similarly, uncertainty in the estimates of the number of non-hospitalized injury patients because of the extrapolation of sample data is likely to have a small impact on (international differences in) disability, because this is dominated by long-term disability in hospitalized patients. Therefore, an important target for improvement is the estimate of YLD

resulting from lifelong disability, which has been estimated conservatively in this study. In our results the YLD for non-admitted injury patients are underestimated owing to incomplete DALY estimates; for some frequently occurring injuries (concussion, superficial injury), no disability weights were estimated in the GBD study. Among these primarily non-admitted patients, there is a small proportion with long-term disability, which may lead to a high estimate of prevalence of disability owing to high annual numbers of patients,^{16,17} and thus results in an underestimation of YLD. Although burns are a very disabling type of injury, they were excluded from our analysis. In the data we used no information was available about severity of the wounds (percentage surface area burned) — which is essential for linking the incidence data to existing data on disability — no valid YLD estimates could be made.

The most important issue, however, with respect to international variation in YLD, seems to be the cross-country comparability of the data on injury incidence. In our study, all injuries were similarly valued for all countries, irrespective of the severity of the injury, differences in health-care systems, and differences in registration practice. However, in an earlier paper we concluded that Austria has a high clinical incidence of injuries of low severity, indicating a low admission threshold.⁷ Therefore, in Austria the burden of injury in terms of YLD could be relatively over-estimated. This observation points to the need for international

standardization of injury incidence data.⁹ Information on injury severity by validated instruments (abbreviated injury scale, AIS; injury severity scale, ISS)¹⁸ for non-hospitalized and hospitalized patients at the ED could support this. Also, good correspondence between the available epidemiological data and disability weights is essential for burden assessment,¹⁹ for instance, by standardized data collection about frequency, duration and severity of functional consequences in injury patients.²⁰

Burden of injury studies are only as good as the weakest link in the chain, which is the epidemiological data.²¹ Agenda setting for the collection of epidemiological data is perhaps the most important issue to emerge from our study. Further consideration and development are required to improve the quality of the data collected by routine and standardized methods, and thus indirectly to improve the validity of the measurement

of the burden of disease due to injuries. Also, more detailed modelling of incidence, prevalence, mortality and burden for specific injury groups is necessary.

Priorities within international and national health policy will depend on whether the primary aim is an improvement in health care or cost reduction. In an earlier study based on the same data, we estimated medical costs incurred by hospitalized injury patients.⁷ We concluded that elderly women (aged 65+ years) consume a disproportionate share of hospital resources for trauma care, mainly caused by hip and femur fractures due to non-traffic injuries. On the basis of our current study, we conclude that males aged 15–44 years with traffic and intentional injuries are an important target for intervention. This demonstrates that health-care costs and the human impact of injury are complementary indicators for national and international health policy. Ideally, costs and burden

of injury should be analysed in a combined perspective.

Unintentional and intentional injuries cause 10% of total mortality and account for 16% of DALYs worldwide.¹ However, injuries are remarkably neglected, compared with the attention devoted to research and policy for other leading causes of DALYs worldwide. Our study contributes to a better understanding of the magnitude and characteristics of the problem and can be used for policy priority setting and injury prevention. ■

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Résumé

Evaluation de la charge de morbidité dans six pays européens

Objectif Évaluer la mortalité, l'incapacité et les années de vie perdues ajustées sur l'incapacité (DALY) dues aux traumatismes dans six pays européens.

Méthodes Les données épidémiologiques (registres de sortie d'établissements hospitaliers, registres des services d'urgence, bases de données sur la mortalité) ont été obtenues pour l'Autriche, le Danemark, l'Irlande, la Norvège, les Pays-Bas et le Royaume-Uni (Angleterre et Pays de Galles). Pour chaque pays, la charge des traumatismes a été estimée en années de vie perdues du fait de la mortalité prématurée (YLL), en années vécues avec une incapacité (YLD) et en DALY pour 1000 personnes.

Résultats Des différences marquées ont été constatées entre les pays concernant la charge des traumatismes. C'est l'Autriche qui a perdu le plus grand nombre de DALY (25 pour 1000 personnes) suivie du Danemark, de la Norvège et de l'Irlande (17 à 20 pour 1000 personnes). Aux Pays-Bas et au Royaume-Uni, la charge totale des traumatismes était relativement faible (12 pour 1000

personnes). La différence entre les pays était imputable à une forte variation de la mortalité prématurée (YLL entre 9 et 17 pour 1000 personnes) et de l'incapacité (YLD entre 2 et 8 pour 1000 personnes). Dans tous les pays, les hommes âgés de 25 à 44 ans supportaient un tiers de la charge totale des traumatismes - constitués principalement d'accidents de la circulation et de traumatismes intentionnels. Les incapacités permanentes étaient dues avant tout à des lésions de la moelle épinière et à des traumatismes crâniens.

Conclusion La charge des traumatismes varie considérablement entre les six pays européens considérés, mais les hommes âgés de 15 à 24 ans supportent une part disproportionnée de la charge évaluée des traumatismes dans tous les pays considérés. Une politique cohérente de lutte contre les traumatismes s'appuie sur des indicateurs généraux de qualité de l'état de santé de la population. Il faut d'urgence obtenir des données standardisées sur l'incidence et les conséquences fonctionnelles des traumatismes.

Resumen

Evaluación de la carga de traumatismos en seis países europeos

Objetivo Evaluar la mortalidad, la discapacidad y los años de vida ajustados en función de la discapacidad (AVAD) relacionados con los traumatismos en seis países europeos.

Métodos Se obtuvieron datos epidemiológicos (registros de alta de los hospitales, registros de urgencias y bases de datos sobre la mortalidad) en Austria, Dinamarca, Irlanda, Noruega, los Países Bajos y el Reino Unido (Inglaterra y Gales). La carga de traumatismos en cada país se estimó en años perdidos por muerte prematura, años vividos con discapacidad y AVAD (por 1000 personas).

Resultados La carga de traumatismos presentó grandes diferencias entre los países. La mayor pérdida de AVAD

correspondió a Austria (25 por 1000), seguida de Dinamarca, Noruega e Irlanda (17–20 por 1000). En los Países Bajos y el Reino Unido, la carga total de traumatismos fue relativamente baja (12 por 1000). Las variaciones entre los países fueron atribuibles a una gran variación de la mortalidad prematura (los años perdidos por muerte prematura oscilaron entre 9 y 17 por 1000) y de la discapacidad (los años vividos con discapacidad oscilaron entre 2 y 8 por 1000). En todos los países estudiados, los varones de 25 a 44 años sufrieron un tercio de la carga total de traumatismos, debida principalmente a los traumatismos intencionados o causados por el tráfico. Los traumatismos craneoencefálicos y medulares fueron la causa de mayor carga de discapacidad permanente.

Conclusión La carga de traumatismos presentó una variación considerable entre los seis países europeos participantes, pero los varones de 15-24 años son los que soportan la mayor carga en todos los países. Los indicadores de buena calidad que resumen

la salud de la población respaldan una política coherente de control de los traumatismos. Hay una necesidad urgente de datos normalizados sobre la incidencia y las consecuencias funcionales de los traumatismos.

ملخص

تقييم عبء الإصابات في ستة بلدان أوروبية

معدل الوفيات المبكرة (تفاوتت سنوات العمر الضائعة بسبب الوفاة المبكرة من 9 إلى 17 لكل 1000 شخص)، وفي العجز (تفاوتت سنوات العمر التي يعيشها الشخص في حالة عجز من 2 إلى 8 لكل 1000 شخص). وفي جميع البلدان يمثل الذكور الذين هم في الفئة العمرية 25 – 44 سنة ثلث العبء الكلي للإصابات، والذي يعزى أساساً إلى إصابات حوادث المرور والإصابات المتعمدة. وتمثل إصابات الحبل النخاعي وإصابات الجمجمة والدماغ معظم العبء، نظراً لما تسببه من عجز مستديم.

الاستنتاج: يتفاوت عبء الإصابات تفاوتاً كبيراً فيما بين البلدان الأوروبية الستة المشاركة في الدراسة، وكان الذكور الذين هم في الفئة العمرية 15 – 24 مسؤولون عن قسط وافر من عبء الإصابات الذي تم تقييمه في جميع البلدان. وهناك سياسة مستقرة لمكافحة الإصابات تدعمها قياسات موجزة وعالية الجودة لمستوى صحة السكان. وتمس الحاجة إلى بيانات قياسية موحدة حول وقوع الإصابات وآثارها على وظائف الجسم.

الهدف: استهدفت هذه الدراسة تقييم الوفيات والعجز وسنوات العمر المصححة باحتساب مدد العجز، الناجمة عن الإصابات، في ستة بلدان أوروبية.

الطريقة: تم الحصول على بيانات وبائية (سجلات تخريج المرضى في المستشفيات، وسجلات إدارة الطوارئ، وقواعد البيانات المتعلقة بالوفيات) لكل من النمسا، والدنمارك، وإيرلندا، وهولندا، والنرويج، والمملكة المتحدة (إنكلترا، وويلز). وتم تقدير عبء الإصابة في كل بلد في شكل عدد سنوات العمر التي يعيشها الشخص في حالة عجز، وعدد سنوات العمر المصححة باحتساب مدد العجز (لكل 1000 شخص).

الموجودات: لوحظت فروق كبيرة في عبء الإصابة فيما بين البلدان. فالنمسا تعاني من أكبر عدد من سنوات العمر المصححة باحتساب مدد العجز (25 لكل 100 شخص)، تليها الدنمارك والنرويج وإيرلندا (17-20 لكل 1000 شخص). أما في هولندا والمملكة المتحدة فكان العبء الكلي للإصابات منخفضاً نسبياً (12 لكل 1000 شخص). ويعزى هذا التباين بين البلدان إلى التباين الكبير في

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Appendix A. Overview of disability weights and duration of health state for injuries in the GBD^a

Injury groups	GBD weight	Duration of disability (years)
1. Concussion	— ^b	— ^b
2. Other skull-brain injury	ST ^c 0.359–0.431 LL ^d 0.350 ^e	0.107 LL 15% ^e
3. Open wound head	0.108	0.024
4. Eye injury	0.300	LL
5. Fracture facial bones	0.233	0.118
6. Open wound face	0.108	0.024
7. Vertebral column fractures / dislocations / sprain / strain	0.266	0.140
8. Whiplash, neck sprain, distortion of cervical spine	— ^b	— ^b
9. Spinal cord injury	0.725	LL
10. Internal organ injury	0.208	0.042
11. Fracture rib / sternum	0.199	0.115
12. Fracture of clavicle / scapula	0.153–0.137	0.112
13. Fracture of upper arm	0.153–0.137	0.112
14. Fracture of elbow / forearm	0.153–0.137	0.112
15. Fracture of wrist (including carpal bones)	0.100	0.112
16. Fracture of hand / fingers	0.100	0.070
17. Dislocation / sprain / strain shoulder / elbow	0.074	0.035
18. Dislocation / sprain / strain wrist / hand / fingers	0.064	0.035
19. Injury of nerves arm / hand	0.064	LL
20. Amputation upper extremity	0.102–0.165	LL
21. Fracture of pelvis	0.247	0.126
22. Fracture of hip	ST 0.372 – LL 0.272	0.139 – LL5% ^e
23. Fracture of femur shaft	ST 0.372 – LL 0.272	0.139 – LL5% ^e
24. Fracture of knee / lower leg	0.196	0.090
25. Fracture of ankle	0.196	0.096
26. Fracture of foot	0.077	0.073
27. Dislocation / sprain / strain of knee	0.064	0.035
28. Dislocation / sprain / strain of ankle / foot	0.064	0.035
29. Dislocation / sprain / strain of hip	0.074	0.035
30. Injury of nerves leg / foot	0.064	LL
31. Amputation lower extremity	0.300	LL
32. Superficial injury (including contusions)	— ^b	— ^b
33. Open wounds	0.108	0.024

^a GBD = Global burden of disease study³.

^b GBD weights and duration of disability are not known for concussion, whiplash, and superficial injury.

^c ST = Short-term.

^d LL = Lifelong.

^e For other skull-brain injury (15%), hip fracture (5%), and femur shaft fracture (5%) a proportion of patients has lifelong sequelae. The other patients have short-term disability.

Appendix B. All-cause mortality rates (crude and age-standardized) by country by age

Age (years)	Country	1999		Average of the last 3 years for which data are available	
		Crude MR ^a	Age-SMR ^b	Crude MR	Age-SMR
0–14	Austria	7.6	7.9	5.9	6.1
	Denmark	6.6	6.7	5.8	5.8
	Ireland	8.2	8.4	7.4	7.5
	Netherlands	5.9	5.9	5.1	5.2
	Norway	6.4	6.5	5.6	5.7
	United Kingdom	4.6	4.8	3.9	4.0
15–24	Austria	49.6	49.6	44.8	44.9
	Denmark	33.9	33.4	32.2	31.9
	Ireland	42.4	42.7	45.3	45.5
	Netherlands	23.7	23.6	23.7	23.7
	Norway	43.1	43.0	40.2	40.1
	United Kingdom	28.2	28.3	26.4	26.5
25–44	Austria	42.4	42.5	40.8	40.8
	Denmark	45.9	46.1	43.2	43.3
	Ireland	38.4	38.1	40.7	40.5
	Netherlands	23.9	23.9	23.6	23.6
	Norway	32.8	32.7	33.7	33.8
	United Kingdom	31.2	31.2	30.2	30.2
45–64	Austria	55.2	55.3	55.1	55.0
	Denmark	51.1	51.3	50.4	50.4
	Ireland	41.4	41.7	41.5	41.6
	Netherlands	27.0	27.0	27.5	27.5
	Norway	37.9	38.0	38.3	38.4
	United Kingdom	27.8	27.8	27.0	27.0
65+	Austria	129.7	118.1	133.1	121.5
	Denmark	221.5	182.6	225.5	184.4
	Ireland	125.2	118.1	112.6	104.9
	Netherlands	109.0	97.7	105.3	94.3
	Norway	199.7	162.7	186.0	148.6
	United Kingdom	82.4	70.4	85.0	71.4
Total	Austria	53.9	47.4	53.3	46.2
	Denmark	64.7	52.0	64.0	50.8
	Ireland	42.8	41.9	42.4	41.3
	Netherlands	32.8	28.8	32.2	28.3
	Norway	55.6	44.0	53.1	42.2
	United Kingdom	33.0	28.4	32.8	27.7

^a MR = Mortality rate.^b SMR = Standardized mortality rate.