

## Background

Accidents and injuries are the fourth leading cause of deaths among the European population and impose a considerable burden on health care systems. There are huge disparities amongst Member States regarding the risk of injuries and accidents. Research evidence suggests that the great majority of accidents are preventable and that a reduction by one quarter of all injuries, including severe and fatal injuries, should be a realistic target over a period of five years (2009-2013).

Despite this background, there is currently no systematic and comprehensive monitoring of accidents and injuries in Europe that would serve as a basis for benchmarking and designing appropriate prevention policies. At the same time, policies at local and national level vary considerably and coordinated approaches are desperately needed.

In light of this situation, there is a need today for a new political impulse to highlight the challenges and opportunities of injury prevention at the national and EU levels and to ensure a systematic and comprehensive surveillance of injuries in all countries. Proper injury data will provide adequate public legitimacy for enhanced actions on injury prevention and notably for the elaboration of national action plans targeted at the right priorities and risk groups to be addressed. Surveillance should produce reliable and up-to-date data that describe:

- the size and characteristics of the problem (i.e. what are the number of cases of injury, broken down by type, and what are the characteristics of each type?);
- the populations at risk (i.e. which kind of people are most likely to incur each type of injury?);
- the risk factors (i.e. what things contribute to each type of injury, and what things are associated with each type of injury?);
- the trends (i.e. is a particular type of injury occurring more or less frequently, and is it doing more or less harm?).

The European Union (EU) and the World Health Organization (WHO) have now put injury prevention and safety promotion firmly in the court of health promotion and consumer protection policies, and identified injury prevention as a major priority in the years to come. In synergy with the WHO

Regional Committee Resolution RC55/R9 [1], the European Commission has issued a Communication to the European Parliament and the Council on “Actions for a Safer Europe” [2]. Mid 2007, the Council of Ministers adopted a Council Recommendation on the prevention of injuries and the promotion of safety [3], inviting Member States to:

- make better use of existing injury data and develop national injury surveillance and reporting systems,
- set up national plans for prevention of injuries for preventive actions in the seven priority areas identified in the Commission’s Communication “Actions for a Safer Europe” and to
- encourage the introduction of injury prevention and safety promotion in school curricula and in professional training.

## Aims

The purpose of this policy briefing is to provide basic insights into the spectrum of injury data sources and available statistics. It also aims to assist respective stakeholders in area of injury prevention and safety promotion to develop good injury surveillance systems by referring to existing standards and good practices in the EU and abroad.

Such injury surveillance systems are intended to record information on individual cases of injury and produce statistical overviews of an injury problem, with all the relevant data being classified and coded according to agreed international standards.

From the information recorded, the effectiveness of interventions can be monitored and evaluated and trends can be identified. It is therefore most important to realise that it is only bringing together the data collections or databases with the subsequent analysis, interpretation and dissemination which defines a surveillance system. Without the latter we only have a data collection or database.

## What is an injury?

An injury is the physical damage that results when a human body is suddenly or briefly subjected to intolerable levels of energy. It can be a bodily lesion resulting from acute exposure to energy in amounts that exceed the threshold of physiological tolerance, or it can be an impairment of function resulting

from a lack of one or more vital elements (i.e. air, water, warmth), as in drowning, strangulation or freezing. The energy causing an injury may be:

- mechanical (e.g. an impact with a moving or stationary object, such as a surface, knife or vehicle), radiant (e.g. a blinding light or a shock wave from an explosion),
- thermal (e.g. air or water that is too hot or too cold), electrical, chemical (e.g. a poison or an intoxicating or mind-altering substance such as alcohol or a drug).

In other words, injuries are the acute, physical conditions. They are listed in Chapter XIX (Injury, poisoning, and certain other consequences of external causes) and Chapter XX (External causes of morbidity and mortality) in the International Statistical Classification of Diseases and Related Health Problems, Tenth revision (ICD-10) [4].

## The size of the injury problem in the EU

The scale of the problem can be presented in two different groupings: fatal and non-fatal injuries. The following figures represent a yearly average based on the injury data for the period 2003-2005 [5].

### *Fatal injuries*

- Every two minutes someone dies of a fatal injury in the EU-27. This adds up to a quarter of a million people each year.
- Injuries kill children, adolescents and young adults (those aged between 1 and 44 years) more than any other cause of death.
- When you combine all age groups injuries represent the fourth major cause of death in the EU. Only cardiovascular diseases, cancer and diseases of the respiratory system claim more lives.
- Among all injury deaths older people are overrepresented: every year more than 100,000 elderly people (65+) in the EU die prematurely due an injury.
- Suicides, road traffic accidents and falls are the three major causes of a fatal injury.

There is an enormous difference in fatal injury rates throughout the EU. Based on the 2003-2005 figures for all ages, Lithuania has the highest injury fatality rate in the EU. The risk of dying from an injury in Lithuania is over five times higher than in the Netherlands, the country which had the lowest injury fatality rate for this time period. It is estimated that more than 100,000 lives could be saved each year if every country in the EU27 reduced its injury mortality rate to the same level as that of the Netherlands (Figure 1).

| Country              | Total number of injuries * | Standardised death rate due to injuries * | Estimated number of avoidable injury deaths ** | Estimated percentage of avoidable injury deaths *** |
|----------------------|----------------------------|---|--|---|
| Austria              | 4.300                      | 43,6                                      | 2.000  | 47%   |
| Belgium              | 6.600                      | 57,2                                      | 3.700  | 56%   |
| Bulgaria             | 4.000                      | 45,4                                      | 1.800  | 45%   |
| Cyprus               | No data                    | -   | -  | -   |
| Czech Republic       | 6.900                      | 64,2                                      | 4.100  | 59%   |
| Germany              | 33.200                     | 31,9                                      | 10.400   | 31%   |
| Denmark              | 3.300                      | 48,7                                      | 1.800  | 55%   |
| Estonia              | 1.800                      | 123,4                                     | 1.400  | 78%   |
| Spain                | 16.900                     | 32,7                                      | 5.000  | 30%   |
| Finland              | 4.300                      | 69,2                                      | 2.800  | 65%   |
| France               | 41.000                     | 52,7                                      | 23.700   | 58%   |
| Greece               | 4.100                      | 33,0                                      | 1.100  | 27%   |
| Hungary              | 8.800                      | 74,8                                      | 6.000  | 68%   |
| Ireland              | 1.400                      | 32,9                                      | 300  | 21%   |
| Italy                | 26.500                     | 34,1                                      | 10.400   | 39%   |
| Lithuania            | 5.300                      | 149                                       | 4.300  | 81%   |
| Luxembourg           | 230                        | 46,1                                      | 110  | 48%   |
| Latvia               | 3.300                      | 132,4                                     | 2,00   | 79%   |
| Malta                | 130                        | 28,3                                      | 20   | 15%   |
| The Netherlands      | 5.300                      | 27,7                                      | Reference Country                              |   |
| Poland               | 25.000                     | 62,3                                      | 14.500   | 58%   |
| Portugal             | 5.300                      | 57,6                                      | 2.400  | 45%   |
| Romania              | 13.500                     | 63,6                                      | 7.500  | 56%   |
| Sweden               | 4.800                      | 40,9                                      | 2.300  | 48%   |
| Slovenia             | 1.500                      | 65,8                                      | 950  | 63%   |
| Slovakia             | 3.100                      | 56  | 1.600  | 52%   |
| United Kingdom       | 20.500                     | 28,6                                      | 3.900  | 19%   |
|                      |                            |   |  |   |
| <b>Total (EU-27)</b> | <b>251.000</b>             | <b>45,4</b>                               | <b>114.800</b>                                 | <b>46%</b>  |

\* 3 years average of the last available years (2003-2005; figures rounded off). \*\* Number of avoidable injury deaths if same rate as The Netherlands (figures rounded off). \*\*\* % of injury deaths avoidable if country had The Netherlands' rate. Source: KfV, 2008 [5].

### Non-fatal injuries

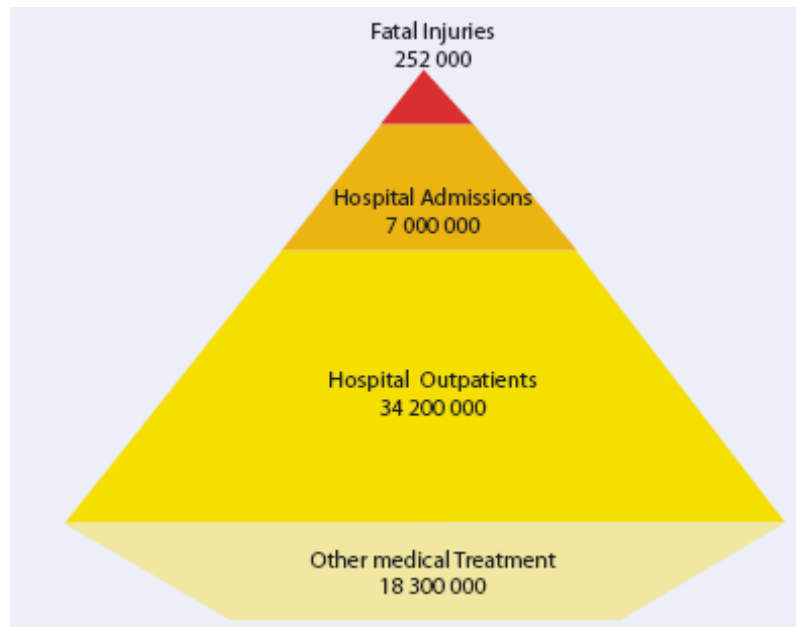
Fatal injuries are just really the tip of the iceberg. Based on 2003-2005 data for every injury-related death, another 28 people are admitted to hospitals and another 136 people are treated at an Accident and Emergency department in the EU (Figure 2):

- 60 million people in the EU receive medical treatment each year as a result of an injury. This is more than the whole population of Italy.
- Out of the 60 million receiving medical treatment for an injury, more than 7 million have to be admitted to hospital each year, which is more than 19,000 people each day.

Children and older people are more at risk of incurring an injury than other age groups.



Figure 2: The magnitude of the injury problem annually in the EU27



Source: KfV, 2008 [5].

### *The burden of injuries*

Recently (2001-2008) epidemiological data from national hospital discharge registers and emergency department registers were collected and analysed according to standard procedures of two European collaborative efforts, EUROCOST [6] and APOLLO [7]. Within these projects a uniform injury based method to calculate medical costs of injury was developed and applied to EU countries. This method allowed calculation of the direct medical costs of injury by sex, age, external cause and type of injury at country level and EU level.

In EU-countries, the average stay in hospital is approximately eight days which corresponds to an estimated cost of € 12 billion alone for hospital inpatients that are treated for injuries. Based on 2003-2005 IDB (EU Injury Database) data the cost of treating out-patients, i.e. patients that are treated in accident and emergency departments but not need to be admitted, can be calculated as far as these injuries are due to a home and leisure accident (so not yet including road traffic injuries, work related injuries, violence and self harm). These calculations result in an estimated annual cost of €18 billion for home and leisure injury patients only. So the total financial burden of hospital treatment due to injuries in the EU is expected to be more than 30 billion, and, if we are including road and other injuries treated in emergency departments, probably 40 billion Euros per year.

It is evident that the indirect costs associated with injuries such as lost work time, insurance and property damage would increase these costs estimates considerably.

### **Shortcomings of the current EU injury surveillance**

Although there are several data collection systems available which provide information about injury mortality and morbidity at the national and EU levels, there are still significant shortcomings. Injury surveillance in the EU – and in most Member States - can be characterised as operating on an incomplete puzzle of data sources that only provides a notion of the complete picture but lacks important details.

For the purpose of injury prevention general health statistics, like health surveys and Hospital Discharge Registers, lack the required detailed information on the external causes of injuries.

Accident reporting systems, such as operated by fire brigades, road police and labour inspectorates cover only a limited segment of risk spectrum and the resulting injuries and deaths. Examples for the latter are the Community Database on Accidents on the Roads in Europe (CARE), the European Statistics on Accidents at Work database (ESAW), and the former Home and Leisure Accidents Surveillance System (EHLASS, now EU IDB – EU Injury Database). These databases are difficult to compare and a comprehensive view of injuries is hard to obtain. As a consequence, even with a number of relevant data sources available, simple questions about injuries in the EU, such as “How many bicycle accidents are there in the EU Member States today? How many are traffic related? How many are sports and leisure related?”, cannot readily be answered, or at least not with sufficient accuracy.

How can EU injury surveillance be improved? Are there good examples? The principal answer to the question of what really needs to be done to improve EU injury surveillance is being provided by the Council Recommendation on injury prevention [2]. In order to reliably identify priorities and monitor prevention measures, the Recommendation urges Member States firstly “to make better use of existing data” and secondly “to develop, where appropriate, an injury surveillance and reporting mechanism which could ensure a coordinated approach across Member States to develop and establish national policies on the prevention of injuries.” [3].

### **Make better use of available sources**

Over the past ten to twenty years, in a great number of Member States initiatives have been taken to explore existing data sources in view of their potential use for injury surveillance. As stated above, the major sources are general health surveys, hospital discharge information and specific sector related data sources.

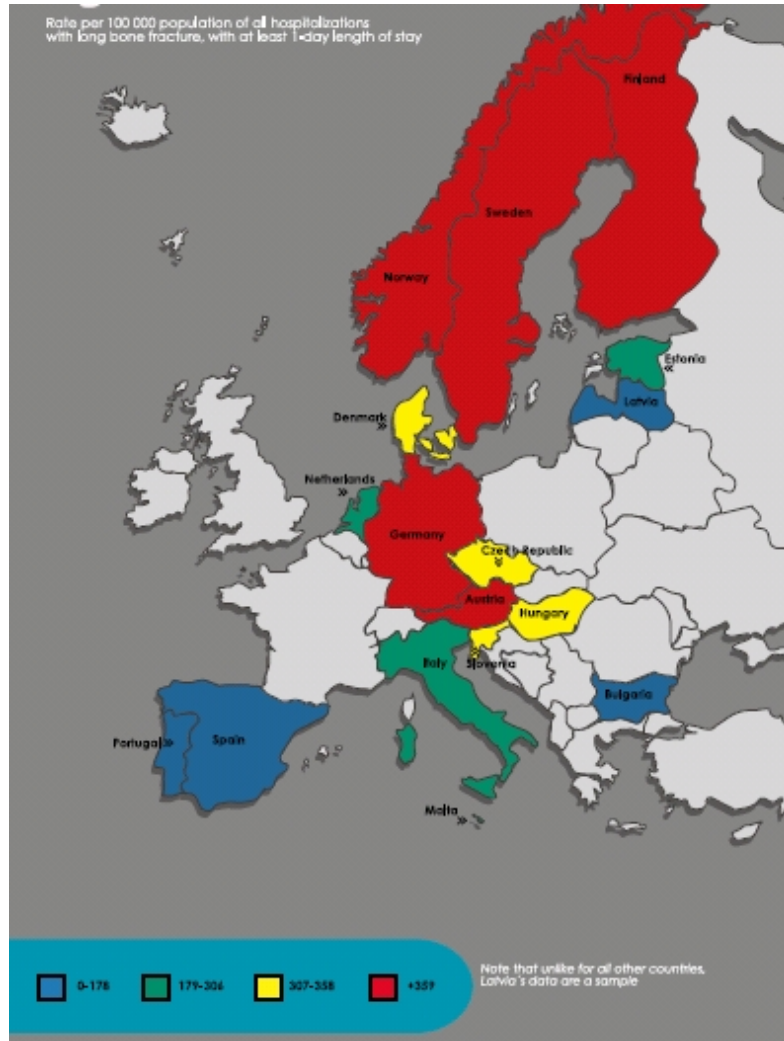
Also at EU level initiatives are being taken in making better use of existing data. One example of an added value presentation of an existing data source for the purpose of injury reporting and surveillance is the web-based query system for routine hospital discharge data, created by the APOLLO project [8]. The APOLLO Hospital Discharge Register (HDR) database provides a large number of indicators derived from the standard HDR data set that greatly enhance the comparability between countries of the original HDR data (Figure 3)

Another EU-funded project aiming at establishing a one-stop information centre for all relevant EU-level injury data is the PHASE (Public Health Actions for a Safer Europe) project [9]. The goal of this pilot is provide stakeholders at the EU and national levels with relevant information for all major injury sectors, outcomes, and external circumstances through comparable and policy relevant indicators – based on harmonised injury mortality and morbidity data for prevention in sectors such as traffic, work place, home and leisure, and violence. The selection of data sources to be considered is guided by the health indicators for “injuries and accidents” of the European Community Health Indicators (ECHI) short list [10] (Table 1):

- The Cause of Death data shall serve as the main source for indicators on injury mortality.
- The Injury Database (IDB) shall serve as the main source and standard for indicators on injury morbidity.
- Both sources need to be complemented by other data sources according to a data model.
- All indicators have to provide incidence rates at least at Member State level by age and sex, and most relevant external causes.



Figure 3: Hospitalization rates of patients with “long bone fractures” for selected countries



Source: APOLLO HDR database [8]

Table 1: ECHI Injury Indicators by preferred data sources – a data model

| ECHI Indicator [1]                                  | Mortality - Preferred Data Source [2] | Morbidity - Preferred Data Source [2]        |
|---|---------------------------------------|--|
| All injuries (all causes, selected external causes) | A. COD                                | A. IDB<br>B. HDR external causes             |
| Road Traffic  | A. CARE<br>B. COD                     | A. CARE<br>B. HDR external causes<br>C. EHIS |
| Work place injuries                                 | A. ESAW<br>B. COD                     | A. ESAW<br>B. EHIS                           |
| Home and Leisure Accidents                          | A. COD                                | A. IDB<br>B. EHIS                            |
| Violence  | A. COD                                | A. IDB<br>B. HDR external causes             |
| Suicide attempt                                     | A. COD                                | A. IDB<br>B. HDR external causes             |

[1] Incidence rates by age and sex, and main external causes. [2] A. most specific source, B. and C. accessory sources. Abbreviations: CARE: Community Road Accident Database. COD: Cause of Death Data (WHO-ICD). EHIS: European Health Interview Survey. ESAW: European Statistics on Accidents at Work. IDB: Injury Database on Home, and Leisure Accidents and All Injuries. HDR: Hospital Discharge Register - ESTAT / APOLLO Internet Query Database.

**Table 2: Comprehensive view of injuries by sector , EU-27)**

| Injury counts and outcomes  | Transport | Work place | Home, Leisure, Sports, School | Total of unintentional injuries | Homicide, assault, other violence | Suicide (attempt) | Total of intentional injuries | Total of all injuries |
|-----------------------------|-----------|------------|-------------------------------|---------------------------------|-----------------------------------|-------------------|-------------------------------|-----------------------|
| Fatal injuries              | 56.412    | 6.216      | 109.512                       | 172.140                         | 6.146                             | 61.368            | 67.514                        | 252.494*              |
|                             | 23%       | 2%         | 43%                           | 68%                             | 3%                                | 24%               | 27%                           | 100%                  |
| Hospital admissions         | 860.00    | 310.00     | 5.200.000                     | 6.370.000                       | 590.000                           | 100.000           | 690.000                       | 7.000.000             |
| Hospital outpatients        | 1.800.000 | 3.000.000  | 27.000.000                    | 31.800.000                      | 2.200.000                         | 200.000           | 2.400.000                     | 34.200.000            |
| Other medical treatment     | 1.200.000 | 1.500.000  | 14.300.000                    | 17.000.000                      | 1.200.000                         | 100.000           | 1.300.000                     | 18.300.000            |
| All medically treated cases | 3.860.000 | 4.810.000  | 46.500.000                    | 55.170.000                      | 3.990.000                         | 400.000           | 4.390.000                     | 59.560.000            |
|                             | 6.5%      | 8.1%       | 78.1%                         | 92.6%                           | 6.7%                              | 0.7%              | 7.4%                          | 100%                  |
|                             |           |            |                               |                                 |                                   |                   |                               |                       |
| Disabled (prevalence 16-60) | 750.000   | 1.300.000  | 900.000                       | 2.950.000                       | -                                 | -                 | -                             | >3.000.000            |
| Hospital bed days           | 7.200.000 | 2.400.000  | 39.000.000                    | 48.600.000                      | 3.000.000                         | 600.000           | 3.600.000                     | 52.200.000            |

\* Including injuries of undetermined intent, not displayed. Source: WHO Mortality Database, WHO Health for all Database, Eurostat, EU Injury Database (IDB, Home and Leisure Accidents) and "Comprehensive View of European Injury Data" CVI – Final Report; 3 year average of latest available years (mostly 2003-2005). Data presentation: Kuratorium für Verkehrssicherheit (KfV), 2007 [5]

The overview in Table 2, produced by the EU-project PHASE [9], is expected to pave the way for a sustainable and comprehensive EU injury information centre, providing information based on the integration of all relevant available data sources at EU level. Obviously, the EU model of integration of existing data sources could be adopted also at the national level which could ensure a coordinated approach across Member States for a comprehensive and consistent injury reporting in the ECHI framework.

## Pro-active surveillance of injuries

The kind of reconstructive patchwork, as described in the previous section, will in most cases lead to a more comprehensive presentation of injury data that is derived from various sources. However, most of these data sources continue to lack specificity in information on the circumstances of the injury occurrence, the external cause of the injury, products involved and associated features in the environment where the injury happened.

For answering such questions, which are vital for developing sound intervention policies, specially designed injury surveillance systems are required. For that purpose, a number of countries have initiated national injury surveillance systems based within accident and emergency departments designed specifically to monitor injury events, e.g.

- the U.S. National Electronic Injury Surveillance System (NEISS),
- Canadian Hospitals Injury Reporting and Prevention Program (CHIRPP),
- or the Victorian Injury Surveillance System (VISS)

In the EU, the Injury Database (IDB) is generating such information in a number of Member States (see box) and is meant to expand to the entire EU-region, in accordance with agreed international standards for classifying external causes of injuries [11].



### Box 1. IIDB - Injury Surveillance in the EU

By 2008, already twelve countries - AT, CY, DK, FR, IE, IT, LV, NL, MT, PT, SE and UK/Wales - have implemented the IDB and made their data available on the web via the internet, though at still varying levels of detail and completeness of the IDB data set. Many of them - AT, CY, DK, IE, LV, NL, MT and UK/Wales - have extended their data collection from "Home and Leisure Accidents" to "All Injuries", providing them with detailed external cause information – e.g. activity, type of sports, place of occurrence, mechanism, involved products and a narrative description of the injury scenario – comparable across all sectors of injuries. The IDB collects data in addition to, and complementary with, routine hospital discharge registers. IDB operates in a –five to ten percent- sample of hospitals with a round the clock emergency service and can operate at a reasonably low cost. Thus, with a small investment there is a big gain in information about injury circumstances – information most relevant for injury prevention and for the safety and health of European citizens.

*More background information on which elements are required for successful surveillance and how to develop surveillance step by step can be found in the report 'Injury Surveillance Guidelines' [12].*

### Conclusion and way forward

Injuries have a constantly high impact on EU citizens with significant human and economic cost consequences. If we want to reduce this impact, reliable and up-to-date injury data is required in order to shape local and national policies, prioritise resources, develop public awareness campaigns, understand relative risk, and design safety into new products and services. An ongoing and systematic collection, analysis, interpretation and dissemination of injury information is therefore required.

"While we have information about deaths, the absence of up-to-date figures on injuries and their causes means we cannot determine the true costs of accidents, both in terms of the misery being suffered by families and the financial burden on employers and society in general. Without this information, we are unable to prioritise new injury prevention campaigns, such as raising awareness of everyday hazards or introducing new product safety regulations. It is also impossible to measure the effect of such campaigns on injury rates."

Errol Taylor, Royal Society for the Prevention of Accidents UK, 2009 [13]

Owing to the Council Recommendation adopted in May 2007, there is a commitment now of the EU Health Ministers and the Commission services to enhance injury surveillance in the EU.

Principal attributes for good surveillance include simplicity, flexibility, reliability, and sustainability. There are also a number of good examples of surveillance systems that meet these requirements, e.g. NEISS in the U.S.A., CHIRPP in Canada, VIS in Australia. For the EU region, the EU Injury Database (IDB) is generating such information in a number of Member States. At the current state, however, the IDB cannot ensure a systematic and comprehensive surveillance of injuries in all countries or at EU level.

Current experiences indicate some potential for basic injury monitoring of non-fatal injuries in existing routine data like the hospital discharge data. In order to effectively use the potential of the HDR and other data sources the creation of national "injury clearing houses" is recommended. Also for this avail, good practice is already available in Europe, e.g. the South West Public Health Observatory ([www.swpho.nhs.uk](http://www.swpho.nhs.uk)) in the UK.

The way forward in injury surveillance is to integrate a reasonable level of new data elements - that are relevant for prevention - into existing hospital discharge and Emergency Department registers. Such integrated systems can benefit from up-to-date e-Health technology and are scalable to local, regional and national needs.





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