

SPECIAL REPORT

International Collaborative Effort on Injury Statistics:
10 year review

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International comparisons of injury data may be useful for examining differences in risk and for suggesting potential interventions or hypotheses for future studies. However important issues to be considered in conducting comparisons are related to both the underlying quality of the data and how the data are collected. The International Collaborative Effort (ICE) on Injury Statistics grew out of concerns over the comparability of international injury data. This article outlines the history behind the development of the Injury ICE, brief descriptions of current and past projects, collaborations, and reflections on the value of collaboration.

The International Collaborative Effort (ICE) on Injury Statistics has met annually since May 1994. Meetings have brought together over 100 people representing more than a dozen countries, both public and private agencies, international organizations, and academia (see box 1). The shared vision has been the improvement of injury statistics by working together to make them internationally comparable and of the highest quality for injury prevention and control.

This synthesis of the 10 years of work aims to further the understanding of the role the ICE on Injury Statistics has played in international injury statistics.

HISTORY

The collaboration between countries on issues related to injury and its measurement was envisioned in the spring of 1991 by staff at the National Center for Health Statistics (NCHS). NCHS has a history of productive collaborative efforts, such as the ICE on Infant and Perinatal Mortality,¹ which worked to understand the differences in infant mortality rates between countries. NCHS has provided continuing funding for the ICE on Injury Statistics with a generous supplement each year from the National Institutes of Health (NIH), National Institute of Child Health and Human Development.

An ICE on Injury Statistics Steering Committee was formed* and made plans for the first symposium held in Bethesda, Maryland in May 1994. Invited collaborators from 15 countries (including academia, non-profit organizations, and federal government offices) presented papers on aspects of injury data and its

collection.² In an attempt to understand how similarly resourced countries were collecting injury related data, the initial collaborators were from more developed countries with more evolved health data collection systems. As part of a strategic plan, the ICE on Injury Statistics is now extending its effort to achieve a broader representation of countries that can learn from one another. This collaborative effort complements the Centers for Disease Control and Prevention's (CDC) more traditional role of providing technical assistance to other countries.

At the May 1994 symposium, Dr David Satcher, then Director of CDC, gave the keynote address. The central theme of his remarks was that collaboration can have a great impact on solving health problems. His remarks, although given nearly a decade ago, are still relevant today (see box 2).

MISSION

The mission of the ICE on Injury Statistics is to improve international comparability and quality of data to better assess the causes and consequences of injury, differences in injury occurrence over time and place, and the most effective means of prevention and control.

Primary goals are to:

- I. Provide a forum for international exchange and collaboration among injury researchers.
- II. Develop and promote international standards in injury data collection and analysis.
- III. Produce products of the highest quality to facilitate the comparability and improved quality of injury data.

Injury ICE participants are an active international network of injury specialists whose expertise can be and is continually pooled to address issues related to injury and its measurement.

Abbreviations: CDC, Centers for Disease Control and Prevention; ICD, *International Classification of Diseases*; ICE, International Collaborative Effort; ICECI, International Classification of External Causes of Injury; NCHS, National Center for Health Statistics; NIH, National Institutes of Health; WHO, World Health Organization

*The Committee included Lois A Fingerhut (NCHS); Bob Hartford, Harry Rosenberg, and Sue Meads (all since retired from NCHS); Lee Annett (National Center for Injury Prevention and Control); Mary Overpeck (then with the NIH's National Institute of Child Health and Human Development, Gordon Smith (then with Johns Hopkins University), and Wim Rogmans (representing the WHO's former Working Group on Injury Surveillance).

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Box 1: Representatives from the following countries and organizations have participated since 1994

United States federal agencies:

- CDC/National Center for Health Statistics.
- CDC/National Center for Injury Prevention and Control.
- CDC/National Institute for Occupational Safety and Health.
- NIH/National Institute of Child Health and Human Development.

Countries and international organizations:

- Australia, Canada, Denmark, England and Wales, Israel, The Netherlands, New Zealand, Norway, Sweden, non-Latin Caribbean countries, and the United States.
- World Health Organization (WHO).
- Pan American Health Organization.

More recently, participation has been welcomed from:

- European Commission's Injury Prevention Program.
- South Africa.
- Spain.
- Thailand.

A complete listing of affiliations of participants can be found at <http://www.cdc.gov/nchs/about/otheract/ice/who2.htm>

Injury ICE projects are generally made up of teams of researchers collaborating on an area of mutual interest. Projects have centered on issues related to the coding, classification and categorization of data and, more recently, on standardized injury indicators to monitor surveillance activities.

To make the work of the ICE accessible to as large an audience as possible, a website and a list serve were developed (www.cdc.gov/nchs/advice.htm) to improve worldwide communication on injury data related issues and to provide a forum to disseminate important injury data findings. The website also serves as an international information resource to disseminate research topics and links to Injury ICE investigators and related publications. Among these resources are four volumes of the *Proceedings of the ICE on Injury Statistics*.²⁻⁵ The five year strategic plan for the ICE on Injury Statistics can likewise be found in volume IV of the proceedings.⁵ A bibliography of published papers resulting from the work of the Injury ICE is featured on the web page and is updated periodically.

CURRENT PROJECTS†

Injury indicators

An injury indicator is a summary measure that denotes or reflects, directly or indirectly, variations and trends in injuries, or injury related or injury control related phenomena. A goal of this project is to identify reliable and valid indicators relevant to injury prevention and aimed at target monitoring, surveillance, priority setting, evaluation, and international information exchange. Getting the indicators

†All project activity can be found at www.cdc.gov/nchs/about/otheract/ice/projects.htm.

Box 2: Remarks of Dr David Satcher in May 2004

"Collaboration has solved many of the world's greatest health problems.... CDC, throughout its history, has recognized health as a global issue and has stayed focused on the vision of Healthy People in a Healthy World.... So, the time is right for us to come together internationally to look at the issue and the value of injury statistics".

"Within this priority of strengthening the core functions of public health is the development of a nationwide health information and surveillance system. That system must be capable of producing information wherever and when it is needed. Information that is standardized is especially important for injury prevention".

"We need a world community involved in solving these problems [risky teen behaviors]. And in order to achieve that, we have to begin with conferences like this, where we look to the future and say, "How are we going to cooperate and collaborate in solving some serious world problems?"¹²

"right" is a primary focus of this group because different indicators intended to reflect the same phenomenon can lead to different results, and these results are used by governments to determine whether targets have been met and thus how resources are distributed.⁶⁻⁸

Selecting a main injury from among the multiple diagnoses associated with fatal injury events

The underlying cause of death is always the external cause of injury. Injury diagnoses are also reported and, in some circumstances, selecting a single or main injury from among the multiple diagnoses is necessary for international comparisons. The goal of this project is to assist the WHO's Mortality Reference Group in developing methodologies for selecting a main injury among multiple injuries. The selection rules for determining the main injury changed between *International Classification of Diseases*, ninth revision (ICD-9) and ICD-10, thus project members will be formally providing recommendations to the WHO Mortality Reference Group to address concerns about the new rules (see ICE project website and also www.paho.org/english/dd/ais/EB_v24n2.pdf).

Poisoning

Achieving consistency and clarity of presentation of fatal poisoning data between years, organizations, and countries is needed. Options can include structuring by ICD codes, by narrative text, or by detailed toxicology data. Toxicologists believe that useful information is often lost when poisoning data are presented using the ICD framework for underlying cause of death (classifying by mechanism and intent). Access to the data by compound or class of compound is also important and not available using the underlying cause data based on the ICD framework. Multiple cause mortality data or collection of narrative data allow for determining specific drugs involved in poisoning deaths. Identifying poisons and poisoning deaths is necessary for estimation of needed treatment resources (based on number and severity) and of treatment requirements (such as provision of stocks of antidotes). Several proposals have been developed by project members for better identification of poisoning related deaths. Collation and dissemination of nationally collected fatal poisoning statistics are important as most poisoning deaths occur outside hospital and are not reported to poisons centers.

Household injury survey comparison

Currently, an international consensus on inclusion criteria or specific questions for use in household injury surveys is

lacking. This makes comparisons of non-fatal injuries difficult at the international level. The primary project goal is to facilitate the development of household survey injury modules to collect population based injury data at the national and community level. A multicountry report of 10 national household survey sets of injury questions is in press.⁹ This report will serve as a guide for developing a standard injury module and provide a reference for interpretation and analysis of worldwide household survey injury data from the 10 countries.

Occupational injuries

Collaborations on international comparisons of fatal occupational injuries have resulted in several analytic articles describing and comparing work related fatal injuries in Australia, New Zealand and the United States, as well as discussing the methodological hurdles and potential solutions to developing international data comparability. An effort is underway to expand international comparisons to include more countries such as an effort recently begun in one Russian province. Currently, the group is seeking information to determine the ability to harmonize occupational injury data from other nations into analytically comparable data sets. The United States, New Zealand, and Australia are now analyzing data on the leading cause of death to workers—motor vehicle deaths—which had not previously been available from all three countries.^{10 11}

Building multiple injury profiles

The objective of this project is to create a systematic approach for summarizing multiple injury diagnosis data into patient injury profiles. Profiles maintain information on all injuries a person sustained, enable a description of a combination of body regions injured, and eliminate the need to make choices as to which injury to include in analyses. Profiles will enable the analysis of patients, not only of their injuries. The principal building blocks for the profile are the cells of the Barell matrix (see below), thus applying a standard categorization and enabling international comparisons. Ongoing work is exploring the possibility of excluding minor injuries with an Abbreviated Injury Score of 1.¹²

Disability

Non-fatal injuries have the potential for contributing to long term health consequences. Understanding the disability outcomes of injury can provide a more comprehensive picture of injury and its sequelae and a clearer picture of its economic and social costs. Measures developed at the Washington Group (see also www.cdc.gov/nchs/citygroup.htm) for use in international measurement of disability will be shared with and assessed by Injury ICE workgroups.

OTHER ICE RELATED PROJECTS

Frameworks for presenting injury mortality data

The external cause of injury matrix for ICD-9 was jointly developed with the ICE on Injury Statistics and the Injury Section of the American Public Health Association. A revised matrix based on ICD-10 was adopted and can be found on the website^{13 14} and see also www.cdc.gov/nchs/about/otheract/ice/matrix10.htm.

The Barell injury diagnosis matrix

The Barell injury diagnosis matrix, named for Vita Barell of Israel (a founding member of the Injury ICE who died in May 2001) is a tool which cross classifies ICD-9-CM injury diagnosis codes by body region and nature of injury. Injury ICE participants worked together to reach consensus on how to group injury diagnosis data to facilitate international comparisons across countries and data sets. The resulting matrix tool has been accepted by countries participating in

the Injury ICE and is useful for a variety of situations. The Barell matrix is currently being modified so that ICD-10 diagnosis codes can be cross classified. This modification will cover both mortality and morbidity in countries that do not have a clinical modification of the ICD.¹⁵

International Classification of External Causes of Injury (ICECI)

Injury ICE participants were actively involved in the development of the ICECI and continue to provide technical consultation and expertise. ICECI was developed with the goal of producing an internationally accepted, multiaxial, modular, and hierarchical system to enable classification of external causes of injury, primarily to support injury prevention. ICECI addresses the limitations of the external cause of injury chapter of the ICD. ICECI, version 1.2 has been completed, released, and adopted as a related classification in the WHO Family of International Classifications,^{16 17} and see also www.iceci.org.

Injury definition

Consensus was reached in 1997 to adopt the external cause of injury matrix as the standard for grouping injuries by cause and intent. This matrix *excludes* adverse effects and complications of care from the definition of injury. Nonetheless, Injury ICE members continue to debate both operational and conceptual definitions of injury. Still under consideration is whether or not to include some of the codes for adverse effects and complications of care in the matrices for external causes of injury mortality and in the ICD-9 CM based Barell matrix for morbidity. The debate continues with many of the issues articulated in published papers.^{18 19} Discussion also continues about whether other ICD codes in chapters XIX and XX ought to be considered as injury, for example, the codes for “foreign bodies”.^{18 19}

International comparisons of drowning mortality

This project showed how multiple cause of death coding or free text searches of mortality records can increase the numbers of deaths attributed to drowning above those resulting from the “usual” underlying cause of death approach.²⁰

International inventory of injury related data sources and harmonization of injury classification system; death registration practices in ICE countries and morbidity registration and classification practices in ICE countries

In the early years of the ICE on Injury Statistics, these projects helped to identify sources of injury data, variation in mortality and morbidity registration and collection systems.^{1 2}

CONCLUSION

The ICE on Injury Statistics has provided a forum for thoughtful discussion, debate, and consensus on issues related to injury data at an international level. It is only through this collaboration that standardized methods have been developed and core data and surveillance functions have been strengthened for future injury prevention research, policy development, and practice. In addition to collaboration between countries, the ICE has served to facilitate collaboration within and across international governmental agencies and the private sector. Collaboration expands thinking which can become insular without constantly challenging the national norm. The ICE on Injury Statistics is now expanding in an effort to attract new partners and broaden the representation of countries that can learn from one another and improve the quality and usefulness of injury statistics for prevention worldwide.

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REFERENCES

- 1 **Various authors.** *Proceedings of the international collaborative effort on perinatal and infant mortality*, Volume I. Papers presented at the International Symposium on Perinatal and Infant Mortality, 1984 Bethesda, Maryland, March 1990: 357 pp. PHS 85-1252. Available at: <http://www.cdc.gov/nchs/about/otheract/ice/publications.htm>.
- 2 **Fingerhut LA**, ed. *Proceedings of the international collaborative effort on injury statistics*. Volume I. PHS 95-1252. March 1995.
- 3 **Fingerhut LA**, ed. *Proceedings of the international collaborative effort on injury statistics*. Volume II. PHS 96-1252. September 1996.
- 4 **Fingerhut LA**, ed. *Proceedings of the international collaborative effort on injury statistics*. Volume III. Washington DC, 2nd Symposium June 1999. April 2000.
- 5 **Fingerhut LA**, ed. *Proceedings of the International Collaborative Effort on Injury Statistics*. Volume IV. PHS 2003-1026. August 2003.
- 6 **Langley J**, Stephenson S, Cryer C. Measuring road traffic safety performance: monitoring trends in nonfatal injury. *Traffic Injury Prevention* 2003;**4**:291–6.
- 7 **Stephenson S**, Henley G, Harrison JE, *et al.* Diagnosis-based injury severity scaling. injury research and statistics series number 20. Adelaide: AIHW (AIHW catalogue No INJCAT 59), 2003.
- 8 **Cryer C**, Langley JD, Stephenson SCR, *et al.* Measure for measure: the quest for valid indicators of non-fatal injury incidence. *Public Health* 2002;**116**:257–62.
- 9 **Heinen M**, McGee KS, Warner M. Injury questions on household surveys from around the world. *Inj Prev* (in press).
- 10 **Driscoll T**, Feyer A-M, Stout N, *et al.* Assessing the classification of work-relatedness of fatal accidents: a comparison between Australia, New Zealand and the United States. *Injury Control and Safety Promotion* 2002;**9**:32–9.
- 11 **Feyer AM**, Williamson AM, Stout N, *et al.* Comparison of work related fatal injuries in the United States, Australia and New Zealand: method and overall findings. *Inj Prev* 2001;**7**:22–8.
- 12 **Aharonson-Daniel L**, Boyko V, Ziz A, *et al.* A new approach to the analysis of multiple injuries using data from a national trauma registry. *Inj Prev* 2003;**9**:156–62.
- 13 **Centers for Disease Control and Prevention.** Recommended framework for presenting injury mortality data. *MMWR Morb Mortal Wkly Rep* 1997;**46**(No RR-14).
- 14 **Fingerhut LA**, Cox CS, Warner M, *et al.* *International comparative analysis of injury mortality: findings from the ICE on injury statistics*. Advance data from vital and health statistics; No 303. Hyattsville, MD: NCHS, 1998.
- 15 **Barell V**, Aharonson-Daniel L, Fingerhut LA, *et al.* An introduction to the Barell body region by nature of injury diagnosis matrix. *Inj Prev* 2002;**8**:91–6.
- 16 **Harrison J.** *ICECI technical update: developments since the adoption of ICECI into WHO-FIC with alpha status in October 2000*. Meeting of WHO Collaborative Centers for the Family of International Classification; Cologne, Germany, October 2003.
- 17 **ICECI Coordination and Maintenance Group.** *International classification of external causes of injuries (ICECI) version 1.2*. Amsterdam: Consumer Safety Institute and Adelaide, AIHW National Injury Surveillance Unit, 2004.
- 18 **Langley J**, Brenner R. What is an injury? *Inj Prev* 2004;**10**:69–71.
- 19 **Langley JD**, Stephenson SCR, Cryer C, *et al.* Traps for the unwary in estimating person based injury incidence. *Inj Prev* 2002;**8**:332–7.
- 20 **Smith GS**, Langley JD. Drowning surveillance: how well do E codes identify submersion fatalities? *Inj Prev* 1998;**4**:135–9.