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Usage of orthopaedic trauma registries among members of the International Orthopaedic Trauma Association: How are we doing?

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Abstract

Introduction: The use of national databases for orthopaedic research has increased significantly in the past decade. The purpose of this study was to report on the current state of orthopaedic trauma registries in 21 countries represented by 20 member societies of the International Orthopaedic Trauma Association (IOTA).

Methods: A web-based survey was circulated to all IOTA member societies. The survey consisted of 10 questions (five open-ended and five multiple-choice).

Results: Representatives from all 21 countries replied. Five countries (24%) do not currently have or plan to start a registry. One country (5%) had a registry that is now closed. Two countries (10%) are building a registry. Thirteen countries (62%) reported at least one active registry, including four countries with more than one registry. Of the 14 countries that reported the existence of a registry, there were 17 registries noted that included patients with fracture. There were seven registries dedicated to high-energy trauma and four registries that included elderly hip fractures. In addition, 9/17 representatives reported the utilization of a fracture classification and 9/17 noted some level of mandate from medical providers. All responders but one reported that data were manually entered into their registries.

Conclusions: Despite the shared vision of quality control and outcome optimization, IOTA society representatives reported significant variability in the depth and format of the orthopaedic trauma registry among IOTA members. These findings represent an opportunity for collaboration across organizations in creating fracture registries.

Level of Evidence: Level IV.

Keywords: fracture database, fracture registry, orthopaedic registry, trauma database, trauma registry

1. Introduction

The use of national databases for orthopaedic research has increased significantly over the past decade.^{1–7} In the field of arthroplasty, clinical registries are available at the state, national, and international levels.⁸ These registries allow for large-scale aggregation of patient information and prospectively collected outcomes. Data mining of these registries has been used for improving care quality, patient safety, and value-based health care.

The authors report no conflict of interest.

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Owing to the initial success of the American Joint Replacement Registry which has become the world's largest registry of hip and knee arthroplasty with data inputting from all 50 states, there has been a rapid expansion of orthopaedic trauma registries in the United States.^{9–12}

The International Orthopaedic Trauma Association (IOTA) was established in 2017 and currently has 20 member societies representing 21 countries. Canada and the United States are both represented by the Orthopaedic Trauma Association (OTA). The IOTA strives to promote international musculoskeletal trauma care and enhance international collaboration in research and program development.¹³ The purpose of this study was to report on the current state of national fracture registries among countries of IOTA society members and describe successes and challenges associated with the collective efforts of these registries.

2. Methods

The objective of the survey was announced at a regular IOTA business meeting and an invitation to participate in the survey was extended to all members. A web-based survey was then sent to representatives of all 21 countries. The survey consisted of 10 questions, five of which were open-ended and five multiple-choice (Supplemental material 1, <http://links.lww.com/OTAI/A62>). A follow-up email was sent to all members whose answers were incomplete. The number of total publications per registry was reported because they were posted on each registry website. Descriptive data analysis was performed with Microsoft Excel

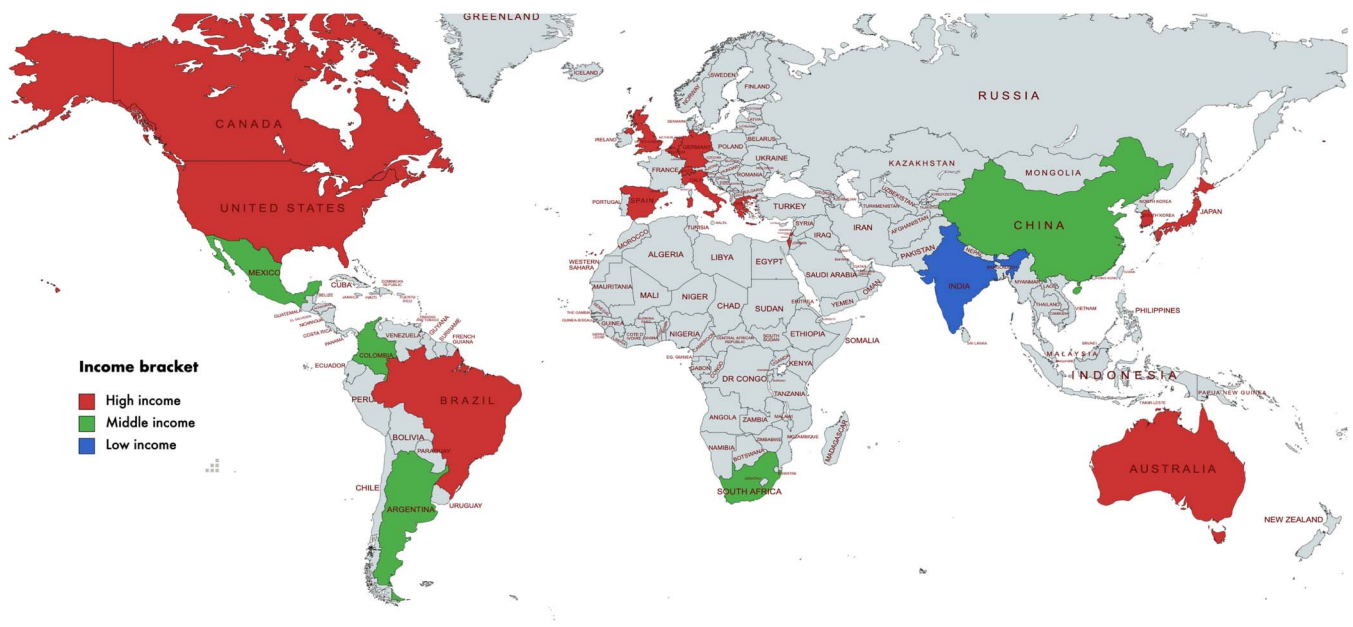


FIGURE 1. World map of IOTA members.¹⁹

(Redmond, WA). The results of the study were reviewed and discussed at the subsequent IOTA meeting.

The research was conducted in accordance with the Declaration of the World Medical Association. The study was deemed exempt from the Institutional Review Board.

3. Results

3.1. Participants

The response rate of the survey was 100%. Representatives from all 21 countries responded to the survey, providing responses for

the 20 member societies. The representatives were either Presidents of their societies or their appointees. The 21 represented countries were from six continents with a range of income levels (Fig. 1).¹⁴

3.2. Registry Status

Five countries (24%) do not currently have and do not have immediate plans to establish a registry (Fig. 2). One country had a registry that was shut down. Two countries are in the process of building a registry. Thirteen countries (62%) report at least one active registry including four with more than one registry. Of the 13 countries with an active

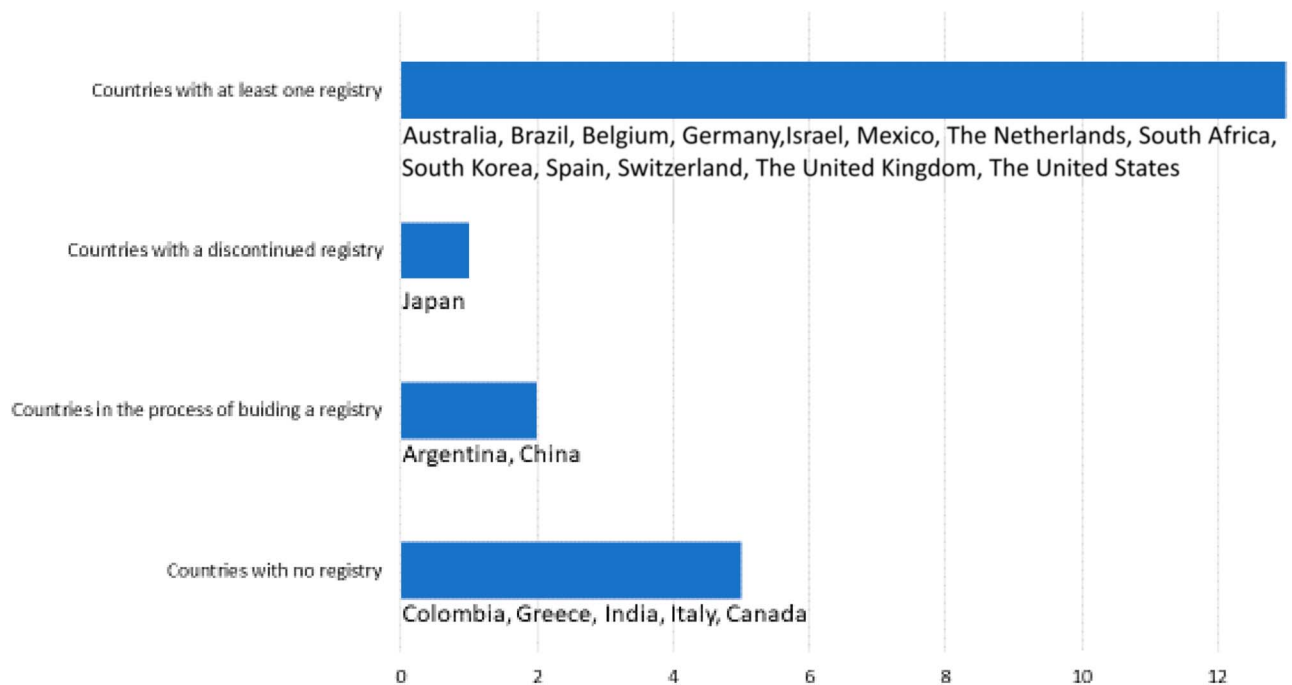


FIGURE 2. Registry distribution among IOTA member societies.

registry, 10 were high-income nations and three were middle-income. There were 17 registries among 14 countries that reported the existence of a registry that included patients with fracture at some point (Table 1). Nine of the 17 registries required the registry information from providers with varying degrees of mandate.

3.3. Registry Description

Among 17 active registries, there were seven registries dedicated to high-energy trauma and four registries focused on elderly hip fractures. Nine of 17 registries used a fracture classification. Fewer than half (6/17) included identifiable patient information. All responders but one reported that data were manually entered into their registries. One country reported that the injury data were pulled automatically from a health database.

3.4. Success and Challenges

Data collected by these registries have resulted in 1847 reported publications regardless of journal (Table 2). Participants commented on benchmarking, quality control, practice improvement, and improved patient outcomes as benefits of having a registry. Common challenges in establishing a registry included cost, follow-up rate, and buy-in from surgeons and hospitals. In addition, many participants commented on obstacles to getting their registries off the ground.

4. Discussion

This study aimed to describe the current state of national fracture registries among the 21 countries of the IOTA and describe

successes and challenges associated with starting and maintaining these registries. Although most IOTA member society representatives reported a fracture registry in their country, there is significant variability in the depth and format of the registries. Thus, future establishment of guidelines by OTA and IOTA for developing effective fracture registries is valuable to ensure success of new registries. Information such as which variables and outcomes to include will be helpful in such guidelines to improve registry utility, efficiency, and potentially, surgeon participation.

Instead of including all orthopaedic injuries, most registries tend to focus on high-energy trauma injuries and fragility hip fractures. This suggests that these injuries have international importance, being relevant to surgeons’ practices and patient care worldwide. Interestingly, Germany and Belgium successfully shared a high-energy trauma registry. We propose that where possible, countries with common goals, injuries patterns, and health care systems collaborate through shared registries to maximize participation, expand their relevance and utility, and minimize maintenance cost.

Moreover, the information included across the registries is not standardized. The AO/OTA fracture classification is universally accepted by orthopaedic traumatologists, required by major journals, and currently used in most fracture outcome studies.¹⁵ However, our study found that the classification is used only in 53% of the included registries. This limitation makes broader analysis difficult and challenging to interpret. The variation in data collection represents an opportunity for a fairly simple change that would allow for seamless registry integration and collaboration in the future.

Our study has limitations. We did not include fracture databases in countries outside of those represented by the IOTA.^{16,17} Our

TABLE 1
Member Societies and Their Fracture Registries

| Country | Population | Registry Name | Registry Description | Registry Website | Years Active |
|--------------------|---------------|--|-------------------------------|---|--------------|
| Argentina | 45,376,763 | Institutional Registry of Hip Fracture in the Elderly | Limited to hip fracture | https://www.clincosm.com/trial/hip-fracture-ciudad-autonoma-de-buenos-aires-observational-patient | 4 (2016) |
| Australia | 25,687,041 | Australia New Zealand Trauma Registry | Trauma registry | https://atr.org.au/ | 10 (2011) |
| Brazil | 212,559,409 | Departamento de Informática do Sistema Único de Saúde | Health registry | http://www2.datasus.gov.br/DATASUS/index.php | 30 (1991) |
| Belgium | 11,555,997 | Trauma Register DGU | Multinational trauma registry | https://www.traumaregister-dgu.de/ | 1993 |
| Canada | 38,005,238 | None | In the process | | |
| China | 1,402,112,000 | | | | |
| Colombia | 50,882,884 | None | | | |
| Germany | 83,240,525 | Trauma Register DGU | Multinational trauma registry | https://www.traumaregister-dgu.de/ | 1993 |
| Greece | 10,715,549 | None | | | |
| India | 1,380,004,000 | None | | | |
| Israel | 9,216,900 | The National Center for Trauma and Emergency Medicine Research | Trauma registry | http://www.gertnerinst.org.il/health_policy/trauma/ | 1995 |
| Italy | 59,554,023 | None | | | |
| Japan | 125,836,021 | Database of Orthopaedic Trauma by the Japan Society for Fracture Treatment | Fracture registry | https://www.jsfr.jp/ | 2015 |
| Mexico | 128,932,753 | Mexican Hip Fracture Audit | Limited to hip fracture | NA | 2019 |
| The Netherlands | 17,441,139 | National Register of Orthopedic Implants | Implant registry | https://www.lroi.nl/over-de-lroi/wat-is-de-lroi | 2007 |
| | | Dutch nationwide Trauma Registry | Trauma registry | NA | 2007 |
| South Africa | 59,308,690 | South African Orthopaedic Registry | General orthopaedic registry | https://saoa.org.za/sa-orthopaedic-registry/ | 2019 |
| South Korea | 25,778,815 | Korean Fracture Society | Tibial shaft fracture | http://www.kofs.or.kr/eng/ | |
| Spain | 47,351,567 | Spanish National Hip Fracture Registry | Limited to hip fracture | | 2016 |
| Switzerland | 8,636,896 | Swiss Trauma Board | Trauma registry | http://www.swisstraumaboard.ch/ | 2011 |
| The United Kingdom | 67,215,293 | Trauma Audit and Research Network | Trauma registry | https://www.tarn.ac.uk/Home.aspx | 1990 |
| The United States | 329,484,123 | National Trauma Data Bank | Trauma registry | https://www.facs.org/quality-programs/trauma/ | 2007 |
| | | Orthopaedic Trauma Association | Orthopaedic trauma registry | tpq/center-programs/ntdb | 2021 |
| | | Fracture and Trauma Registry | | https://ota.org/research/fracture-trauma-registry | transition? |

TABLE 2
Number of Publications per Fracture Registry

| Country | Registry Name | Reported Publications |
|--------------------|--|-----------------------|
| Argentina | Institutional Registry of Hip Fracture in the Elderly | NA |
| Australia | Australia New Zealand Trauma Registry ²⁰ | 5 |
| Brazil | Departamento de Informática do Sistema Único de Saúde | NA |
| Belgium | Trauma Register DGU ²¹ | 378 |
| Germany | | |
| Israel | The National Center for Trauma and Emergency Medicine Research ²² | 186 |
| Japan | Database of Orthopaedic Trauma by the Japan Society for Fracture Treatment | NA |
| Mexico | Mexican Hip Fracture Audit | NA |
| The Netherlands | National Register of Orthopedic Implants ²³ | 47 |
| | Dutch nationwide Trauma Registry | NA |
| South Africa | South African Orthopaedic Registry | NA |
| South Korea | Tibia fracture registry | NA |
| Spain | Spanish National Hip Fracture Registry | NA |
| Switzerland | Swiss Trauma Board | NA |
| | Fracture registry | NA |
| The United Kingdom | Trauma Audit and Research Network ²⁴ | 41 |
| The United States | National Trauma Data Bank ²⁵ | 1146 |
| | Orthopaedic Trauma Association Fracture and Trauma Registry | NA |

study is not meant to be exhaustive, but descriptive, of the various efforts made by countries represented by member societies of the IOTA. In addition, we collected the number of publications to indirectly describe the impact registries have had on surgeon practices, but this simple method does not allow direct measure of registry effectiveness, and the quality of the publications remained undefined. To our knowledge, there is no well-established method to determine the influence of a registry on patient care.

The 100% response rate and excellent participation were among the strengths of the study. The study results were circulated and discussed among IOTA members. Our members agree that future work should include the establishment of registry guidelines and further collaboration among member societies for registry development and results sharing. Even in each individual country, collaborations among different registries are also beneficial. In the United States, registries with the inclusion of orthopaedic injuries are governed by different organizations.^{7,10,11,18} Minimizing duplication and cost of such registries is essential because multiple questionnaires sent to patients can lead to survey fatigue for patients and lower participation rates. A fracture registry run by the Orthopaedic Trauma Association since 2005 has been discontinued.¹¹ In an attempt to modernize technology and harness the power of aggregate data, the American Academy of Orthopaedic Surgeons launched a new Fracture Trauma Registry (FTR). The AAOS-FTR will focus on several fragility-related fractures, including proximal humerus fractures, hip fractures, ankle fractures, and distal radius fractures.^{10,11}

In conclusion, an opportunity exists for international societies to collaborate to build successful fracture registries. Besides the exchange of ideas and knowledge, countries with common interests can choose to share a fracture registry. International organizations such as IOTA serve as an excellent platform for collaboration. Registries are associated with a high cost, and significant work must be dedicated to their development and maintenance. Fracture

registry guidelines would be beneficial to maximize participation and the scope of registry data's impact on patient care.

APPENDIX 1. CORPORATE AUTHORSHIP—SURVEY PARTICIPANTS FROM THE INTERNATIONAL ORTHOPAEDIC TRAUMA ASSOCIATION (IOTA)

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