

Supplementary Material: Box 3. Common Challenges for Registry Implementation in LMICs & the frequency of their description in reviewed literature.

- Information Management (77.1%)
 - o Data quality
 - o Missing data
 - o Data analysis
 - Lack of expertise for analysis
 - Lack of system for analysis & dissemination
- Workforce (45.7%)
 - o Lack of human resources
 - o Inadequate support for registry staff (workspace, *etc.*)
 - o High turnover of staff
- Infrastructure (34.3%)
 - o Software development & management
 - o Physical resources (lack of tablets/iPads, computers)
 - o Lack of storage space for equipment
 - o Internet
- Financing (20%)
 - o Lack of support after initial implementation sponsored
 - o Lack of long-term funding for research staff
- Organization/Leadership (20%)
 - o Lack of hospital & regional government buy-in
 - o Limited understanding of role for registry
 - o No cohesion between individual efforts (disjointed efforts)

Supplementary Material: Box 4. The Guatemala Experience: Establishing a trauma registry for the first time

A Guatemalan surgeon with first-hand experience in trauma registry implementation was interviewed about the barriers and facilitators in this context. The main difficulties in Guatemalan trauma care involve no trauma system being established, including a lack of designation and training for pre-hospital attention and a non-trauma exclusive, which makes attention difficult and disorganized. Trauma care is based on national and institutional guidelines adapted to available resources.

Initial education and learning about trauma registries started with individual education formation in the United States by some Guatemalan surgeons. The importance of communicating needs to NGOs and other institutions through data collected over time is evident; this being the first step to creating a trauma system. After acquiring NIH funding, the Guatemalan infrastructure and governance were prepared to welcome the first trauma registry project based on what had gone wrong in Colombian and Paraguayan implementation experiences. Issues in these countries had to do with the software being unable to adapt to existing software from the emergency rooms, an excessive additional amount of time to fill out, and political obstacles of unequal training to most personnel.

Implementation in Guatemala was done in two different institutions, which had a different acceptance and experiences. Initial takeaway points were the need for “quick wins,” incentives, and an explanation of the benefits of the registry to be clear for everyone involved, including politicians, hospital administrators, residents, and medical students. Infrastructure preparation was necessary and required funds. In addition, reducing the number of variables, evaluating the feasibility of data collection in the emergency department, and having personnel or registers exclusively dedicated to collecting data to avoid additional workload, proved the most effective in terms of quality and completeness of data. Data transcription and shorter formats were also required.

Outcomes and benefits included lessons learned from missing data and seeing what information was not being collected in medical records. Additionally, the emergence of questions from the ministry reflects the relevance and importance of the information generated. Limitations to continuing the registry included funding variability linked to administration changes, and hospitals and political position turnover, as well as lack of trained personnel to do data mining, analysis, and interpretation. Hence, the importance of having high-income partners that can aid in data management and usage (*e.g.*, cost-effective and outcomes analyses).

Regarding the possibility of introducing a tool such as IRTEC, Guatemalan stakeholders believe it could be useful to have this standardized and implemented. They think it is particularly useful in settings in which there has been nothing done regarding starting registries because it saves up the time it takes to analyze which variables are relevant, and feasible. However, the two paramount aspects for successful implementation are funding for registers and infrastructure, and the country’s ability to access collected data immediately, along with data ownership. There is also the need for the country to have a say in additional variables to collect, specifically those of interest to each country, aside from the general format. The Guatemalan stakeholder noted that this is applicable to Guatemala but suggested that each country likely has individualized requirements and demands.

Supplementary Material: Box 5. Barriers to successful IRTEC implementation

- Infrastructure
 - Physical resources (lack of tablets, computers)
 - Lack of storage space for equipment
- Workforce
 - Lack of dedicated personnel to oversee transition & data collection
 - Inadequate support for registry staff (training, workspace, *etc.*)
 - High staff turnover limiting consistent data collection
- Financing
 - Lack of support after initial implementation
 - Lack of long-term funding for research staff
- Organization/Leadership
 - Lack of employee, hospital, & regional government buy-in
 - Lack of internal mechanisms for quality assurance & data analysis
- Information Management
 - Dual documentation with lengthy data collection
 - Transition from manual to digital data entry
 - Language in standardized clinical forms not culturally validated