Commentary

# Strengthening emergency care by developing data collection systems in low- and middle-income countries

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## ABSTRACT

Emergency care surveillance as well as registries of emergency care are largely absent in most LMICs. Improper data systems in Emergency Department create an important gap in our understanding about the health of large portions of the population. Clinical data systems in LMICs and lower-resource settings will foster research and generation of contextualized evidence.

## African relevance

- This manuscript highlights the challenges faced by the LMICs in electronic data system development
- The paper discusses the strategies that may be useful in LMICs for establishing data collection systems

## Introduction

The World Bank Disease Control Priorities project estimates that more than half the deaths and around 40% of the total burden of disease in low-income and middle-income countries (LMICs) result from conditions that could be treated with prehospital and emergency care [1].

Fifteen leading causes of global deaths and disability-adjusted life years are from conditions amenable to emergency care. [2] This burden is highest in low-income and middle-income countries (LMICs), where there is a dearth of data from LMIC emergency care to guide policy making, resource allocation and service provision. [2]

Emergency care surveillance as well as registry of emergency patients are largely absent in most LMICs and the Emergency care systems (ECS) face severe fragmentation lacking system-wide coordination and accountability. The lack of proper data systems represents an important gap in our understanding about the health of large portions of the population [3]. Implementation of care guidelines from high-income countries (HICs) to LMICs is constrained by insufficient data and differences in epidemiology of illnesses, resources, organization and practice. Clinical data systems within Emergency Departments (ED) in LMICs will not only impact policy making but foster research and hence generation of contextualized evidence.

## Challenges & Strategies for LMICs

The unique role of the ECS builds a safety net for the society, but the huge patient load pushes this safety net to the 'breaking point' [6]. Amidst jam packed Emergency Departments with a large throughput of patients, where providing quality acute care itself is a daunting task; the idea of obtaining longitudinal data seems inconceivable and impractical without proper data collection systems in place. Furthermore, LMIC patient populations are relatively young, and more often have late and serious presentations in contrast to HICs emergency patients. Therefore, simple translation and application of practices that deemed efficacious in HICs to LMIC settings without considering the appropriate systems and disease factors that are present will result in failure. Fluid Expansion as Supportive Therapy (FEAST) trial [4] is a vital example where aggressive resuscitation with fluids among children of septic shock in Africa, demonstrated greater mortality when compared to the same treatment modality used in higher income countries [4]. A recent paper from India also highlighted the need to develop research in lower-resource settings and hence democratizing evidence production [5].

The challenges for LMICs exist at all levels including access to basic infrastructure, availability of a standardized data collection tool and software, availability of a dedicated personnel to collect data, maintaining integrity of the collected data and data flow so that it can eventually be utilized for research and policy making. Internet

connectivity and hence online data entry may not always be available in rural and even urban areas of LMICs [7].

*Current practice*

Ours is a tertiary care institute, based in the capital city of New Delhi. Although we have a less than perfect data system, we are making efforts for transition to an improved data system. We have a dedicated personnel available throughout the day in the Emergency Department, named Nurse Information Specialists (NIS). These are a special group of nurses trained in basic data collection and data management. On arrival to the ED, the demographic data (which includes name, age, gender, address, time and mode of arrival etc.) is collected by dedicated data entry operator registering the patient to the system. Clinical data on presenting complaints, vitals on arrival, working diagnosis, investigations and treatment given including admission or discharge status is added by NIS after assessment and treatment has been initiated. Organized data can be accessed from the backend with help of a data manager from the Institute Information Technology (IT) facility. Data helps in monthly morbidity and mortality meetings, clinical audits and coordination of patient services. Emergency patient data is now being used for research purposes, developing disease registries and surveillance systems. The clinical template is also scanned and stored for later use and audit. Regular feedback meeting are conducted to address challenges with the NIS and the software team at the backend. In one of our projects we are utilizing emergency data collection system and scanned records to collect data on Google Forms and then perform analysis to look at the epidemiology of emergency patient visits. The collected data is being coded as per International Disease of Classification tenth edition. (ICD-10).

*Key strategies to improve data systems*

1. National Policy for Emergency Care Systems should include basic IT infrastructure and trained human resource for Emergency Departments across the country.
2. A special cadre of clinical nurses who are trained in data management should be created. NIS will play a key role of quality managers through data collection, management and its utility. Data will also help the ED in live tracking of patients, foster patient care and interdepartmental coordination.
3. In remote rural areas or even in urban areas of LMICs where resources are scarce a 'hybrid model' may be useful. This means that clinical data is collected on a standardized (pre-developed) hand-filled clinical template when patient is being assessed by the emergency physician. The same template can be used by the nurses to write up their assessment and drugs that they will be dispensing. The ED based clinical template should have essential dataset only and complex data collection should be avoided. A copy of the clinical template should be given to the patient and one copy should be stored for medical records at the Health Centre. This stored copy can be scanned or the data can be fed directly on a digital data template offline by a dedicated data entry operator instantly or at a later date. Using the clinical template of the physician as a data collection tool will ensure comprehensive data collection, improve the integrity of data and will prevent the need for dedicated personnel to collect data when human resource is scarce.
4. The insipid and unexciting clerical responsibility of data collection shouldn't be attributed to a single person alone but should be borne by a team, where each and every individual – registration staff, doctors, nurses and data entry operators work in harmony and play a role in data collection; making an integrated system.

## Conclusion

Effective use of clinical data has the potential to save lives.

Integration of technology doesn't always require a paradigm shift; simple modular enhancements in pre-existing systems in place serve the purpose well. Tools such as mobile app-based data collection, online tool platforms like Kobo Toolbox, survey forms like Google Forms can assist in data collection and storage. [7]

Developing simple data collection tools for the emergency departments across the LMICs is the need of the hour. This will require political and administrative will for a national policy with basic IT infrastructure and trained human resource in Emergency Departments across. Data collection with time stamping and time motion studies will streamline patient care processes and promote continuous quality improvement and implementation research.

To ensure that key data are collected consistently and reliably, a basic required data set should be recorded with additional data gathered on ad hoc basis. A smaller amount of data collected with completeness and accuracy is more valuable than larger inaccurate and incomplete data collections.

## Authors' contribution

Authors contributed as follow to the conception or design of the work; the acquisition, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: AKu contributed 40%; Aka contributed 30%; and RM, PR and SB contributed 10% each. All authors approved the version to be published and agreed to be ac-countable for all aspects of the work.

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## Declaration of competing interest

The authors declared no conflicts of interest.

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