The Emergency Medicine Education and Research by Global Experts (EMERGE) Network: Challenges and Lessons Learned

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Introduction: The Emergency Medicine Education and Research by Global Experts (EMERGE) network was formed to generate and translate evidence to improve global emergency care. We share the challenges faced and lessons learned in establishing a global research network.

Methods: We describe the challenges encountered when EMERGE proposed the development of a global emergency department (ED) visit registry. The proposed registry was to be a six-month, retrospective, deidentified, minimal dataset of routinely collected variables, such as patient demographics, diagnosis, and disposition.

Results: Obtaining reliable, accurate, and pertinent data from participating EDs is challenging in a global context. Barriers experienced ranged from variable taxonomies, need for language translation, varying site processes for curation and transfer of deidentified data, navigating institution- and country-specific data protection regulations, and substantial variation in each participating institution’s research infrastructure including training in research-related activities. We have overcome many of these challenges by creating detailed data-sharing agreements with bilateral regulatory oversight agreements between EMERGE and participating EDs, developing relationships with and training health informaticians at each site to ensure secure transfer of deidentified data, and formalizing an electronic transfer process ensuring data privacy.

Conclusion: We believe that networks like EMERGE are integral to providing the necessary platforms for education, training, and research collaborations for emergency care. We identified substantial challenges in data sharing and variation in local sites’ research infrastructure and propose potential approaches to address these challenges. [West J Emerg Med. 2022;23(6)947–951.]

INTRODUCTION
Research in emergency medicine (EM) has increased in complexity and sophistication through collaborative efforts in the past two decades.¹ Specifically, research networks can provide adequate cohort size for statistical power, global representation of illnesses for generalizability, and structured research support to ensure integrity and quality of study designs.² Research networks can overcome current barriers such as varying research infrastructure support in emergency departments (ED) across the globe and allow for
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The Emergency Medicine Education and Research by Global Experts (EMERGE) network was formed in June 2018, with the goals of generating evidence, translating knowledge to improve emergency care for patient populations, and strengthening EM research capacity globally.\(^4\) In the spirit of being inclusive we have reduced barriers to entry; thus, all institutions with EDs regardless of their annual census or academic affiliations can become EMERGE members. EMERGE continues to attract member sites across all six World Health Organization regions and continents, with a current membership of 26 EDs in 17 countries (www.EMERGENetwork.org). Aggregating high quality data on a common platform regardless of geographic borders is critical for describing and comparing the basic epidemiology of emergency care globally; increasing numbers to power hypothesis-generating studies; and improving generalizability of research findings.\(^5\) Here we report the issues and barriers faced by the network and discuss potential solutions.

METHODS

Operating on a carousel model,\(^6\) EMERGE is governed by an executive committee consisting of three subcommittees aligned with the missions of research, education, and data oversight (performed by a data coordinating center). EMERGE intentionally proposed the development of a global ED visit registry to demonstrate feasibility of data-sharing. The registry is a six-month, retrospective, deidentified, minimal dataset of routinely collected variables, such as patient demographics, diagnosis, and disposition. The data was collected by determining the core elements a priori, and each site communicated with the data-coordinating center to harmonize variable fields from their respective electronic health records (EHR).

RESULTS

EMERGE experienced considerable barriers ranging from variable data taxonomies, need for language translation, varying processes for data cleaning and transfer of deidentified data, and navigating numerous data protection regulations (Table 1). Institutions and countries vary substantially regarding data oversight, ranging from the need to set up individualized research agreements to legal barriers resulting in the inability to transfer deidentified data across geographic borders for some participating sites. Such data-fencing has precluded some sites to transfer deidentified data across geographic borders for some research agreements to legal barriers resulting in the inability to transfer deidentified data across geographic borders for some participating sites. This supports the notion that EDs across the globe want to participate in endeavors to generate evidence.

Because it is an unfunded network, such intense data efforts from EMERGE will require substantial resources and are unsustainable. We believe the future viability of international research networks will depend on developing a federated data model in which the data is collected using standardized definitions and processes, retained at the institution, analysed locally or using federated machine learning, and reported in an aggregated manner while preserving privacy and overcoming regulatory requirements.\(^8\) However, based on our experience, building a federated data model requires sites to obtain appropriate local regulatory approvals and have the necessary data infrastructure including data scientists and trained personnel to support this approach.

Another approach to enhancing site research capabilities is to enhance the research training and education of the personnel in each participating ED. We are currently collaborating with the Development Implementation, and Assessment of Novel Training in Domain-based competencies (DIAMOND), which is a web-based, curated research education platform, developed by the Clinical & Translational Awards (CTSA) mechanism in the United States.\(^9\) This novel and scalable platform allows research personnel to evaluate their knowledge gaps and build highly customizable, on-demand, web-based research education modules for training in research methods and procedures. The enhanced research

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(References and tables are omitted for brevity, focusing on the main points discussed.)
Table 1. Issues faced in data collection across a global research network and potential solutions.

| Issues | Potential Solutions |
|--------|---------------------|
| Global level | |
| • Political unrest | • Remain sensitive to the impact of politics on research personnel, infrastructure, and timelines |
| • Infections (eg, pandemics) | • Adopt an opportunistic research posture |
| • Different languages | • Provide translation services |
| • Need for international funding | • Conduct needs analysis and seek appropriate funding channels |
| National level | |
| • Data regulations (eg, GDPR\(^a\), ICMR\(^b\), LGDP\(^c\)) | • Build a federated data model |
| • Regulatory compliance – Ethics Committee | • Provide guidance using a master study protocol and guidance documents |
| Regional level | |
| • Application of national laws | • Understand the variability in regional interpretation of national laws |
| • Data variables differ | • Accept data variables in variable formats; provide data consultation services |
| Site level | |
| • Variability in requirements by ethics committees | • Provide research education via DIAMOND platform |
| • Data governance and concerns of breach in confidentiality | • Work on site-specific protocol templates; understand the concerns and differing requirements of various ethics boards |
| • Trust issues | • Communication with specific sites prior to data transfer to eliminate the possibility of receiving identifiable data; create a process system with data center |
| • Variability in fields for electronic health records | • Maintain transparency, provide regular updates |
| • Information technology support/availability | |
| System level | |
| • Accessing the Collaborative Institutional Training Initiative | • Ensure data compatibility for major variables |
| • Research experience | • Consider funding where possible for personnel for data extraction |
| • Lack of dedicated administrative and research time | • Remain flexible to adapt documents and data use agreements to reflect site-specific requirements that do not diverge from overall data policy |
| Personnel level | |
| • Building a mentor-mentee model | |
| • Provide authorship and acknowledgements as an incentive | |

GDPR, General Data Protection Regulation, EU data law; ICMR, Indian Council of Medical Research, Indian data law; LGDP, Lei Geral de Proteção de Dados or General Data Protection Law, Brazil data law; DIAMOND, Development, Implementation, and Assessment of Novel Training in domain-based competencies (https://diamondportal.org/).

Methodology training will increase the site support and thereby sustain engagement in global research participation. Sharing of data-related resources across sites will further enhance the success of the federated data model.

**LIMITATIONS**

The barriers encountered and solutions proposed are based on our experience, and it is possible that research networks in other specialities or those that have more robust support may have different barriers and challenges. Our experience is that with limited resources, there is a risk of over-burdening the sites as well as the central data-coordinating center. Some of these barriers can be potentially circumvented by site commitment of time and resources to the network research goals and aligning priorities.\(^a\). EMERGE has collected information from participating sites through an ED demographics study that will allow us to better delineate each site’s patient population and research capabilities to participate in studies and thereby facilitate decisions on the type and number of active studies at any one point in time for the network.\(^b\)

**CONCLUSION**

We identified challenges in data-sharing and variation in research infrastructure among sites. Immediate next steps
include the need to create regulatory-compliant federated
data models, enhance research education and training,
develop relevant research priorities, and identify research
questions that require global participation yet can be
performed at sites with limited resources.

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