Article type      : Special Contribution

Corresponding author mail id:- tbeckermd@gmail.com

**Global Emergency Medicine: A review of the literature from 2016**

Torben K. Becker, MD
Department of Critical Care Medicine, University of Pittsburgh Medical Center, Pittsburgh, PA

Bhakti Hansoti, MBChB, MPH
Department of Emergency Medicine, Johns Hopkins University, Baltimore, MD

Susan Bartels, MD, MPH
Department of Emergency Medicine, Queen's University, Kingston, Canada
Harvard Humanitarian Initiative, Cambridge, MA

Alison Schroth Hayward, MD, MPH
Department of Emergency Medicine, Yale School of Medicine, New Haven, CT

Braden J. Hexom, MD
Department of Emergency Medicine, Rush University Medical Center, Chicago, IL

Kevin M. Lunney, MD, PhD
Medical Corps, US Navy
Navy Trauma Training Center, Los Angeles County and University of Southern California, Los Angeles, CA

Regan H. Marsh, MD, MPH
Department of Emergency Medicine, Brigham and Women's Hospital, Boston, MA
Partners In Health, Boston, MA

Maxwell Osei-Ampofo, MBChB, MBA, MPH
Emergency Medicine Directorate, Komfo Anokye Teaching Hospital, Kumasi, Ghana
Kwame Nkrumah University of Science and Technology, Kumasi, Ghana

Indi Trehan, MD, MPH, DTM&H
Partners In Health, Harper, Liberia
Department of Pediatrics and Institute for Public Health, Washington University in St. Louis, St. Louis, MO
Department of Paediatrics and Child Health, University of Malawi, Blantyre, Malawi

Julia Chang
Brown University, Providence, RI

Adam C. Levine, MD, MPH
Department of Emergency Medicine, Warren Alpert Medical School of Brown University, Providence, RI

On behalf of the *Global Emergency Medicine Literature Review (GEMLR) Group*

**Abstract**

*Objectives:* The Global Emergency Medicine Literature Review (GEMLR) conducts an annual search of peer-reviewed and gray literature relevant to global emergency medicine (EM) to

identify, review, and disseminate the most important new research in this field to a global audience of academics and clinical practitioners.

*Methods*: This year 13,890 articles written in four languages were identified by our search. These articles were distributed among 20 reviewers for initial screening based on their relevance to the field of global EM. An additional two reviewers searched the gray literature. All articles that were deemed appropriate by at least one reviewer and approved by their editor underwent formal scoring of overall quality and importance. Two independent reviewers scored all articles.

*Results*: A total of 716 articles met our inclusion criteria and underwent full review. Fifty-nine percent were categorized as emergency care in resource-limited settings, 17% as emergency medicine development, and 24% as disaster and humanitarian response. Nineteen articles received scores of 18.5 or higher out of a maximum score 20 and were selected for formal summary and critique. Inter-rater reliability testing between reviewers revealed Cohen's Kappa of 0.441.

*Conclusions*: In 2016, the total number of articles identified by our search continued to increase. The proportion of articles in each of the three categories remained stable. Studies and reviews with a focus on infectious diseases, pediatrics, and the use of ultrasound in resource-limited settings represented the majority of articles selected for final review.

## Introduction

The Global Emergency Medicine Literature Review (GEMLR) strives to improve the global practice of emergency medicine (EM) by facilitating emergency care practitioners' identification of the most current and important research conducted on relevant topics around the world. Our review began in 2005 in an attempt to identify and consolidate the relevant global EM literature into a format that is readily available to academics and practitioners.[1-11] This year, our panel of reviewers and editors included physicians from Canada, Ethiopia, Ghana, Singapore, and the United States.

Our group strives to identify the most relevant practice changing articles, by scouring both the peer-reviewed and gray literature via a comprehensive search strategy. Gray literature has been defined as any material produced by an organization whose primary function is not peer-reviewed academic publication.[12] Our goal in performing a gray literature search is to identify

new global EM research conducted by government agencies, local or international nongovernmental organizations, or other entities that may not have published in peer-reviewed journals.

The primary goals of the review are to illustrate best practices, stimulate research, and promote further professionalization in the field of global EM through the identification of important new publications that focus on emergency care in the global context, including care provision in limited-resource settings, disaster and humanitarian response, and the development of emergency medicine as a clinical discipline throughout the world. At the same time, it is important to note that this review is not a formal systematic review or meta-analysis, as it does not aim to synthesize the published literature on a specific topic or research question. Instead, its goal is to identify the highest quality and most relevant global EM research from around the globe and summarize it in a single, easy to use reference.

**Methods**

Each year, our editorial board revises a procedure manual that outlines in detail the methodology for its search, screening, scoring, and reviewing processes.[13] Our project is not a research study, and thus no prior ethical or institutional review board approval was sought for this manuscript. All participants in this project are unpaid volunteers, and include 11 editors, 3 advisors, 1 representative from *Academic Emergency Medicine*, and 22 reviewers. As reviewers and editors were not blinded to the articles' authors, both reviewers and editors were recused from scoring or reviewing any articles in which they may have been directly or indirectly involved.

*Peer-reviewed literature search*

The initial search was conducted in two blocks: the first covering publications from January 1 to August 31, 2016, and the second from September 1 to December 31, 2016. PubMed was used to search Medline for original research or review articles that contained at least one "global" search term and one "emergency medicine" search term (Table 1). Seven journals which publish a significant number of global EM articles based on our experience from our prior reviews were 'hand searched', and all articles from the 2016 calendar year were included in the review. This year, the following journals were included in the hand search: *Academic Emergency Medicine*,

*African Journal of Emergency Medicine*, *Annals of Emergency Medicine*, *Bulletin of the World Health Organization*, *Emergency Medicine Journal*, *Prehospital and Disaster Medicine,* and *The Lancet*. Based on the linguistic capacity of our reviewers and editors, our search this year included articles published in English, French, Swahili, Portuguese, and Spanish. All studies were limited to human subjects only; news articles, editorials, case reports, commentaries, and letters to the editor were excluded. Articles that had been electronically published ahead of print in 2015 were included in last year's review.

*Gray literature search*

For the gray literature search, we used a pre-identified list of academic, government, and non-governmental organizations known to conduct significant global health research or implementation work (Table 2). Two reviewers were assigned to search the websites of these organizations for needs assessments, program monitoring, evaluation reports, topic reviews, white papers, conference proceedings, and other articles that may be relevant to the field of global EM.

*Article selection for inclusion*

Articles identified by our search strategy were distributed among 20 reviewers (plus two additional reviewers for the gray literature search) for initial screening based on their relevance to the field of global EM. These articles were then selected for scoring. The full-text article was obtained and classified as either an original research or review article and subsequently categorized as emergency care in resource-limited settings ("emergency care"), emergency medicine development ("development"), or disaster and humanitarian response ("disaster response") articles. Development articles include research on the development of EM as a specialty, EM training programs, or emergency medical care systems in countries without fully developed EM systems. This category also includes articles on EM training programs that focus on training individuals to work in resource-limited settings, regardless of the state of EM development in that country. Disaster response articles include research on the care of civilian populations in conflict; disaster mitigation, assessment, and response; and health care of refugees and internally displaced persons.

Each article was independently scored by two reviewers using a predefined grading scale that assessed for clarity, design, ethics, importance, and impact. Each topical area was scored from 0 to 5, totaling a final score range from 0 to 20 (Table 3). The scoring criteria are designed to help identify methodologically sound and scientifically impactful research in the field of global EM. The mean of the two scores was used as the final score for the article. Any article with a score difference between reviewers of greater than two standard deviations from the median score difference was rescored by an editor. The final score was then determined as the mean of the two reviewers' and the editor's scores. Articles with a final score of 18.5 of higher were selected for formal review, and were then distributed to reviewers who produced summaries and critiques of each article.

**Results**

The total number of articles identified by our PubMed search for 2016 was 10,031: 9,922 in English, 49 in Spanish, 37 in French, and 23 in Portuguese. The total number of articles produced by our hand search for 2016 was 3,859. From the combined 13,890 articles, 705 were selected for formal scoring.

Through our gray literature search process, we found 11 additional global EM research articles that met the inclusion criteria; these were combined with those identified by the Medline and hand search process to create a final database of 716 research articles for formal scoring by two reviewers. This year, about 9% of the articles included were accidentally assigned to three instead of two reviewers; all three scores were used to compute the mean score.

Of the 716 articles included, 421 (59%) were categorized as emergency care, 122 (17%) as development, and 172 (24%) as disaster response. A total of 542 (76%) of the articles were original research, while the remaining 174 (24%) were review articles.

The median final score for all articles was 13.5, ranging from 2 to 20. There was no difference in median scores between original research (13.5) and review (13.5) articles (p = 0.53) as assessed by Wilcoxon signed-rank test. The differences in median scores between emergency care (13.5), development (13.2), and disaster response (13.0) articles were significant (p = 0.03). Inter-rater

reliability for reviewer scoring, measured using Cohen's Kappa, was 0.441, considered "moderate" reliability in the literature.[14,15]

Articles that received a score greater than 18.5 were selected for formal review. The 2016 global EM articles selected for full review are listed in Table 4.[16-34] Nineteen articles were selected for inclusion, of which, 15 (79%) were categorized as emergency care, three (16%) were categorized as development, and one (5%) was categorized as disaster response articles. Eighteen (95%) articles were original research manuscripts and one (5%) was a review article. This year, no manuscript from the gray literature search scored highly enough to be included in the final list of top articles presented in this paper.

The complete database of all 716 identified global EM articles for 2016, as well as full summaries and critical analyses of the top-scoring 19 global EM articles of 2016, can be found as Supplements S1 and S2 in the online version of this article.

**Discussion**

The number of articles identified by our search continues to increase, rising from 12,435 manuscripts in 2015 to 13,890 articles in 2016. As in 2015, the rise in the number of articles appears to genuinely represent an increase in the field as a whole, as it was not explained by a large number of articles with a focus on Ebola, Zika or the conflict in Syria, nor the number of new journals indexed in Medline. Furthermore, the search strategy remained unchanged from previous years. Interestingly, the number of articles selected for full review was essentially unchanged, despite the additional articles identified in the initial search.

Among the articles scoring highly enough to be selected for full review, there was a small increase in emergency care articles along with a concomitant decrease in disaster response articles. The number of original research articles continued to increase overall, hopefully representing an increasing maturation in global EM research capacity.

Among the emergency care articles there continues to be a focus on the acute diagnosis and management of infectious diseases, including emerging and re-emerging pathogens. A study

from Baudin et al. reports on the association of Rift Valley fever on miscarriages among women in Sudan.[16] Traditional infectious diseases emergencies, such as undifferentiated fever in children, also remain prominent in the literature, as exemplified by Elfving et al. who evaluated the etiology and management of febrile children in Zanzibar using modern nucleic-acid based diagnostic testing in an area that has benefited from a marked decrease in malaria.[20] The continued challenge of managing febrile infants took a significant step forward with the article by Mir et al., who demonstrated that simplified antibiotic regimens, with an emphasis on oral therapy as outpatients, was equivalent to traditional inpatient management with parenteral antibiotics.[23]

A number of research articles this year focused on evaluating the use of rapid diagnostic tests for communicable diseases. Boisen et al. validated a rapid diagnostic test for the Ebola virus that may markedly change the way that patients are triaged and isolated in future outbreaks.[17] In what may be particularly useful in settings with high rates of HIV and tuberculosis, Peter et al. demonstrated the effectiveness of a novel point-of-care urine test to guide tuberculosis diagnosis and treatment among HIV-positive patients.[24] There is a need to make diagnostic testing more accessible, in areas where traditional laboratory services are unavailable. The focus on point-of-care diagnostic technologies may represent an effort to improve accessibility to manage acute infectious diseases.

Emergency care clinicians around the world must adapt the triage, screening, and diagnostic tools classically used in the resource-rich settings where emergency medicine was first developed as a specialty. A two-staged triage system was implemented in Cambodia by Khan et al. to separate critical, urgent, and non-urgent patients, demonstrating moderate validity and inter-rater reliability.[22] The use of the Emergency Triage Assessment and Treatment (ETAT) tool for pediatric patients continues to spread, with Kapoor et al. demonstrating the dissemination of ETAT from the referral hospitals down to the primary health center level in Guatemala.[33] In Nigeria, Burnham-Maurisch et al. used a nested design to conduct two-step screening for sickle cell disease, which due to pain crises and acute infections poses a heavy burden on the emergency care system in sub-Saharan Africa.[18] In another paper studying anemia, Sawe et al.

demonstrated that clinical gestalt was a fair alternative to laboratory testing in diagnosing anemia in resource-limited settings.[26]

In further studies from the pediatric world, Ralston et al. demonstrated that a combination of height and mid-upper arm circumference was superior to other methods in determining the weight of children presenting for acute care.[25] The accuracy of chest x-rays in identifying the cause of tachypnea was demonstrated to be relatively poor in India,[27] emphasizing further the need for improved diagnostic tools when assessing children in respiratory distress, especially given that pneumonia continues to account for the greatest burden of mortality in children worldwide.[35]

Another diagnostic technology that has revolutionized EM in recent years and is now starting to embed itself into emergency practice worldwide, just as it has in well-resourced settings, is point-of-care ultrasound (POCUS). This year, two high-quality articles were identified that present data on the use of, and training in, POCUS in resource-limited settings.[28,34] Both articles add to the growing literature that POCUS can be reliably used by practitioners in low-income settings to improve in the diagnosis of acute presentations of both communicable and non-communicable disease, especially in locations where traditional radiography and laboratory testing may be limited and must be used judiciously.

As EM continues to develop into a recognized medical discipline and component of health systems worldwide, prehospital care will inevitably become of particular concern in resource-limited countries and conflict zones. High-scoring articles this year described barriers to emergency medical services (EMS) use in India,[31] the significant increase in road traffic accidents and injuries in post-invasion Iraq,[29] and the limited implementation of the World Health Organization's trauma guidelines.[21] In terms of trauma care, a study by Chattopadhyay et al. found that a novel and low-cost dressing performed as well as Xeroform in vitro and in vivo for management of burn wounds, providing a new option for practitioners in resource-limited environments who manage victims of trauma and burns.[19]

Finally, two articles deserve particular mention, as they demonstrate the increasing maturity of global EM to encompass topics beyond the traditional areas of emergent stabilization and primary care complaints. First, in the realm of palliative care, is a study by Syed et al. that identified barriers that physicians in Pakistan faced in end-of-life discussions with families of critically ill patients.[30] The most common barriers include denial, the level of education in the family, disagreements among family members, and the lack of professional support in having these discussions. It is remarkable to consider that these barriers and challenges are not so different from those faced in Western medicine as well, with palliative care only in recent years taking its rightful place as a valued equal at the table of health care. The second unique article was the one scored article to be classified in the disaster response category. In a complex multilevel statistical analysis involving nearly two million children and more than a century of natural disasters, Daoud et al. demonstrated significant linkages between child poverty, poor governance structures, and natural disasters.[32] This, again, is a demonstration that global EM is growing and maturing beyond straightforward epidemiology, diagnosis, and direct patient management, into a medical discipline uniquely situated between politics, society, the environment, and health. One can only continue to anticipate that future years will show even more growth and development of global EM in this regard.

## Conclusions

As the body of original research in the field of global EM continues to grow, this year has demonstrated an increased focus on technology to improve clinical emergency care delivery in low resource settings. A number of articles focused on point-of-care rapid diagnostic tests for communicable disease and point-of-care ultrasound.  As in previous years, there remains the traditional focus on infectious diseases and triage. Lastly, we hope that the robustness of the research methodologies demonstrated by several of the studies featured in this review represent the developing research capacity in global EM.

**References**

1. Levine AC, Gadiraju S, Goel A, Johar S, King R, Arnold K. International emergency medicine: a review of the literature. Acad Emer Med 2007;14:182-3.

2. Levine AC, Goel A, Keay CR, et al. International emergency medicine: a review of the literature from 2006. Acad Emer Med 2007;14:1190-3.

3. Levine AC, Becker J, Lippert S, Rosborough S, Arnold K. International emergency medicine: a review of the literature from 2007. Acad Emer Med 2008;15:860-5.

4. Lippert S, Levine AC, Becker J, Foran M, Rosborough S, Arnold K. International emergency medicine: a review of the literature from 2008. Acad Emer Med 2009;16:1335-40.

5. Foran M, Levine A, Lippert S, et al. International emergency medicine: a review of the literature from 2009. Acad Emer Med 2011;18:86-92.

6. Aschkenasy M, Arnold K, Foran M, et al. International emergency medicine: a review of the literature from 2010. Acad Emer Med 2011;18:872-9.

7. Schroeder ED, Jacquet G, Becker TK, et al. Global emergency medicine: a review of the literature from 2011. Acad Emer Med 2012;19:1196-203.

8. Jacquet GA, Foran M, Bartels S, et al. Global emergency medicine: a review of the literature from 2012. Acad Emer Med 2013;20:835-43.

9. Becker TK, Jacquet GA, Marsh R, et al. Global emergency medicine: a review of the literature from 2013. Acad Emer Med 2014;21:810-7.

10. Becker TK, Bartels S, Hansoti B, et al. Global emergency medicine: a review of the literature from 2014. Acad Emer Med 2015;22:976-84.

11. Becker TK, Hansoti B, Bartels S, et al. Global emergency medicine: a review of the Literature From 2015. Acad Emer Med 2016;23:1183-91.

12. GreyNet International Conference on Grey Literature 1997, expanded 2004. (Accessed April 4, 2017, at http://www.greynet.org/greynethome/aboutgreynet.html.)

13. GEMLR Procedures Manual 2016. (Accessed April 6, 2017, at http://www.gemlr.org/uploads/1/4/6/4/14642448/proceduresmanual.pdf.)

14. Landis JR, Koch GG. The measurement of observer agreement for categorical data. Biometrics 1977;33:159-74.

15. Sim J, Wright CC. The kappa statistic in reliability studies: use, interpretation, and sample size requirements. Phys Ther 2005;85:257-68.

16.	Baudin M, Jumaa AM, Jomma HJ, et al. Association of Rift Valley fever virus infection with miscarriage in Sudanese women: a cross-sectional study. Lancet Glob Health 2016;4:e864-e71.

17.	Boisen ML, Cross RW, Hartnett JN, et al. Field validation of the ReEBOV antigen rapid test for point-of-care diagnosis of Ebola virus infection. J Infect Dis 2016;214:S203-9.

18.	Burnham-Marusich AR, Ezeanolue CO, Obiefune MC, et al. Prevalence of sickle cell trait and reliability of self-reported status among expectant parents in Nigeria: implications for targeted newborn screening. Public Health Genomics 2016;19:298-306.

19.	Chattopadhyay A, Chang K, Nguyen K, et al. An inexpensive bismuth-petrolatum dressing for treatment of burns. Plast Reconst Surg Glob Open 2016;4:e737.

20.	Elfving K, Shakely D, Andersson M, et al. Acute uncomplicated febrile illness in children aged 2-59 months in Zanzibar - aetiologies, antibiotic treatment and outcome. PLoS One 2016;11:e0146054.

21.	LaGrone L, Riggle K, Joshipura M, et al. Uptake of the World Health Organization's trauma care guidelines: a systematic review. Bull World Health Organ 2016;94:585-98C.

22.	Khan A, Mahadevan SV, Dreyfuss A, et al. One-two-triage: validation and reliability of a novel triage system for low-resource settings. Emerg Med J 2016;33:709-15.

23.	Mir F, Nisar I, Tikmani SS, et al. Simplified antibiotic regimens for treatment of clinical severe infection in the outpatient setting when referral is not possible for young infants in Pakistan (Simplified Antibiotic Therapy Trial [SATT]): a randomised, open-label, equivalence trial. Lancet Glob Health 2017;5:e177-e85.

24.	Peter JG, Zijenah LS, Chanda D, et al. Effect on mortality of point-of-care, urine-based lipoarabinomannan testing to guide tuberculosis treatment initiation in HIV-positive hospital inpatients: a pragmatic, parallel-group, multicountry, open-label, randomised controlled trial. Lancet 2016;387:1187-97.

25.	Ralston ME, Myatt MA. Weight estimation tool for children aged 6 to 59 months in limited-resource settings. PLoS One 2016;11:e0159260.

26.	Sawe HR, Mfinanga JA, Mwafongo V, Reynolds TA, Runyon MS. The test characteristics of physician clinical gestalt for determining the presence and severity of anaemia in patients seen at the emergency department of a tertiary referral hospital in Tanzania. Emerg Med J 2016;33:338-44.

27. Seear M, Awasthi S, Gowraiah V, et al. Predictive accuracy of chest radiographs in diagnosing tachypneic children. Indian J Pediatr 2016;83:930-6.

28. Shah SP, Fils-Aime R, Desir W, Joasil J, Venesy DM, Muruganandan KM. Focused cardiopulmonary ultrasound for assessment of dyspnea in a resource-limited setting. Crit Ultrasound J 2016;8:7.

29. Stewart BT, Lafta R, Cherewick M, et al. Road traffic injuries in Baghdad from 2003 to 2014: results of a randomised household cluster survey. Inj Prev 2016;22:321-7.

30. Syed AA, Almas A, Naeem Q, Malik UF, Muhammad T. Barriers and perceptions regarding code status discussion with families of critically ill patients in a tertiary care hospital of a developing country: a cross-sectional study. Palliat Med 2016;31:147-57.

31. Vasudevan V, Singh P, Basu S. Importance of awareness in improving performance of emergency medical services (EMS) systems in enhancing traffic safety: a lesson from India. Traffic Inj Prev 2016;17:699-704.

32. Daoud A, Hallerod B, Guha-Sapir D. What is the association between absolute child poverty, poor governance, and natural disasters? A global comparison of some of the realities of climate change. PLoS One 2016;11:e0153296.

33. Kapoor R, Sandoval MA, Avendano L, et al. Regional scale-up of an Emergency Triage Assessment and Treatment (ETAT) training programme from a referral hospital to primary care health centres in Guatemala. Emerg Med J 2016;33:611-7.

34. Reynolds TA, Noble J, Paschal G, et al. Bedside ultrasound training at Muhimbili National Hospital in Dar es Salaam, Tanzania and Hospital San Carlos in Chiapas, Mexico. Afr J Emerg Med 2016;6:125-31.

35. The Global Burden of Disease Child and Adolescent Health Collaboration. Chils and adolescent health from 1990 to 2015: Findings from the Global Burden of Diseases, Injuries, and Risk Factors 2015 Study. JAMA Pediatr 2017; doi:10.1001/jamapediatrics.2017.0250.

**Table 1: Search Terms**

| Emergency Medicine | Global |
|---|---|
| Emergency medicine | World health |
| Refugees | Developing countries |
| Emergency treatment | International |
| Relief work | Global |
| Rescue work | Tropical medicine |
| Acute disease | Third world |
| Humanitarian | Middle-income countries |
| Critical Illness | Low-income countries |
| War | Resource-limited settings |
| Prehospital | |
| Conflict | |
| Triage | |
| Disasters | |
| Multiple trauma | |
| Injuries | |
| Internally displaced persons | |
| Emergencies | |
| Emergency medical services | |
| Resuscitation | |
| Critical care | |

| | |
|---|---|
| Sepsis<br><br>Shock | |

**Table 2: Gray Literature Sources**

| |
|---|
| Academic centers/think tanks<br><br>1. Global Health Council<br><br>2. Center for Global Development<br><br>3. The United Nations University<br><br>4. RAND Corporation<br><br>5. The Woodrow Wilson Center<br><br>6. The Bill and Melinda Gates Foundation<br><br>7. Center for Global Health Research/University of Toronto<br><br>8. Emergency Trauma Care Project<br><br>9. Centre for Research on the Epidemiology of Disasters (CRED)<br><br><br>NGOs, UN, and government agency websites<br><br>1. MEASURE Evaluation<br><br>2. MSF<br><br>3. Epicentre<br><br>4. International Rescue Committee<br><br>5. International Medical Corps |

6. Oxfam International

7. Oxfam Great Britain

8. GIZ/GTZ

9. International Committee of the Red Cross

10. Centers for Disease Control and Prevention

11. World Health Organization

12. Humanitarian Practice Network

13. UN High Commission for Refugees

14. UN Development Program

15. Inter-Agency Standing Committee

16. UNICEF

17. JHPIEGO

GIZ/GTZ = Deutsche Gesellschaft für Internationale Zusammenarbeit; JHPIEGO = formerly

Johns Hopkins Program for International Education in Gynecology and Obstetrics; MSF =

Médecins Sans Frontières; NGO = non-governmental organization; UN = United Nations;

UNICEF = United Nations Children's Fund.

**Table 3: Scoring Criteria**

| | Original Research Article | Points | Review Articles | Points | |
|---|---|---|---|---|---|
| **Clarity** | | | Clearly stated purpose for review | 2 | |
| | | | Sufficient background provided | 1 | |
| | | | Understandable to nonprofessional | 1 | |
| | | | Clear language, appropriate use of tables and figures | 1 | |
| **Design** | RCT *or* observational study with control group *or* a diagnostic study utilizing an appropriate criterion (gold) standard for comparison | 2 | Formal meta-analysis or systemic review (including studies with a control group) | 2 | |
| | No bias in selection of subjects; attempts to limit bias | 1 | Study selection is clear and reproducible | 1 | |
| | Adequate blinding of study subjects | 1 | Article selected by at least two blinded authors | 1 | |
| | Correct statistical tests used for analysis | 1 | Data aggregated and/or analyzed appropriately | 1 | |
| **Ethics** | Approved by IRB | 2 | | | |
| | Adheres to Declaration of Helsinki | 1 | | | |
| | Consent obtained or waived by IRB | 1 | | | |
| | Authors have no COI | 1 | | | |
| **Importance** | Results are generalizable to a variety of settings | 2 | Results are generalizable to a variety of settings | 2 | |
| | Topic is important | 2 | Topic is important | 2 | |
| | Topic is clearly relevant to GEM | 1 | Topic is clearly relevant to GEM | 1 | |
| **Impact** | Recommendations can be implemented in developing countries | 2 | Recommendations are applicable across a wide range of different settings | 2 | |

| | The intervention studied is cost-effective | 1 | The intervention studied is cost-effective | 1 | |
| | NGOs, UN agencies, and other actors would likely change their practice if they were aware of this study | 1 | NGOs, UN agencies, and other actors would likely change their practice if they were aware of this study | 1 | |
| | Study results likely to stimulate further research | 1 | Study results likely to stimulate further research | 1 | |

COI = conflict of interest; GEM = global emergency medicine; IRB = institutional review board; NGO = non-governmental organization; RCT = randomized controlled trial; UN = United Nations.

**Table 4: Global Emergency Medicine Literature Review 2016 Articles**

| Category | First Author | Title | Journal | Summary |
| --- | --- | --- | --- | --- |
| Emergency care in resource-limited settings (ECRLS) | Baudin M | Association of Rift Valley fever virus infection with miscarriage in Sudanese women: a cross-sectional study | Lancet Glob Health | In Sudan, cross-sectional evidence suggests that Rift Valley fever virus is independently associated with spontaneous abortion. |
| | Boisen M | Field validation of | J Infect Dis | A rapid diagnostic test |

| | | | |
|---|---|---|---|
| | | the ReEBOV antigen rapid test for point-of-care diagnosis of Ebola virus infection | | for Ebola could be used as a potential triage tool in future epidemics to minimize the spread of the disease. |
| | Burnham-Maurisch A | Prevalence of sickle cell trait and reliability of self-reported status among expectant parents in Nigeria: implications for targeted newborn screening | Public Health Genomics | The integration of two-step screening of primiparas and high risk newborns into established community health care initiatives is potentially an effective and cost-saving public health initiative to help decrease early morbidity and mortality from sickle cell disease. |
| | Chattopadhyay | An inexpensive | Plast Reconstr | A low-cost, hand- |

| | A | bismuth-petrolatum dressing for treatment of burns | Surg Glob Open | made burn dressing was as effective as Xeroform dressing in vitro and in vivo. This may serve as an acceptable alternative in resource-limited settings. |
|---|---|---|---|---|
| | Elfving K | Acute uncomplicated febrile illness in children aged 2-59 months in Zanzibar - aetiologies, antibiotic treatment and outcome | PLoS One | This study identifies the causes, clinical management and outcomes of pediatric fever in an African primary care setting by conducting infectious pathogen testing in febrile patients as well as healthy controls. |
| | Khan A | One-two-triage: validation and reliability of a novel | Emerg Med J | This study evaluates a new triage tool designed for low- |

| | | triage system for resource limited settings | | resource settings which demonstrates moderate validity and inter-rater reliability. |
|---|---|---|---|---|
| | LaGrone L | Uptake of the World Health Organization's trauma care guidelines: a systematic review | Bull World Health Organ | A systematic review finds the WHO trauma care guidelines to be widely disseminated globally but infrequently utilized for policy development or educational curricula. |
| | Mir F | Simplified antibiotic regimens for treatment of clinical severe infection in the outpatient setting when referral is not possible for young infants in | Lancet Glob Health | This study evaluates two simplified antibiotic regimens to treat young infants (0-59 days) in low-resource settings, who cannot be referred to a hospital |

| | | Pakistan (Simplified Antibiotic Therapy Trial [SATT]): a randomised, open-label, equivalence trial | | with signs of severe clinical infection, but without signs of critical illness. |
|---|---|---|---|---|
| | Peter J | Effect on mortality of point-of-care, urine-based lipoarabinomannan testing to guide tuberculosis treatment initiation in HIV-positive hospital inpatients: a pragmatic, parallel-group, multicountry, open-label, randomised controlled trial | Lancet | The addition of a low-cost, point-of-care, urine-based lipoarabinomannan test as a rapid diagnostic adjunct for HIV-positive inpatients with suspected tuberculosis improves 8-week mortality. |
| | Ralston M | Weight estimation tool for children | PLoS One | Height-based weight estimation with |

| | | aged 6 to 59 months in limited-resource settings | | stratification by mid-upper arm circumference (MUAC) class was superior to estimation based on MUAC, 2011 or 2007 Broselow tapes based on survey data from low and middle income settings. |
|---|---|---|---|---|
| | Sawe HR | The test characteristics of physician clinical gestalt for determining the presence and severity of anaemia in patients seen at the emergency department of a tertiary referral | Emerg Med J | Use of clinical gestalt to determine the presence and severity of anemia is a fair alternative to laboratory testing in resource limited settings. |

| | | | | |
|---|---|---|---|---|
| | | | | hospital in Tanzania |
| | Seear M | Predictive accuracy of chest radiographs in diagnosing tachypneic children | Indian J Pediatr | The accuracy of chest x-rays in differentiating between pneumonia, wheeze, and non-respiratory problems in tachypneic children presenting with respiratory complaints to two low-resource hospitals in India was poor. |
| | Shah S | Focused cardiopulmonary ultrasound for assessment of dyspnea in a resource-limited setting | Crit Ultrasound J | A training for Haitian practitioners on cardiopulmonary ultrasound to assess dyspneic patients was helpful in the diagnosis and management of left |

| | | | | |
|---|---|---|---|---|
| | | | | ventricular systolic dysfunction, mitral valve disease, pericardial effusion, and pleural effusion. |
| | Stewart B | Road traffic injuries in Baghdad from 2003 to 2014: results of a randomized household cluster survey | Inj Prev | This random-clustered, community survey provides important information on the incidence of road traffic injuries and their effects on Baghdad over a 10-year period in post-invasion Iraq. |
| | Syed A | Barriers and perceptions regarding code status discussion with families of critically ill patients | Palliat Med | This study examines barriers faced by physicians and their perceptions in discussing code status with families of |

| | | in a tertiary care hospital of a developing country: A cross-sectional study | | critically ill patients in a tertiary hospital in a developing country. |
|---|---|---|---|---|
| | Vasudevan V | Importance of awareness in improving performance of emergency medical services (EMS) systems in enhancing traffic safety: a lesson from India | Traffic Inj Prev | Population preference for a private vehicle and lack of awareness of available ambulance services are critical impediments to a successful pre-hospital system in India. |
| Disaster and humanitarian response (DHR) | Daoud A | What Is the association between absolute child poverty, poor governance, and natural disasters? A global comparison of | PLoS One | The association between child poverty and its relation to natural disasters and poor governance in low and middle-income |

| | | some of the realities of climate change | | countries is complex. |
|---|---|---|---|---|
| Emergency medicine development (EMD) | Kapoor R | Regional scale-up of an Emergency Triage Assessment and Treatment (ETAT) training programme from a referral hospital to primary care health centres in Guatemala | Emerg Med J | This study evaluated a training for healthcare workers in a primary care setting in the triage and initial care of pediatric patients in rural Guatemala and found knowledge and skill retention was acceptable at 12 months. |
| | Reynolds TA | Bedside ultrasound training at Muhimbili National Hospital in Dar es Salaam, Tanzania and Hospital San Carlos in Chiapas, Mexico | Afr J Emerg Med | Point-of-care ultrasound has rapidly developed into an integral part of both emergency and critical care in resource limited settings, despite |

| | | | | limited training. Context-specific ultrasound training may greatly aid bedside clinical decision-making in locations where other imaging modalities may not be available. |
|---|---|---|---|---|