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ORIGINAL ARTICLE

Essential medicines for emergency care in Africa☆,

M.C. Broccoli[a], J.L. Pigoga[b], M. Nyirenda[c], L.A. Wallis[d], E.J. Calvello Hynes[e,*]

[a] Department of Emergency Medicine, Boston Medical Center, Boston, MA, USA
[b] Rollins School of Public Health, Emory University, Atlanta, GA, USA
[c] Queen Elizabeth Central Hospital, Ministry of Health and University of Malawi College of Medicine, Blantyre, Malawi
[d] Division of Emergency Medicine, University of Cape Town, Cape Town, South Africa
[e] Department of Emergency Medicine, University of Colorado School of Medicine, CO, USA

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ABSTRACT

Objectives: Essential medicines lists (EMLs) are efficient means to ensure access to safe and effective medications. The WHO has led this initiative, generating a biannual EML since 1977. Nearly all countries have implemented national EMLs based on the WHO EML. Although EMLs have given careful consideration to many public health priorities, they have yet to comprehensively address the importance of medicines for treating acute illness and injury.

Methods: We undertook a multi-step consensus process to establish an EML for emergency care in Africa. After a review of existing literature and international EMLs, we generated a candidate list for emergency care. This list was reviewed by expert clinicians who ranked the medicines for overall inclusion and strength of recommendation. These medications and recommendations were then evaluated by an expert group. Medications that reached consensus in both the online survey and expert review were included in a draft emergency care EML, which underwent a final in-person consensus process.

Results: The final emergency care EML included 213 medicines, 25 of which are not in the 2017 WHO EML but were deemed essential for clinical practice by regional emergency providers. The final EML has associated recommendations of desirable or essential, and is subdivided by facility level. Thirty-nine medicines were recommended for basic facilities, an additional 96 for intermediate facilities (e.g. district hospitals), and an additional 78 for advanced facilities (e.g. tertiary centres).

Conclusion: The 25 novel medications not currently on the WHO EML should be considered by planners when making rational formularies for developing emergency care systems. It is our hope that these resource-stratified lists will allow for easier implementation, and will be a useful tool for practical expansion of emergency care delivery in Africa.

African relevance

What is already known about this subject:

- Essential medicines lists are efficient means to ensure access to safe and effective medications.
- Although essential medicines lists have given careful consideration to many public health priorities, they have yet to comprehensively address the importance of medicines for treating acute illness and injury.
- Low-resource settings with underdeveloped emergency care systems are in urgent need of emergency care-specific essential medicines lists to enhance facility and system planning.

What this study adds:

- This manuscript proposes an emergency care essential medicines lists that includes 213 medicines, 25 of which are not in the 2017 WHO essential medicines lists.
- These medications were selected and agreed upon by expert clinicians practicing emergency care in Africa using a multi-phase consensus process.
- The final essential medicines lists has associated recommendations of desirable or essential, and is subdivided by facility level (basic,

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* Corresponding author.
E-mail address: emilie.calvellohynes@ucdenver.edu (E.J. Calvello Hynes).

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intermediate, advanced).

Introduction

Since the introduction of the World Health Organization's (WHO) Model List of Essential Medicines in 1977, essential medicines lists (EMLs) have become a core component of primary healthcare [1]. EMLs have nearly doubled access to essential medicines and are often cited as one of the most cost-effective interventions in modern healthcare [2,3]. By effectively limiting the number of medicines available, EMLs encourage prescription of higher-quality medicines [4], guide proper use and dosage of these medicines, and facilitate clinical education and training [1]. EMLs can also address public health concerns such as antibiotic resistance by promoting responsible use of these medicines [5].

The WHO EML is evidence-based, with medicines being prioritised based on public health relevance, safety, cost-effectiveness, and efficacy to ensure that they can be available in adequate doses at all times [6,7]. Ninety-five percent of countries have national EMLs guided by the WHO EML [4,7]; national EMLs are then used to inform treatment guidelines and allow for mandates surrounding procurement, provision, and training. Aid groups also rely on the WHO EML to create widely-applicable purchase lists and field guidelines [8,9].

From a population perspective, EMLs represent cost-effective interventions directed toward preventing and treating diseases [1]. However, the current WHO list has not been oriented toward a crucial form of secondary prevention – the appropriate treatment of patients with emergent clinical presentations. Emergency care is recognised as an effective means of reducing morbidity and mortality, especially in low-resource settings where the majority of the global burden of injury and illness resides [10–12]. Emergency care remains an underdeveloped aspect of healthcare in much of the world [10,13,14], and the essential medicines necessary for a general approach to treating acute illness and injury across multiple diseases have not been formally specified.

Some countries include medicines lists in their emergency care treatment guidelines, but these lists are not vetted for cost-effectiveness, public health relevance, and evidence of efficacy and safety [7]. The WHO EML itself receives minimal input from emergency care specialists [11]; the resultant list prioritizes vaccines and medications for the chronic treatment of infectious and non-communicable diseases but has notable gaps in vital medications required for emergency care [7]. In high-income countries the current WHO inclusion list is not problematic; systems are able to tailor the WHO EML to their already-functioning emergency units. But low-resource settings where emergency care systems are far less developed lack the capacity to complete such a process, yet are in urgent need of emergency care-specific medication lists to enhance facility and system planning [10,14,15].

More than half of Africans lack access to essential medicines [2] and many are required to pay for medicines prior to receiving care [16]. This is particularly problematic and often grossly unethical in emergency situations when medicines are needed immediately, regardless of ability to pay. A simplified emergency care EML would ensure the safety, efficacy, and availability of life-saving medicines [17]. It would serve to guide an essential component of emergency service delivery, leading to a more reliable drug supply and improved prescribing patterns, likely with improved patient outcomes and cost-effectiveness [4,8].

Over the coming decades, many African countries are expected to develop their emergency care systems. Currently, only one example of a country-level essential emergency medication list exists in Africa [18]. This paper describes a multi-step consensus process which we undertook to establish an EML for emergency care in Africa. We believe that such a list will be a useful tool for practical expansion of emergency care delivery in Africa, and that increasing the availability of essential emergency medicines will ultimately improve outcomes from acute injury and illness.

Literature review

A comprehensive literature review of both peer-reviewed publications and grey literature was conducted in late 2015 to identify EMLs specific to emergency care. A list of key search terms surrounding emergency medications and EMLs was devised. PubMed, MEDLINE, and Google Scholar were first searched to identify EMLs specific to emergency care; however, this search only returned one such list, published by the Ethiopian Food, Medicine and Health Care Administration and Control Authority in 2014 [18].

The search was then broadened to look for lists of essential medicines designed for low-resource settings. Although many national- and regional-level EMLs are available online, they are not published in indexed journals, so a detailed search of the grey literature was necessary [19]. Through the use of online search engines and key search terms we were able to identify numerous EMLs on academic, organisational, and government sites, including the 2013 WHO Essential Medicines List, the 2013 Médecins Sans Frontiers Essential Drugs list, and National Medicines Lists from 44 (81%) African countries. There was mention of EMLs for several other African countries, but they were not specific to emergency care and were unable to be obtained online.

The 2013 WHO EML and the 2013 Essential Drugs list from Médecins Sans Frontiers were compared to the retrieved National Medicines lists. We abstracted all medications known to be used in emergency care settings. Drugs used only to treat chronic conditions, such as chemotherapeutics and anti-retroviral medications, were not included. Drugs were also excluded if they were not listed on a majority ($> 50\%$) of identified African EMLs, as this strongly indicated their lack of relevance and/or availability in the African setting.

This initial process generated a candidate list of 250 potential medicines. Drugs were grouped by categories deemed relevant to emergency care in order to facilitate later presentation for consensus gathering. We undertook a year-long, multi-step consensus process to refine the candidate list into a final EML for emergency care in 2015–16 (Fig. 1). The study design did not require our team to seek IRB approval.

Online survey

The candidate list of medicines was used to generate a survey using an online tool (SurveyMonkey®). In order to capture opinions from the breadth of emergency care systems across Africa, a wide variety of healthcare providers who deliver emergency care in a range of contexts across the continent were sampled via convenience. Survey participants were identified through AFEM's membership pool: members who had been practising emergency care (whether as a specialist or any other level of healthcare provider) for at least one year at any type of facility were targeted. Of these, 109 had current contact details on file and were able to be reached via email to request participation.

The online survey contained 250 total medications, divided into 33 categories. Due to the large francophone population in Africa, it was made available to participants in both English and French. Participants were asked to rank each medicine as "essential", "desirable", "not necessary", or "not applicable" [20,21]. Medicines were also ranked for three levels of facilities (basic, intermediate, advanced) to allow the EML to build upon the previously published African Federation for Emergency Medicine's (AFEM) sub-Saharan African emergency care facility designations [21]. This approach is synergistic with other initiatives for African emergency care development that base recommendations on facility capacity [22].

Respondents were asked to propose other medications and provide commentary. Medication routes were not specified at the time of the survey; however, respondents were informed about the facility level capacity of drug administration (e.g., basic level facilities can