



Review article

Considerations for service delivery for emergency care in low resource settings



Harveen Bal Bergquist^{a,b,*}, Taylor W. Burkholder^a, Osama A. Muhammad Ali^c, Yasein Omer^b, Lee A. Wallis^b

^a Keck School of Medicine, Department of Emergency Medicine, University of Southern California, Los Angeles, CA, USA

^b Division of Emergency Medicine, University of Cape Town, Cape Town, South Africa

^c Tamayoz Emergency and Trauma Center, Khartoum, Sudan

ARTICLE INFO

Keywords:

Emergency care systems
Service delivery
Access
Quality improvement

ABSTRACT

In a shift from the more traditional disease focused model of global health interventions, increasing attention is now being placed on the importance of strengthening healthcare systems as a key component for achieving improved health outcomes. As emergency care systems continue to develop and strengthen around the world, the concept of service delivery provides one way to assess how well these systems are functioning. By focusing on service delivery, a system can be evaluated based on its ability to provide patients with access to the high-quality emergency care that they deserve. While the concept of service delivery is commonly used to evaluate the effectiveness of care in high-resource settings, its use in low resource settings has previously been limited due to challenges in operationalizing the concept in a context appropriate way. This article will begin by discussing the concept of service delivery as it specifically applies to emergency care systems and then discuss some of the challenges in defining and assessing this concept in low resource settings. The article will then discuss several new tools that have been developed to specifically address ways to evaluate emergency care service delivery in low-resource settings that can be used to inform future systems strengthening activities.

African relevance

- The provision of high-quality emergency care is limited across much of the African region.
- Many current methods to evaluate the quality of emergency care service delivery are not applicable to much of the region.
- New tools are being developed that can inform emergency care systems development in a context appropriate way.

Introduction

Health-related interventions, particularly those related to healthcare in low resource settings (LRS), have traditionally focused on condition-specific targets such as decreasing morbidity and mortality due to HIV/AIDS or decreasing global maternal mortality rates. Increasing attention is now being placed on how understanding and strengthening overall healthcare systems can help ensure care is delivered effectively and efficiently across disease-conditions, thereby helping to secure improved care for all populations.

At its core, a healthcare system should be designed with the needs of

the population in mind. To ensure a health system is truly population centric, it should be evaluated using metrics that actually matter to patients, such as the ability to stay healthy and the ability to obtain accurate and timely diagnosis and treatment. The goal is to create overall improvement in health for the entire population, including decreased morbidity and mortality and improved quality of life. By focusing on service delivery one can ensure a system is designed to most adequately meet the needs of the population it serves.

In this paper we begin by defining the core concepts of an emergency care system and the importance of focusing on service delivery as a marker for access to care. We will also discuss some of the challenges in operationalizing the concept of service delivery in LRS, as well as present several current tools specifically designed to help define and evaluate emergency care service delivery in LRS.

Service delivery

Several perspectives can be taken when seeking to evaluate the effectiveness of a healthcare system. One approach is to focus on traditional health outcomes, such as morbidity and mortality rates, as a core

* Corresponding author at: LAC+USC Medical Center, 1200 N State St Room 1011, Los Angeles, CA 90033.

E-mail address: lee.wallis@uct.ac.za (H.B. Bergquist).

<https://doi.org/10.1016/j.afjem.2020.07.002>

Received 12 January 2020; Received in revised form 12 May 2020; Accepted 6 July 2020

Available online 13 August 2020

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measure of how well a healthcare system functions. However, a different perspective can be gained when shifting the focus to the concept of service delivery which examines how patients interact with the healthcare system to receive care. More simply put, service delivery refers to the patient-centred outward face of the healthcare system and reflects how well a system can provide patients with resources and access to care (e.g. access to medications, quality hospital care, etc.). Through a focus on service delivery, we can better understand how populations interact with their healthcare system and how well patients are actually able to access the care that they need. For instance, while having a supply of IV antibiotics is crucial for any healthcare system, that supply is less useful if it cannot effectively be delivered to those who need it in a timely manner.

While healthcare systems in high resource settings are often evaluated through an emphasis on service delivery (using metrics such as door-to-balloon time for revascularization in heart attacks or door-to-needle time for administration of thrombolytics in strokes), its use in LRS has previously been limited given challenges in operationalizing this concept in a context appropriate way. This is especially true with respect to service delivery in emergency care, which has long been an overlooked component of the healthcare system. However, a mounting body of evidence now speaks to the critical role of emergency care in improving health outcomes for populations and has led to increased attention on emergency care system development. This is reflected in the passage of Resolution 72.16 by the World Health Assembly in May 2019 which calls on all member states to “strengthen the provision of emergency care as part of universal health coverage so as to ensure the timely and effective delivery of life-saving health care services to those in need.” [1] With this increasing emphasis on strengthening emergency care, it is now even more important to identify ways to conceptualize and evaluate service delivery within an emergency care system and understand how this can be applied to LRS in a useful and meaningful way.

Emergency care systems

Emergency care can broadly be defined as the delivery of health services for conditions that require rapid intervention to avert death or disability (such as shock or respiratory failure), or for which delays of hours can worsen prognosis or render care less effective (such as management of an asthma exacerbation, or suturing of wounds) [2]. As opposed to other medical specialties that are more organ-based (such as cardiology or neurology), one of the hallmarks of emergency care is the diagnosis, management and initial stabilization of a wide range of acutely ill, undifferentiated patients. These patients present at any time, are of any age and represent a wide range of acute medical, surgical, and obstetric conditions. As Carlson et al., states, an effective emergency care system serves three major functions: 1) it serves as a primary point of entry into the healthcare system for all patients with symptomatic conditions, 2) it provides time sensitive management of acute exacerbations of chronic disease, and 3) it serves as a crucial safety net for patients without other linkages to healthcare. Emergency care service delivery can be conceptualized via the processes of assessing and screening, intervening, diagnosing, managing and disposition [3].

In addition, emergency care also encompasses care from before a patient arrives at a facility (e.g. care given by pre-hospital providers at the scene of an accident) to the transition to ongoing care after the Emergency Unit (EU) (e.g. admission to the hospital for further acute management or discharge with referral to outpatient care). This concept is reflected in the emergency care systems framework developed by the World Health Organization (WHO), which defines the key elements and processes of each component of emergency care including care at the scene, care during transport, and facility-based emergency care (Fig. 1).

The WHO framework particularly emphasizes patient safety, clinical decision-making support, quality improvement, rules governing the

provider-patient relationship, and linkage to ongoing care [2]. When the components from the framework are mapped to the WHO's characteristics of good service delivery, key considerations for assessing and improving the emergency care system emerge (Table 1) [4].

The discussion of service delivery within this article specifically focuses on facility-based emergency care.

Access to emergency care

One of the first steps in improving healthcare outcomes for a population is ensuring access to quality care. One often referenced metric defines access to care in terms of geographical or physical access to healthcare facilities. For example, through extensive mapping, Ouma and colleagues concluded that 71% of the population of sub-Saharan Africa lives within 2 h of a hospital and therefore, has access to emergency services [5]. However, while proximity to healthcare facilities is important, viewing access strictly in terms of geography often misses many important details. For instance, the physical presence of a hospital or an EU provides no information as to the quality of services provided at that facility [6]. Anecdotally, many “established” EUs in LRS continue to face multiple challenges in providing quality emergency care including: lack of material resources and supplies, limited staff with dedicated emergency training (including specialists), absence of key standardised processes such as formal triage, the absence of clinical protocols to guide care, and limited formal quality improvement processes to drive internal improvements in care delivery. Examining a healthcare system through the lens of service delivery—i.e. are patients actually able to get the care that they need when they need it—helps to expand the concept of access to healthcare to include issues such as insurance coverage, cost of care, availability of services and cultural appropriateness of care. This helps identify additional barriers to care that influence how patients experience the healthcare system as part of their daily lives.

Issues surrounding access to high-quality emergency care services are particularly important given the system's function as a safety net for the most vulnerable segments of a population. As the one component of the healthcare system that is available to provide acute care at any time of day, year round and for all age groups, it is a consistent point of care for vulnerable populations who are often left with few health access opportunities [7]. In addition, emergency care is an important, and often the only, point of contact for patients who seek symptom-based care when they are acutely ill instead of regular, longitudinal care through the primary healthcare system. Furthermore, during times of increased vulnerability across the population, such as during a natural disaster when other components of the healthcare system may be compromised, the emergency care system may act as the only point of contact to receive care. As emergency care systems continue to develop and strengthen across LRS, a focus on service delivery can help actively ensure that even the most vulnerable population groups have access to the care they need.

Standardization of emergency care functions

Strengthening emergency care service delivery in LRS requires context-appropriate guidance on the essential resources necessary to deliver those services. The WHO produces a Model List of Essential Medicines that has been updated every two years since 1977 and is used by many countries as the basis for national essential medicines lists (EMLs) [8,9]. While the WHO's EML is tailored to providing care in LRS, it does not specifically address the needs of emergency care service delivery per se. In 2016, the African Federation for Emergency Medicine (AFEM) utilized a multiphase expert consensus process to generate an EML specifically targeted towards emergency care delivery in LRS. Through this process, 213 essential medications were identified, 25 of which were not included on the 2017 WHO list [10].

More recently, the World Bank Disease Control Priorities project

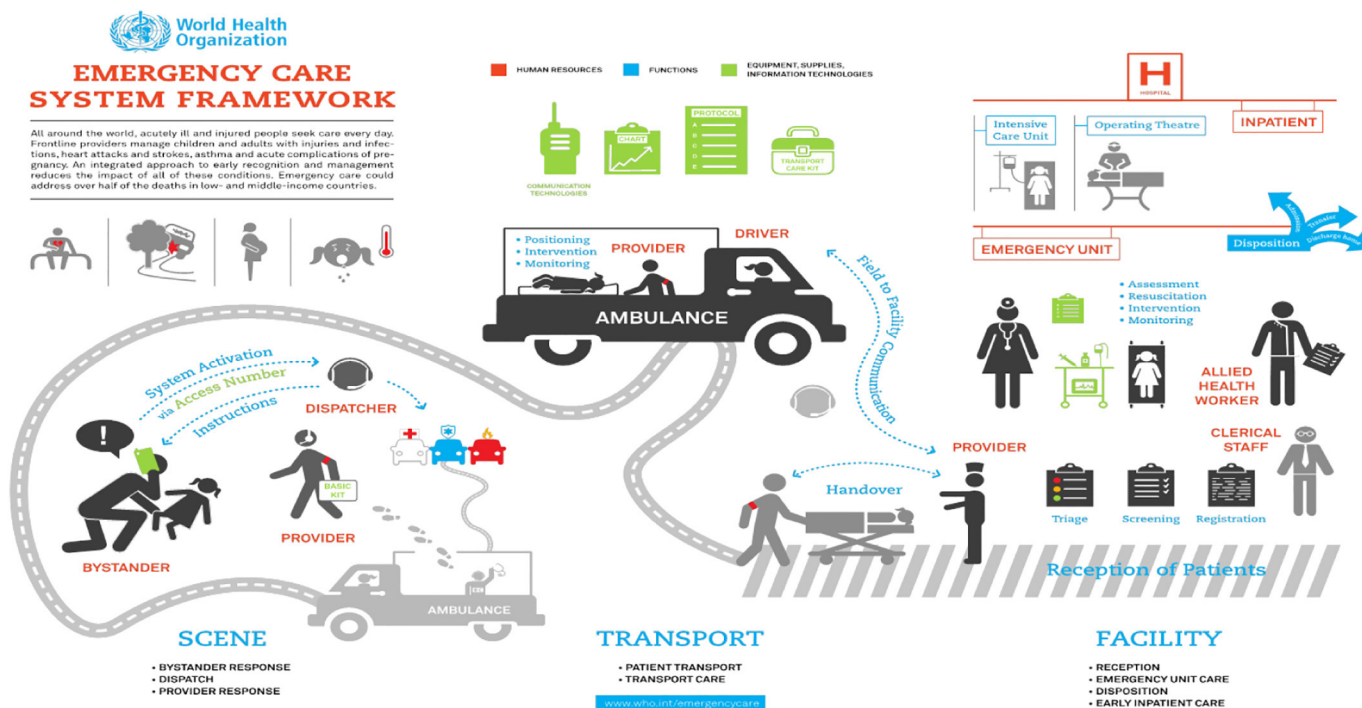


Fig. 1. The emergency care system.
Source: WHO, http://www.who.int/emergencycare_infographic/en/

Table 1.
Characteristics of emergency care service delivery.
Adapted from: WHO Monitoring the Building Blocks of Health Systems (A Handbook of Indicators and Their Measurement Strategies), 2010.

Box 1. Characteristics of good service delivery (WHO) applied to emergency care.
1. Comprehensiveness. A complete set of emergency services is provided, appropriate the local burden of emergency disease and population needs.
2. Accessibility and Coverage. Emergency services are geographically accessible, affordable, and do not discriminate against marginal or vulnerable populations.
3. Continuity. Services are oriented to meet the ongoing care needs of the patients including inpatient admissions, surgical services, and linkage to primary and rehabilitation care.
4. Quality. Emergency care provision is measurably timely, safe and appropriate for patients' needs and in keeping with context-appropriate best practices.
5. Person-centeredness. With a particular focus in community participation in the process of developing and improving the delivery of emergency care, services are delivered around the person so as to be responsive to their needs and acceptable to them.
6. Coordination. Services are organized so as to link levels of care (e.g. district hospital, referral hospitals) via referral networks across the public and private sectors, providing patients that require advanced services not available in a facility to have rapid transportation and access to reach those services in another facility.
7. Accountability and efficiency. Emergency care services are managed well so as to avoid wastage, allocate resources effectively, and track performance and outcomes for emergency conditions.

defined an Essential Package of Emergency Care that details a set of services, including the capacity to recognize or manage specific conditions and to perform identified procedures and interventions, seen as the core of emergency care services. These services, as well as essential medication recommendations, are distinguished based on the level of the healthcare facility (primary health centre, first-level hospital, and referral/specialized hospital). The package also includes the relevant policy interventions that need to be in place in order to support the effective delivery of such services [2]. In addition, the WHO will shortly release the *Essential Resources for Emergency Care Manual* (EREC), which includes guidance on essential emergency care services, equipment, medication and supplies mapped to health system level (e.g. first-level

hospital vs referral hospital). Further information regarding the EREC can be obtained from emergencycare@who.int.

Assessing emergency care service delivery

The challenge of determining the quality of emergency care service delivery in LRS also highlights the need for context-relevant tools that can reliably help decision makers accurately assess the current state of emergency care services, identify important gaps, and provide the information needed to ensure system development continues in a meaningful way. While several assessment tools exist, most have been designed based on well-developed emergency care systems from high-income countries and have little applicability to LRS [11]. Many of the initial tools developed by the WHO and other international organizations for use in LRS tended to focus on assessments of infrastructure and the ability to provide care within the context of specific clinical conditions and thus did not capture the spectrum of emergency care service delivery [11–14].

The first tool designed specifically to assess emergency care service delivery in LRS in Africa was AFEM's Emergency Care Assessment Tool (ECAT) [15,16]. Borrowing a concept from the WHO's Emergency Obstetric Care (EmOC), the ECAT is designed to assess key signal functions for sentinel conditions for emergency care. Signal functions are key medical services that should be available in all well-functioning EUs and serve as indicators for the level of care that is being provided [17]. Rather than relying on simple inventory lists to approximate capacity to deliver emergency care, signal functions incorporate the physical resources, infrastructure, human resource capacity and existing system processes to assess if patients' needs can be met in a wide variety of emergency conditions. Examples of key signal functions for emergency care include: the ability to administer supplemental oxygen, the ability to administer intravenous antibiotics, and the ability to reduce and immobilize a fracture.

This approach of evaluating service delivery through key signal functions has been adopted by the WHO in their 2017 Hospital Emergency Unit Assessment Tool (HEAT), derived from ECAT, the

WHO Emergency Care System Framework, the WHO Guidelines for Essential Trauma Care [11] and the WHO Tool for Situational Analysis to Assess Emergency and Essential Surgical Care [18], as well as a broad review of other instruments. The HEAT is designed to assess emergency care service delivery at the facility level and can be used by an individual institution or multiple facilities across a regional or national level to gain a broader assessment of the entire emergency care system. The HEAT evaluates emergency care service delivery by focusing on key signal functions related to the measurement of vital signs, airway interventions (e.g. placement of an oral airway), breathing interventions (e.g. ability to place a chest tube), circulation (e.g. the ability to administer IV fluids), neurological interventions (e.g. the ability to administer benzodiazepine), sepsis interventions (e.g. the ability to administer IV antibiotics), trauma interventions (e.g. the ability to immobilize fractures) and obstetric interventions (e.g. the ability to administer uterotonic drugs). The HEAT also evaluates facilities based on infrastructure (e.g. designated triage area, designated hand washing facilities), laboratory and diagnostic facilities, existence/use of guidelines and protocols and human resources. More information regarding the HEAT tool can be obtained from emergencycare@who.int.

Measuring improvements in service delivery

As dedicated tools are now available to define and assess the essential components of emergency care service delivery, efforts must also be made to ensure that progress can be measured in a reliable and effective way to continue to inform future system strengthening. Quality improvement assessments of emergency care are crucial to the continued improvement of care provision. In fact, in 2007 the World Health Assembly passed resolution 60.22 requesting that the WHO 'provide support to Member States for the design of quality-improvement programmes and other methods needed for competent and timely provision of essential trauma and emergency care.' [19] Many quality improvement metrics used in high-income settings to improve emergency care service delivery (e.g. 'door-to-balloon' time for myocardial infarctions and time to thrombolytics in stroke) are not translatable to LRS because of a lack of resources for diagnosis, treatment, and higher-level coordination of care that these indicators require. In addition, a comprehensive review by Aaronson, et al. demonstrated that while broad emergency department quality and safety indicators have been applied in LRS, they do not adequately assess all aspects of emergency care and there is still a need for more comprehensive measures that are locally applicable [20].

The WHO has created a list of potential quality indicators, but these are not specific to emergency care [4]. In addition, several LMICs have generated their own list of quality indicators, but these have tended to be focused on specific diseases, such as trauma or asthma, rather than the emergency care system as a whole. To address this gap, AFEM developed a list of 76 context appropriate quality indicators that reflect the breadth of emergency care and identified a top 15 list from within these [21]. Examples of these service delivery indicators include: the percentage of patients diagnosed with sepsis who are given antibiotics during EU length of stay, percentage of patients with an oxygen saturation of less than 92% who are given supplemental oxygen and percentage of patients with documented wheezing on exam who were given bronchodilator treatment. These indicators require few resources to assess, are feasible, and can facilitate improvements in emergency care service delivery in LRS in a meaningful way [21]. In addition, the EREC manual, which will be released shortly by the WHO, will also contain indicators that can be used to monitor emergency care delivery and system performance.

Conclusion

As countries continue to work towards improving the health of their populations, increased focus is being placed on strengthening

healthcare systems to help improve overall health outcomes. A key component to improving healthcare systems is examining issues regarding access to care—not just in terms of physical or geographical access, but access to meaningful, high-quality healthcare services. Given its unique position within the healthcare system, emergency care plays a vital role in safe-guarding the health and well-being of a population, especially for the most vulnerable. Ensuring the availability and quality of emergency care services must be a top priority as systems develop in Africa and all LRS. By focusing on defining and assessing the components of emergency care service delivery, we can form a clear picture of the current gaps in providing high quality emergency care. In order to achieve this successfully we must use tools that are feasible and applicable to service delivery in the LRS, several of which have been discussed above. In doing so, we can create actionable priorities for future emergency care system improvement that will help ensure that all populations have access to timely and life-saving care.

Author's contributions

Authors contributed as follow to the conception or design of the work, the acquisition of analysis or interpretation of data for the work and drafting the work or revising it critically for important intellectual content. HBB contributed 50%; TBB contributed 15%; LW contributed 15%; OAM contributed 10% contributed; YO contributed 10%. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

Prof Lee Wallis is an editor of the African Journal of Emergency Medicine. Prof Wallis was not involved in the editorial workflow for this manuscript. The African Journal of Emergency Medicine applies a double blinded process for all manuscript peer reviews. The authors declared no further conflict of interest.

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