



## ESICM 2014: Access to Acute Care - Planning Needed Now for Cities



More than half of the world's population already live in cities, and the the proportion is predicted to grow to 70% by 2050. Infrastructure planning is essential for cities to manage this growth. However, access to information that can assist cities to plan healthcare is not uniformly available across high-, middle- and low-income countries.

In a joint session with the Indian Society of Critical Care Medicine at the European Society of Intensive Care Medicine (ESICM) congress in Barcelona this month, Dr. Kathy Rowan, UK, presented the study by the International Focum of Acute Care Trialists (InFACT) that explored access to urban acute care services in high versus middle income countries.

Rowan reminded delegates that there has been a rapid population movement from rural to urban areas particularly in middle income countries. The United Nations, World Bank and others have warned that rapid growth of the world urban population can only be safe if cities develop adequate key infrastructure. Therefore in healthcare, acute and critical care resources are vital. However, infrastructure cannot rely on market forces alone, and government-led needs assessment and coordinated public and private investment is required. Without such action current estimates suggest that 2 billion people will be in living in urban slums by 2035.

The InFACT study, published in *Intensive Care Medicine* looked at middle income countries, which cover half of the world's population. Acute services are defined as fundamental urban healthcare infrastructures such as ambulance systems, hospitals, emergency departments and ICUs. Currently no methods or standards exist to assess the adequacy of urban acute services, and estimates of their availability are extremely limited.

This study was a pilot project to generate and compare estimates of the supply of acute care services across cities in diverse regions and to assess the extent to which data were readily available to cities for future planning. It was a descriptive cross-sectional study looking at the supply of several measures of acute care services. The sample was seven cities with a population of more than 100,000 in two high-income, three upper middle-income and two lower middle-income countries:

- Bogota (Colombia)
- Boston (USA)
- Chennai (India)
- Kumasi (Ghana)
- Liaocheng (China)
- Paris (France)
- Recife (Brazil) [pictured]

The population varied from 2m (Kumasi) to 12m (Paris). Population density varied from 671 in Liaocheng to 8012 in Kumasi. Per capita GDP varied 25 fold. Data was collected between January-September 2012.

The study used two denominators - population and disease burden. Population is more likely to be measured similarly across countries and with reasonable accuracy, but fails to reflect demand on services. Disease burden is less likely to be measured similarly across countries and is less accurate, but it reflects demand on services. They chose number of deaths due to acute illness (as per Global Burden Disease project/method), and abstracted data from 2008 GBD project update (number of deaths per country in multiple disease categories). They selected all diseases (communicable and non-communicable) whose burden would potentially be mitigated by acute services - (dis)agreed by consensus. The sum of deaths across all selected diseases was defined as number of deaths due to acute illness for each country. For each city, they multiplied number of deaths due to acute illness in the country by population of the city divided by population of the country, and repeated for age groups.

## **Methods**

The methods to determine acute care services supply were for local collaborators to use data from local and regional authorities with primary data collection where required, e.g. phoning hospitals to find out about ICU beds. They developed and piloted the data collection instrument with the aim of creating standard definitions applicable to all cities. This resulted in the ACCESS 'supply' inventory instrument. For example, the definition of ambulance is a vehicle that transports acutely ill patients from home to hospitals and not for interhospital movements. In the case of ICU beds the study let people define these themselves. In general, these are staffed with higher intensity nursing than available on acute care wards and the ability to provide oxygen therapy, pulse oximetry, vasopressors or invasive haemodynamic monitoring (e.g. ability to measure CVP) and invasive mechanical ventilation.

Hospital beds were the highest in Boston/ Paris and lowest in Kumasi. Not all hospital beds in Bogota, Liaocheng or Chennai and Kumasi could deliver oxygen. Local definitions of ICU beds were more liberal. If using the standardised definition of ICU beds there was a 45-fold variation between Boston and Kumasi.

## **Access to Information on Supply**

Five of the cities had a centralised data source for at least some data. Chennai and Kumasi required data collection direct from acute care institutions. Ambulances in Paris required contact with each fire station. ICU beds in Recife, Bogota and Liaocheng required contacting each hospital.

## **Disease Burden**

The burden of deaths due to acute illnesses was generally highest in Kumasi. Bogota had the smallest burden for acute illness but highest for injury. Liaocheng had the smallest burden for respiratory infection. Adults over 60 had higher deaths due to all acute illnesses and respiratory infection except in Chennai and Kumasi, where the burden of deaths due to respiratory infection was highest in children (0-14 years old).

When looking at acute care supply per 100 deaths from acute illness the variation was generally higher than with population-based data.

The variation in ICU beds varies from 0.06 to 4.11 per 100 deaths. Ambulances vary 0.06 to 6.06 per 100 deaths

Rowan emphasised that this study as very much an initial attempt, with a convenience sample. There was generally a wide variation in supply and no clear agreement on optimal supply. The relationship with per capita GDP suggests a point beyond which higher GDP does not fuel greater supply, although it was a very small sample.

Rowan concluded by saying that with the world urbanising rapidly, there is a huge need for urban healthcare planning. She called the variation in supply currently "staggering." Cities do not even know their own supply, and it is likely to get worse. This study begins the work of generating a

standardise instrument to measure supply. Once a standardised measurement has been developed, thresholds can be set, and cities can consider planning. She warned, however, that the work was very laborious. For broader scale studies, it is worth considering smart “crowd-sourced” options.

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