

## Vital Statistics: Estimating Injury Mortality in Kigali, Rwanda

Woon Cho Kim<sup>1,7</sup> · Jean Claude Byiringiro<sup>2</sup> · Georges Ntakiyiruta<sup>3</sup> · Patrick Kyamanywa<sup>4</sup> · Jean Jacques Irakiza<sup>5</sup> · Jean Paul Mvukiyehe<sup>5</sup> · Zeta Mutabazi<sup>5</sup> · Jean Paul Vizir<sup>5</sup> · Jean de la Croix Allen Ingabire<sup>3</sup> · Steven Nshuti<sup>3</sup> · Robert Riviello<sup>6</sup> · Selwyn O. Rogers Jr.<sup>7</sup> · Sudha P. Jayaraman<sup>6,8</sup>

Published online: 13 October 2015  
© Société Internationale de Chirurgie 2015

### Abstract

**Background** Globally, injury deaths largely occur in low- and middle-income countries. No estimates of injury-associated mortality exist in Rwanda. This study aimed to describe the patterns of injury-related deaths in Kigali, Rwanda using existing data sources.

**Methods** We created a database of all deaths reported by the main institutions providing emergency care in Kigali—four major hospitals, two divisions of the Rwanda National Police, and the National Emergency Medical Service—during 12 months (Jan–Dec 2012) and analyzed it for demographics, diagnoses, mechanism and type of injury, causes of death, and all-cause and cause-specific mortality rates.

**Results** There were 2682 deaths, 57 % in men, 67 % in adults >18 year, and 16 % in children <5 year. All-cause mortality rate was 236/100,000; 35 % (927) were due to probable surgical causes. Injury-related deaths occurred in 22 % (593/2682). The most common injury mechanism was road traffic crash (cause-specific mortality rate of 20/100,000). Nearly half of all injury deaths occurred in the prehospital setting (47 %,  $n = 276$ ) and 49 % of injury deaths at the university hospital occurred within 24 h of arrival. Being injured increased the odds of dying in the prehospital setting by 2.7 times ( $p < 0.0001$ ).

**Conclusions** Injuries account for 22 % of deaths in Kigali with road traffic crashes being the most common cause. Injury deaths occurred largely in the prehospital setting and within the first 24 h of hospital arrival suggesting the need for investment in emergency infrastructure. Accurate documentation of the cause of death would help policy-makers make data-driven resource allocation decisions.

This work has been presented in part at the US Investigators' Network Symposium on Global Non-Communicable Diseases Research, Emory University, Sept 2014 and at the College of Surgeons of East, Central, and South Africa Conference, Dar es Salaam, Tanzania, Dec 2014.

Woon Cho Kim and Jean Claude Byiringiro are co-first authors.

✉ Sudha P. Jayaraman  
sudhapjay@gmail.com

<sup>1</sup> Emory University School of Medicine and Emory Global Health Institute, Atlanta, GA, USA

<sup>2</sup> Accident and Emergency, University Teaching Hospital, Kigali, Rwanda

<sup>3</sup> Department of Surgery, University Teaching Hospital, University of Rwanda, Kigali, Rwanda

<sup>4</sup> Faculty of Medicine, University of Rwanda, Kigali, Rwanda

<sup>5</sup> School of Medicine, University of Rwanda, Kigali, Rwanda

<sup>6</sup> Division of Trauma, Burns and Critical Care, Department of Surgery, Brigham and Women's Hospital, Harvard Medical School, Boston, MA, USA

<sup>7</sup> Department of Surgery, University of Texas Medical Branch, Galveston, TX, USA

<sup>8</sup> Division of Acute Care Surgery, Department of Surgery, Virginia Commonwealth University, PO Box 980454, Richmond, VA 23220, USA