Bridging the Gaps in Post-Crash Care in Zambia: Key Insights from the ZNPHI EHCO Road Safety Webinar

Moses Mwale[1], Memory Kaluba[2] and Emmanuel M Makasa[3]
[1]World Health Organization, Lusaka, Zambia [2]The Zambia National Public Health Institute, Lusaka, Zambia
[3]Centre for Surgical Healthcare Research, Dept. of Surgery & Digital Health Institute University Teaching Hospitals, Lusaka, Zambia
Corresponding Author: Mr. Moses Mwale: mwalem@who.int

Cite this article: Mwale, M., Kaluba, M & Makasa, E.M. Bridging the Gaps in Post-Crash Care in Zambia: Key Insights from the ZNPHI EHCO Road Safety Webinar. *Health Press Bull. 2024;08(3):8-18.*

Road traffic crashes pose a substantial public health challenge in Zambia, leading to significant injury, disability, and death. Effective post-crash care is essential in mitigating these outcomes, yet Zambia's emergency medical systems face numerous obstacles. This article synthesizes insights from an August 2024 webinar which focused on improving post-crash care in Zambia, identifying key challenges across the pre-hospital, intra-hospital, and post-hospital stages of care. It emphasizes the need for enhanced coordination of emergency services, better training for first responders, and the integration of standardized clinical protocols. In addition to addressing clinical and logistical gaps, this article highlights critical deficiencies in financing treatment for crash victims, focusing on inadequate insurance coverage, delayed fund disbursement, and policy gaps leading to severe underfunding. By proposing targeted policy reforms and advocating for the adoption of WHO-recommended tools and practices, the article offers a practical roadmap for improving Zambia's post-crash care system. The recommendations provided here aim not only to reduce the burden of road traffic injuries and fatalities but also to serve as a model for similar contexts in other low- and middle-income countries.

Introduction

Road traffic crashes (RTCs) represent a significant public health challenge in Zambia, contributing to a substantial burden of injury, disability, and death (RTSA 2022b, Mwale, et al. 2023). RTCs are among the leading causes of death in the country. The impact of these crashes extends beyond immediate fatalities, resulting in long-term injuries and disabilities placing significant strain on Zambia's healthcare system and economic resources. The cost associated with road traffic injuries—including medical expenses, loss of productivity, and the broader economic impact on families—further exacerbates the challenge, particularly in a country where healthcare resources are already limited (WHO 2023).

Effective post-crash care is crucial in mitigating these outcomes, as timely and adequate medical intervention can save lives and reduce the long-term impact of injuries. This involves not only the immediate response at the scene of a crash but also the continuity of care through emergency services, hospital treatment, rehabilitation, and community reintegration. The ability to provide such comprehensive care hinges on a well-coordinated and well-resourced healthcare system, which, in the case for many countries in the WHO

Afro Region, remains a significant challenge (WHO 2024).

Recent literature has highlighted the critical importance of effective post-crash care in reducing road traffic fatalities and improving outcomes for crash victims. A systematic review by Callese et al. (Trauma system development in low- and middle-income countries: a review. 2015) found that improvements in emergency care interventions could significantly reduce mortality and disability from road traffic injuries in low- and middle-income countries. Additionally, Haghparast-Bidgoli et al. (Exploring the provision of hospital trauma care for road traffic injury victims in Iran: a qualitative approach. 2013) emphasized the need for integrated trauma systems, noting that well-coordinated pre-hospital and hospital care can substantially improve survival rates for severe injuries. In the African context, Adeloye et al. (Global and regional child deaths due to injuries: an assessment of the evidence. 2018) identified several key barriers to effective post-crash care, including inadequate emergency communication systems, lack of trained personnel, and insufficient equipment in rural areas.

A retrospective hospital-based study at Monze Mission Hospital in Zambia highlights significant challenges in post-crash care, including poor data quality, high pre-hospital mortality, limited resources, and underreporting, which collectively hinder effective intervention and policy development (Sichembe, Manyozo and Moodie 2019). Furthermore, a cost-effectiveness analysis by Wesson et al. (The cost of injury and trauma care in low- and middle-income countries: a review of economic evidence, 2014) demonstrated that investments in trauma care systems could yield substantial economic benefits, with interventions being highly cost-effective in low- and middle-income settings. These studies underscore the urgent need for comprehensive improvements in post-crash care systems, particularly in resource-limited settings like Zambia.

On August 21, 2024, a webinar titled “Improving Post-Crash Care Services for Road Traffic Crash Victims in Zambia” was convened to examine the current state of post-crash care in the country. The event featured a series of presentations by leading experts who offered valuable insights into the strengths, weaknesses, and opportunities within Zambia’s post-crash care system. The presenters included specialists from the World Health Organization (WHO) in Geneva, the WHO Country Office in Zambia, and the Centre for Surgical Healthcare Research (CSHR) within the Department of Surgery at the University Teaching Hospitals in Lusaka, Zambia. Their collective expertise provided a comprehensive analysis of the challenges and potential solutions for enhancing post-crash care in Zambia.

This article synthesizes key insights from the webinar, focusing on the challenges Zambia faces in providing effective post-crash care and proposing actionable solutions based on expert recommendations. It is believed that addressing these issues can help Zambia move closer to achieving its road safety targets under the United Nations' Decade of Action for Road Safety 2021-2030.

1. Zambia's Road Safety Profile

Findings from the Global Status Report on Road Safety (GSRRS) 2023 (WHO 2023) were presented, focusing on Zambia's profile (WHO, Road Safety Zambia 2023 Country Profile 2024). The GSRRS reports that Zambia has a road traffic mortality rate of 17.1 deaths per 100,000 population, which, while lower than the African average of 19.4, remains above the global average of 15. This statistic highlights the ongoing risk that road traffic crashes pose to public health in the country.

Table 1 Comparison of Country-Reported Deaths vs. GSRRS Estimated Number of Deaths in Zambia (2007-2021

Year	Country Reported Deaths	GSRRS Estimated No. of Deaths	% Diff
2021	2,163	3,338	54%
2015	1,851	3,586	94%
2013	1,388	3,117	125%
2007	1,266	3,056	141%

As illustrated in Table 1, there has been a positive trend in the reduction of underreporting of road traffic fatalities in Zambia over the years. In 2007, the discrepancy between the number of deaths reported by Zambia and the estimates provided by the GSRRS was 141%. However, by 2021, this discrepancy had decreased significantly to 54%. For example, in 2021, Zambia officially recorded 2,163 road traffic fatalities, while the GSRRS estimated the actual number to be around 3,338 (WHO, Road Safety Zambia 2023 Country Profile 2024). This reduction in the percentage difference over time reflects Zambia's progress in improving the accuracy of its data collection and reporting systems. This positive trend is a crucial step toward better understanding the true scale of road traffic injuries and fatalities in the country. As Zambia continues to enhance its reporting mechanisms, it will be better positioned to implement targeted and effective road safety policies and interventions. Accurate data is essential for crafting strategies that can further reduce the mortality and morbidity associated with road traffic crashes, ultimately leading to safer roads and healthier communities.

It was observed that Zambia's road infrastructure and vehicle safety standards also contribute to the high rate of road traffic injuries. The country has nearly 10,000 kilometers of paved roads, but systematic road safety audits are lacking, and there is no national law mandating road safety inspections. In terms of vehicle safety, while periodic technical inspections are conducted, significant gaps in laws regarding seat-belt standards, pedestrian protection, and anti-lock braking systems were noted (WHO, Road Safety Zambia 2023 Country Profile 2024). These deficiencies exacerbate the risks faced by road users and complicate the provision of post-crash care.

2. Challenges in Post-Crash Care

The country's emergency medical systems grapple with complex issues across all stages of post-crash care following a road traffic crash. From the critical moments immediately following a crash to long-term rehabilitation, the country faces significant hurdles in providing adequate and timely

care to victims. This section delves into the key challenges identified across three crucial stages: pre-hospital care, intra-hospital care, and post-hospital care. Each of these stages is marked by specific obstacles that collectively contribute to suboptimal outcomes for crash victims and highlight the urgent need for comprehensive improvements in Zambia's post-crash care system.

Pre-Hospital Care

The webinar underscored that one of the most critical challenges in Zambia is the inadequacy of pre-hospital care. The country's communication systems are poorly coordinated, lacking a central command structure to oversee emergency responses. This fragmentation is further complicated by the existence of multiple emergency lines, making it difficult for victims or bystanders to know whom to contact in the event of a crash.

Additionally, it was noted that Zambia lacks trained primary responders. While attempts have been made by the private sector and NGOs to establish paramedic services, these efforts have been limited to Lusaka and have not been sustained. The absence of trained personnel at crash sites means that initial medical management, which is crucial for improving outcomes, is often inadequate. Furthermore, bystanders, who frequently arrive first at crash scenes, lack the necessary training to provide basic first aid or trauma care, leading to suboptimal outcomes and sometimes even exacerbating injuries.

Intra-Hospital Care

Challenges extend into hospital care, where the capacity to manage trauma patients is severely constrained. It was pointed out that many district hospitals, which are often the first point of contact for crash victims, are staffed by junior doctors with limited experience in trauma management. These facilities often lack the necessary equipment and supplies, further complicating the provision of effective care.

Ambulances, when available, are frequently inadequately equipped and staffed by personnel who lack training in using the medical equipment they carry. This situation is particularly dire in rural areas, where health facilities may be understaffed or closed after hours, leaving victims without timely care. The delays in transferring patients to better-equipped facilities can result in preventable deaths or the worsening of injuries.

Post-Hospital Care

Post-hospital care, including rehabilitation and psychological support, was identified as another critical area where Zambia's healthcare system falls short. Many victims of road traffic crashes face long-term disabilities, yet access to rehabilitative services is limited. Psychological support for both victims and their families is virtually non-existent, despite the significant mental health toll that such incidents can take.

The financing of treatment for traffic crash victims in Zambia presents a significant challenge, revealing inconsistencies between policy intentions and practical outcomes. The National Health Insurance Management Authority (NHIMA) does not extend coverage to road traf-

fic crash victims, based on the premise that all vehicles are mandatorily insured and should, therefore, cover hospitalization costs. However, the webinar identified several issues with the implementation of this policy. Firstly, funds from compulsory motor vehicle insurance often experience delays in disbursement to healthcare facilities. Secondly, when funds are received, they are frequently insufficient to cover the full spectrum of care required, particularly for complex surgical interventions. This misalignment between policy and practice has notable consequences. It places a substantial financial burden on victims and their families, who must bear the costs of expensive surgical procedures and ongoing care. Additionally, healthcare providers face challenges in delivering necessary treatments due to financial constraints. The current system, while designed to ensure coverage for crash victims, appears to be falling short of its intended purpose. This situation underscores the need for a comprehensive review of the existing policy framework and its implementation to address the gap between intended coverage and actual financial support for traffic crash victims.

3. Integrated Emergency and Critical Care

The webinar emphasized the need for an integrated approach to emergency, critical, and operative care. Effective post-crash care requires a seamless integration of services across the health system, from pre-hospital care through to rehabilitation. The World Health Organization's (WHO) clinical protocols and tools, such as the Emergency and Critical Care Toolkit, offer a framework that can be adapted to the Zambian context to enhance care quality and patient outcomes. The WHO Emergency Care System Framework (WHO 2018) offers a comprehensive approach to improving emergency care, crucial for better post-crash outcomes in Zambia. The framework covers the entire care process—from the accident scene to emergency unit and inpatient care—ensuring timely, coordinated responses. Figure 1 of the inforgraphic highlights key elements like bystander response, dispatch, and patient transport, all essential for reducing fatalities and disabilities from road traffic crashes. Clinical protocols and operational guidelines. Figure 2, standardize care, aligning it with global best practices.

The framework also ensures governance through provider certification and legal mandates, addressing access barriers common in Zambia. By implementing this framework, Zambia can build a more effective and resilient emergency care system, improving outcomes for crash victims and other emergencies. The discussion also emphasized the importance of standardized clinical protocols, ensuring that all patients receive consistent, high-quality care regardless of where they are treated. These protocols include guidelines for triage, resuscitation, and trauma management, which are vital for improving survival rates and reducing the long-term impact of injuries.

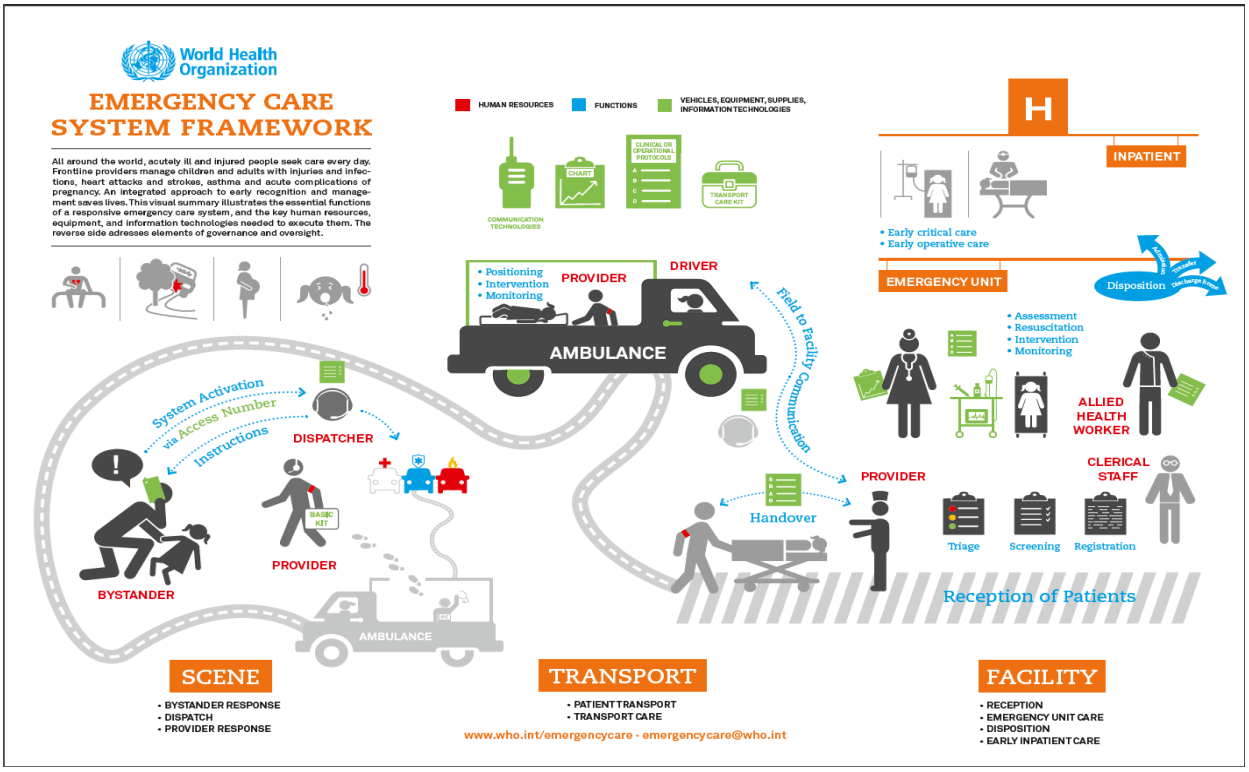

Figure 1 Key Components of the WHO Emergency Care System Framework: Essential elements from the scene of injury to emergency unit care, emphasizing coordinated and timely responses (WHO 2018).

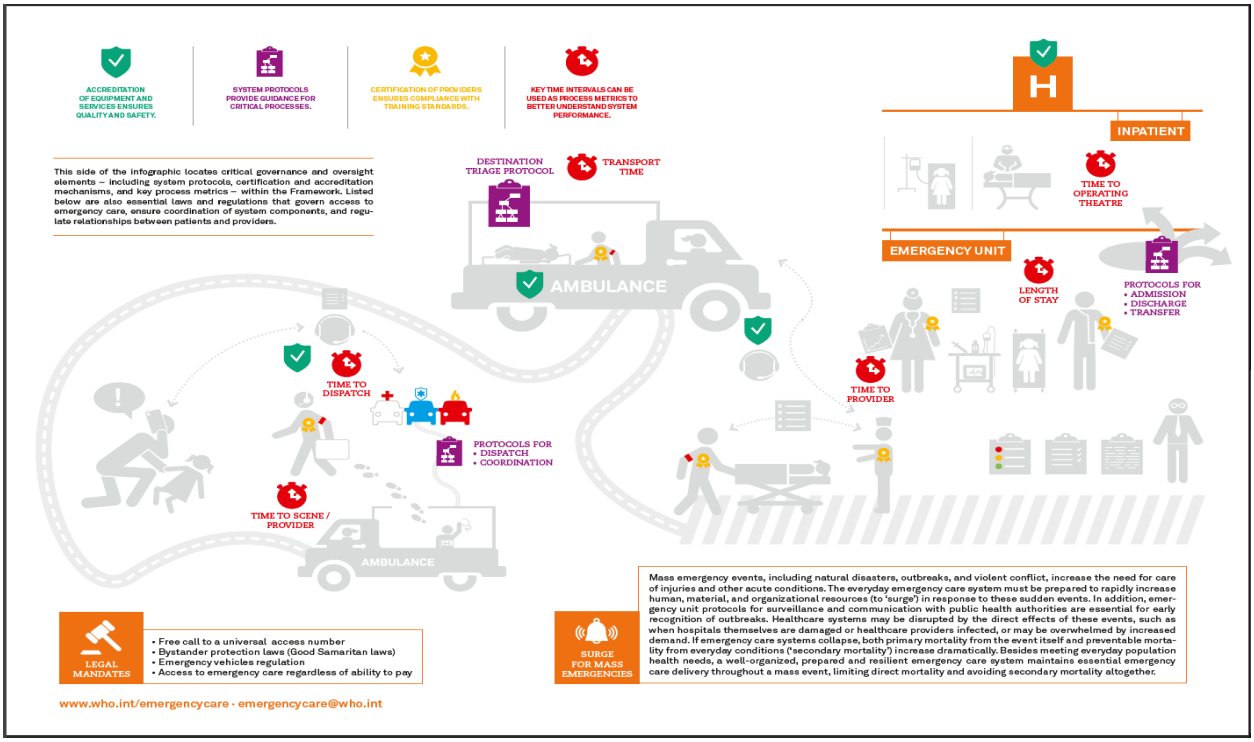

Figure 2 Clinical and Operational Protocols in the WHO Emergency Care System Framework: Standardized guidelines for effective emergency care, ensuring best practices and governance (WHO 2018).

Tools and Resources

A wide range of tools and resources designed to support the integration of emergency care services, available through the World Health Organization (WHO), were presented. These include:

- *UHC Service Package Delivery & Implementations (SPDI) Tool: Supports* the delivery and implementation of UHC service packages (see www.UHCC.who.int).
- *Pathway to Care:* Outlines the steps required for timely and appropriate patient care from injury through rehabilitation
- *Emergency Care Systems Framework:* Provides guidance on developing and strengthening emergency care systems (WHO 2018).
- *WHO Emergency Care Toolkit:* A freely accessible set of interventions designed for use in hospital emergency units, especially in resource-limited settings (WHO n.d.).
- *Community First Aid Response:* Emphasizes the importance of training community members in basic first aid.
- *Basic Ambulance Provider Course:* Equips ambulance personnel with essential skills for managing emergencies.
- *Mass Casualty Management Systems:* Ensures effective response to incidents with large numbers of victims (WHO 2007).
- *Basic Critical Care Course:* Trains healthcare providers in the management of critically ill patients (WHO n.d.).
- *SBAR Structured Handover Tool:* A communication tool for efficient patient handovers (National Guideline Centre (UK). 2018).
- *Acute Transfer Checklist:* Ensures that the sending facility team completes all necessary actions before transferring a patient to another facility for urgent health needs (WHO 2024).
- *Operative Care at the First Level Hospital:* Guidelines for providing surgical care in primary healthcare settings.
- *Guidelines for Essential Trauma Care:* Outlines minimum standards for trauma care services (WHO 2012)
- *Prehospital Trauma Care Systems:* Manual to guide policymakers with affordable, sustainable, and minimally resource-intensive interventions, covering system organization, capacity development, data collection, transportation, communication, and ethical and legal consideration (WHO 2005).
- *Guidelines for Trauma Quality Improvement Programmes:* Provide practical methods for enhancing trauma care by monitoring services, identifying issues, and implementing corrective measures, applicable universally across different healthcare systems (WHO 2012).
- *WHO Trauma Care Checklist:* Ensures timely, life-saving interventions in emergency units by reviewing critical actions to prevent missing life-threatening conditions, adaptable to any emergency care setting (WHO 2016).

- *WHO Clinical Registry:* Enhances emergency care by collecting and analyzing data to identify care gaps, enabling targeted quality improvements and saving lives (WHO 2023).
- *Advocating for emergency care: a guide for nongovernmental organizations:* This guide, developed by WHO and partners, outlines how NGOs can advocate for emergency care, especially for road traffic injuries, using step-by-step actions and case studies (WHO 2023).

The implementation of WHO tools and resources has a profound impact on improving injury outcomes, particularly in low-resource settings like Zambia (Reynolds, Wilkinson and Bertram MY 2023). These tools, such as the WHO Trauma Care Checklist, Emergency Care Systems Framework, and the Basic Critical Care Course, are designed to standardize and elevate the quality of care across all stages of emergency and trauma management.

By providing structured guidelines and training, these resources help healthcare providers deliver more consistent, timely, and effective care. The study highlights how even in challenging environments, the use of WHO tools ensures that essential care is accessible and meets a high standard of safety and efficiency, ultimately leading to significantly better outcomes for those who suffer injuries from road traffic crashes and other emergencies.

4. Research, Legislation, and Policy Recommendations

Research and Information Management

The webinar emphasized the need for robust research and data management systems to inform policy decisions. Establishing trauma registries and quality improvement mechanisms was identified as crucial for monitoring and enhancing the effectiveness of post-crash care. Accurate and comprehensive data collection is essential for identifying gaps in care and ensuring that resources are allocated where they are most needed (Mwale, et al. 2023).

Legal and Policy Gaps

Several critical gaps in Zambia's legal and policy framework for post-crash care were highlighted. Notably, there is no Good Samaritan law to protect individuals who assist crash victims, which discourages bystanders from providing aid. Additionally, there are no laws mandating universal access to emergency care or offering free rehabilitative and psychological services to crash victims and their families. The absence of these legal protections leaves victims vulnerable and places additional strain on the healthcare system.

Recommendations for Policy Improvement

To address these challenges, several policy reforms were recommended:

- **Strengthening Legal Frameworks**: Enacting laws that ensure universal access to emergency care, establishing a Good Samaritan law, and providing financial support for rehabilitative and psychological services.

- **Enhancing Data Collection and Research**: Investing in trauma registries and data management systems to improve the quality of care and inform policy decisions.
- **Improving Emergency Services**: Increasing the availability and training of primary responders, ensuring that ambulances are adequately equipped, and establishing central coordination for emergency responses.

5. Conclusion

The webinar on post-crash care in Zambia revealed critical challenges, including inadequate pre-hospital services, gaps in intra-hospital trauma management, and limited access to post-hospital rehabilitation. Despite these challenges, the insights gathered offer a clear pathway toward strengthening Zambia's post-crash care system. By integrating WHO-recommended tools and fostering coordinated efforts across all levels of care, Zambia has the opportunity to make meaningful progress in reducing road traffic fatalities and improving the outcomes for crash victims.

This article has highlighted the pressing need for targeted legal reforms, better data management, and the expansion of emergency services—areas that are crucial for bridging the current gaps in care. The practical recommendations outlined here, grounded in both global standards and local realities, provide a blueprint for stakeholders committed to advancing road safety and public health in Zambia.

As Zambia strives to meet its road safety targets under the United Nations' Decade of Action for Road Safety 2021-2030, the findings and strategies discussed in this article can serve as a catalyst for change. By adopting these evidence-based approaches, Zambia can not only enhance its post-crash care but also set a precedent for other low- and middle-income countries facing similar challenges. The journey toward comprehensive post-crash care is complex, but with the actionable steps provided, significant improvements are within reach.

Disclaimer

The views expressed in this article are those of the authors and do not necessarily reflect the views, policies, or positions of the World Health Organization (WHO) or the Zambia National Public Health Institute (ZNPHI).

Acknowledgments

The authors would like to express their deepest gratitude to the presenters of the webinar titled **"Improving Post-Crash Care Services for Road Traffic Crash Victims in Zambia."** Special thanks go to Dr. Azmach Gebregiorgis, Dr. Vanessa Naidoo for their invaluable insights, expertise, and contributions to the discussions. Their presentations have provided critical perspectives that have greatly informed this article. We are also thankful to all the participants who engaged in the webinar and contributed to the rich dialogue on enhancing post-crash care in Zambia.

References

1. Adeloye, D., K. Bowman, K. Y. Chan, S. Patel, H. Campbell, and I. Rudan. 2018. "Global and regional child deaths due to injuries: an assessment of the evidence." *Journal of global health* 8 (2): 021104. https://doi.org/10.7189/jogh.08.021104.

2. Callese, T. E., C. T. Richards, P. Shaw, S. J. Schuetz, L. Paladino, N. Issa, and M. Swaroop. 2015. "Trauma system development in low- and middle-income countries: a review." *Journal of Surgical Research, 263, pp.254-263.* 193 (1): 193(1), 300–307. https://doi.org/10.1016/j.jss.2014.09.040.

3. Haghparast-Bidgoli, H., H. Khankeh, E. Johansson, M. H. Yarmohammadian, and M. Hasselberg. 2013. "Exploring the provision of hospital trauma care for road traffic injury victims in Iran: a qualitative approach." *Journal of injury & violence research* 5 (1): 28-37. https://doi.org/10.5249/jivr.v5i1.195.

4. Mwale, M., K. Mwangilwa, E. Kakoma, and K., Iaych. 2023. "Estimation of the completeness of road traffic mortality data in Zambia using a three source capture recapture method." *Accident Analysis & Prevention* 186: 107048. https://doi.org/10.1016/j.aap.2023.107048.

5. National Guideline Centre (UK). 2018. "Chapter 32, Structured patient handovers." In *Emergency and acute medical care in over 16s: service delivery and organisation.* . London: National Institute for Health and Care Excellence (NICE). https://www.ncbi.nlm.nih.gov/books/NBK564933/.

6. Reynolds, T, T Wilkinson, and et al Bertram MY. 2023. "Building implementable packages for universal health coverage." *BMJ Global Health* 2023: 8:e010807. https://doi.org/10.1136/bmjgh-2022-010807.

7. RTSA. 2022b. *2021 RTSA Annual Report.* Lusaka: The Road Transport and Safety Agency. Accessed May 15, 2024. https://www.rtsa.org.zm/wp-content/uploads/2022/11/2021-RTSA-Annual-Report.pdf.

8. Sichembe, W., S.D. Manyozo, and R., Moodie. 2019. "The epidemiology of road traffic crashes in rural Zambia: A retrospective hospital-based study at Monze Mission Hospital. ." *Medical Journal of Zambia* 46 (4): 64-276.

9. Wesson, Hadley K H, Nonkululeko Boikhutso, Abdulgafoor M Bachani, Karen J Hofman, and Adnan A Hyder. 2014. "The cost of injury and trauma care in low- and middle-income countries: a review of economic evidence,." *Health Policy and Planning* 29 (6): 795-808. https://doi.org/10.1093/heapol/czt064.

10. WHO. 2024. *Acute Transfer Checklist.* Geneva: WHO. https://cdn.who.int/media/docs/default-source/integrated-health-services-(ihs)/csy/ect/acute-transfer-checklist.pdf?sfvrsn=1f6ef235_1.

11. WHO. 2023. *Advocating for emergency care: a guide for nongovernmental organizations.* Geneva: World Health Organization. https://www.who.int/publications/i/item/9789240064317.

12. WHO. 2023. *Global status report on road safety 2023.* Geneva: World Health Organization.

13. WHO. 2012. *Guidelines for essential trauma care.* Geneva: World Health Organization. https://www.who.int/publications/i/item/guidelines-for-essential-trauma-care.

14. WHO. 2012. *Guidelines for trauma quality improvement programmes.* Geneva: WHO. https://www.who.int/publications/i/item/guidelines-for-trauma-quality-improvement-programmes.

15. —. n.d. "Improving care of the injured." Geneva: World Health Organisation. https://www.who.int/activities/improving-care-of-the-injured.

16. WHO. 2007. *Mass casualty management systems : strategies and guidelines for building health sector capacity.* Geneva: World Health Organization. https://iris.who.int/bitstream/handle/10665/43804/9789241596053_eng.pdf?sequence=1.

17. WHO. 2005. *Prehospital Trauma Care Systems.* Geneva: World Health Organization. https://www.who.int/publications/i/item/prehospital-trauma-care-systems.

18. —. 2024. "Road Safety Zambia 2023 Country Profile." Geneva: World Health Organization. https://www.who.int/publications/m?healthtopics=183ef672-c33a-4aab-91a0-d469e3ebf685&regionscountries=46094a25-6ee0-4b39-818a-b18d2df6d97c.

19. WHO. 2024. *Status report on road safety in the WHO African Region, 2023.* Brazzaville: WHO African Region,. Accessed August 21, 2024. https://iris.who.int/bitstream/handle/10665/378194/9789290343356-eng.pdf?sequence=1&isAllowed=y.

20. WHO. 2023. *WHO Clinical Registry.* Geneva: WHO. https://www.who.int/publications/m/item/who-clinical-registry.

21. —. 2018. "WHO Emergency Care System Framework." Geneva: World Health Organization. https://www.who.int/publications/i/item/who-emergency-care-system-framework.

22. —. n.d. "WHO Emergency Care Toolkit (ECT)." Geneva: The World Health Organization. https://www.who.int/teams/integrated-health-services/clinical-services-and-systems/emergency-and-critical-care/emergency-care-toolkit#:~:text=The%20WHO%20Emergency%20Care%20Toolkit,ill%20and%20injured%20within%20hospitals.

23. WHO. 2016. *WHO Trauma Care Checklist.* Geneva: WHO. https://www.who.int/publications/i/item/trauma-care-checklist.

24. n.d. "World Health Organization. (n.d.). Basic Emergency Care (BEC)." Geneva: World health Organization. https://www.who.int/teams/integrated-health-services/clinical-services-and-systems/emergency-and-critical-care/bec.