

Table 1. Barriers and Recommendations for Trauma Data Collection and Management in Conflict Settings

Category	Theme	Code	Quotes
1. Data Collection Complexities	Operational Definition and Trauma Registry Challenges	• Ambiguity in Defining the Scope of Trauma for Data Collection • Absence of trauma registries and reliability concerns • Registries designed by professionals in peacetime render them impractical for use during times of conflict	“So in most countries, conflict trauma registries do not exist, so they cannot be the main source in which you can rely on information from... there is no agreed data set of trauma indicators. It very much depends on a multitude of variables” (P04).
	Heterogeneity in Data Collection Practices	• Diverse nature of data collection for trauma registries across multiple countries and organizations • Variability in data collection procedures across projects and countries • Selective focus on some types of data over others in terms of the different echelons of care along the trauma pathway	“So we have a case where we have had kind of long-term and patient reported outcome data from one project ... but zero data collected from another project” (P01). “But generally speaking, in places like Pakistan or Iraq or Afghanistan or Iran or whatever, you're not going to get that sort of dense reporting that you find in maybe Western states so generally speaking, when it's a country, that's you know, in the developing status, the reporting on it is generally just around the incident and not the long term outcomes” (P05).

		• Differences in organizations in data collection timing among organizations; short-term vs. long-term data collection • Lack of a centralized data collection system and varied data collection methods employed by NGOs	
	Inadequate Data Accuracy and Quality	• Lack of comprehensive data due to challenges in obtaining accurate information in war settings • Lack of proper data collection due to emotional burden on healthcare professionals to document incidents • The inadequacy and inaccuracy of data collected impacts data sharing • Absence of research culture among organizations	“You know, so often you get data and you know major decisions are made on it and then you actually look at the accuracy of the data and you think, well, hang on a minute. You know, we're making these huge decisions based on data that is really when you look at it very closely, it's actually, you know, not that reliable at all” (P02).
	Geopolitical and Governance Hurdles	• Challenges in accessing certain countries or regions and displacement	“In our region you often have a government and then a de facto government... So having access to that data is very difficult” (P04).

		of populations contribute to limitations in data accessibility • Limited access to data collection tools and technologies due to blockades and sanctions • Influence of local state actors in conflict settings affects data collection and accessibility	
2. Data Management and Sharing Complexities	Fragmentation of Trauma-related Data	• Data stored in various cloud-based systems in some organizations. • Lack of interoperability between data systems • Fragmentation of data systems limits access to comprehensive patient records leading to information losses and duplication of records • Absence of cloud-based data leads to fragmentation of patients' records	“...each piece of the healthcare system operates in a fragmented fashion and it may be incomplete; it creates challenges and data collection so when somebody comes in for care, it can be quite a bit of work to get a whole story around what has happened” (P11).
	Organizational Policies and Data Territorialization	• Territorialization over data and competition between organizations or	“There is an entrenched culture of territorialism and reluctance to share data” (P01).

		actors in the field pose challenges to data sharing • Strict rules and data protection measures implemented by organizations due to confidentiality and privacy concerns hinder data sharing practices	
	Weaponization and Politicization of Data	• Fear and anxiety of organizations surrounding data sharing • Reluctance to utilize cloud systems for storing data due to hacking risks and security concerns in sensitive contexts where governments are part of the conflict • Political tensions hinder data sharing between state and non-state actors to avoid negative perceptions of parties involved in conflict • Misuse or manipulation of data to serve certain political agendas or researchers' political and social beliefs	“I think the knee jerk reaction would be to think that digitalizing would solve that, or high tech would solve that in a lot of these contexts. Technology, Internet access. It's not readily available. And it also infringes on security and safety. So, a lot of staff in these contests are not comfortable with storing that data on a cloud system for example. Because it could be accessible or hacked by anyone, security trumps the need for data in these contexts. A lot of the time, particularly in very sensitive context where the government is party to the conflict” (P04). “So I think that the data that's handled is often either restricted for access by states. It is abused and misused in terms of its interpretation for other people's agendas and often the hard data that comes out of conflict is manipulated so that it ends up possessing a certain narrative, and that narrative is often in step with the researcher's own political convictions or social beliefs” (P05)

3. Resource Allocation and Infrastructure Challenges	Limited Funding and Resource Priorities	• Limited funding for comprehensive global dataset collation efforts • Discrepancy in allocation of resources directed to trauma research compared to other health-related issues	“Sometimes having access to data is what sets you apart from other agencies and allows you to secure funding. So there is that competitive process that kicks in, but that is not by nature of the NGO world or the humanitarian world, but rather something that is enforced through the donor world” (P04).
	Technological and Personnel Constraints	• Lack of personnel and high staff turnover leading to discontinuation of projects • Concerns about reliance on technology due to potential errors in transferring data to digital databases • Lack of basic technological resources, electricity and internet connectivity	“Any disruptions or glitches in the software-based data collection system can limit the capacity to handle information and may result in the loss of critical data” (P06).
4.Recommendations for Optimizing Trauma Data	Reducing the Mismatch Between Capacity and Context	• Integrate data collection practices into medical students’ training programs	“Educating and integrating the importance of data collection and clinical training right the way from medical schools, nursing, nursing, schools up to you know specialization

		• Ensure that field personnel are educated and trained in data collection	residency training programs. I think these are all examples of how we can work towards having a realistic, more practical approach to meaningful trauma related data” (P04).
	Prioritizing Minimum Datasets for Trauma Injuries	• Implement a standardized digital network to facilitate data collection processes regardless of geographical location, provided that there is internet access • Utilize digital systems to aid in the classification of injuries • Establish a robust data collection and management system and standardize data collection methodologies • Establish a universally agreed-upon classification system for trauma injuries to ensure consistent and accurate data collection	“And then the second step would be to build consensus around those countries where conflict exists on what a minimum data set for conflict related trauma ... (P04).

		• Build consensus among organizations operating in conflict-affected countries on what a minimum dataset for conflict-related trauma should include	
	Ensuring Trauma Related Data is Locally Owned and Used	• Foster collaboration between organizations and countries • Advocate for making datasets available for research use and engage with NGOs and academics • Ensure the availability of accurate data by providing evidence-based data to impact policies and advocate for humanitarian laws • Encourage local ownership of data by national rather than international agencies	“... not giving ownership to any agency outside of the country, but rather having local ownership...” (P04).
	Increasing Funds and Resources	• Acknowledge the need for expertise and human and technological resources	“We should increase funds for data collection and for repairing devices used during data collection” (P03).

		• Increase funds for data collection and maintenance of technological devices used for data collection	
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