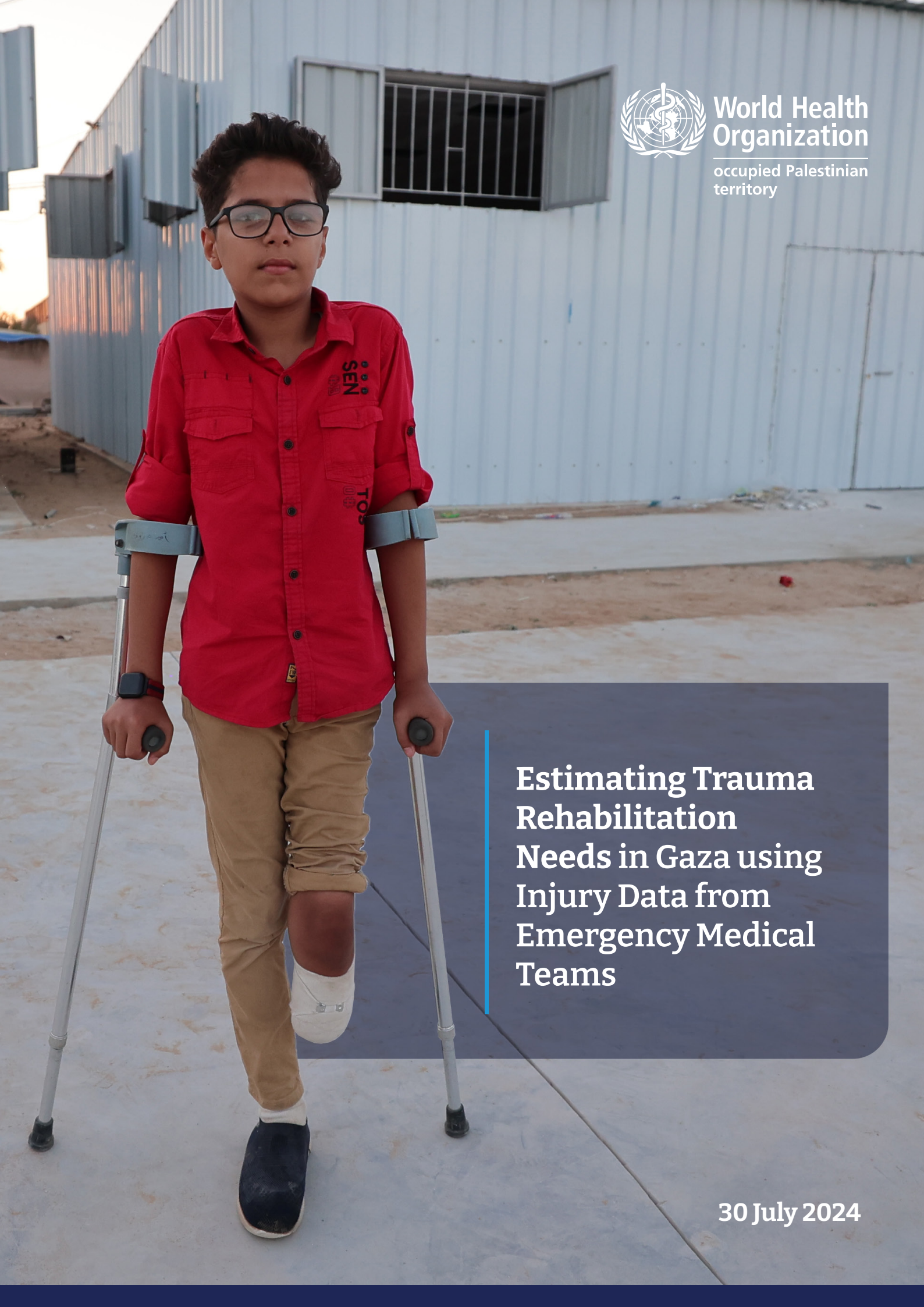


World Health Organization

occupied Palestinian territory

Estimating Trauma Rehabilitation Needs in Gaza using Injury Data from Emergency Medical Teams

30 July 2024

This technical note was established by the World Health Organization to provide partners with evidence-based insights on number and distributions of conflict-related injuries by type. This exercise is a crucial aspect of planning for a surge in rehabilitation-related services, as it enables an effective allocation of resources, timely response, and comprehensive care for affected individuals. It also supports decision making around ongoing acute trauma care needs. Accurate injury estimates contribute to long-term health planning and policymaking, including support for ongoing rehabilitation services. By utilizing estimates of conflict-related injuries, stakeholders can better address the physical, psychological, and social needs of survivors, ultimately fostering resilience and recovery in post-conflict communities in Gaza.

Background

The war in Gaza has caused an enormous surge in traumatic injuries while severely disrupting available rehabilitation services. Planning for the needs of survivors with injuries has been hampered by a lack of disaggregated data on injury type and severity. To fill this critical information gap, WHO and partners developed this estimate.

Daily reports from the Emergency Medical Teams (EMT) Minimum Data Set (MDS) for conflict from 10 January to 16 May 2024 were used as a proxy to estimate the number of major injuries requiring ongoing care and rehabilitation in Gaza. Our analysis uses the total number of people injured provided by the Ministry of Health (MoH), and assumes that a significant proportion of people will experience more than one injury. This is important, as from a planning perspective, we need to understand not only the total number of people injured, but the number of specific injuries (such as the number of amputations).

The analysis found that around 25% of all those injured (or 22 500 people) are likely to have acute and ongoing rehabilitation needs, including patients with extremity injuries, amputations, head and spinal cord injuries and burns. While extremity injuries are the dominant injury with about 15 000 cases, there are also likely to be 3000-4000 amputations, and over 2000 major head and spinal cord injuries, and over 2000 major burns.

Currently available rehabilitation services are heavily disrupted and do not come close to meeting the enormous surge in needs. Even if previous services are re-established, a massive scale-up of rehabilitation efforts is required. Rehabilitation services are key to preventing complications and ensuring the best possible recovery of survivors and must be considered an essential component of the ongoing emergency response.

Objective

To estimate the overall trauma rehabilitation surge created by the war in Gaza, using the MDS as a proxy to allow for better prioritisation and coordination of rehabilitation efforts.

Methodology

Inclusion / Exclusion criteria

- Medical data collected through the EMT MDS were analysed.
- Data on health events and mechanism of injury were extracted from 1673 daily reports submitted by EMTs operating under the coordination of WHO inside Gaza between 10 January and 16 May 2024.
- In total, 8878 "health events[1]" involving traumatic injuries were identified, as well as 2860 patient contacts where burns were reported as the mechanism of injury. (cf. Annex)

Adjustment for biases

- Sample biases were identified, and small adjustments were made to allow the sample to be extrapolated to the entire population of injured people.
- A sensitivity analysis was done using data only from Type 2 EMTs and Specialised Care Teams (SCT) to triangulate findings. (Type 2 EMTs provide the same services as Type 1, plus general, trauma and obstetric surgery and other major conditions as well as inpatient acute care.)

Use of the MoH data for the total number of injuries

- The total number of injured people was based on reporting from MoH. The total number of injured people reported on 23 July was 90257 and was rounded down to 90 000 in calculations.

1) Definitions of trauma health events in Red EMT MDS:
   - Major Head/Neck/Spine injury: Any major trauma to the scalp, skull, brain, neck and spinal cord requiring hospitalization and/or general anaesthesia.
   - Major Thorax injury: Any major trauma involving the chest requiring hospitalization and/or general anaesthesia.
   - Major Abdomen/Pelvic injury: Any major trauma involving the abdomen and pelvic requiring hospitalization and/or general anaesthesia.
   - Major Extremity injury: Any upper and lower extremity injures requiring hospitalization and/or spinal or general anaesthesia.
   - Minor injury: Any injury that can be treated as an outpatient

Limitations and biases

- **Limited availability of data:** 21% of MDS reports include disaggregated data on injuries. Other reports use a more limited "ultra MDS" format due to limited connectivity. Nevertheless, disaggregated reports include 8878 injuries and an additional 145 amputation procedures, as part of 61 767 patients treated.

- **Selection bias:** The EMT MDS dataset is not an exact representation of the overall situation in Gaza. EMTs have different admission criteria and service availability when compared to national hospitals and have been operational for less time.

- **Trauma definitions:** MDS definitions are not intended to indicate rehabilitation needs. The MDS also reports burns and amputations slightly differently from other health events. Burns are reported under mechanism of injury (MOI), whereas amputations are reported as a surgical procedure. Some adjustment to estimates was required to accommodate this.

- **Unavailability of disaggregated injury data from the MoH:** The total number of injured people reported is based on publicly available data from MoH. More detailed disaggregation was not available, though efforts are underway to retrospectively identify patients with specific injuries.

- **Adjustment for polytrauma:** The MDS reporting of health events means that more than one injury may be documented per patient (multiple trauma) whereas MoH report on the number of individuals injured. For example, a patient with a spinal cord injury and an amputation in the EMT MDS would be reported as two separate injuries by the MDS, and one individual by the MoH. From a planning perspective, it is important to count both individuals and injuries. For example, a patient with double amputation will require two prosthetics.

- **Age and gender disaggregation:** Though some overall age and gender disaggregation is available from MoH and EMTs, it is not possible to use current data to disaggregate injuries as injury distribution is likely to vary depending on age and gender.

Table 1: Breakdown of injuries based on EMT data

(SCT = Specialised Care Team)

Injury	# all EMT	% all EMT	# T2 and SCT	% T2 and SCT
Major head/neck/spine	291	3.2	203	3.3
Major thorax	187	2.1	138	2.2
Major abdomen/pelvic	283	3.1	200	3.2
Major extremity	1089	12.1	804	12.9
Minor injury	7028	77.9	4743	76.3
Limb amputation (performed)	145	1.6	125	2
Burns (MOI)	2860	15*	715	8*

*The total exceeds 100% because burns are reported as percentage of total MOI and not as a health event.

Note: EMTs also report on the number of patients that "require rehabilitation" as an outcome in the MDS. 4.3% (2656) of **all patients (not only those with injures)** captured in the MDS during this period required ongoing rehabilitation – a figure which is in line with our overall injury estimates below.

Considerations for the use of EMT data (above) to estimate overall rehabilitation burden of injuries (below) and its rationale

- The EMT data was broadly consistent with the distribution of life changing injuries we would expect to see in a conflict of this nature.
- Secondary analysis, removing outpatient facilities from the analysis, did not have a major impact on findings – with the anticipated small increase in overall percentage of amputations performed and a small decrease in the overall percentage of minor injuries.
- EMT coding for amputation only includes "amputation performed," meaning amputations performed by surgeons in the EMT. Traumatic amputations, (happening in the community as the direct result of a crush or blast injury) are therefore not included in the sample. Amputation rates may also differ in pre-existing hospitals. We have increased the expected percentage of limb amputations slightly on this basis. Some anecdotal reports indicate that the amputation rate may be higher still.
- EMT coding of major head/neck/spine injury does not indicate the presence of lasting impairment due to neurological injury. The overall percentage was reduced slightly to exclude those patients without lasting impairment. It is also assumed that acute survivability from major head or spinal cord injury in Gaza is likely to be relatively low.

- EMT coding of major thorax injury/major pelvis/abdomen injury does not provide a clear rehabilitation indication, and was combined as “other major injury.”
- Burns is classed in the MDS as a mechanism of injury rather than a trauma “health event.” MOI is recorded for 11 383 patient contacts, compared to trauma health events that account for 8878 of patients. Data is hard to interpret and includes significant double counting due to patients returning for repeated dressing changes. Across all EMTs, burn was recorded as the mechanism of injury for around 15% of cases – though one centre providing post-acute wound care burns accounted for over 50% of all cases. When data from only Type 2 and SCT was used, this number falls to 8%. We considered the removal of burns as an estimate, but instead used a lower estimate based on data from other contexts. For example, data from the WHO coordinated trauma response in Mosul indicated burns constituted around 2% of the trauma burden in conflict that also involved the use of explosive weapons in populated areas. Data on civilians and local combatant burns in other armed contexts averages 3.3%. As not all burn injuries will require ongoing rehabilitation, 2% seems a reasonable estimated percentage of life changing burn injuries. However, the actual number could be higher.
- While a small proportion of major injuries may only require a short period of acute rehabilitation input, some minor injuries (as defined by the MDS) such as tendon injuries or peripheral nerve injuries will also require immediate and ongoing rehabilitation and are not captured here. These numbers are likely to balance out.
- We have tried to estimate numbers of injuries, not number of people injured. There is evidence in conflict, in particular with the use of explosive weapons in populated areas, that between one third and half of all patients will present with multiple injuries. To calculate numbers of injuries (rather than people injured), we took the total number of injured people reported injured by MoH (90 000), then provide a low estimate assuming 15% of patients had multiple injuries, a medium estimate assuming one third of cases include multiple injuries, and a high estimate assuming 50% of cases include multiple injuries. (cf. table 2)

Final estimate

Table 2: Distribution of estimated number of injuries by type and by polytrauma assumptions

Injury needing rehabilitation	Est % total injuries	0% polytrauma	15% polytrauma	30% polytrauma	50% polytrauma
Major head/neck/ spine injury	2	1800	2070	2340	2700
Major Extremity Injury	13	11700	13455	15210	17550
Limb Amputation	3	2700	3105	3510	4050
Burn	2	1800	2070	2340	2700
Other major injury	5	4500	5175	5850	6750
Minor injury	75	67500	77625	87750	101250
Total	**100**	**90000**	**103500**	**117000**	**135000**

Interpretation and implications

- Major injuries requiring ongoing rehabilitation are likely to constitute 25% of the total number of injuries, or at least 22 500 people (as of 23 July 2024).

- Currently available rehabilitation services do not come close to meeting the enormous surge in needs. Even if previous services are re-established, a massive scale-up of rehabilitation effort is already required.

- **Major extremity injuries** constitute the main rehabilitation need, with an estimated range of 13 455 to 17 550. Although data does not allow disaggregation, the majority are likely to be lower limb injuries, including complex fractures with peripheral nerve injuries.

- It is reasonable to expect that there are between 3105 and 4050 **limb amputations**, though some anecdotal reports indicate this number may be higher. As with extremity injuries, the majority are likely to be lower limb injuries. At present, there are no operational prosthetic and orthotic services in Gaza. A scale up of long-term prosthetic services is needed – in careful coordination with existing providers who are already planning surge capacities.

- There are likely be around 2000 **spinal cord and severe traumatic brain injuries** – though MDS coding means there is a low confidence in the number. All patients with life changing injuries are placed at significant risk by the severe disruption of rehabilitation and other post-acute services. This is particularly true of patients with spinal cord injury and traumatic brain injury, who are at increased risk of life-threatening complications while displaced and will face challenges (along with their families) in any evacuation. Accessible accommodation for those with complex injuries is required, along with inpatient step-down care for those who cannot be safely discharged.
- Despite challenges with estimations, the number of **burn injuries** requiring rehabilitation is likely to be at least 2000. Displacement is also likely to contribute to a persistent surge in burn injuries with risk of fires in tented communities, changes to cooking methods etc. Specialised burn rehabilitation services are needed.
- The number of people with injuries requiring **assistive products** far exceeds the amount of equipment provided and in the pipeline based on reporting on the Health Cluster Dashboard. Partners are reporting stocks of essential assistive products such as wheelchairs and crutches are exhausted. Many people with disability who have been displaced will also require new or replacement products.
- This huge surge in rehabilitation needs occurs in parallel with the destruction and disruption of essential rehabilitation services that these patients require. Acute rehabilitation services are severely disrupted along with all other hospital services. All three dedicated inpatient rehabilitation services have been damaged or destroyed. Remaining primary health care and community level services are frequently paused or rendered inaccessible due to fighting. Much of the rehabilitation workforce is also displaced, while secondary sources report 39 physiotherapists killed by 10 May.
- This technical note relates only to new injuries, but tens of thousands of Palestinians in Gaza with pre-existing conditions now also lack access to essential rehabilitation services and assistive products that they depend on to maintain their health, independence and access to other critical services.

25%
Of injuries need long-term rehabilitation

13,455 - 17,550
Major extremity injuries

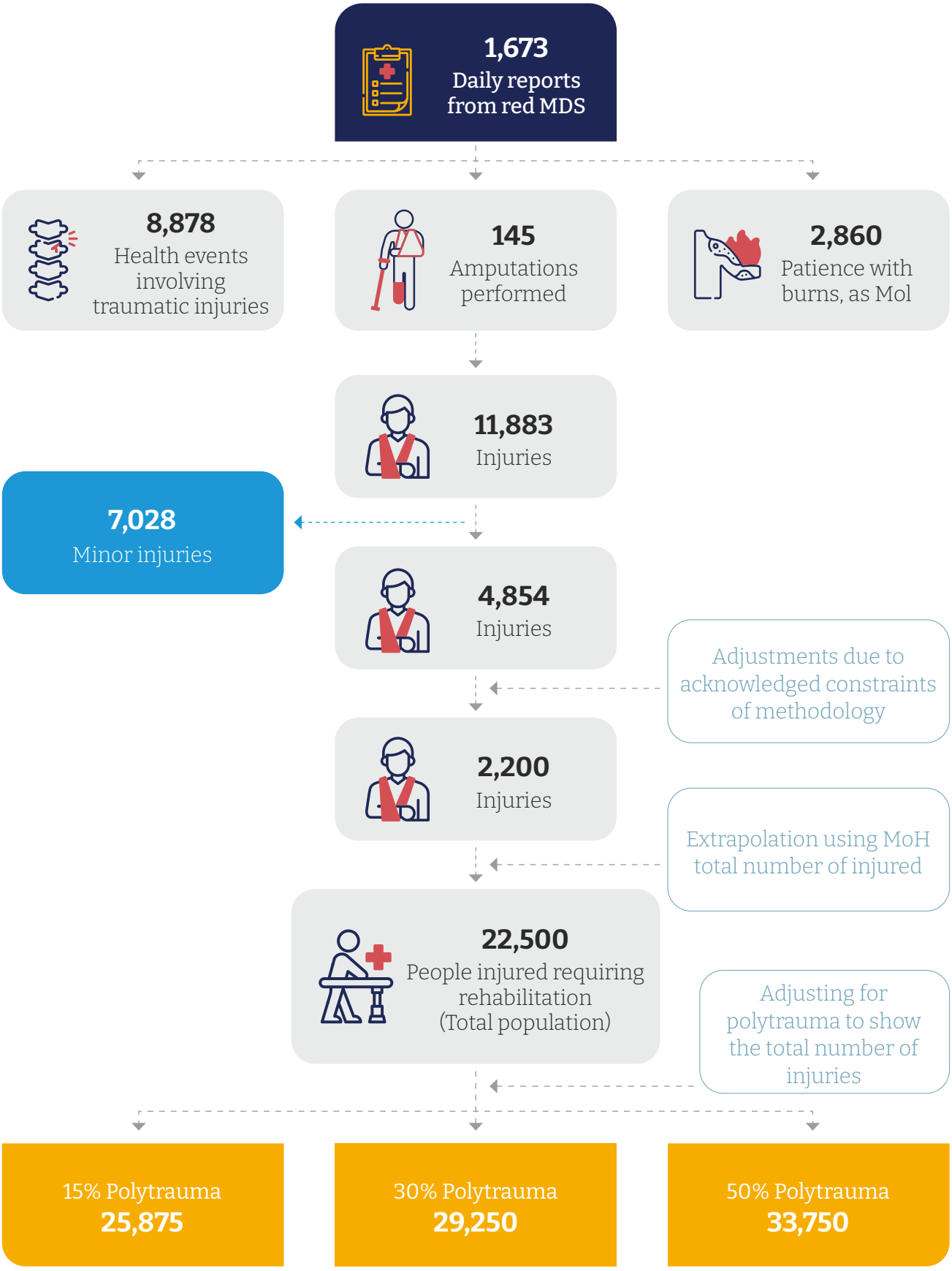
3,105 - 4,050
Limb amputations, mostly lower limbs

~2,000
Spinal cord & brain injuries

~2,000
Burn injuries needing rehabilitation

39
Physiotherapists killed (by May 10)

Annex: Flowchart of selection and extrapolation process of injuries



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