



The Global Architecture of Trauma Care

A Blueprint for Resource Allocation and System Design
based on the 2026 Guidelines for Essential Trauma Care.



The Global Burden of Injury

4.4 Million

deaths annually (8% of all global deaths).

268 Million

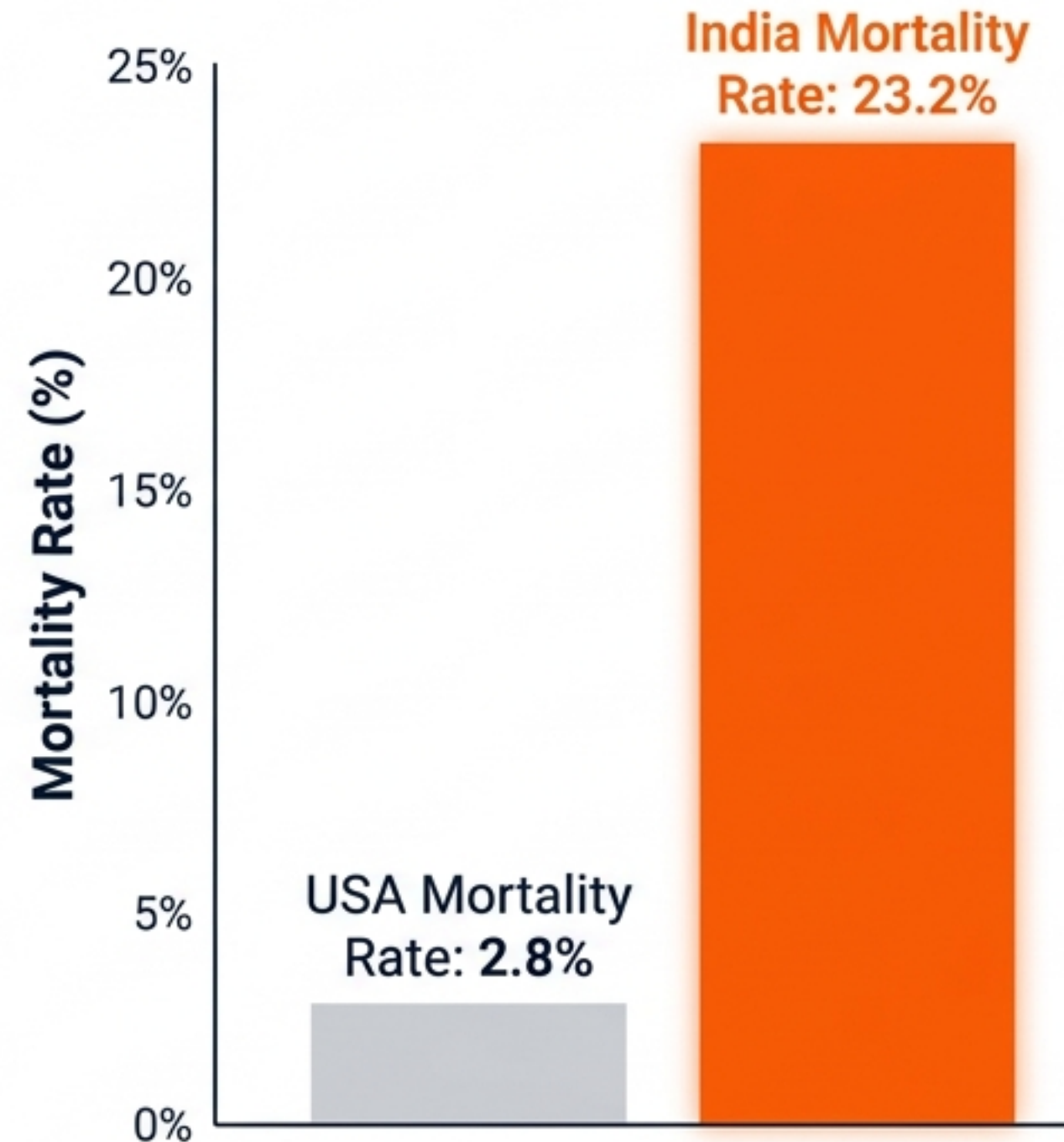
DALYs lost (10% of global DALYs).



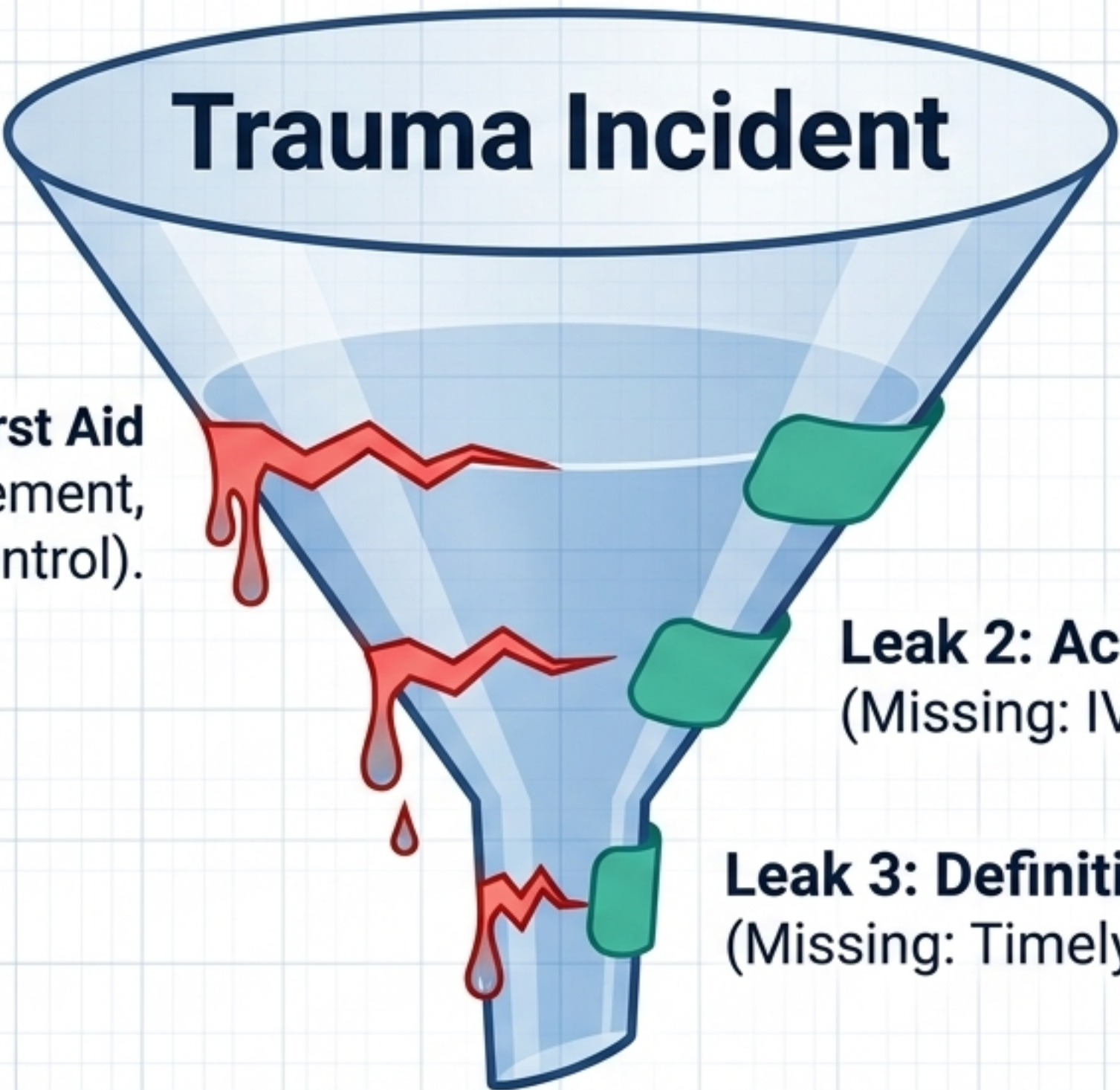
Over 80% occur in LMICs.

The Discrepancy of Care

For hospitalized patients with identical injury severity (ISS 9):



Trauma Incident



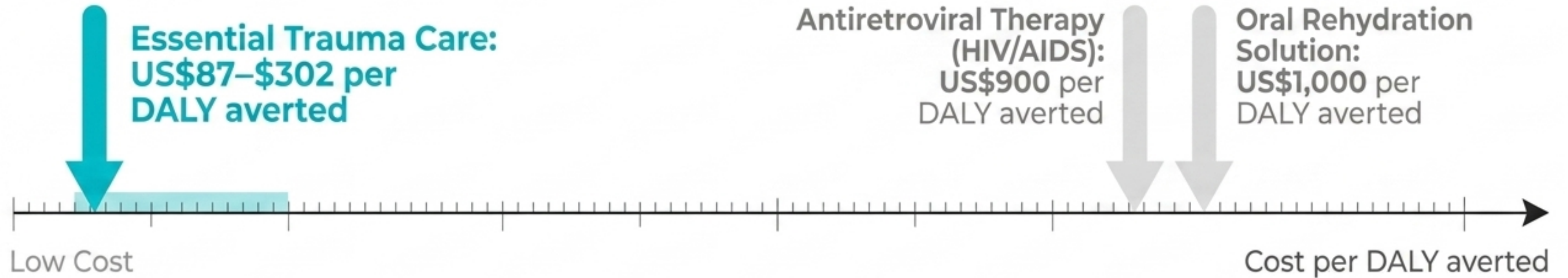
Leak 1: Pre-Hospital & Basic First Aid
(Missing: Airway management, hemorrhage control).

Leak 2: Acute Resuscitation
(Missing: IV fluids, chest tubes).

Leak 3: Definitive Care
(Missing: Timely laparotomy, burr holes).

Eliminating these systemic inequalities in case-fatality rates could save 1,000,000 lives per year.

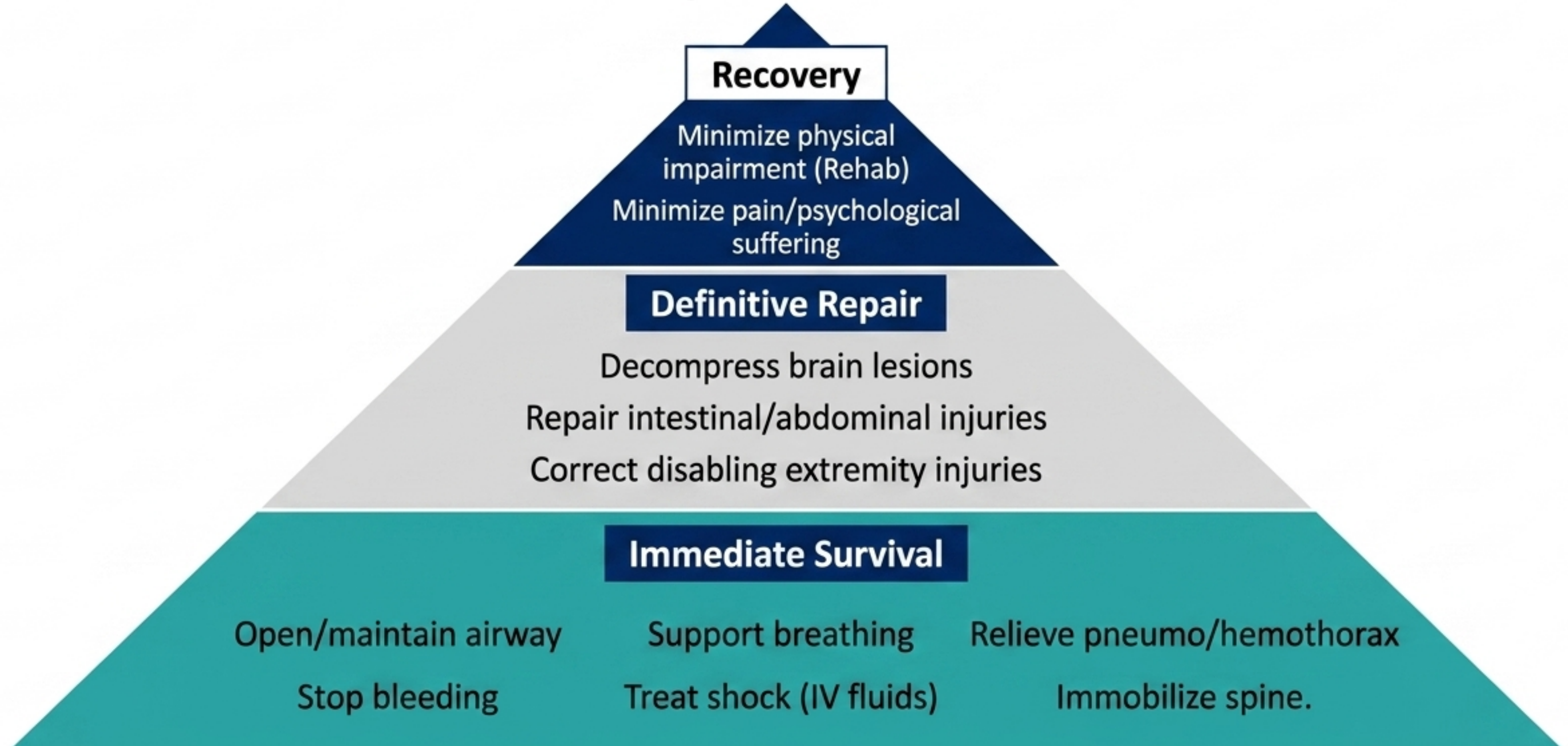
Trauma Care is Exceptionally Cost-Effective



Shortages in essential supplies like IV fluids and airways are often due to organizational shortcomings, not prohibitive costs.

Essential Trauma Services: The Rights of the Injured

Hierarchy of Trauma Needs



The Facility Tier Matrix



Clinic

Staff: Nurses, mid-level providers.

Role: Basic first aid, stabilization, referral.



First-Level Hospital

Staff: General doctors, occasionally a general surgeon.

Role: Minor procedures, resuscitation, holding care.



Second-Level Hospital

Staff: General surgeon, occasionally orthopedic/emergency specialists.

Role: Intermediate trauma laparotomy, definitive fracture care.



Tertiary Hospital

Staff: Broad subspecialties (Neurosurgery, advanced ICU).

Role: Advanced definitive care, severe traumatic brain injuries.

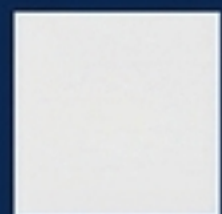
Resource Allocation Logic



Core (Solid Dot): Must be assured at that level in all cases, even in environments with <\$10 per capita health spending.

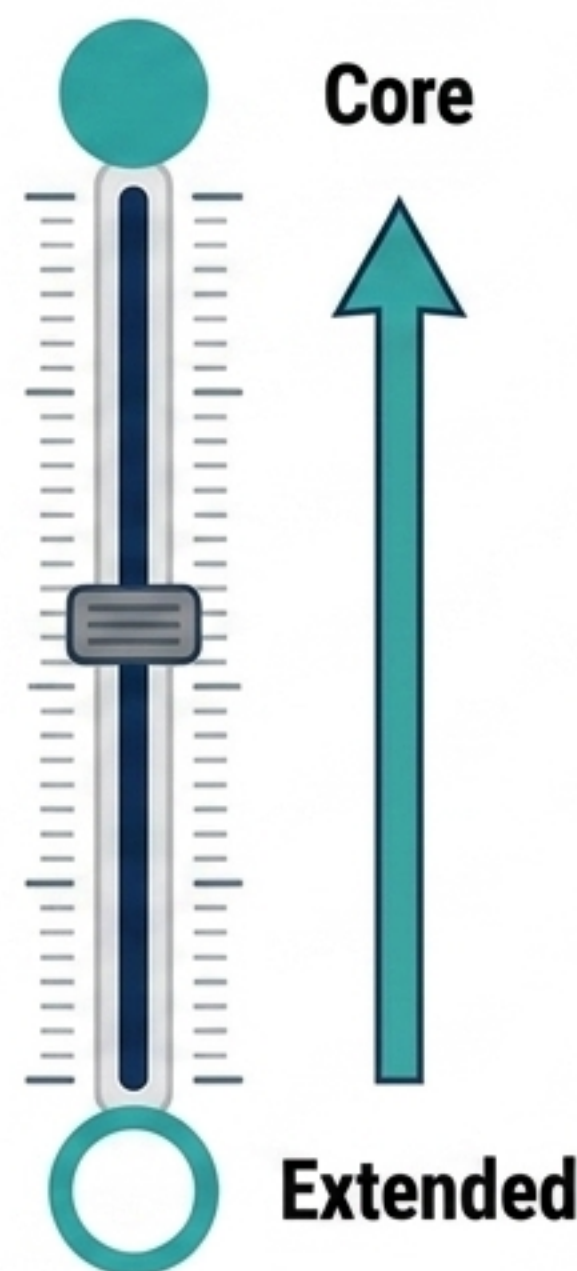


Extended (Hollow Ring): Increases success probability but adds cost/training burden.



Not Applicable

The “Upgrade” Slider



Extended items should slide up to “Core” when a facility experiences:

High trauma volume (e.g., highway proximity)
OR improved regional economic resources (e.g., Middle-Income status).

The 2004 vs. 2026 Evolution: Raising the Global Baseline

Pulse Oximetry



2004:
Not Applicable
at Clinics.



2026:
Core at ALL
levels.

Mechanical Ventilators



2004:
Extended.



2026:
Core at 2nd &
Tertiary levels.

Portable X-Ray



2004:
Core only at
Tertiary.



2026:
Core at ALL
hospital levels.

Diagnostic Ultrasound (FAST)



2004:
Extended.



2026:
Core at 2nd &
Tertiary levels.

Phase 1 Resuscitation: Airway Management

	 Clinic	 1 st	 2 nd	 Tertiary
Knowledge/Skills				
Manual maneuvers	●	●	●	●
Endotracheal Intubation	○	○	●	●
Cricothyroidotomy	○	○	●	●

	 Clinic	 1 st	 2 nd	 Tertiary
Equipment/Supplies				
Suction (Manual)	●	●	●	●
Suction (Powered)	○	○	●	●
Laryngoscope & ET Tubes	○	○	●	●

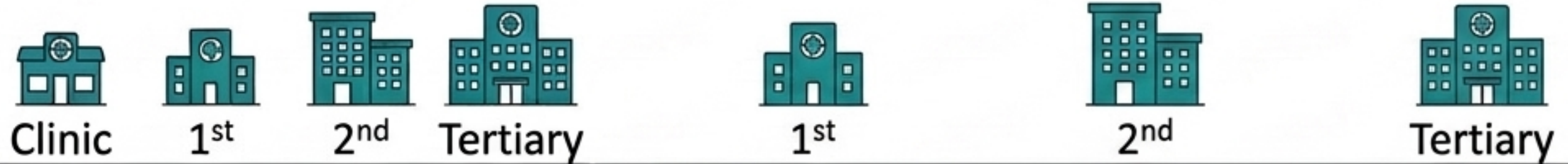
Suction is critical; manual/foot-pump devices must be **Core** in any hospital to mitigate power outages.

Phase 1 Resuscitation: Breathing & Respiratory Distress

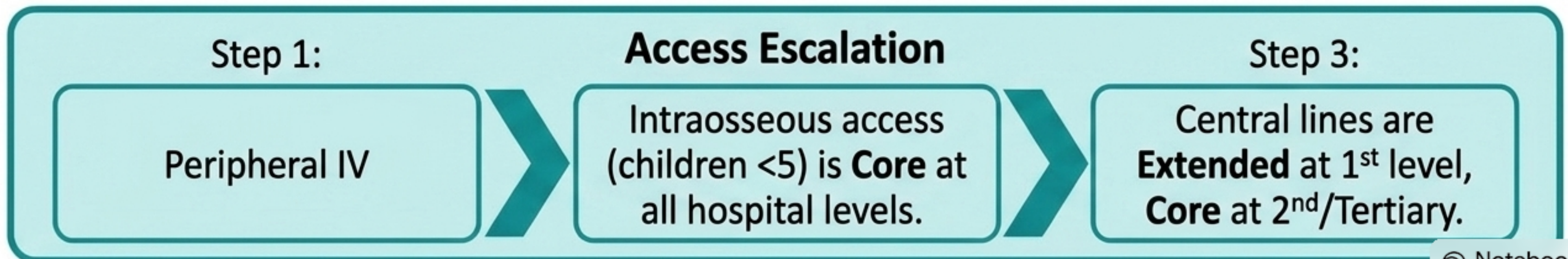
	 Clinic	 1 st	 2 nd	 Tertiary
Knowledge/Skills				
Assess adequacy	●	●	●	●
Needle thoracostomy	○	●	●	●
Chest tube insertion		●	●	●

	 Clinic	 1 st	 2 nd	 Tertiary
Equipment/Supplies				
Oxygen supply	○	●	●	●
Pulse oximetry	●	●	●	●
Chest tubes & one-way flow-seal		●	●	●
Bag-valve-mask	○	●	●	●

Phase 1 Resuscitation: Circulation & Shock

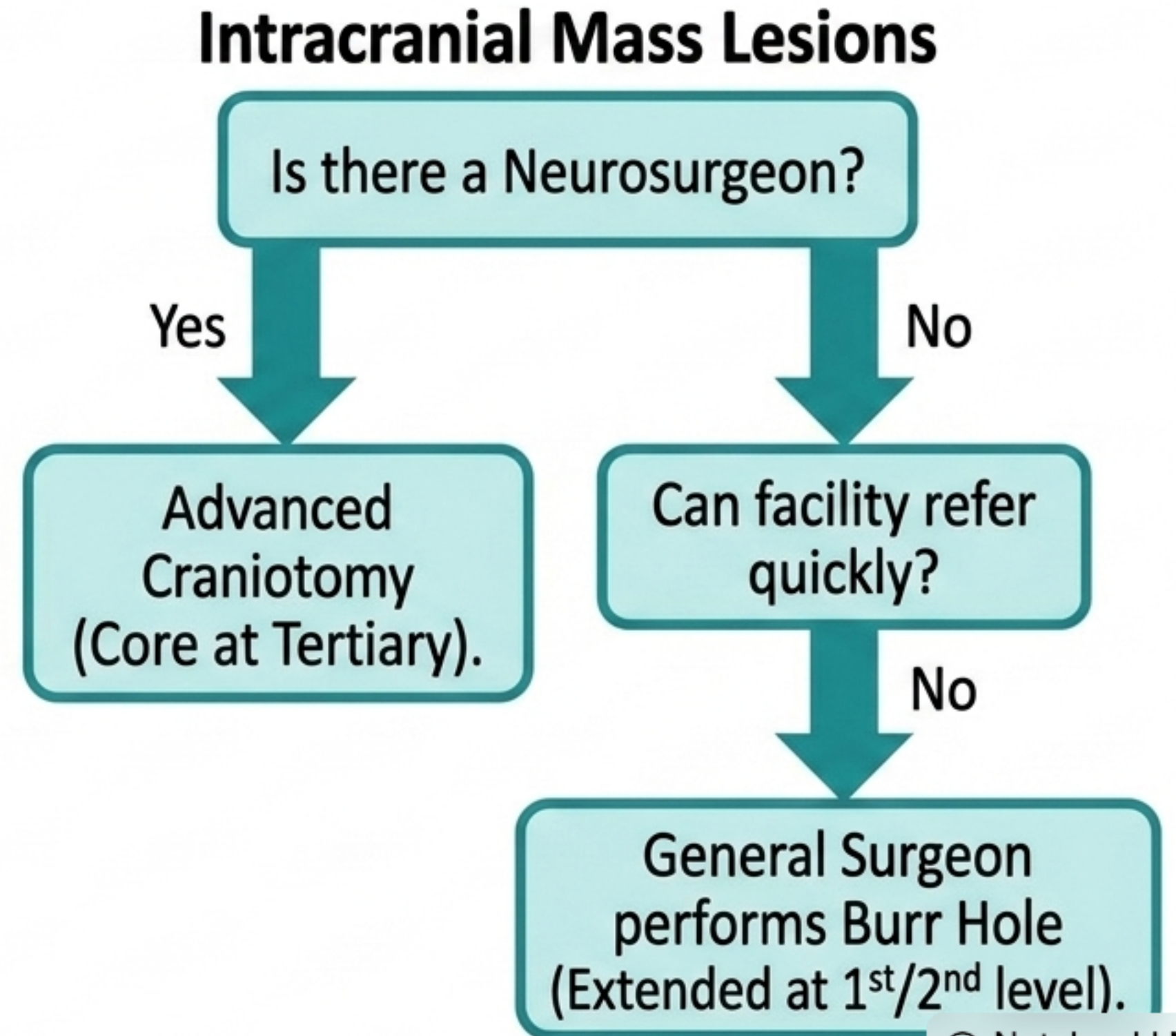


Circulation Interventions				
External compression & Tourniquets	●	●	●	●
Peripheral IV & Crystalloid & Crystalloid	○	●	●	●
Blood Transfusion		●	●	●



Definitive Care: Traumatic Brain & Neck Injury

	 Clinic	 1 st	 2 nd	 Tertiary
Prevent secondary brain injury (normotension/oxygenation)		●	●	●
CT Scans		○	○	●



Definitive Care: Chest & Abdomen



Clinic



1st



2nd



Tertiary

Diagnostic Capabilities				
FAST Ultrasound		○	●	●
DPL		○	●	●
CT Scan		○	○	●



Clinic



1st



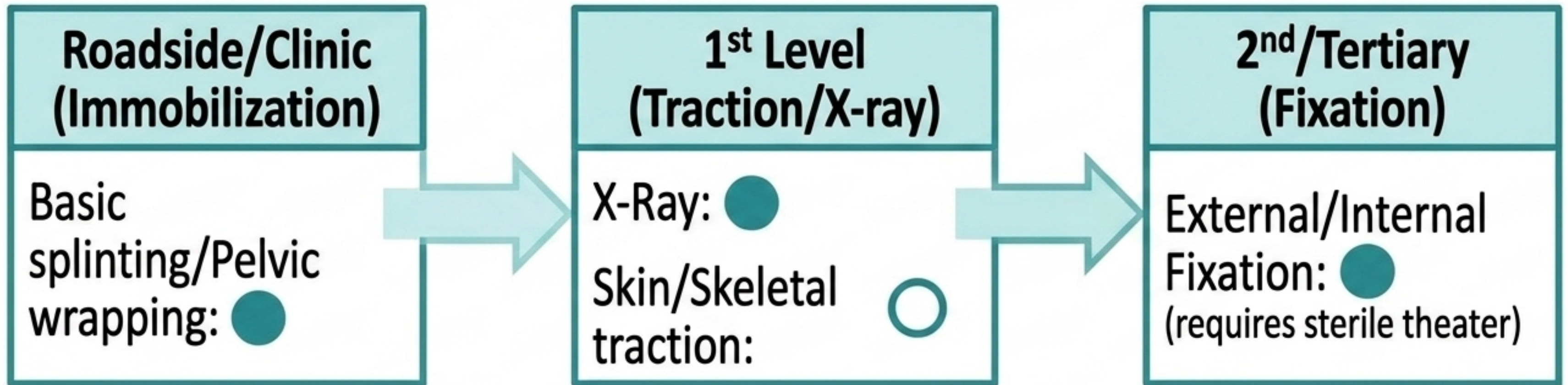
2nd



Tertiary

Surgical Capabilities				
Chest tube autotransfusion		○	●	●
Intermediate Laparotomy (e.g., splenectomy, bowel repair)		○	●	●
Advanced Laparotomy (e.g., hepatic resection)			●	●

Definitive Care: Extremity & Spinal Injury



Prevention of pressure sores/urinary complications is Core at all hospitals.

Definitive Care: Burns & Wounds

Cooling burns with clean water and sterile dressings are Core at ALL levels, including basic clinics.

	 Clinic	 1 st	 2 nd	 Tertiary
Burns				
Debridement & Escharotomy		○	●	●
Skin Grafting		○	●	●
Complicated Wounds				
Tetanus prophylaxis (Toxoid requires refrigeration)	●	●	●	●

Cross-Cutting Capabilities: Diagnosis & Monitoring

Bedside Monitoring

BP Cuff, Thermometer,
Stethoscope, Pulse
Oximetry ●

Electronic cardiac

○ Clinic ●● Hospitals
(Core hospitals)

Radiology

Plain films

○ Clinic ●● Hospitals

Portable X-ray

●● Hospitals

Laboratory

Hemoglobin/Glucose
● (Core ALL)

Electrolytes/Lactate
●● Hospitals

Arterial blood gases

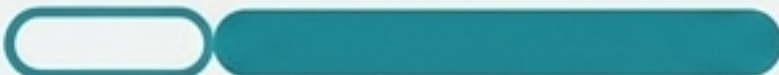
○ 1st level
● 2nd/Tertiary

The Trauma Formulary (Aligned with WHO MLEM)

1 Pain

   
Clinic 1st 2nd Tertiary

Paracetamol/Ibuprofen 
(Core ALL)

Morphine 

2 Anesthesia

   
Clinic 1st 2nd Tertiary

Local 

General/Spinal 

Converting General Anesthesia to Core at 1st level dramatically increases surgical access.

3 Antibiotics (Access Group)

   
Clinic 1st 2nd Tertiary

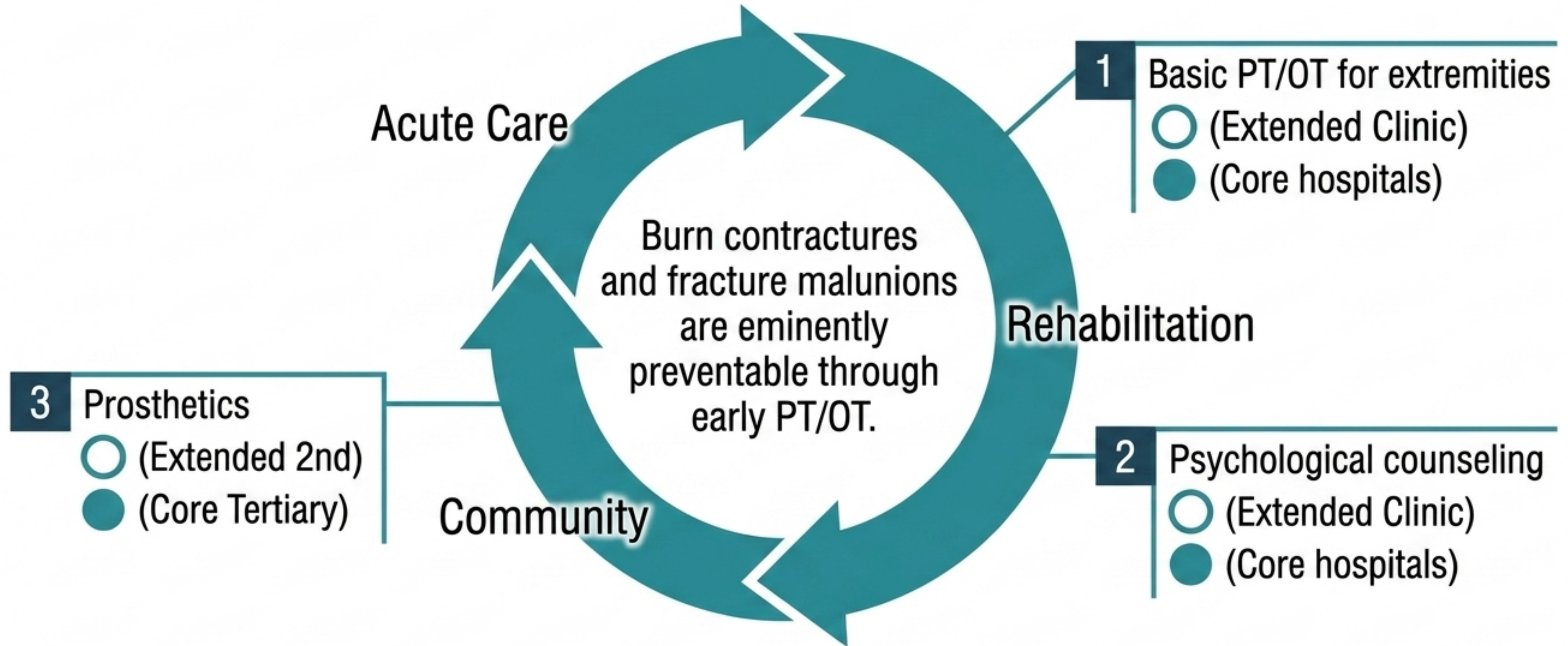
Ampicillin,
Metronidazole 

4 Fluids

   
Clinic 1st 2nd Tertiary

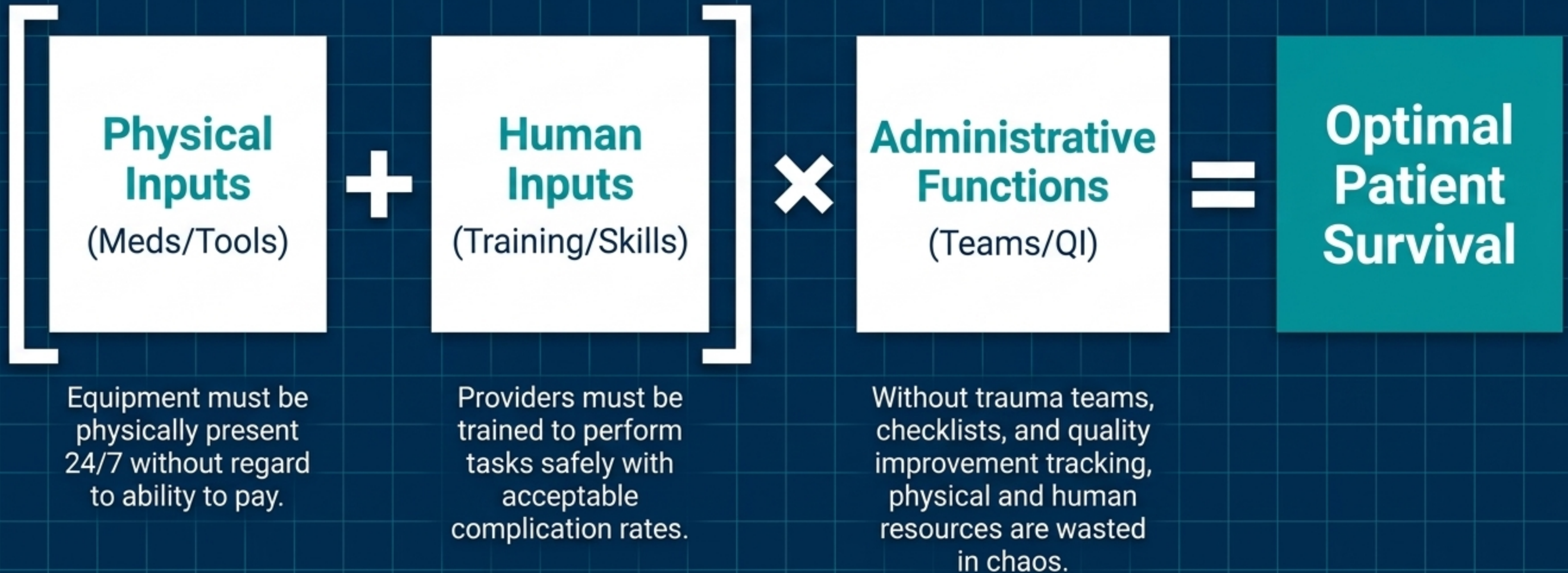
Balanced salt solutions
& Glucose IV fluids 
Hospitals

Closing the Loop: Rehabilitation & Recovery

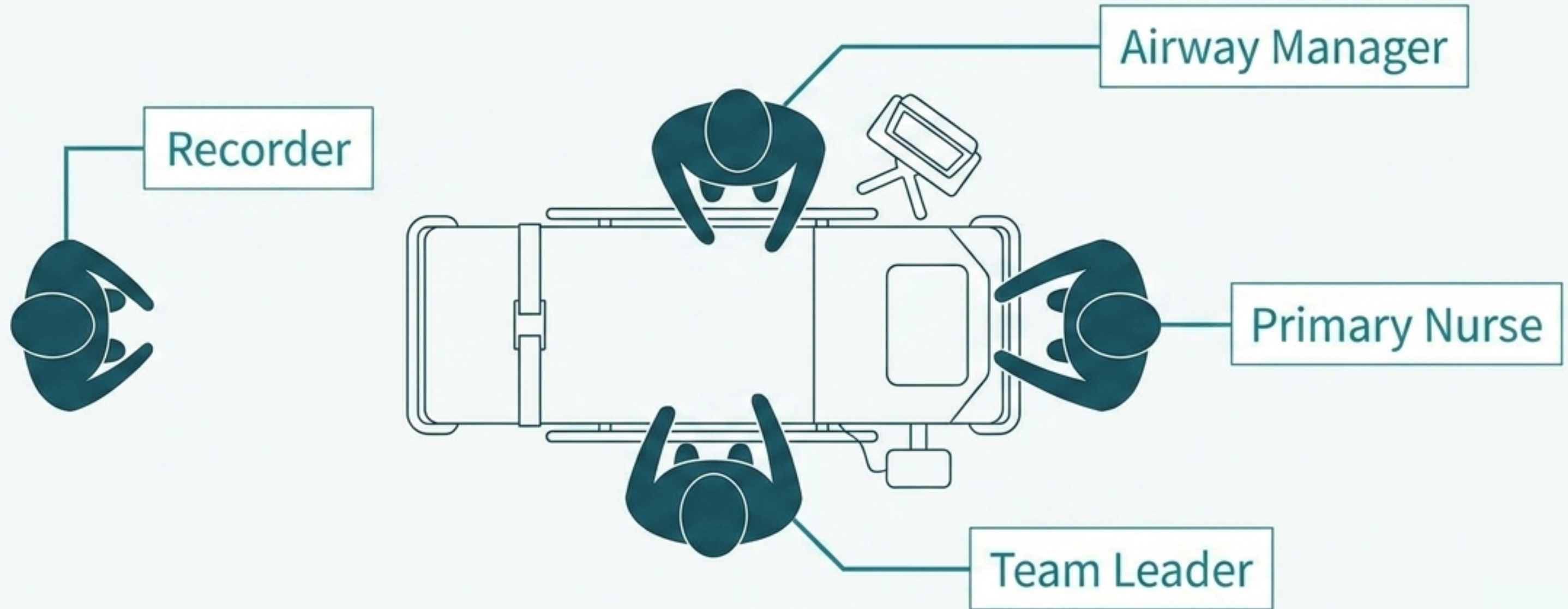


Discharge planning: Core at all hospital levels to connect patients with community resources.

The Ecosystem of Care



The Trauma Team Blueprint



Implementation:

Pre-assigned roles are Core at 2nd/Tertiary hospitals, Extended at 1st level (due to staffing limits, where 1 doc/1 nurse often provide all care).

Core Philosophy:

Organization cures the environment of anxiety and confusion.

The Quality Improvement (QI) Loop

