

Background

Greater than 90% of the global 6.4 million deaths in children under 14 years occur in resource-limited settings. Acute pediatric critical illnesses – sepsis, pneumonia, trauma – are leading causes of death and disability outside of the neonatal period, yet critical care services are not universally available. A significant number of these lives could be saved by proven, simple critical care and supportive interventions despite challenging environments and fewer pediatric available critical care resources as compared to high-income countries. However, there is a gross disparity not only in available pediatric critical care resources, but also of available data, and, thus, evidenced-based guidelines, between high income countries (HIC's) and low and middle income countries (LMIC's). Without region-specific data that captures the burden of disease, outcomes, and resource utilization of pediatric populations in resource-limited settings, we cannot develop context-appropriate, evidence-based interventions, or appropriately allocate limited but available resources to hospitals. Even accepted practices such as aggressive fluid resuscitation for patients in septic shock, which is standard of care in HIC's, can lead to increased mortality compared to controls in LMIC's.

Objectives

Primary outcome is prevalence of acute critical illness, defined as: death within 48 hours, including ED mortality; OR admission/transfer to an HDU or ICU; OR transfer to another institution with a higher level of care; OR receiving critical care-level interventions (vasopressor infusion, invasive mechanical ventilation, non-invasive mechanical ventilation) regardless of location in the hospital.

Secondary outcomes include: etiology of critical illness, in-hospital mortality, early mortality (death within 48 hours of presentation), cause of death, resource utilization, and change in neurocognitive status from premonitory state from admission to discharge

Study Design and Methods

Global PARITY is a prospective, observational, multicenter, multinational point prevalence study to measure the burden of acute pediatric critical illness in self-identified LMIC.

Study population: Acutely ill or injured children aged 28days to 14years presenting to an emergency department (ED) or directly admitted to an inpatient unit at a participating site.

Excluded children are those presenting for follow-up visits, vaccination, suture removal (or other non-acute complaint) or children with a corrected gestational age less than 42 weeks.

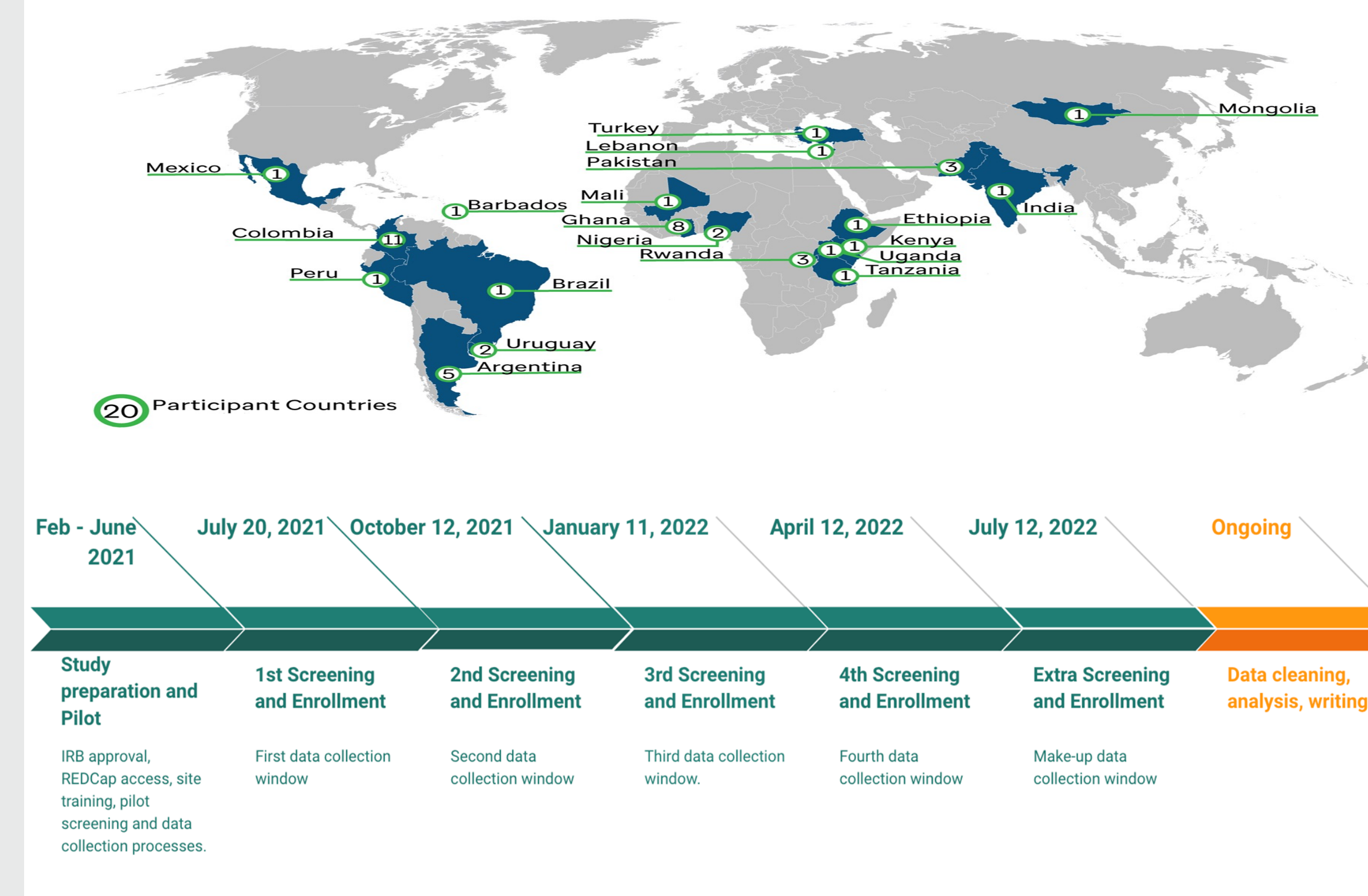
Recruitment: Participating sites were recruited via World Federation of Pediatric Intensive & Critical Care Societies (WFPICCS), Pediatric Acute Lung Injury & Sepsis Investigators Network (PALISI), and Red Colaborativa Pediatrica de Latinoamérica (LAREd Network).

Study Design and Methods cont'd:

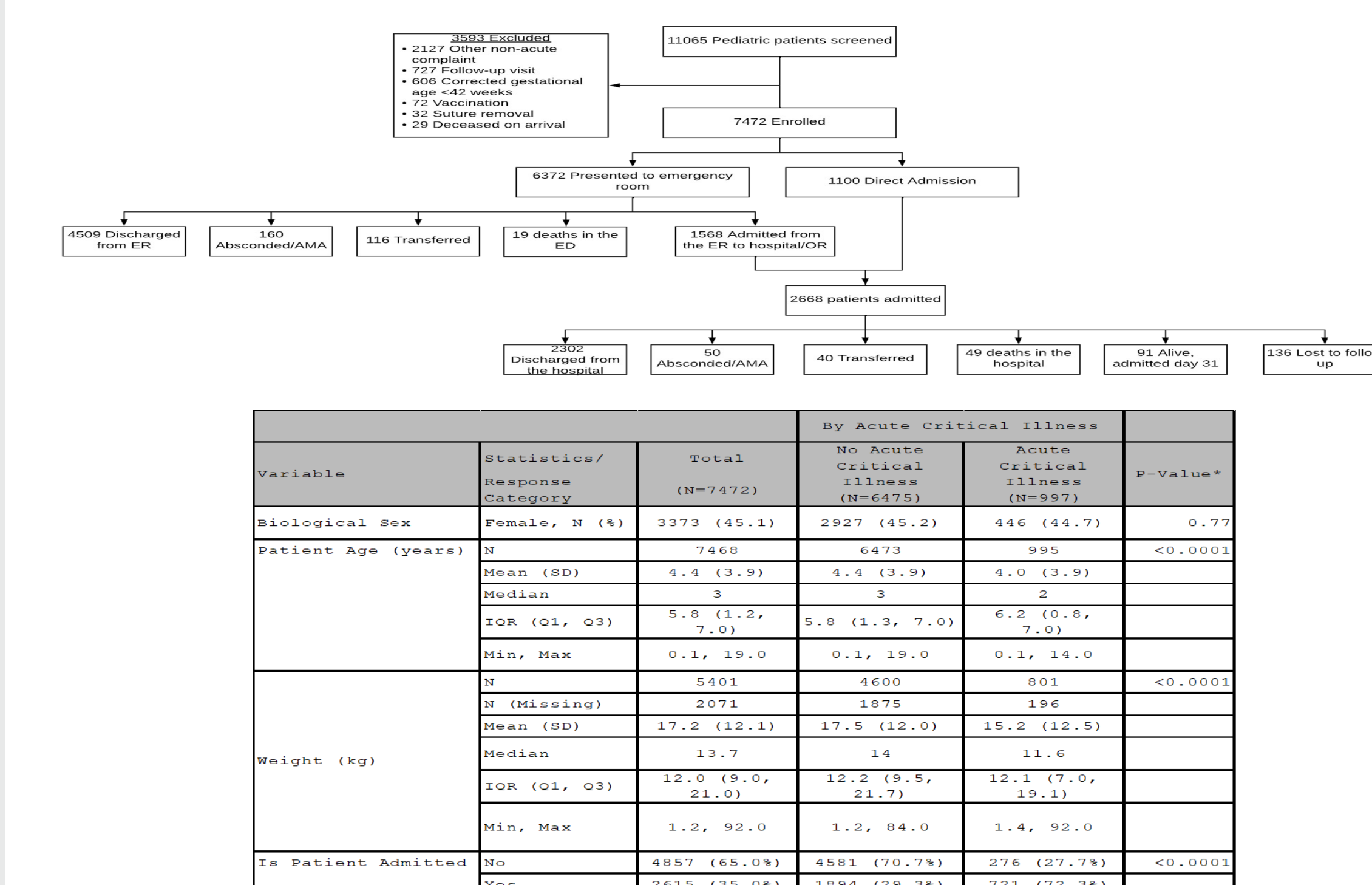
All children were screened presenting to the ED or direct admits to inpatient units for inclusion criteria. Once included, study personnel then followed participating patients prospectively to determine in-hospital outcomes and resource utilization. The local research team collected data from the medical chart on the day of admission and then once a day until death or discharge. Data collected included:

- Patient Characteristics:** presenting symptoms; severity of illness; anthropometrics (weight, height, mid-upper arm circumference); comorbidities (HIV status, congenital heart disease, malnutrition); presenting vital signs; available laboratory test results; imaging studies and results; and the POPC prior to the current illness.
- Hospital Resource Utilization:** data on use of blood transfusion, fluid bolus, vasoactive agents, non-invasive positive pressure ventilation, oxygen therapy, mechanical ventilation, ICU admission, and antibiotic administration.
- Outcomes:** whether discharge home, transfer to a higher level of care *within* the hospital, transfer to *another* hospital, and death; final hospital diagnosis, length of stay and documented cause of death (if applicable), and the POPC at the time of discharge.

Participating Sites



Results: Patient Demographics by Acute Critical Illness

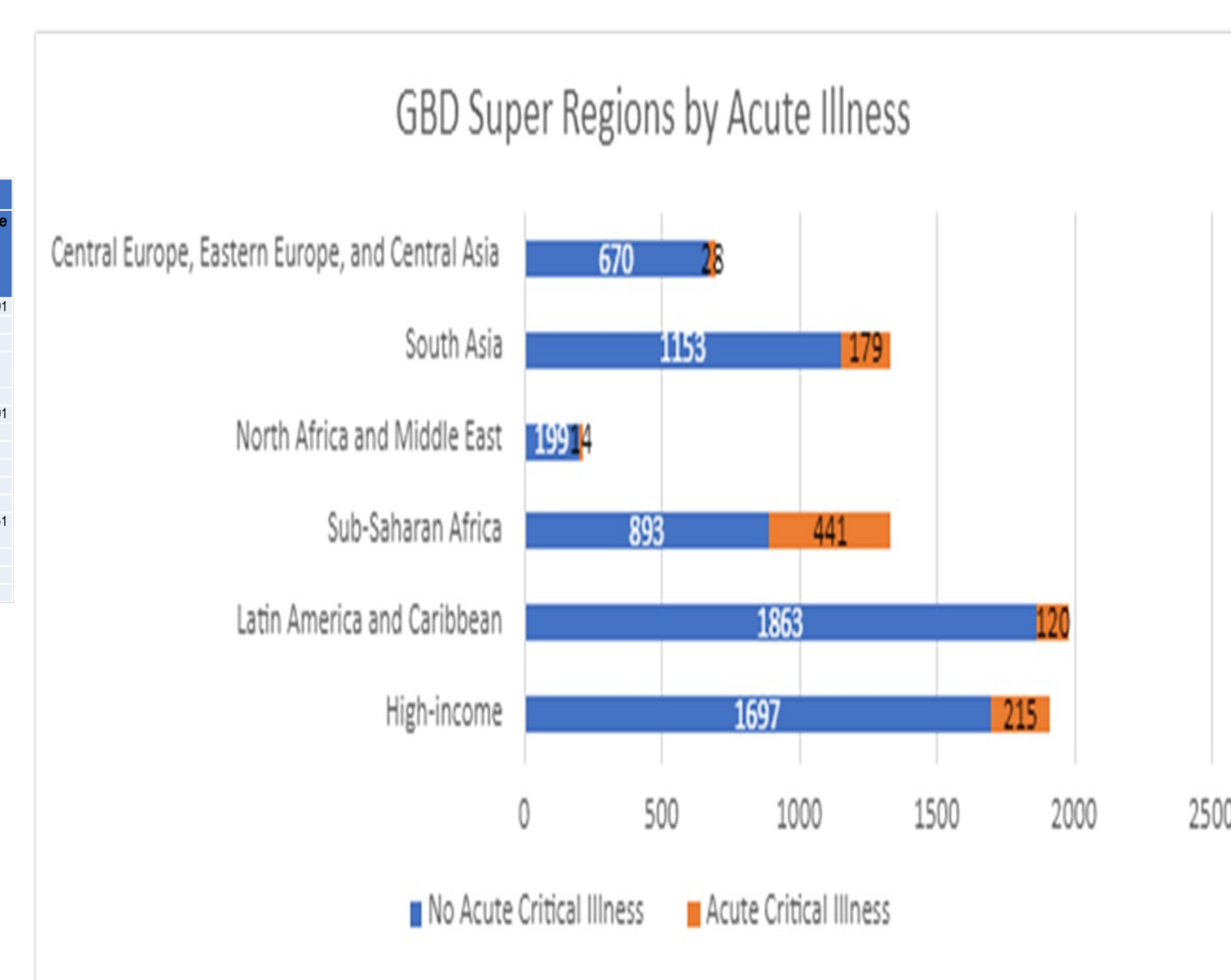


Results: Prevalence and Outcomes of Acute Critical Illness

Critical Illness		Total (n/N)	Inpatient/Outpatient	
			No Acute Critical Illness (n/N)	Acute Critical Illness (n/N)
Death Within 48 Hours	No	7425 (99.4%)	6475 (100.0%)	950 (95.3%)
	Yes	47 (0.6%)	0 (0.0%)	47 (4.7%)
Admission / Transfer to an HDU or ICU	No	6692 (89.6%)	6475 (100.0%)	217 (21.8%)
	Yes	780 (10.4%)	0 (0.0%)	780 (78.2%)
Transfer to Another Institution with a Higher Level of Care	No	7328 (98.1%)	6475 (100.0%)	853 (85.6%)
	Yes	144 (1.9%)	0 (0.0%)	144 (14.4%)
Receive Critical Care	No	7291 (97.6%)	6475 (100.0%)	816 (81.8%)
	Yes	181 (2.4%)	0 (0.0%)	181 (18.2%)
Composite Acute Critical Illness	No	6475 (86.7%)	6475 (100.0%)	0 (0.0%)
	Yes	997 (13.3%)	0 (0.0%)	997 (100.0%)

Outcomes by definition of critical illness:
Children with acute critical illness were more likely to die, require ICU admission, be transferred or receive critical care interventions

Hospital Outcome up to 30 days:
Children with acute critical illness more likely to have a longer length of stay, more likely to be admitted for more than 30 days. There was no difference in acute critical illness based upon primary discharge diagnosis.



Acute Critical Illness by GBD Super Region
GBD created super regions based on two criteria: epidemiological similarity and geographic closeness. The High-Income region covers 34 countries in different parts of the world. Sub-Saharan Africa had the highest proportion of acute critical illness.

Discussion:

Focus on a single critical illness, as done in previous point prevalence studies, fails to capture the burden of pediatric critical illness. Thus it is difficult to prioritize resources and achieve greatest potential impact on child mortality; and, prior point prevalence studies do not reflect disease prevalence in LMICs.

Global PARITY is successful in creating a large, prospective, global point prevalence study that describes the epidemiology of acute critical illness and patient outcomes in resource limited settings.

Prevalence of acute critical illness and the outcomes vary by GBD regions

Communicable diseases were the leading cause of admissions due to critical illness

The top 5 diagnoses for children presenting with acute critical illness are: pneumonia, sepsis or septic shock, acute malaria, other non-communicable diseases, and diarrhea/gastroenteritis

Limitations:
Site and center selection may not truly represent all children presenting with acute critical illness. Center drop out due to several factors: COVID pandemic, sociopolitical issues in country, ethics approval processes. COVID had significant effect of care seeking behaviors as well as limited the ability of many centers to participate fully.

Selected References:
Abbas, Q., Holloway, A., Caporal, P., López-Barón, E., Aguilnik, A., Remy, K. E., ... & Bhutta, A. T. (2021). Global PARITY: Study Design for a Multi-Centered, International Point Prevalence Study to Estimate the Burden of Pediatric Acute Critical Illness in Resource-Limited Settings. *Frontiers in Pediatrics*, 9. [doi: 10.3389/fped.2021.681181](https://doi.org/10.3389/fped.2021.681181)

Need to output at 200%