BIOME cohort: Multi-system microbiome dynamics and clinical outcomes in massive burn injury patients

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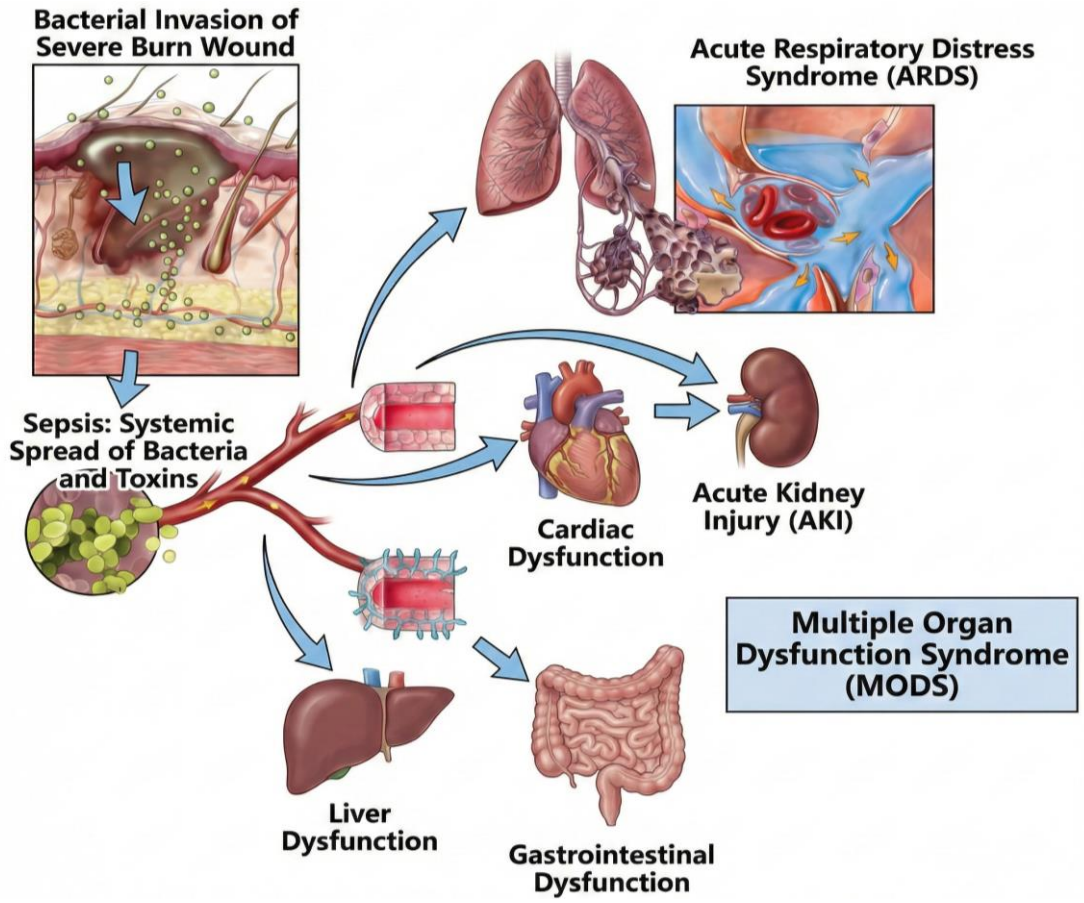
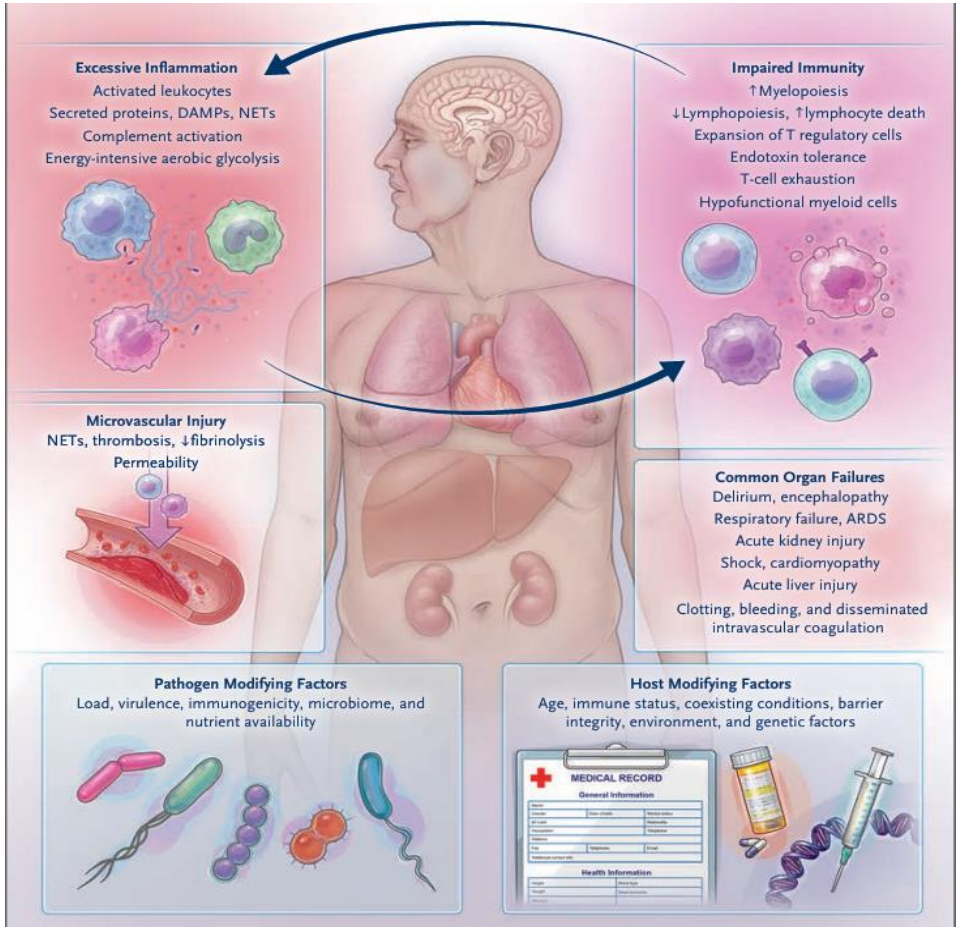
Background

Sepsis as the Leading Cause of Death in Patients with Massive Burn Injury

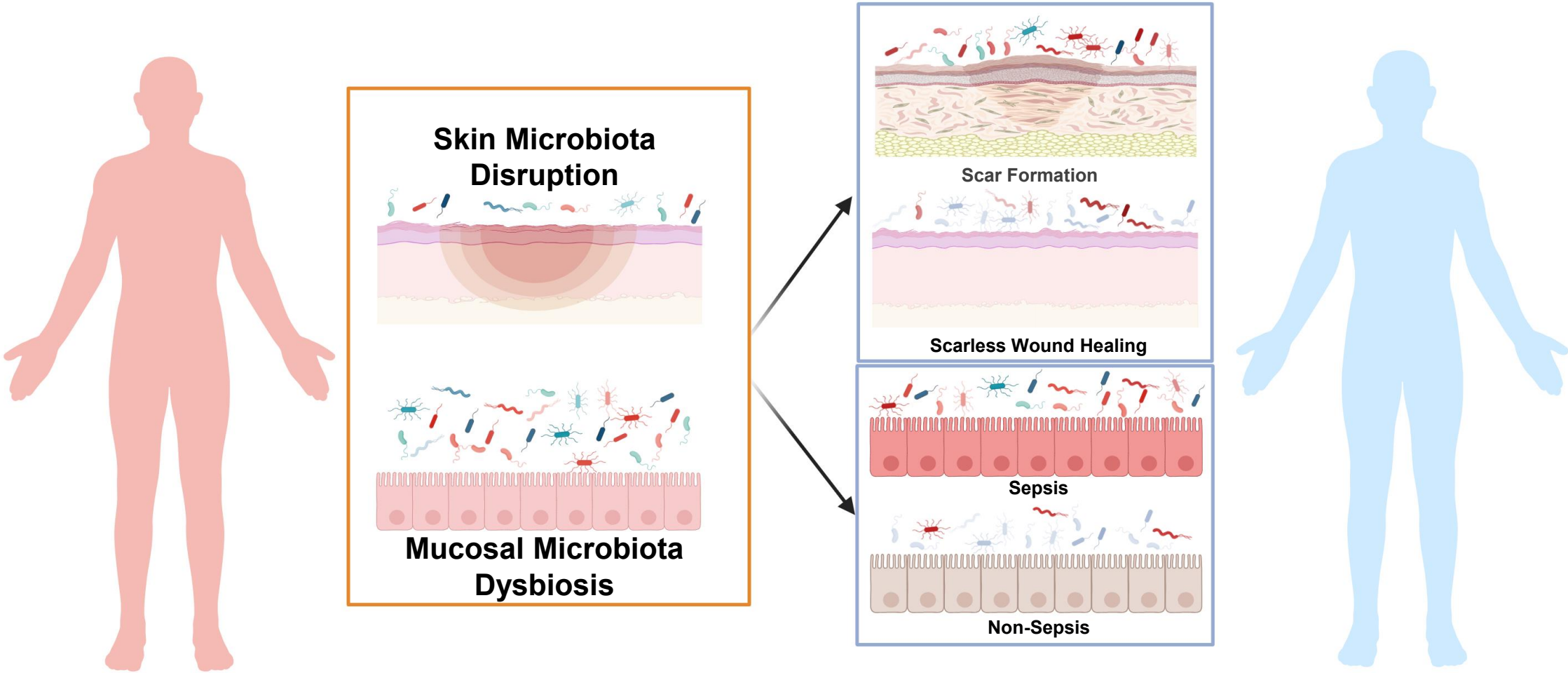




Lancet. 2018;392(10141):75-87.

Background

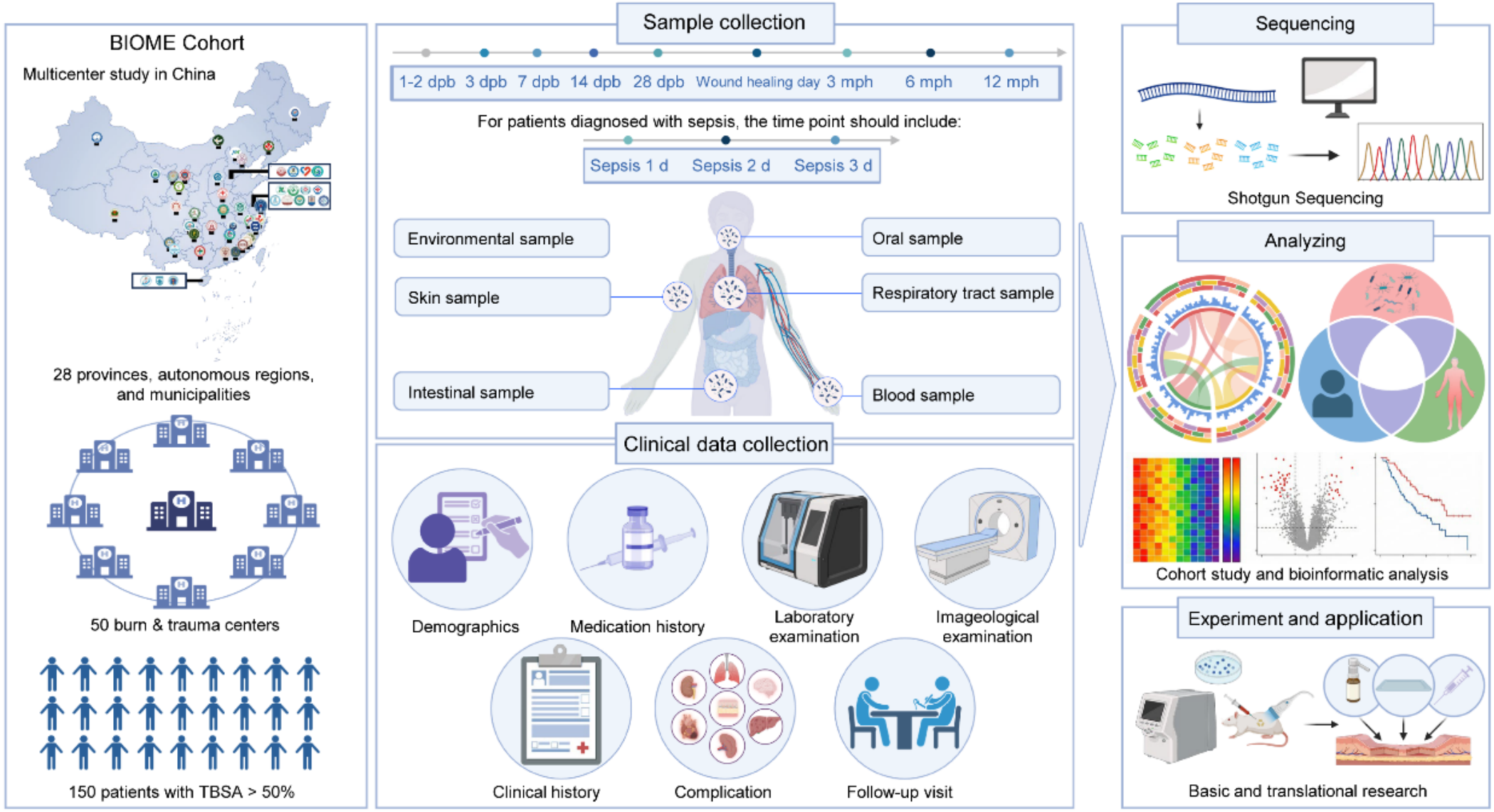
The MBI represents a unique clinical model of systemic stress, ideal for investigating cross-organ microbial interactions.



Current Limitations in Burn Microbiome Research: Isolated Sampling and Small Cohorts

Article Source	Collection Site	Sample Size	Microbial Changes
Burns. 2024;50(2):444-453.	Post-burn intestine	54 patients; 2 time points	Significant reduction in *Bifidobacterium* after burns
PLoS One. 2017;12(3):e0173848.	*Post-burn respiratory tract*	*48 patients; 1 time point*	*Increased abundance of Streptococcaceae and Enterobacteriaceae in the respiratory tract after burns*
Wound Repair Regen. 2018;26(2):182-191.	*Post-burn skin*	*19 patients; 4 time points*	*Increased abundance of Firmicutes in the skin after burns*
Sci Rep. 2021;11(1):10667.	Post-burn skin	10 patients; 6 time points	Significant microbial diversity in burn wounds, with reductions in *Cutibacterium acnes* and *Staphylococcus*
Burns. 2025;51(3):107372.	*Post-burn scar*	*23 patients; 2 time points*	*Decreased abundance of Bacteroides and increased abundance of Campylobacter and Kupfferibacter in scars after 3 months*

Graphical Abstract



The first multi-center prospective cohort study on massive burn injury patients.

BIOME Cohort Map & sampling Timeline

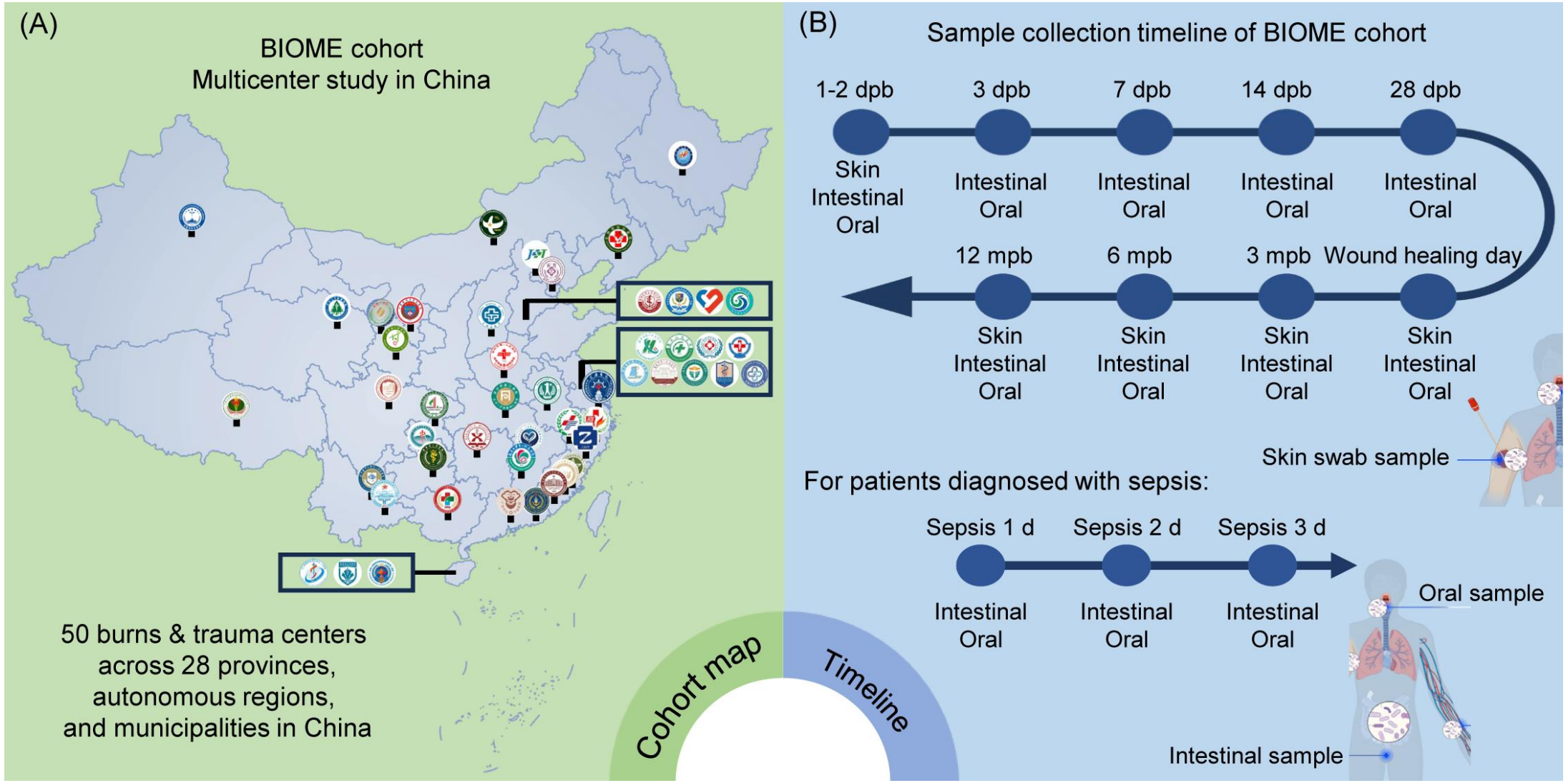
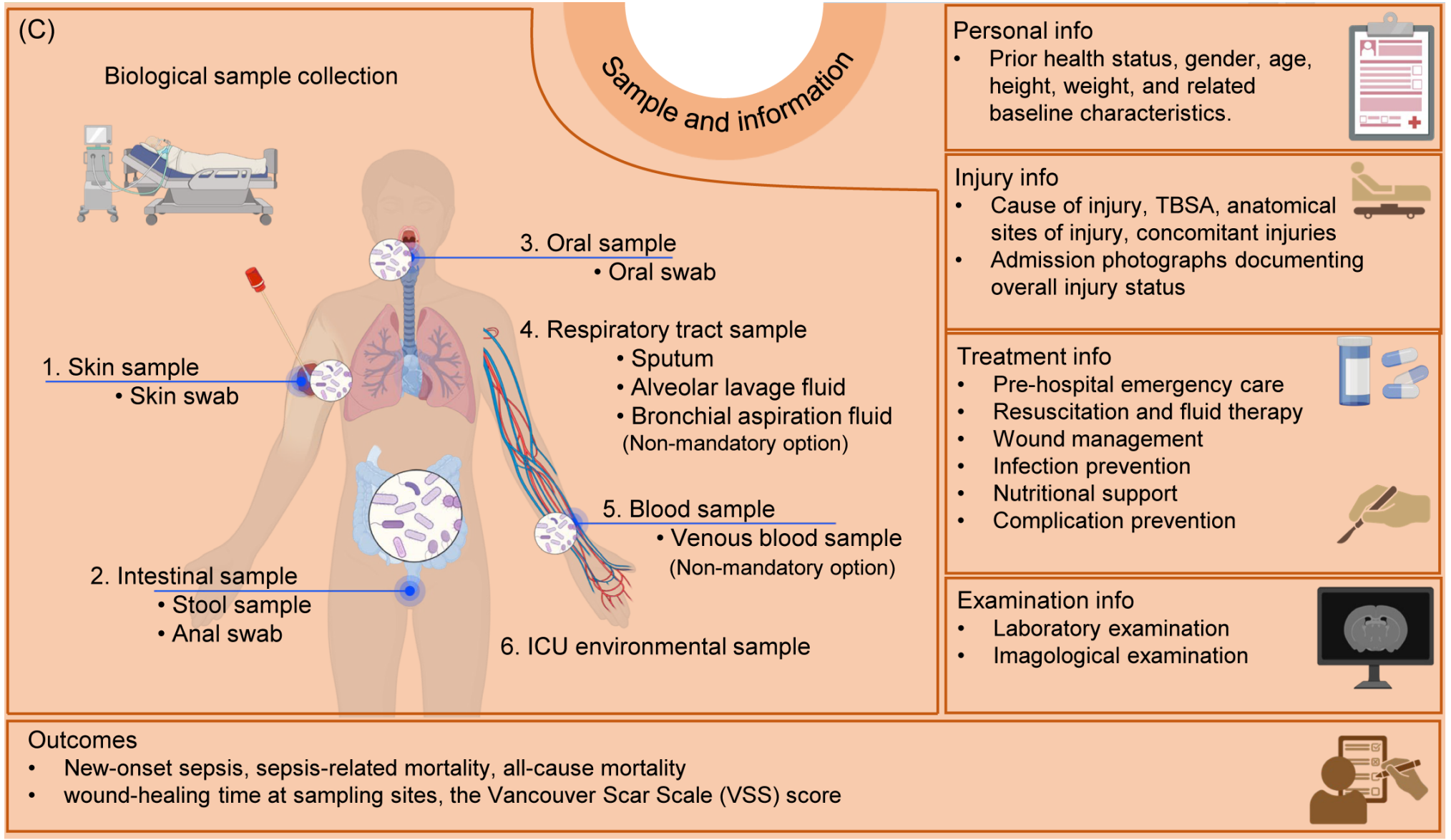


Figure 1 Study design and data collection framework of the BIOME cohort.

Sample and Clinical Information Collection



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Patient Enrollment Progress

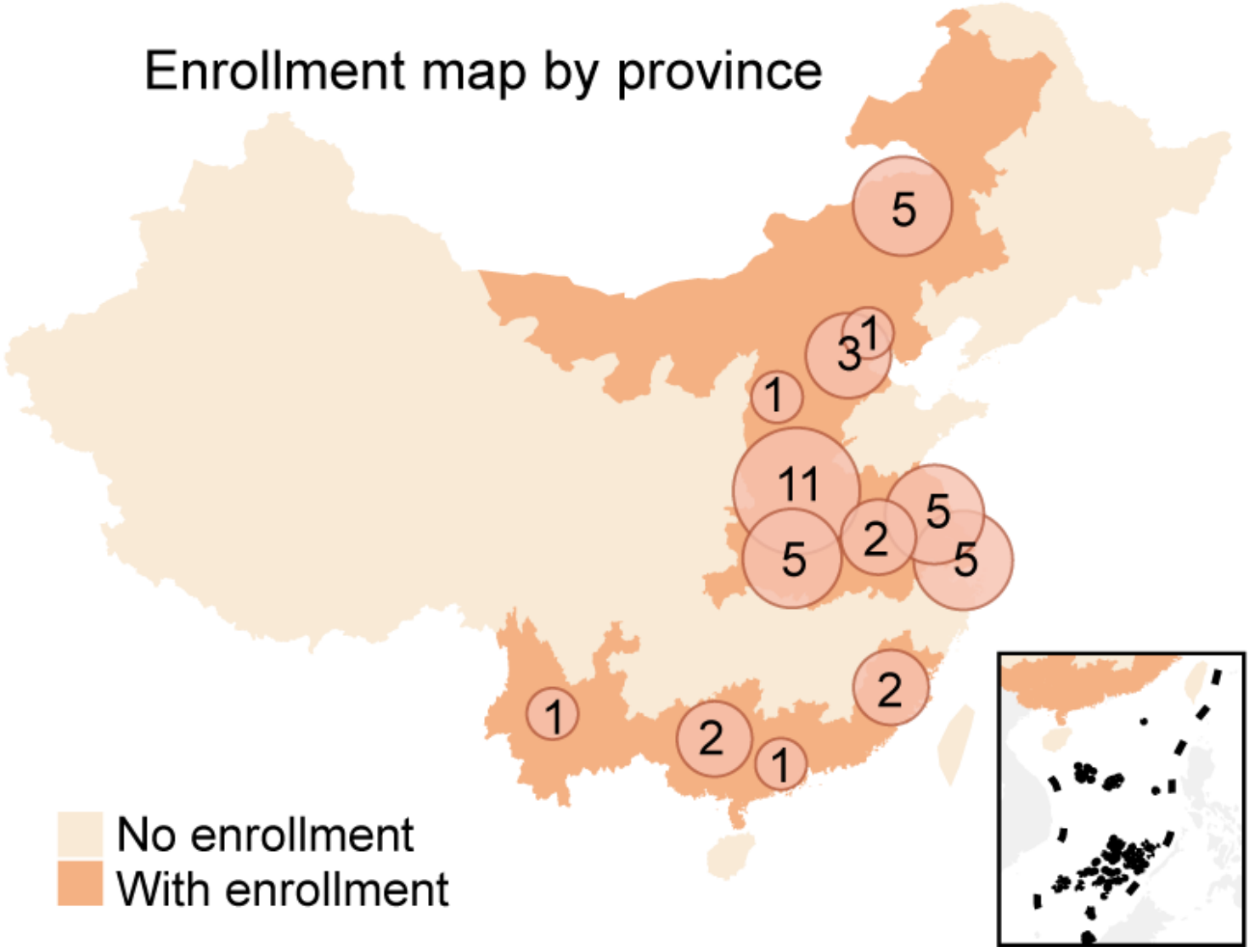
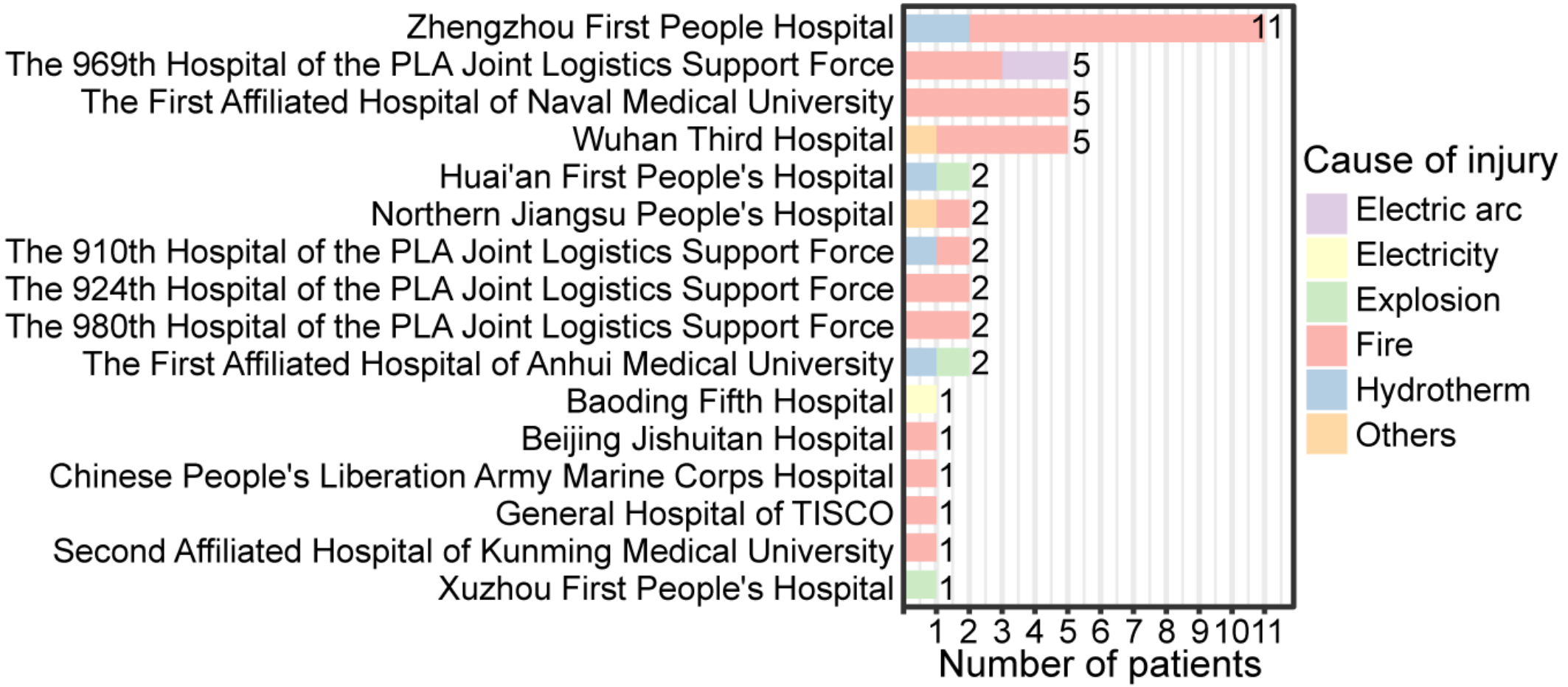


Figure 2 Sample Collection of the BIOME Cohort (as of September 21, 2025).

Patient Enrollment Progress



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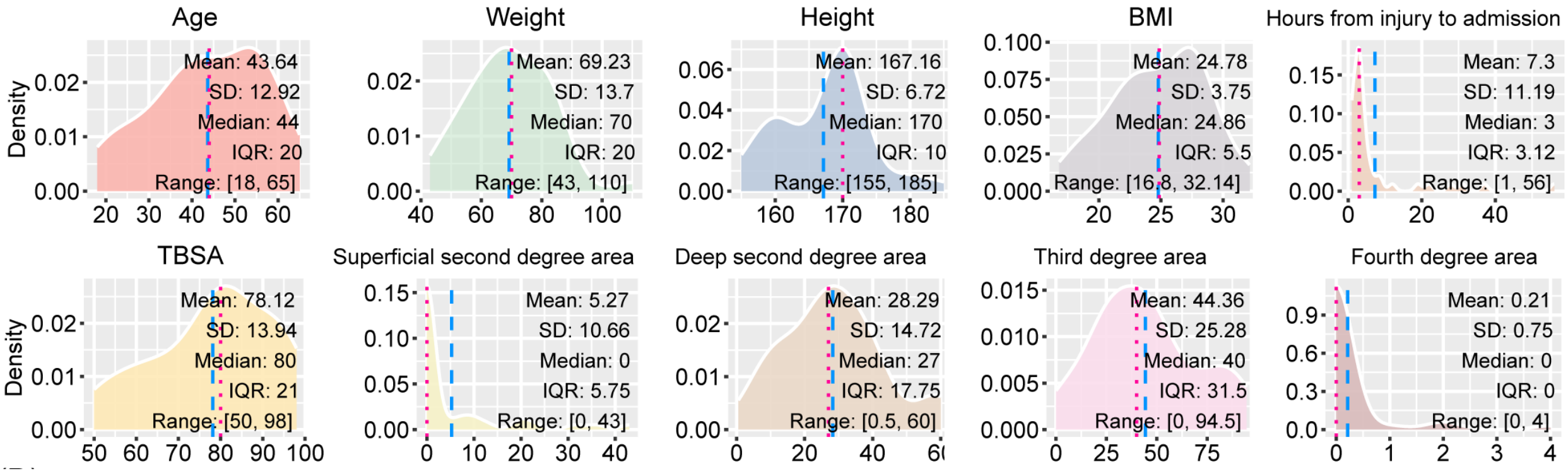

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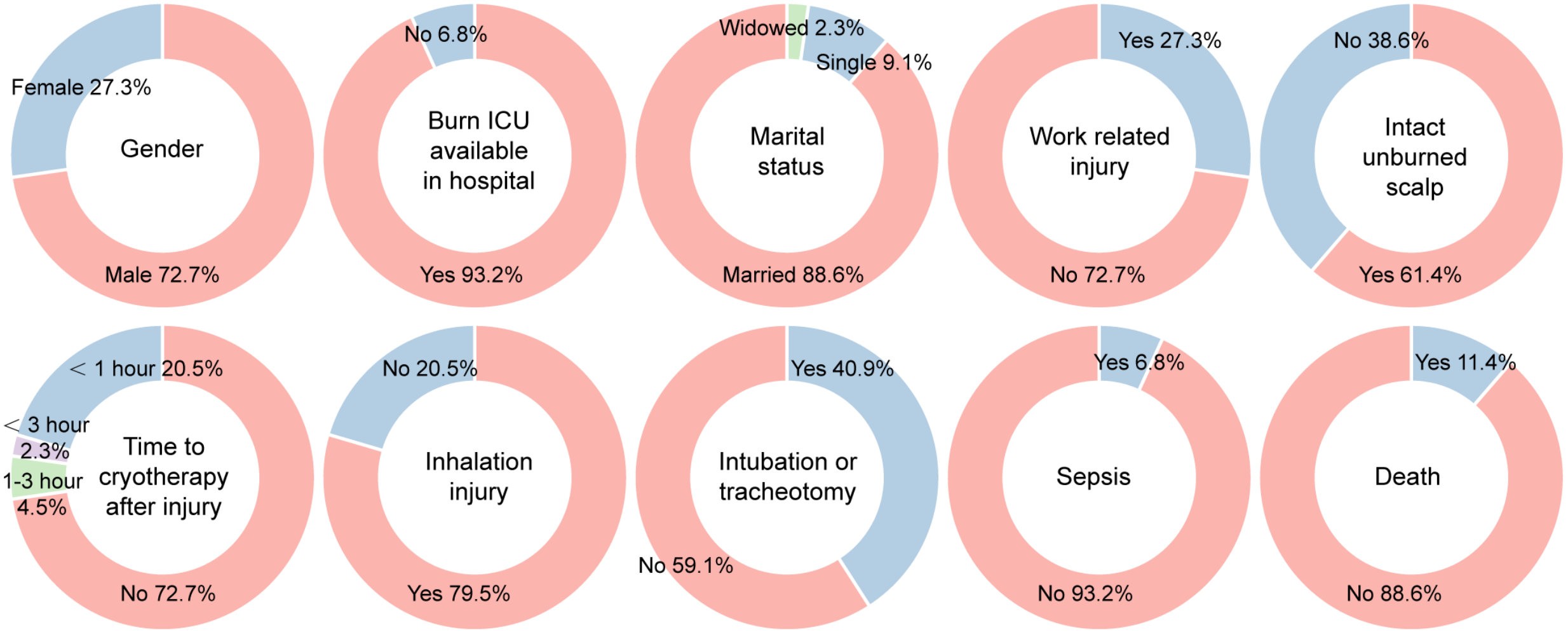

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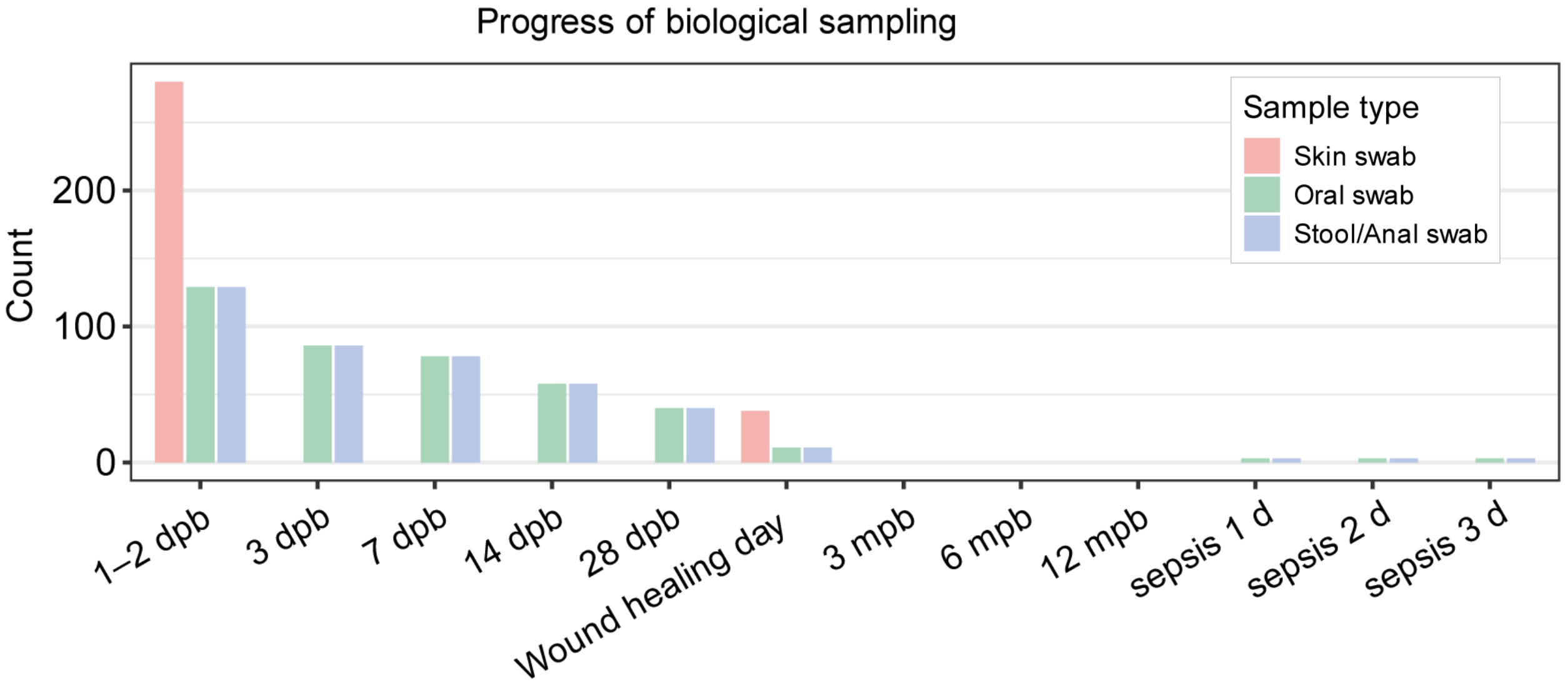

Figure 2 Sample Collection of the BIOME Cohort (as of September 21, 2025).

BIOME Project Research Center

Summary

- The BIOME cohort study plans to recruit at least 150 patients with extensive burns from 50 hospitals across 28 provinces, autonomous regions and municipalities in China.
- The study will collect skin swabs, intestinal and oral samples from the burn patients, integrate shotgun metagenomic and collect longitudinal clinical data.
- The aims are: (1) To explore the changes and relationships between the skin microbiota and microbiota communities in other parts (such as the intestine and mouth) during the systemic stress caused by burns; (2) To develop predictive models for microbial characteristics and clinical courses; (3) To evaluate the diagnostic and therapeutic potential of microbial-derived biomarkers in burn care, thereby paving the way for precision medicine in wound management.

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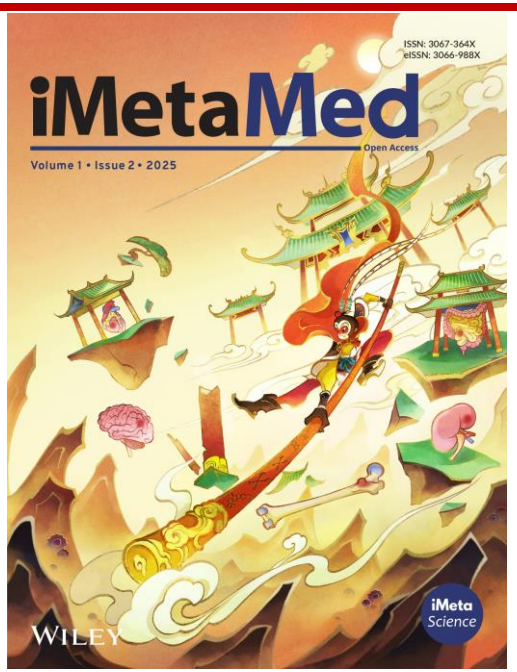

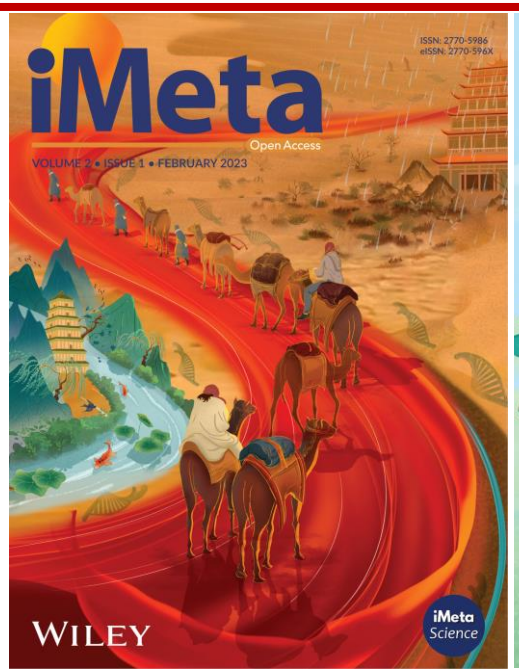

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