

Expert Care, No Expert Needed:

Validating a Field Deployable Autonomous Closed Loop Resuscitation system for Severe Hemorrhagic Shock

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Financial Interests & Disclosures

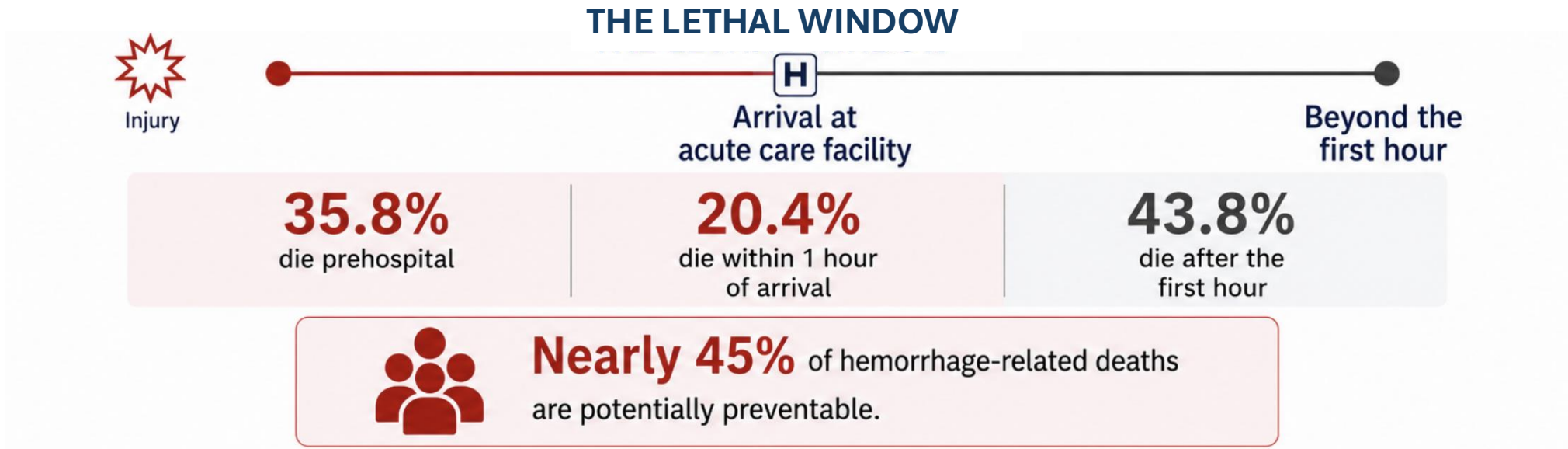
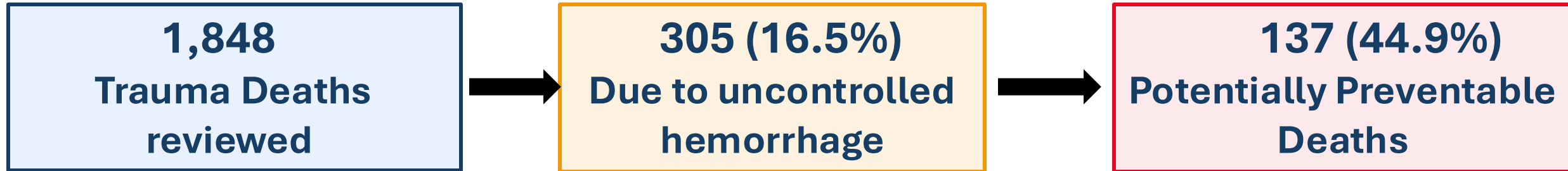
- **Yusr Ahmed, MBBCH** has no financial interests, conflicts of interest, or relevant disclosures related to this work.

Hemorrhagic Shock and Preventable Trauma Death

Why This Matters?



Death Clusters in the First Hour Window



Sustaining En-Route Resuscitation to Eliminate "Care Dead Zone" Under Operational Constraints



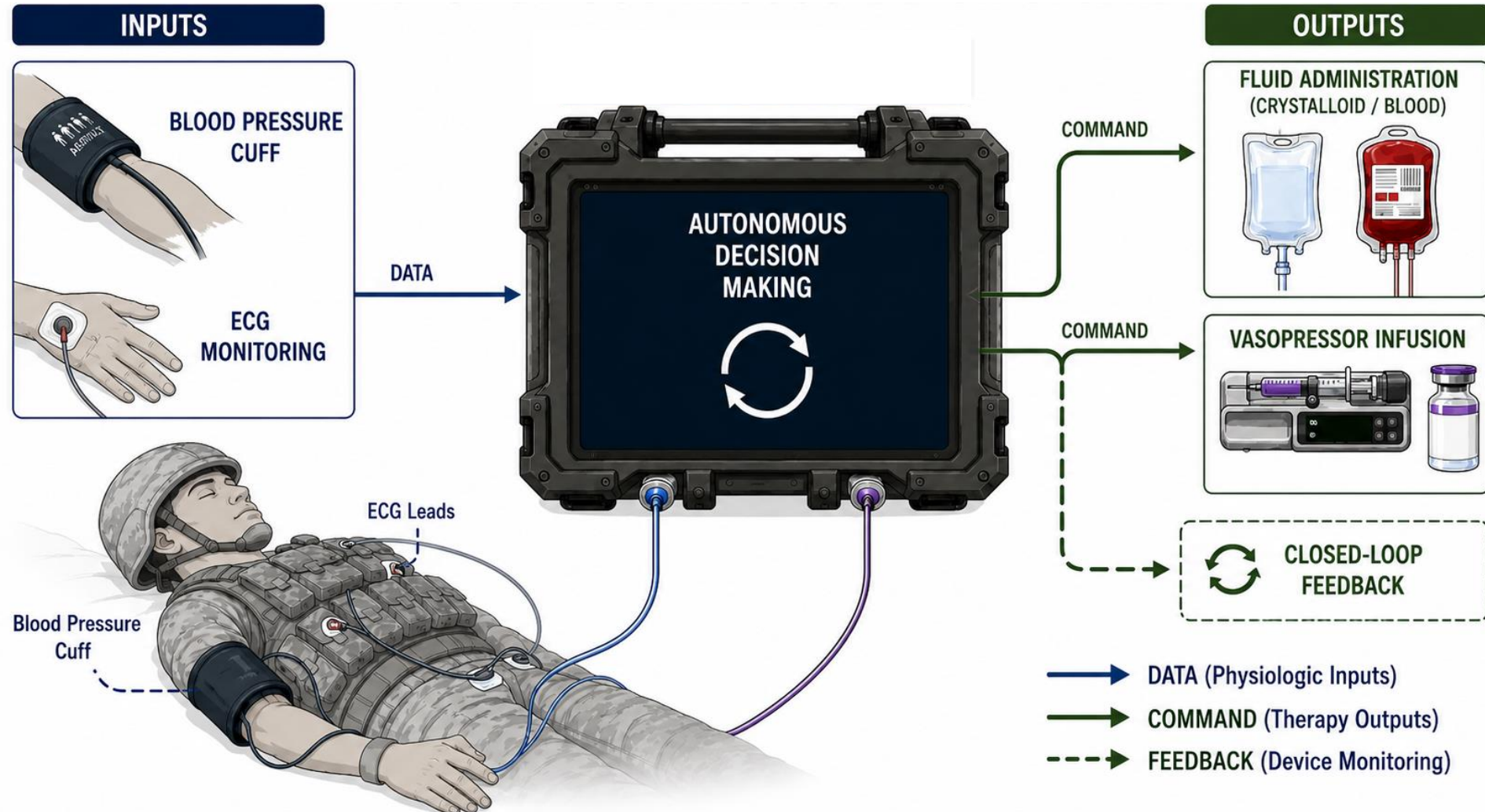
Evacuation
Zero Setup time



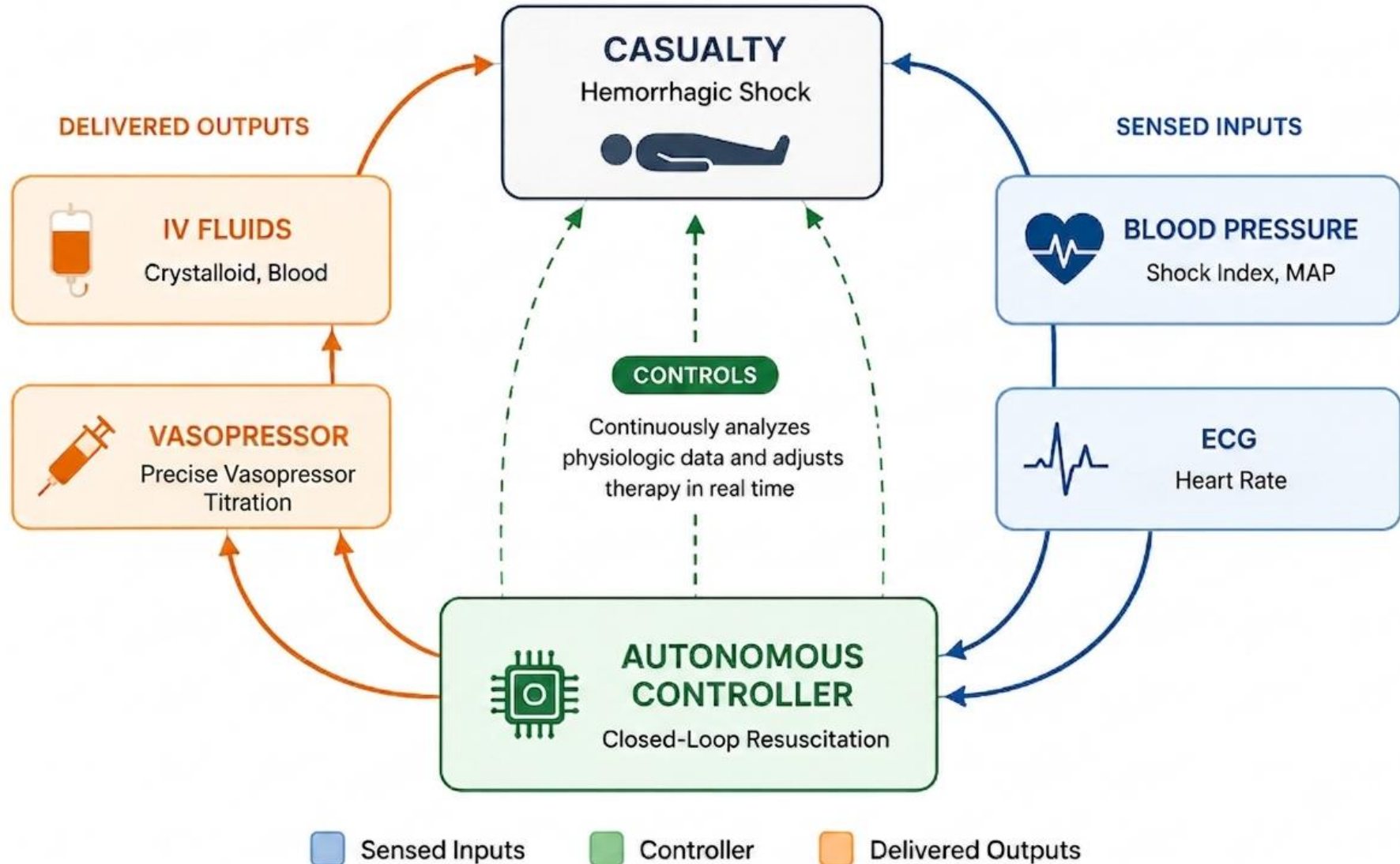
Limited Operational Capacity



Immediate Autonomy via Field-Ready Inputs: *Reducing The Cognitive & Logistical Burden to Enable Mass Casualty Care*



Transforming Point-of-Injury Care via Precision-Guided Automated Resuscitation



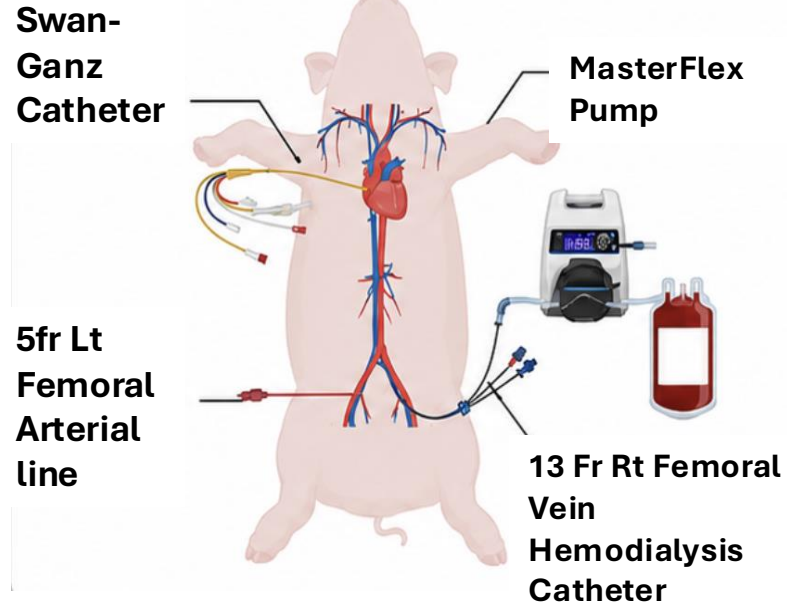
Hemorrhagic Shock Porcine Model

Study Cohort

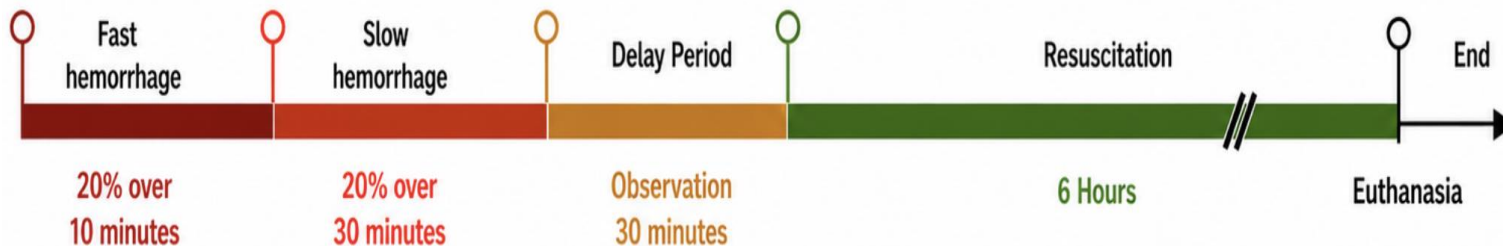
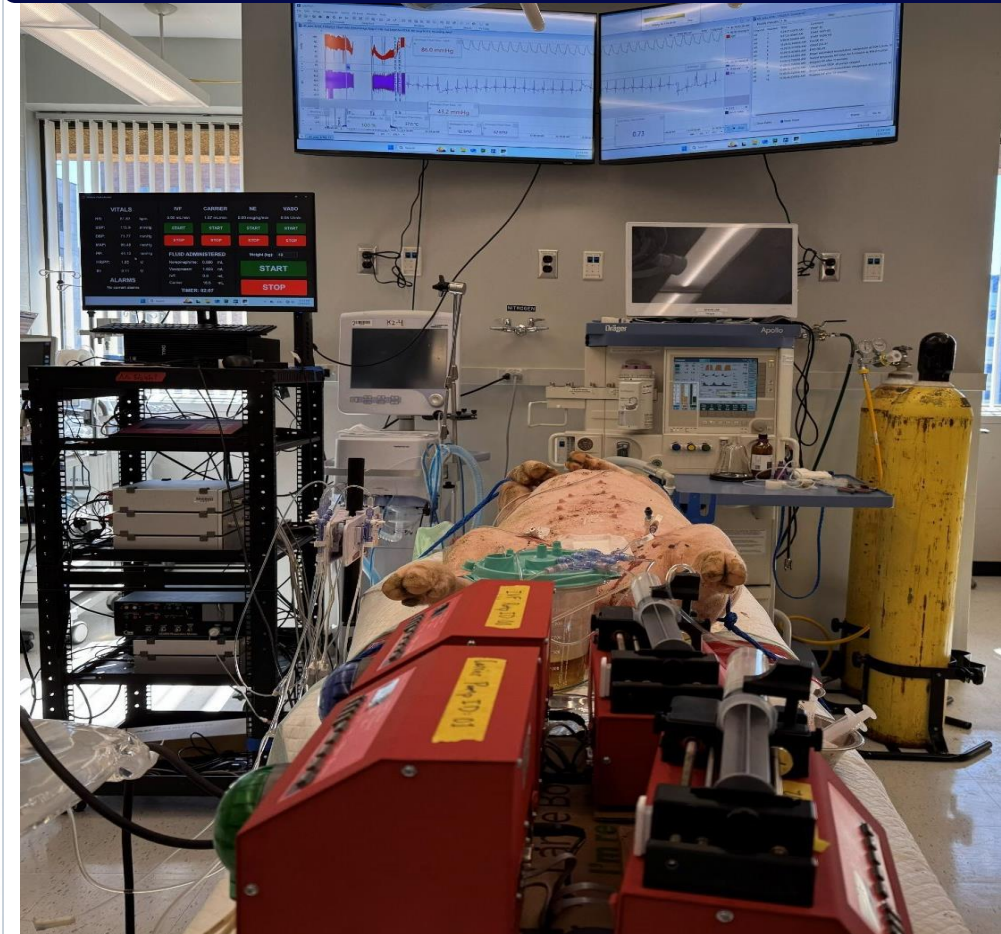
**Group 1 (n=6):
Expert guided
Resuscitation**

**Group 1 (n=6):
Automated
Resuscitation**

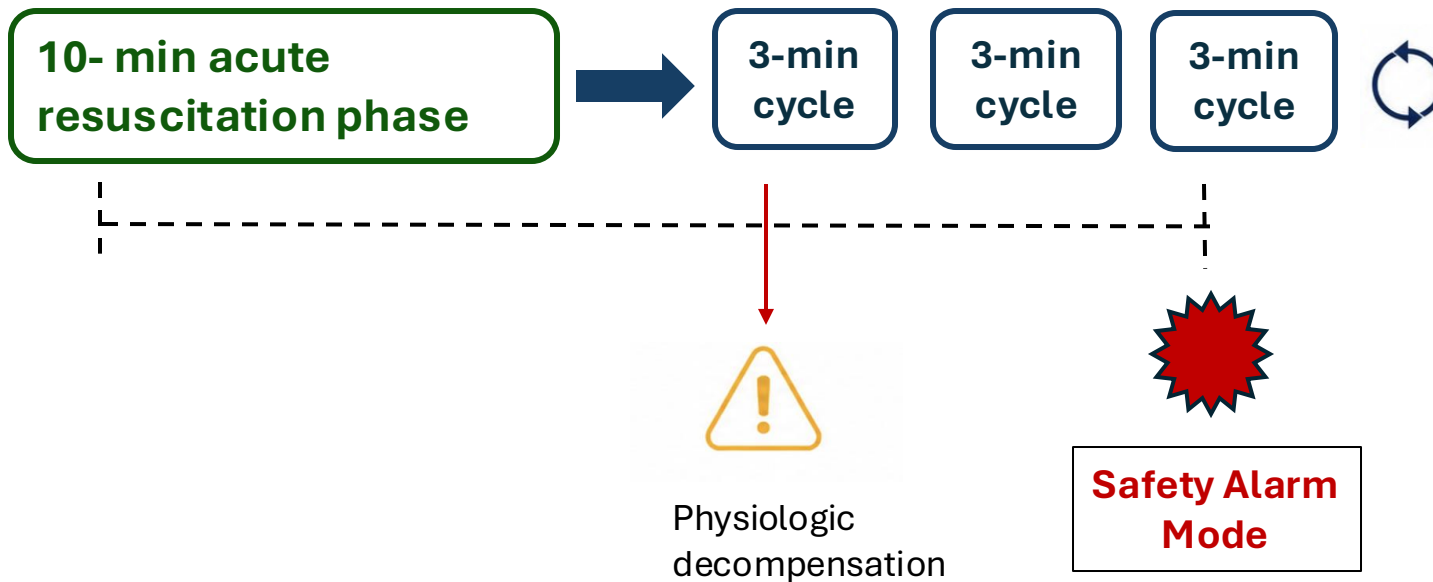
Instrumentation



Experiment Setup



Automated Closed-Loop Logic Driven by Real-Time Safety Alerts

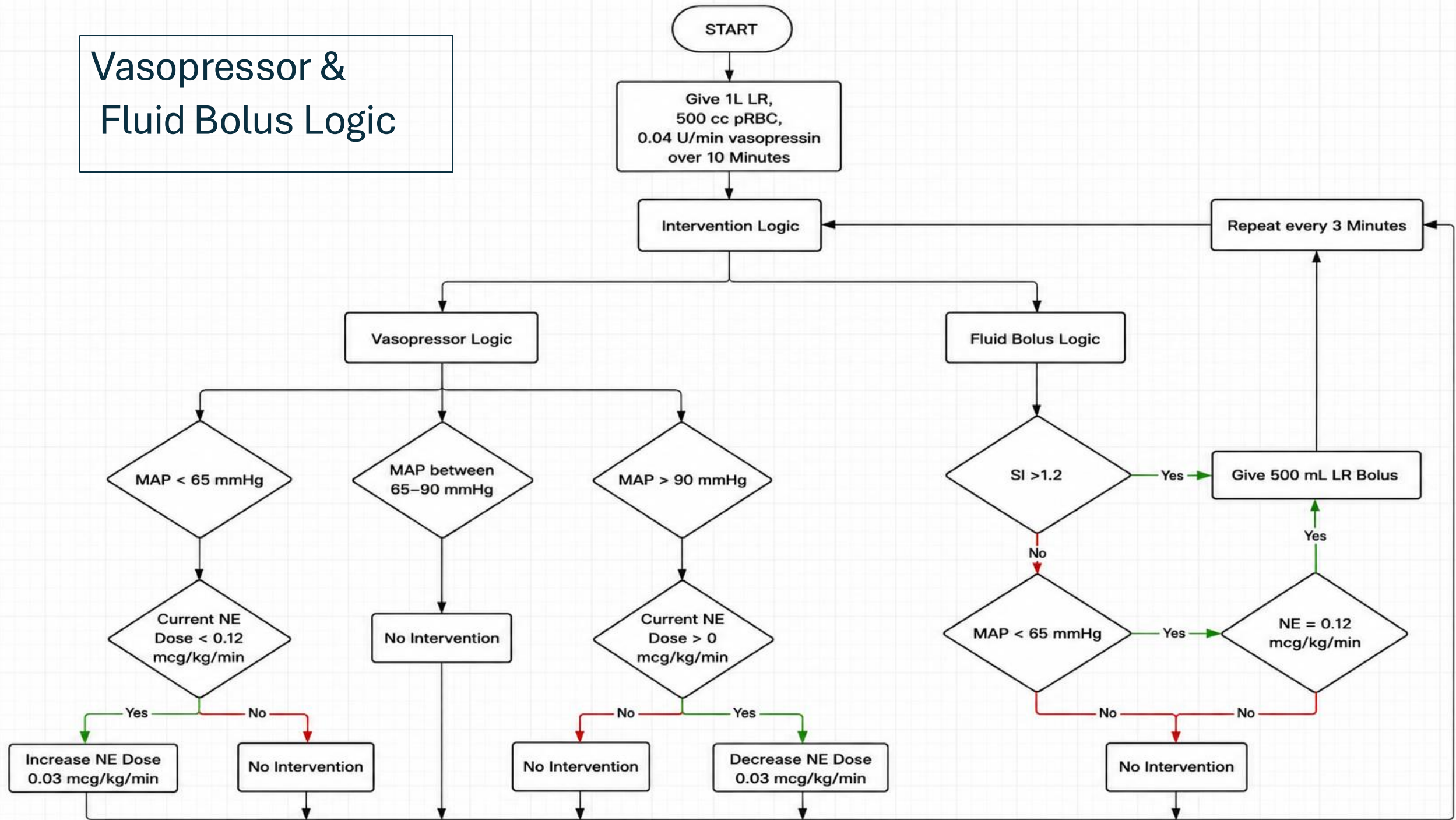


User Interface

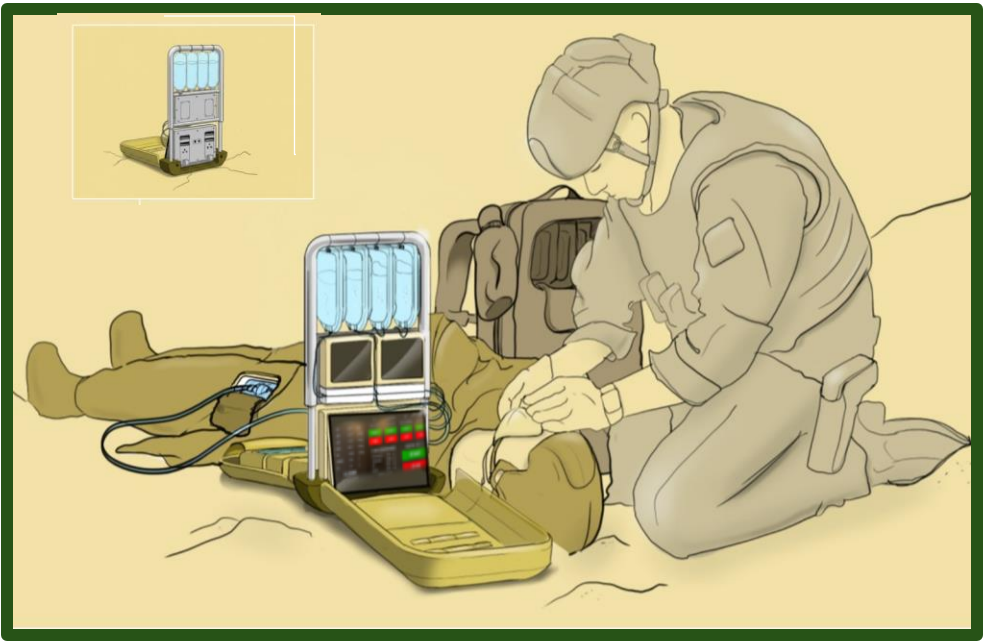
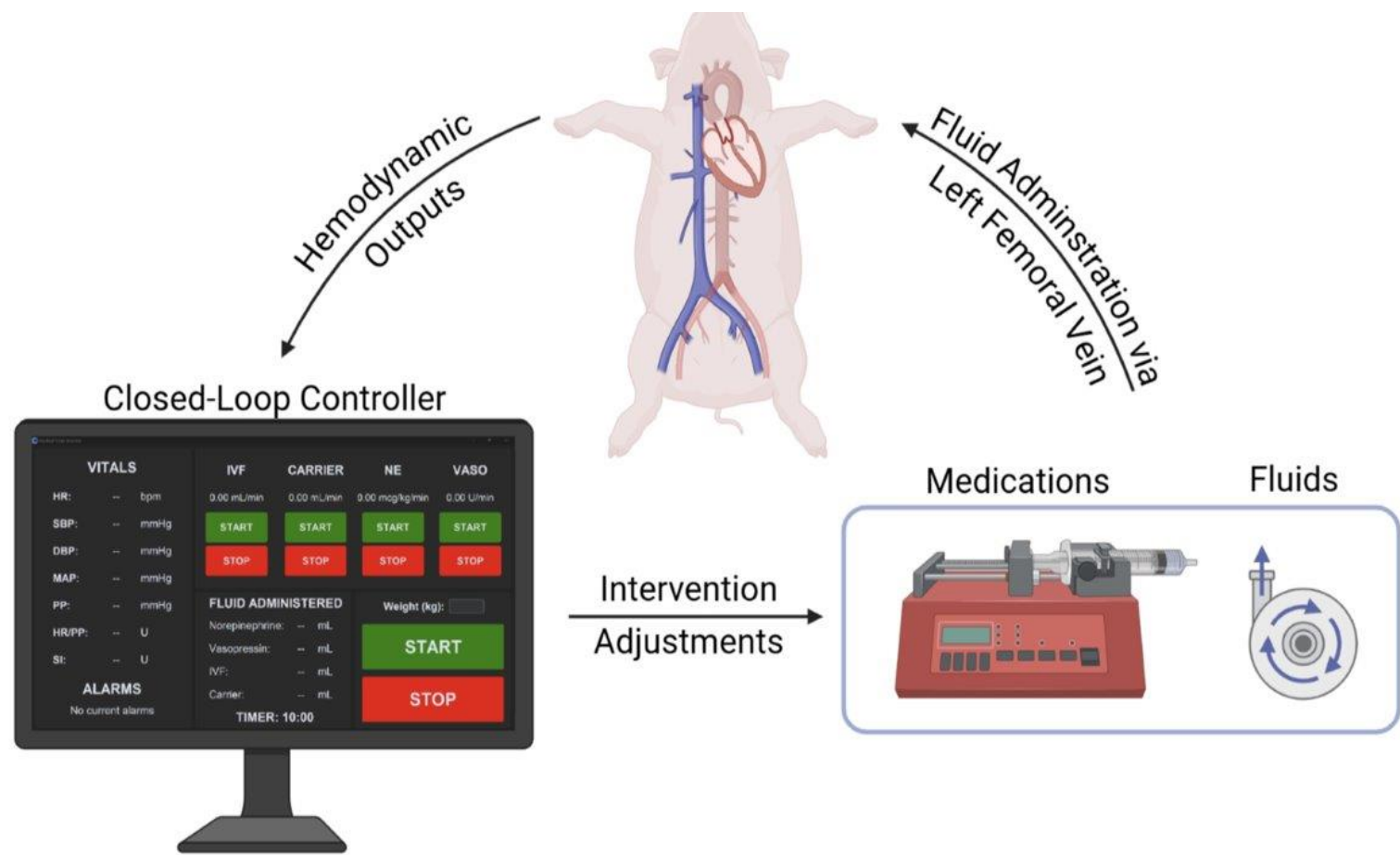
Vasopressor and Fluid Bolus Logic



Vasopressor & Fluid Bolus Logic

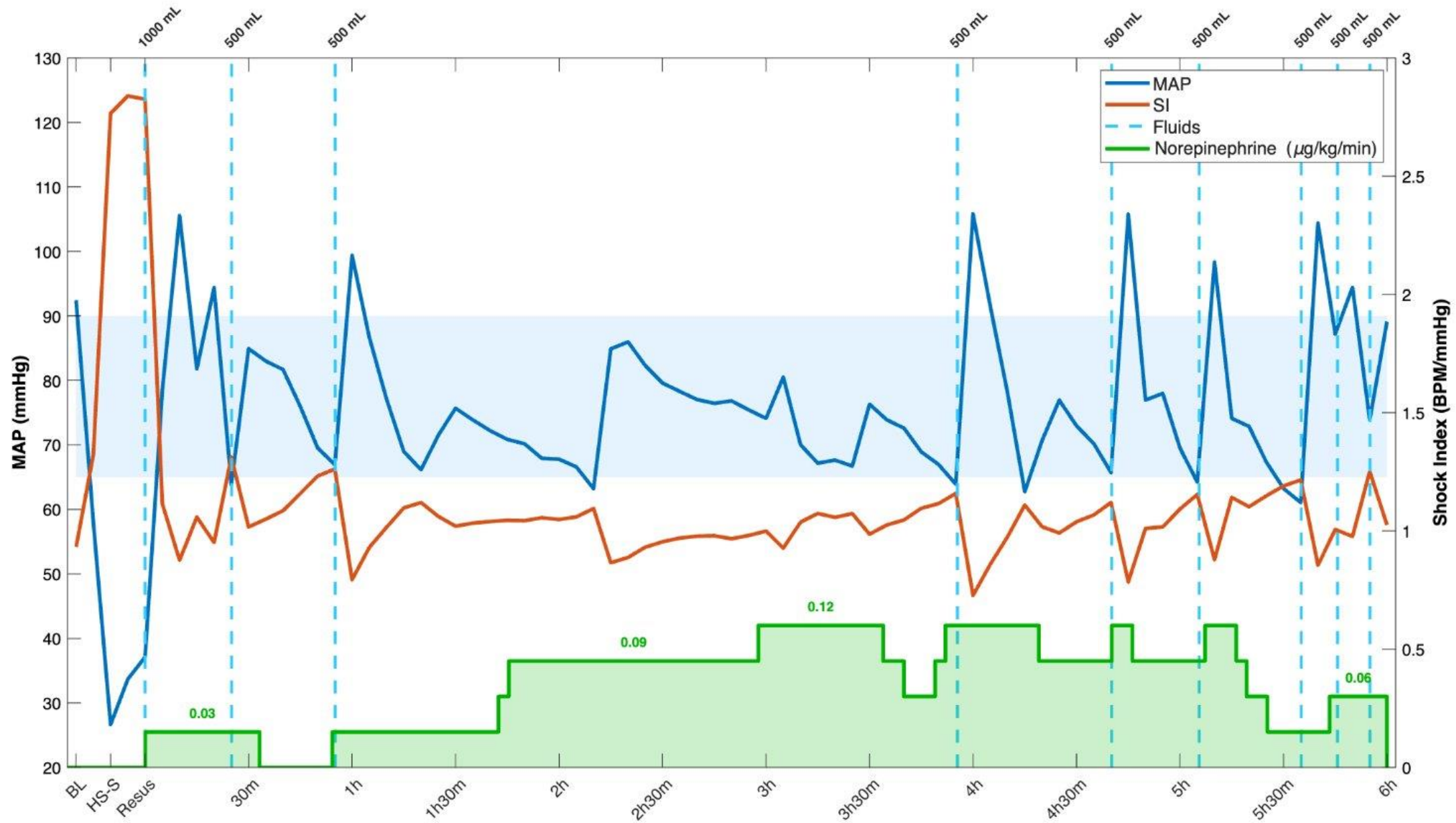


Automated System Workflow: Compact Physiology-Driven Infusion System



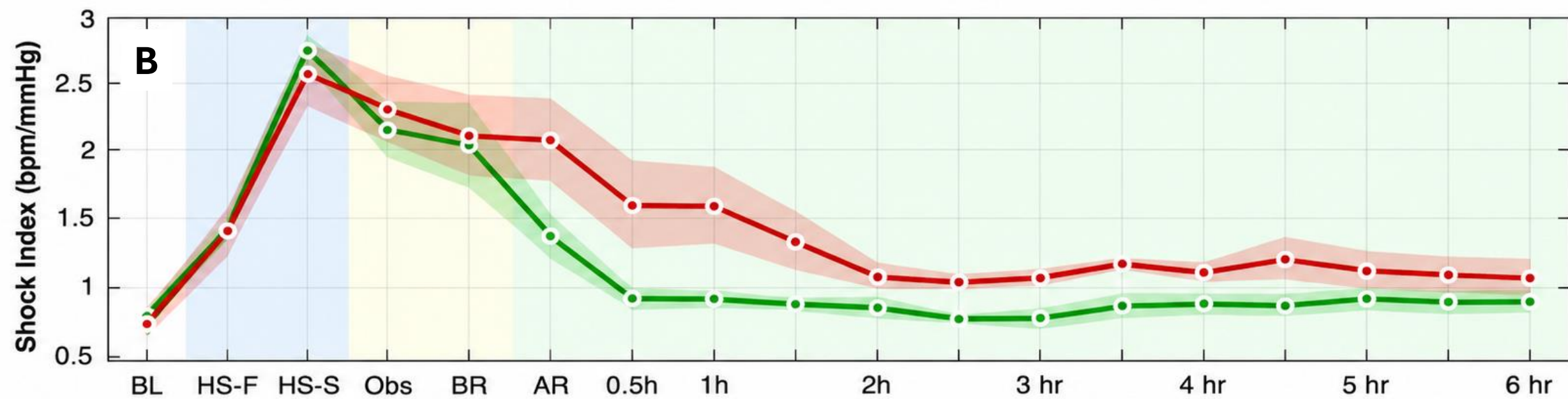
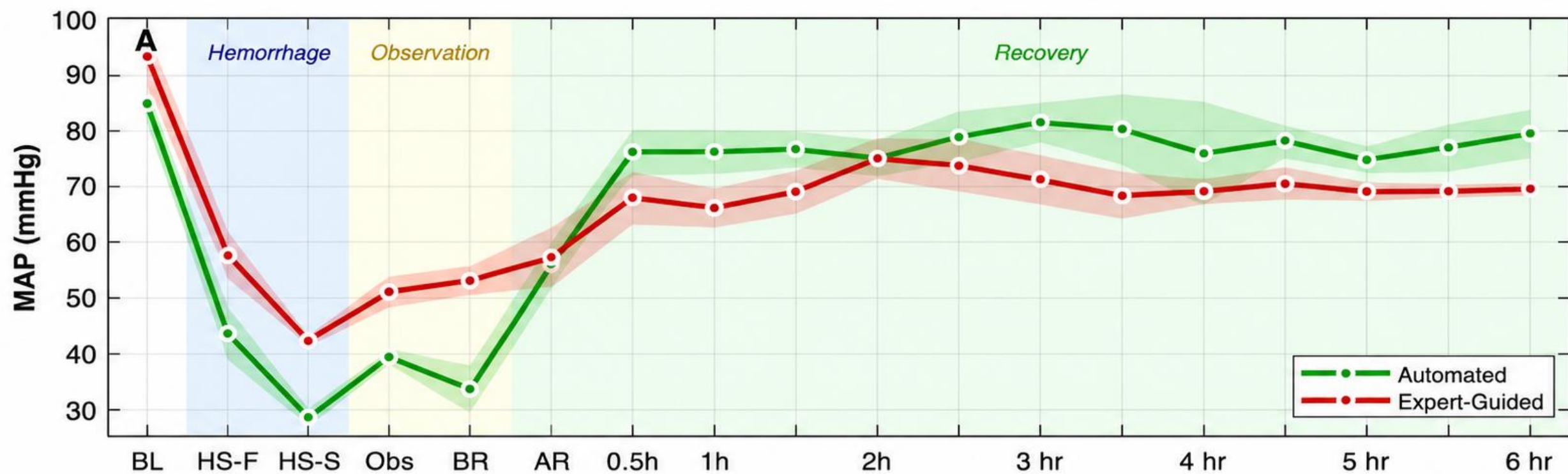
System Implementation

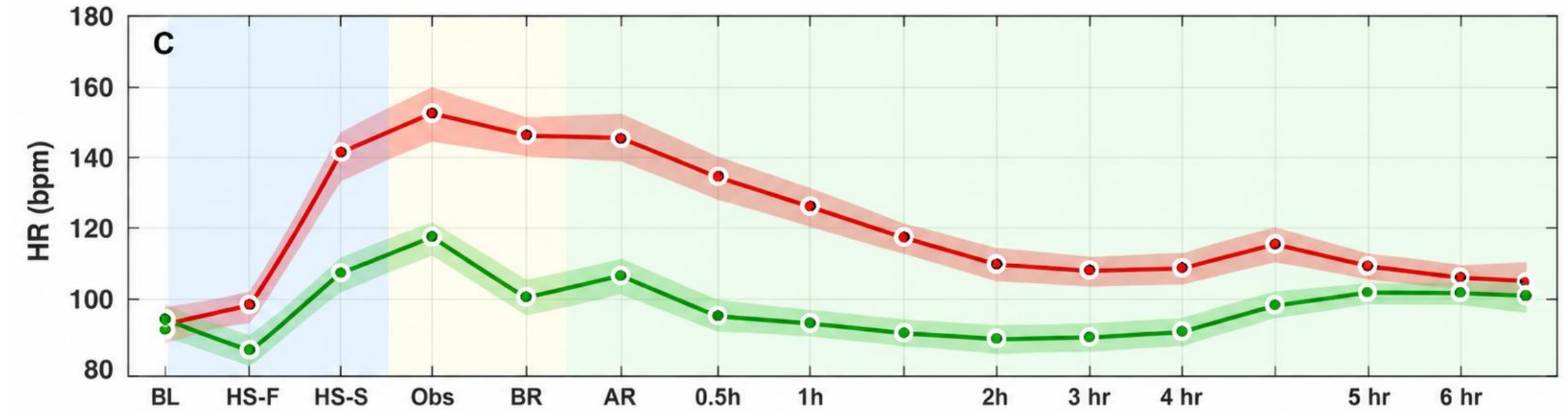




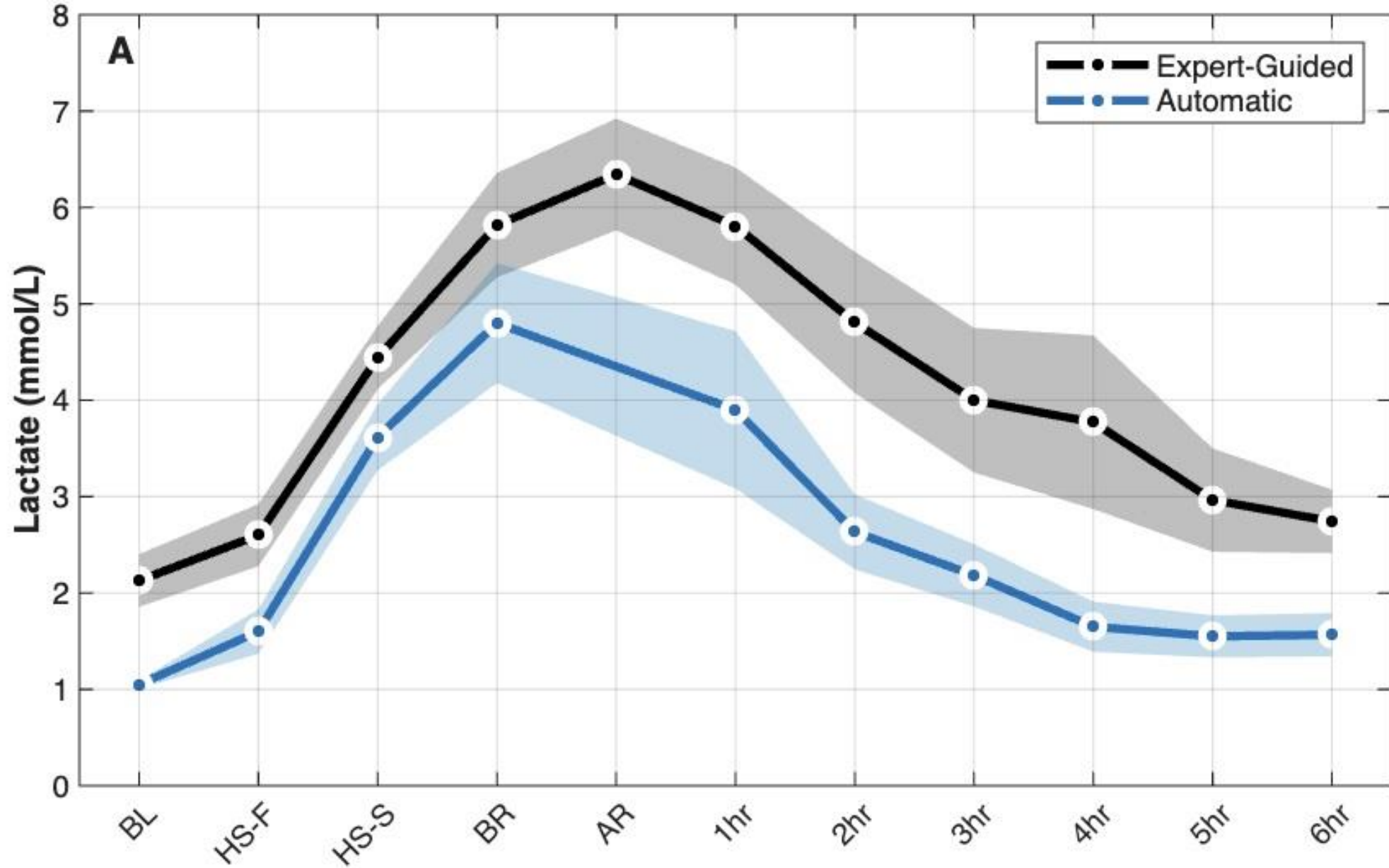
Hemodynamic Trajectories







Lactate Clearance



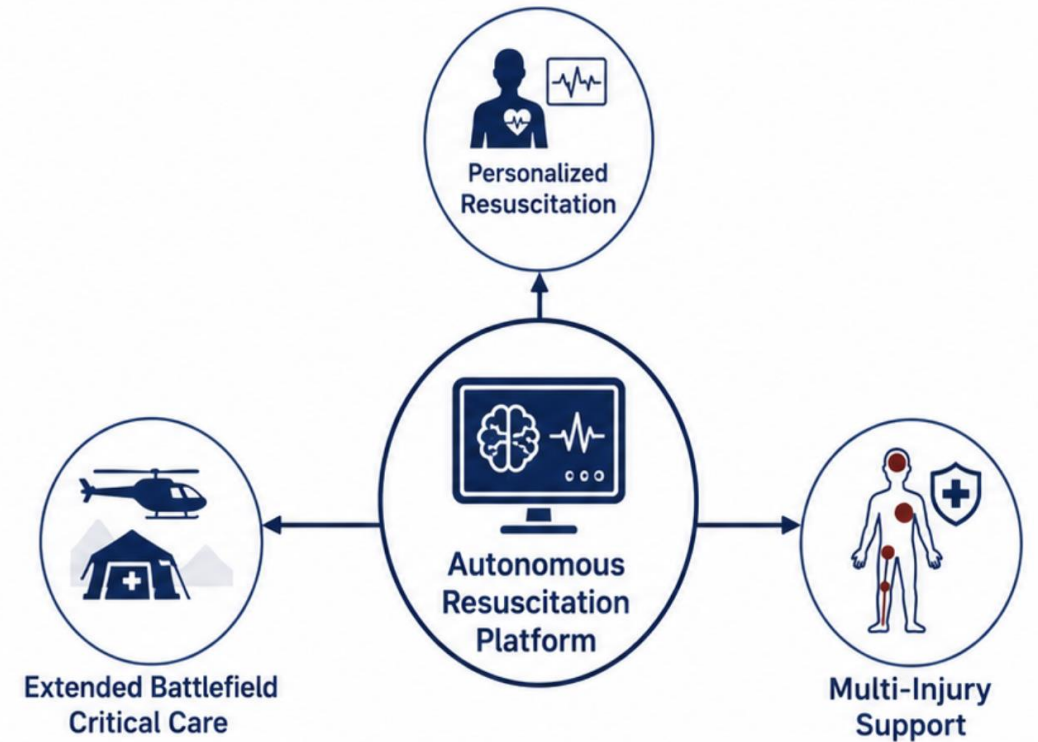
Transformative Operational Capability for Prolonged Field Care

- **Leveraging Field-deployable metrics** to guide precise closed-loop care, preventing over-resuscitation in prolonged field
- **The control logic** consistently detected hemodynamic shifts and rapidly initiated interventions significantly improving survivability in austere settings



A Scalable Platform for Autonomous Critical Care

Next-generation ML-driven decision support to personalize trauma resuscitation and expand multi-injury battlefield capabilities.





THANK YOU

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