



Deploying Operational Triad Teams for Emergency Response During a Medical Fluids Shortage

Office of Emergency Management

Dr. Meredith Masters, Medical Director

Dr. Anna Lin, Assistant Medical Director

Kathy Harris, Executive Director

Presenter



Martha Meredith Masters, MD
Medical Director, OEM,
Stanford Medicine

M. Meredith Masters is currently a Clinical Associate Professor and serves as an Associate Vice Chair as well as the Marc and Laura Andreessen Medical Director for Disaster Relief for the Stanford University School of Medicine Department of Emergency Medicine. She is also the Medical Director for the Office of Emergency Management for Stanford Medicine. Dr. Masters' clinical and research interests are focused on disaster preparedness and mitigation, improving education in disaster medicine, and the ethical delivery of care during crises.

Presenter



Anna Lin, MD

Clinical Professor, Stanford School of Medicine, Medical Director, Sedation Services, and Assistant Medical Director, Office of Emergency Management

Stanford Medicine Children's Health

In addition to practicing pediatric hospital medicine at Lucile Packard Children's Hospital, Dr. Lin serves as the Assistant Medical Director for the Office of Emergency Management for both the Stanford Medicine Children's Health and Stanford Health Care enterprises. She is an active member of the Western Regional Alliance for Pediatric Emergency Management (WRAP-EM) and the Pediatric Pandemic Network, both federally funded groups with missions to improve pediatric emergency management regionally and nationally. She also serves on the American Academy of Pediatrics' Council on Children and Disasters Executive Committee.

Presenter



Kathy Harris, MCRP
Executive Director
Stanford Health Care

Kathy Harris is the Executive Director of the Office of Emergency Management, serving Stanford Health Care and Stanford Medicine Children's Health in many planned and unplanned incident responses including new hospital activations, pandemic, work stoppage, infrastructure outages, severe weather, wildfire, and supply shortage. She holds a Master's degree in Community and Regional Planning from the University of Oregon and a Bachelor's degree in Environmental Studies from Emory University.

Disclosure of Relevant Financial Relationships

Martha Meredith Masters, MD reports no relevant financial relationships or relationships she has with ineligible companies of any amount during the past 24 months.

Anna Lin, MD reports no relevant financial relationships or relationships she has with ineligible companies of any amount during the past 24 months.

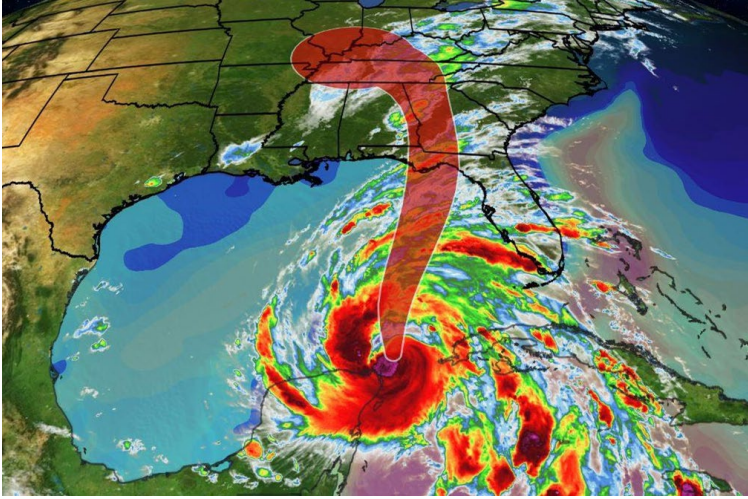
Kathy Harris, MCRP reports no relevant financial relationships or relationships she has with ineligible companies of any amount during the past 24 months.

Agenda

- Incident Overview
- Initial Response
- Activating a Joint Hospital Incident Command System (HICS)
 - Medical / Technical Specialists
 - Operations Section Branch Leadership Triads
- Evaluating Conservation Measures
- Communications and Waste Reduction Strategies
- Reflections on Response and Next Steps



Hurricane Helene



Hurricane Helene Map (Source: [The Weather Channel](#))

A tropical disturbance in the western Caribbean Sea intensified to a Category 4 hurricane, making landfall on 9/26/2024, and dissipating over Tennessee on 9/29/2024



Extreme Winds and Flooding (Source: [ABC News](#))

After making landfall in Florida, the storm brought extreme flooding and damage as far as western North Carolina. The Blue Ridge Mountains region, including Asheville, experienced record rainfall and wind gusts.



A levee break resulted in major flooding of the Baxter North Cove facility in Marion, NC. Water levels reached 4 feet, bringing mud and debris into the plant. Damage to the bridges leading to the facility further hindered recovery efforts.

North Cove Facility

1.4M+

Facility square footage

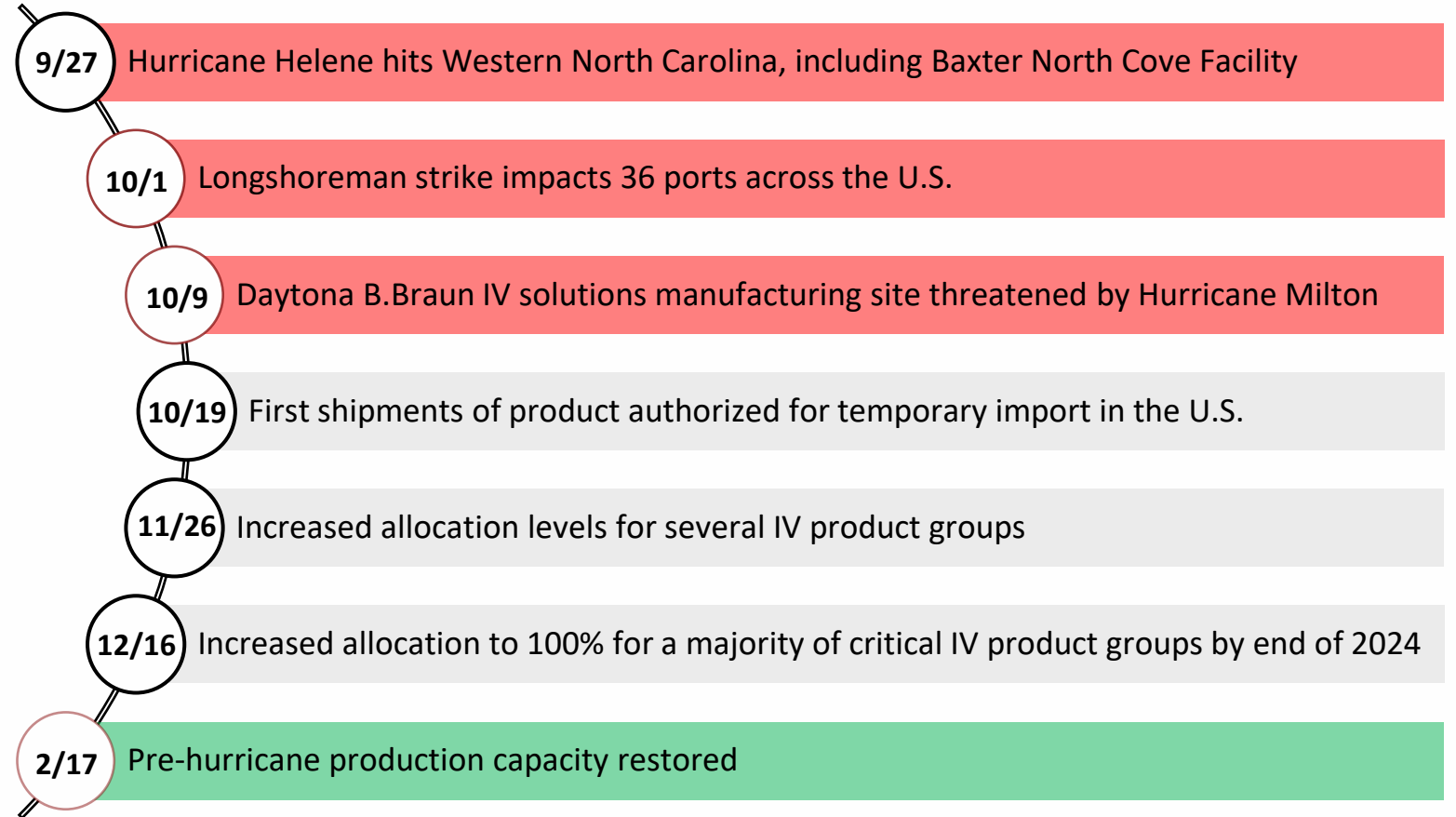
1M+

IV solutions produced at the site daily

60%

of global supply of intravenous (IV) and peritoneal dialysis (PD) solutions, Baxter's largest manifesting facility in the U.S.

Supply Chain Recovery Timeline



Initial Response at Stanford Medicine

- Stanford Medicine Supply Chain identified **66 fluids** that would be impacted by the incident
- Stood up a multidisciplinary, cross-organization “**Fluid Disruption Governance Committee**”
 - Market updates
 - Snapshot of days inventory on hand (DIOH) of impacted fluids
 - Identify departments who were highest users of highest risk supplies, based on distribution history from Supply Chain
- **Safety stock** supported continuation of relatively normal operations
- **Emergency Management** participated in active monitoring and coordinated response to mutual aid requests



Mutual Aid Request Fulfilled on 10/8/2024

- Baxter reduction in supply
- Significant increase in trauma volume following regional trauma center service reduction
- Rescheduling elective surgical cases

Product	Quantity Needed
0.9% Normal Saline 250mL bags	1000 bags
0.9% Normal Saline 500mL bags	625 bags
0.9% Normal Saline 1000mL bags	1625 bags
Lactated Ringers 1000mL bags	1100 bags

→ 300 Lactated Ringers 1000mL bags



10/28/25

Joint Hospital Incident Command System (HICS) Activation

- Sustainability of Safety Stock
- Information Management
- Crisis Care
- Organizational Framework

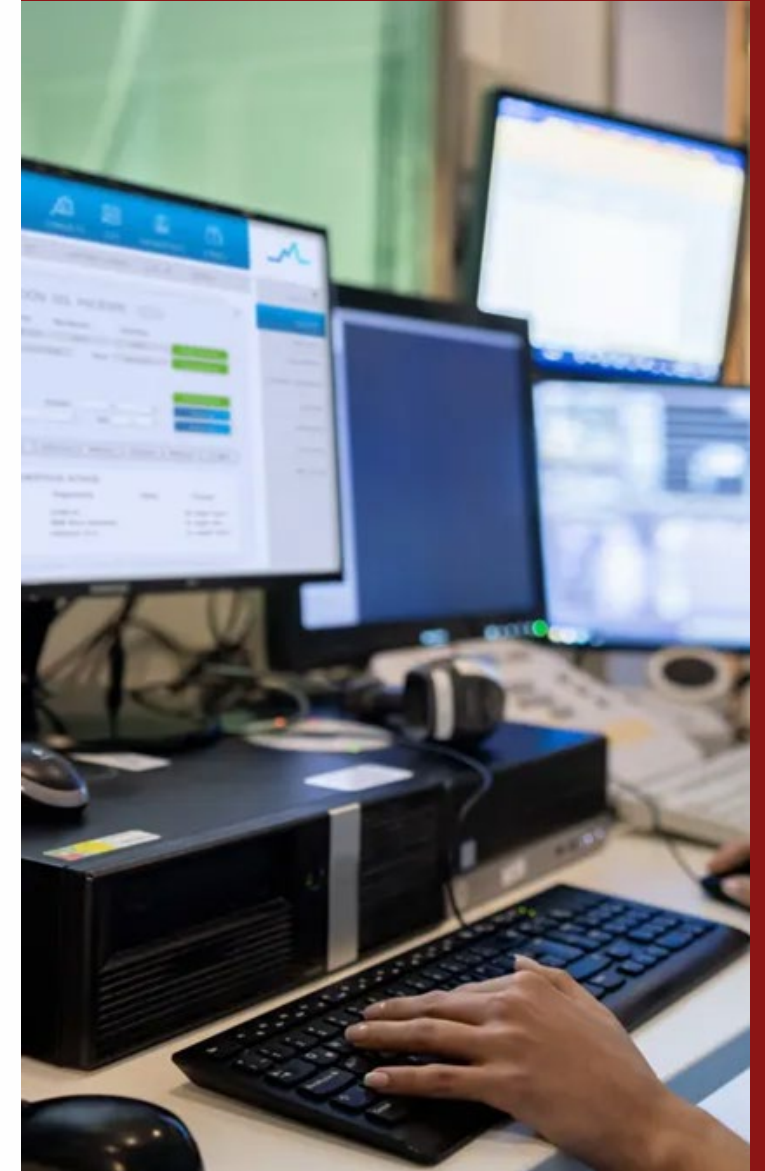
Sustainability of Safety Stock

- **Uncertainty about length of fluid shortage**
 - It would take **several months to restore** full manufacturing capabilities at the Baxter North Cove facility.
 - Many healthcare organizations across the country – as well as within the San Francisco Bay Area – were **rescheduling procedures and adjusting operations** due to the fluid shortages.
- **Safety stock was also a finite resource**
 - Safety stock was not enough to sustain normal operations.
 - Organizations **anticipated increased demand** for limited fluids due to a rise in census from end of year procedures or respiratory virus season.



Information Management

- **Understanding of the incident's impacts** on Stanford Medicine were mixed:
 - Stanford Medicine organizations did not initially send out mass communications about the hurricane's impact.
 - Some populations were taking **no action to conserve** because they didn't think Stanford was impacted, while others were initiating **conservation measures that might be too extreme**.
- **Information on fluid use was initially limited** to short-term procurement and distribution records:
 - Fluid utilization was **not tracked at a granular bag level** (esp. NS and LR)
 - Not all impacted fluids were managed by Supply Chain workflows
 - **Distribution did not necessarily equal use**
 - **Access to historic use data challenged** by recent Workday implementation



Crisis Care

- **No standing repository of approved conservation measures.**
- No established **plans identifying or prioritizing which services lines were most time-sensitive** and could not be suspended without impacting patient care.
 - Severity of **consequence when curtailing** one service's use of a fluid in support of another
 - Identification of which services could **leverage a suitable alternative** without major disruption to operations
- Stanford Medicine **Crisis Care Plan provided a framework** for decision-making during critical resource shortage but was still primarily oriented to concerns from the COVID-19 pandemic response.



Strengths of a Joint Hospital Incident Command System (HICS)

- **Centralized Coordination:** Streamlining and aligning incident response across the organization.
- **Organizational Input:** Collecting recommendations and insights from all departments to enhance our response strategy:
 - Confirming feasibility of sourcing alternatives.
 - Assessing the clinical impacts of proposed changes.
 - Mitigating individual decision-making stress and moral distress.
- **Equitable Resource Distribution:** Ensuring fair provision of resources and care across the organization.
- **Technology Integration:** Facilitating the development and implementation of new technological solutions to support care delivery.
- **Operational Impact Assessment:** Identifying and addressing broad operational impacts, including future volume management.
- **Crisis Care Planning:** Proactively preparing for worst-case scenarios to ensure continuity of care.

Response Objectives

1. Identify conservation measures to extend contingency care for all fluid types.
2. Develop a plan for crisis care for any item currently with less than 5 days on hand without resupply expected within 5 days.
3. Facilitate a decision-making process among identified Medical/Technical Specialists (MTSSs).
4. Identify context on operational impacts.
5. Support response coordination and communications.

Command Staff Report to the Incident Commanders	Incident Commanders (ICs)				Expanded for incident needs	
	SHC:		LPCH:			
	Communications / Public Information Officers (PIOs)		Medical / Technical Specialists (MTSs) (MDs / SMEs)			
	SHC:	LPCH:	SHC:	LPCH:		
	Liaison Officer (OEM)		Patient Safety Officers (Quality)			HCC Coordinator (OEM)
			SHC:	LPCH:		
	Security Services (Shared)*		Environment of Care Safety Officers (EH&S)		Field Services IT/AV Support for HCC	
		SHC*:	LPCH:	SHC TDS:	LPCH IS:	

General Staff *Section Chiefs report to the Incident Commanders; Branch Directors and Unit Leaders report to the respective Section Chief*

Operations Section Chiefs	
SHC:	LPCH:
Emergency Department Branch Directors	
Peds/300P:	Adult/500P:
Interventional Svcs / Proc & Diagnostics Branch Directors	
SHC:	LPCH:
Inpatient Branch Directors	
SHC:	LPCH:
Ancillary Branch Directors, incl. Lab, Pharmacy, Radiology, et al	
SHC:	LPCH:
Ambulatory Branch Directors	
SHC:	LPCH:
Patient & Family Support Branch Directors	
SHC:	LPCH:

Logistics Section Chiefs	
SHC:	LPCH:
Supply Chain Branch Dir.	Workforce Health & Wellness
Human Resources Branch Directors	
SHC:	LPCH:
Facilities & Infrastructure Branch Directors	
SHC*:	LPCH:
Hospitality Branch Directors	
SHC*:	LPCH:
Offsite Property Services*	Parking & Transportation*

* LCC Depending on the nature of the incident, the Security and SHC EOC (EH&S) Safety Officer roles may be covered via the Logistics Coordination Center rather than stand alone in the HCC Command Staff

Planning Section Chiefs	
SHC:	LPCH:
Situation Status Unit Leader(s)	
SHC:	LPCH:
Documentation Unit Leader(s)	
SHC:	LPCH:
Finance Section Chiefs	
SHC:	LPCH:
Technology Section Chiefs	
SHC:	LPCH:

Including Clinical Informatics to analyze utilization data.

Expanded to leadership triads in each branch

Coordinated by Emergency Management staff and operational leaders.

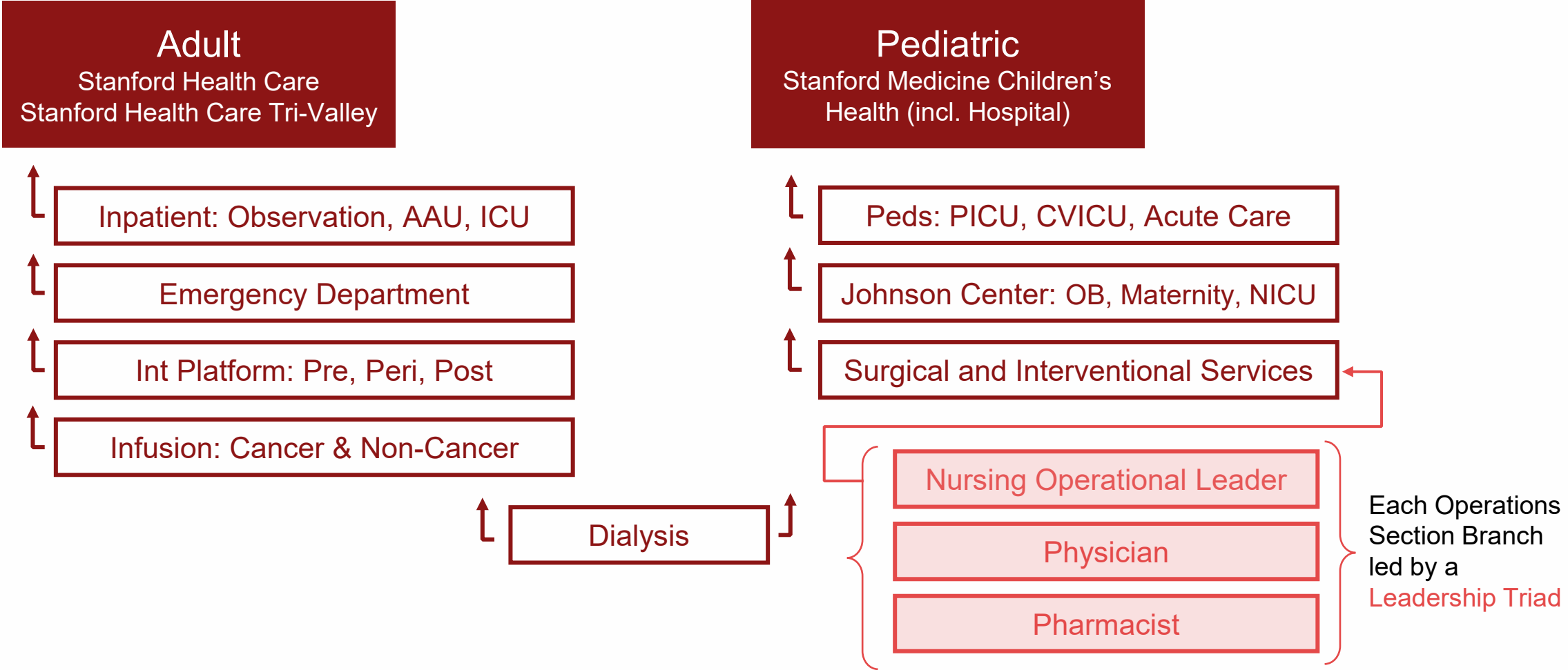
Medical / Technical Specialists

- Emergency Management (*Medical Direction*)
- Chief Medical Officer (CMO) or Assistant Chief Medical Officer (ACMO)
- Ethics (*leaders from the Stanford Center for Biomedical Ethics*)
- Risk (*Senior Vice President, Chief Risk / Admin Officer*)
- Supply Chain
- Pharmacy
- Technology (*Clinical Informatics*)

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Operations Section Branches & Leadership Triads

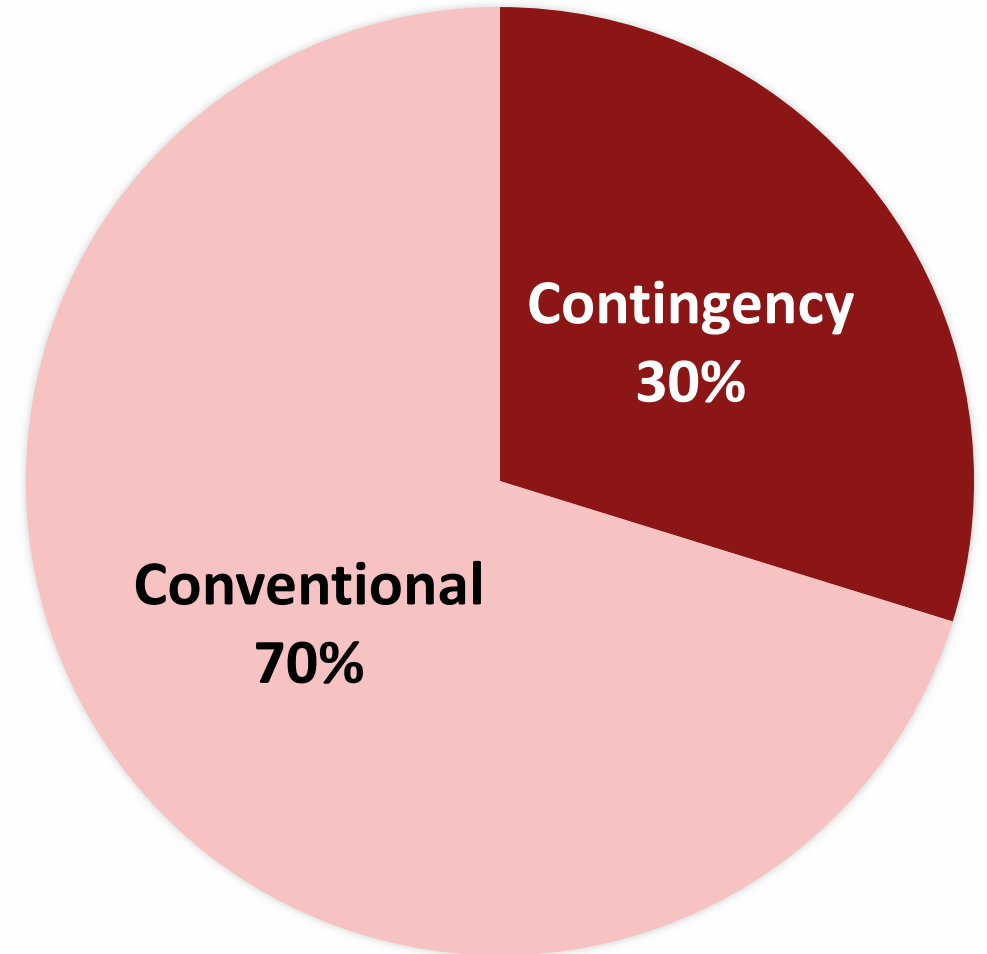


Response Strategies

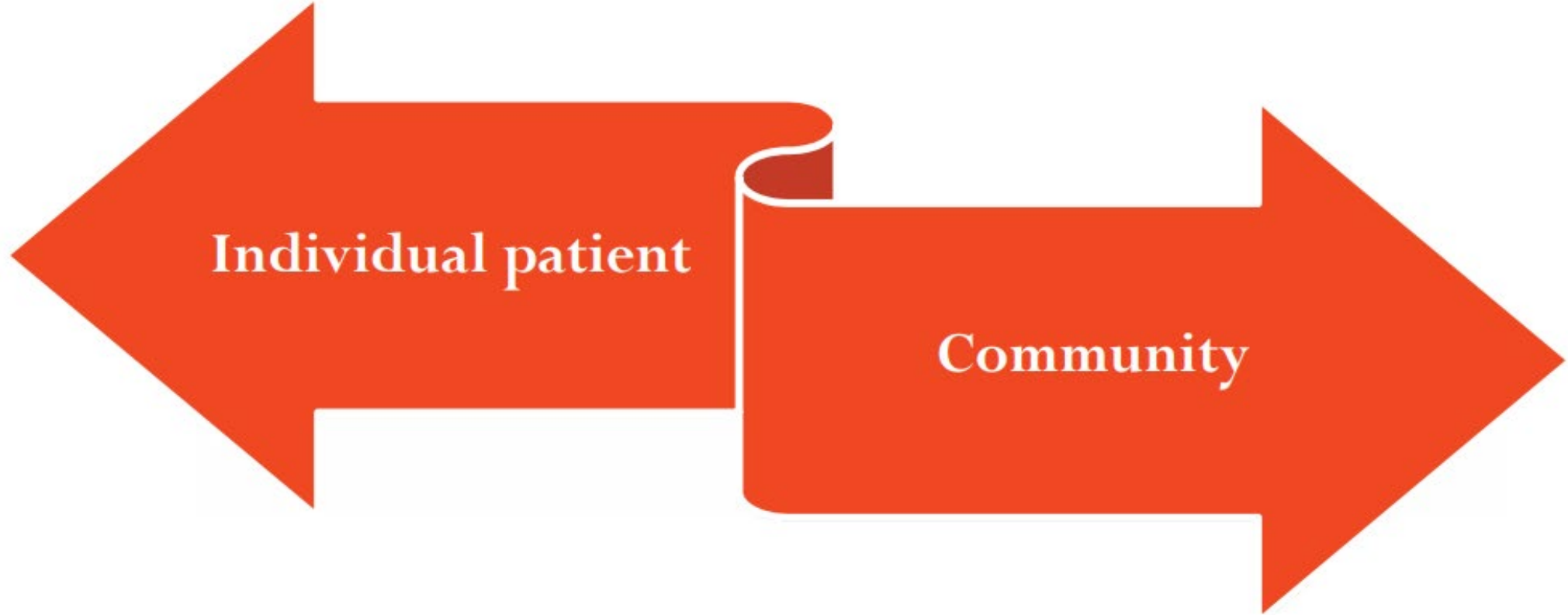
139 response strategies submitted & reviewed

- 33 duplicate strategies
 - leaving 106 unique strategies
- Each proposal was reviewed by its respective branch leadership triad within the Operations Section before review and approval by the joint HICS.
- Most approved strategies were considered conventional care.

HICS-Approved Strategies by Standard of Care



Focus of *Normal* Care



Individual patient

Community

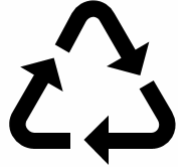
Focus of *Crisis* Care

HICS-Approved Response Strategies

HICS-Approved Response Strategies		Examples
Substitution	17	Procure pre-diluted medications rather than dilute concentrated medications
Reduction	17	Align practice with NPO policy allowing clear liquids such as water, Gatorade, and Pedialyte until 1 hour prior to anesthesia
Extended Use	7	IV fluid use to expiry date when overwrap is removed
Limit Access	4	Centralization of specific at-risk SKUs
Conservation	2	Purchase of a device that allows irrigation fluids to be reused in subsequent cases

Conservation Strategies

Minimize Waste



- Select the appropriate bag size based on fluid needs to minimize waste.
- Avoid opening and pre-spiking bags in anticipation of need.
- Return unused fluids to Supply Chain Support Center, even if manufacturer expiration has passed (650) 723-5047
- Decrease “chase fluid” and TKO

Evaluate Clinical Need



- Evaluate clinical need for IVF replacement and TKO orders.
- Promote early discontinuation

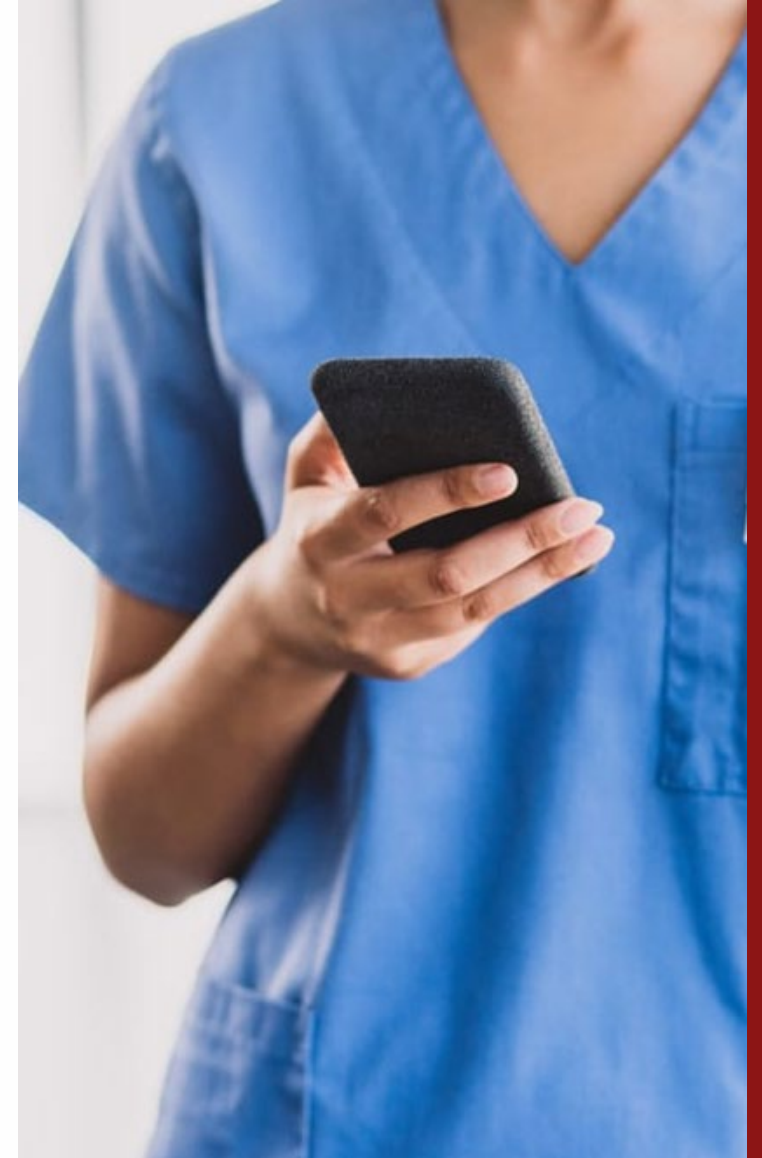
Use Alternatives



- Consider oral hydration
- Maximize medication administration by alternative routes of administration e.g., oral electrolyte replacement
- Use therapeutic alternatives that do not require fluids to prepare
- Consult pharmacist for recommendations

Communications

- Leveraged regular meetings with staff, including tiered huddles
- Created a Supply Chain intranet page
- Utilized Epic communications, including pop-up reminders at sign in
- Standardized script for Supply Chain Customer Services Center
- **Challenges**
 - Messages reaching physicians
 - Disconnect between messages of awareness vs. expected actions.
 - Desire for concise instruction vs. how much should be left to individual discretion / decision



Future Waste Reduction

- Evaluate practice patterns
- Be mindful of clinical burden each strategy imposes
- Confirm which conservation strategies to operationalize as standard work
- Don't be so lean have inadequate contingency stock in the future



Reflections on Response

Strengths

- Identifying the concern for potential for differential care at the bedside
- **HICS:**
 - “Gave it more teeth and alignment”
 - Effective framework for mitigation – not just response
 - Off-cycle review process
- **Inclusion:**
 - **Stakeholder engagement**
 - Operations Section branches **triad leadership structure**
 - Involving the **Pediatric Emergency Department** in both Adult and Pediatric Operations branches
 - Leveraged daily **Stanford Medicine Dialysis group**
- **Routine presentation of “days on hand allocation”**

Reflections on Response

Opportunities

- **Without true demand data**, leaders couldn't accurately determine if the organization was short based on volumes, nor track use back to the patient or provider level.
- Confirm best modalities to **get information to physicians** in a timely manner.
- **Should HICS have been activated sooner?** Further define activation guidelines in consideration of level of risk.
- **Streamlining duplicative efforts**
- More **interdisciplinary planning** that identifies conflicting priorities and explores **crisis care plans**

Questions?

OEM EMERGENCY MANAGEMENT

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be SAFE.
be SMART.
be KIND.

+ be
PREPARED.