



Wildfire Evacuation Planning

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Background

During the Santa Cruz County wildfire in August 2020, the hospital was threatened with the potential need for evacuation. The emergency response team identified gaps in the hospitals' readiness:

- The hospital evacuation plan was insufficiently detailed for a wildfire evacuation scenario where air quality is a significant concern..
- The evacuation criteria did not account for local geographic challenges that are factors when determining risk, such as blocked access roads in a small community with limited exits.
- Emergency supplies were inadequate to care for the volume and medical needs of patients.
- Staff were unaware of emergency supply locations.
- Staff did not know how to evacuate patients when outside air quality is unsafe to stage patients in the parking lot.
- Many staff were personally evacuated, creating additional staffing challenges.
- There was no plan for the pharmacy: medication security must be maintained.

Purpose

The quality improvement project goal was twofold:

- Train hospital staff to efficiently and safely evacuate a hospital during a wildfire
- Ensure staff has access to adequate medically necessary supplies to manage care.

Methods

A multidisciplinary team used the Failure Mode Effect Analysis (FMEA) method to identify the largest gaps in our evacuation plan. FMEA is a validated hospital quality and safety tool to proactively identify, assess, prioritize and manage risk. Risk levels are scored by multiplying 0-10 scale scores about frequency of risk, detection and severity of risk. A higher score indicates the risk should be managed as a higher priority.



Figure 1: neonatal , maternal and adult evacuation supplies



Results

- Developed criteria for evacuation risk based on the county geography (Figure 2). This was used during Incident Command huddles to determine current evacuation risk status.
- Updated HICS 260e forms to include TRAIN resource allocation triage model (Figure 5)
- Crafted a better emergency plan specific to a wildfire event
- Made GO BAGS with critical supplies for each unit
- Created a new Disaster Supply Cart and other supply kits (Figures 1, 3 and 4)
- Drilled on the new improved plan, and redrilled a year later
- Installed Pulse Point, Purple Air apps on leader phones
- Created action checklists specific to each unit
- Approved a workflow for Pharmacy to provide medications to evacuating patients and to secure the pharmacy in the event of a total hospital evacuation.

Figure 2: Fire evacuation risk calculator

0 – Little to no risk	Fire more than 10 miles away, no evacuation watch, and/or fire containment increasing, AQI <150
1 – Low risk	No warnings, fire more than 10 miles away, no evacuation watch, and/or fire containment begun, AQI <150
2 – Medium risk	No warnings, fire 5-10 miles away, evacuation watch and/or fire containment begun, AQI >151 and <500 outside
3 – High risk	Fire ≥5 miles/ Dominican initiates evacuation, evacuation warning in place, AQI >500 and indoor air unhealthy with smoke in the building – consider evacuation with CNE/ CAO approval (Call SHEMS), Voluntary Evacuation
4 - Imminent	Evacuation ordered by local OES, commence immediately (Call SHEMS), Mandatory Evacuation

Figure 3: GO BAG and critical supply packs inventory lists

SMSC GO BAG INVENTORY CHECK LIST			IMMINENT DELIVERY PACKS (2 each red totals)	
Locations: 1 bag in Perinatal, 1 in Med Surg, 1 in SPS PACU, 1 in Main PACU and 1 in Admitting In large, labeled duffel bag, please ensure the following is included:			One located at front Perinatal Nurse station	
SPS	Expiration date	Quantity	Inventory Check List	
50 cc syringe	2/2025	4	<input type="checkbox"/> Bath blanket	<input type="checkbox"/> Under buttock pad <input type="checkbox"/> 2 face shield masks <input type="checkbox"/> Nonsterile gloves (M) <input type="checkbox"/> Cover gown
Surgical mask	No expiration	4	<input type="checkbox"/>	
Face shield	No expiration	3	<input type="checkbox"/>	
Goggles	No expiration	3	<input type="checkbox"/>	
Medium gloves	4/2023	4 pairs	<input type="checkbox"/>	
Large gloves	6/2023	4 pairs	<input type="checkbox"/>	
Hand sanitizer	3/2023	1	<input type="checkbox"/>	
General emergency supplies	Expiration date	Quantity	<input type="checkbox"/>	
ORL sticks	4/20/2024	1 pack	<input type="checkbox"/>	
Fluoridant	No expiration	3	<input type="checkbox"/>	
Batteries for flashlight	No expiration	4x AAA	<input type="checkbox"/>	

Figure 4: Directions about what to bring to evacuation location

DISASTER CARTS AND SUPPLIES TO BRING TO EVACUATION AREA		
Unit	Items to bring	Where located
SPS PACU	<input type="checkbox"/> Crash Cart	<input type="checkbox"/> In SPS PACU
	<input type="checkbox"/> Disaster cart	<input type="checkbox"/> In SPS PACU
	<input type="checkbox"/> GO Bag	<input type="checkbox"/> Clean Nutrition Room
OR	<input type="checkbox"/> Difficult Airway Cart	<input type="checkbox"/> General storage- Across from elevator Room 1112
	<input type="checkbox"/> Blood cart	
	<input type="checkbox"/> Holding Cart	
Med Surg	<input type="checkbox"/> GO Bag	<input type="checkbox"/> Medication Room
	<input type="checkbox"/> Bedside Commode with elevated seat	

Discussion / Conclusions

The hospital is much more prepared for wildfire evacuation than previously. The FMEA method is a suitable tool to measure risks and identify necessary mitigation strategies. It is essential to drill on the plan regularly to ensure leaders and staff are familiar with supplies, equipment and evacuation procedures.

- The emergency response team created standard work to ensure that supply carts and GO-BAGS are included in regular supply outage checks.
- The wildfire response plan was added to the hospital's policy review system, so it is reviewed and updated at least every three years.
- 100% of nurses use TRAIN, embedded in the EHR risk screening processes, to evaluate all inpatient's potential evacuation needs.
- The pharmacy has a plan to securely evacuate and provide necessary medication if needed.

Figure 5: TRAIN evacuation method

ADULT PATIENT EXAMPLE					
	Car	BLS	ALS	CCT	Specialized
Life Support	Stable	Minimal	Minimal - Moderate	Moderate	Maximal
Mobility	Car/ Wheelchair	Wheelchair or Stretcher	Wheelchair or Stretcher	Stretcher/ Immobile	Stretcher/ Immobile/ Bariatric
Monitoring Level/ Stability	Routine Vitals	Routine + 02 sat; Moderately stable	Frequent + Cardiac Monitoring; Interventions possible	Continuous changing status; Interventions possible	Specialized OR requirements, Equipment or Scarce Resources; Complexity
Pharmacy	PO Meds	IV Lock	IV Fluids – IV Drip without titration	Titrated IV Drip; TPN Dependent	IV Drop ≥ 2; type and monitoring requirement
Infection		BASED ON MEDICAL NEED			Highly infectious patient

References

Lin A, Taylor K, Cohen R. (2018). Triage by resource allocation for inpatients: A novel disaster triage tool for hospitalized pediatric patients. *Disaster Medicine and Publish Health Preparedness*.

Institute for Healthcare Improvement (nd) Failure mode and effects analysis (FMEA) tool. <https://www.ihl.org/resources/Pages/Tools/FailureModesandEffectsAnalysisTool.aspx>

Learn More

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