

Empowering Emergency Responders to Treat on Scene Alleviates Hospital Strain During Disaster Events



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INTRODUCTION

- Disasters**—events exceeding a community’s capacity to cope—are rising globally (+74% in the past decade).
- Hurricane Ida (Aug 29, 2021):** Category 4, 14-ft storm surge, 15 in rainfall, 2 tornadoes; Louisiana: 28 deaths, \$55B damages, 990,000 residents without power.
- Generator use increases risk of carbon monoxide poisoning (COP) & burn injuries; potentially overwhelming local hospitals & burn centers.
- Healthcare strain**, compounded by COVID-19, prompted a collaborative effort for **EMS and our Burn Center, including just-in-time training** to treat clinically mild COP and burn injuries on scene.
- Objective:** Examine EMS-burn center coordination & prehospital management of COP and burn injuries during Hurricane Ida.

METHODS

- Design:** Retrospective EMS data analysis (37 Louisiana parishes);
non-human subject's research.
- Population:** 17,474 EMS calls (Jul 8–Oct 31, 2021); 1,607 related to COP or burn injury.
- Cohorts by disaster timeline:**
 - PRE-IDA: 07/08–08/25/21 (7 weeks)
 - MID-IDA: 08/26–09/08/21 (2 weeks)
 - POST-IDA: 09/09–10/31/21 (7 weeks)
- Data collected:** Call volume, dispatch metrics, on-scene time, transport rates, transport turnaround times, patient disposition, clinical features on presentation.
- Statistical analysis:**
 - Weekly call volume: median, range, Kruskal-Wallis. Negative binomial regression → Rate Ratios (RR) with 95% CI; MID-IDA as reference. Transport rates: Chi-squared test.

RESULTS

Table 1. Summary of weekly EMS calls.

	PRE-IDA	MID-IDA	POST-IDA	p-value
Total calls, weekly, median (range)	108 (76-132)	146 (141-151)	76 (57-79)	0.006
CO calls, weekly, median (range)	98 (69-126)	116.5 (110-123)	59 (43-74)	0.006
Burn calls, weekly, median (range)	10 (4-16)	29.5 (28-31)	13 (5-19)	0.069

Table 2. Rate ratios and 95% confidence limits from models of EMS calls from negative binomial regression models.

	RR (95% CI)	p-value
<i>Total Calls</i>		
mid-Ida vs pre-Ida	1.4 (1.1,1.7)	0.018
mid-Ida vs post-Ida	2.0 (1.6,2.6)	<.001
<i>CO Calls</i>		
mid-Ida vs pre-Ida	1.2 (0.9,1.6)	0.196
mid-Ida vs post-Ida	2.0 (1.5,2.7)	<.001
<i>Burn Calls</i>		
mid-Ida vs pre-Ida	2.8 (1.7,4.6)	<.001
mid-Ida vs post-Ida	2.3 (1.4,3.7)	0.002

Table 3. Summary of patient disposition EMS calls.

	PRE-IDA	MID-IDA	POST-IDA	p-value
Transport, % (n)				<.001
No	5.7 (43)	16.2 (47)	8.7 (49)	
Yes	94.3 (710)	83.8 (244)	91.3 (514)	

EMS turnaround times remained stable across all periods, averaging 63 ± 36 min PRE-IDA, 64 ± 31 min MID-IDA, and 69 ± 49 min POST-IDA.

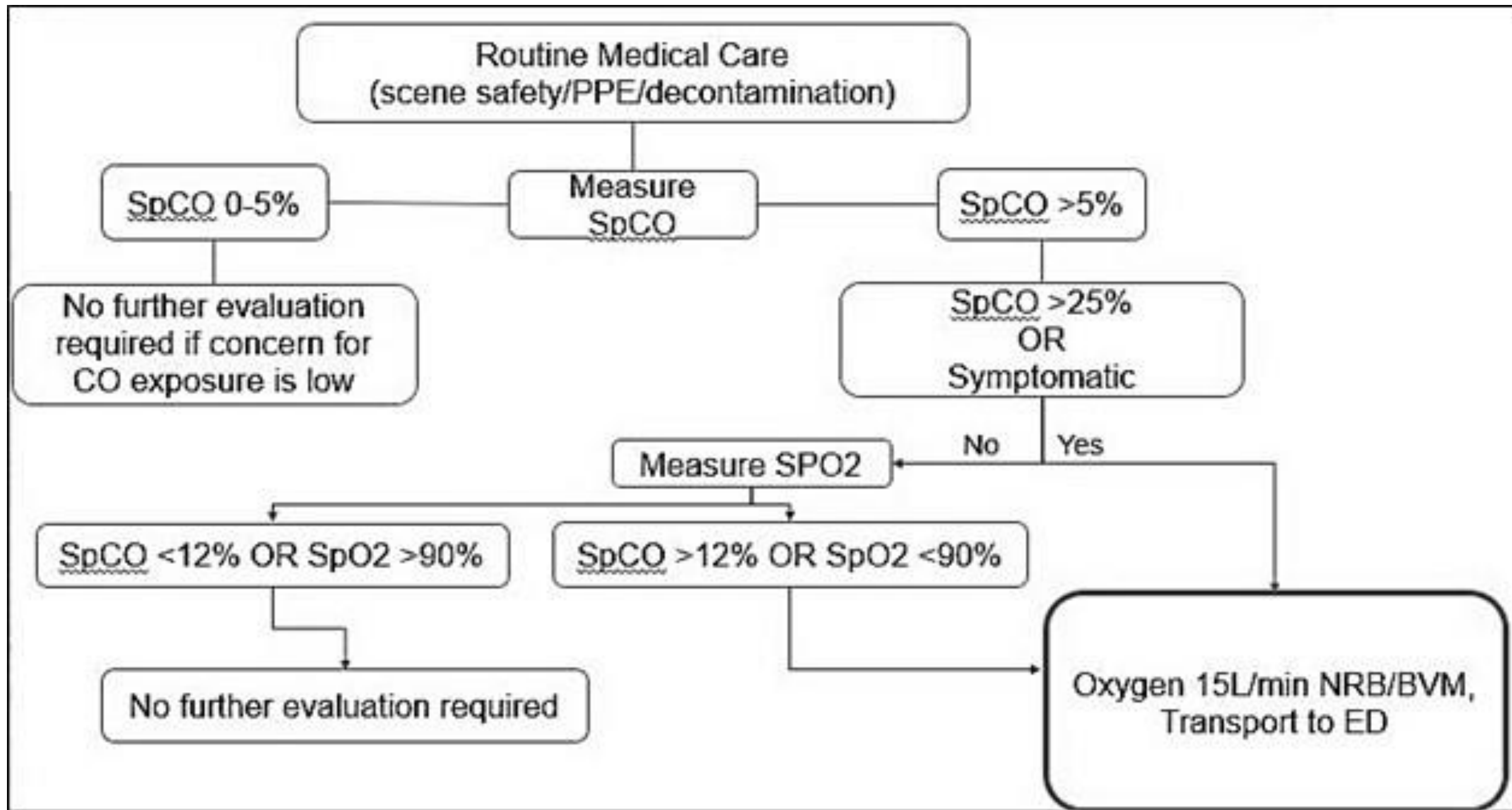


Figure 1. Triage and treatment algorithm for EMS responding to suspected COP during Hurricane Ida.

DISCUSSION

- Hurricane Ida caused surges in COP and burn injuries, peaking MID-IDA, while transport times stayed the same.
- EMS field interventions—including **oxygen therapy for COP and Push Packs** (pre-stocked kits for ≤10% TBSA burns)—allowed safe on-scene treatment and reduced hospital transports.
- No subsequent calls nor hospital transport** occurred for patients treated on scene.
- Just-in-time training and structured protocols enabled safe EMS autonomy.
- Early oxygen for COP and burn triage criteria ensured appropriate care while preserving hospital capacity.

CONCLUSIONS

- Disasters increase generator-related COP & burn injuries.
- Coordinated EMS-burn center protocols enhance disaster response
- On-scene EMS treatment with structured protocols **safely reduces hospital burden.**
- Future work: long-term outcomes, standardized disaster protocols, optimized oxygen/resource allocation.

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