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## Letter to the Editor

# Indirect effects of COVID-19 on OHCA in a low prevalence region



To the Editor,

Mortality in the United States and internationally increased during the COVID-19 pandemic.<sup>1,2</sup> Effects of social distancing, reluctance to seek medical attention, decrease in bystander assistance or other barriers to care may contribute.<sup>3</sup> Decreased visits for high-risk medical conditions has been particularly concerning.<sup>4</sup> Reports from high prevalence regions make it difficult to disentangle the contributions of infection and indirect effects on mortality.<sup>1,5</sup> We analyzed emergency medical services (EMS) data from agencies serving a catchment area

of 2.6 million with low prevalence of COVID-19. We compared incidence and treatment of out-of-hospital cardiac arrest (OHCA) during the pandemic to historical trends.

On April 13th 2020, Pennsylvania issued a bulletin regarding treatment of OHCA in patients with suspected COVID-19. Providers were to don personal protective equipment (PPE) for standard, contact and airborne protection prior to CPR. Generally, patients without ROSC were not to be transported and providers were to

**Table 1 – Cohort characteristics and outcomes.**

Characteristic	Overall (n = 12,935)	Pre-COVID (n = 12,252)	Post-COVID (n = 683)	Difference pre- vs post-COVID (95% CI)
Age, years	63 ± 19	63 ± 19	64 ± 19	−0.76 (−2.2 to 0.68)
Female gender	4,805 (38)	4,552 (38)	253 (38)	−0.1% (−3% to 4%)
Arrest etiology				
Trauma	1,139 (9)	1,099 (9)	40 (6)	−3% (−5% to −1%)
Medical	11,796 (91)	11,153 (91)	643 (94)	3% (1% to 5%)
EMS-assessed only (DOA)	6,631 (51)	6,302 (51)	329 (48)	−3% (−7% to 1%)
Witnessed collapse	3,697 (29)	3,480 (28)	217 (32)	3% (−0.2% to 7%)
Layperson CPR	4,371 (34)	4,125 (34)	246 (36)	2% (−1% to 6%)
Prehospital ROSC <sup>a</sup>	1,624 (35)	1,529 (35)	95 (38)	3% (−3% to 9%)
Transported from scene <sup>a</sup>	4,273 (68)	4,067 (68)	203 (58)	−10% (−5% to −15%)
Scene time, min <sup>a</sup>				
Transported patients	26 ± 12	26 ± 12	30 ± 13	3.8 (2.1 to 5.4)
Non-transported patients	25 ± 11	24 ± 11	29 ± 13	4.2 (1.8 to 6.7)
CPR duration, min <sup>a</sup>				
ROSC	18 ± 12	18 ± 12	16 ± 10	−2.2 (−5.9 to 1.4)
No ROSC	25 ± 11	24 ± 11	29 ± 13	4.2 (1.8 to 6.7)
First advanced airway <sup>a</sup>				
Endotracheal tube	2,887 (46)	2,760 (42)	127 (36)	−8% (−3% to −12%)
Supraglottic	993 (26)	904 (14)	89 (24)	10% (5 to 15%)
Airway first pass success <sup>b</sup>	2,909 (75)	2,745 (75)	164 (76)	1% (−5% to 7%)
Multiple responding crews	3,243 (25)	3,067 (25)	176 (26)	1% (−3% to 4%)
Time from arrival to, min <sup>b,c</sup>				
Vascular access	7.8 ± 5.9	7.7 ± 5.8	8.4 ± 6.4	0.7 (−0.02 to 1.5)
Epinephrine	9.2 ± 5.9	9.1 ± 5.7	10.3 ± 7.7	1.2 (0.4 to 1.9)
Compressions	4.2 ± 6.7	4.1 ± 6.6	4.6 ± 6.9	0.5 (−0.5 to 1.6)
Advanced airway	13.5 ± 6.9	13.5 ± 6.9	13.8 ± 7.1	0.4 (−0.6 to 1.4)

<sup>a</sup> Reported only for EMS-treated patients (i.e. excluding those DOA).

<sup>b</sup> Reported for those patients in whom the procedure was attempted.

<sup>c</sup> Excludes EMS-witnessed arrests.

contact medical command after 10 min of resuscitation without ROSC to discuss termination. We compared encounters from January 2016 to February 2020 (“pre-COVID”) with those March 1st, 2020 to May 25th, 2020 (“post-COVID”). We included adults  $\geq 18$  years assessed by one of 24 regional EMS agencies for OHCA. The region had a low prevalence of COVID-19, with 2 cases per 1000 persons as of June 22, 2020. We excluded interfacility transfers and duplicate charts generated by multiple responding units.

We extracted data from the prehospital electronic medical record (emsCharts; ZOLL Data Systems). We collected age; gender; arrest characteristics (medical vs traumatic etiology); automated external defibrillator (AED) use; witnessed collapse; layperson CPR; CPR duration; initial advanced airway use; and prehospital ROSC. Encounter characteristics included number of responding crews; and, time to EMS arrival, initiation of vascular access, chest compressions, epinephrine administration and advanced airway attempt. We categorized outcomes as: dead on EMS arrival (DOA) without treatment; treated with resuscitation terminated prior to transport; treated and transported.

There were 794,696 encounters during the study period of which 15,779 (2%) were for OHCA and 12,935 were included. Mean age was  $63 \pm 19$  years and 4,805 (34%) were female. There were 12,252 cases of OHCA pre-COVID ( $56 \pm 9$  cases/week) and 683 post-COVID ( $55 \pm 9$  cases/week), with fewer traumatic arrests post-COVID (Table 1). The proportion of cases deemed DOA did not differ pre- and post-COVID (46% vs 45%, respectively). Provision of layperson CPR (34% vs 36%), AED use (14% vs 15%) and prehospital ROSC (35% vs 38%) also did not differ. Scene times post-COVID were significantly longer. Time to first epinephrine administration was delayed by 1.2 (0.4–1.9) minutes.

We did not find an increase in overall OHCA during the COVID-19 pandemic in a low prevalence region despite lower ED volumes for acute conditions. We also did not observe a difference in key treatment metrics that might reflect public (layperson CPR and AED use) or provider (proportion of EMS-assessed OHCA that were resuscitated) anxiety about infectious exposure. Multiple small but significant differences in patient care, including airway management and time to epinephrine administration, are of unclear significance but merit further systematic investigation.

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## Conflict of interest statement

Nothing declared.

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