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BRIEF REPORT

Emergency Encounters for Illness During and After the Los Angeles Wildfires

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Wildland-urban interface (WUI) fires are increasing in frequency and scope, as exemplified by the Los Angeles fires that began on January 7, 2025. When compared with urban-only and wildland-only fires, WUI fires spread more rapidly and consume a greater mixture of both biomass and industrial fuels.[1] Data regarding specific health outcomes experienced by locally affected Los Angeles residents are limited.[2,3]

METHODS

We examined data on emergency encounters at Cedars-Sinai, comprising the largest adult acute care medical center in Los Angeles County and located 18.1 and 10.2 miles from the Eaton and Palisades fire origins, respectively. We focused on encounters involving residents from zip codes within our catchment area that were either directly affected by a January wildfire or located adjacent to a fire-affected zip code (39 zip codes). For this region, mean outdoor concentration of particulate matter with a diameter of ≤2.5 μm was 20.1 ± 14.5 μg/m^3 during the week preceding fire onset and 33.6 ± 86.2 μg/m^3 during the week after fire onset.[4] We identified the most frequently occurring International Classification of Disease, 10th Revision coded emergency discharge diagnoses (≥50 per month). For clinical interpretability, we categorized respiratory diagnoses as upper (J00-J06, J30-J39) or lower (ie, acute pulmonary: J09-J18, J20-J22, J40-J4A, J60-J70, J80-J84, J85-J86, J90-J94, J96-J99). We manually chart reviewed randomly selected encounters across all years to ensure validity of all code-based diagnoses.

To analyze encounters occurring within 90 days after fire onset (January 7, 2025 to April 7, 2025) compared with those during prior years (2018-2024), we conducted interrupted time series analyses using generalized least squares with autoregressive moving average correction models. We prespecified 90-day postfire outcomes due to the potential for a persistent excess in cardiorespiratory events,[5] particularly given the magnitude and duration of this fire event. For each diagnosis, encounter count was regressed on postfire (vs prefire) event status adjusting for time, COVID-19 year (2020 and 2021), duration from the fire-onset date, and week and month as continuous and categorical variables to account for additional temporal trends and seasonality, respectively.

What is the clinical question being addressed?
What health outcomes did local residents experience following onset of the Los Angeles wildfires?

What is the main finding?
Local residents experienced a 24% excess in pulmonary illness, a 46% excess in myocardial infarction, and a 218% excess in systemic illness requiring emergency medical attention.

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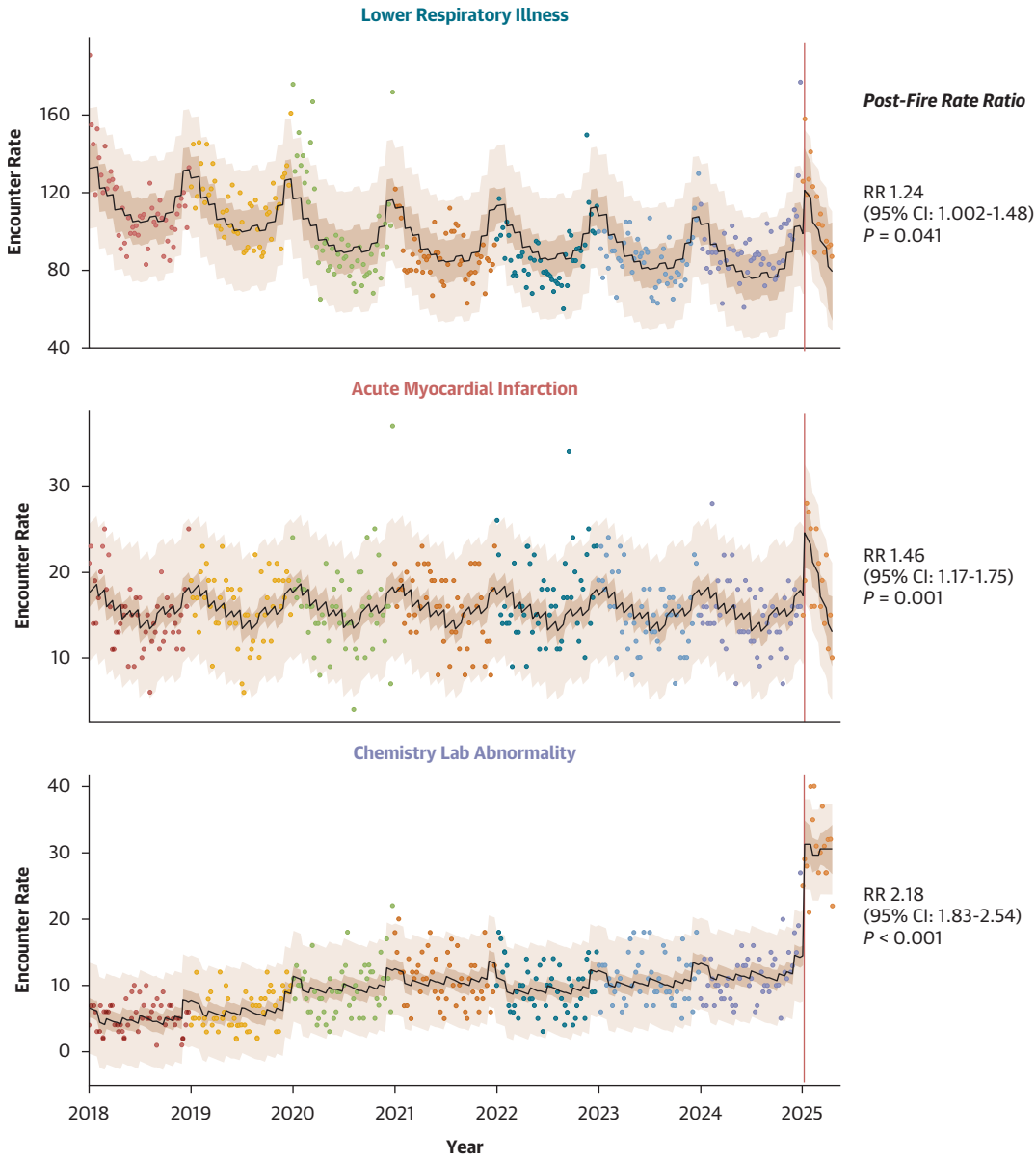
FIGURE 1 Excess Emergency Encounters After Onset of the Los Angeles Wildfires



Results shown are derived from generalized least squares with autoregressive moving average correction models analyzing emergency department encounters occurring within 90 days after start of the fires compared with during prior years. The postfire rate ratio is calculated as the proportional increase in each encounter diagnosis (ie, postfire divided by prefire baseline estimates from the generalized least squares with autoregressive moving average correction model). The weekly average encounter rate (ie, "rolling average") is depicted as the best fitted line (black line), along with 95% CI limits representing the range within which the true weekly average encounter rate is estimated to exist with 95% level of confidence (brown area) and 95% prediction interval limits representing 95% of all predicted possible weekly counts of emergency encounters (tan area) for each given diagnosis.

All analyses were conducted using R v4.3.1 and with a 2-tailed $P < 0.05$ considered statistically significant. All protocols were approved by the Cedars-Sinai Institutional Review Board.

RESULTS

For the study region and period, the U.S. Census-estimated population was stable (range: 1,224,258-

1,265,274 for years 2018-2024 and 1,216,764 for year 2025) along with the frequency of average monthly emergency encounters (range: 2,062-2,602 for January to March 2018-2024 and 2,586 for January to March 2025). Accordingly, there was no postfire difference in total encounters (postfire rate ratio: 0.98 [95% CI: 0.85-1.11]). However, encounters for certain diagnoses occurred more frequently than for others (**Figure 1**).

During the 90 days after wildfire onset, we observed an excess in encounters for acute pulmonary illness (1,490 vs 1,407 during the same calendar period in prior years), acute myocardial infarction (AMI) (259 vs 222), and blood chemistry laboratory abnormalities (398 vs 115). In time series analyses accounting for temporal dependencies, encounters for acute pulmonary illness increased by 24% (1.24 [95% CI: 1.002-1.48]), for AMI by 46% (1.46 [95% CI: 1.17-1.75]), and for chemistry laboratory abnormalities by 218% (2.18 [95% CI: 1.83-2.54]). The latter finding was seen in the absence of similar trends for readily attributable conditions such as kidney disease or dehydration ($P > 0.10$ for all). Because laboratory diagnoses are not conventionally intended to be coded as primary or principal encounter diagnoses,[6] we identified and found the most frequently co-occurring nonlaboratory diagnoses to include a range of symptoms (ie, chest pain, abdominal pain, syncope, dyspnea, dizziness) and medical conditions (ie, lower respiratory illness, dysrhythmia, hypertensive disorder, head injury, sepsis).

DISCUSSION

In the wake of the historic WUI fires that affected Los Angeles in January 2025, we sought to understand the specific health effects experienced by local residents. We observed an acute excess in emergency encounters for not only pulmonary illness but also AMI. We also found evidence of increased systemic illness, presenting as a substantial excess in emergency encounters for blood chemistry laboratory abnormalities—a finding not described previously after major wildfires.

In a recent study, Paglino et al[3] observed that all-cause fatalities occurred in excess during the first 4 weeks of the Los Angeles fires onset and then returned to prefire baseline rates. Our results similarly indicate that more severe forms of illness presented early on in some susceptible individuals, whereas potentially less severe effects may have persisted or presented with delayed timing in others. Our study is further focused on outcomes in local residents most likely to have experienced a substantial dose or duration of exposures to the products of mixed wildland-urban fuel combustion.[7] The complexity of WUI fire exposures may account for similarities in timing yet differences in the range of adverse health outcomes seen after predominantly wildland fire exposures.[5] Notably, we observed an excess in chemistry laboratory abnormalities that was not readily attributable to any particular medical diagnoses. Systemic health effects are not often reported in postwildfire outcomes studies, perhaps because they are not easily detected or because they are associated more with WUI than wildland-only fire exposures. Indeed, the smoke produced by WUI compared with wildland-only fires is known to contain not only a more complex aggregate of volatile and semivolatile chemical constituents but also toxic metals, which may alter the epigenetic profiles of immune cells with broad tissue distribution in exposed individuals.[8]

Study limitations include a reliance on zip code, given the lack of dynamic location data for temporarily or permanently evacuated individuals. We were unable to distinguish between changes in the at-risk population size and changes in the frequency of outcomes; nonetheless, the at-risk population would need to have increased (rather than decreased) by at least 46% to explain the observed AMI excess. We were also unable to account for individual-level variation in the use of risk mitigation resources or support systems.

CONCLUSIONS

Local residents experienced major adverse health outcomes immediately after the Los Angeles WUI fires. In addition to an overt excess in cardiopulmonary illness, we observed an increase in systemic health effects that warrant further characterization. Overall, our findings underscore the need for additional studies to discern longer-term risks[9] and to more completely understand the health impacts of wildland-urban fires.

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