The Impact of Environment on the COLDS Scoring Scale

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INTRODUCTION

- Children presenting with URI symptoms on the day of surgery are known to be at higher risk for perioperative respiratory complications[3-5]

- In 2014, B. Lee and August published the COLDS score to risk stratify pediatric patients with URIs.[1-2] Our group showed this score has good predictive value for perioperative adverse events (AUC: 0.69)

- Using logistic regression, we calculated a modified, component-weighted regression model, which improved upon the predictive value (AUC: 0.71)

- The predictive ability of the COLDS score varied by seasons: AUC: 0.82 in summer and AUC :0.67 in winter

- We hypothesized this difference may be due to socioeconomic factors and air quality.

METHODS

- Data was collected on 722 cases between March 12, 2021- July 8, 2021.

  Inclusion criteria:
  - < 6 years old

  Exclusion criteria:
  - Endotracheal tube
  - Tracheostomy
  - Cyanotic heart disease

- Anesthesia providers completed questionnaires about their patients and perioperative events. We also recorded influenza activity, the air quality index (AQI), and presence of active wildfire within 50 miles of the hospital, and other socioeconomic variables

- Receiver operating characteristic curves were used to assess the predictive ability of the COLDS score for PRAEs

- We created a new component-weighted regression model with influenza activity as a factor

METHODS

	1	2	5
Current Signs and Symptoms	None	Mild (Parent confirms URI AND/OR congestion, rhinorrhea, sore throat, sneezing, low fever, dry cough)	Moderate/Severe (Purulence, wet cough, abnormal lung sounds, lethargy, toxic appearance or high fever)
Onset of Symptoms	>4 weeks ago	2-4 weeks ago	< 2 weeks ago
Presence of Lung Disease	None	Mild (Hx of RSV, mild intermittent asthma, BPD if >1y/o, loud snoring, or passive smoker)	Moderate/Severe (Moderate persistent asthma, infant with BPD, OSA or pulmonary hypertension)
Airway Management	None or Facemask	LMA or supraglottic airway	Endotracheal Tube
Type of Surgery	Other (Including PE tubes)	Minor airway (T/A, nasal lacrimal duct probing, flexible bronchoscopy and dental extractions)	Major airway (Cleft palate, rigid bronchoscopy, maxillofacial surgery)

Figure 1: The COLDS Scoring Scale

- Air quality was investigated based on the patient's zip code, using AirNow Interactive Map.
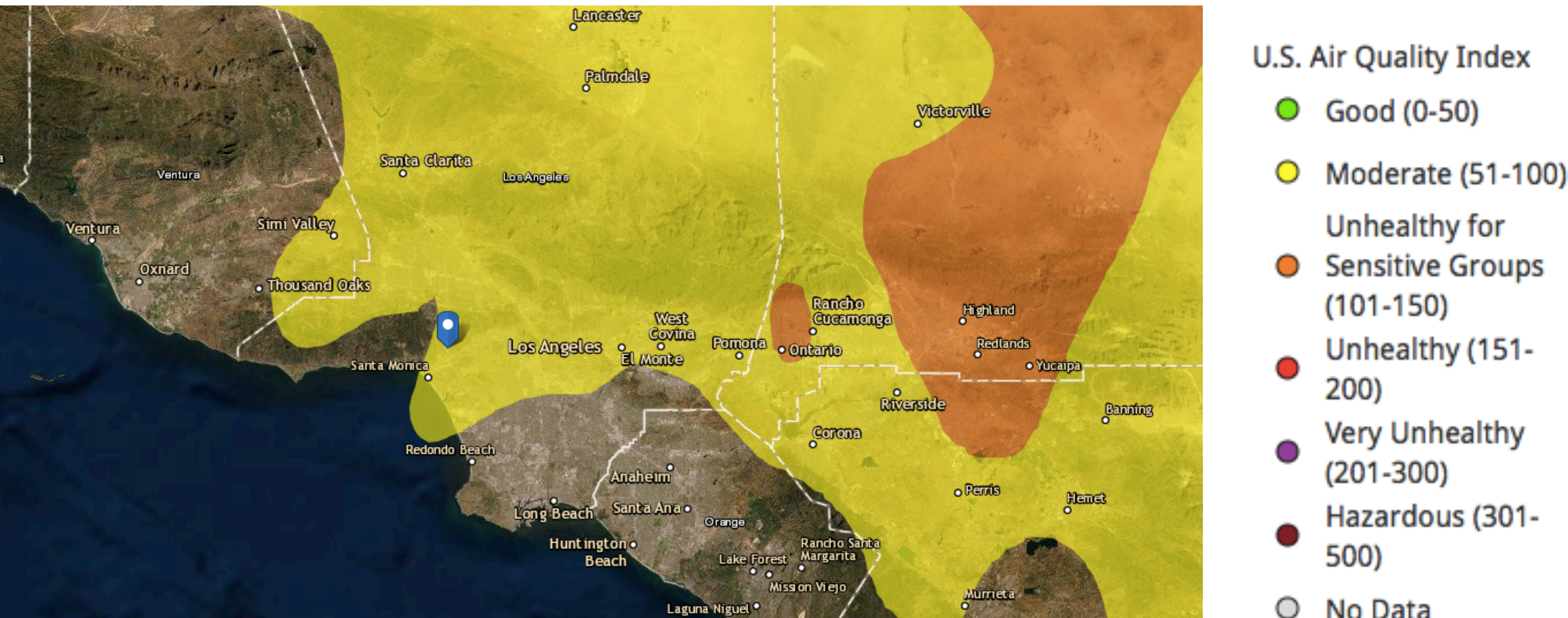

Figure 2: AirNow Interactive Map of Air Quality with Legend

Socioeconomic Variables Include	
Total Population Estimate	Percentage of those below the poverty line
Percentage of those unemployed	Percentage of those with no high school diploma (over 25 years old)
Percentage of those minority persons	Percentage of persons who speak English less than well
Percentage of persons in housing structures with 10 or more units	Percentage of those living in mobile homes

Figure 3: Socioeconomic Factors Investigated

RESULTS

- Influenza activity was an independent predictor of perioperative respiratory adverse events
  - OR = 1.68, 95% CI 1.26-2.37

- After controlling for patients with URI symptoms, influenza activity was still an independent predictor
  - OR = 1.44, 95% CI 1.17-1.67

- Air quality index and the presence of a wildfire, within 50 miles of the hospital were not independent predictors of PRAE

- Socioeconomic factors were not independent predictors of PRAE.

DISCUSSION

- While it has been previously shown that air pollution can cause an increase in respiratory symptoms in the pediatric population,[6] AQI within 50 miles of the hospital was not high enough to cause adverse events

- In addition, AQI within the patient's zip code the day before surgery was not high enough to cause adverse events.

- Although lower socioeconomic status has been historically associated with worse health outcomes such as worse asthma control, socioeconomic factors was shown to not have a high enough effect to cause adverse events

- Further investigation into other socioeconomic effects, such as percentage of households with a single parent

- For future projects, data should be collected from patients outside of the Los Angeles area in order to determine if socioeconomic factors have a greater role when taken at a larger scale.

REFERENCES

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