



Prescription Drug Monitoring Program: Research Applications

Harold Rogers PDMP 2022 National Meeting - Monday, December 5, 2022

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Research Focus

- Development of PDMP-based prediction models
 - To aid clinicians in safe opioid prescribing
 - Models that predict long-term opioid use
- Examining medication access
 - Opioid analgesic access during disaster events
 - Access to Medication for Opioid Use Disorder (Buprenorphine)

ORIGINAL ARTICLE

A Risk Prediction Model for Long-term Prescription Opioid Use

Iraklis E. Tseregounis, PhD, Daniel J. Tancredi, PhD,*† Susan L. Stewart, PhD,‡
Aaron B. Shev, PhD,§ Andrew Crawford, PhD,§ James J. Gasper, PharmD,|| Garen Wintemute, MD,§
Brandon D.L. Marshall, PhD,¶ Magdalena Cerdá, DrPH,# and Stephen G. Henry, MD****

Prediction Model Development

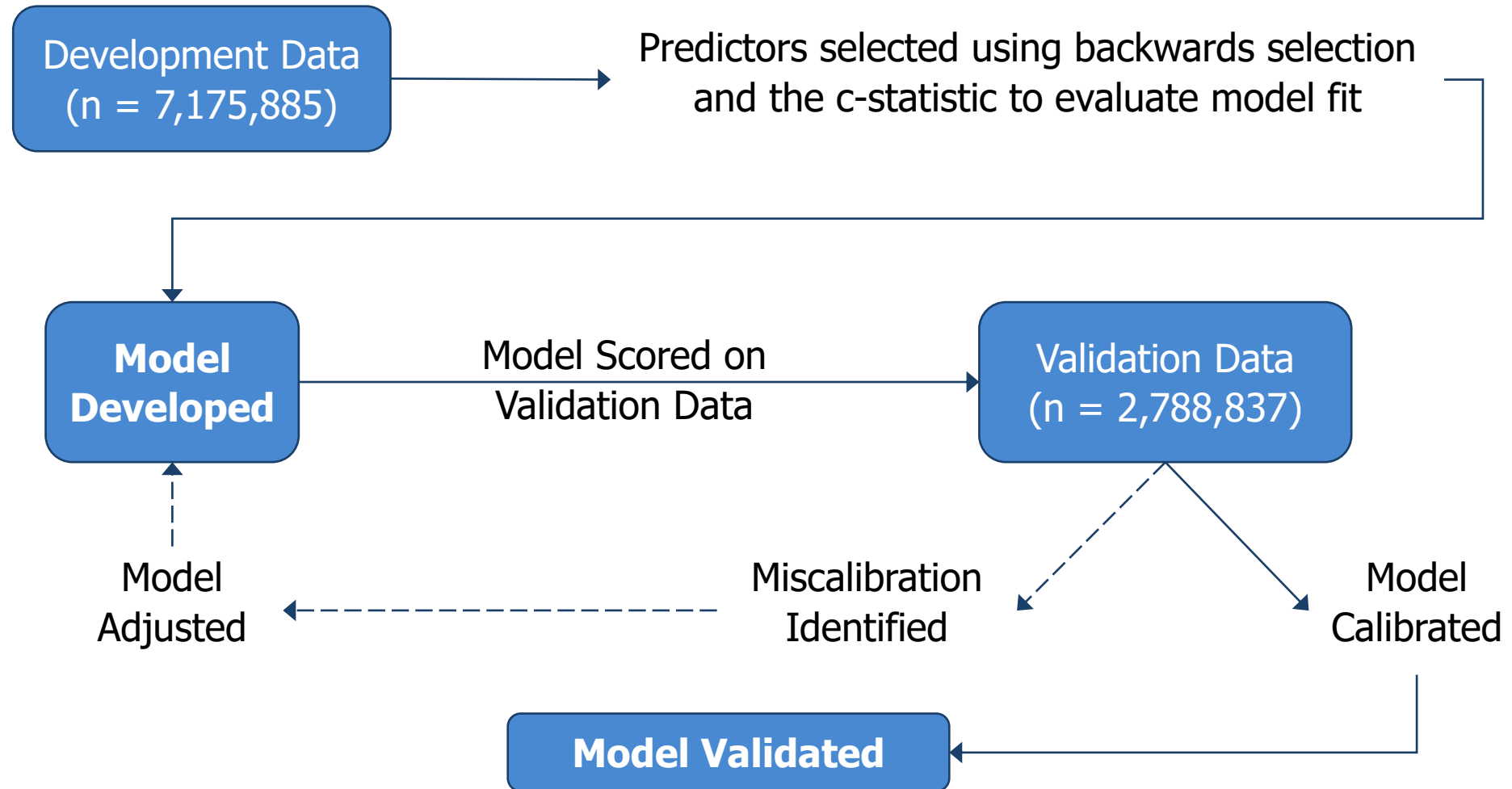
- **Objective:** Develop a model that predicts new long-term opioid use exclusively from prescription data
- **Cohort:** Opioid-naïve patients, at least 12 years old, prescribed pill-form opioid analgesics in California in 2016-2018 whose prescriptions appear in CA's PDMP
- **Outcome:** New long-term use
 - “New”: No record of opioids in previous 2 years
 - “Long-term”: Prescribing episode lasting >90 days with at least 3 opioid prescriptions and no prescribing gap >60 days
 - “Use”: Opioid supply assumes use

Prediction Model Development - Method

- Multiple logistic regression
- All predictors constructed from PDMP data
- Data to develop model derived from first **30 days** following index prescription
- Predicts outcome at **91 days**
- Example:

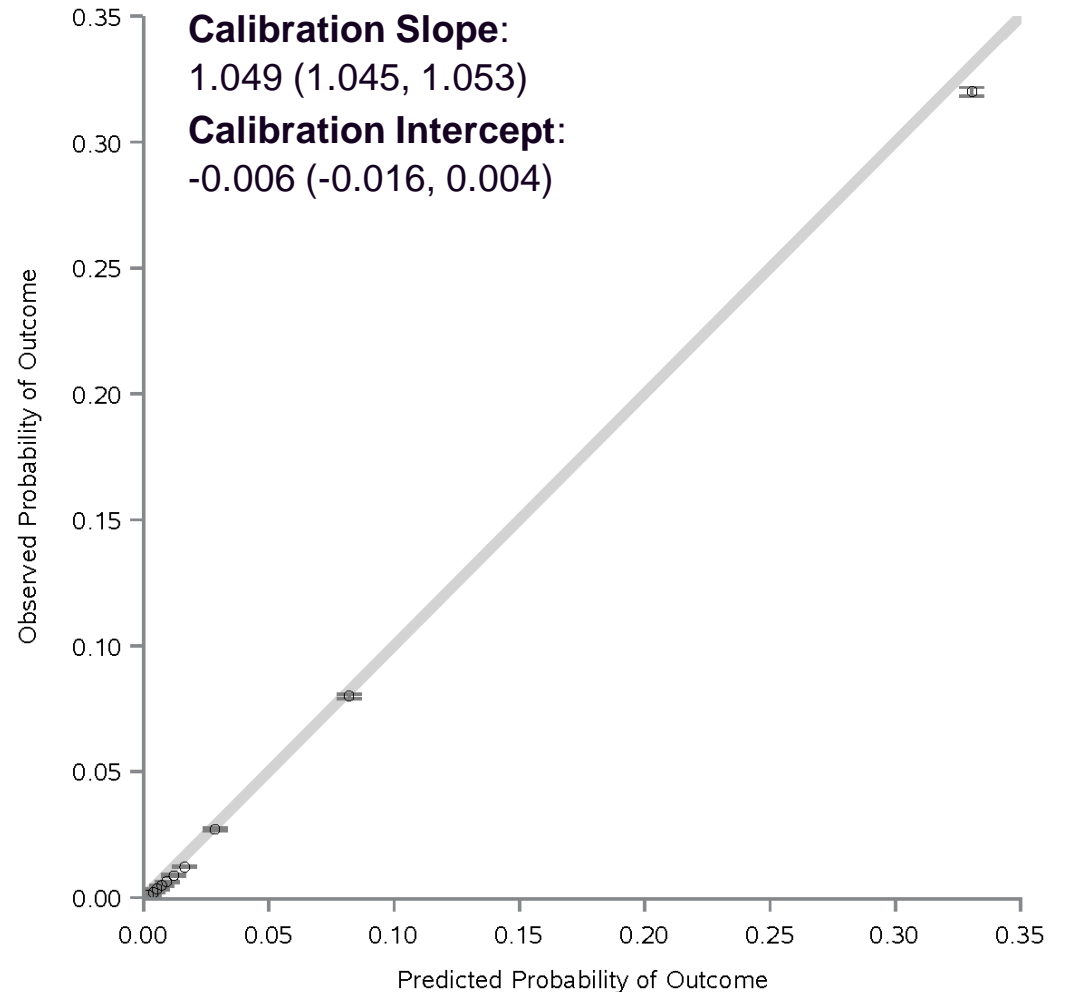


Prediction Model Development - Method



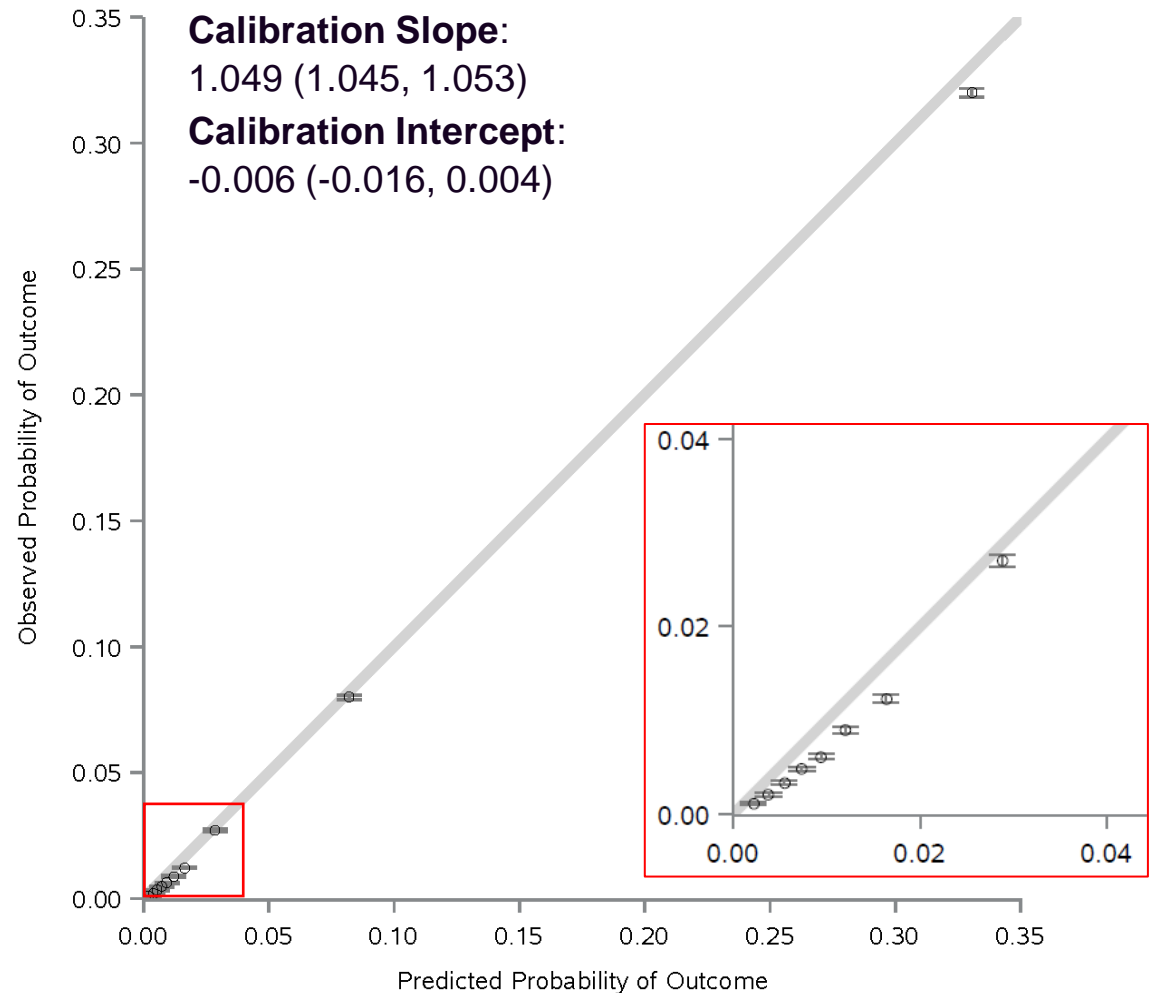
Prediction Model Development – Validation Results

- **Excellent Discrimination**
 - Model can differentiate between cases and controls
 - C-statistic: 0.913 (0.912, 0.914)
- **Good Calibration**
 - Predicted probability aligns well with observed probabilities



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Prediction Model Development – Next Steps

- **Short-term:** More Validation Studies
 - Temporal (for newer data)
 - External (outside California, specifically Kentucky)
 - Ongoing work (R03DA054496, PI: Tseregounis)
- **Long-term:** Implementation?
 - Utility as a foundational model for PDMP-based tool development
 - Evaluation of effectiveness as clinical aid – weighing the costs and benefits for tool implementation and use

Access to Medication

J Addict Med. 2021 ; 15(5): 425–428. doi:10.1097/ADM.0000000000000768.

Trends in Buprenorphine to Treat Opioid Use Disorder in California, 2012—2018: Medicaid Outpaces the Rest of the State

Iraklis Erik Tseregounis, PhD¹, James J. Gasper, PharmD, BCPP², Stephen G. Henry, MD, MSc³



Contents lists available at [ScienceDirect](#)

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RESEARCH

The impact of California wildfires on patient access to prescription opioids

Iraklis E. Tseregounis*, Chris Delcher, Susan L. Stewart, James J. Gasper, Aaron B. Shev, Andrew Crawford, Garen Wintemute, Stephen G. Henry

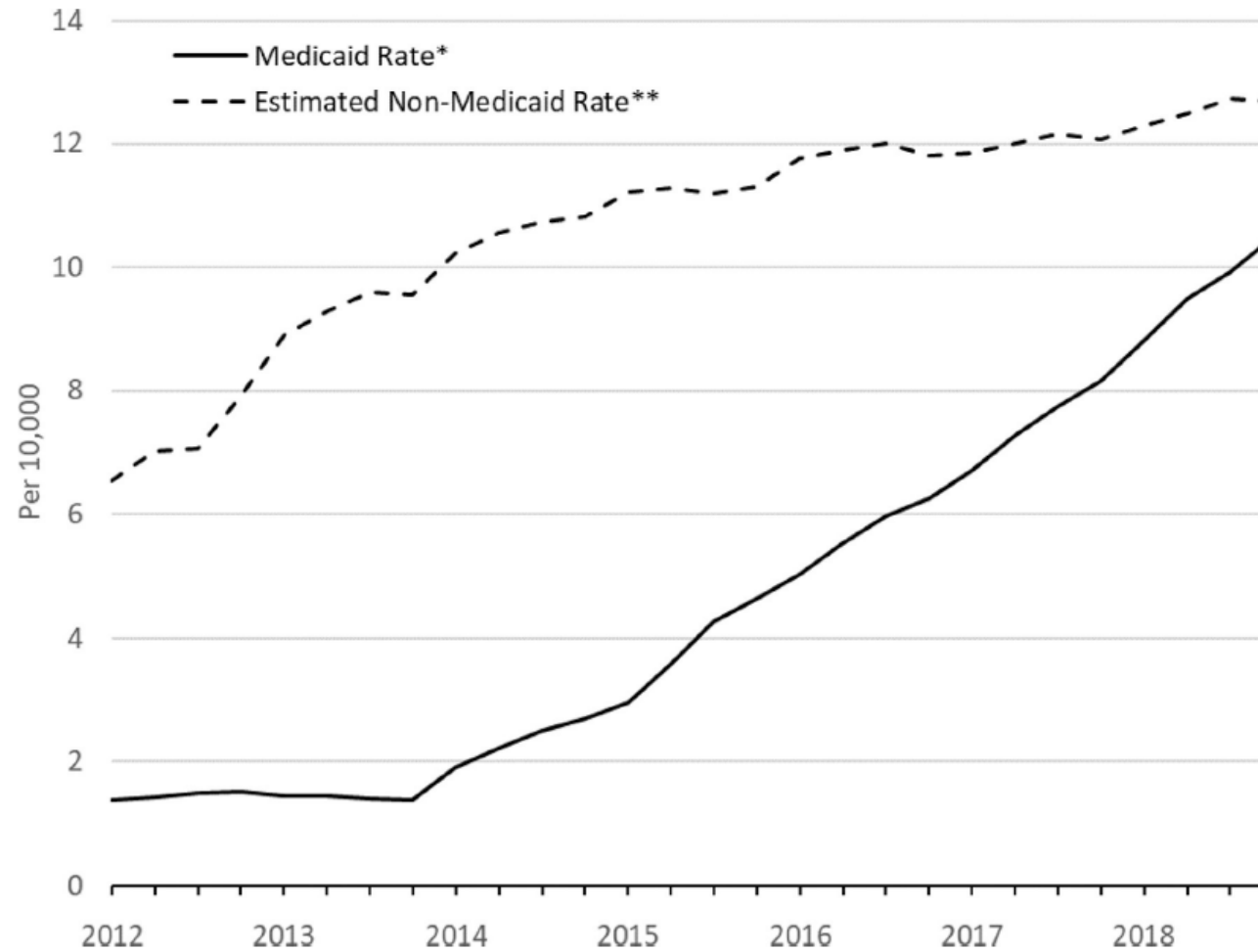
Access to Medication – Buprenorphine in CA

Trends in Buprenorphine to Treat Opioid Use Disorder in California, 2012—2018: Medicaid Outpaces the Rest of the State

Iraklis Erik Tseregounis, PhD¹, James J. Gasper, PharmD, BCPP², Stephen G. Henry, MD, MSc³

- **Objective:** To compare buprenorphine prescribing trends paid through Medicaid versus non-Medicaid payer sources
- **Method:** Combined data from CA's PDMP and Medicaid claims to obtain quarterly counts of patients receiving buprenorphine
 - *Medicaid:* From claims data provided by Department of Healthcare Services
 - *Non-Medicaid:* Estimated by subtracting Medicaid totals from DHCS from totals derived from PDMP records

Access to Medication – Quarterly Buprenorphine Prescribing Rates, CA 2012—2018



Access to Medication – Opioid Access during Wildfires



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RESEARCH

The impact of California wildfires on patient access to prescription opioids

Iraklis E. Tseregounis*, Chris Delcher, Susan L. Stewart, James J. Gasper, Aaron B. Shev, Andrew Crawford, Garen Wintemute, Stephen G. Henry

Objective: To determine if wildfires are associate with disruptions in opioid access for patients on long-term opioid therapy

Access to Medication – Opioid Access during Wildfires



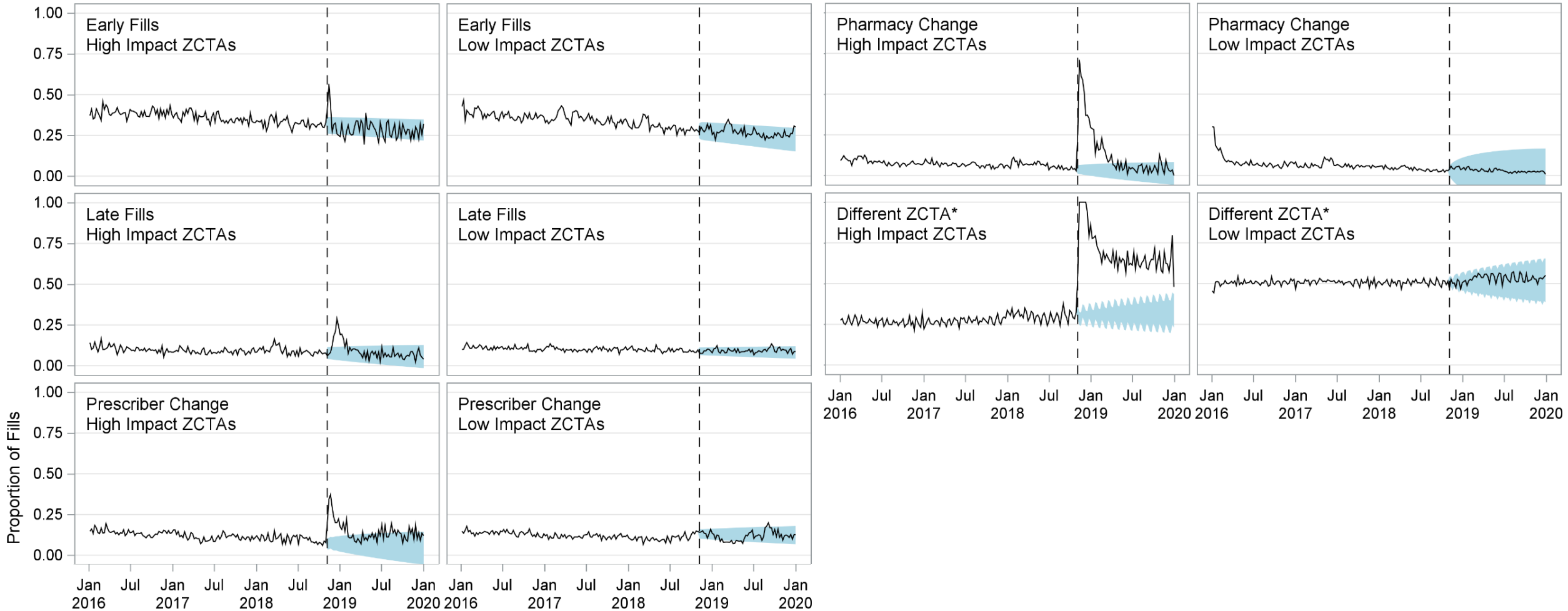
- Analysis focused on two large wildfire events
- **Tubbs Fire**
 - October 2017
 - Napa/Sonoma counties
 - 22 deaths/5,600 structures destroyed
- **Camp Fire**
 - November 2018
 - Butte county
 - 85 deaths/18,000 structures destroyed

Access to Medication – Opioid Access during Wildfires



- Comparison weekly prescribing totals at the ZIP code level pre- and post-fire by fire impact
- Fire impact defined by FEMA individual applications for relief (applications per 100 residents)
 - High: >10
 - Low: 1-10
 - No: 0
- Pre-fire data used to model ARIMA forecasts of expected post-fire proportions and compared to observed data

Access to Medication – Post-Camp Fire ARIMA forecast of expected versus observed weekly proportions



Access to Medication – Opioid Access during Wildfires

- Findings identified a concerning loss of access for patients during the Camp Fire
- Future disaster relief efforts can be improved to ensure patients maintain access to their medications
 - Education of patients as to their options
 - Education of pharmacists on regulations for prescribing Sch.II drugs during a declared emergency
 - Outreach to evacuation zones to ensure patients have access to medications
- Implications beyond California and wildfires

Importance of PDMP-related Research

- PDMP-related research can have a tangible impact in the development of clinical-facing tools and answering questions related to medication access
- PDMPs offer a wealth of prescribing information that can be operationalized to answer important policy questions with real-world implications
 - Natural disaster preparedness
 - Policy evaluation

Thank You!

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- Dr. James Gasper, Department of Healthcare Services
- Center for Healthcare Policy and Research, UC Davis