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)
A Risk Prediction Model for Long-term Prescription Opioid Use

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ORIGINAL ARTICLE
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:

  - 730-Day Look-Back Period (No Opioids Prescribed)
  - 30-Day Period (Inform Model)
  - 60-Day Period (Outcome Assessment)
Prediction Model Development - Method

Development Data (n = 7,175,885)

Predictors selected using backwards selection and the c-statistic to evaluate model fit

Model Developed

Model Scored on Validation Data

Model Adjusted

Miscalibration Identified

Validation Data (n = 2,788,837)

Model Calibrated

Model Validated
**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

![Graph showing calibration](image)

**Calibration Slope:**
1.049 (1.045, 1.053)

**Calibration Intercept:**
-0.006 (-0.016, 0.004)
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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

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

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

RESEARCH

The impact of California wildfires on patient access to prescription opioids

Iraklis E. Tsergounis⁎, 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

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- **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

* Per 10,000 CA Residents Eligible for Medicaid, ** Per 10,000 CA Residents Ineligible for Medicaid
Objective: To determine if wildfires are associated 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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