Me:

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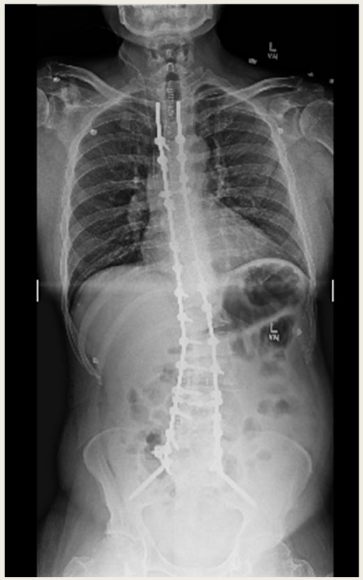
Disclosures: NIH, LSRS BOD, CSNS EC



Opioid work:

- 2018 Restrictive opioid prescribing law implemented in WV
- Sequential, explanatory mixed methods study – interested prescription changes AND unintended consequences
  - *Interrupted time series quasi-experimental analysis of prescription data from WV Board of Pharmacy State PDMP*
    - Electronic database of all schedule II-V substances dispensed by pharmacies to WV patients
    - Includes data from patients regardless of payor
  - *Qualitative investigation of prescription-triad stakeholders (prescribers, dispensers, patients)*

ARIMA

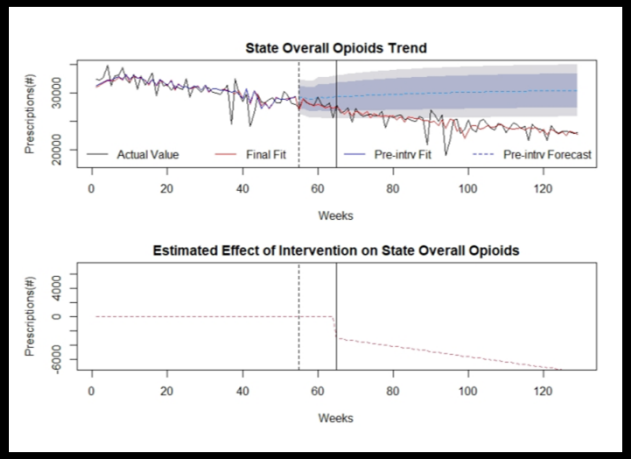
- Variables (for opioids and benzo control):
  - *# of unique first-time opioid prescriptions*
  - *# of unique overall opioid prescriptions*
  - *Daily MME (standard CDC formula)*
  - *Prescription amounts ("days' supply")*
  - *128 week sequence of data for all variables*

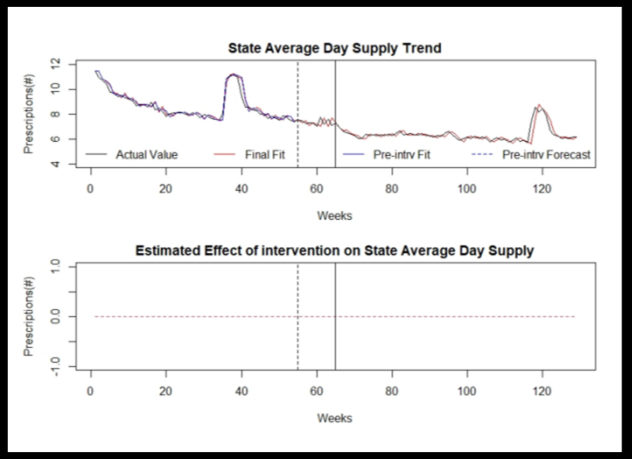
Assuming p is the number of time lags of an AR model and q is the order of an MA model, then an ARIMA process with (p,d,q) order is:
Y_t=c+(φ_1 Y´_(t-1)+φ_2 Y´_(t-2)+⋯+φ_p Y´_(t-p))-(θ_1 ε_(t-1)+θ_2 ε_(t-2)+⋯+θ_q ε_(t-q))+ε_t

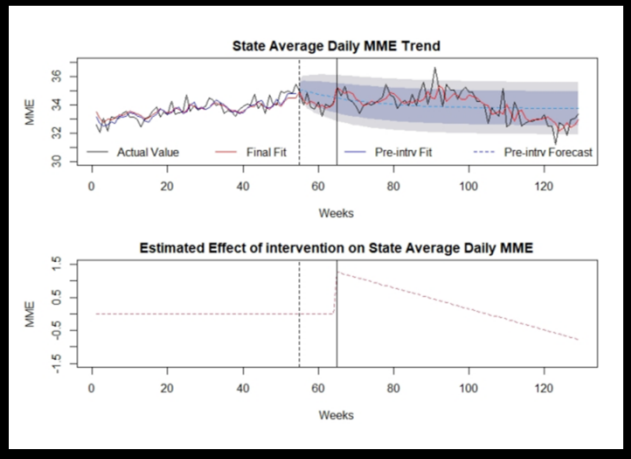
When c is a constant, X_i is the value of time series at time i, $\varphi_1, \varphi_2, \dots, \varphi_p$ are parameters of the model, ε_t is normal random noise at time t, $\theta_1, \theta_2, \dots, \theta_q$ are coefficients of the model, and $\acute{Y}_t = \nabla^d Y_t$. Here d time differencing ($\nabla^d Y_t$ *or* $\mathrm{B}^d Y_t$) helps to produce a stationary process.

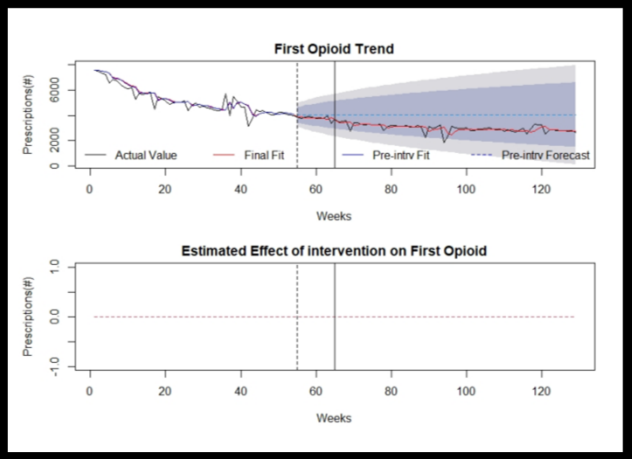
Qualitative Investigation

March 2020– January 2021
20 prescribers, 10 dispensers, and 20 patients (including people using diverted or illicit substances)
Interview guide constructed based upon quantitative data findings
30-60 min telephone interviews were digitally recorded, professionally transcribed, independently analyzed by 3 investigators
Utilized content analysis: Codes were constructed, verified, organized into themes


State Overall Opioids Trend
Prescriptions(#)
Actual Value
Final Fit
Pre-intrv Fit
Pre-intrv Forecast
Weeks
Estimated Effect of Intervention on State Overall Opioids
Prescriptions(#)
Weeks


State Average Day Supply Trend
Prescriptions(#)
Actual Value
Final Fit
Pre-intrv Fit
Pre-intrv Forecast
Weeks
Estimated Effect of intervention on State Average Day Supply
Prescriptions(#)
Weeks


State Average Daily MME Trend
MME
Actual Value
Final Fit
Pre-intrv Fit
Pre-intrv Forecast
Weeks
Estimated Effect of intervention on State Average Daily MME
MME
Weeks


First Opioid Trend
Prescriptions(#)
Actual Value
Final Fit
Pre-intrv Fit
Pre-intrv Forecast
Weeks
Estimated Effect of intervention on First Opioid
Prescriptions(#)
Weeks

Stakeholder themes

Physicians:

- *Fear of disciplinary action for prescribing opioids led to refusal to prescribe*
- *Subsequent care shifts and treatment gaps resulted*
- *There is a lack of efficacious alternatives to opioids for pain in rural areas*
- *Without options, patients transitioned to illicit substances*

Patients:

- *Confirmed that they transitioned to illicit substances after forced tapering or care interruptions*
- *Worsened severity of opioid use disorder*

"[It] really started to scare a lot … of providers into feeling that it wasn't worth the risk to continue to prescribe for fear of being labeled as an over prescriber or being outside of the norm or, you know, the potential liability that goes along with it."

"They were coming in and busting a lot of docs and then making it so… that we didn't need that law to be afraid."

"I think the law that occurred in 2018, really, if anything shifted us to a place where there's not enough opioid prescribing for many painful conditions that aren't treatable with other means."

"That was a big problem and a big oversight on behalf of law enforcement and the physician community… We didn't have a good plan when we got these doctors down. We didn't- we didn't go in and find all these patients and… pick up the pieces from these patients. So that we could appropriately taper them and in a way that managed … their withdrawal symptoms and their dependency without them turning to the illicit market. And I think that's a big source of a lot of our problems."

"They were coal miners and never had drug problems ever before but finally couldn't get pain medicine anymore from a doctor and it ruined their lives. They spent all of their money. It ruined their marriages, ruined the relationship with their children, and they were just trying to be good, honest, working people"

Implications/Lessons Learned

- Wider stakeholder involvement in law development
- Improved anticipation of related harms
- Fail-safes to avoid patient abandonment
- Improve knowledge of and access to non-opioid (and opioid?) treatments for pain in rural communities