

## **DAG**

Main exposure: ADF opioid use Outcome: Overdose death

Population: adult chronic pain patients (with insurance)

prescriber impression of patient

prior acute vs. chronic opioid

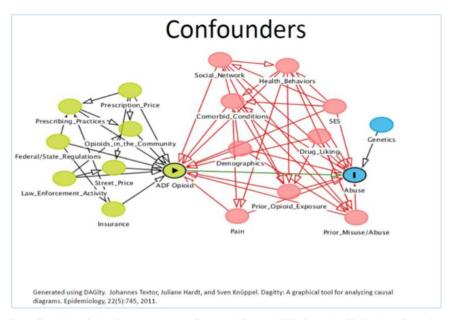
surgery

hospice

mental health history

gabapentin use

MAT



Source: Tamra Meyer, Designs that assess exposure and outcome in the same individuals over time, FDA Meeting on Data and Methods for Evaluating the Impact of Opioid Formulations with Properties Designed to Deter abuse in the Postmarked Settings: A Scientific Discussion of Present and Future Capabilities, July 10, 2017, Silver Spring, MD.

## Directed acyclic graph depicting relationships of ADF use with overdose and covariates Unmeasured Confounding Unduly high Urinalysis opiates Number of prescribers Mental health history Substance abuse history Drug seeking Overdose ADF use Dosage (MME) Days' supply (# days) Formulation Non-fatal Causal Pathway of Interest (controlled release/ transdermal/ ADF+antagonist) Fatal Sex Age Pain Diagnosis Physician specialty SÉS Insurance type Comorbidity Home to care facility distance Non-causal pathway

Uncontrolled confounding
Minimal sufficient set