Introduction

- Long term secular decline in mortality
- Especially pronounced for minorities
- Starting in late 1990s, mortality rates started to climb for middle-aged whites – particularly low educated males
- Generated from particular deaths
  - Drug poisonings, suicides, alcohol liver disease
  - Case and Deaton: “Deaths of despair”

This class

- Outline the basic trends
  - Trends are scary
  - The declining economics prospects for low-skilled males is a part of the problem
- Two notes
  - Problem is concentrated in a particular group
  - But economics is not the whole story

- Components of the trends
  - Most of the deaths of despair is rising drug deaths
  - Most of drug deaths are opioid/heroin
  - Outline the origins of the opioid/heroin/fentanyl crisis
    - Opioid crisis looks to be started by OxyContin
    - Heroin crisis started by the reformulation of Oxy
    - Fentanyl crisis piggy-back on the heroin crisis
White 25-29: 82% increase
Black 25-29: 8% decline
White 30-34: 90% increase
Black 30-34: 12.5% decline
Deaths of Despair and Its Components

65% of the increase in the deaths of despair due to drugs

Deaths of despair

Drug poisonings

Suicides

Alcohol-related liver mortality

Deaths of despair and its components.

Drug Poisonings, 1999-2016

77% of the increase in the drug poisoning rate is heroin/opioid poisonings

All drugs

Heroin/opioids

Not heroin/opioids

Drug poisonings, 1999-2016.

White, non-Hispanics, 25-34

72% of the increase in the death rate is heroin/opioid poisonings

All cause (left axis)

Heroin/opioid (right axis)

White, non-Hispanics, 25-34.

White, non-Hispanics, 35-44

98% of the increase in the death rate is heroin/opioid poisonings

All cause (left axis)

Heroin/opioid (right axis)

White, non-Hispanics, 35-44.
Case and Deaton

- Deaths of despair are a result of the breakdown in institutions: Jobs, earnings, family
- Time trends are easy to establish
- Correlation pronounced
- Correlation ≠ causation
Problem for Case and Deaton

- Institutional outcomes have been declining for Blacks as well
- Poorer levels and same trends in outcomes
- Why has the drug crisis not impacted this group?
The drug crisis

Some facts

- Drug deaths now 72,000/year
  - MV fatalities: 40,100
  - Gun deaths: 40,000
  - Homicides: 19,500
  - Suicides: 47,173

- Between 1989 – 2017
  - 704,000 drug poisoning deaths
  - About the same number of US soldiers that have died in armed conflicts from Spanish American War through Operation Enduring Freedom
States with Lower Changes in Opioid Death Rates

States with the Highest Changes in Opioid Death Rates

Opioid Death Rate, 1999-2017

Opioid Death Rates, 1999-2017
How did the opioid crisis come about

- Three distinct crisis
  - Opioid, then heroin, now fentanyl

- All are all related
  - Opioids led to heroin
  - Heroin led to fentanyl
Part 1: The Rise of OxyContin

Re-analysis of pain management

- <1990s, opioids mainly used for acute pain
  - Post surgery, cancer
- 1990s movement to use for chronic pain
  - 1996 – Consensus statement of two professional pain societies –
    - “an epidemic of untreated pain”
    - Urged a more general use of opioids
    - < 1% of opioid users become addicted
  - 1998 – Federation of State Medical Boards – MDs will not face discipline for heavy use of pain meds
  - 2001 Joint Commission – pain is the “5th vital sign”

Enter OxyContin

- Synthetic drug with similar properties to heroin
- Active ingredient is Oxycodone
  - Been around since 1917
  - Introduced to US in 1935
  - Percodan – Oxycodone and aspirin (1950)
  - Percocet – Oxycodone and acetaminophen (1974)
- OxyContin introduced in 1996
  - Purdue Pharma (Sackler Family)
  - Extended release (ER) drug – high mg content
  - $35 billion in worldwide sales through 2015

Enter OxyContin

- Released at same time as reform taking place
- Purdue actively marketed to doctors
- Originally marketed as “non habit forming”
  - Purdue trained sales force to mislead about addiction
  - Porter and Jick (1980)
Enter OxyContin

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  - Purdue trained sales force to mislead about addiction
  - Porter and Jick (1980)
  - In 1996, Purdue was allowed to say addiction is rare when appropriately used
  - Forced to stop in 2001
  - 2007 – Paid $600 million in fines to Feds

Advertising plan

- 1996 – advertise OxyContin for cancer patients
- 1997 and on – push for chronic pain sufferers
- Budgeted $640 million to advertise from 1996-2000
Triplicate Prescription Pad states

- 9 states in 1995 (CA, HI, ID, IL, IN, MI, NY, RI, TX)
- 3 copies
  - For Schedule II drugs
    - Narcotic analgesics (including OxyContin)
    - Barbiturates
    - Stimulants
  - One kept by the Doc
  - Two given to pharmacy – one sent to state
  - State monitors use
- Schedule III drugs included at the time
  - Vicodin
  - Codeine
  - Combination drugs
  - Dihydrocodeinone

Purdue and Triplicate states

- Focus groups – Doc’s don’t like triplicate pads
  - “Based on the discussion with the two groups of doctors in the triplicate state, albeit a small sample, it did not appear that they used Class II narcotics for treatment of non-cancer pain. Most did not want to go through the trouble involved, and they did not want to give the Government an excuse to monitor their activities”
- Heavy use of Schedule III drugs
  - “Writing triplicate prescriptions was more trouble than others, due to the details of the forms and the various people that need to be copied on them. To the extent that they can avoid this extra effort, they will try to follow alternate protocols”

Purdue and Triplicate states

- Especially true for acute pain
  - “For the most severe conditions, such as those occurring as a result of trauma or post-operative conditions, they would prescribe a narcotic. In the non-triplicate states, this was often a class II Opioid, whereas in the one triplicate state we visited, it was a Class III opioid” (p.26)
- Barrier to success in these states
  - “However, because oxycodone is a Class II opioid, prescribing OxyContin will entail a triplicate prescription in those states requiring them. In addition, Class II opioids cannot be phoned in to the pharmacy, while Class III opioids can. These regulations create a barrier when positioning OxyContin versus the Class III opioids”

- Advertising strategy – avoid triplicate states
  - “Among the physicians in this triplicate state who do use Class II narcotics in the treatment of non-cancer pain, our research suggests the absolute number of prescriptions they would write each year is very small, and probably would not be sufficient to justify any separate marketing effort” (p. 39)
Drug Death Rates by Triplicate Status

Deaths/100K

Year

1989 1991 1993 1995 1997 1999 2001 2003 2005 2007 2009 2011 2013 2015

non-Triplicate States

Triplicate States

Forecasts based ≤ 1996 data
Opioid Death Rates by Triplicate States

Non-Opioid Death Rate by Triplicate Status

Part 2: The Movement to Heroin

Oxy reformulation

- Purdue Pharma responds to critics by releasing abuse-resistant version
- FDA approves reformulation on April 5, 2010
- New formulation is released without notice on August 10, 2010
- Old drugs immediately pulled from market
Old and New OxyContin crushed

Problem
- Demand for opioids is still there
- The ability to get high is NOT
- Solution: switch to a close substitute
- That alternative: heroin

Heroin markets in US
- Historically – heroin markets divided by the Mississippi River
  - East was white powder heroin from SE Asia
  - West was black tar heroin from Mexico
- Largest markets: NE and MW
- Mexican heroin making larger inroads all across US
  - Taken over Chicago, Philly, DC, NJ, part of NY

New suppliers: Xalisco Boys cartel
- Pioneered new distribution system:
  - Cell owner supplies heroin from Mexico
  - Cell manager in US city/town
    - receives shipments
    - runs the business
  - Telephone operator stays in an apartment all day receiving orders and relays these to drivers
  - Drivers meet consumers and sell the heroin
• High focus on product quality and customer service
• When they enter a city they sought out high users
• Now
  – US awash in heroin
  – Amazingly high quality
  – Very low price

Real heroin prices

Dating the switch to heroin

Dating the heroin crisis
• Examine lots of national time series
  – Opioid use/abuse
  – Heroin abuse
• Use a statistical procedure to date a “structural break”
• All series break right after the reformulation of OxyContin
The results

- Reformulation of OxyContin brought about a shift to heroin
- The decline in deaths to opioids was compensated 1-for-1 with deaths from heroin
- Problem: Federal governments’ only solution to the opioid crisis SO FAR has been to encourage abuse-deterrent formulation
- Little likelihood of success as long as heroin and fentanyl is so prevalent
Part 3: The Movement to Fentanyl

Fentanyl

- ~2013, heroin begins to be laced with fentanyl
- Fentanyl 50 x more potent than morphine
  - Prince died of a fentanyl OD
- Source
  - Legal diversion
  - Created in clandestine labs
  - Mixed w/ heroin
  - Counterfeit opioid pills

Amount needed to OD, Heroin and Fentanyl

How is Fentanyl making it to the US?

- Order by mail from China
  - “The most common distribution medium is via the U.S. Postal Service,” US Treasury
  - FedEx/UPS subject to electronic tracking of foreign packages to identify source USPS is not
  - Work in small independent networks
  - 700 fentanyl-related sales listing on English language dark web sites
How is Fentanyl making it to the US

- Mexican drug gangs
  - Produced in Mexico
  - $32,000 in raw ingredients can produce 1 million pills w/a street value of $20 million
  - Brought in as a raw drug
  - Any mixing with other drugs is done at the retail and not wholesale level
  - Sinaloa Jalisco cartels are the most likely sources
  - Few years ago, going wholesale price for heroin/pound in Mexico was $600. Now $100

Tradeoffs

- Chinese mail-order
  - Lower volume, high purity (90%)
- Mexican gangs
  - Much higher volume, lower purity (<10%)
Restrictions

• 2018 – At G-20 dinner with Trump and Xi in Buenos Aires, Xi agreed to reclassify fentanyl controlled substance
• Makes these dark web sites in China subject to enforcement by state government

Some success
– Has decreased darkweb sellers
– Of USPS seized with fentanyl, most are now from US

Some concerns
– China may now be shipping precursors to Mexico
– Mexico produces the fentanyl