UC San Diego
SCHOOL OF MEDICINE

Department of
BioMedical Informatics

Bolarin Lawrence

Information Visualization for Prescription Drug Monitoring Program Data

About Me

Bolarin Lawrence

- Second Year at UC San Diego

- Nanoengineering Major with a Biology Focus

- Interest in the pharmaceutical industry

Opioid Crisis

The Opioid Epidemic has been a **major medical issue** in the United States for decades.
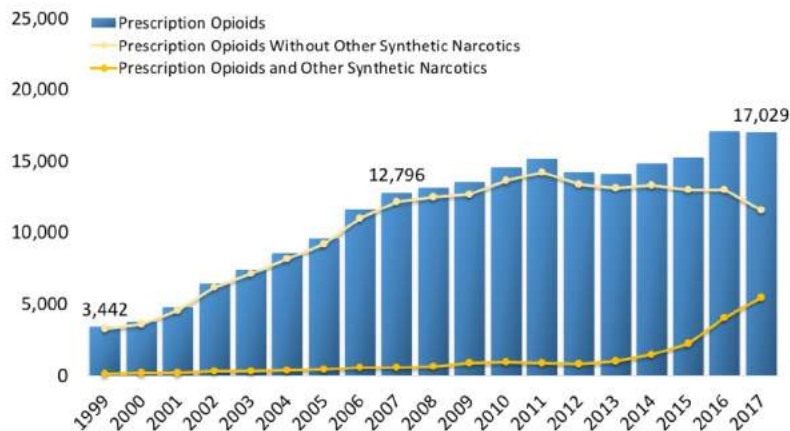
- The National Safety Council stated in their 2019 report that Americans are **more likely to die from opioid overdoses** than from car crashes (Bursztynsky).

There are **two types of opioids: prescription and illegally obtained**. A patient, however, can become dependent and addicted to prescription opioids.

- Individuals who become **addicted** may schedule their lives around these drugs, prioritizing them over other activities.
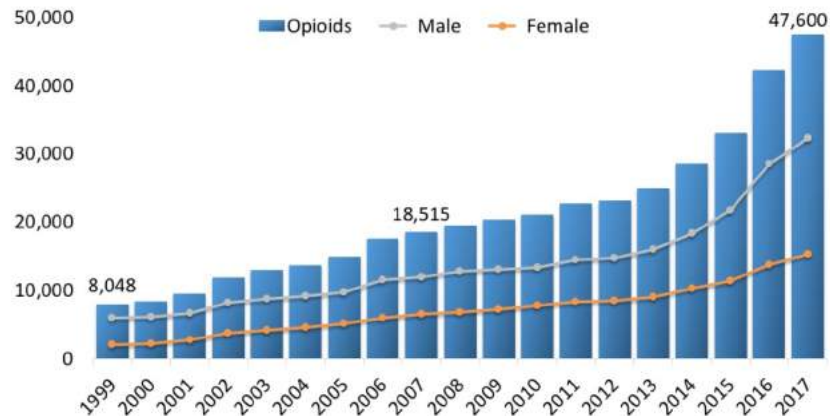
National Drug Overdose Deaths Involving Prescription Opioids, Number Among All Ages, 1999-2017
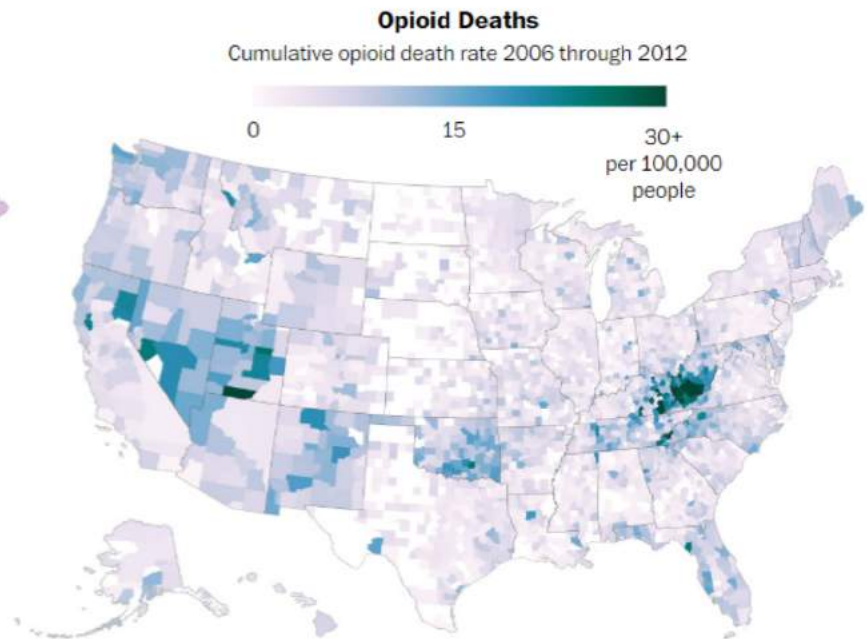

Legend:
- Prescription Opioids
- Prescription Opioids Without Other Synthetic Narcotics
- Prescription Opioids and Other Synthetic Narcotics

Data points: 3,442 (1999); 12,796; 17,029 (2017)

National Drug Overdose Deaths Involving Any Opioid, Number Among All Ages, by Gender, 1999-2017

Legend:
- Opioids
- Male
- Female

Data points: 8,048; 18,515; 47,600

Number of pills per person per year

Average county yearly total 2006 through 2012

5   75   150+

Opioid Deaths

Cumulative opioid death rate 2006 through 2012

0   15   30+ per 100,000 people
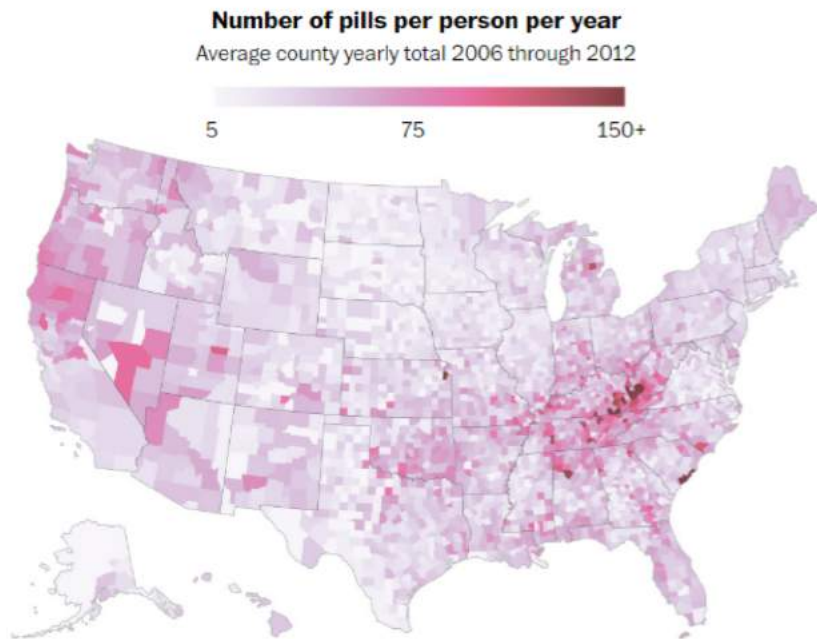
Source: Data compiled by the DEA and CDC and analyzed by The Post

So how do we solve this?

A change in how doctors monitor
patients needs to occur!

What we have currently!

Prescription Drug Monitoring Program (PDMP)

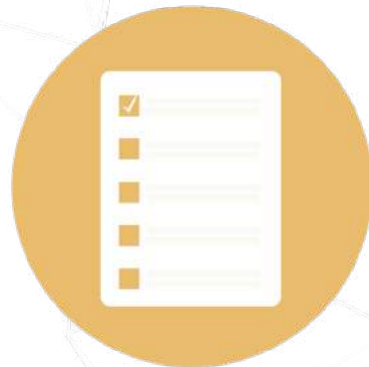- A program created that promotes public health by identifying the misuse of prescription medications.

Controlled Substance Utilization Review and Evaluation System

- A PDMP platform for controlled substances in California.

Prescription Drug Monitoring Program

Pharmacies

Healthcare Providers

State Insurance Programs

Healthcare Licensure Boards

State Health Department

Law Enforcement

CURES 2.0
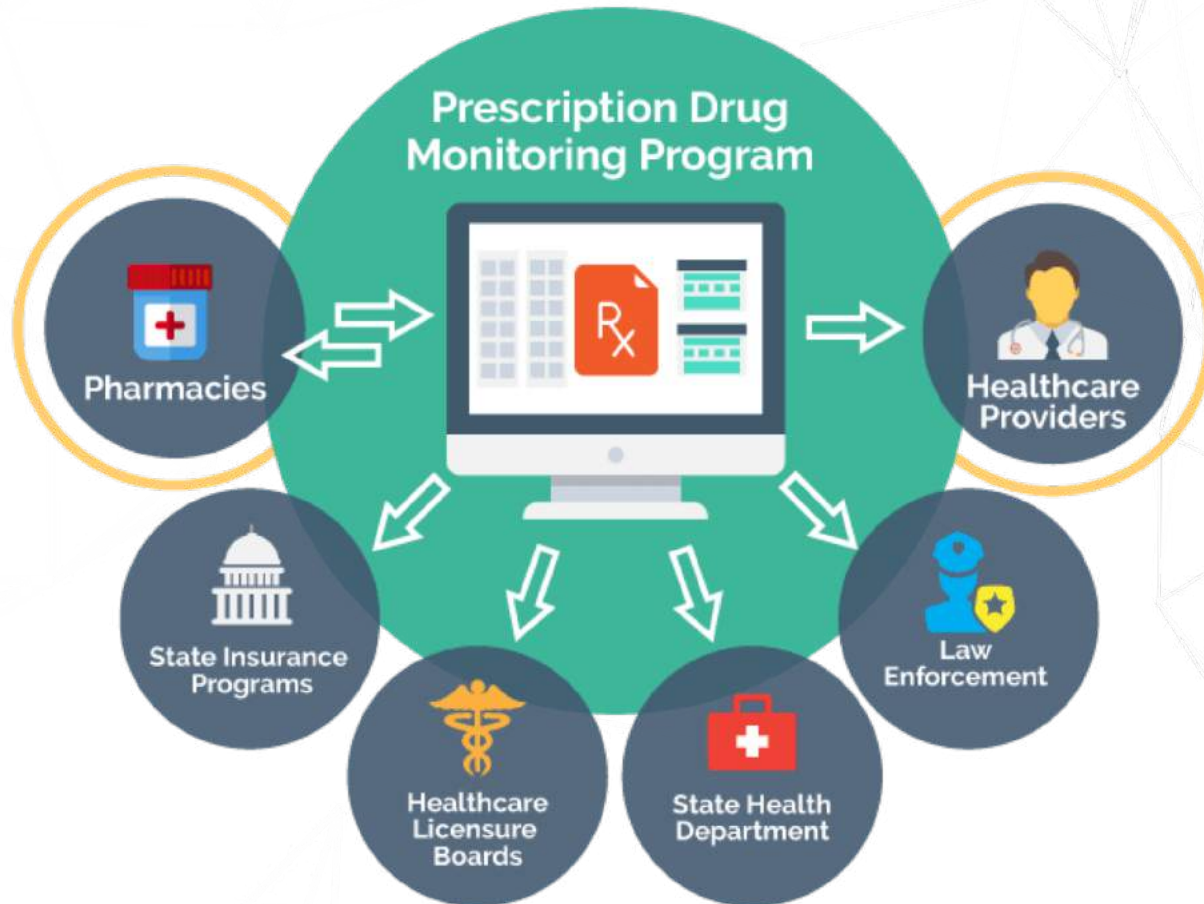
	New Date Filled	Compact	Drug Name	Opioid	Form	Drug Strength	Opioid Strength	Qty	Days Supply	Species Code	Refill#	Refills Authorized	Payment Method	Presc. DEA#	Pharmacy Name
1	New Date Filled	Compact	Drug Name	Opioid	Form	Drug Strength	Opioid Strength	Qty	Days Supply	Species Code	Refill#	Refills Authorized	Payment Method	Presc. DEA#	Pharmacy Name
2	6/13/2019	N	MORPHINE SULFA	MORPHINE	TER	15 MG	15	60	30	1	0	0	Other	BP	VONS PHARMACY #1
3	5/11/2019	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	1	3	Military/VA	FY	N/A
4	5/7/2019	N	MORPHINE SULFA	MORPHINE	TER	15 MG	15	60	30	1	0	0	Other	BP	VONS PHARMACY #1
5	4/7/2019	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	0	3	Military/VA	FY	N/A
6	4/7/2019	N	MORPHINE SULFA	MORPHINE	TER	15 MG	15	60	30	1	1	0	Other	MH	VONS PHARMACY #1
7	3/22/2019	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	30	30	1	0	3	Military/VA	FY	N/A
8	3/8/2019	N	MORPHINE SULFA	MORPHINE	TER	15 MG	15	60	30	1	0	0	Other	BP	VONS PHARMACY #1
9	3/2/2019	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	5	5	Military/VA	FY	N/A
10	2/9/2019	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	4	5	Military/VA	FY	N/A
11	2/1/2019	N	MORPHINE SULFA	MORPHINE	TER	15 MG	15	30	30	1	0	0	Other	MH	VONS PHARMACY #1
12	1/7/2019	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	3	5	Military/VA	FY	N/A
13	12/14/2018	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	2	5	Military/VA	FY	N/A
14	11/24/2018	N	DIAZEPAM	N/A	TAB	5 MG	5	3	2	1	0	0	Other	MV	VONS PHARMACY #1
15	11/6/2018	N	OXYCODONE HCL	OXYCODONE	TER	10 MG	10	30	30	1	0	0	Other	BP	VONS PHARMACY #1
16	11/6/2018	N	ACETAMINOPHEN	HYDROCODONE	TAB	325 MG-5 MG	5	120	15	1	0	0	Other	BP	VONS PHARMACY #1
17	11/2/2018	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	1	5	Military/VA	FY	N/A
18	10/7/2018	N	ACETAMINOPHEN	HYDROCODONE	TAB	325 MG-5 MG	5	240	30	1	0	0	Other	MH	VONS PHARMACY #1
19	9/25/2018	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	0	5	Military/VA	FY	N/A
20	9/19/2018	N	OXYCODONE HCL	OXYCODONE	TAB	5 MG	5	76	13	1	0	0	Com.Insurance	BP	VONS PHARMACY #1
21	9/4/2018	N	OXYCODONE HCL	OXYCODONE	TER	10 MG	10	60	30	1	0	0	Com.Insurance	BP	VONS PHARMACY #1
22	9/2/2018	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	5	5	Military/VA	FY	N/A
23	8/19/2018	N	OXYCODONE HCL	OXYCODONE	TAB	5 MG	5	120	20	1	0	0	Com.Insurance	MV	VONS PHARMACY #1
24	8/7/2018	N	OXYCODONE HCL	OXYCODONE	TER	10 MG	10	60	30	1	0	0	Com.Insurance	MV	VONS PHARMACY #1
25	7/27/2018	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	4	5	Military/VA	FY	N/A
26	7/8/2018	N	OXYCODONE HCL	OXYCODONE	TER	10 MG	10	60	30	1	0	0	Com.Insurance	MV	VONS PHARMACY #1
27	7/8/2018	N	OXYCODONE HCL	OXYCODONE	TAB	5 MG	5	120	20	1	0	0	Com.Insurance	MV	VONS PHARMACY #1
28	6/23/2018	N	ZOLPIDEM TARTR.	N/A	TAB	5 MG	5	60	30	1	3	5	Military/VA	FY	N/A

John Smith

List patient sex and age:

- Sex: Male
- Date of Birth: 02/23/1986
- Address: 123 Main Ave, San Diego, CA 88888
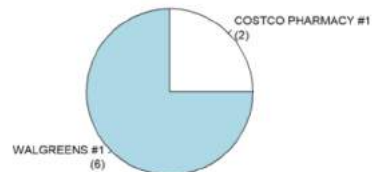
C.U.R.E.S. Data

These are visual representation of the CURES Data for John Smith

These are the locations of the pharmacies that John Smith visited during the time period:
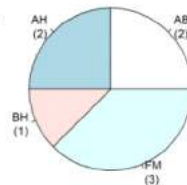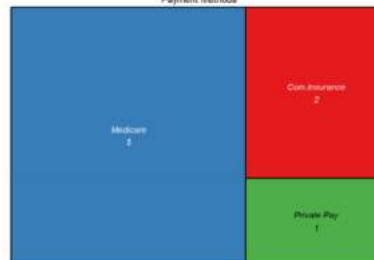
PAGE 1

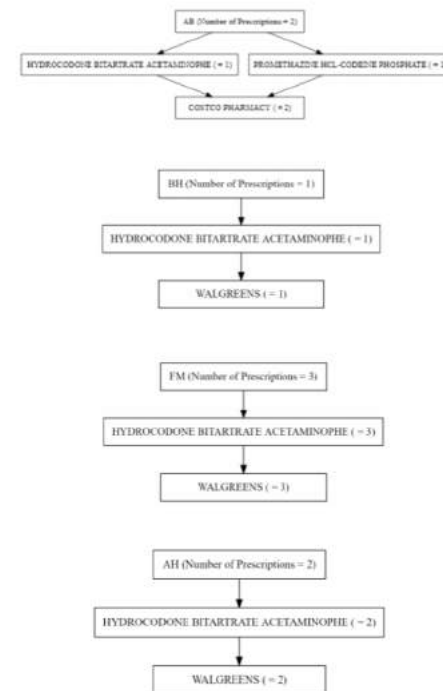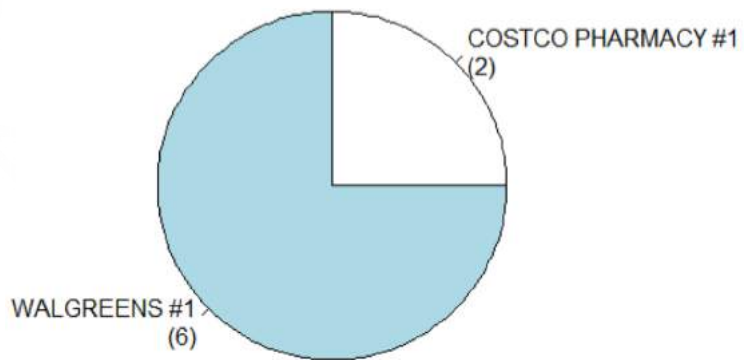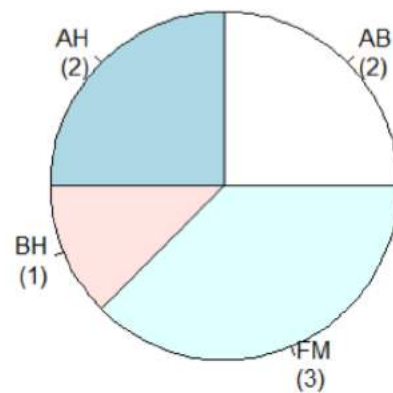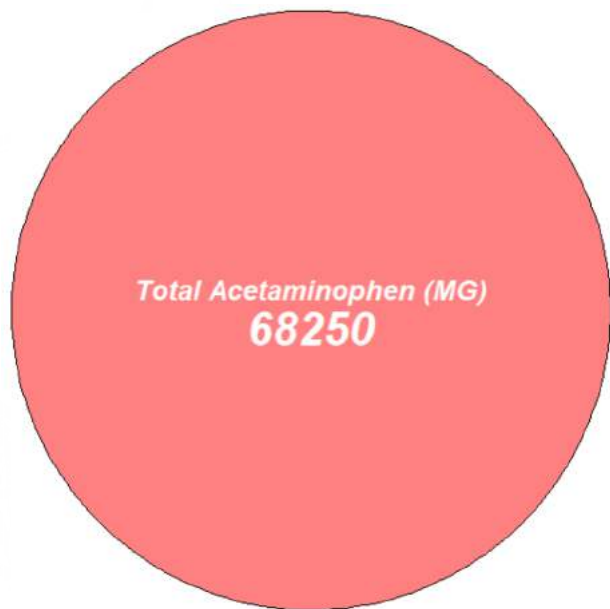**Distribution of Pharmacies**

Distribution of DEA Numbers

COSTCO PHARMACY #1 (2)

WALGREENS #1 (6)

AH (2)

AB (2)

BH (1)

FM (3)

Total Acetaminophen (MG)
68250

Number of Unique Pharmacies
2

Payment Methods

Medicare 1

Com.Insurance 2

Private Pay 1

PAGE 2

Prescriber Flowcart of CURES Data

AB (Number of Prescriptions = 2)

HYDROCODONE BITARTRATE ACETAMINOPHE (= 1)

PROMETHAZINE HCL-CODEINE PHOSPHATE (= 1)

COSTCO PHARMACY (= 2)

BH (Number of Prescriptions = 1)

HYDROCODONE BITARTRATE ACETAMINOPHE (= 1)

WALGREENS (= 1)

FM (Number of Prescriptions = 3)

HYDROCODONE BITARTRATE ACETAMINOPHE (= 3)

WALGREENS (= 3)

AH (Number of Prescriptions = 2)

HYDROCODONE BITARTRATE ACETAMINOPHE (= 2)

WALGREENS (= 2)

PAGE 3

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Distribution of Pharmacies

COSTCO PHARMACY #1
(2)

WALGREENS #1
(6)

Distribution of DEA Numbers

AH
(2)

AB
(2)

BH
(1)

FM
(3)

Number of Unique Pharmacies
2

Total Acetaminophen (MG)
68250

Payment Methods

Medicare
5

Com.Insurance
2

Private Pay
1

FM (Number of Prescriptions = 3)

↓

HYDROCODONE BITARTRATE ACETAMINOPHE (= 3)

↓

WALGREENS (= 3)

BH (Number of Prescriptions = 1)

↓

HYDROCODONE BITARTRATE ACETAMINOPHE (= 1)

↓

WALGREENS (= 1)

Average MME Per Day in Drug Prescriptions: David Brown

Total Prescription Days Supplied: 470 days
Number of Unique Drugs: 3
If MME per day > 49 mg suggest naloxone
If MME per day > 89 mg recommend naloxone
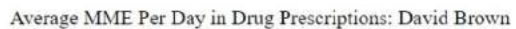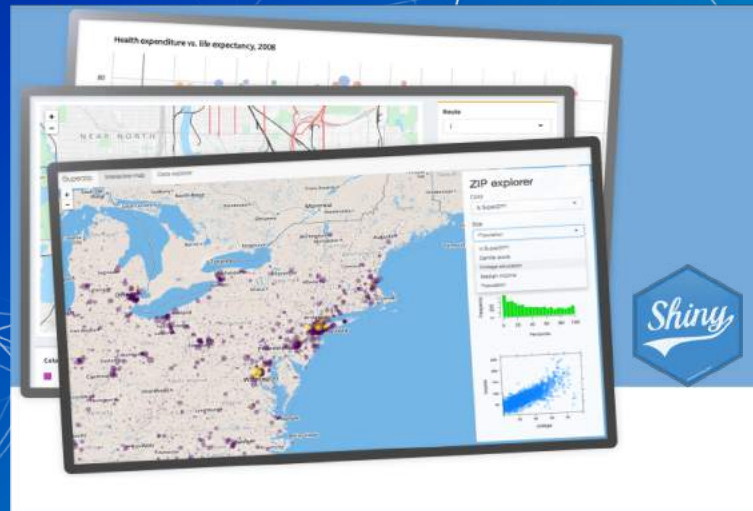
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Next steps

What I learned

Professional

- R (programming language)
- Data Visualization
- Opioids (Epidemics, Prescription Drugs, MME)

Personal

- Independent learning
- Communication

Thank you!

- Dr. Jejo Koola

- Dr. Gregory Polston

- Dr. Zaid Yousif

- Reid Otsuji

- Stephanie Labou

- Mary Linn Bergstrom

- Elizabeth Santillanez

- National Library of Medicine (Training Grant T15LM011271)

Questions?

Works Cited - Images

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