

Using “big data” to enhance clinical  
and population-level health  
interventions:  
How academics can add value

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# What is Population Health Sciences ?

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- Development and application of tools integrating clinical, biologic, social and environmental data on large numbers of people to:
  - Provide evidence for improved health care delivery at the bedside
  - Establish scientific foundations for population level decision making impacting health of groups
  - Enhance our understanding of the pathways by which health and disease evolve over the life-course

# Core Disciplines

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- Health Services Research
- Epidemiology
- Informatics and Biostatistics
- Demography
- Genetics
- Environmental Science
- Economics, Psychology, Sociology & other Social Sciences

# Data Set Overview

## Large Regional/National Data

- Optum
- *Marketscan*
- *CMS*
- IRiSS – Census Data
- Danish Biobank
- Alcoa Occupational Cohort
- Solano Cohort
- HRS/CMS Linked Data
- Kaiser Northern California
- Stanford Military Data Repository
- NHANES Dietary Data
- VA Disability
- HCUP Nationwide Inpatient Sample

## Children

- CPQCC Neonatal Database
- March of Dimes
- HCUP – KID
- California Perinatal Quality Care Collaborative

## Stanford PHS Data Vault



## Stanford Data

- STRIDE
- Stanford Cancer Genetics Research Database
- Stanford Imaging Studies
- Asthma/Allerg

## Disease Specific Data

- AIDS Clinical Trials Group data
- DAIDS data sets
- California Cancer Registry
- Ovarian Cancer Assoc. Consortium

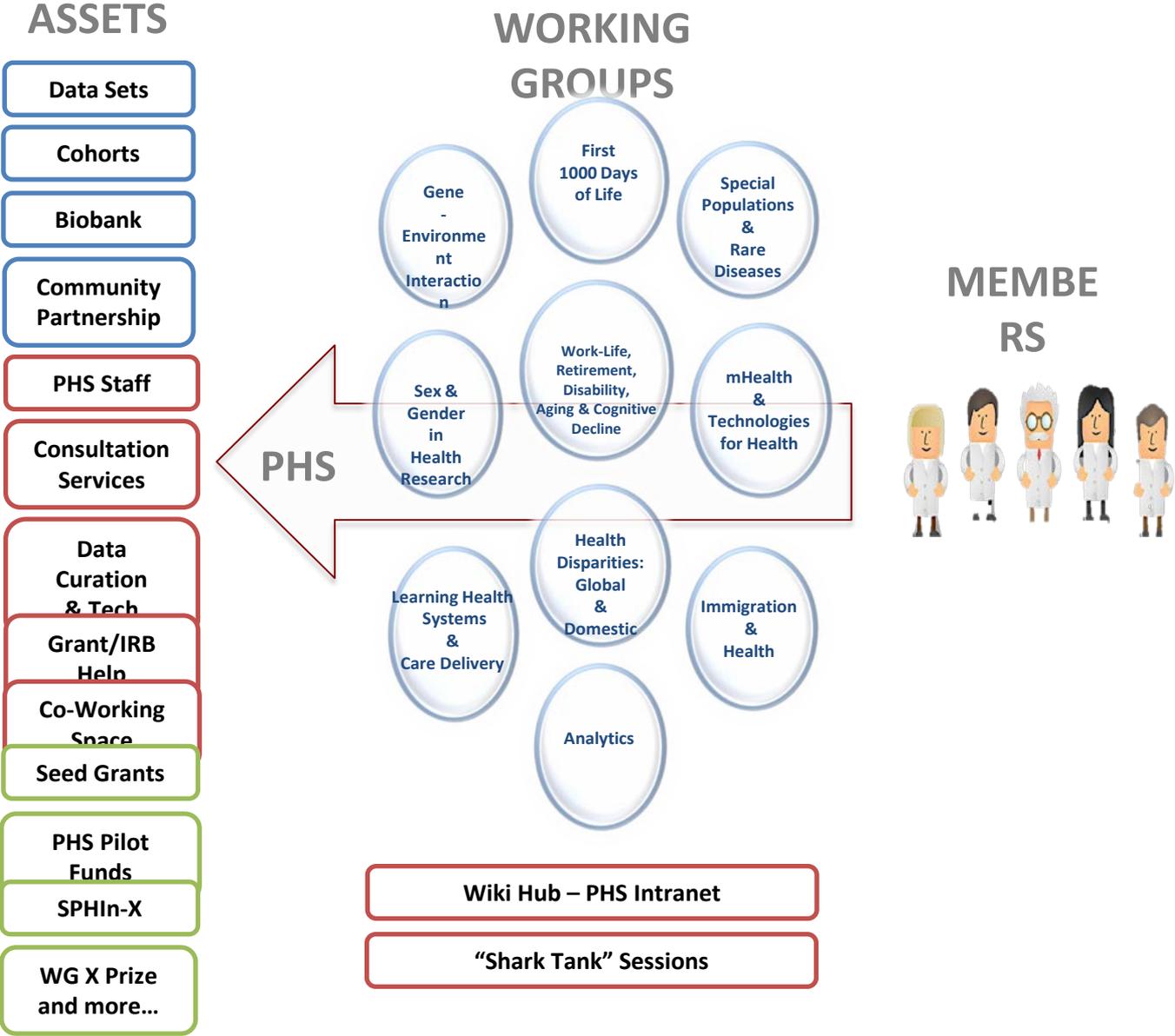
## Global Health Data

- *Indian Rail Service*
- Africa - Demographic and Health Surveys/ INDEPTH
- *Singapore Cohort*
- *Taiwan National Insurance*
- FEWSnet food price dataset

## Environmental Data

- California Neighborhoods Data System
- Worldwide weather data
- Particulate matter
- Pesticide use

# PHS Resources





# Mapping and layering



Santa Clara  
county

aerial pesticide application

air quality – PM 2.5

industrial waste

percent below poverty level

automobile exhaust

ground level ozone

...disease prevalence, risk factors, data from remote sensing devices, etc.

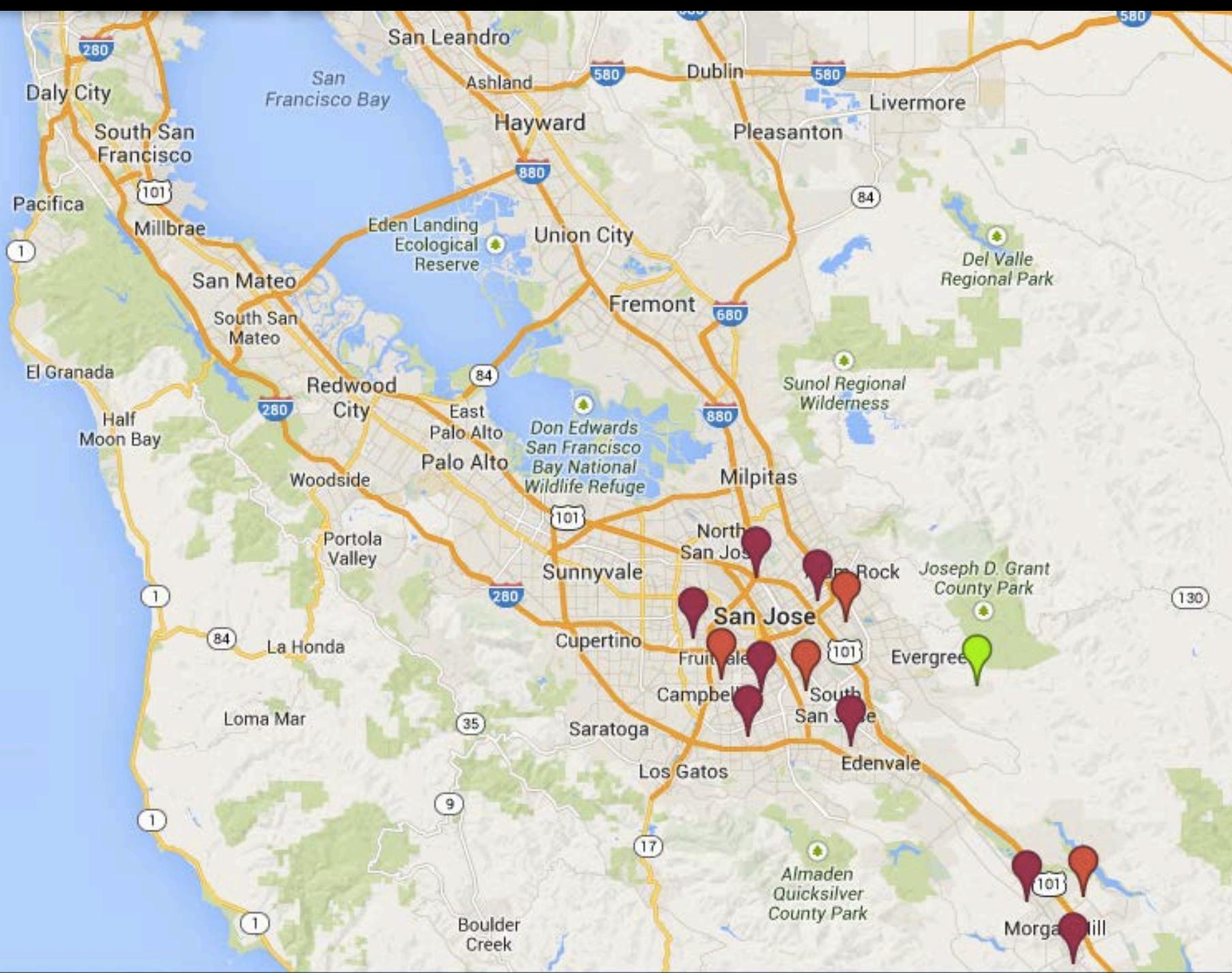


**WHICH ONE  
DESERVES  
TO DIE?**

# **Wellness and Surveillance in our Neighborhood: Community Engagement Science**

There's 4 killers on the loose in our County;  
we know who they are but we can't catch them

... YET





**3 for Life**

# “Syndrome” Surveillance

- Defining patterns of clinical complaints
- Presenting them in real-time and real-place
- System for always knowing “what’s going around” ...

# “Street drugs”

San Francisco Chronicle

## Overdose deaths linked to pills containing fentanyl

By Erin Allday | April 2, 2016 | Updated: April 2, 2016 8:55pm



Photo: Andrew Seng, Aseng@sacbee.com



Family and friends gather at Pollack Ranch Park in South Sacramento on Friday, April 1, 2016, to remember Jerome Butler. Butler who on Wednesday, March 30, 2016, died after taking what he believed was a Norco pill given to him by a friend. The pill is believed to have contained the powerful painkiller fentanyl. Butler is one of several people in Sacramento County in recent days to die in a recent wave of opiate overdoses. As of Friday morning, 36 overdose cases and nine deaths linked to the synthetic opioid fentanyl have been reported to the Sacramento County Department of Health and Human Services. Public health officials believe that fentanyl, a powerful synthetic opioid that can cause cardiac arrest, was laced into counterfeit Norco tablets, a common prescription painkiller. They're urging people not to take prescription-type pills that haven't been prescribed by and obtained from a physician or pharmacy.

# Doctor fighting S.F. diabetes epidemic backs soda tax

By Heather Knight | April 2, 2016 | Updated: April 2, 2016 6:58pm



Photo: Lea Suzuki, The Chronicle



Dr. Dean Schillinger talks with a patient during a medical appointment at San Francisco General Hospital on Monday, February 22, 2016 in San Francisco, California.



**Half a million well**