Surveillance Using Sentinel and iMEDS Program

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Postmarketing Surveillance Using Sentinel and IMEDS

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Insurance claims

Billing information

Hospital records

Outpatient records

Disease registries

Wearables

CMS Data

???

What is Sentinel?

- FDA's post-market active surveillance system launched in 2008
- Provides privacy-protected real world evidence on use of medical products
- Electronic healthcare and claims data from 17 data partnerships
- Captures billions of encounters with healthcare system
- 300,000,000 unique patients' records
  - Administrative
  - Clinical
  - Registries
- >425 million person-years of observation time
- Based on distributed data network and common data model

Legislatively Mandated

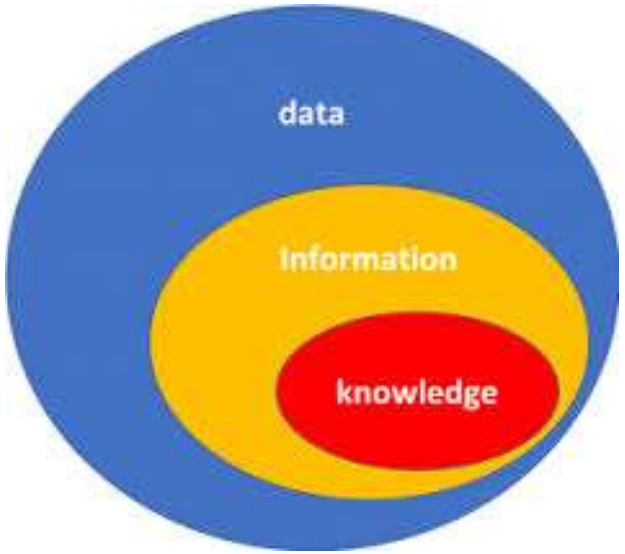
"…create a robust system to identify adverse events and potential drug safety signals"

Federal Food, Drug, and Cosmetic Act
Sec. 505(k)(3)(C)(i)(3)(cc)
(21 U.S.C. 355(k)(3)(C)(i)(III)(cc))

Why is Sentinel important?

- Generates real world evidence from billions of healthcare records to support regulatory actions related to medical product safety

- Evidence helps inform healthcare provider decision- making for patients



What kinds of question can Sentinel answer?

Example 1

- How many patients take the same drug?
- How many patients are having side effects?
- How many are male and female?
- Are side effects more common after taking one drug than after another drug that treats the same problem?

Example 2

- Number of tablets of X dispensed to outpatients in 2017?
- Patients who filled a prescription for X who also filled a prescription for Y?
- Risk of a problem among patients dispensed both drug X and drug Y compared to patients dispenses drug X and drug Z?

What does FDA do with Sentinel information?

- FDA queries are submitted to participating organizations
- Those organizations summarize and aggregate the responsive data
- Aggregated data submitted to FDA for safety evaluation
- FDA can do the following:
  - Determine that outcome not product related
  - Revise label
  - Restricted use
  - Media Alerts/MedWatch
  - Removal of drug or vaccine

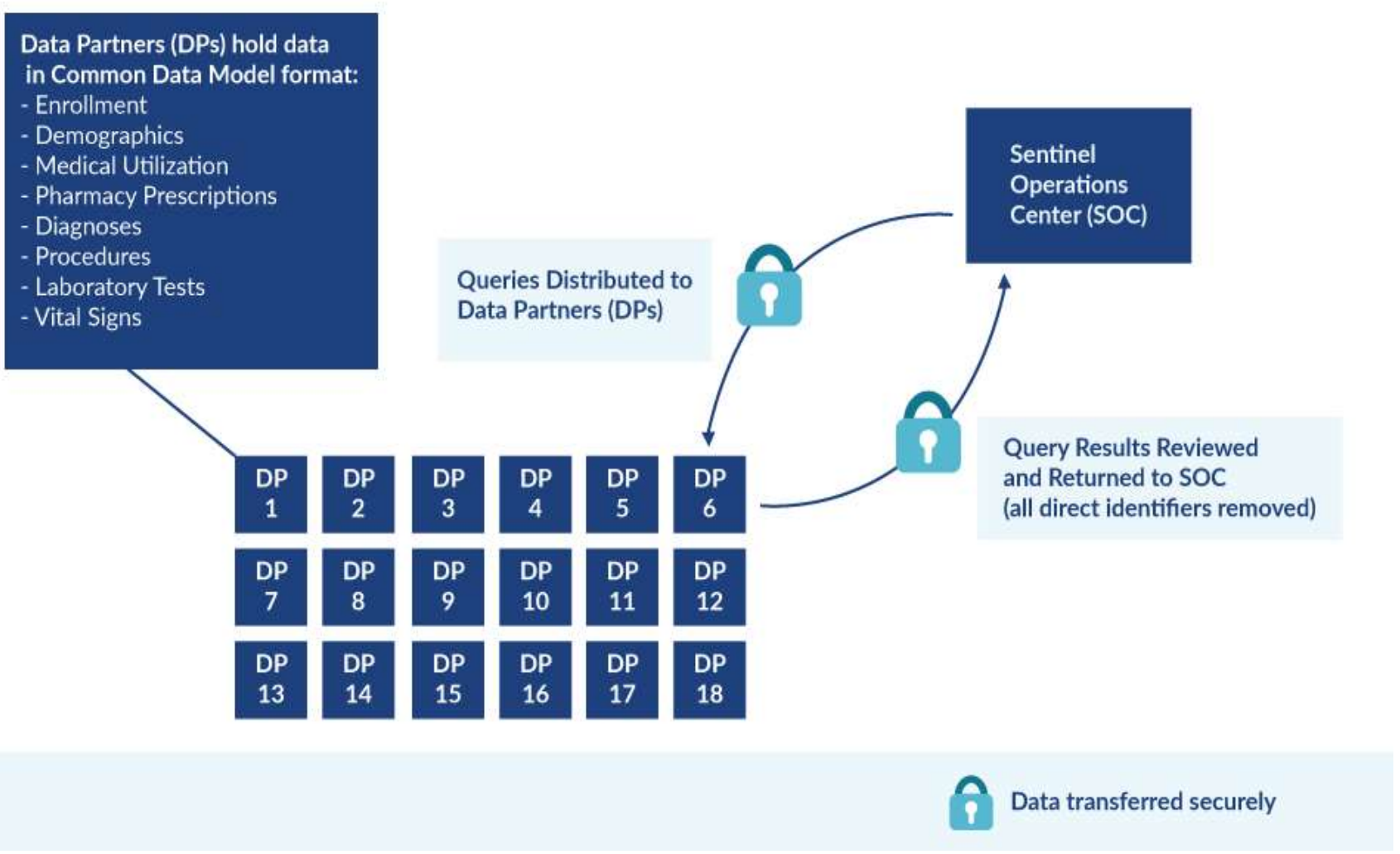
What organizations participate in Sentinel?

Aetna*
America's Health Insurance Plans
Blue Cross Blue Shield of Massachusetts*
Brigham and Women's Hospital
Duke University School of Medicine*
Harvard T.H. Chan School of Public Health
HealthCore, Inc.*
Health Care Systems Research Network
- Harvard Pilgrim Health Care System*
- HealthPartners Institute*
- Henry Ford Health System
- Marshfield Clinic Research Institute*

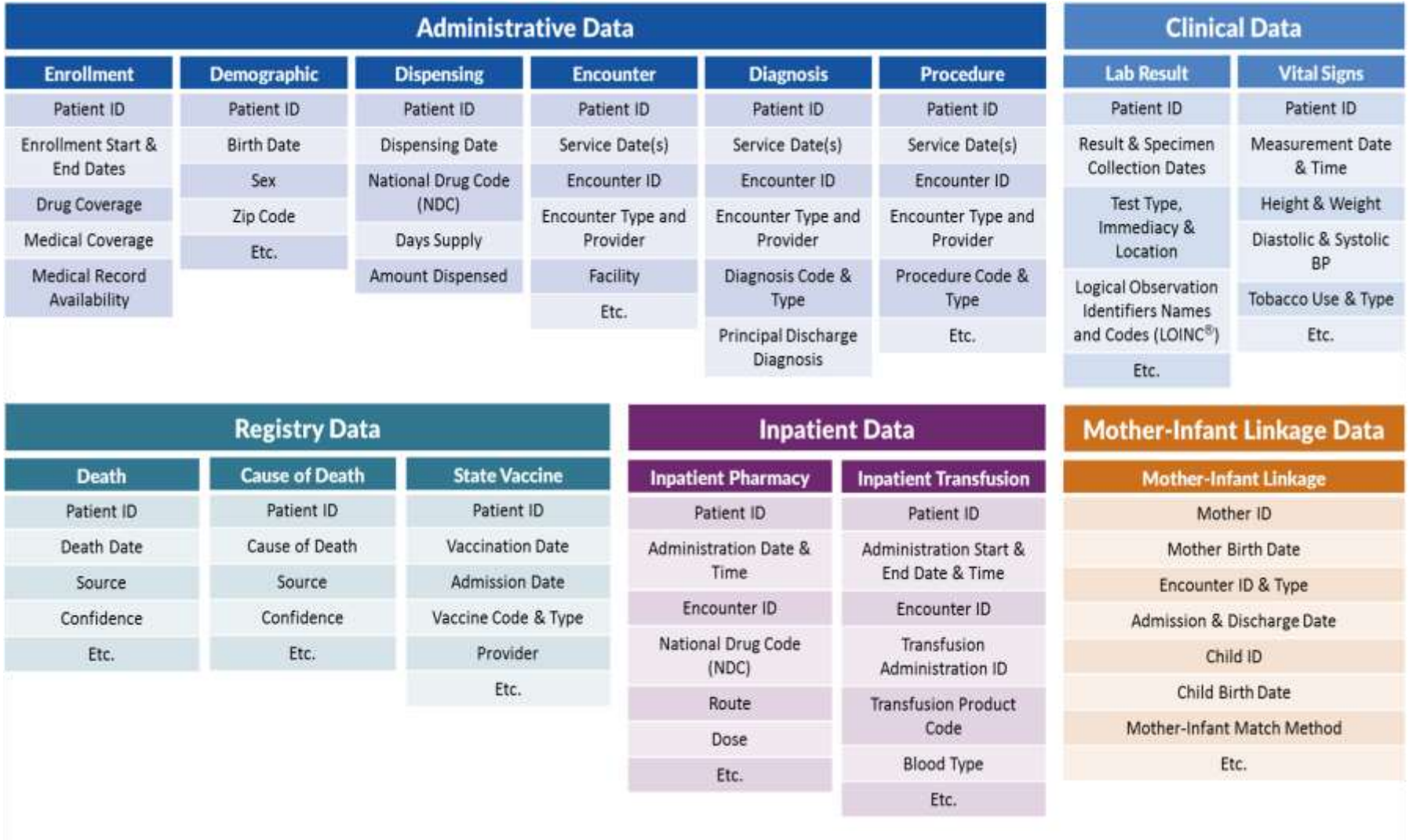
HCA Healthcare*
Humana, Inc.*
IBM
IQVIA
Kaiser Permanente Center for Effectiveness and Safety Research
Optum*
Rutgers University
University of Alabama at Birmingham
University of Florida
University of Illinois at Chicago
University of Iowa
University of North Carolina
University of Pennsylvania School of Medicine
Vanderbilt University School of Medicine*
Weill Cornell Medicine, Healthcare Policy & Research

*Indicates Data Partners

What is a distributed database?



What is a Common Data Model?



Sentinel In Action*

- Used to evaluate an infant vaccine to prevent diarrhea after reports of side effects
- Info collected on ~500,000 vaccinated infants
- FDA concluded febrile seizures did occur but only in 2/100,000 babies but benefit outweighed risk
- FDA alerted clinicians and parents about the possible adverse effect

*Part of CBER's PRISM program

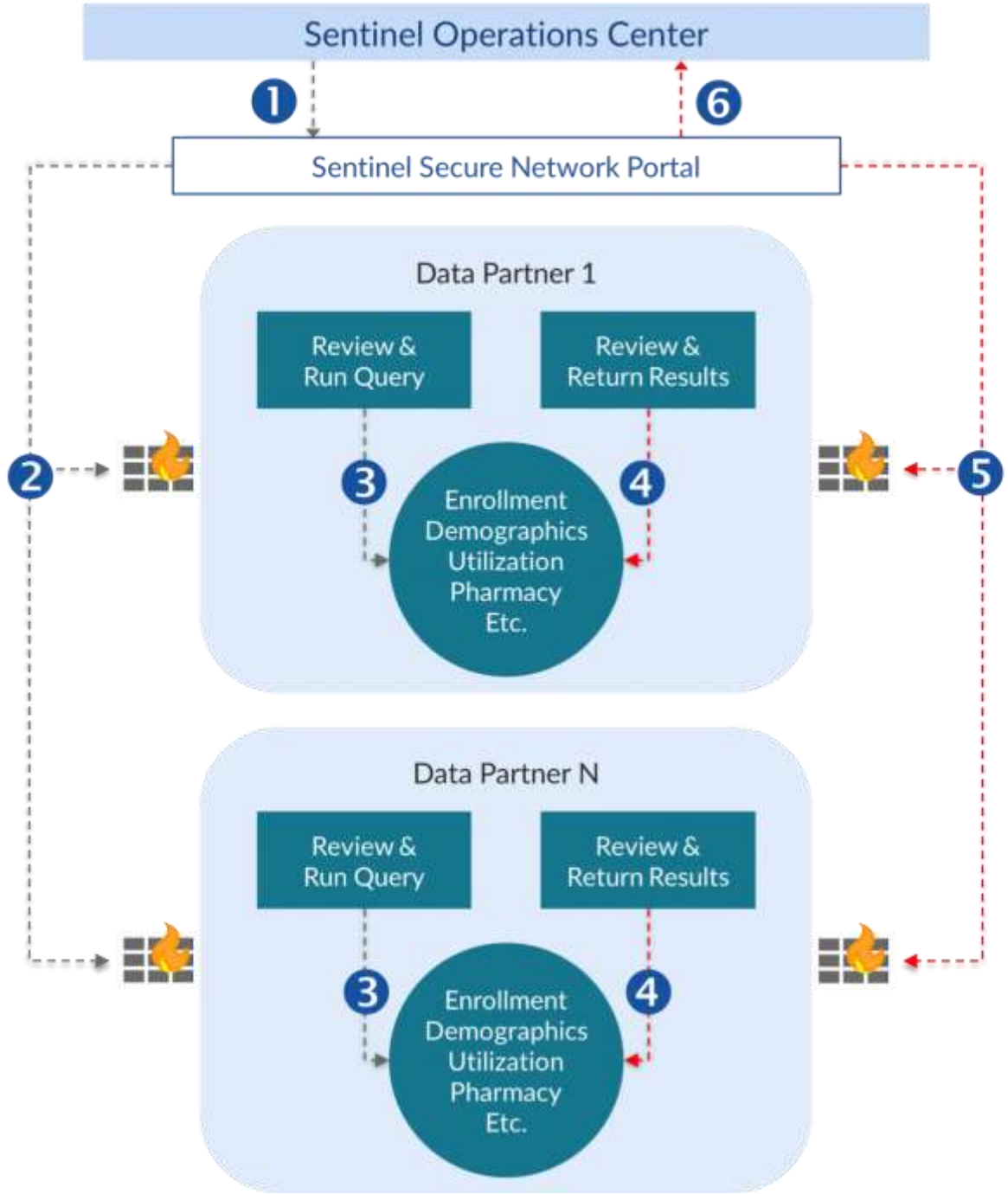
(**P**ostlicensure **R**apid **I**mmunization **S**afety **M**onitoring)

How else does FDA use Sentinel?

- To study 9 potential safety issues associated with 5 products, eliminating need for postmarketing studies
- To understand use patterns of opioids and other products
- Whether products are used for approved indications
- How products are used during pregnancy
- To quantify the rate of medication errors
- To conduct pragmatic clinical trials embedded in real-world delivery systems

What about patient privacy?

- Data partners maintain physical and operational control over their own data (thanks to distributed data network)
- All data stay within their firewalls
- All personally identifiable information is removed
- Responsive data is aggregated or summarized
- Only minimum amount of data is used to respond to inquiries



1. FDA data request sent to Data Partners via FISMA-compliant secure network portal
2. Data Partners retrieve query
3. Data Partners review and run query against their local data behind their firewalls
4. Data Partners review results for accuracy and privacy compliance
5. 6 Data Partners return results, stripped of direct identifiers, to SOC via secure portal

But, what about HIPAA?

- HIPAA Privacy Rule permits covered entities to use and disclose PHI to public health authorities (FDA) without patient consent

- Collaborating Organizations are also public health authorities - acting under contract with and under FDA's authority

- Each Data Partner must assess and maintain compliance with relevant state privacy laws and regulations

What is IMEDS?

- **I**nnovation in **M**edical **E**vidence and **D**evelopment (IMEDS) program
- Sentinel privacy-protected healthcare data made available to public and private entities for medical product research
- Examples
  - Identify rare adverse events in small populations
  - Comparative studies to assess risk
  - Analyses of off label uses, appropriate use, medication errors
  - Health outcomes from generic vs. branded drug use
- Governed by Reagan-Udall Foundation for the FDA

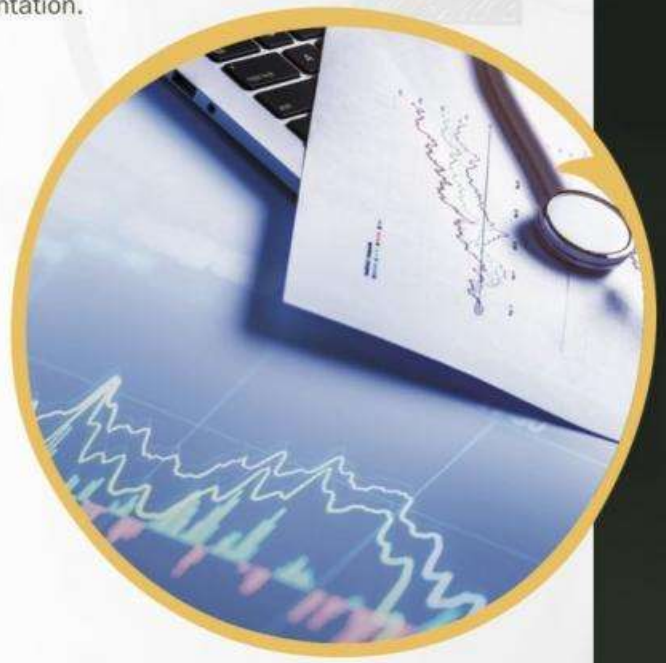
Why Choose IMEDS?

Efficient, Collaborative Approach

With IMEDS, industry scientists are essential study team members—from protocol development through implementation.

A Single Entry Point

Companies have many pathways to respond to safety signals or conduct post-market research. But IMEDS accesses the claims data of millions of covered lives. This population size means previously unanswered questions can be independently evaluated.



Potential Beyond Post-Market Safety

IMEDS queries can:

- Fulfill regulatory obligations (PMRs, REMs)
- Characterize hard-to-reach populations (e.g. rare conditions, mother-child linkages)
- Compare outcomes across patient groups using different drugs
- Assess drug utilization or effectiveness

What's next?

- Using real world evidence in regulatory decision-making
- Machine learning, natural language, AI
- Effectiveness studies
- Quality improvement for delivery systems and payor organizations
- Signal detection vs. safety surveillance
- To fulfill regulatory obligations
- Customized epidemiological studies
- Drug development (utilization studies, combination therapies, additional indications)
- Combining vast scientific expertise of all public and private partners to learn from vast stores of data

For More Information

https://www.sentinelinitiative.org

http://reaganudall.org/innovation-medical-evidence-development-and-surveillance