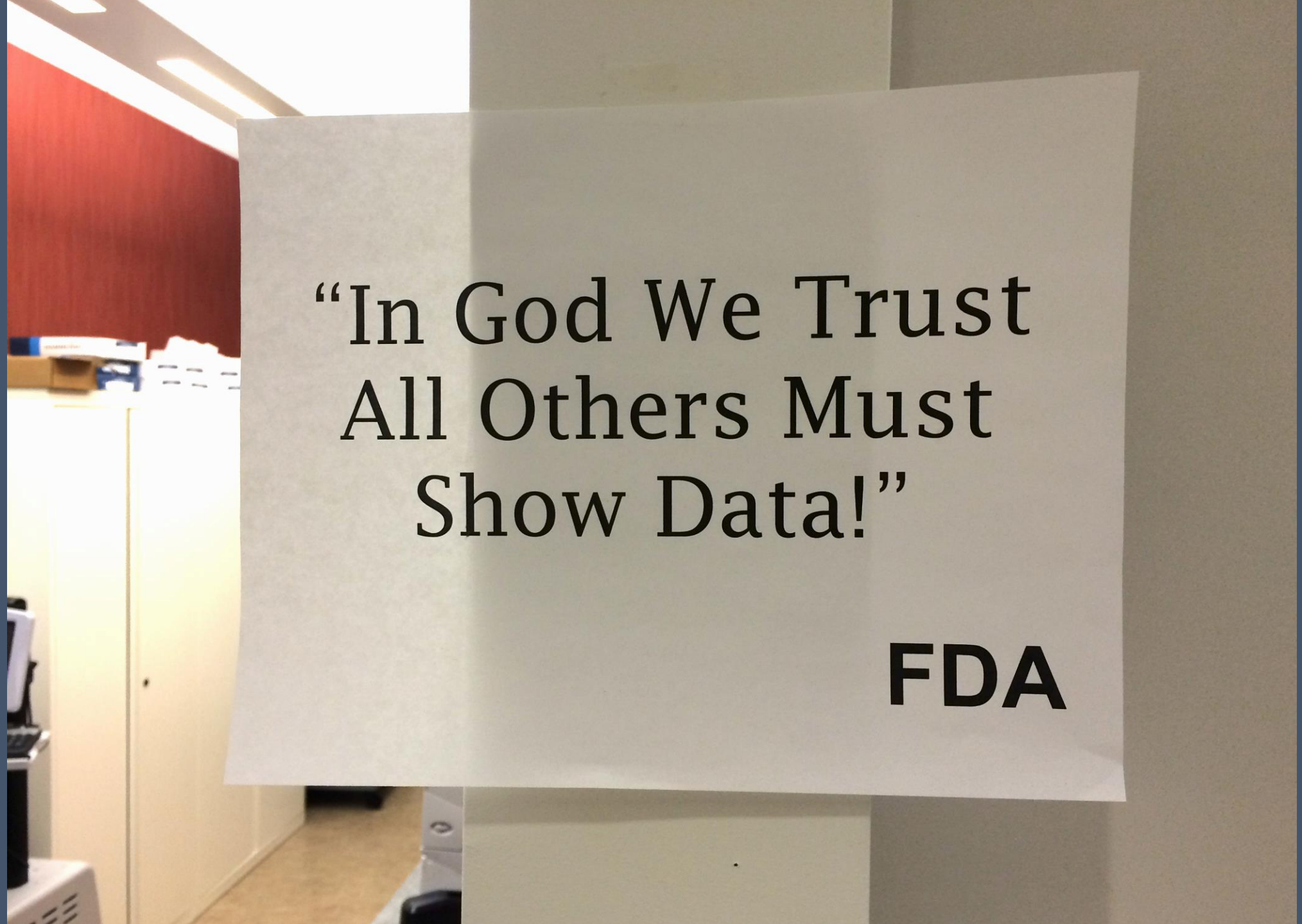
Real-World Evidence

Yuzhi Hu

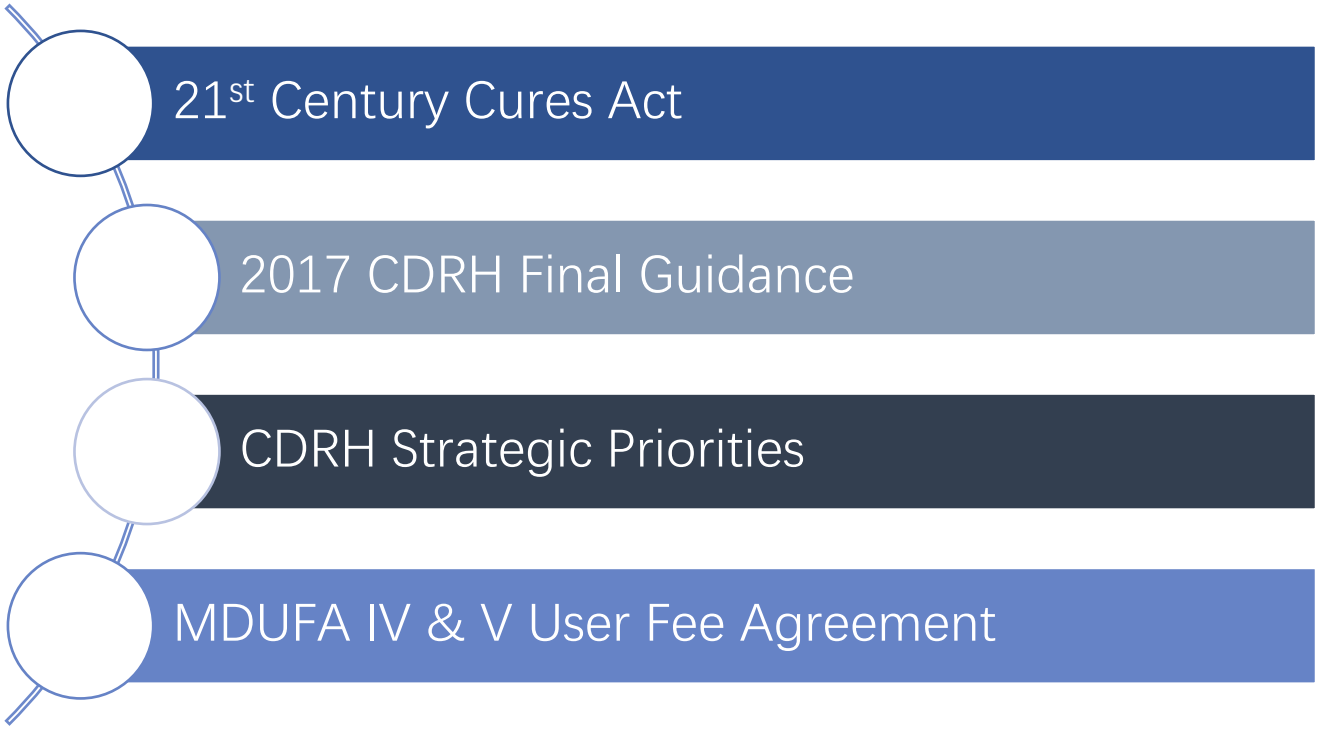
WHY RWE

CONFIDENCE INNOVATION


"In God We Trust
All Others Must
Show Data!"
FDA

BETTER BALANCE

Support to RWE



Support to RWE

Concept

- What is RWE exactly
  - Evidence generated under routine care without artificial intervention
- RWE is nothing new
- RWE needs to be “fit for purpose”
  - In many situations, RCT is not replaceable
  - In others, RWE might be helpful, or even preferable

Clinical Trial Data

- High Internal Validity
- Low Reusability
- Represent the Ideal Situation
- Expensive

Real-World Data

- High External Applicability
- High Reusability
- Represent the Nasty World
- Relatively Cheap

Quality

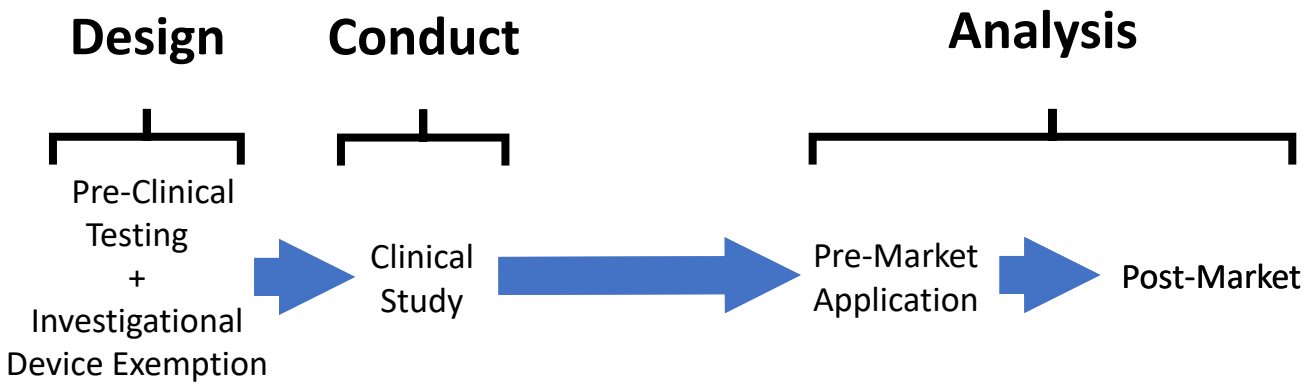
Relevant & Reliable

Safety

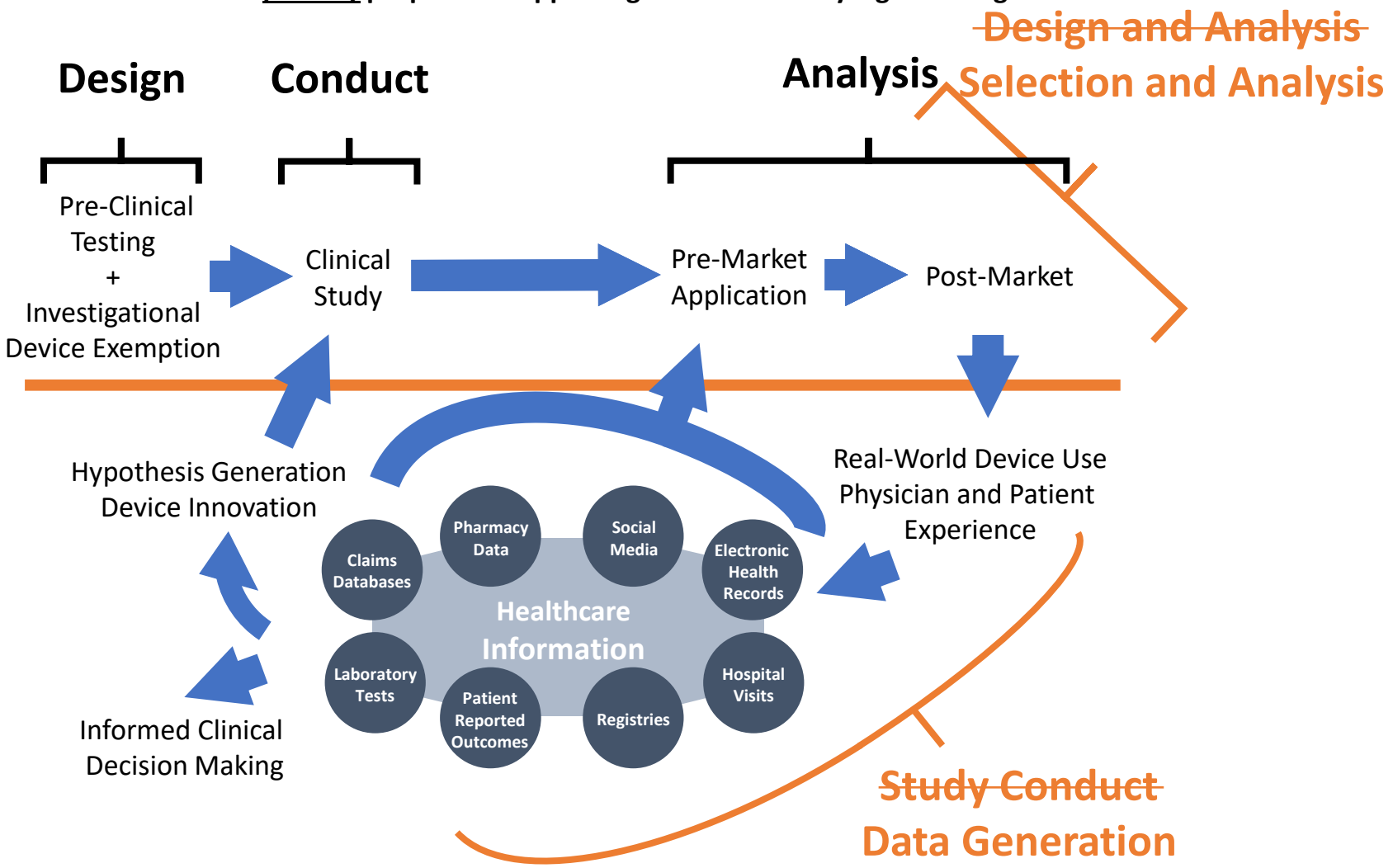
Are there reasonable assurances, based on valid scientific evidence that probable benefits to health from use of the device *outweigh any probable risks? [860.7(d)(1)]*

Effectiveness

Is there reasonable assurance, based on valid scientific evidence that the use of the device in the target population will provide *clinically significant results? [860.7(e)(1)]*


Design
Conduct
Analysis
Pre-Clinical
Testing
+
Investigational
Device Exemption
Clinical
Study
Pre-Market
Application
Post-Market

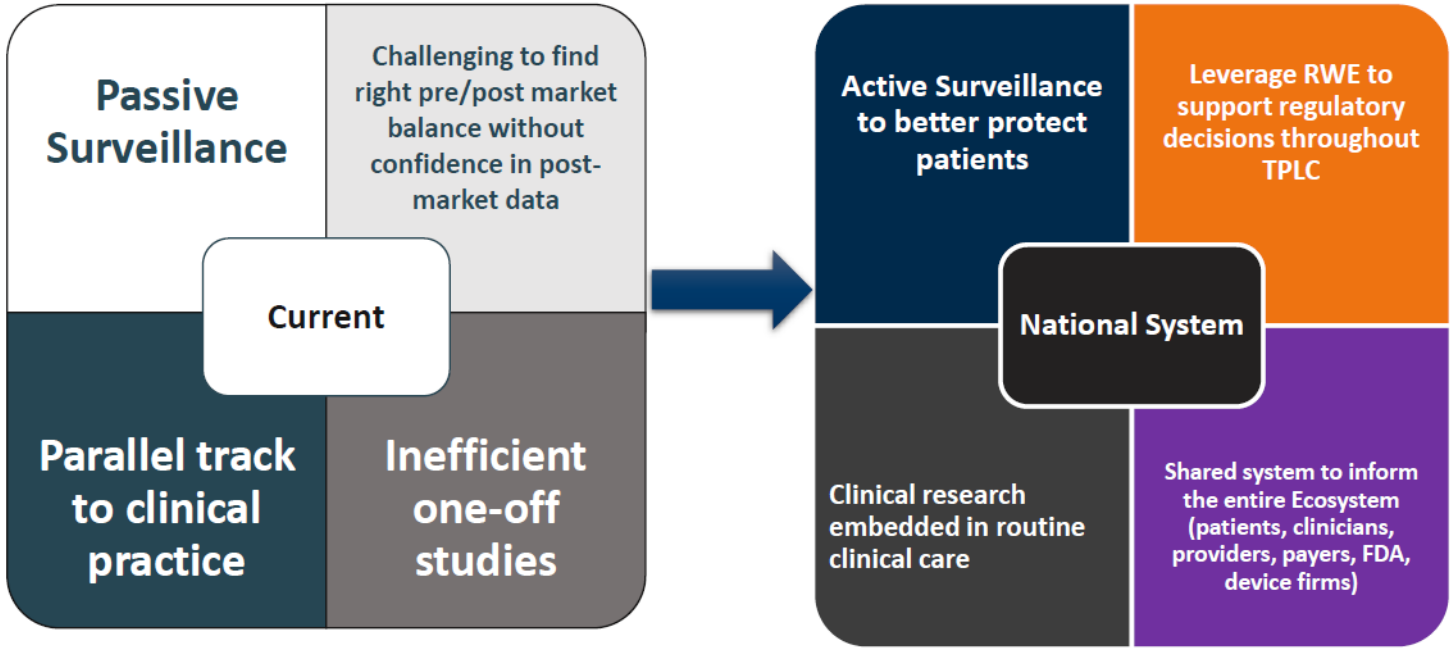
Patient information collected for <u>primary</u> purpose of supporting research activity – generating evidence



WHY IMPORTANT

CDRH GOAL

" Patients in the US have access to high-quality, safe, and effective medical devices of public health importance first in the world… "



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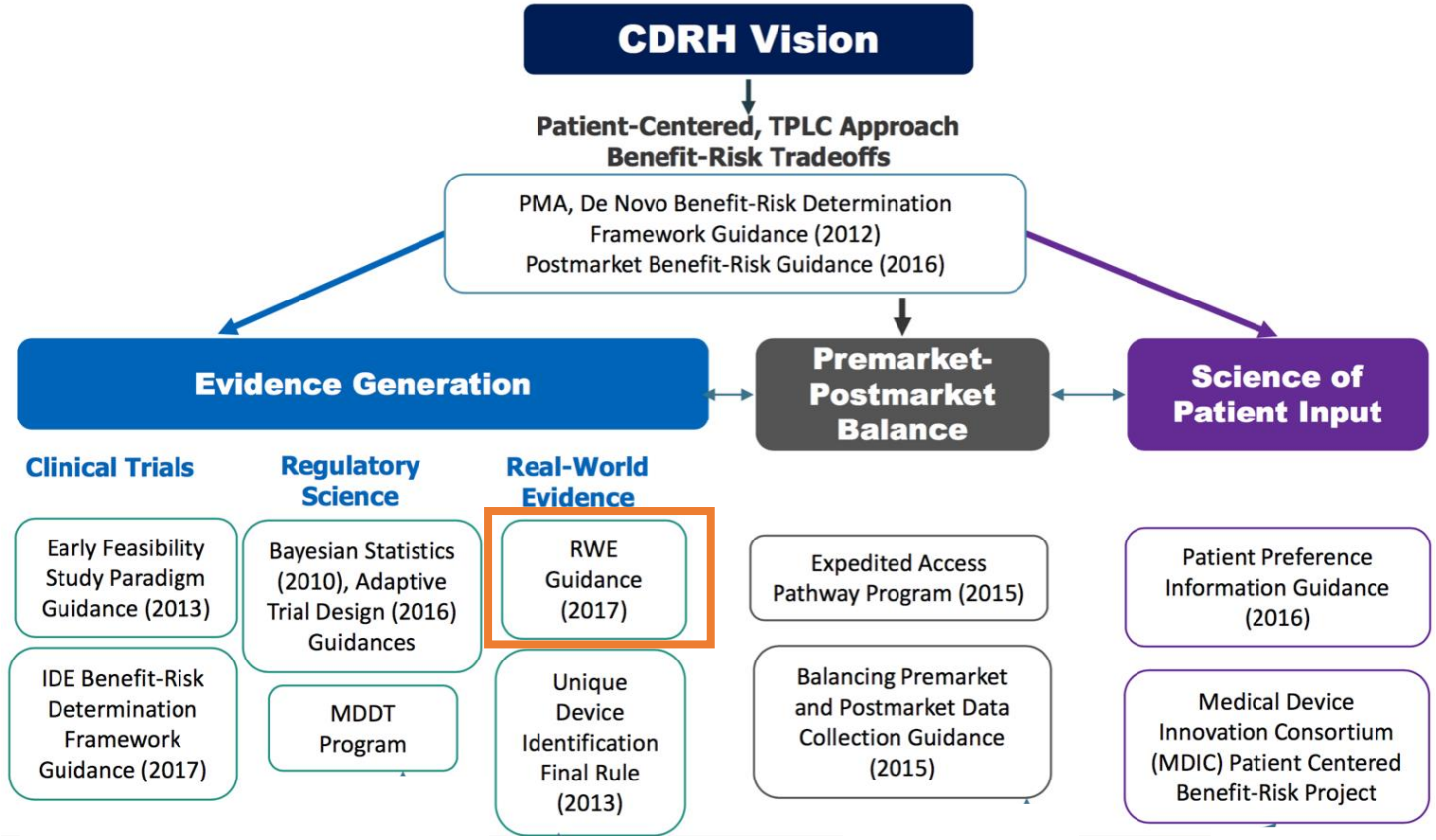

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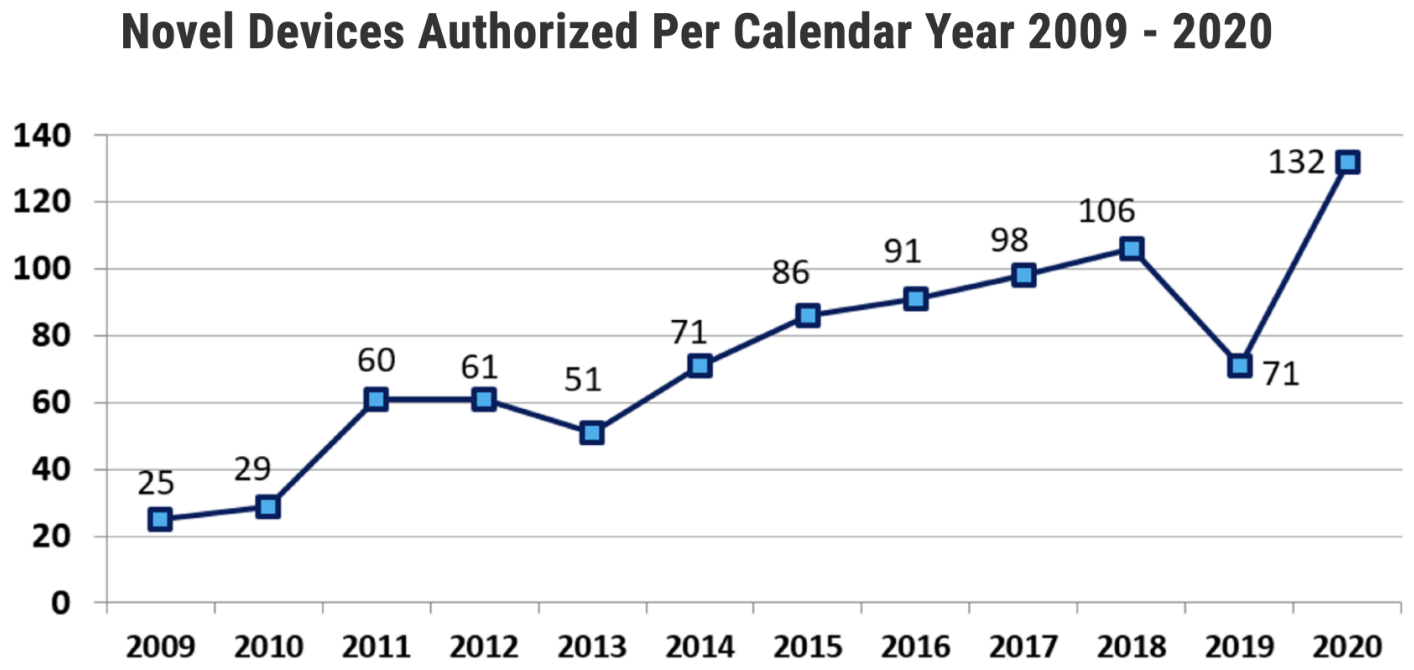
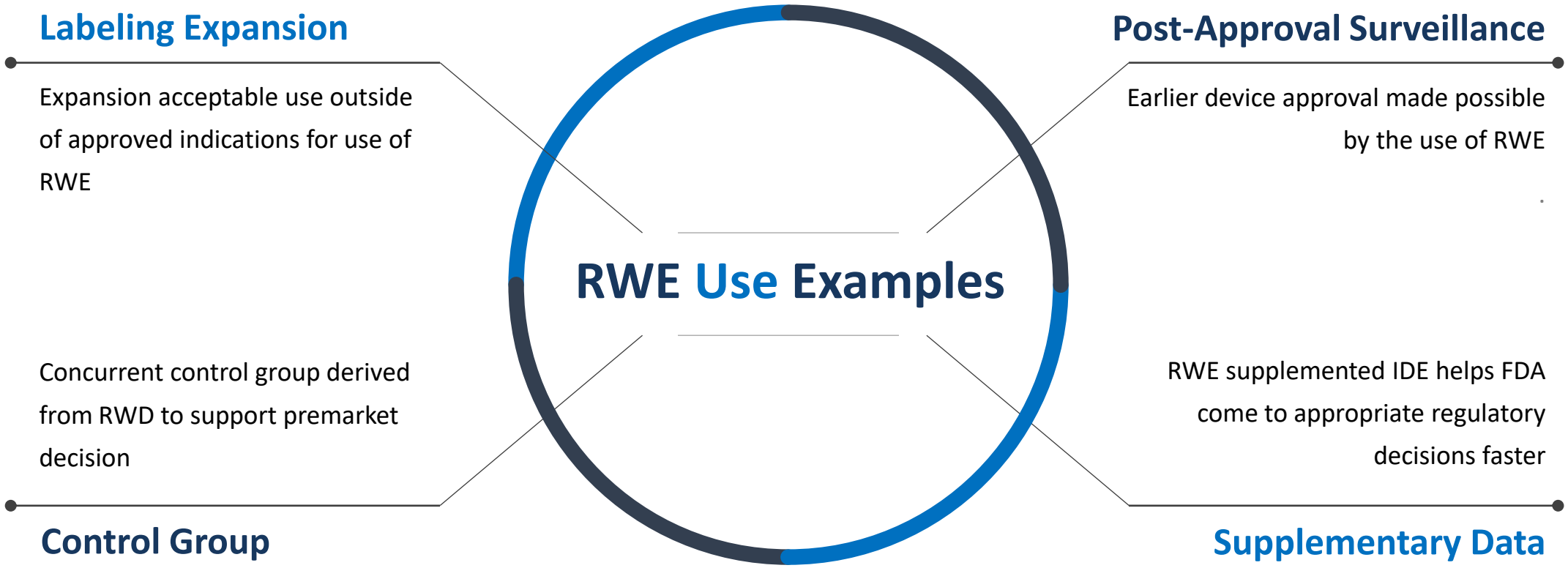


In 2020, novel devices included original PMAs, panel track supplement PMAs, De Novos, HDEs, breakthrough 510(k)s, and specific Emergency Use Authorizations (EUAs) deemed novel.

TO INDUSTRY


Labeling Expansion
Expansion acceptable use outside of approved indications for use of RWE
Post-Approval Surveillance
Earlier device approval made possible by the use of RWE
RWE Use Examples
Concurrent control group derived from RWD to support premarket decision
Control Group
RWE supplemented IDE helps FDA come to appropriate regulatory decisions faster
Supplementary Data

USE CASE

Transcatheter Aortic Valve Replacement (TAVR)

- 2002 in EU; **2010** in the U.S.
- U.S. was the 42nd country
- Transcatheter Valve Therapy (TVT) Registry was established as CoA.
  - FDA with regulatory demands
  - CMS with coverage demands and incentive
  - ACC & STS as operator
- TVT in 20+ regulatory decisions of multiple companies
  - Expanded indication for TAVR devices for alternate access
  - First third generation TAVR device for intermediate risk patients 18 days after EU granting
  - First TAVR device for mitral valve-in-valve repair in the world

USE CASE

Transcatheter Aortic Valve Replacement (TAVR)

- IN TOTAL, companies invested $24 million in **RWE**
- The costs of counterfactual **clinical trials** were estimated at $147 million
- ROI for industry > 400%

DIAGNOSTICS

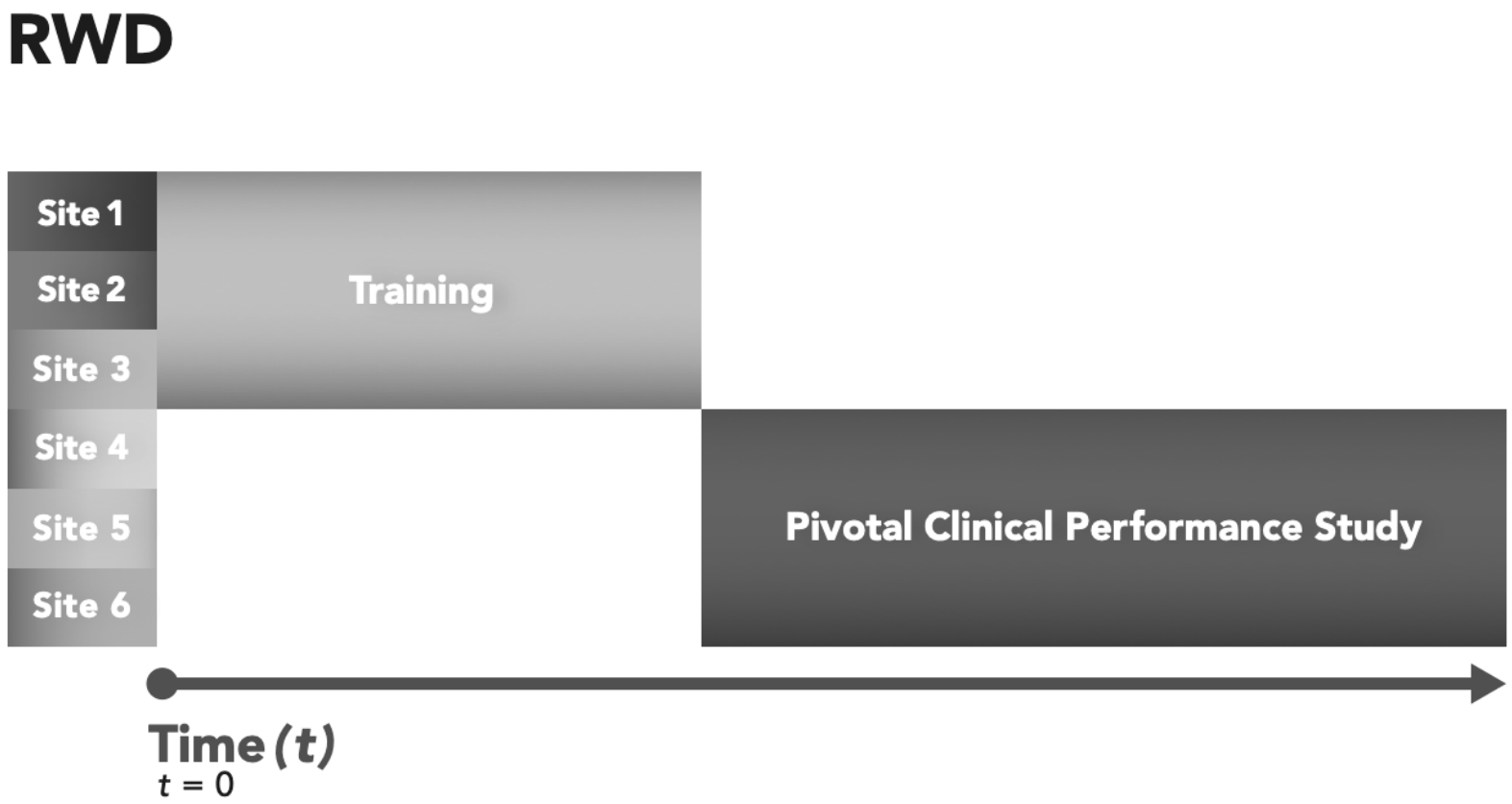
Special features

Where to get

Examples

DIAGNOSTICS

AI/ML and RWE



DIAGNOSTICS

"One of the greatest potential benefits of ML resides in the ability to improve ML model performance through iterative modifications, including by learning from real-world data."

--FDA Guidance, ML Change Control Plan

DIAGNOSTICS

MDIC
MEDICAL DEVICE INNOVATION CONSORTIUM

Real-World Clinical Evidence Generation: Advancing Regulatory Science and Patient Access for *In Vitro* Diagnostics (IVDs)

A Framework for Incorporating Real-World Data and Evidence Into Pre- and Postmarket Regulatory Decision-Making for IVDs

A report of the IVD Real-World Evidence Working Group of the Medical Device Innovation Consortium (MDIC)

August 24, 2020

DIAGNOSTICS

TAKEWAY

THANK YOU!