



IDEAL + Devices = IDEAL(D) Rational Approach for Devices

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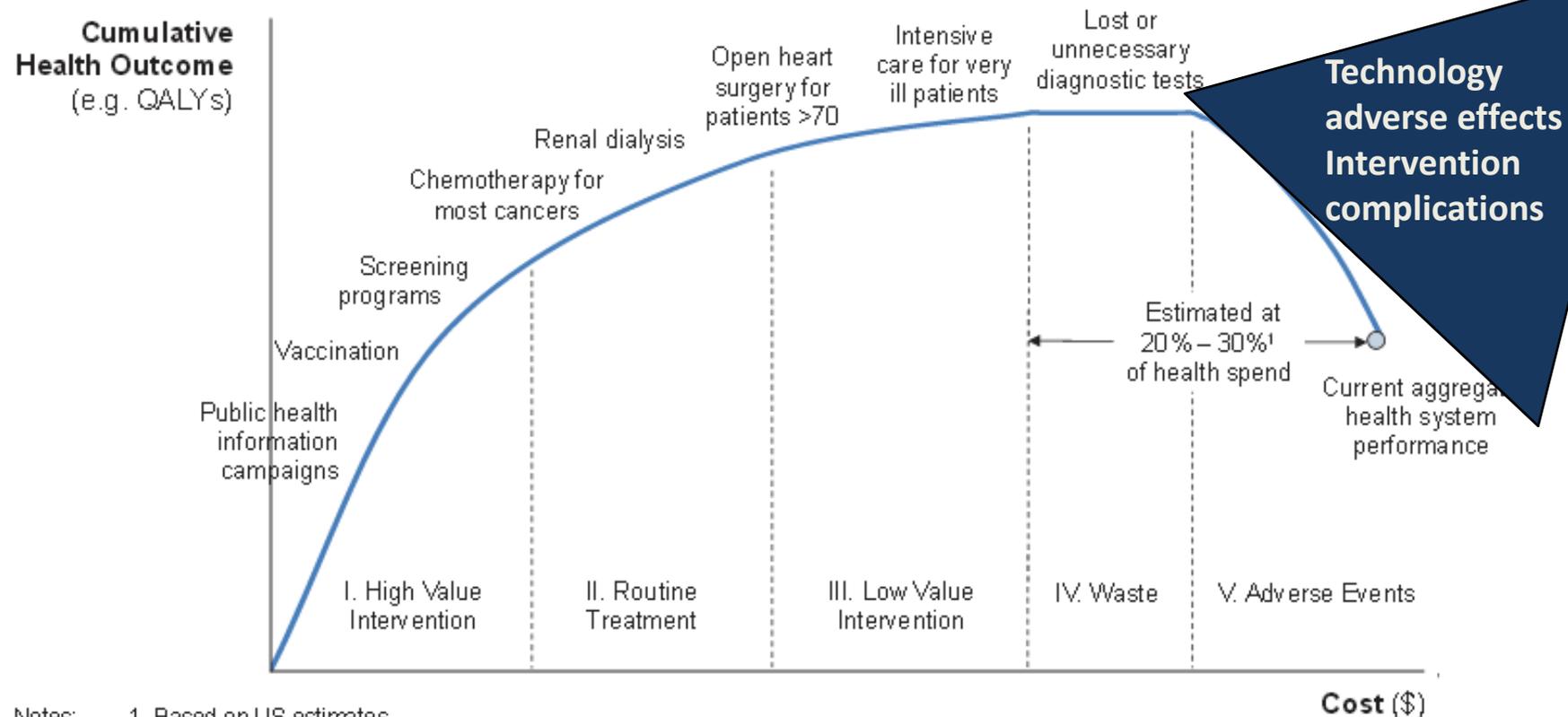
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Waste in The Healthcare

Health outcomes are driven by productivity and cost-effectiveness of interventions

Health System Performance



Notes: 1. Based on US estimates

Source: Pacific Strategy Partners analysis; TO Tengs, et al, 'Five-hundred life saving interventions and their cost effectiveness', *Risk Analysis*, 1995, 15(3):369-484; Institute of Medicine of the National Academies, *Best Care at Lower Cost: The Path to Continuously Learning Health Care in America*, 2012; DM Berwick & AD Hackbarth, 'Eliminating Waste in US Health Care', *Journal of the American Medical Association*, 2012, 307(14):1513-1516; Pricewaterhouse Coopers (PWC) Health Research Institute, *The Price of Excess: Identifying Waste in Healthcare Spending*, 2008

OVER 160,000 CLIENTS
CAN'T BE WRONG

Transvaginal Mesh

Are you the victim of Transvaginal Mesh Implant Failure?

Mesh Erosion Lawsuits

FDA ALERT: Recent studies show high failure rate and erosion with the use of Vaginal Mesh,

RECALL



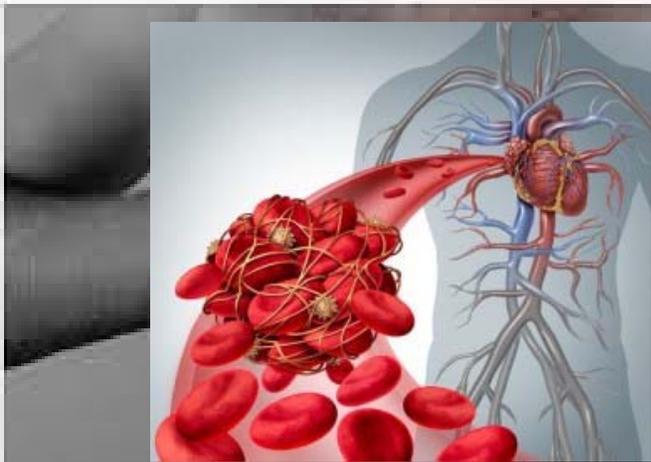
"I NEVER SIGNED UP FOR THIS"

READ OVER 1000 STORIES BY WOMEN. then go spread the word!



\$3.35 MILLION VERDICT VAGINAL MESH LAWSUIT

The New York Times



HAVE YOU OR SOMEONE YOU KNOW HAD COMPLICATIONS FROM AN IVC FILTER?

FDA RECALL Heart Device Wires — St. Jude Riata & Riata ST Lead Wires for Pacemakers



FDA has recalled the St. Jude Riata and Riata ST lead wires because the silicone coating around the wires erodes at a higher-than-expected rate. If erosion occurs, there may be serious consequences, including death.

If you or loved one have a pacemaker with St. Jude lead wires call

TSR Injury Law - today!



We'll provide information on claims against St. Jude Medical, manufacturer of Riata and Riata ST Lead Wires.

Call for a Free Consultation

612-TSR-TIME

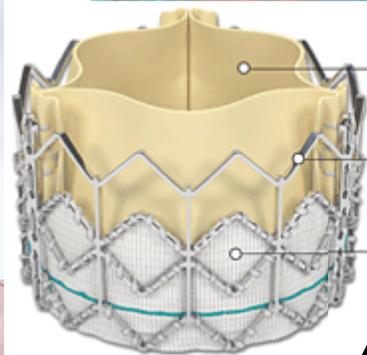
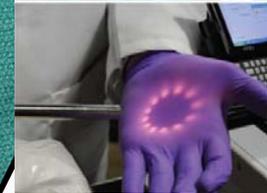


WE HAVE TWO OPTIONS.
EITHER AN EVIDENCE-
BASED TREATMENT OR
AN EXCITING, RISKY
ALTERNATIVE.





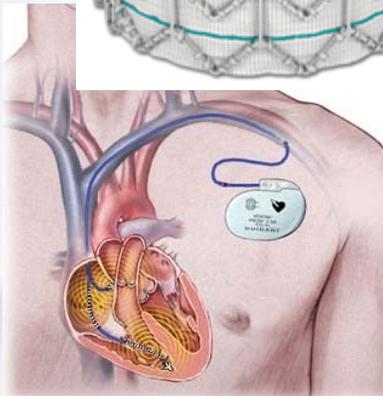
Diverse World of Devices For Advancing Public Health



Edwards SAPIE

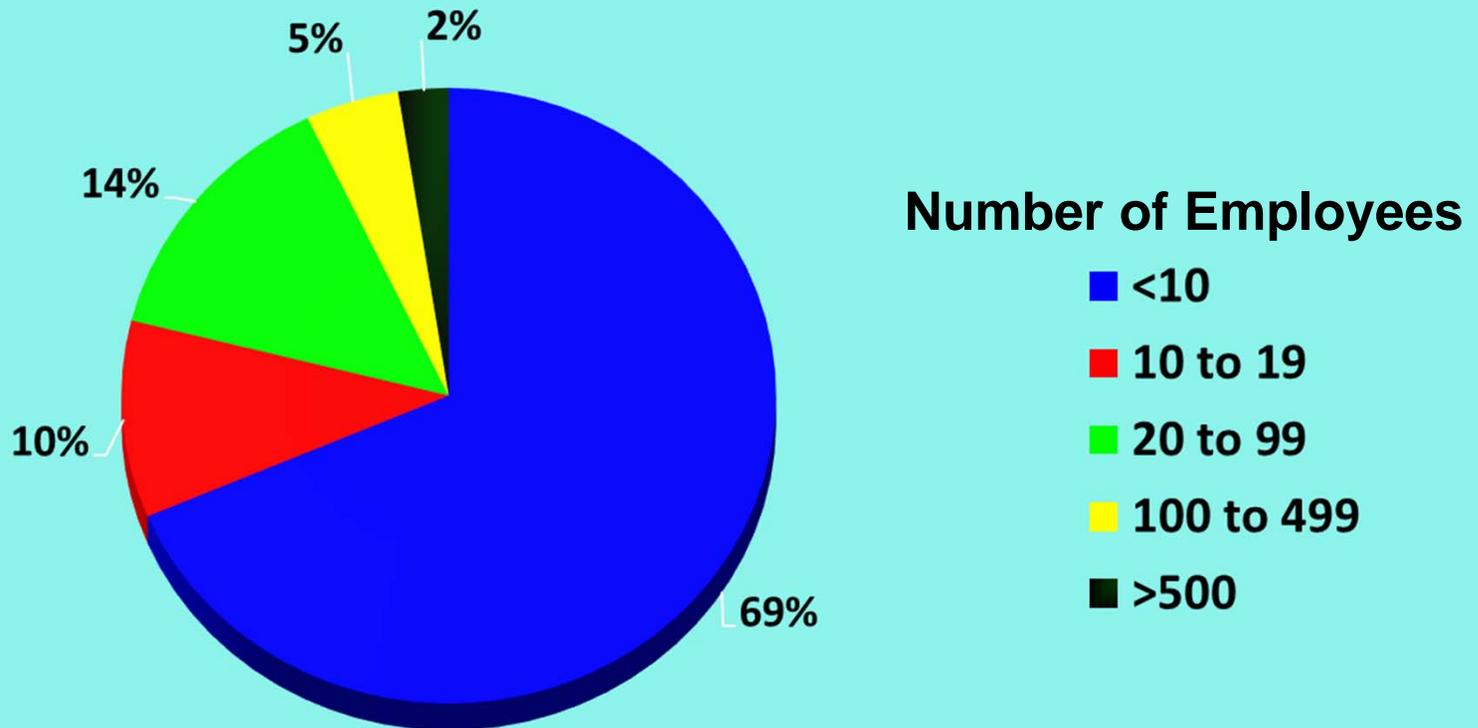
Bovine Pericardial Tissue Leaflets with Carpentier-Edwards TheraFix Process*

Balloon-expandable Stainless Steel Frame





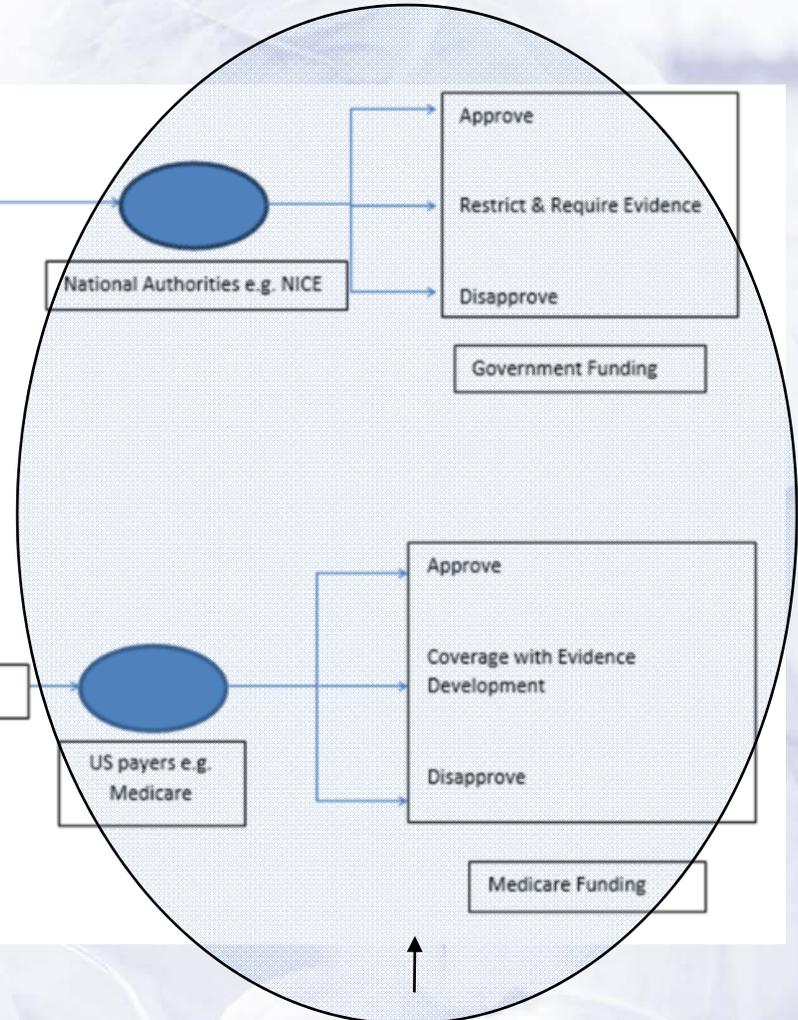
U.S. Medical Device Manufacturing Companies by Number of Employees



Source: Dun and Bradstreet, Inc.



IDEAL-D Recognizes: Devices Are Regulated Products



Post-Approval



IDEAL-D: Partnership!

- IDEAL-D has the structure to depict the stage of innovation & recommendations for **evidence accumulation** – ethical and political appeal for Total Product Life Cycle (TPLC) assessments
- IDEAL-D is **NOT** a regulatory pathway & serves as advanced framework & methodology for regulators to collaborate with surgeons
- Recognize key commonalities between devices and surgery reach out to innovators, regulators and payers
 - Operator skill and learning curves (e.g. implants or robots)
 - Strong preferences
 - Need for quality registry systems (dual purposing for both surgery and devices)



Stage 0

- Starting point of the IDEAL is pre-clinical development: materials & components are tested
- Current testing standards not always following 'real-world' situations (e.g. metal-on-metal testing)
- Where applicable surgeons with engineers should collaborate to develop better testing
- Encourage development of better standards for simulator & cadaver studies. Follow guidelines for animal studies

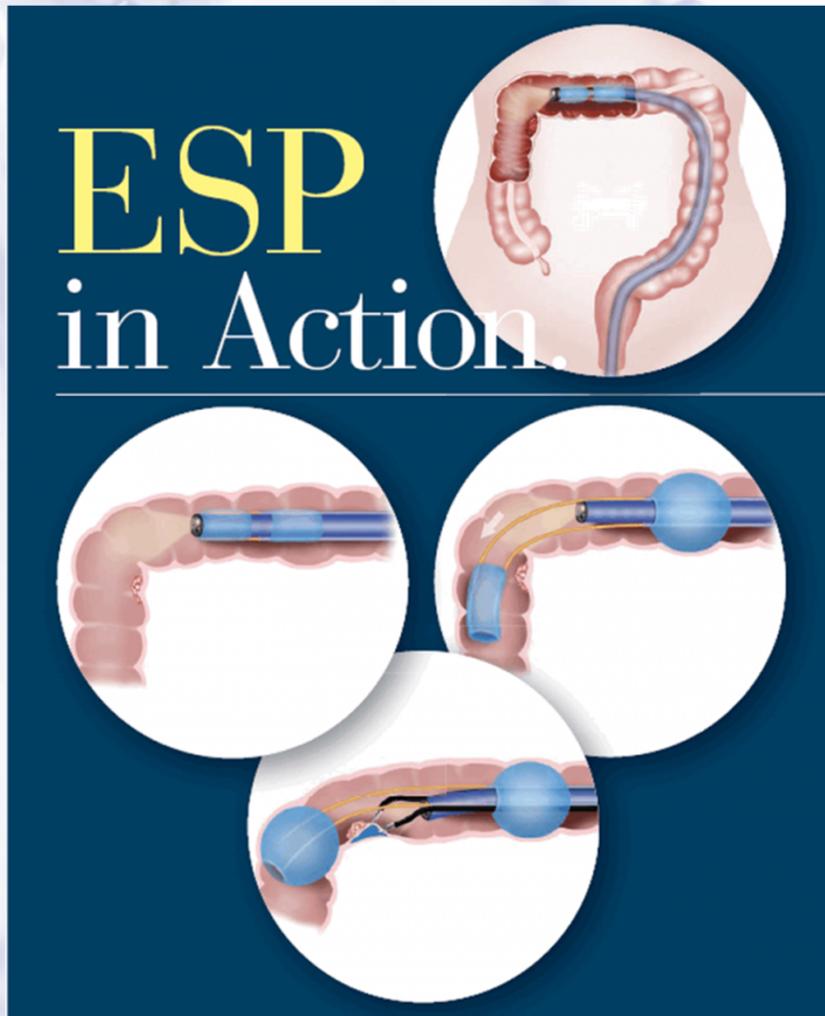


Stage 1

- **Compulsory reporting of all new innovations to accessible international registry**
- **Confidential reporting of failed innovations**
- **Reporting of first in human use integrated into a process by which devices are patented and regulated but data often NOT available**
- **May use existing channels (e.g. Clinical Trials.gov) BUT must allow learning**
- **Confidential reporting is OK but communication with innovators if needed to allow learning**



Example: Endoluminal Platform



- Has a potential to eliminate colectomy: dramatic change
- Thorough pre-clinical testing using animal models
- 510k approval
- IRB plays important role: approval to do first-in-man study



Stages 2a-b

Stage 2a PDS

Small uncontrolled, consecutive. Record changes and their timing. Address “tinkering”
Focus on technique & feasibility

Stage 2b PES

Technique is stable multiple centers and investigators. Large uncontrolled prospective. Can study learning curve. Build consensus on NEED for trial and definitions and outcome expectations for a Stage 3 trial

Often Combined Stage 2a and 2b within IDE. Many device iterations occur at Stages 0-1, but problems with device insertion/activation still requires iteration. Quality control and learning curve estimation very important: Studies conducted in experienced centers to minimize risks of harm. Regulators and IRB provide guidance on study designs

May be the start of the registry



Example: Valve for SAVR



- *Edwards Intuity Elite* rapid deployment surgical valve
- TRANSFORM clinical trial, which treated 839 patients in 29 centers in the U.S
- Indirect comparison with STS data



Stage 3

Comparative Trial

Procedure widely accepted, & possible replacement for current standard

Definitive comparison (preferably RCT) against current best practice after learning curves are overcome

Consensus over definition of intervention, indications and quality control measures

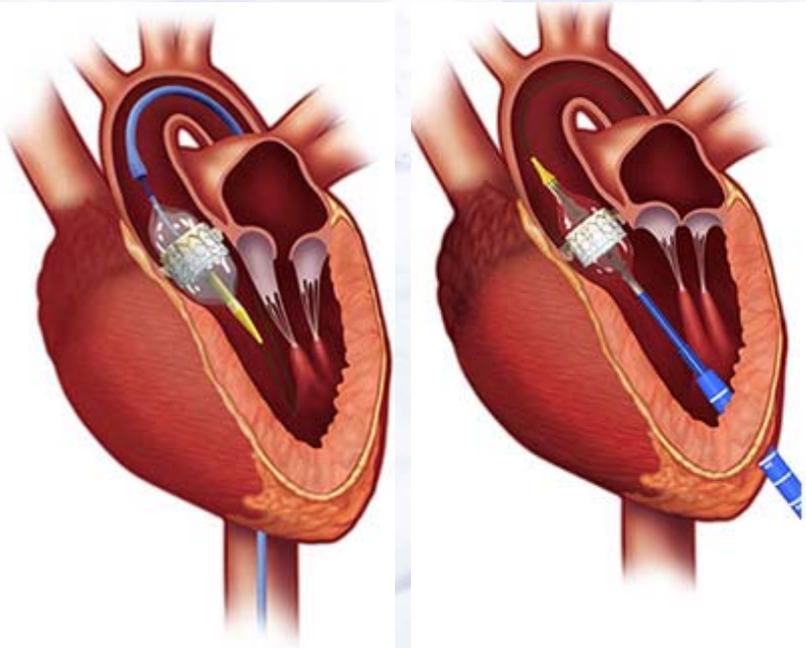
Trial(s) might follow stage 2a and 2b or Stage 1 (fused stages 2a, 2b and 3) within IDE. IDEAL-D: **learning, quality control & intervention definition** should be overcome OR should not be major issues

Regulators & surgeons should reach consensus on international set of principles on need & timing of RCT

Real world outcomes are critical as procedure cannot be widely accepted before the trial



Example: TAVR



- TAVR first approved in EU & first-in-man studies
- IDE in USA started with a trial that includes early learning outcomes
- Registry (IDEAL stage 4) is very important
- As technology is widely adopted registry should transition to quality system with **reduced** burden and industry funding



Stage 4

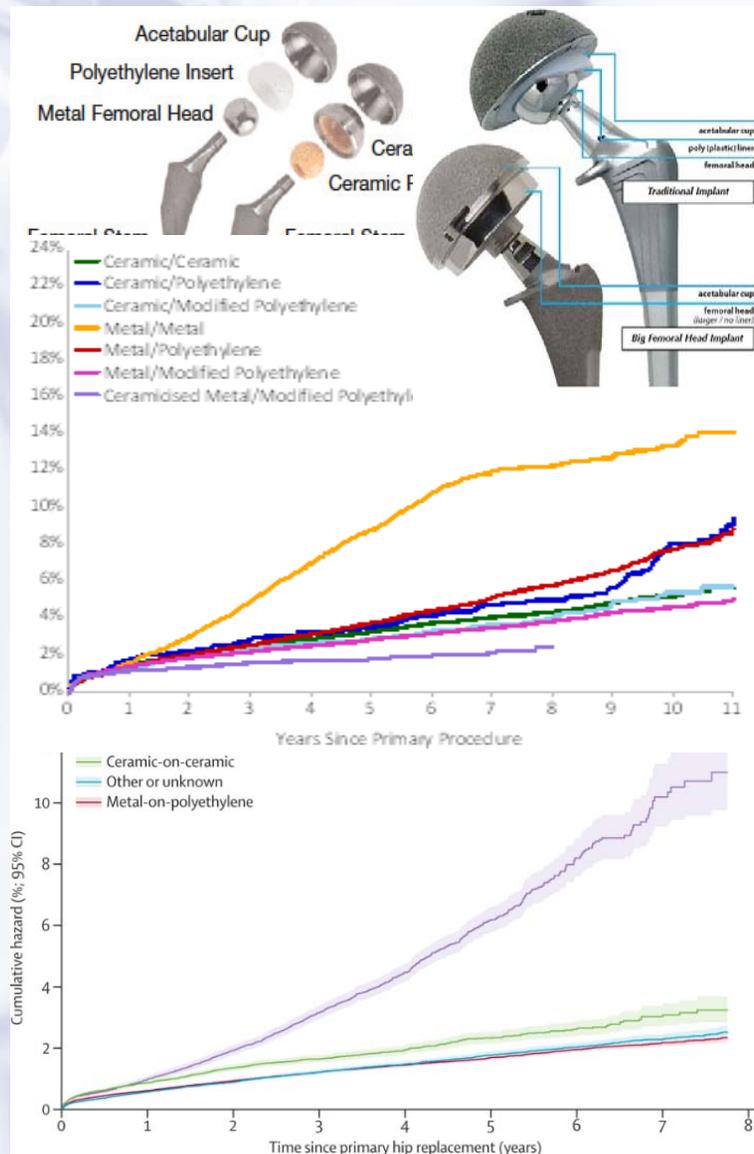
**Stage 4 (long-term study)
Registries for monitoring late
and rare problems and changes
in use (indication creep)**

**Stage 4 (long-term study)
Registries and are critically for
IDEAL-D, **begin early**
particularly for “nth-of-a-kind”
products that enter practice after
stage 0.**

**For first-of-a-kind devices,
registries ensure controlled
introduction to market.
“Nested” RCTs possible within
registries**



Example: Joint Replacement



- Metal on metal hips and most devices approved via 510K
- Did not require clinical evidence & there are 1000s of devices in the market
- Registry (IDEAL stage 4) is the only pragmatic system for evaluation

“Organized system that continuously and consistently collects relevant data in conjunction with routine clinical care, evaluates meaningful outcomes and comprehensively covers the population defined by exposure to particular device(s) at a reasonably generalizable scale (e.g. international, national, regional, and health system)’ with a primary aim to improve the quality of patient care ”

- 1. DEVICE DATA:** Contains sufficient information to identify the device
- 2. QUALITY SYSTEM:** Is part of a health care delivery quality improvement system
- 3. BENEFICIAL CHANGE:** Has established mechanisms to bring about beneficial change (e.g. stakeholder engagement)
- 4. EFFICIENCY:** The registry is embedded in the health care delivery system (i.e., not overly burdensome, not complicated, not costly)
- 5. ACTIONABLE DATA:** The registry provides actionable information in a relevant and timely manner to decision makers
- 6. TRANSPARENCY:** The governance structure, data access, and analytical processes of the registry are transparent
- 7. LINKABILITY:** Information in the registry can be linked with other data sources for enhancement
- 8. TOTAL DEVICE LIFE-CYCLE:** The registry as infrastructure for seamless integration of evidence throughout the device life cycle



Key Implications

- If a new implantable device is completely novel and requires learning then all IDEAL stages in a consecutive order including an RCT in Stage 3 are justified
- If a registry were set up for these devices from stage 1 to 4, subsequent “me too” devices could join it via ‘nested RCT design’
- For devices which have already bypassed IDEAL Stages 1-3 without assessment, (e.g. robotic surgery, hips, knees) a population registry with minimum data is needed, similar to international joint replacement registries