



CSRC MINI
THINK
TANK 2015

Sharon-Lise
T. Normand

Overview

Combining
evidence for
signal detection

Examples

Differential
follow-up

Predicate
devices

What Does
and Does Not
Work Well

Near and
Long Term

CV SAFETY ASSESSMENTS: SIGNAL DETECTION WITH HETEROGENEOUS DATA SOURCES

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STATEMENT OF PROBLEM

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Heterogeneous data sources:

- Contain different data **types**
 - Natural language processed, laboratory measurement, billing claims data, abstracted data
- Elements have different **resolutions**
 - Measurement error varies across data elements (e.g., imaging information versus claims data)
- Sources may cover **different time periods**
 - Registries with a longer versus shorter history
- **Completeness** of data varies
 - Partially or completely missing data elements
- **Design** differences: prospective, retrospective, blinding
- Potential to **grow**



POOLING DATA FOR SIGNAL DETECTION

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- **Pool** data (across devices, across indications, across patient populations) when uncertainty exists
- **Appropriateness** of pooling depends on
 - data quality
 - data completeness
 - how reported
 - units of measurement
 - design (blinded, prospective, retrospective, etc)
- What **level** of pooling is acceptable?
- Operator effects can be substantial (**learning**)



TAVR REGISTRIES

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Feature	REGISTRY			
	(1) U.S.	(2) Western Europe	(3) Canada	(4) U.K.
No. Patients	7710	996	339	2732
Centers	224	44	6	31
Year	11/11-5/13	6/10-7/11	6/05-6/09	1/07-12/11
Manufact.	Edwards	CoreValve	Edwards	Both
Age	84 ± 10	81 ± 6	81.8 ± 8	?
Severity	7 ± 6	19.2* ± 12.4	9.8 ± 6.4	?
30-Day Mortality (%)	7.6	4.5	10.4	5.4 in 2011
Follow-up (%)	46	99	100	?

Sources:

(1) JAMA,2013;310(19):2069-2077

(2) <http://www.tctmd.com/show.aspx?id=115845>

(3) JACC,2010;55(11):1080-1090

(4) TCT 2012 slides



STARCLOSE (NEW) VS ANGIOSEAL (OLD)

(Source Sarma, 2013 ACC)

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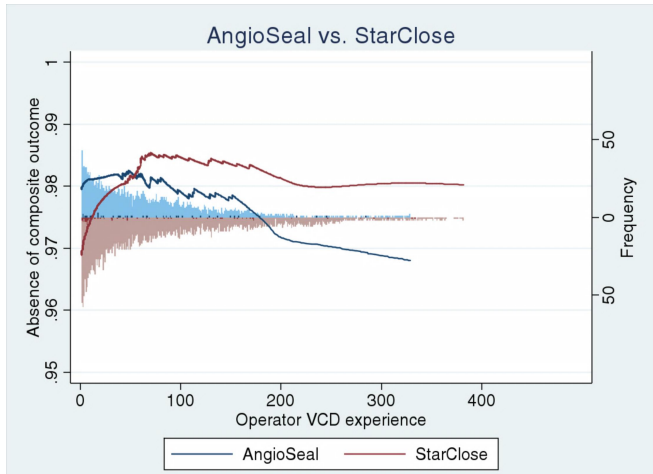
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DISTRIBUTED NETWORKS

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- Depends on how computations are conducted
 - Combining data at the individual-level among networks
 - Combining aggregated data across networks
- When some elements are partially or completely missing, aggregated approaches are not sufficient

Distributed network approaches require substantial overhaul

- But, **substantial** opportunities to learn faster by exploiting variation



NEEDS

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Using registries for **signal detection** requires:

- Sharing **more** than summary statistics
- Theoretical and empirical experience with **causal modeling** using heterogeneous data
- Development of inferential tools for **pooling related but distinct** data
 - Methodology to validate results
- Methodology to separate **cumulative learning** from patient severity
- Rules of engagement: **what** & **how much** to pool?