



SCIENTIFIC
REGISTRY OF
TRANSPLANT
RECIPIENTS

Endpoints to Consider for Transplant Quality Assessment

Jon Snyder, PhD

Director of Transplant Epidemiology

Scientific Registry of Transplant Recipients

Hennepin Healthcare Research Institute

Disclosures

The views expressed are my own and do not necessarily reflect the official policies of the U.S. Department of Health and Human Services, nor does mention of trade names, commercial practices, or organizations imply endorsement by the U.S. Government.

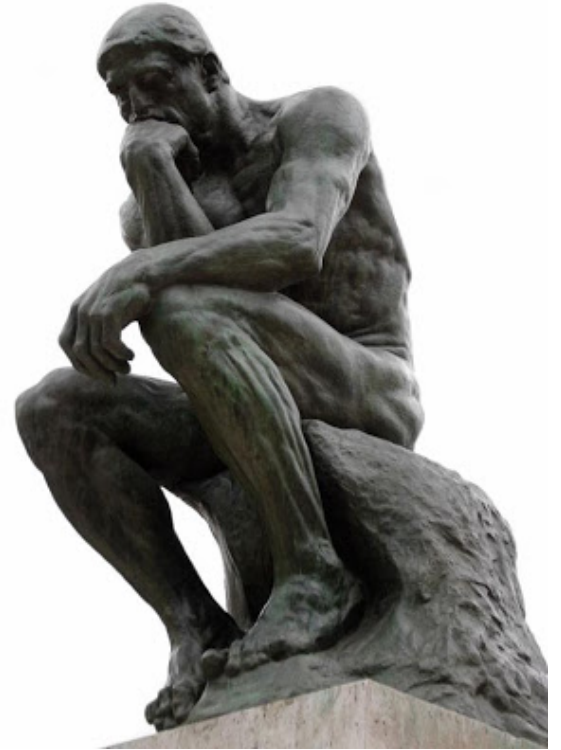
Welcome to Minnesota!



In 1876, **Jesse James** and his gang were thwarted from robbing a bank in **Northfield, Minnesota**. Several members of his posse were captured and killed, and in subsequent years the group slowly dissolved before Robert Ford finally assassinated Jesse James in 1882.

My goals:

- Get us thinking about what makes a good metric.
- Focus on some of the philosophical questions surrounding metrics.

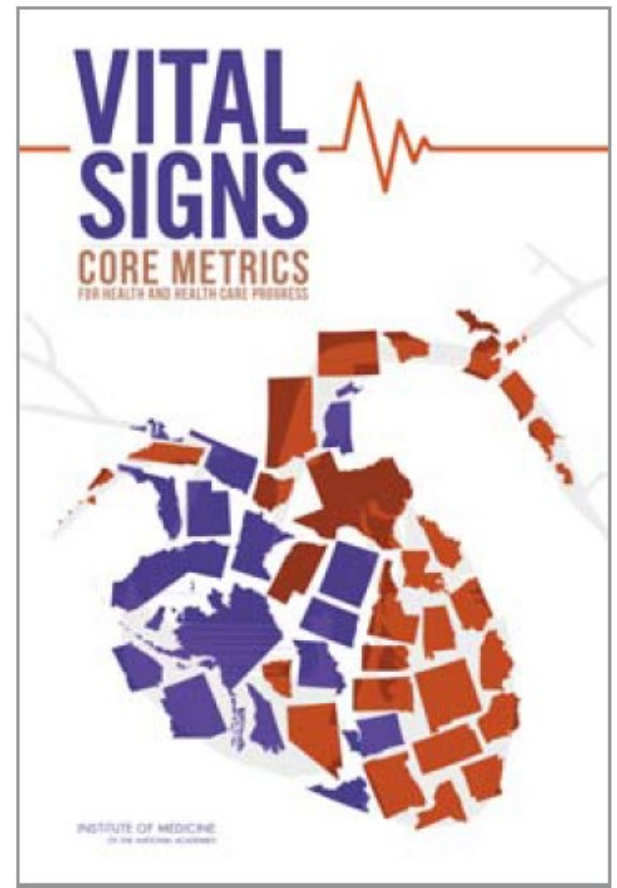


Institute of Medicine

Vital Signs: Core Metrics for Health and Healthcare Progress

Available at:

<https://www.nap.edu/catalog/19402/vital-signs-core-metrics-for-health-and-health-care-progress>



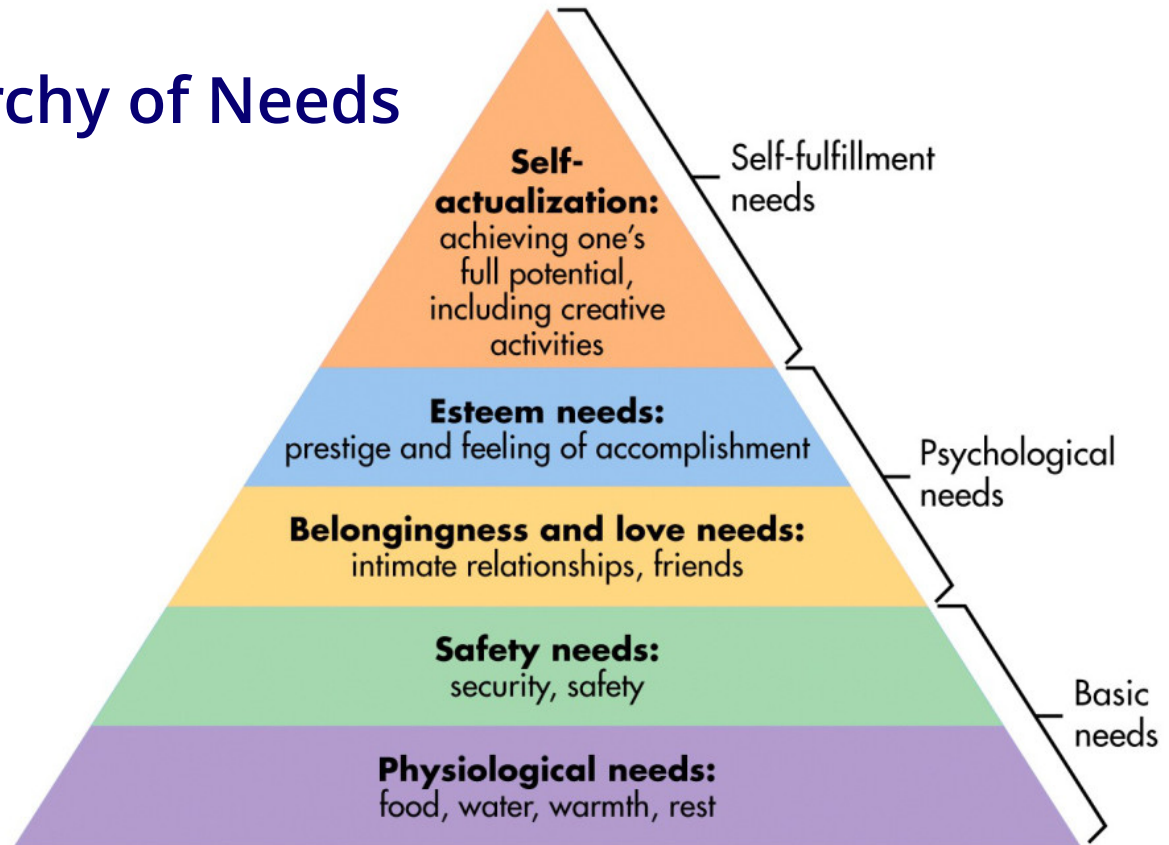
Core measures should:

1. Be important for health
2. Be likely to contribute to progress
3. Be understandable
4. Have technical integrity
5. Have potential to have broader system impact
6. Have utility at multiple levels

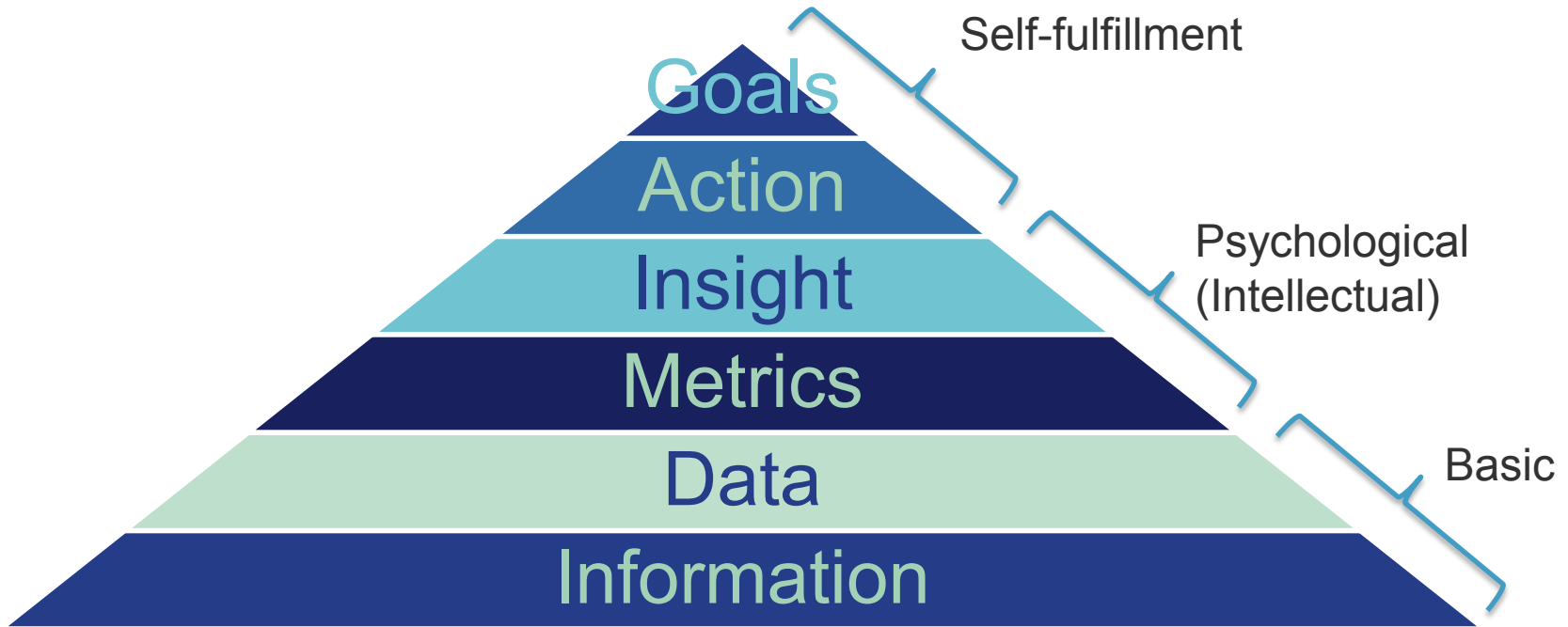
IOM (Institute of Medicine). 2015. *Vital signs: Core metrics for health and health care progress*. Washington, DC: The National Academies Press.



Maslow's Hierarchy of Needs



Snyder's Hierarchy of Metric Needs



Data, Statistics, Metrics, and Good Metrics

Data

- numbers that summarize observations

A statistic

- a number that is calculated from data

A metric

- a statistic that people use to make decisions

A good metric

- a statistic that helps people make good decisions

Use of Metrics by Transplantation Stakeholders

Transplant programs

- decide whether to change processes to improve quality.

Patients

- decide where to list.

Insurers

- decide which programs to place on their lists of preferred programs.

Regulators

- decide which programs should be reviewed.

Important questions to guide us to a “good” metric:

What is the metric going to be used for?

- Public reporting?
- Provider performance monitoring for QAPI?
- Regulatory oversight?

Who is in the primary audience for the metric?

- Patients/caregivers?
- Providers?
- Regulators?

One Size Doesn't Fit All!!!

A metric can be good for some decisions and bad for other decisions.

In fact, it is often easy to “criticize” a metric by applying it to the wrong decision.

Just because you can measure it, doesn't make it a good metric!

Possible metric: Number of years a transplant program has been in business.

Hypothesis: Older programs have more experience and staying power in the business, and therefore must provide better care.

Potential issues with this metric:

- Age of the program may not reflect quality at all.
- Old programs may have all staff with outdated training or old equipment or all new staff and new equipment.
- New programs may have the “latest and greatest” equipment and training.

Other examples of metrics that are not great:

Median time to transplant for transplant recipients

Good for patients?

- Not really... tells you how long people waited if they got transplanted.
- Tells you nothing about how long you will likely wait.

Good for providers?

- Maybe... tells you the median time your transplant recipients were on the list, but difficult to draw conclusions or make list management decisions.

Good for regulators?

- No. No actionable information.

Other examples of metrics that are not great:

Observed first-year survival

Good for patients?

- Not really... depends on the case-mix at the program. Each patient is unique, so “average” first-year survival doesn’t tell a patient what may happen to them.

Good for providers?

- Not really. Doesn’t tell you if you’re doing better or worse than other programs. Programs taking more risk will have worse observed 1-year survival.

Good for regulators?

- No. Needs risk adjustment to draw any conclusions.

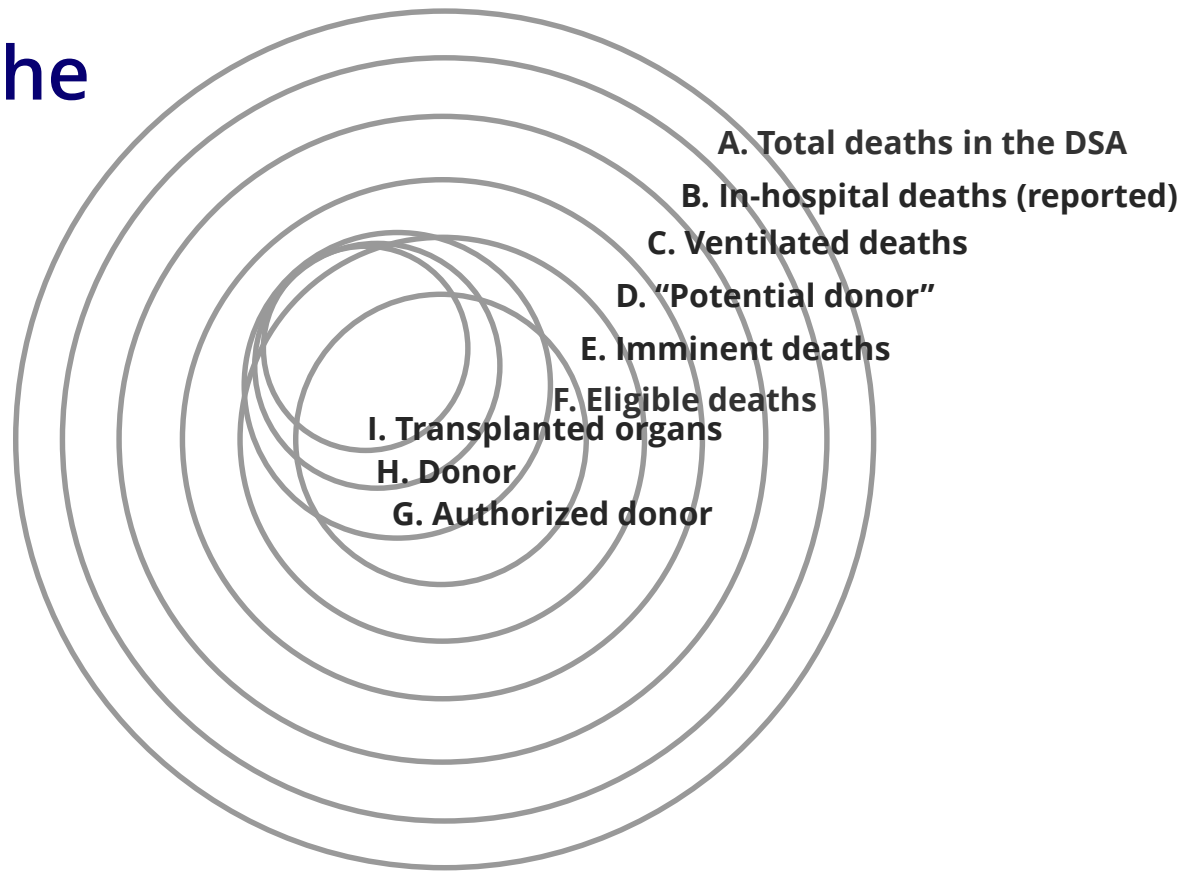


SCIENTIFIC
REGISTRY OF
TRANSPLANT
RECIPIENTS

Choosing relevant metrics

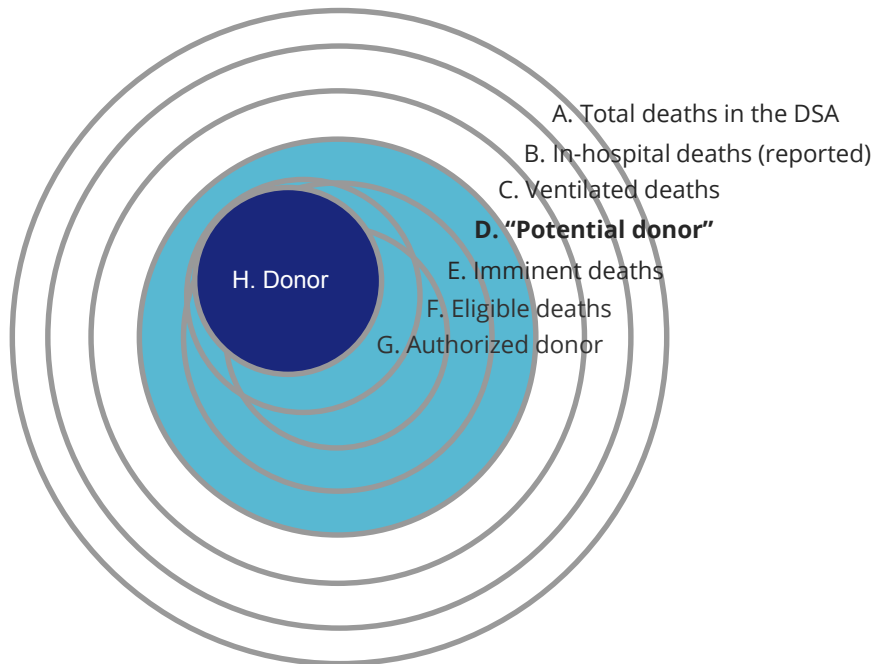
The process suggests good metrics

Example of the deceased donation process

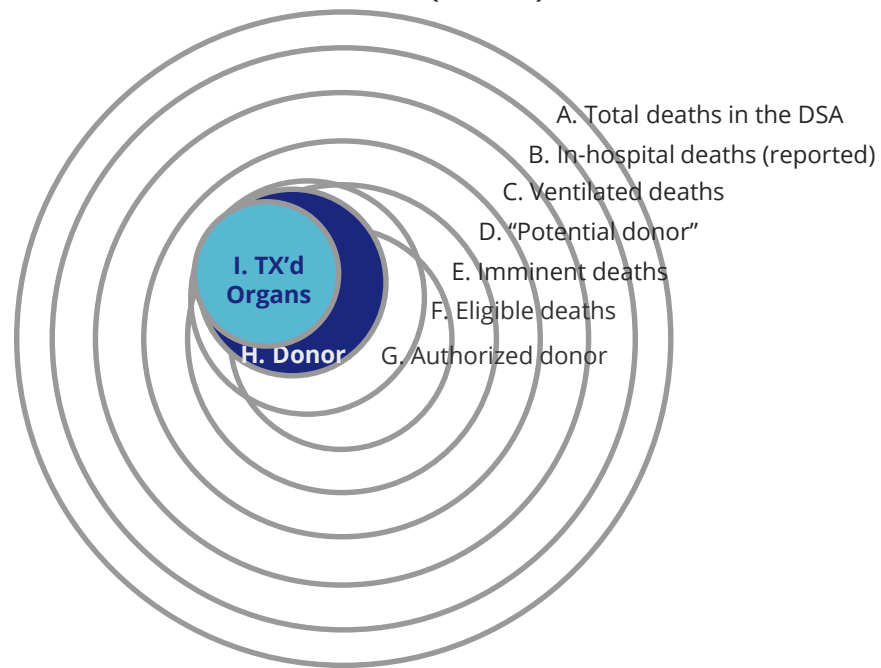


Two primary metrics for deceased donation:

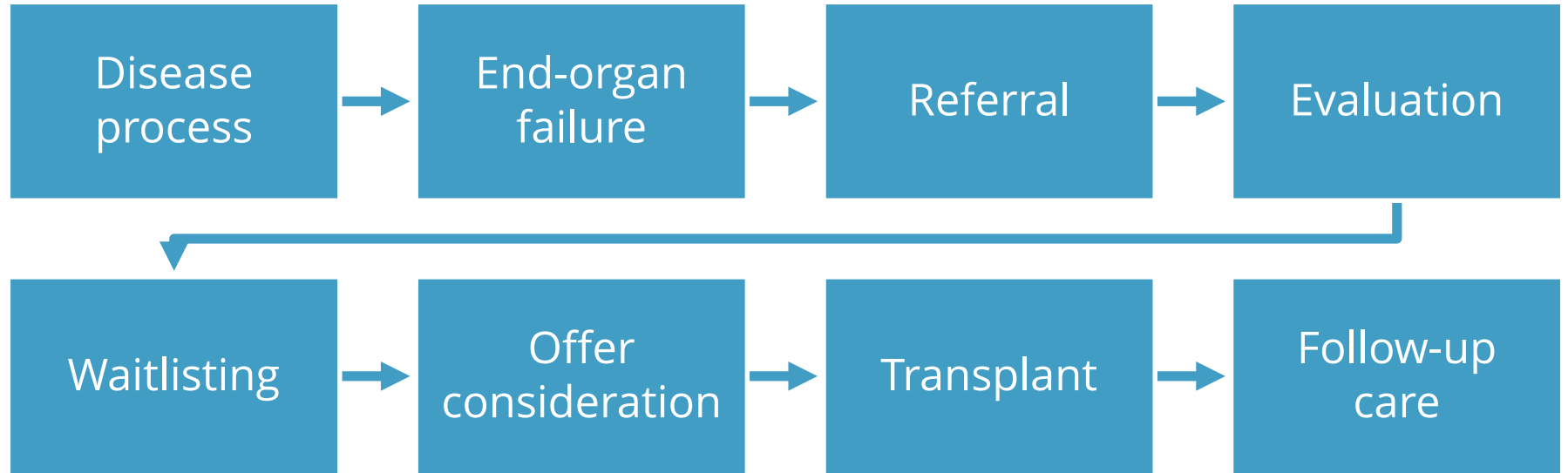
1. How often do “potential donors” become actual donors? (Conversion)



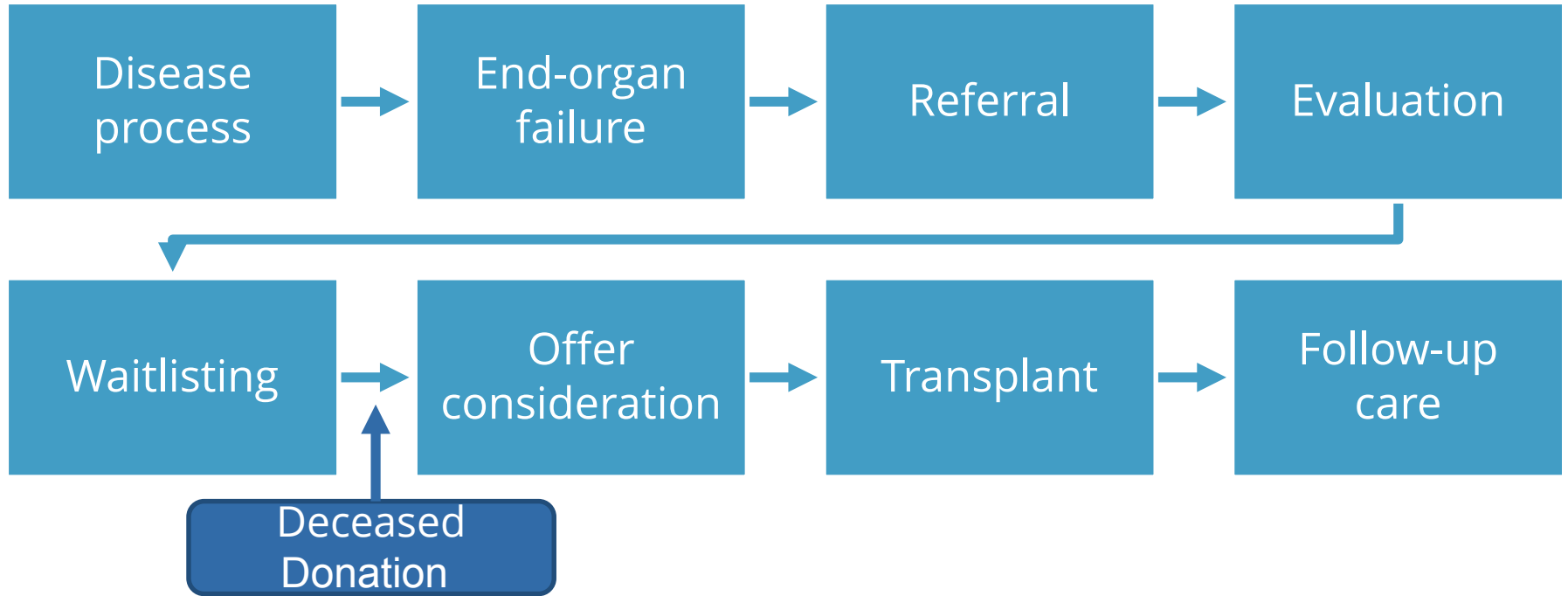
2. How often are organs transplanted from actual donors? (Yield)



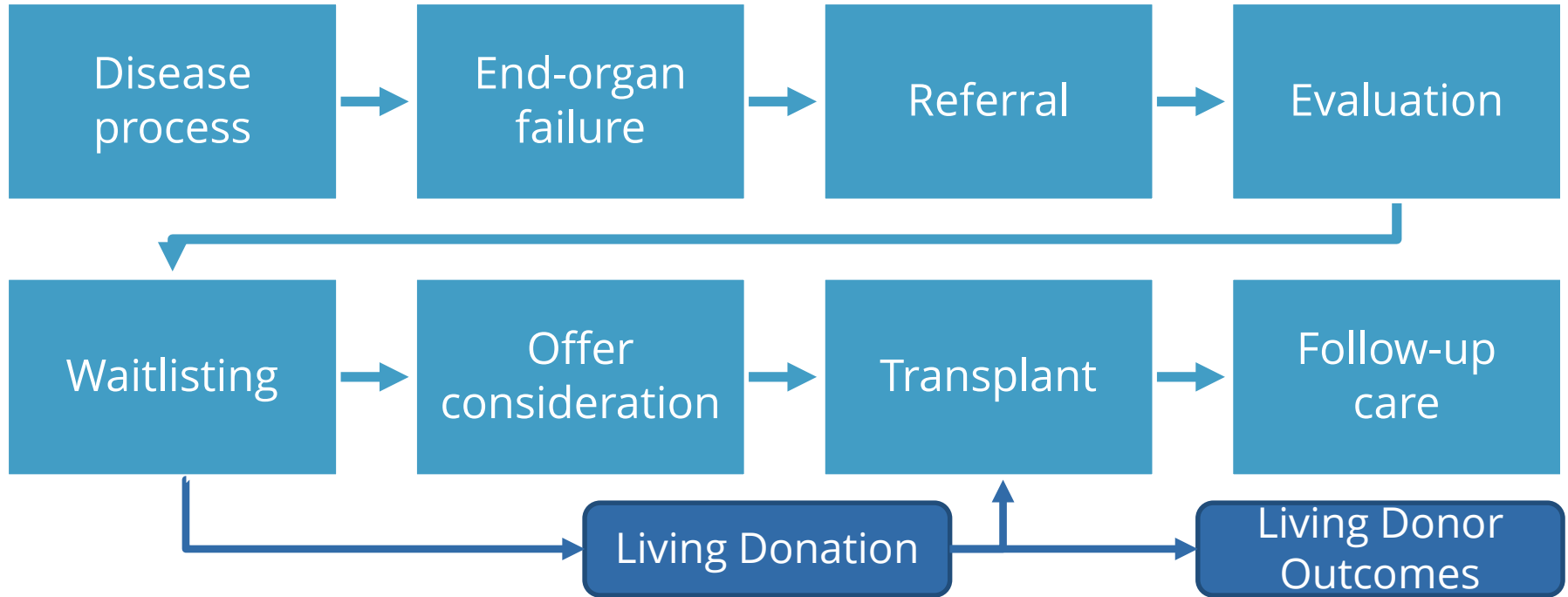
The transplant process:



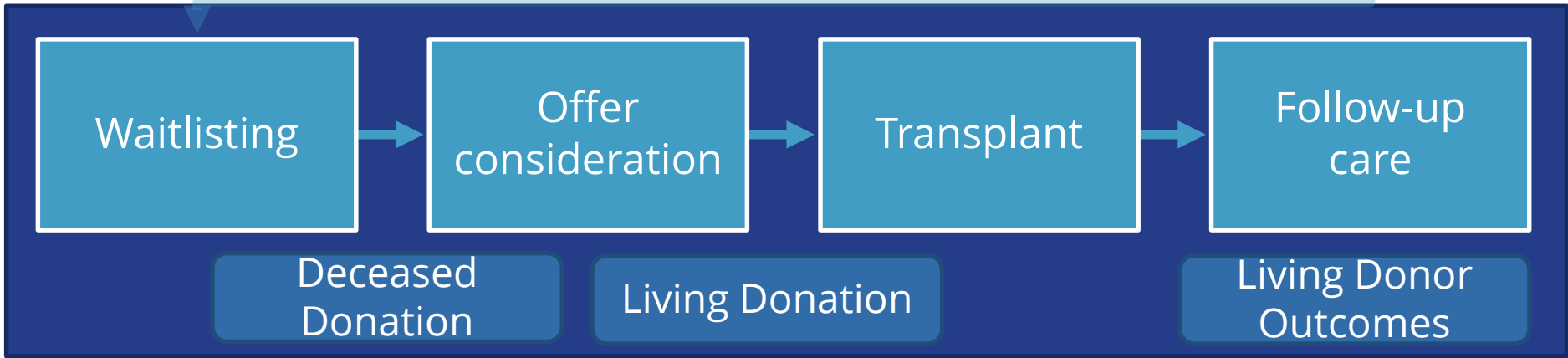
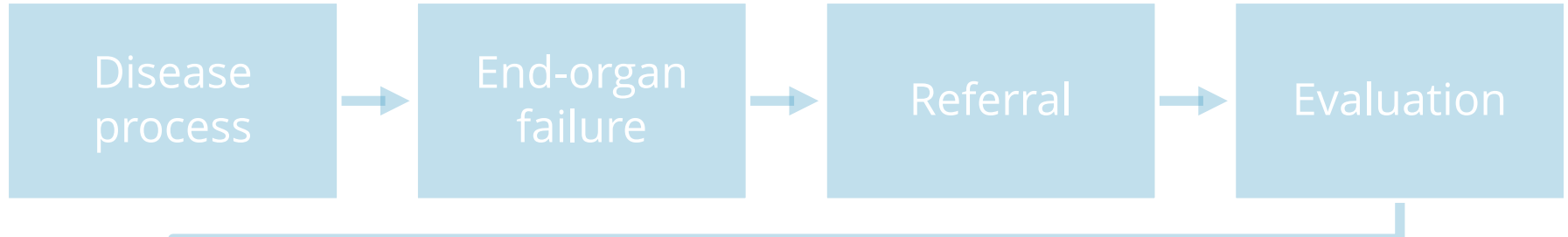
The transplant process:



The transplant process:



Current Domain of the OPTN/SRTR:



SRTR contractual reporting obligations:

Waitlist activity

Waitlist outcomes

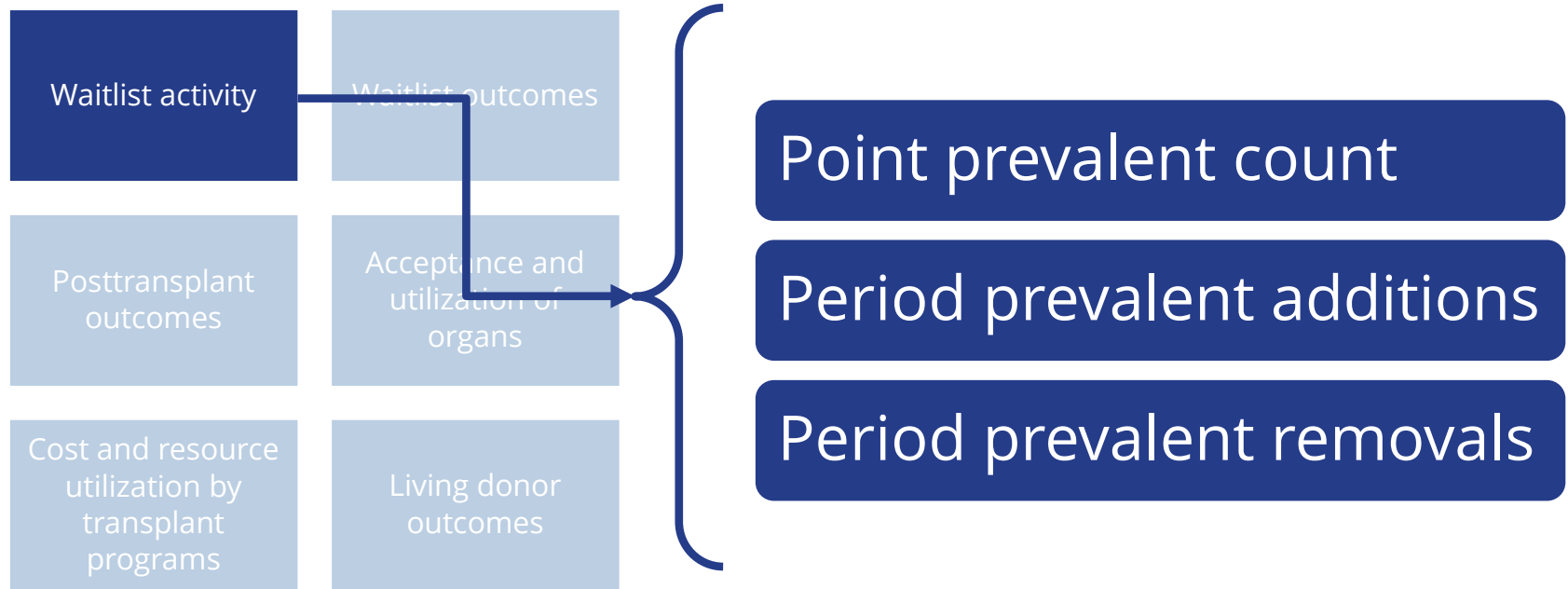
Posttransplant
outcomes

Acceptance and
utilization of
organs

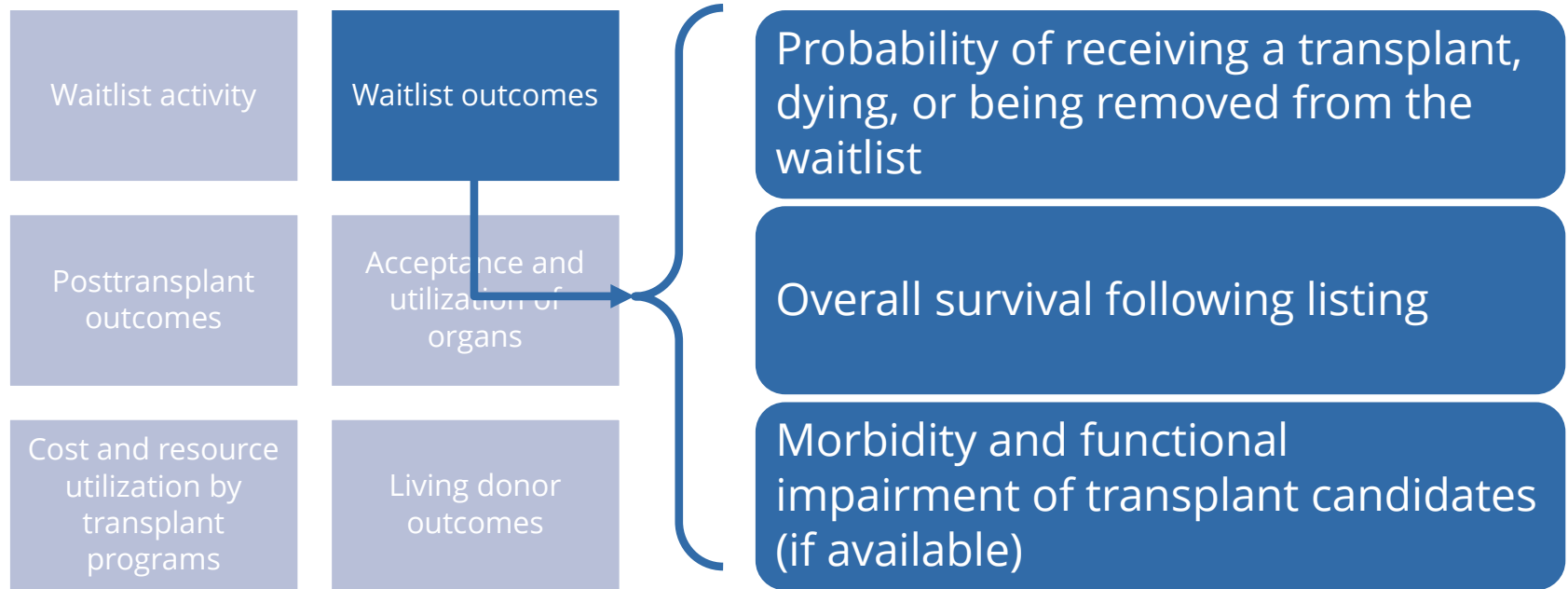
Cost and resource
utilization by
transplant
programs

Living donor
outcomes

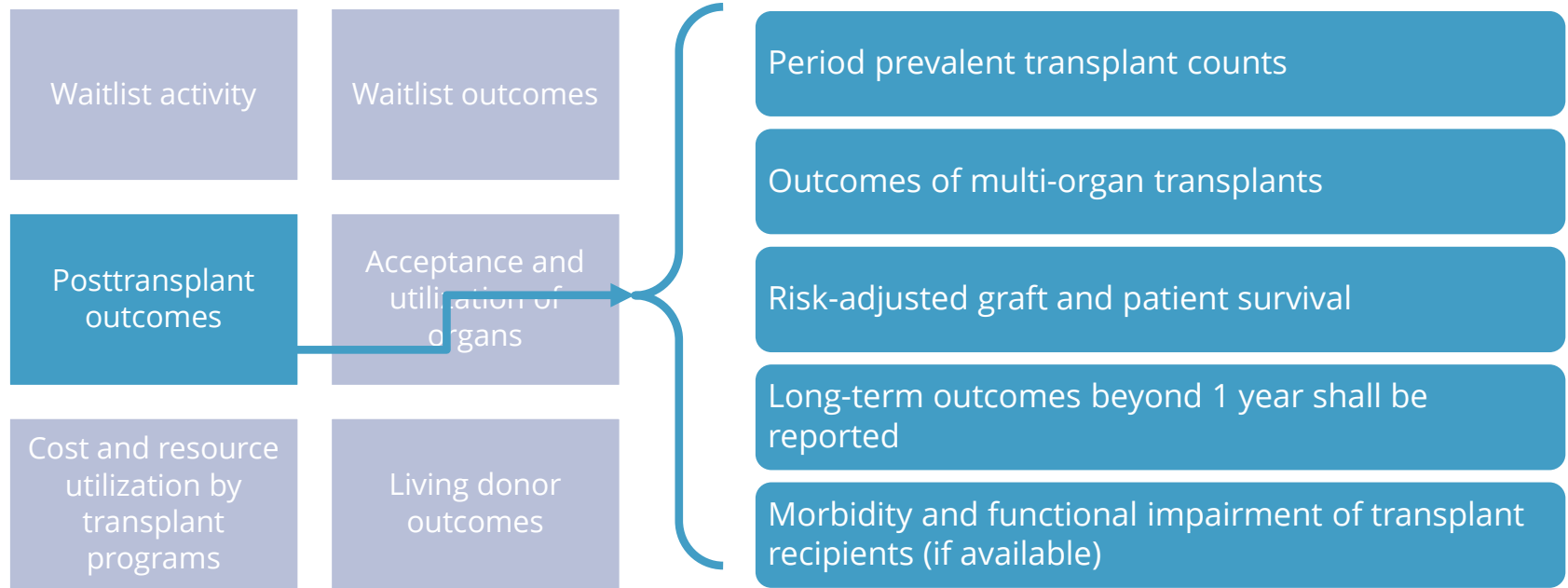
SRTR contractual reporting obligations:



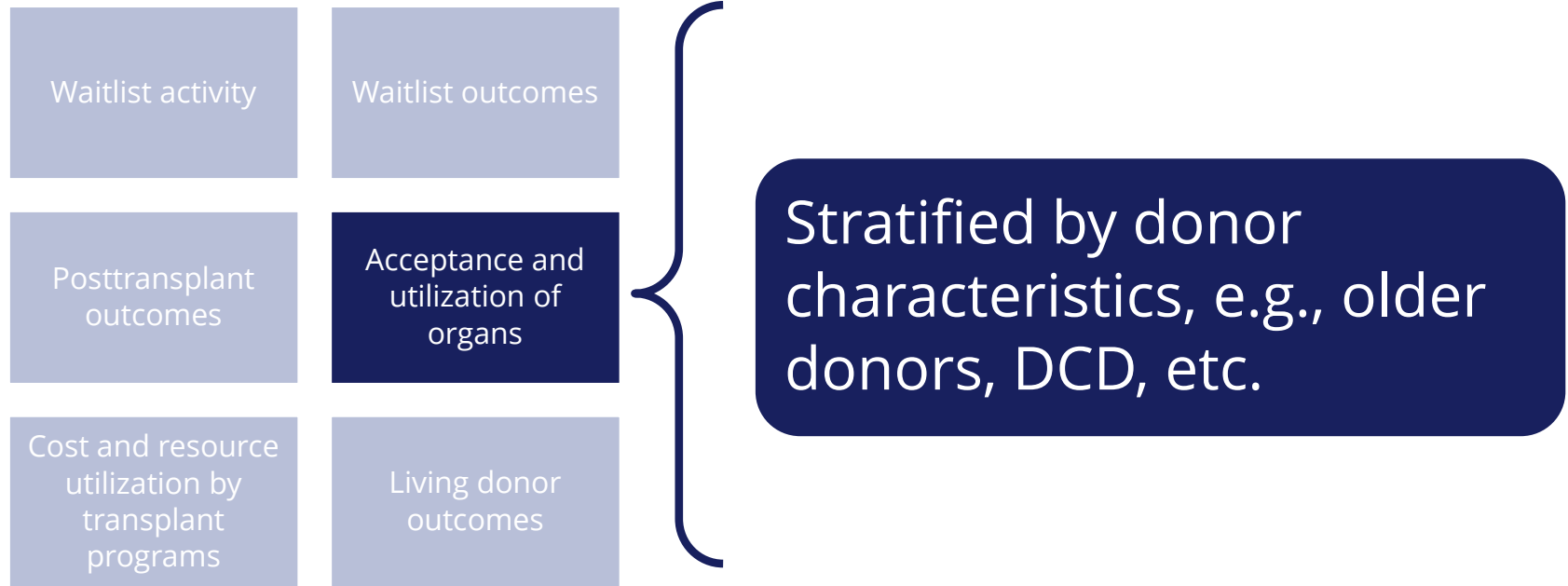
SRTR contractual reporting obligations:



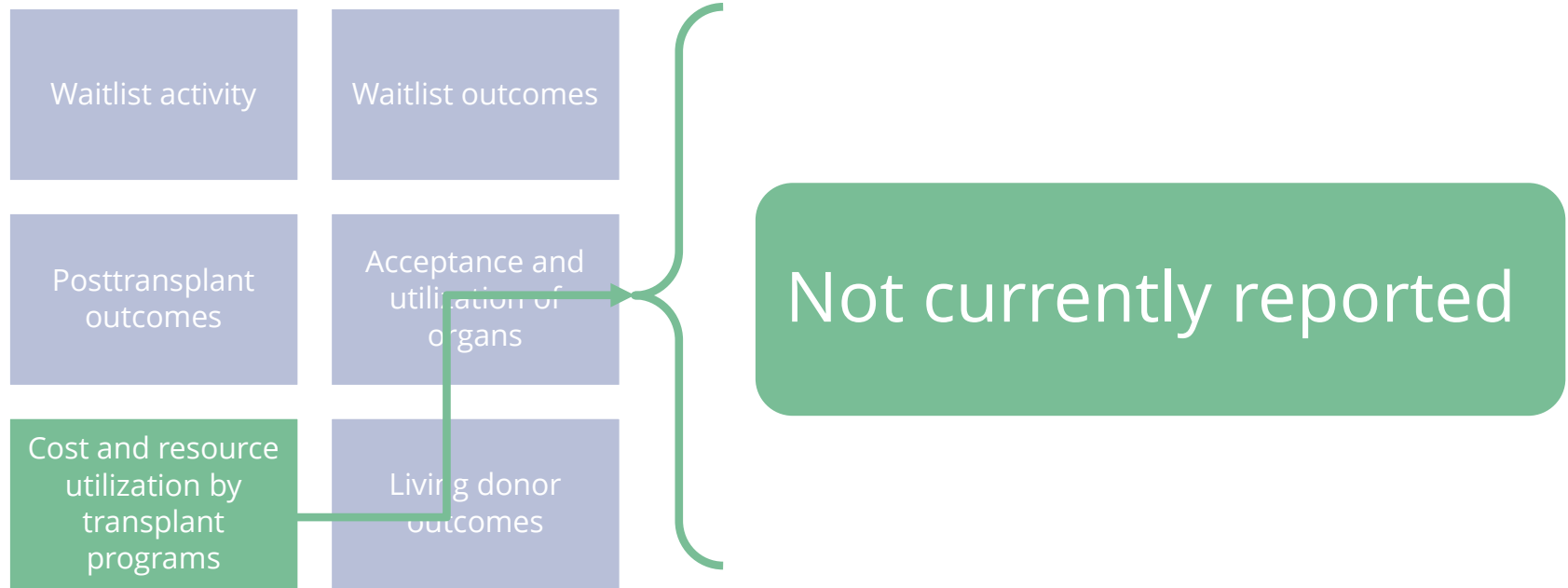
SRTR contractual reporting obligations:



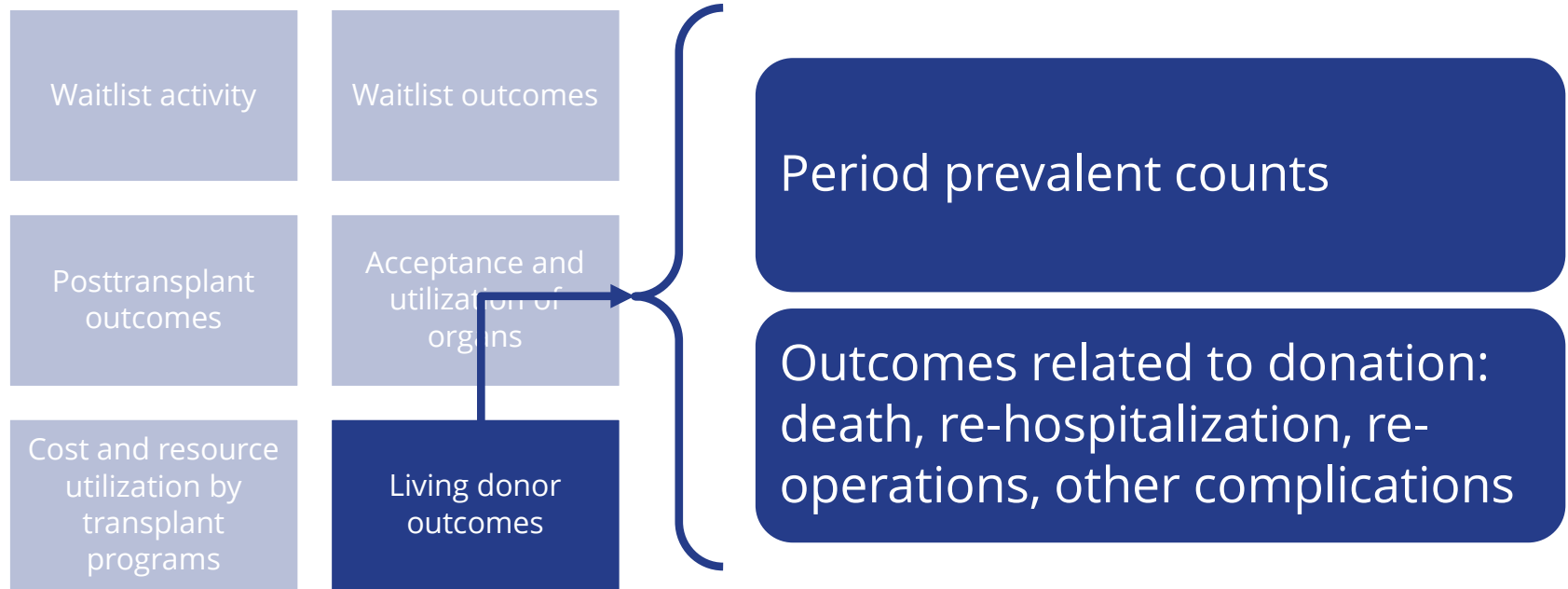
SRTR contractual reporting obligations:



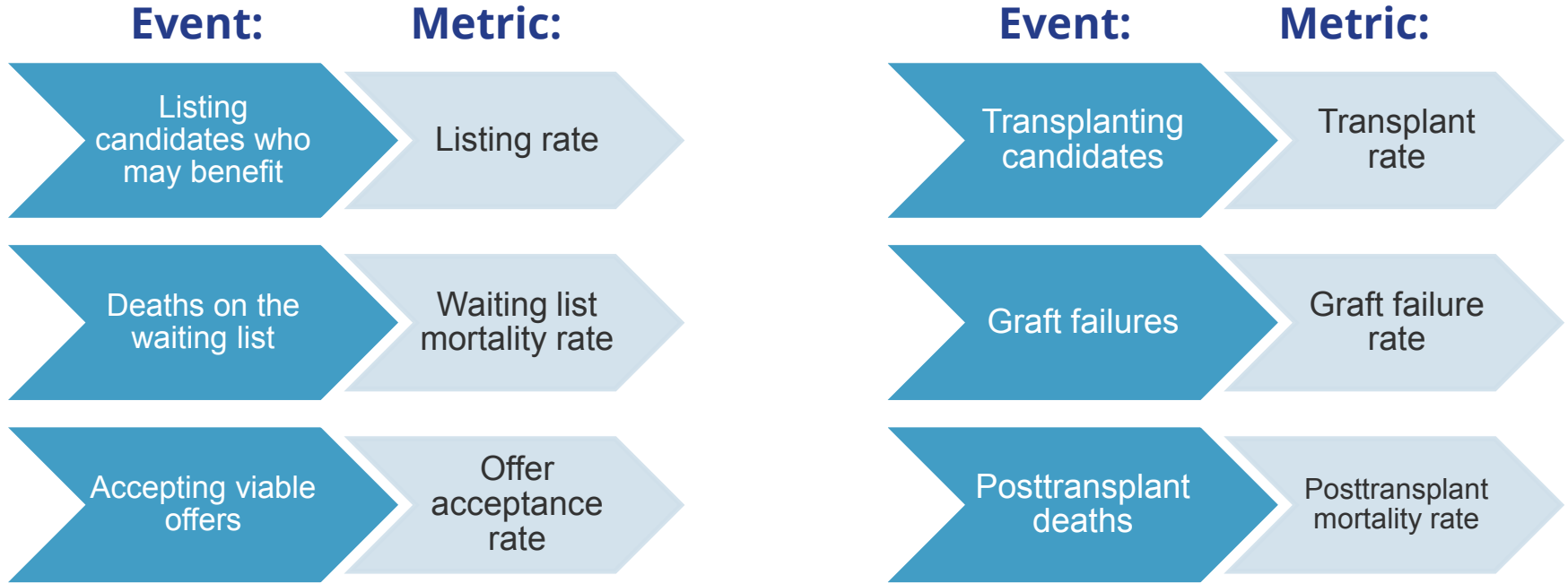
SRTR contractual reporting obligations:



SRTR contractual reporting obligations:



Meaningful events in the process often suggest good metrics:



Key questions by which to judge a metric:

Can we calculate it?

- Seems obvious, but consider listing rate, we don't have data on referrals.

Who is the primary audience?

- Patients?
- Providers?
- Regulators?

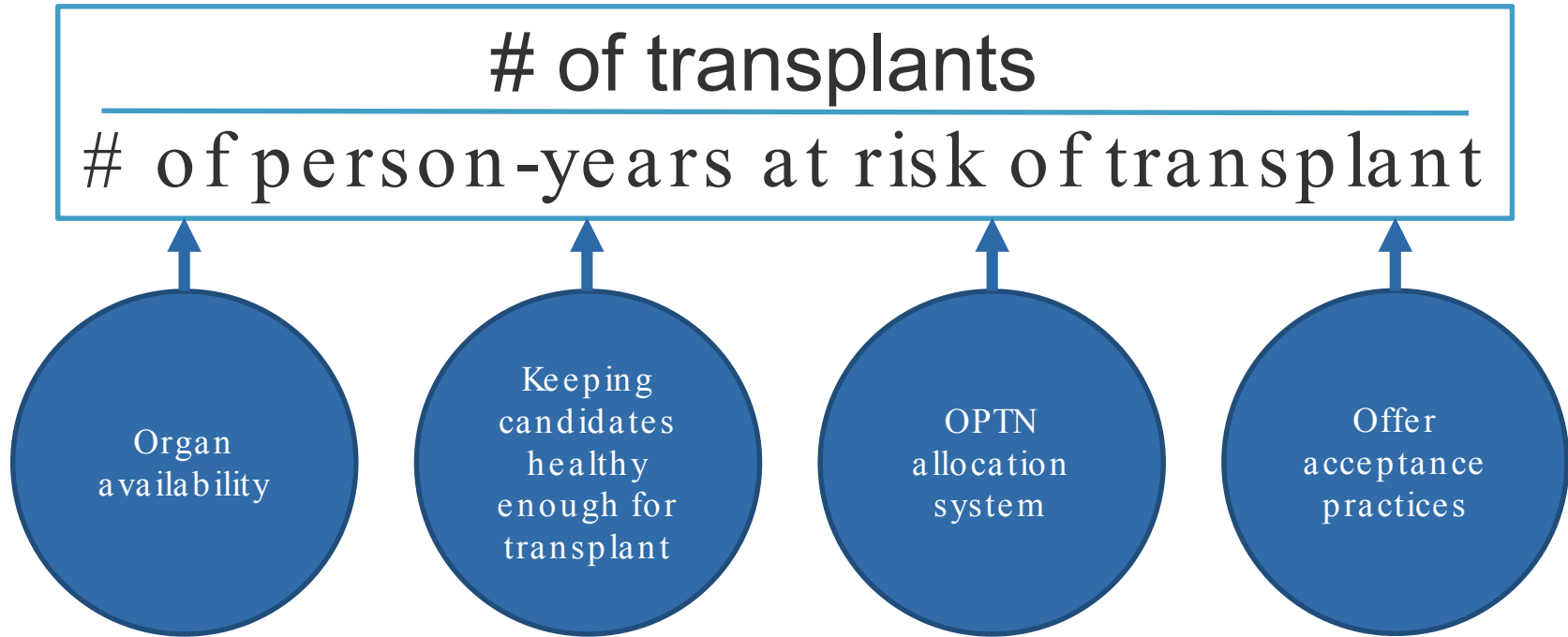
What will the metric be used for?

- QAPI?
- Regulatory oversight?
- Public Reporting?

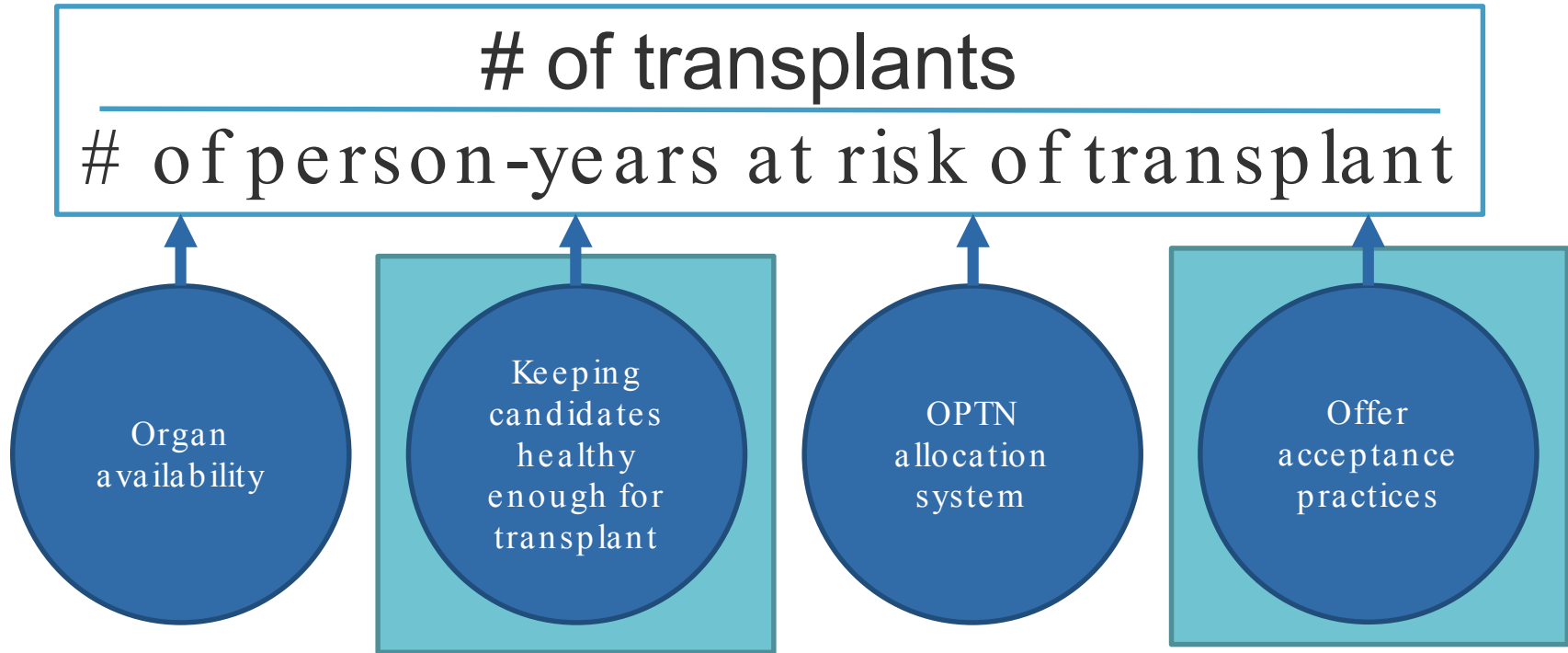
Does the metric have construct validity?

- Are we measuring what we think we're measuring?

Example Metric: Transplant Rate



Example Metric: Transplant Rate



So, is Transplant Rate a good metric?

The audience matters!

Patients (OK metric)

- Transplant rate describes speed at which transplants occur at the program.
- Patients do not necessarily care which components of the process are under whose control.
- An adjusted O/E metric provides better information to patients than the rate itself.

Providers (requires additional data to be a good metric)

- What part of the process is under the control of the program?
 - Organ availability? (Geographic disparity)
 - Keeping candidates well enough to be transplanted when offers arrive?
 - Offer acceptance?

Regulators (not a good target of regulatory compliance)

- Pieces of the puzzle are out of the control of the program, e.g., organ availability and the OPTN allocation system.

What about offer acceptance?

Patients (not a good metric)

- A program with a high supply and average offer acceptance could easily be a better choice than a program with low supply and high acceptance.

Providers (good metric)

- Accepting viable offers is under the control of the program.
- Risk adjusted O/E for offer acceptance tells the program how their acceptance practice compares with other programs considering similar offers.

Regulators (good metric)

- Programs with low relative acceptance rates could help their candidates by changing their acceptance behavior.
- Low acceptance rates make allocation less efficient, which makes it more difficult to place organs.

First-year outcomes

Table C6. Adult (18+) 1-year survival with a functioning graft
Single organ transplants performed between 01/01/2014 and 06/30/2016
Deaths and retransplants are considered graft failures

	MNUM	U.S.
Number of transplants evaluated	395	40,586
Estimated probability of surviving with a functioning graft at 1 year (unadjusted for patient and donor characteristics)	#1 97.83%	95.18%
Expected probability of surviving with a functioning graft at 1 year (adjusted for patient and donor characteristics)	96.03% #2	--
Number of observed graft failures (including deaths) during the first year after transplant	8	1,837
Number of expected graft failures (including deaths) during the first year after transplant	14.82	--
Estimated hazard ratio*	#3 0.59	--
95% credible interval for the hazard ratio**	[0.29, 1.02]	--

Figure C3. Adult (18+) 1-year graft failure HR estimate

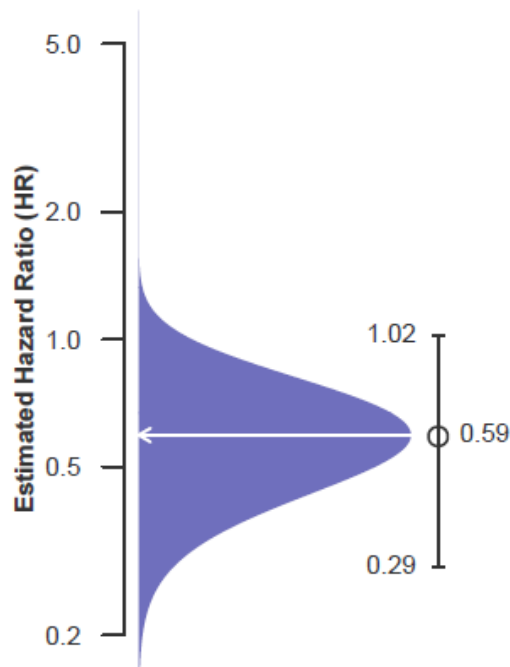
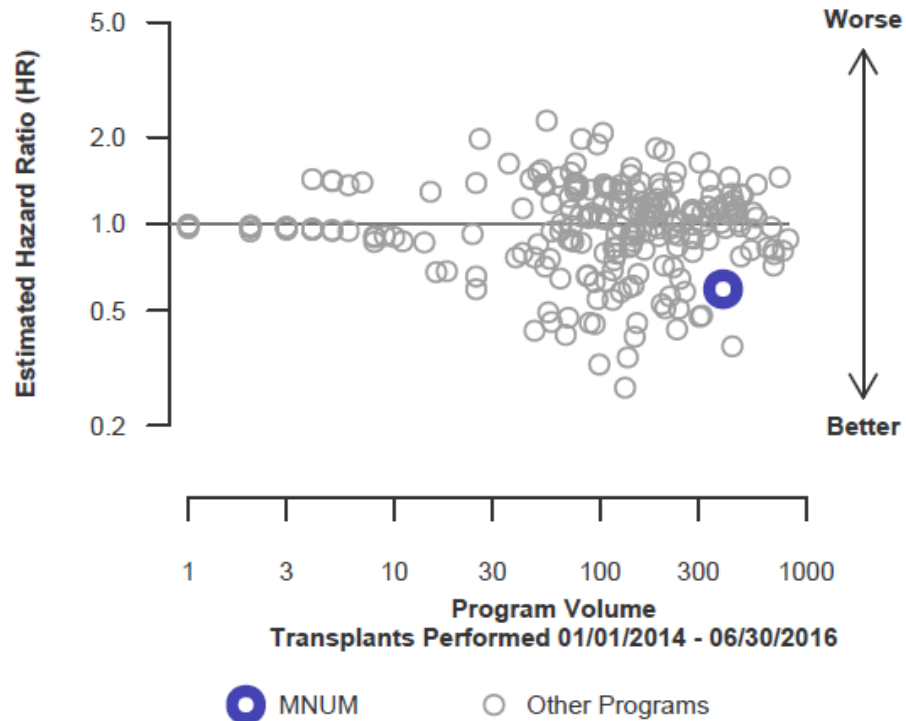



Figure C4. Adult (18+) 1-year graft failure HR program comparison



Is the hazard ratio for first-year survival a “good metric”?



Strengths:

- Risk adjusted
- Important to patients
- Relatively well-defined endpoint

Weaknesses:

- Risk adjustment is imperfect
- Some argue long-term outcomes are more important.
- Some argue surgical success (short-term outcomes) better describes quality.
- Getting people transplanted is more important than posttransplant outcomes.

Long-term vs. Short-term Outcomes

(SRTR currently reports 1-month, 1-year, and 3-year outcomes.)

Long-term outcomes (e.g., 10-year):

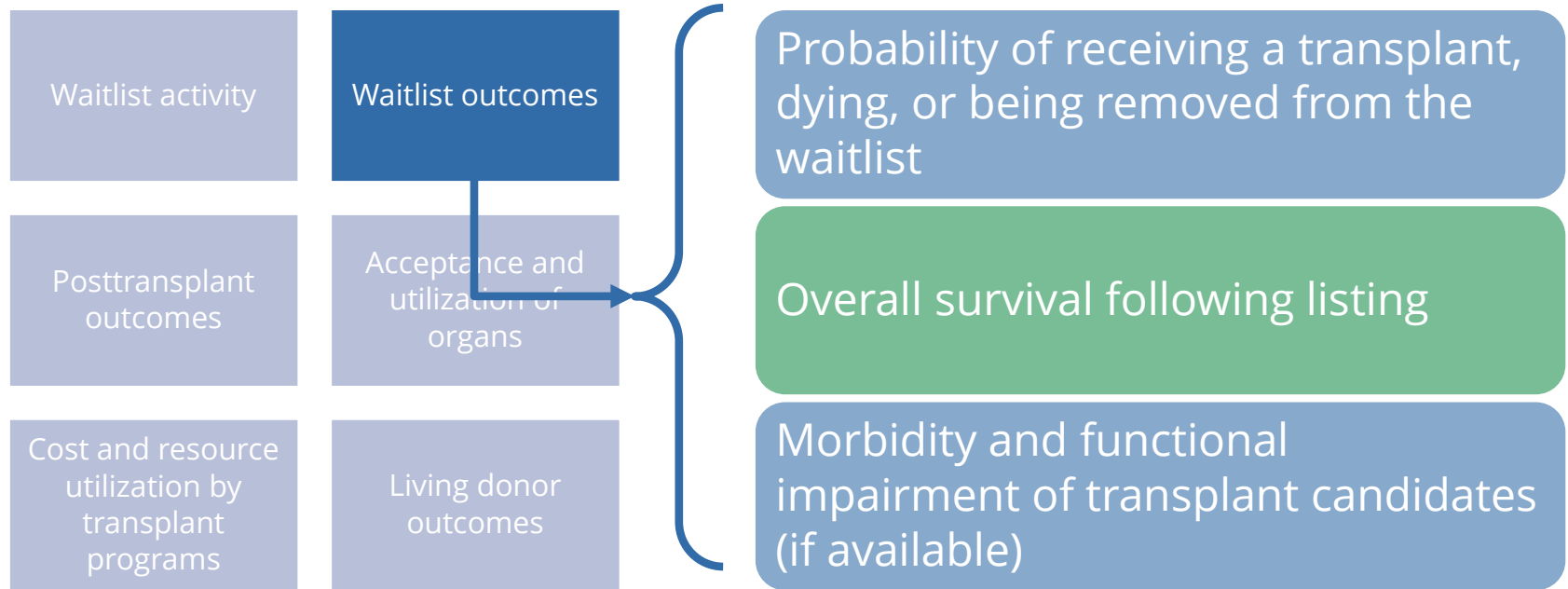
- Attractive on many levels... patients want to know their long-term prognosis if they receive a transplant at the program.
- 10-year outcomes are only known for transplants that happened 10-years ago at your program, which may not be relevant to today's reality.
- Programs may not provide direct care to patients long after transplant.

Short-term outcomes (1-month):

- May be more “under the control” of the transplant program.
- Misses potential impact of follow-up care by the program.
- May not have enough events (statistical power) to present a meaningful metric.

Finding a balance necessitates a compromise.

SRTR contractual reporting obligations:



Overall survival following listing

Patients (good metric)

- Attractive for a metric targeted towards patients... patients want to know the likely outcome if they are listed at a certain program.

Providers (not a great metric)

- Need to drill down to components of care that affect patient outcomes both pre- and posttransplant.
- Many aspects are out of the control of the program.

Regulators (not a good metric)

- Lots of things impact outcomes pre- and posttransplant, some of which are under the control of the program, many of which are not.

What about unintended consequences of metrics:

Posttransplant outcomes:

- May cause risk aversion by providers, limiting access to transplant for patients that could benefit.

Waiting List mortality and life-years from listing:

- May cause providers to limit access to the list.

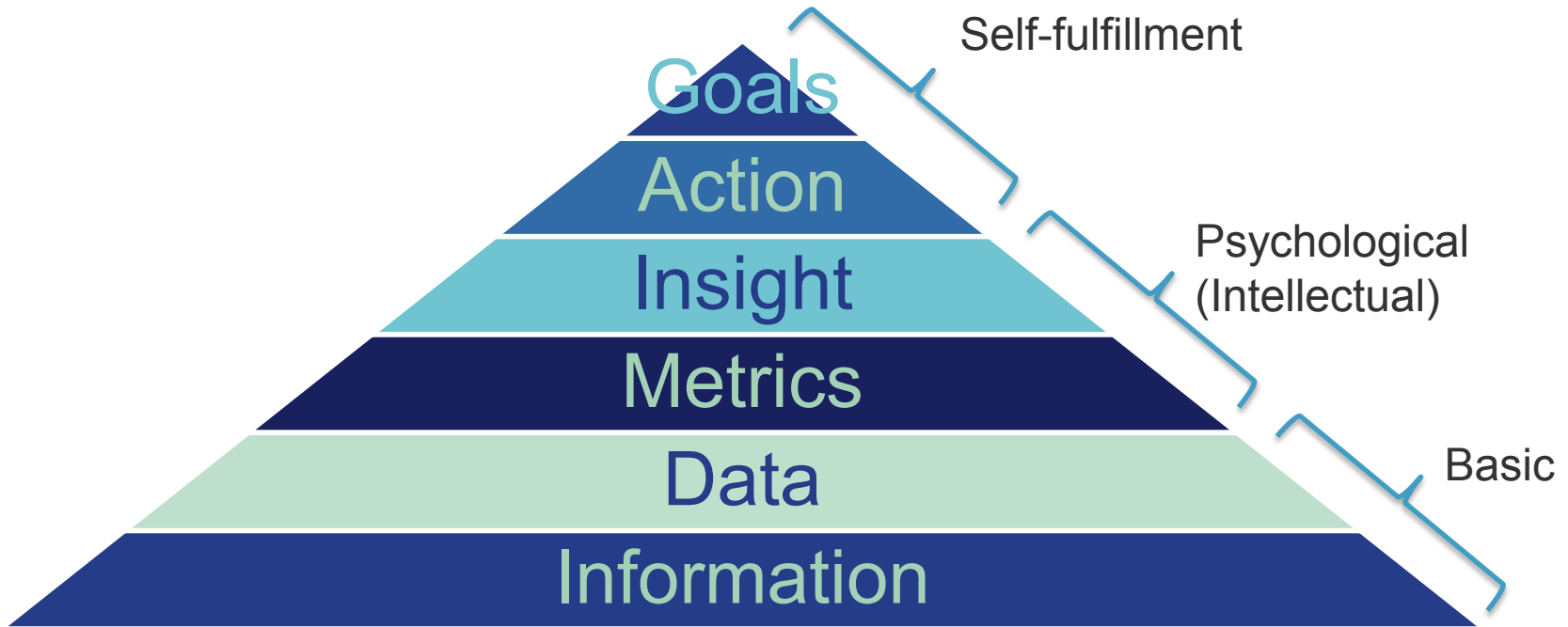
Risk adjustment (good risk adjustment) is the only way metrics can mitigate unintended consequences. Necessitates good data collection.

Conclusions

Choosing the right metric is context specific, and must address the following questions:

1. Who is the target audience for the metric?
 1. Patients?
 2. Providers?
 3. Payers?
 4. Regulators?
2. What is the intended purpose?
 1. Public reporting?
 2. Provider QAPI?
 3. Provider contracting?
 4. Regulatory oversight?

Snyder's Hierarchy of Metric Needs



Welcome to Minnesota!



SPAM is produced by the Hormel Foods Corporation, which is based in Austin, Minnesota. Austin is also home to the **Spam Museum**, which has dubbed itself “the world’s most comprehensive collection of spiced pork artifacts.”

Welcome to Minnesota!



FREE ADMISSION

COME VISIT! 101 3rd Avenue NE
Austin, MN 55912
(507) 437-5100

MUSEUM HOURS **April – September**
Monday-Saturday: 10:00am-6:00pm
Sunday: 11:00am-5:00pm
[See All Hours +](#)

SHOP HOURS **April – October**
Monday-Saturday: 9:00am-6:00pm
Sunday: 11:00am-5:00pm
[See All Hours +](#)

**Director
Transplant
Epidemiology**

Jon Snyder, PhD, MS

**Medical
Editor**

Nan Booth, MSW, MPH, ELS

Biostatisticians

Nicholas Salkowski, PhD

Andrew Wey, PhD

David Zaun, MS

Noelle Hadley, MS

Sally Gustafson, MS

David Schladt, MS

Melissa Skeans, MS

Tim Weaver, MS

Investigators

Bertram Kasiske, MD FACP

Ajay Israni, MD, MS

Allyson Hart, MD, MS

**Marketing &
Comm.**

Mona Shater, MA

Amy Ketterer

**Program
Manager**

Laura Klein, MPH

**Project
Managers**

Katherine Audette, MS

Alyssa Herreid, MPH

Bryn Thompson, MPH

**Administrative
Assistant**

Pamela Giles

**IT, Web,
Database,
Simulation**

Ryan Follmer

Carl Fils-Aime

Mark Fredrickson

Patrick Johnson

Joshua Pyke, PhD

Eugene Shteyn, MS



SCIENTIFIC
REGISTRY OF
TRANSPLANT
RECIPIENTS

Thank you...

Questions or feedback: jsnyder@SRTR.org



[@SRTRNews](https://twitter.com/SRTRNews)



[Scientific Registry of Transplant Recipients](https://www.linkedin.com/company/scientific-registry-of-transplant-recipients/)



[SRTR](https://www.youtube.com/SRTR)