Cost-Effectiveness Calculators for SUD: A Pilot of Peer Recovery Support Services and Bystander Naloxone Distribution

MSD Center Webinar, October 25, 2022

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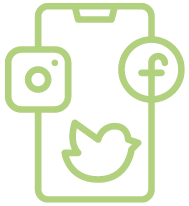

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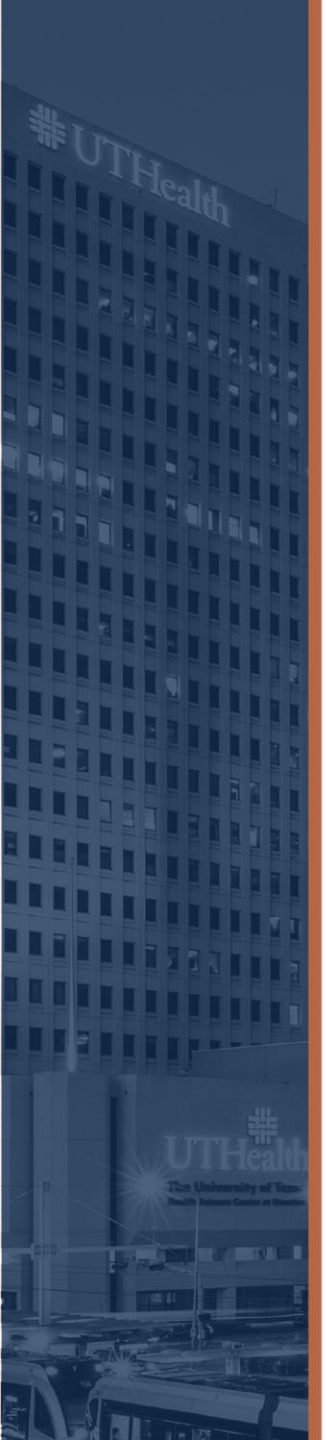
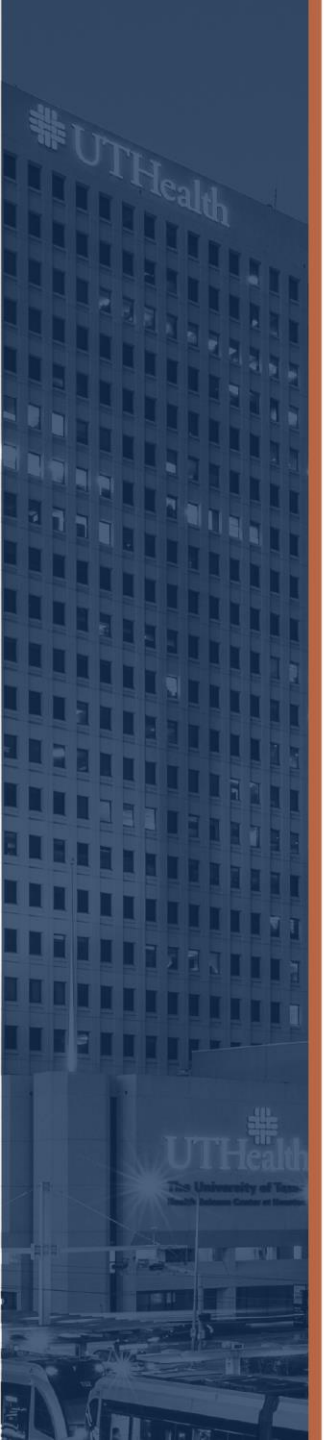


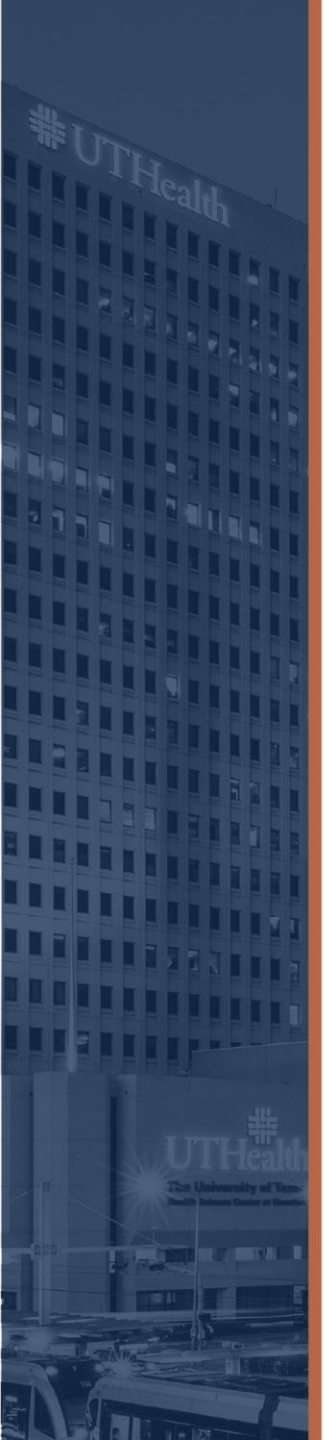
Outline for Today

- Background and goals for the future
- Learn about cost-effectiveness analysis
- How we structured our analysis to make the calculator
- Hands-on cost-effectiveness calculator tutorial – your feedback encouraged!



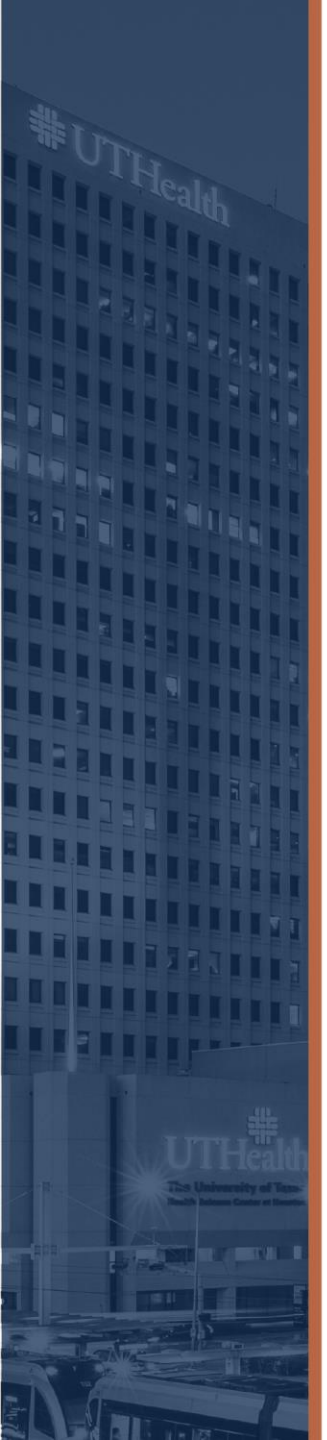
Background

- Our ultimate goal:
  - A free, web-based multi-faceted cost-effectiveness calculator that
    - Empowers stakeholders (RCOs, advocates, community decision-makers) to use cost-effectiveness information
    - Increases support for existing programs, build support for the adoption of programs
- Bonus goal:
  - Fill in the knowledge gaps – very little economic evaluation research on peer-driven SUD interventions

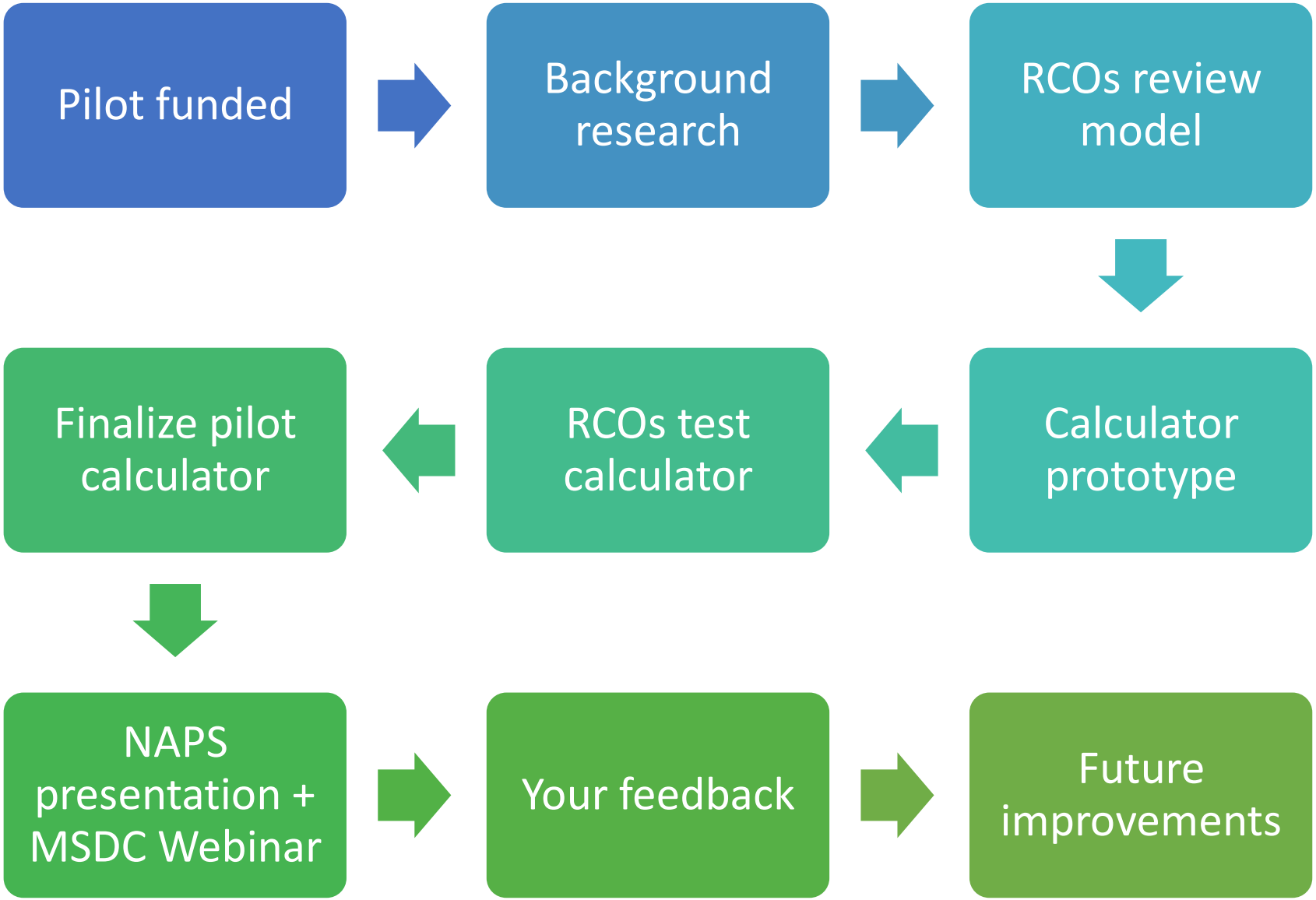


Background

- Lots of work to do!
- Unfunded collegiate recovery program calculator here
- Pilot funding to make today's calculator:
  - Long-term PRSS + Bystander Naloxone Distribution
  - Free, web-based, more accessible
- Will also seek peer-reviewed publication



THANK YOU to Communities for Recovery and RecoveryATX for providing critical feedback!



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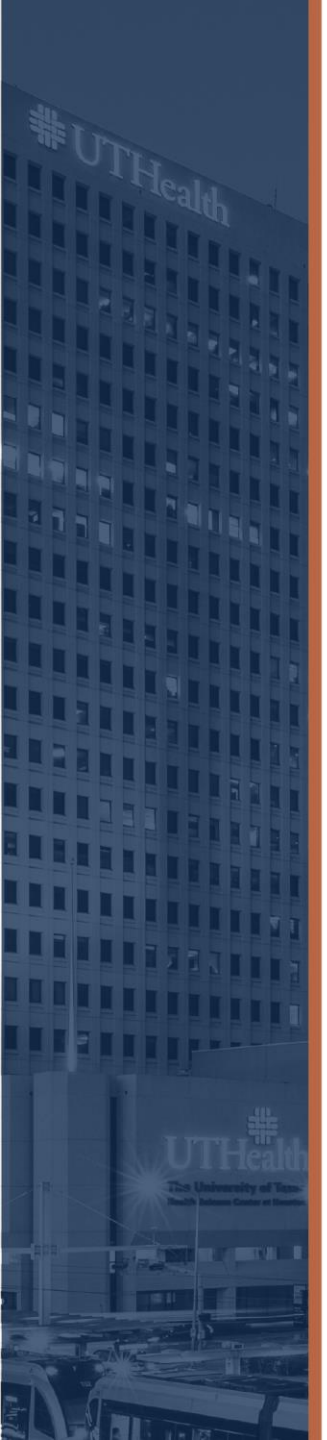

What is Cost-Effectiveness Analysis?

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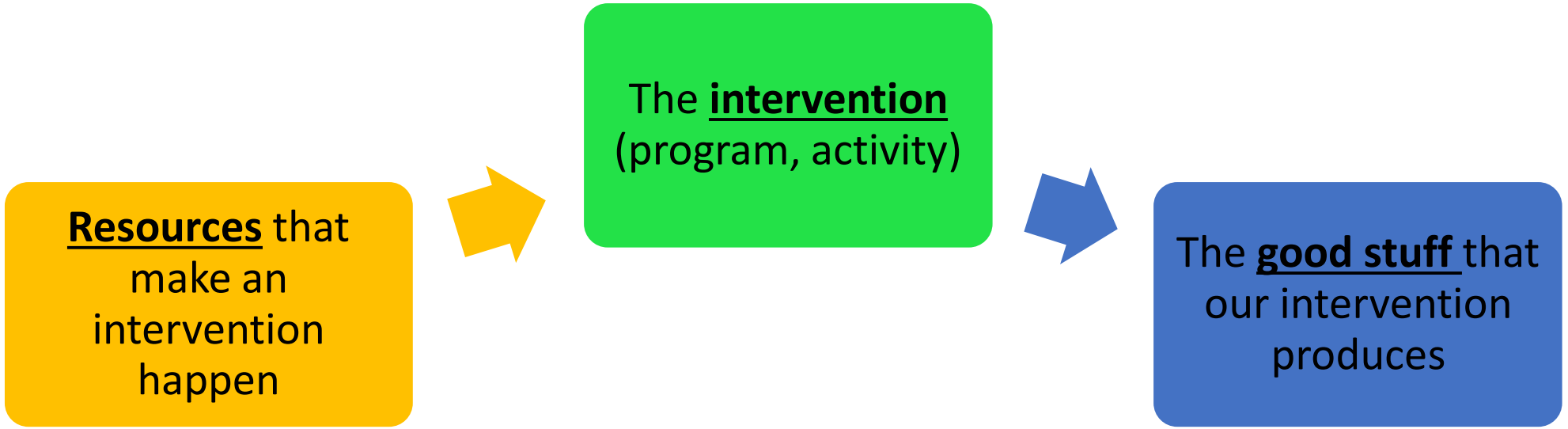


What is Cost-Effectiveness Analysis?

Resources that make an intervention happen

The **intervention** (program, activity)

The **good stuff** that our intervention produces

How balanced are resources to good stuff?

What is Cost-Effectiveness Analysis?

Cost-Effectiveness

Cost-Benefit Analysis

Return on Investment

How balanced are resources to good stuff?

What is Cost-Effectiveness Analysis?

Cost-Effectiveness

Resources have $$$, but good stuff doesn't

Cost-Benefit Analysis

Both resources and good stuff have $$$

Return on Investment

How balanced are resources to good stuff?

What is Cost-Effectiveness Analysis?

Cost-Effectiveness

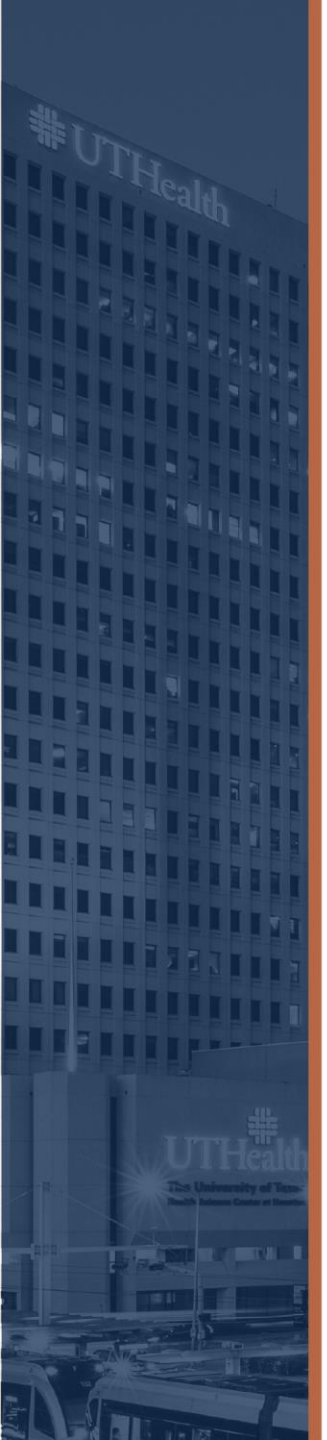
Resources have $$$, but good stuff doesn't

Cost-Benefit Analysis

Both resources and good stuff have $$$

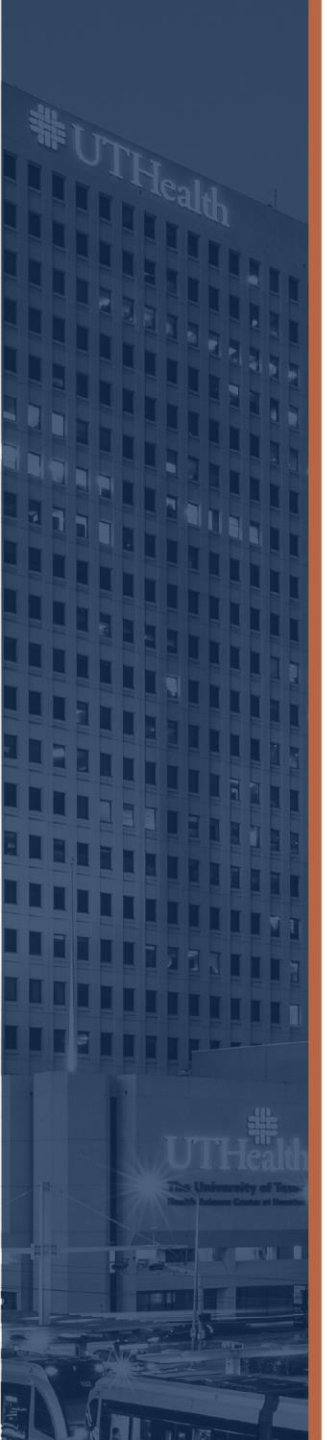
Return on Investment

How balanced are resources to good stuff?



$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} =$$

- The result is called an **Incremental Cost-Effectiveness Ratio (ICER)** and represents the cost of the intervention per unit of good stuff produced.
- Examples: $100 per person quitting tobacco, $20 per averted sick day, or $500 per quality-adjusted year of life added.
- Let’s look at an everyday example!



- Grocery store metaphor:
  - Compare sticker prices, but packaging or product is not identical, so we can compare price per ounce (or other unit), instead.

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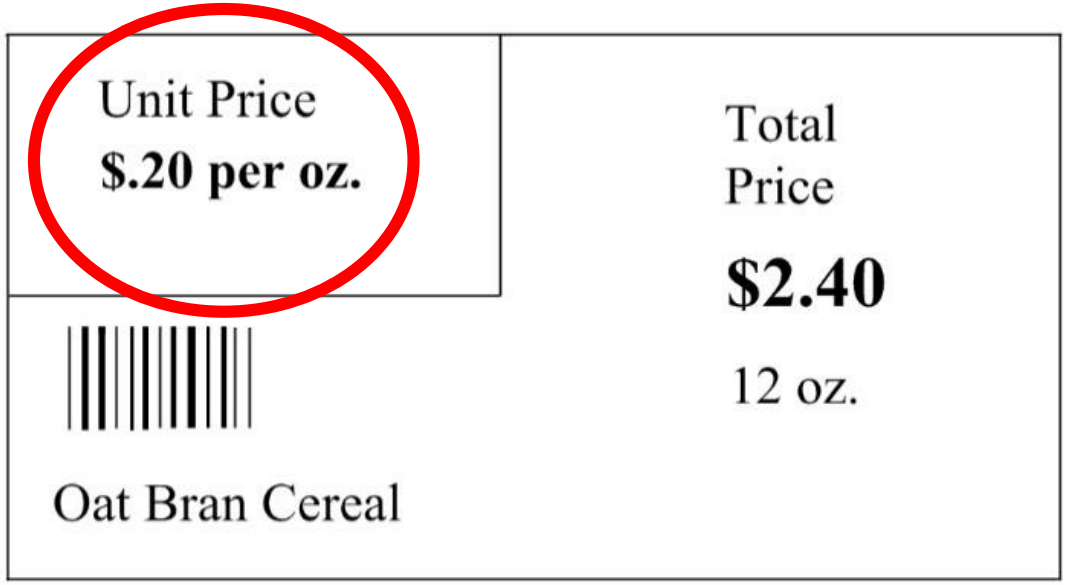
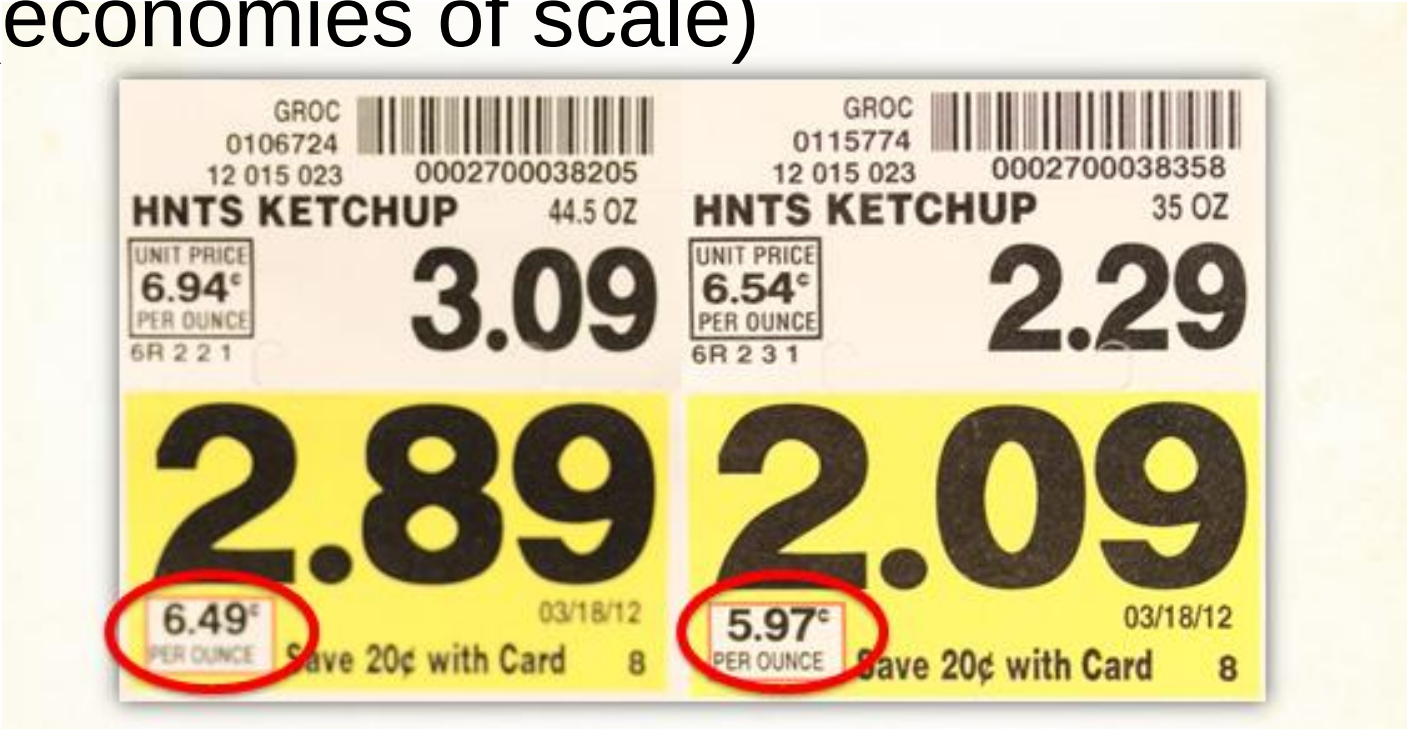
  - Compare sticker prices, but packaging or product is not identical, so we can compare price per ounce (or other unit), instead.
  - **For different types of cereal.**

Unit Price **$.20 per oz.**	Total Price **$2.40**
Oat Bran Cereal	12 oz.

- Grocery store metaphor:
  - Compare sticker prices, but packaging or product is not identical, so we can compare price per ounce (or other unit), instead.
  - **For different types of cereal.**



- Grocery store metaphor:
  - Compare sticker prices, but packaging or product is not identical, so we can compare price per ounce (or other unit), instead.
  - Or for the exact same product and brand, but different sizes (economies of scale)



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- Examples: $100 per person quitting tobacco, $20 per averted sick day, or $500 per quality-adjusted year of life added.

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

- Compare to current standard of care, often called "treatment as usual."
- Example: Intervention is a new vaccine, treatment as usual is the old vaccine.

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

- **Effects (the good stuff)**:
  - Don't assign $$$
  - Always have to do QALYs (quality-adjusted life year)

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

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  - Don't assign $$$
  - Always have to do QALYs (quality-adjusted life year)

4 years perfect health
QOL weight = 1
4 x 1 = 4

= 4 QALYs added

4 years at half of perfect health
QOL weight = 0.5
4 x 0.5 = 2

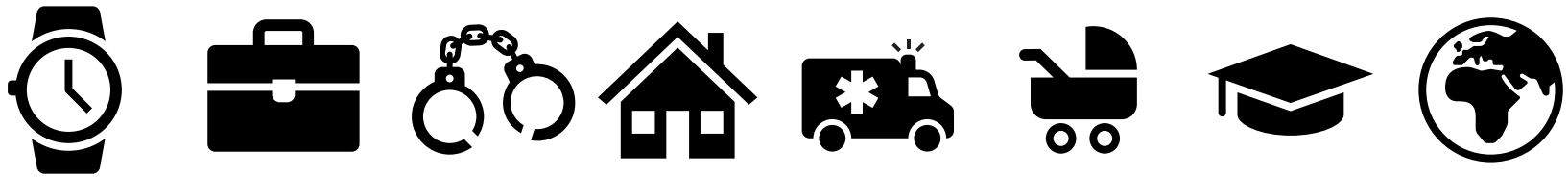
= 2 QALYs added

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

- **Effects (the good stuff)**:
  - Don't assign $$$
  - Always have to do QALYs (quality-adjusted life year)
    - Can compare to past studies – very useful to researchers
  - **Should** also do something useful to stakeholders and people who can use this information most
    - Examples: per additional person in recovery, per life saved, etc.

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

- **Costs:** Two perspectives (at least)
  - Societal



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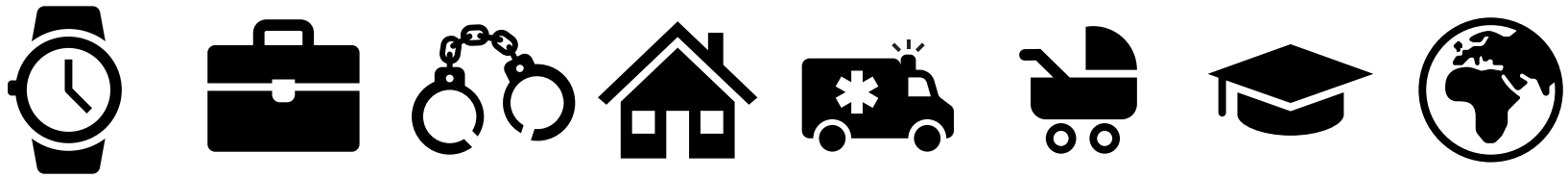

  - Health System – flexible, meaningful

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Recap:

- **Effects:**
  - No $$$
  - QALY and ideally something meaningful
- **Costs:**
  - All $$$
  - Societal and health system perspectives

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Recap:

- **Effects:**
  - No $$$
  - QALY and ideally something meaningful
- **Costs:**
  - All $$$
  - Societal and health system perspectives

So we will have at least 2 ICERs, maybe 4

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Interpreting ICER

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Interpreting ICER

- It might look like one number (e.g. “$10,000”) but remember that it is actually a ratio ($10,000/1), and that the 1 in the denominator represents **one unit of the good stuff.**
  - Just like the price per ounce in our grocery store example!

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Interpreting ICER

- Compare to **"willingness to pay"** or to some other threshold.
  - Standard: $50,000; $100,000; $200,000 per QALY
  - A number that is meaningful in context
    - Example: Cost of specialty SUD treatment, cost of ICU care, etc.

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Interpreting ICER

- If ICER is **less than** the willingness to pay threshold, then it is **cost-effective!**

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Interpreting ICER

- If ICER is **less than** the willingness to pay threshold, then it is **cost-effective!**
- Can be cost-effective to one threshold, but not to another (Example: “cost-effective to $50k, but not compared to the cost of ICU care”)

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Interpreting ICER

- If ICER is **negative** because it costs less and is more effective, then the intervention is BOTH **cost-saving AND cost-effective.**
- Because , $\frac{intervention\ costs\ less, so\ negative}{intervention\ does\ more\ good, so\ positive} = -\text{ICER}$

$$\frac{Cost\ of\ Intervention - Cost\ of\ Treatment\ as\ Usual}{Intervention\ Effect - Treatment\ as\ Usual\ Effect} = \text{ICER}$$

Interpreting ICER

- The intervention does NOT have to be cost-saving to be cost-effective!

Dealing with Uncertainty

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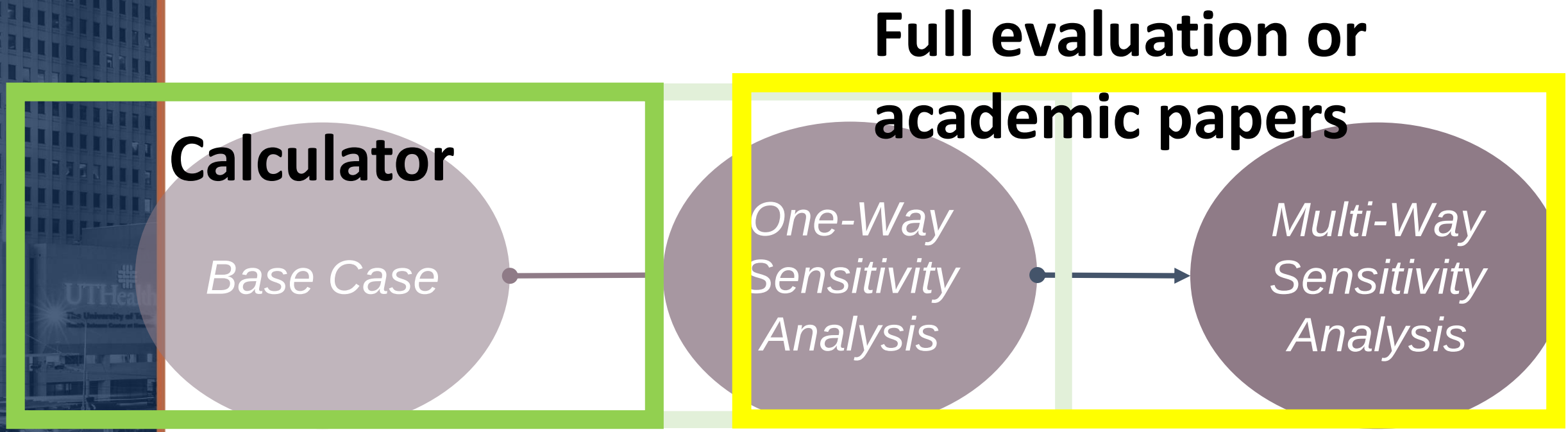
Base Case: Our basic model for a set time period. We're not looking at any uncertainty here, we're just using whatever numbers we have, usually an average or a median.

Dealing with Uncertainty

One-Way Sensitivity Analysis: Change one input at a time: how does cost-effectiveness change when input changed (for example: more participants, higher cost of naloxone, better retention of participants)

Dealing with Uncertainty



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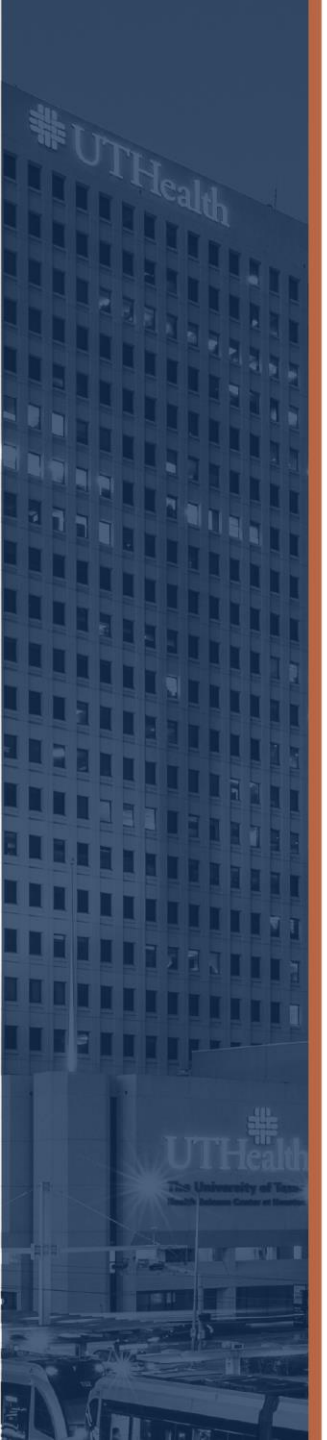
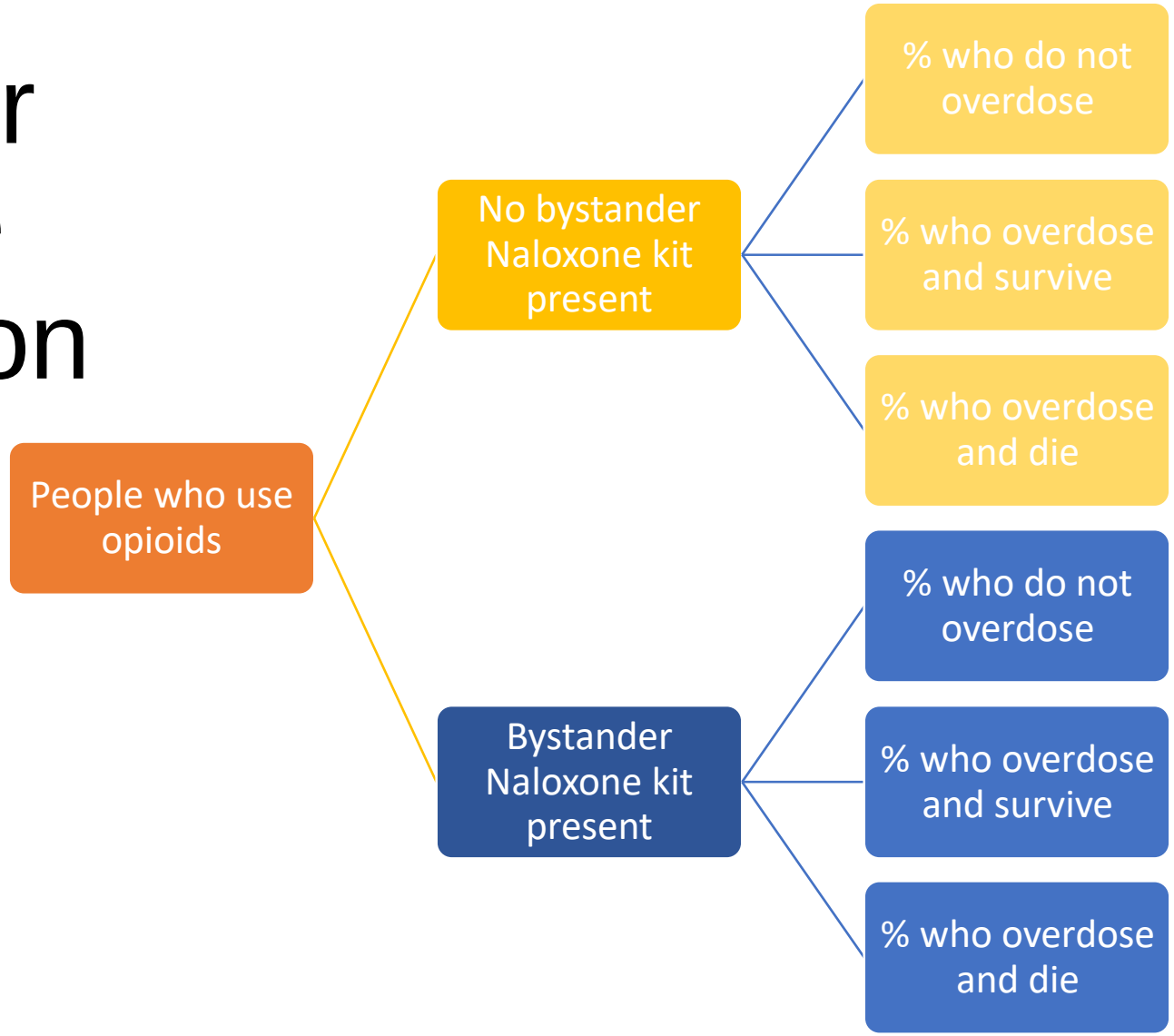


Moving into the Models

- Bystander naloxone distribution - Marnie
- Long-term, post-treatment PRSS delivered in an RCO setting - Sierra

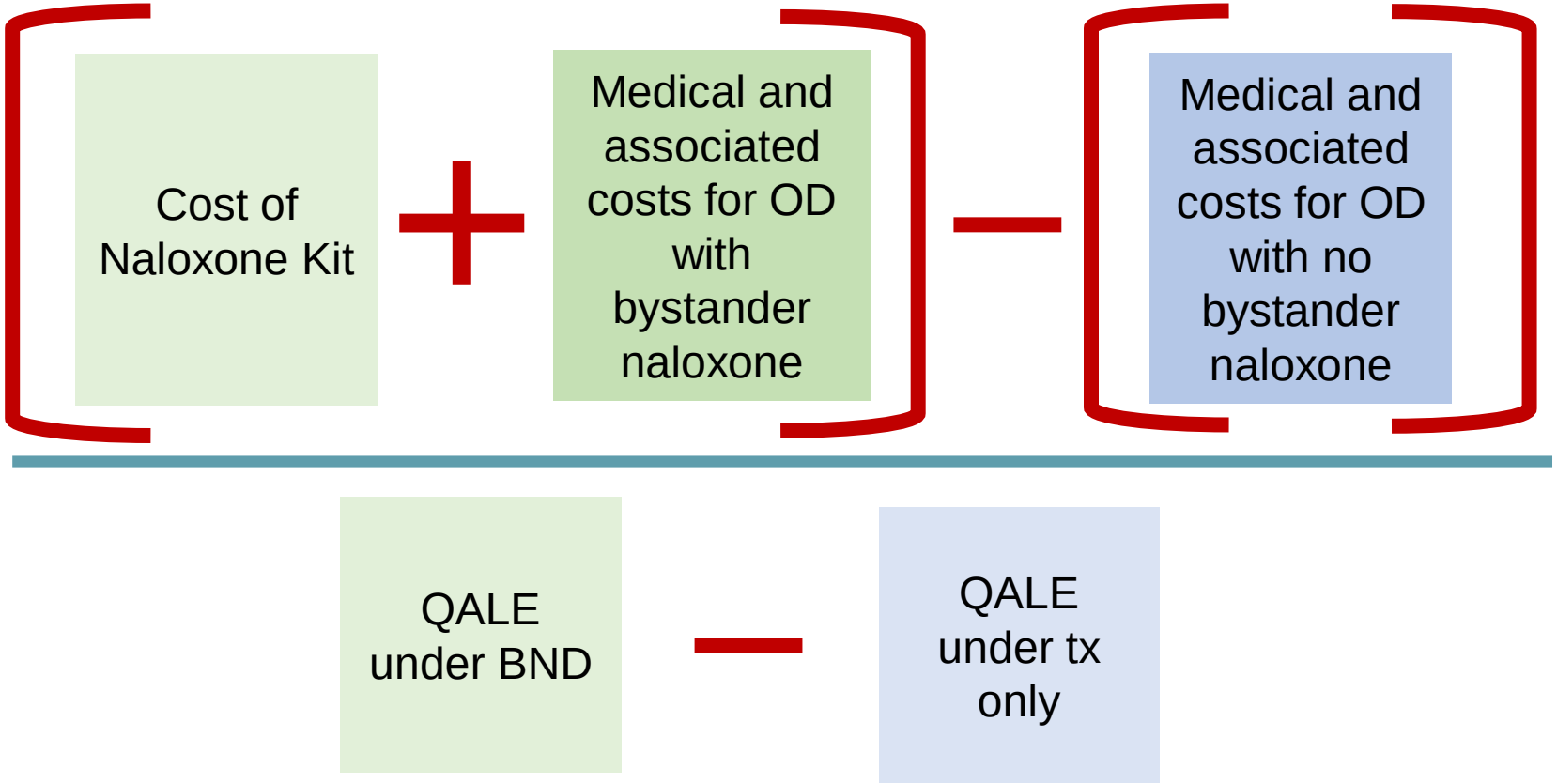
Bystander Naloxone Distribution



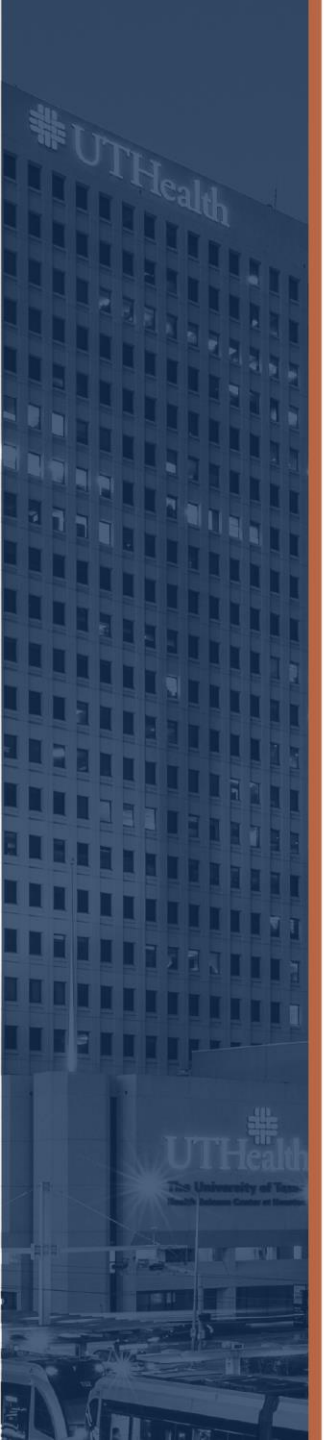
Updated from Coffin and Sullivan, 2013

HEALTH SYSTEM

Bystander Naloxone Distribution



tx = usual treatment (e.g., EMS, ED treatment)
QALE = quality-adjusted life expectancy

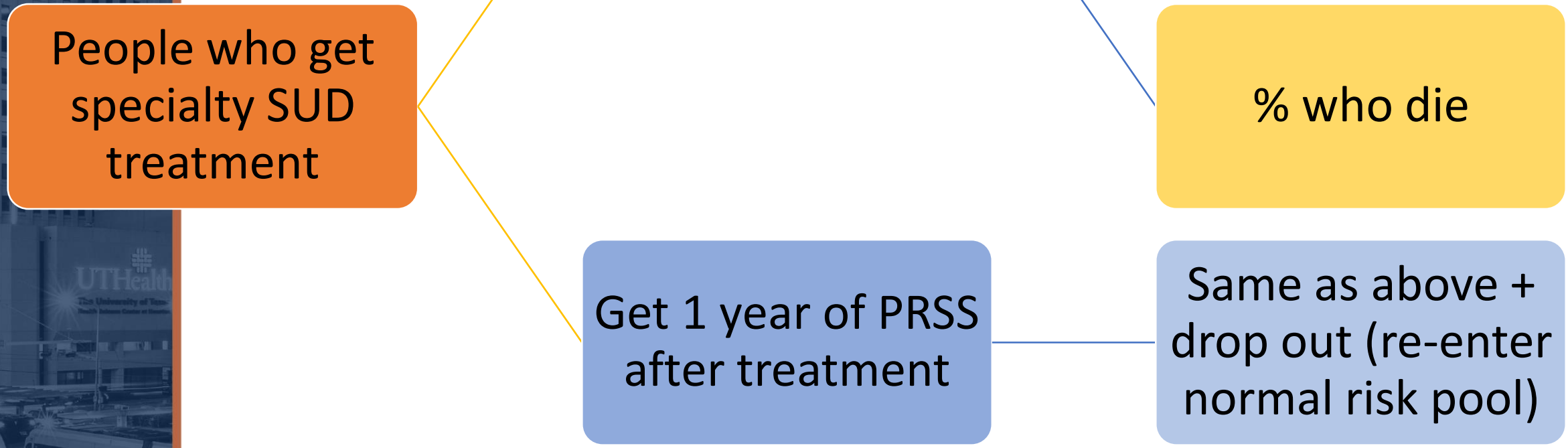


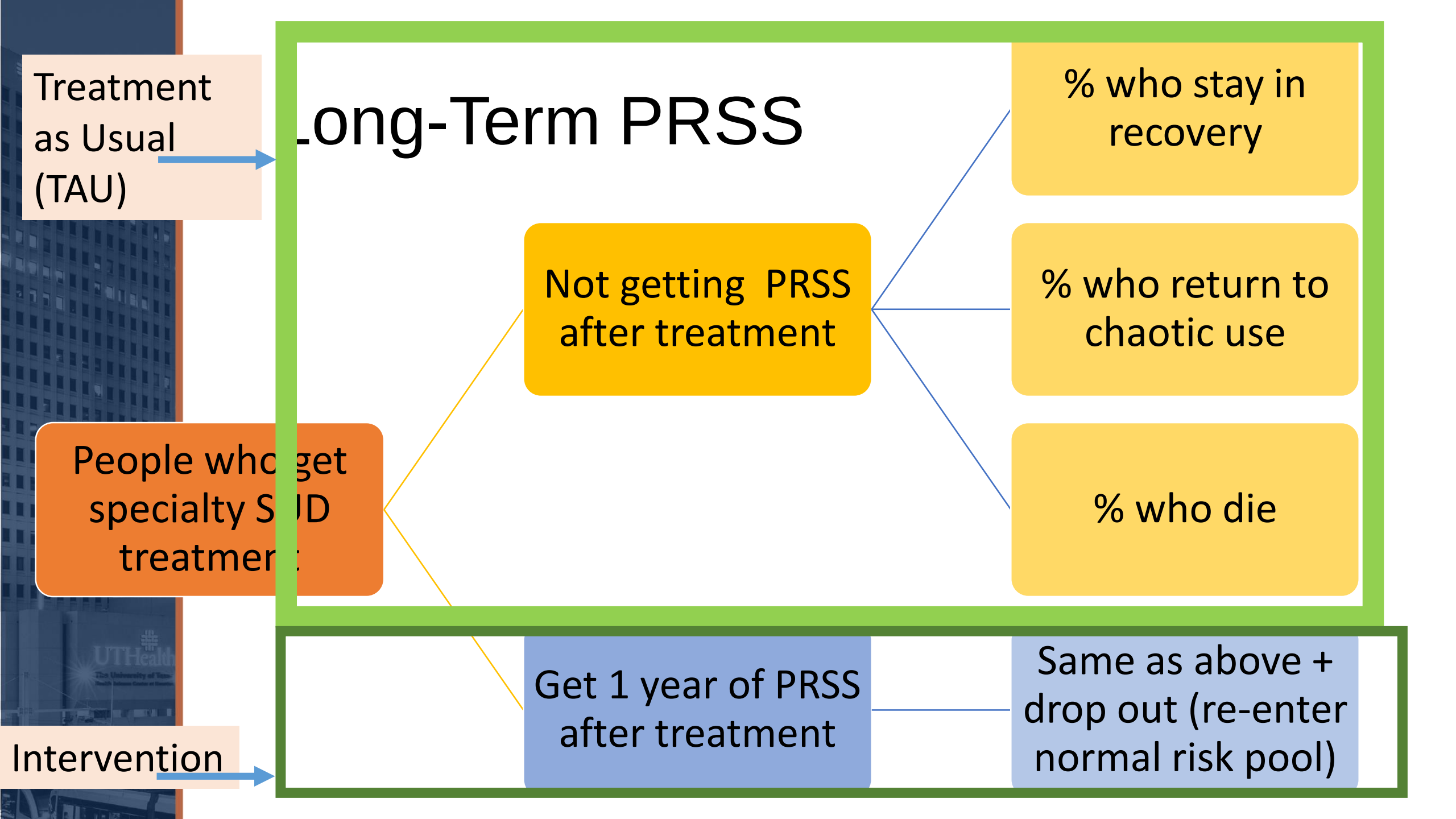
Bystander Naloxone Distribution

- **Recall: Health system perspective versus societal perspective**
  - Health system – just the costs that would be carried by whatever the health system is. Care about averted medical costs within the health system, too.
  - Societal – Need to think about things like someone's time outside of the health system, productivity, etc.

  - With bystander naloxone distribution programs, a significant factor for the societal perspective is lives saved.

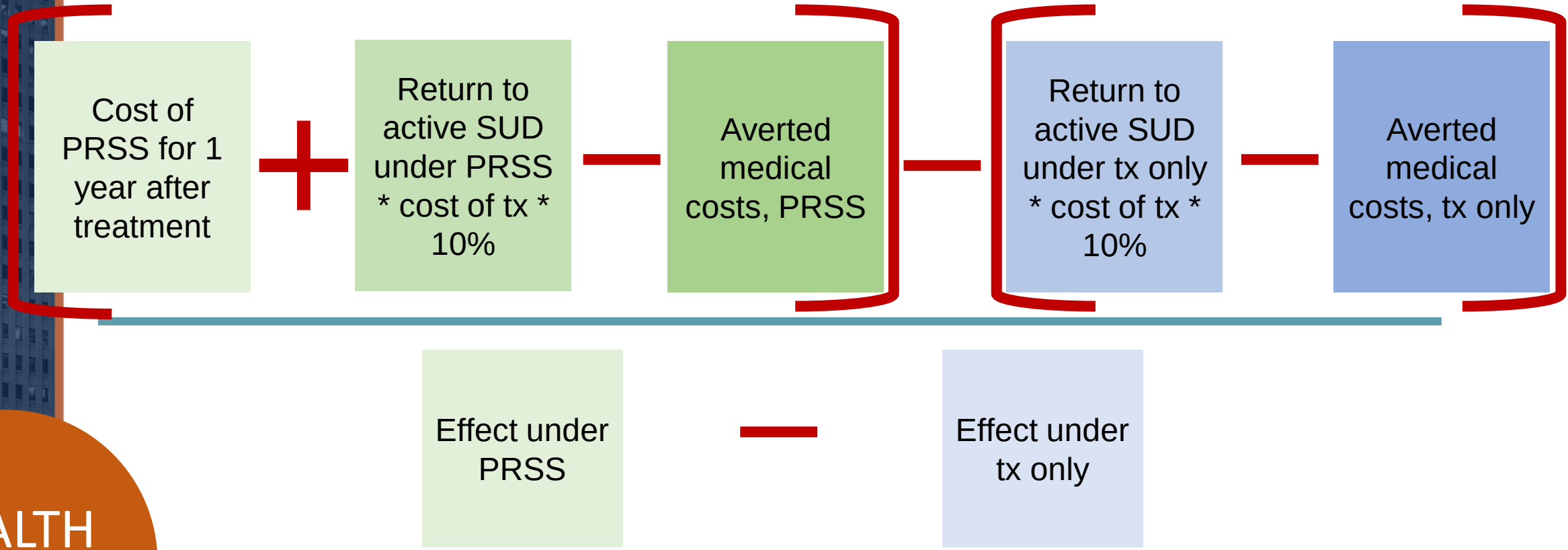
Long-Term PRSS




Treatment as Usual (TAU)
Long-Term PRSS
% who stay in recovery
Not getting PRSS after treatment
% who return to chaotic use
People who get specialty SUD treatment
% who die
Get 1 year of PRSS after treatment
Same as above + drop out (re-enter normal risk pool)
Intervention

tx = specialty SUD treatment

Long-Term PRSS



Effect under PRSS

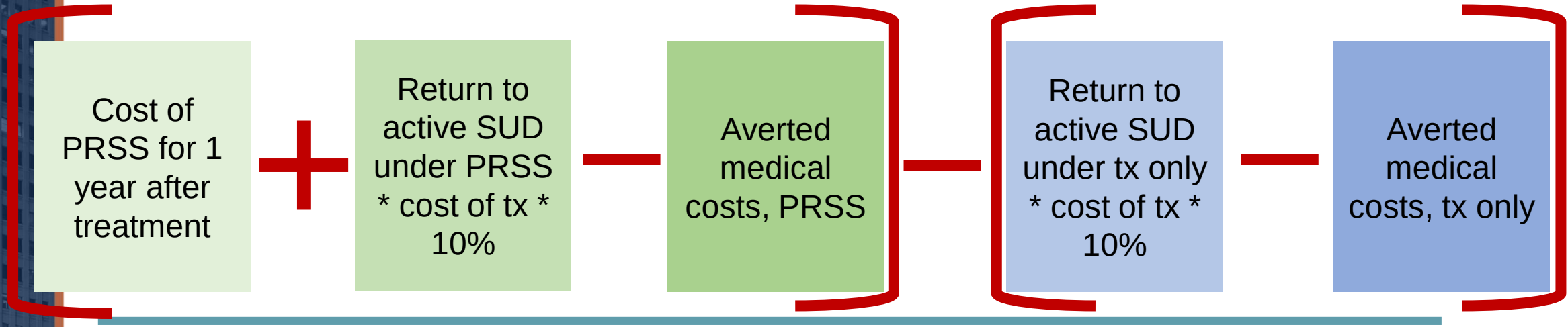
−

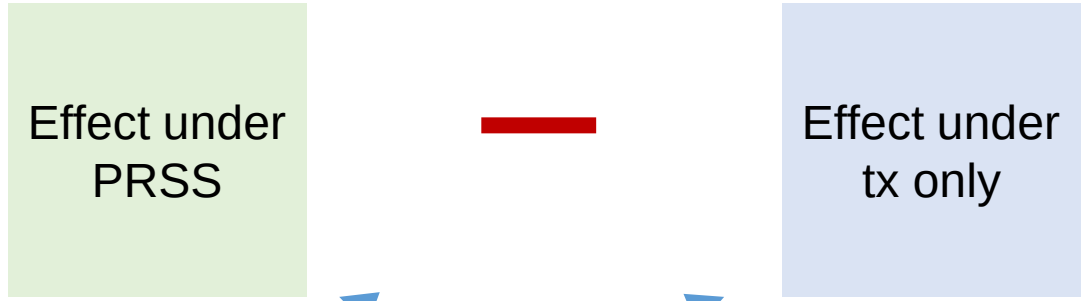
Effect under tx only

HEALTH SYSTEM

tx = specialty SUD treatment

Long-Term PRSS



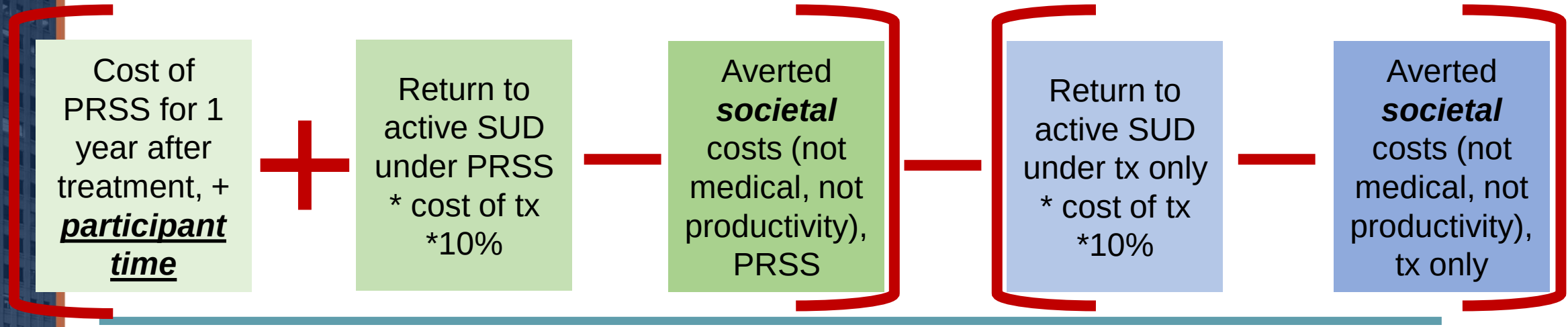


HEALTH SYSTEM

QALYs
People in recovery at 3 years

tx = specialty SUD treatment
QALE = quality-adjusted life expectancy

Long-Term PRSS



SOCIETAL

Effect under PRSS

−

Effect under treatment only

QALYs
People in recovery at 3 years

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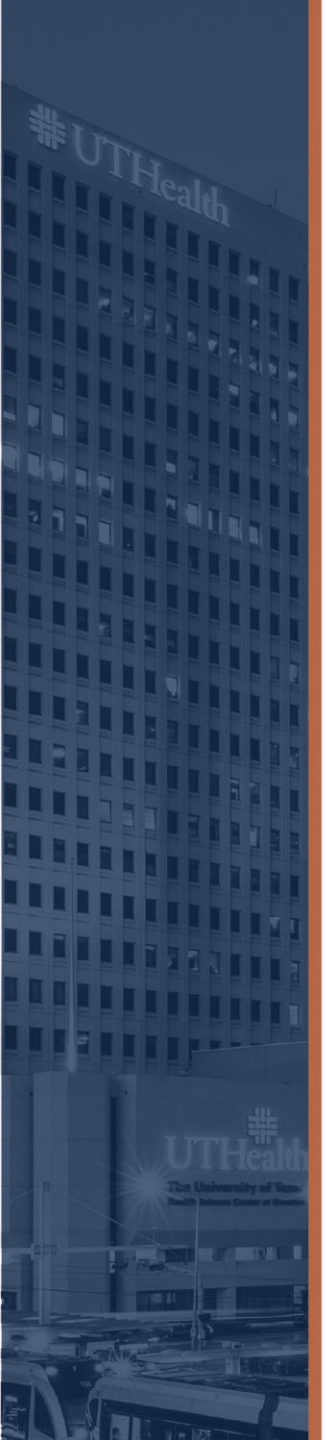
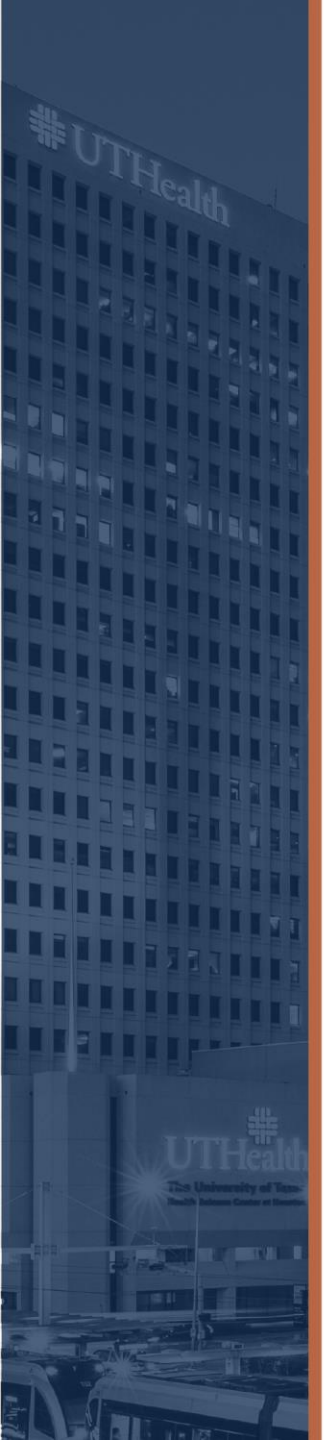


Let’s look at the calculator!

web.sph.uth.edu/cea/



Additional feedback or questions?

Please take our feedback survey!
https://redcap.link/calculator

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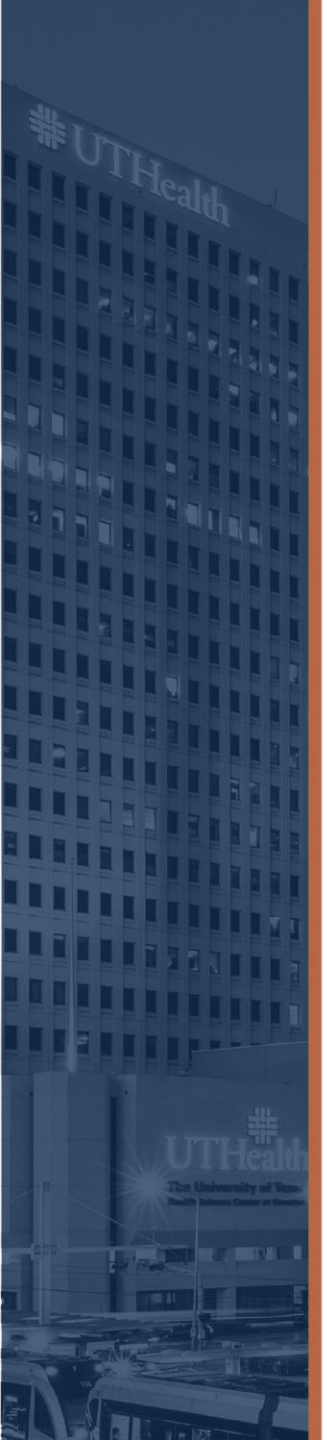

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