



Leveraging Novel Data and Analytics for HIV-Related Implementation Research

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No conflicts of interest to declare.



Implementation science is a multidisciplinary and pragmatic field

- Conceptual overlap with other disciplines
- A focus on “real world” practice
- Makes use of available evidence, including data routinely collected and generated by programs

“We’ve already been doing this- we just didn’t call it implementation science”.



Routine data are ordinary, using them to demonstrate impact is novel

- A byproduct of delivering health services
- Captured during standard operations rather than gathered for a specific study
- Aggregate or individual, longitudinal or cross sectional
- Wide variation in completeness and standardization

Sexual and reproductive health services
Routine client visit record Form SRH 02

Participant ID
KZN 04 7731

Visit date
12 / 03 / 2025

Site / facility
eThekwinini clinic 3

Age
24

Population group
☒ sex worker ☐ other

Services this visit
☒ HIV test ☒ PrEP
☐ STI screening ☐ contraception

HIV result
☒ negative ☐ positive

PrEP status
☐ start ☒ refill

Next visit date

Provider initials
N. M.

For program monitoring and evaluation use only



We are already answering real-world HIV-related questions using routine data

- Research informing practice, practice informing research
- Prioritizing speed, preserving scientific certainty
- Application of rigorous methods can improve quality of inference





Guiding principles* to balance rigor with real-world relevance using routine data

1

Address stakeholder priorities

Start from what programs and communities need to know

2

Be certain in the uncertainty

State results clearly while being explicit about uncertainty

3

Lean into missingness

Treat what is missing as information, not just a gap

4

Methods are not a cure all

Analysis cannot replace good data or sound judgment

***A select few of likely many**

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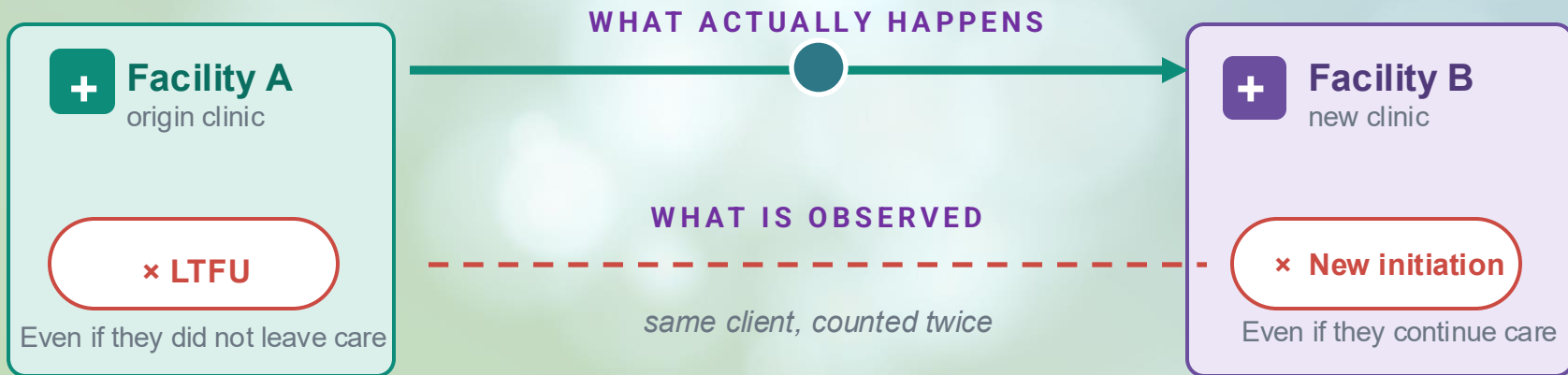


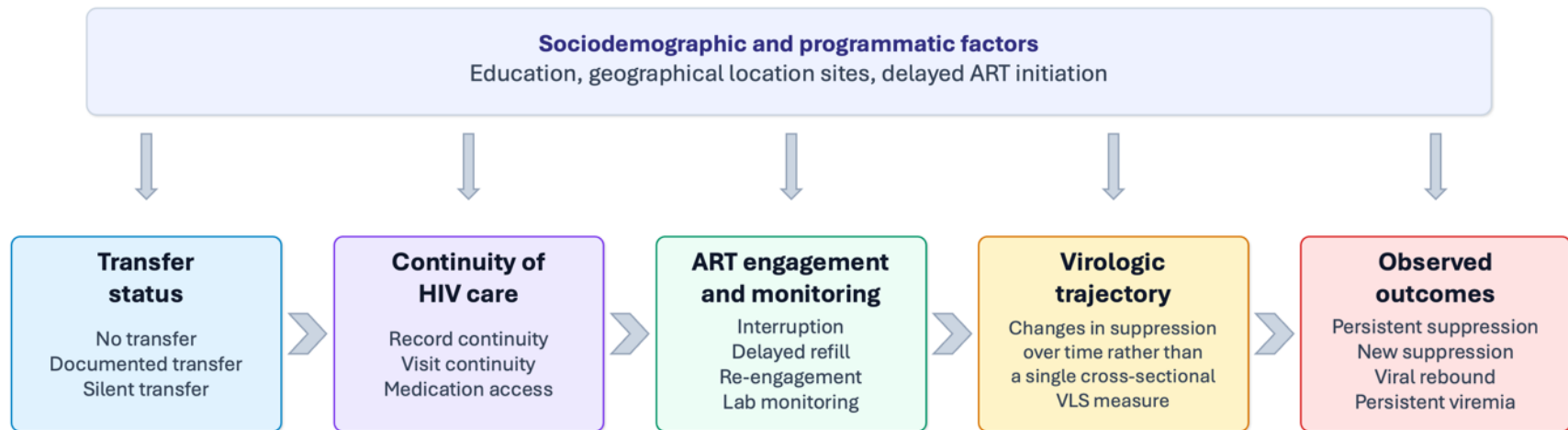
Address Stakeholder Priorities



What was the problem identified by key stakeholders?

- Facility switching erroneously marked LTFU (“silent transfer”)
- Transfer status should inform clinical management
- Challenges care provision when mobility is common





Conceptual Framework: Transfer Status and Virologic Outcomes



What were our key priorities?

- Index clients via National Unique Patient Identifier (NUPI)
- Systematically identify and catalogue silent transfers vs. documented transfers
- Understand the relationship with viral load trajectories over time

Among 3,850 FSW accessing ART via nine SWOP* sites in Kenya (2022-2025):

10.5%

experienced
viral rebound

0.9%

experienced
persistent viremia

1

Facility switching in Kenya

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What did we find?

291 (7.6%)

participants experienced
a **documented transfer**

152 (3.9%)

participants experienced
a **silent transfer**

**Facility switching was associated with
persistent viremia over time**

Silent transfer
(vs. no transfer)

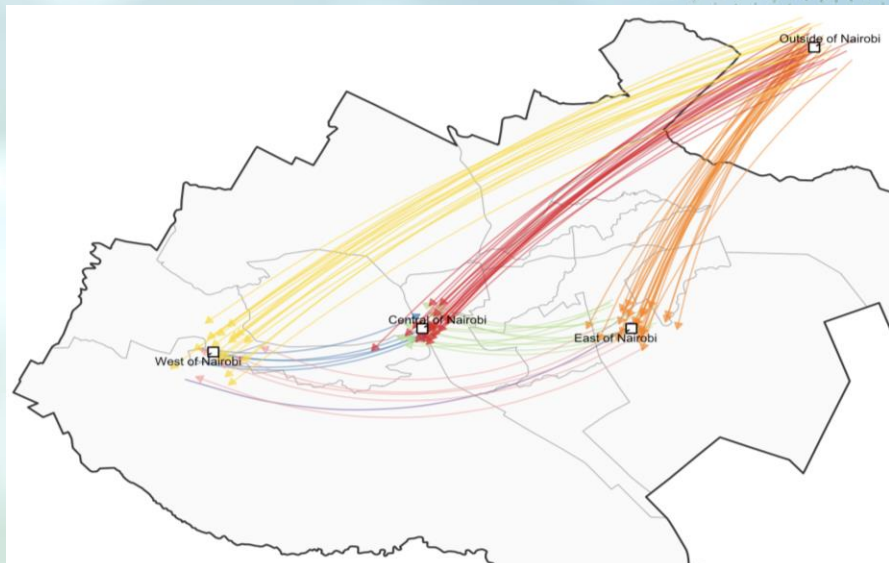
OR 5.00

95% CI 1.80, 13.91

Documented transfer
(vs. no transfer)

OR 4.71

95% CI 1.68, 13.21



Among participants who experienced a **silent transfer**:
87 of 152 (57.2%) involved cross-region movement.

Source: Mi Y et al. *CROI* 2026.



Key Learnings

1

Critical to invest in integrated data systems and infrastructure



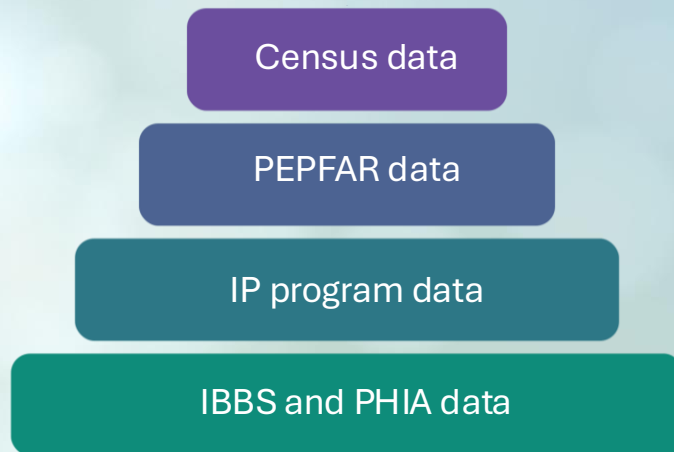
Be Certain in the Uncertainty



What was the problem?

- Size estimates among most volatile, unreliable estimates in HIV public health
- No gold standard >> **multiple methods exist**
- Size estimates important to provide information for HIV programs in Namibia

What data did we have?





What methods did we use?

- Suite of small area estimation approaches
- Consensus estimation
- Input data “ranked” by key stakeholders and weighted
- Program data used as informative priors

The Triangulator - A Consensus Estimate Calculator

[Define Prior Beliefs](#)
[Synthesis](#)

Estimate Type

Mean or Other

	Name	Estimate	Lower	Upper	Design Confidence
1	Source 1				100
2	Source 2				100
3	Source 3				100
4	Source 4				100
5	Source 5				100

Estimate : An estimate from a study

Lower: 95% confidence interval lower bound

Upper: 95% confidence interval upper bound

Design Confidence : Expert confidence in the design / implementation of the study. This scales the standard error such that a value of 50 will double the standard error.



What did we find?

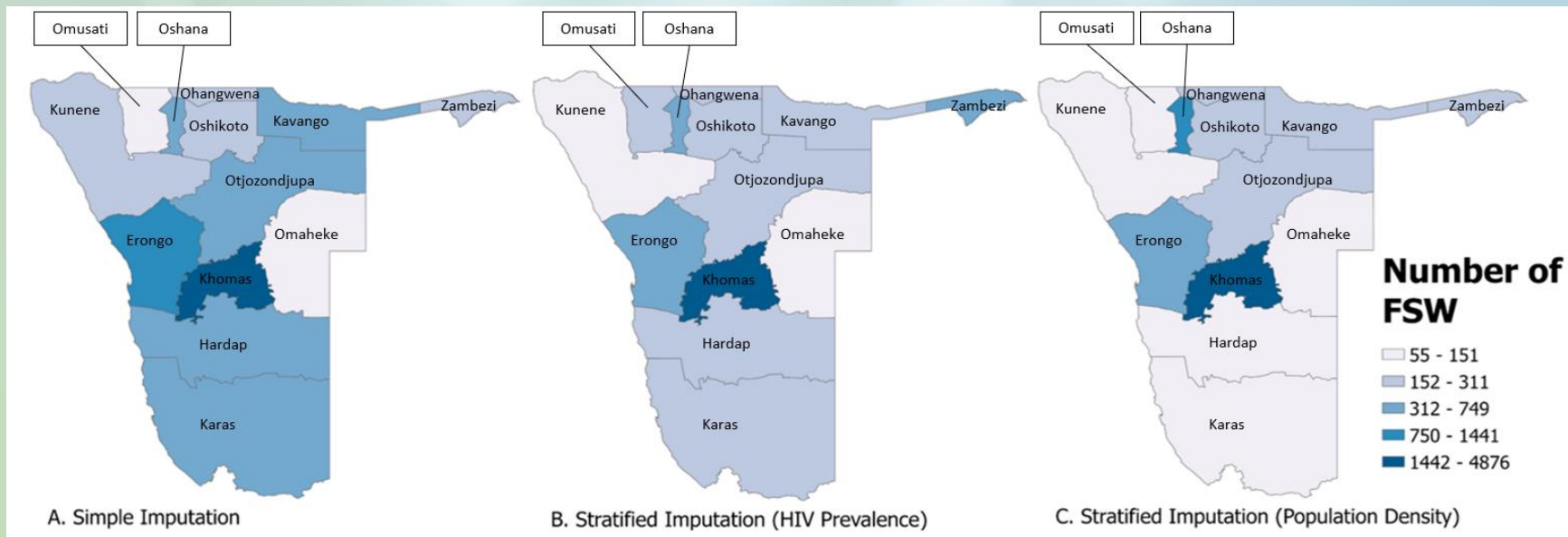
- National estimates for FSW ranged from 4,777 to 13,148 across Namibia, comprising 1.5% to 3.6% of women 15-49
- Program data increased the proportion of FSW in high-density regions

Table 2. Absolute and Proportion Estimate Differences in FSW Extrapolated Estimates Before and After the Integration of Program Data

	Simple Imputation		Stratified Imputation, HIV Prevalence		Stratified Imputation, Population Density	
Stratified Imputation	Pre-Program Data Proportion	Post-Program Data Proportion	Pre-Program Data Proportion	Post-Program Data Proportion	Pre-Program Data Proportion	Post-Program Data Proportion
Greater than Median	0.019	0.028	0.026	0.040	0.011	0.034
Less than/Equal to Median			0.014	0.012	0.028	0.010
Region	Pre-Program Data Estimate	Post-Program Data Estimate	Pre-Program Data Estimate	Post-Program Data Estimate	Pre-Program Data Estimate	Post-Program Data Estimate
Zambezi	175.3	256.3	231.0	404.2	749.6	310.7
Ohangwena	129.6	189.5	170.7	298.9	680.0	229.7
Erongo	985.4	1440.6	695.1	609.2	1606.9	522.9
Khomas	2751.1	4021.9	1940.7	1700.7	1607.5	4875.8
Hardap	283.9	415.1	200.3	175.5	638.0	150.7
Karas	277.6	405.9	195.9	171.6	716.1	147.3
Kavango	367.9	537.9	259.6	227.5	1766.2	195.3
Kunene	139.8	204.4	98.6	86.4	698.5	74.2
Omaheke	103.5	151.3	73.0	64.0	444.8	54.9
Omusati	73.6	107.5	96.9	169.6	672.4	130.4
Oshana	512.1	748.7	361.3	316.6	618.8	907.7
Oshikoto	125.1	182.9	164.8	288.5	1897.5	221.7
Otjozondjupa	428.4	626.2	302.2	264.8	1051.6	227.3



How did we communicate our findings?





Key Learnings

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Critical to invest in integrated data systems and infrastructure

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Important to balance community knowledge and lived experience with other amassed data

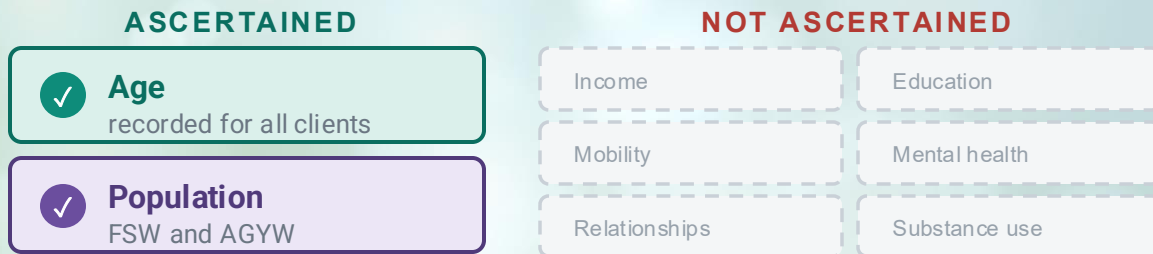


Lean into the Missingness



What was the problem?

- Clinical forms captured PrEP use, but few other data



Only age and population are reliably ascertained. Most non-clinical variables are unmeasured.

How do we recover true differences in PrEP discontinuation from incomplete outcome data?

3

Oral PrEP discontinuation in South Africa

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Leveraging the power and precision of program data

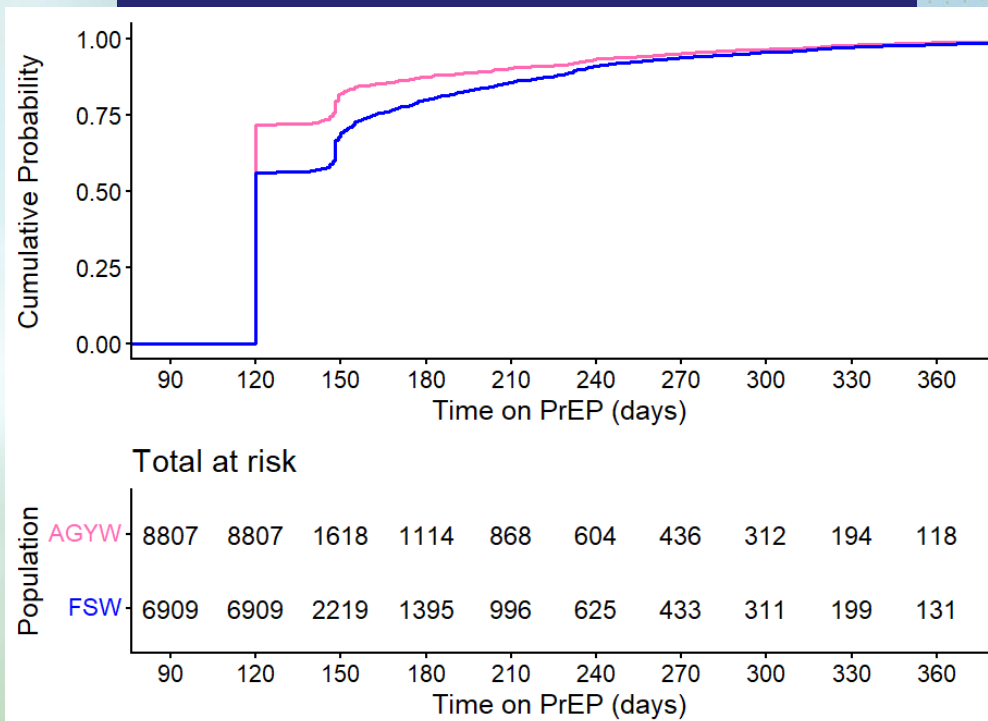
22.8% of AGYW

returned for PrEP
at 120 days

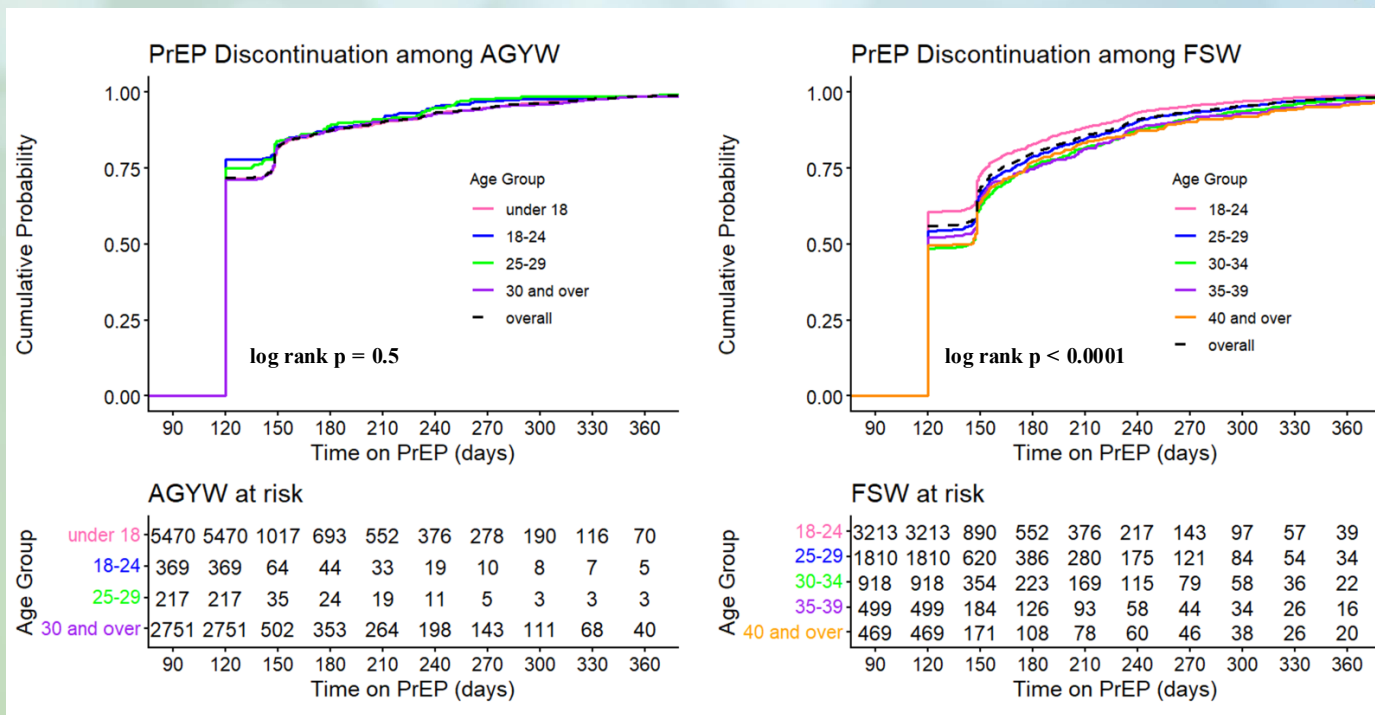
44.0% of FSW

returned for PrEP
at 120 days

Among 15,716 AGYW and FSW accessing PrEP
in South Africa



Source: Schluth C et al. *CROI* 2026.





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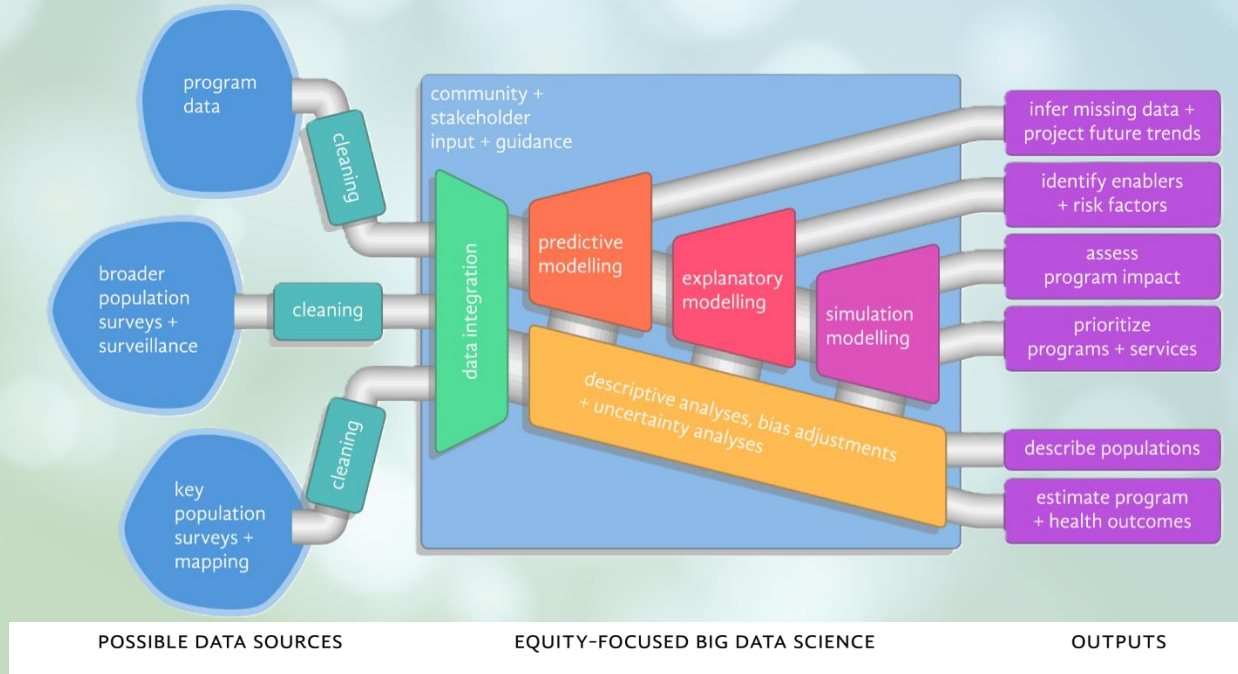
Missing data can be informational and provide key insights



Methods Are Not a “Cure All”



Where we're going, we do need a road





Concluding thoughts

- Routine data. Proceed with guardrails (*but please proceed*)
- Impact is predicated on partnership
- Implementation science may not be for everyone (*but we would love to have you share our tent*)





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