



***Africa Impact Evaluation Program on AIDS  
(AIM-AIDS)  
Cape Town, South Africa  
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# Randomization



# Objective

To estimate

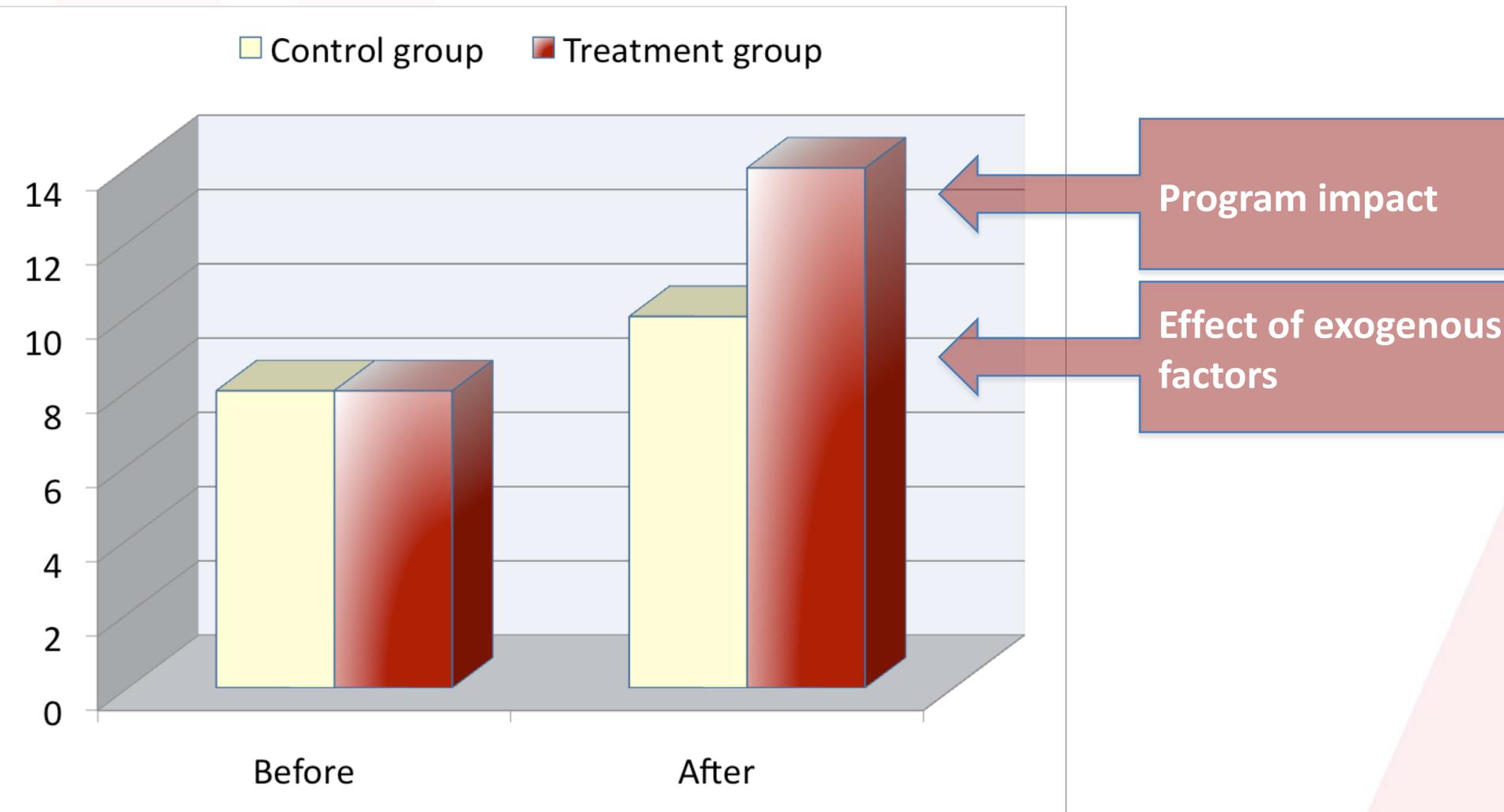
- the *causal* effect of intervention on the treated

We need

- A good counterfactual (control group)



# Illustration



# Motivation

- Statistical analysis: Typically involves inferring the causal relationship between  $X$  and  $Y$  from observational data
  - Many challenges & complex statistics
  - We never know if we're measuring the true impact
- Impact Evaluation:
  - Retrospectively:
    - same challenges as statistical analysis
  - Prospectively:
    - we generate the data ourselves through the program's design → evaluation design
    - makes things much easier!



# Gold standard: Experimental design



*Experimental design = Randomized evaluation*

- Only method that ensures balance in unobserved (and observed) characteristics
  - Only difference is treatment
- Equal chance of assignment into treatment and control for everyone
- With large sample, all characteristics average out
- Precise and unbiased impact estimates



# Options for randomization



- Random assignment with and without treatment (partial coverage)
  - Lottery on the whole population
  - Lottery on the eligible population
  - Lottery after assignment to most deserving populations
- Random phase in (full coverage, delayed entry)
- Variation in treatment (full coverage, alternative treatments)



# Example: Impact of condom distribution

## 1. Random assignment

- Treatment group receives condoms
- Control group receives nothing

## 2. Random phase-in

- Treatment group receives condoms today
- Control group receives condoms in the next period

## 3. Variation in treatment

- Treatment group receives condoms
- Control group receives condoms and information



# Operational opportunities for randomization

- Resource constrain full coverage
  - Random assignment is fair and transparent
- Limited implementation capacity
  - Phase-in gives all the same chance to go first
- No evidence on which alternative is best
  - Random assignment to alternatives with equal ex ante chance of success



# Operational opportunities for randomization, cont.



- Pilot a new program
  - Good opportunity to test before scaling up
- Operational changes to ongoing programs
  - Good opportunity to test changes before scaling them up



# At what level should you randomize?

It depends on the unit of intervention

- Individual, household
- Group
  - School
  - Community or village
  - Health unit/district or hospital
  - District/province



# Unit of randomization

- Individual or household randomization is lowest cost option
- Randomizing at higher levels requires much bigger samples: within-group correlation
- Political challenges to unequal treatment within a community
  - But look for creative solutions
- Some programs can only be implemented at a higher level



# Éléments de base d'une Evaluation Expérimentale

Target population

High risk population



Potential participants

Sex workers

Truck drivers



Evaluation sample



Random assignment

Treatment group

• Participants • Drop-outs

Control group



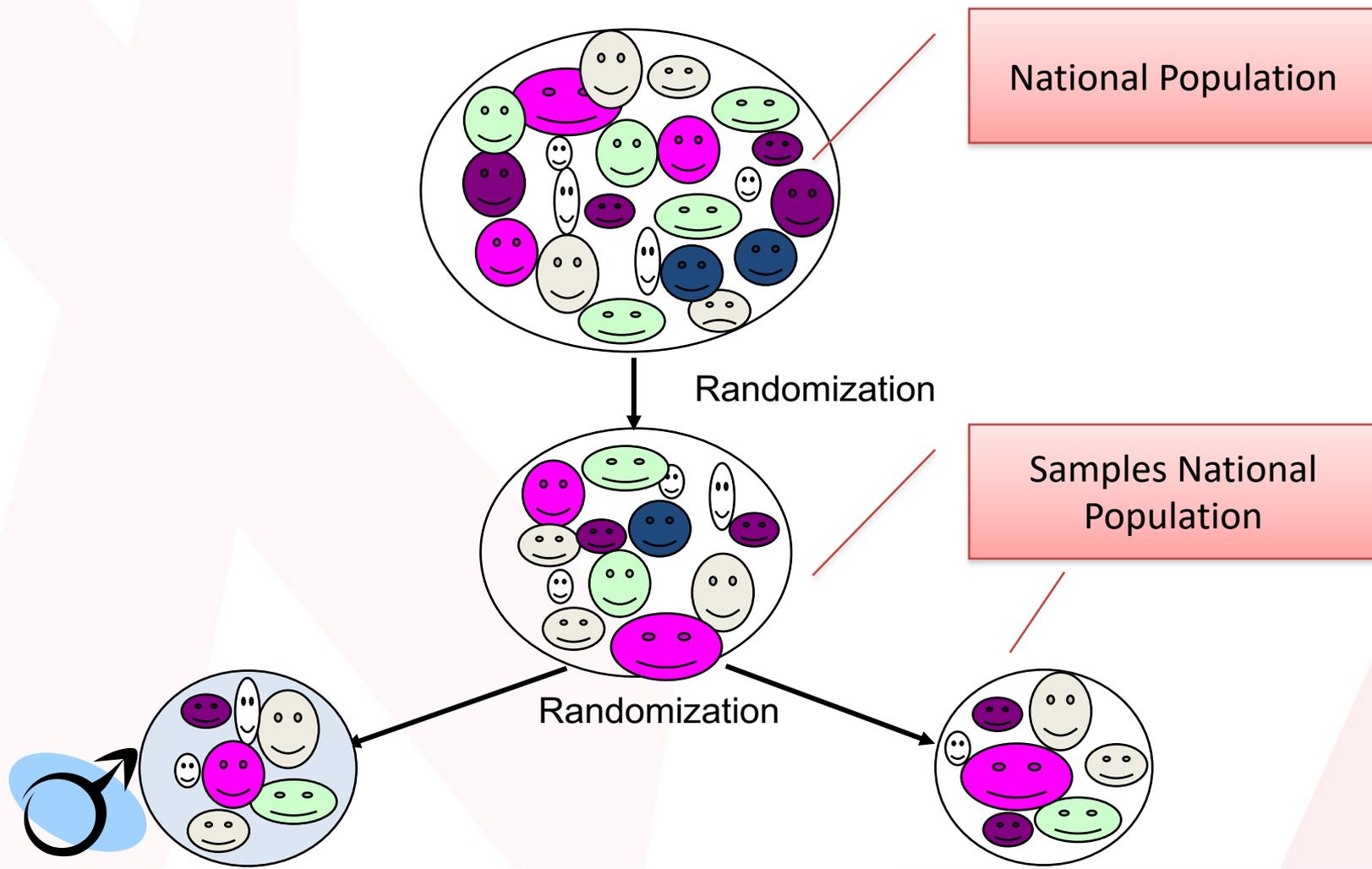
# External and Internal validity

- External validity
  - The sample is representative of the total population
  - The results in the sample represent the results in the population
  - We can apply the lessons to the whole population
- Internal validity
  - The sample is representative of a segment of the population
  - The results in the sample are representative for that segment of the population
  - We cannot apply the lessons to the whole population
  - Does not inform scale-up without assumptions

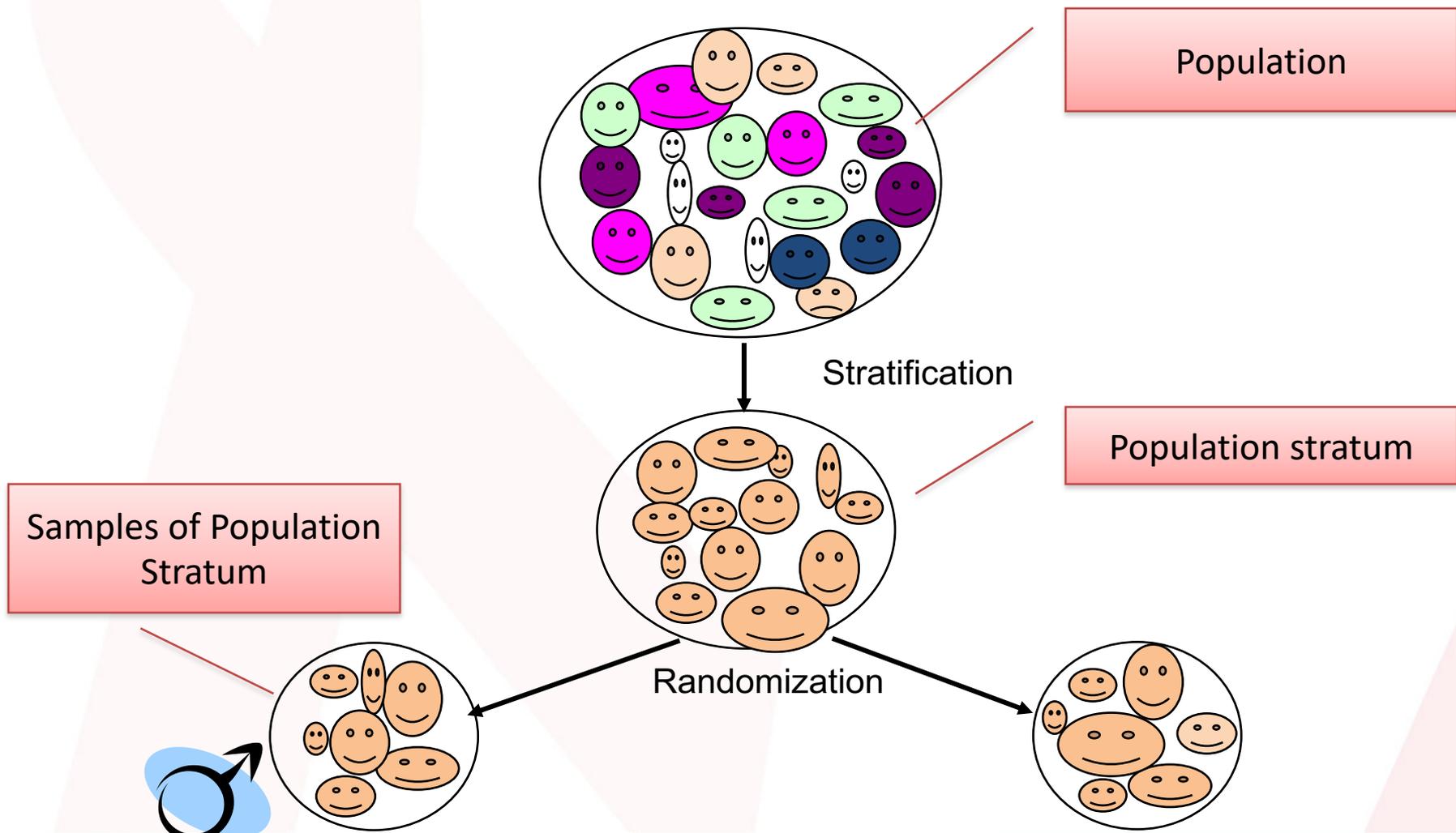
Example: Condom intervention on sex workers versus condom interventions on the whole population



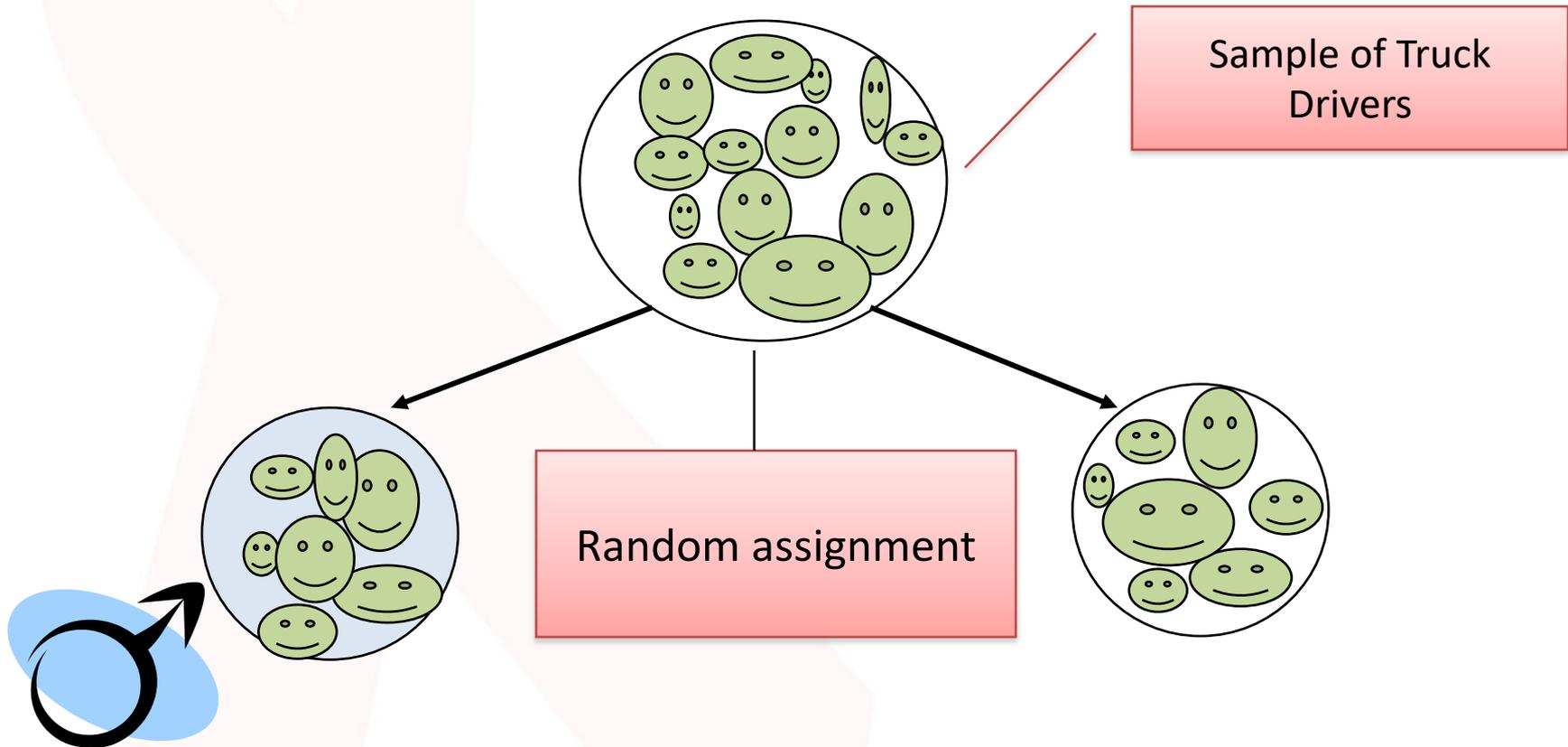
# External validity



# Internal validity



# Example: Condom Distribution, internal validity



# Example: Condom distribution in communities near truckers' rest stops



## Basic sequence of tasks for the evaluation

- Baseline survey in rest stop areas
- Random assignment of rest stops
- Intervention: condom distribution to women in communities neighboring rest stops assigned to treatment
- Follow-up survey



# Efficacy & Effectiveness



- Efficacy
  - Proof of concept
  - Smaller scale
  - Pilot in ideal conditions
- Effectiveness
  - At scale
  - Prevailing implementation arrangements
- Higher or lower impact?
- Higher or lower costs?



# Advantages of experiments

- Clear and precise causal impact
- Relative to other methods
  - Much easier to analyze
  - Cheaper (smaller sample sizes)
  - Easier to convey
  - More convincing to policymakers
  - Methodologically uncontroversial



# When is it *really* not possible?



- The treatment has already been assigned and announced  
*and* no possibility for expansion of treatment
- The program is over (retrospective)
- Universal eligibility and universal access
  - Example: free access to ARV





# Thank You

