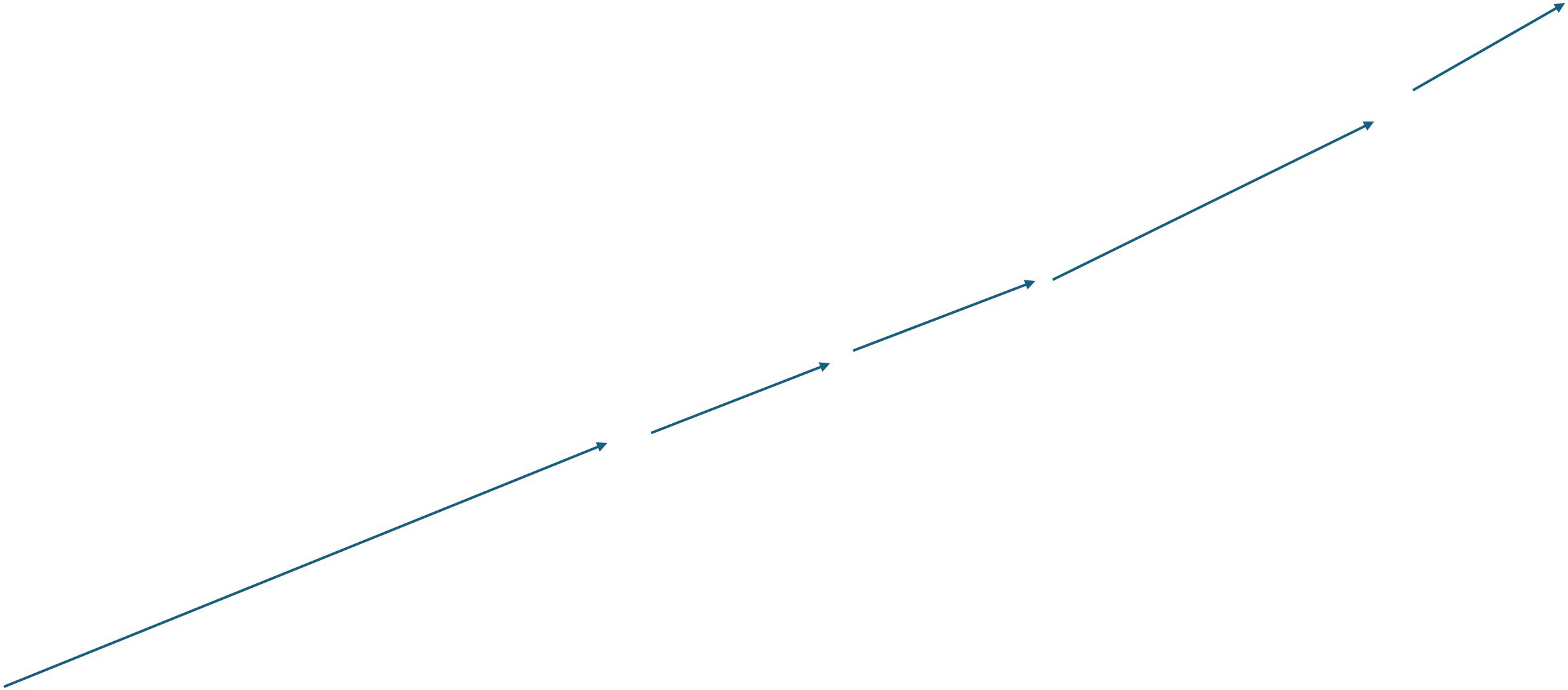
Population Health Modeling: Day 1

Yale SCHOOL OF PUBLIC HEALTH
Data Science and Data Equity

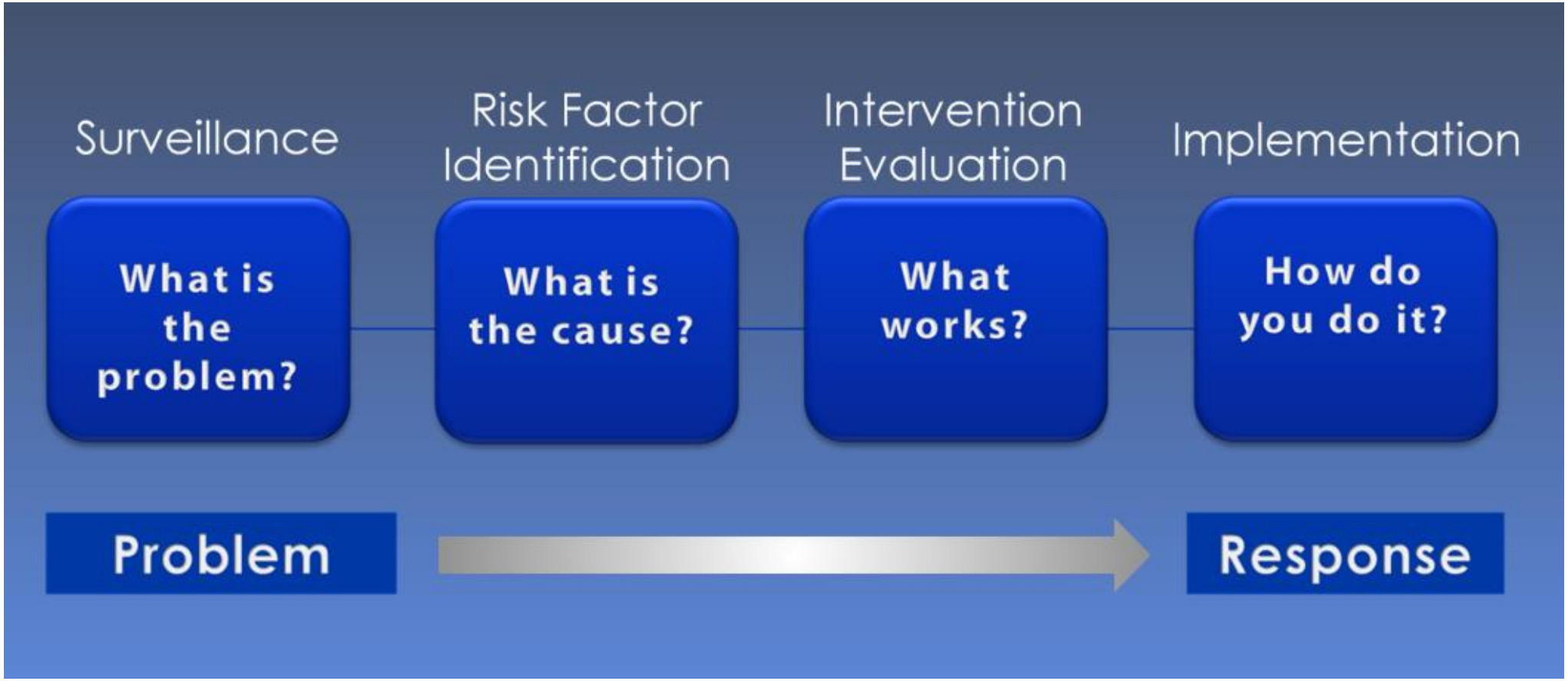


Starting off with some data collection

Salus populi suprema lex esto

- Public Health is Big
  - Ideas and Disciplines
  - Societal Impact
  - Intersectionality
- Public Health is Small
  - unobtrusive
  - small things- decisions, people, microbes, molecules
- Why?

Purpose of Public Health Modeling



https://www.cdc.gov/training/publichealth101/e-learning/epidemiology/

How do we answer these questions?

- Try being a data source!

- Clinical Research
  - Develop interdisciplinary empathy
  - Be a good collaborator!
- Laboratory Science
  - Understand datasets
  - Spot errors
- Surveys
  - Design practice

Data sources

- Individuals
  - Surveys, clinical records, autopsy reports ☹
- Environment
  - Weather stations, water treatment facilities, etc.
- Health Systems
  - EHRs
- Other
  - Google location data, tobacco sales data, etc.

We Need Data!

- Data need to be timely, accurate, complete, available, and accessible.

- Population health data are almost always none of these things.

We don’t know what we don’t know, and when we do know what we don’t know, we don’t know what to do, you know?

- Cascades of ~~problems~~ opportunities!
  - People who know what to do
  - People who can do it
  - People who know what we should do about it

Responsible Conduct of Research

- Belmont Report
  - Tuskegee Airmen Study
  - Koko
- Justice, Beneficence, Respect for Persons

Basic Principles of Public Health Modeling

All Models are Bad, Some Models are Useful

- Irreducibly complex real-world problems
- Understand your data source
- State assumptions clearly
- Measure twice, cut once

Course Overview

- Infectious disease surveillance
- Time series analysis
- Hierarchical modeling
- Genomic epidemiology
- Market Basket Analysis
- Compartmental modeling

Questions?

Time for a field trip!

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