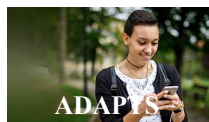


Tradeoffs



Susan & Kelly



- 30 min discussion 10 min together, 10 min in group, randomly selected group leads last 10 min
- Tradeoff between within study learning (to personalize) and between study learning (generalizable knowledge)

Personalization

- Monday: RL algorithms are used to “personalize” the treatments to individuals both via use of their current state as well as the use of a person-specific RL algorithm
 - Personalization involves learning for these specific individuals.

This is NOT about obtaining generalizable knowledge! This is not about other people... ₂

Discussion

- Generalizable knowledge
 - Enables making statements about a population of individuals.
 - Transfer information about one population to another

3

Discussion

- Developing an AI powered mobile health intervention involves a sequence of clinical trials
- Implementing an AI powered mobile health intervention by a clinical health system, or a company requires continual monitoring.

4

Generalizable Knowledge

- Developing an AI powered mobile health intervention involves a sequence of clinical trials
- Scientists want to learn between clinical trials so as better understand causal mechanisms (test health theories)
- Scientists want to learn between clinical trials to improve the RL alg for the next trial.

5

Each clinical trial involves a new set of individuals... Sometimes from slightly different populations

HeartSteps V1 : sedentary adults in Midwest

HeartSteps V2/V3: adults in the Seattle area who are newly diagnosed with stage 1 hypertension

Generalizable Knowledge

- Implementing an AI powered mobile health intervention by a clinical health system, or a company, requires continual monitoring.
 - New sensors become available, new treatments are developed, new types of phones and wearables.
 - Patient population evolves

6

Tension Between Personalization & Obtaining Generalizable Knowledge

- If the algorithm “personalizes excessively”
 - No data to make inference about the same individual in that individual’s future
 - No data to make inference about other individuals

“personalizes excessively”==uses (near)-deterministic policy

7

Penalizes excessively==== policy is deterministic...

Tension Between Personalization & Obtaining Generalizable Knowledge

- Obtaining generalizable knowledge
 - involves being thoughtful about the sample of individuals in the trial
 - involves continual exploration to make inference about the individual's future self

8

Operationalize This Tension!

- What does this mean
 - For constructing an RL algorithm?

9