Assessing and Predicting Patterns of Adherence to Weekly SMS Surveys on HIV Risk and Symptoms among Youth

Heather J. Gunn

CHIPTS
University of California, Los Angeles
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Because of the prevalence of mobile device ownership, public health researchers are using Short Message Service (SMS) for more tasks (e.g., medication reminders, health information, diabetes management)

Self-reporting via SMS has increased, which can create an intensive longitudinal data set

However, consistent self-reporting relies on voluntary participation and access to a mobile device capable of SMS

How can we increase participation/adherence?
Purpose of the Analysis

- Assess patient engagement by identifying clusters of adherence patterns to a weekly SMS survey
- Determine if there are participant characteristics that differentiate the clusters
Method and Background of the Study

- Intervention study designed to test effectiveness of different interventions on increasing preventive measures for youth at high risk of acquiring HIV
- Participants
  - 919 youth at high risk of acquiring HIV
  - Ages 14-24 ($M = 20.9$)
- Weekly SMS survey for 104 weeks that assessed HIV symptoms and risks
- Mixture hidden Markov model
Sequence of Responses for Two Participants
Sequence of Responses for All Participants
Results: How Many Clusters Are There?

Active (\( n = 312 \))

Intermittent (\( n = 149 \))
Results: How Many Clusters Are There?

Inactive ($n = 458$)
Results: What Describes the Clusters?

- Ever been homeless

- Other predictors tested:
  - Intervention group
  - Age
  - Sex at birth
  - Sexual orientation
  - Race
  - Depression at baseline
  - Anxiety at baseline
  - Hazard drinking at baseline
  - Ever used drugs
Discussion

- Provide mobile phones and mobile phone plans for participants to increase adherence
- Investigate other predictors that may be related to participation (e.g., SES, trauma)
Limitations

- Listwise deletion to handle missing data on predictors
  - Future direction: explore other missing data handling options
- Exploratory
  - Generalizability/Replicability
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Questions?

- hgunn@mednet.ucla.edu
Weekly SMS Survey Questions

1. How many of these symptoms did you experience in the past 7 days - fever, headache, sore throat, swollen glands, rash, fatigue?

2. Have you had a fever, severe headache, sore throat, swollen glands, rash, extreme fatigue, vomiting/diarrhea, or no appetite in last week?

3. How many days did you feel sad or depressed in the past 7 days?

4. Did you have any genital itching/pain/discharge, burning during urination, lower stomach pain, or discomfort during sex?
Weekly SMS Survey Questions

5. How many times did you have sex without using condoms in the past 7 days?

6. How many days did you use alcohol and/or drugs in the past 7 days?

7. How many days did you not have a place to sleep and/or not enough to eat in the past 7 days?

8. How many days did you miss taking medications in the past 7 days?
Mixture Hidden Markov Model (MHMM)
## Fit Statistics

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Sequence of Responses for All Participants