Optimizing Context-Aware Connected Care through Just In Time Adaptive Intervention (JITAI)

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**Sensing:**
- State of need, risk
- State of receptivity, opportunity for intervention

**Intervention:**
- Sustained Engagement
- Burden

**JITAI** (Just in time adaptive Intervention) – designed to provide right type and amount of support at right time in person’s natural environment by adapting to the person’s changing internal state and context
MD2K Sense to Stop Study

• Most (93%) unaided smoking cessation attempts fail in 1st week
  ➢ 95% of lapses (puff, slip) followed by relapses
  ➢ We encourage patients to call when tempted to smoke. ...but they rarely do

• Stress predicts lapse/relapse=> increasing state of risk?
  ➢ Can a JITAI to reduce stress decrease the probability of lapse/relapse?

• But **WHEN** should we intervene?

  **We don’t know!!**
  Need a micro-randomized trial (MRT) figure out
Two Alternative Hypotheses

• **Stress as a state of heightened relapse risk:**
  - Person needs to be prompted (reminded) to perform stress management as soon as stress occurs to contain the rising vulnerability and prevent lapse.
  - Don’t bother the person when s/he is not stressed.

• **No-Stress as a state of opportunity to rehearse skills, master new habits:**
  - Stress → limited cognitive capacity;
  - Under stress, people have little capacity to pay attention and rehearse skills
  - Provide a prompt to practice stress management skills only if the person is not under stress
The Micro-Randomization

- Randomization to intervention or no intervention could happen for every minute, BUT no randomization occurs under conditions of "UNAVAILABILITY:"

1. Can’t provide a stress classification: stress level unclear; physically active; poor data (UNCERTAINTY)
2. Person driving (SAFETY)
3. < 60 minutes since last intervention; < 10 minutes since EMA (BURDEN)

- Micro-randomization probabilities set to yield:
  • average of 3 interventions/day across morning, afternoon, evening w/50% under Stress, 50% under No Stress
How to tell which decision rule for the JITAI/EMI is correct?

- **Proximal outcome**: short-term goal the intervention is intended to achieve
- reduced probability/increase time to a lapse in the window following stress intervention vs. no intervention in (a) state of risk, (b) in state of receptivity, or (c) in any state

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<th>No Intervention</th>
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<td>Not Stressed</td>
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<td>Stressed</td>
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Potential Decision Rule if Stress Proves to be a Tailoring Variable

Every minute
IF availability = Yes,
Then,
If passively sensed stress = Yes,
Then IO = prompt stress-regulation
Else if passively sensed stress = No
Then IO = ‘do nothing’
Else If availability = No,
Then IO = ‘do nothing’
Culture of Health

- MD, RN
- RD, Exercise specialist
- Psychologist, MSW

Health Illness Professionals

Person

- Skills
  - Tools

Support People

- Friends
- Family
- Social media

Friends

Social media

Person

Health Illness Professionals