

# eMAC Roundtable: Behavioral Economics and Medication Adherence

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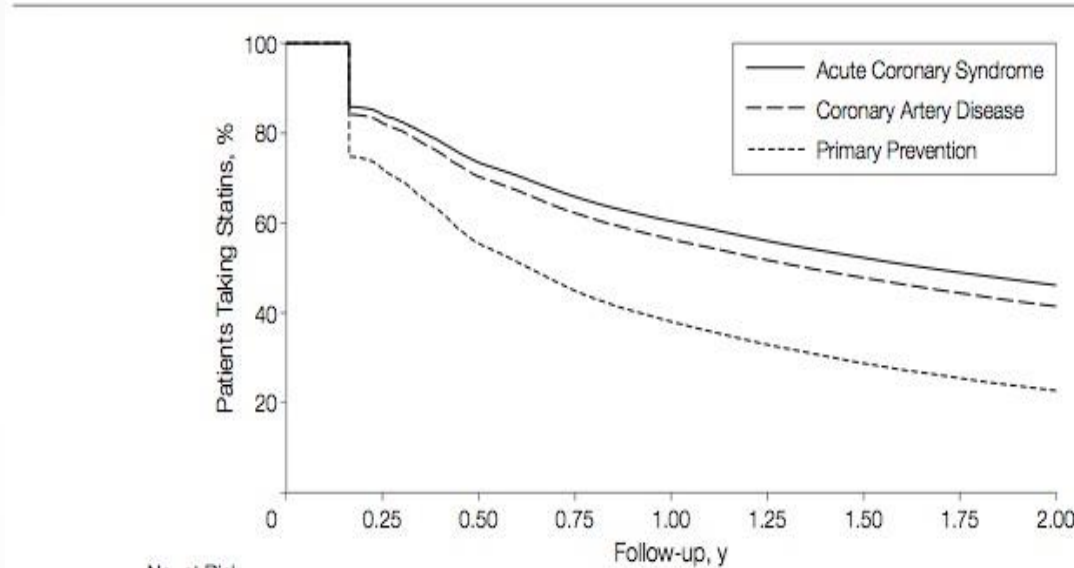
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**CENTER FOR HEALTH CARE INNOVATION**  
Accelerating Ideas to Transform Health Care

# Medication adherence post-MI

**Figure.** Survival Curves for Adherence With Statins in 3 Cohorts

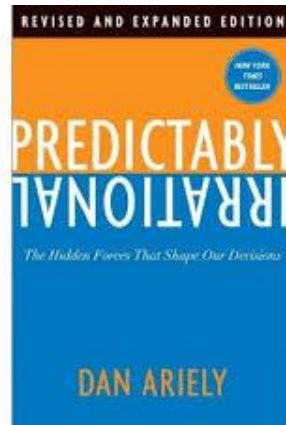
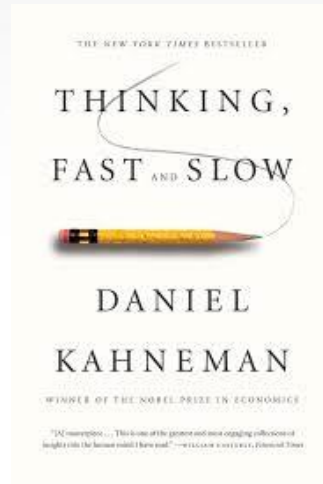
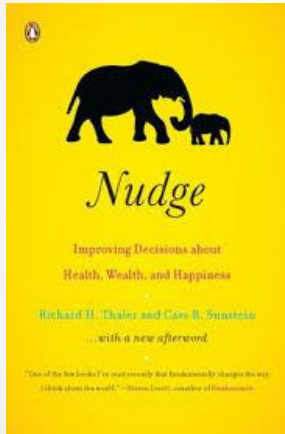


With free medications, adherence increased from **39% to 43%**

# Contextual inquiry



# Behavioral Economics and Health



- Smoking cessation
- Lipids
- Colon cancer screening
- Weight loss
- Physical activity

# Science of motivation

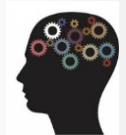


## Standard Economics

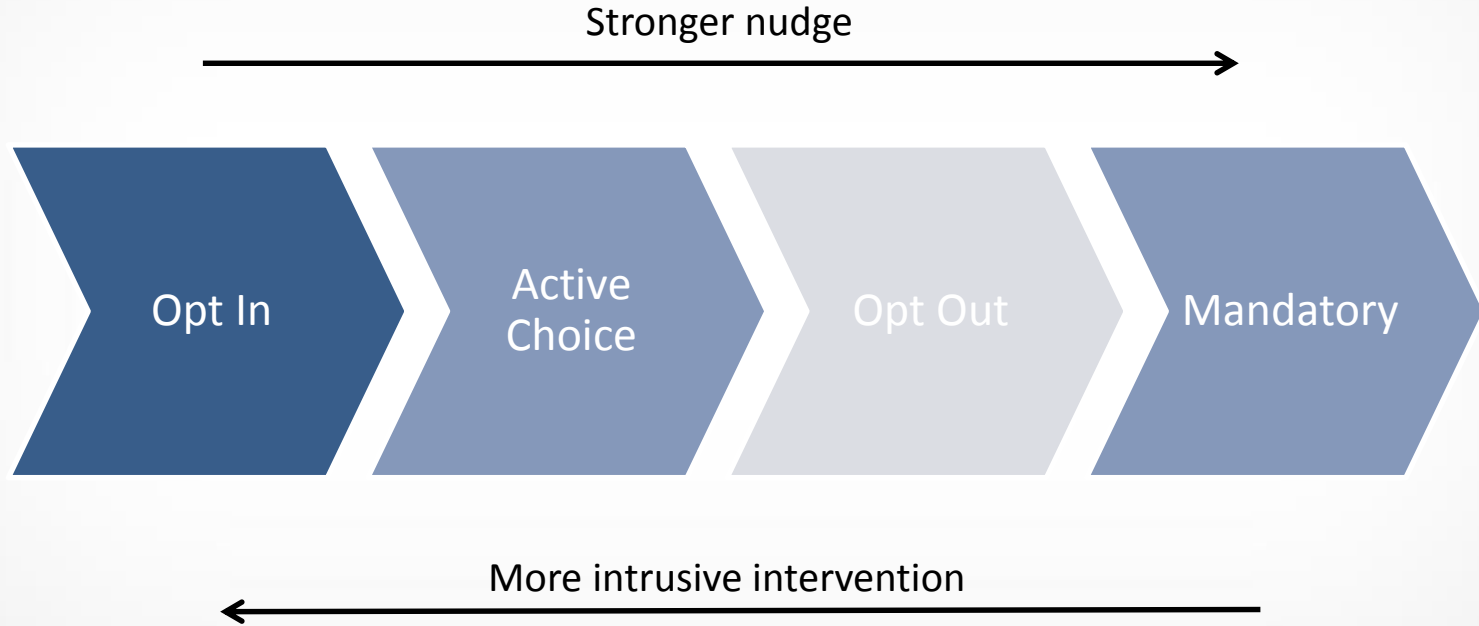
- Assumes people are rational and value-maximizers
- Objective information alone will guide decisions
- Size of financial reward is what matters

## Behavioral Economics

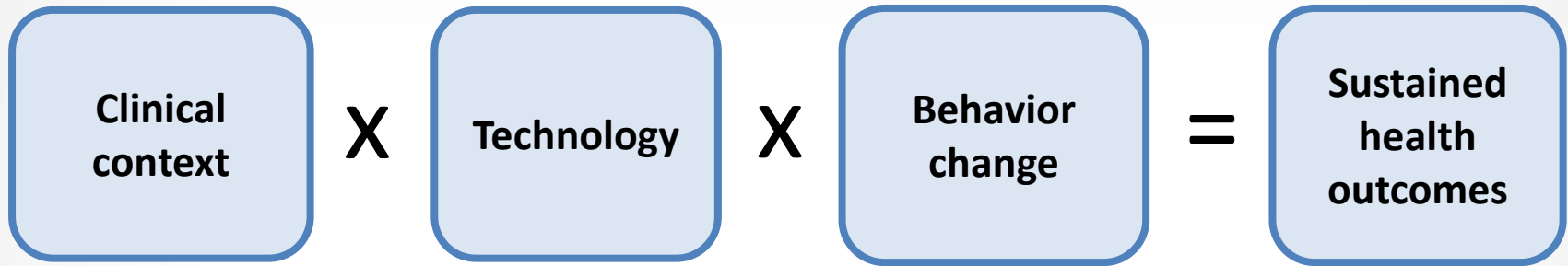
- Recognizes that people are irrational in predictable ways
- Framing and choice architecture can nudge
- Incentive design and delivery are critical



# Choice Architecture



# Automated Hovering- the other 5,000 hours



- Need the right clinical condition and environment
- Technology is necessary for scale
- Technology is not sufficient without behavior modification

# Heart Strong- Post heart attack patients



1. Wireless pill bottles for cardiovascular meds
2. Engagement incentives with daily lotteries conditional on adherence
3. Social incentive - Friend or family member gets automate alerts
4. Assignment of an engagement advisor as needed (lower personnel ratio)

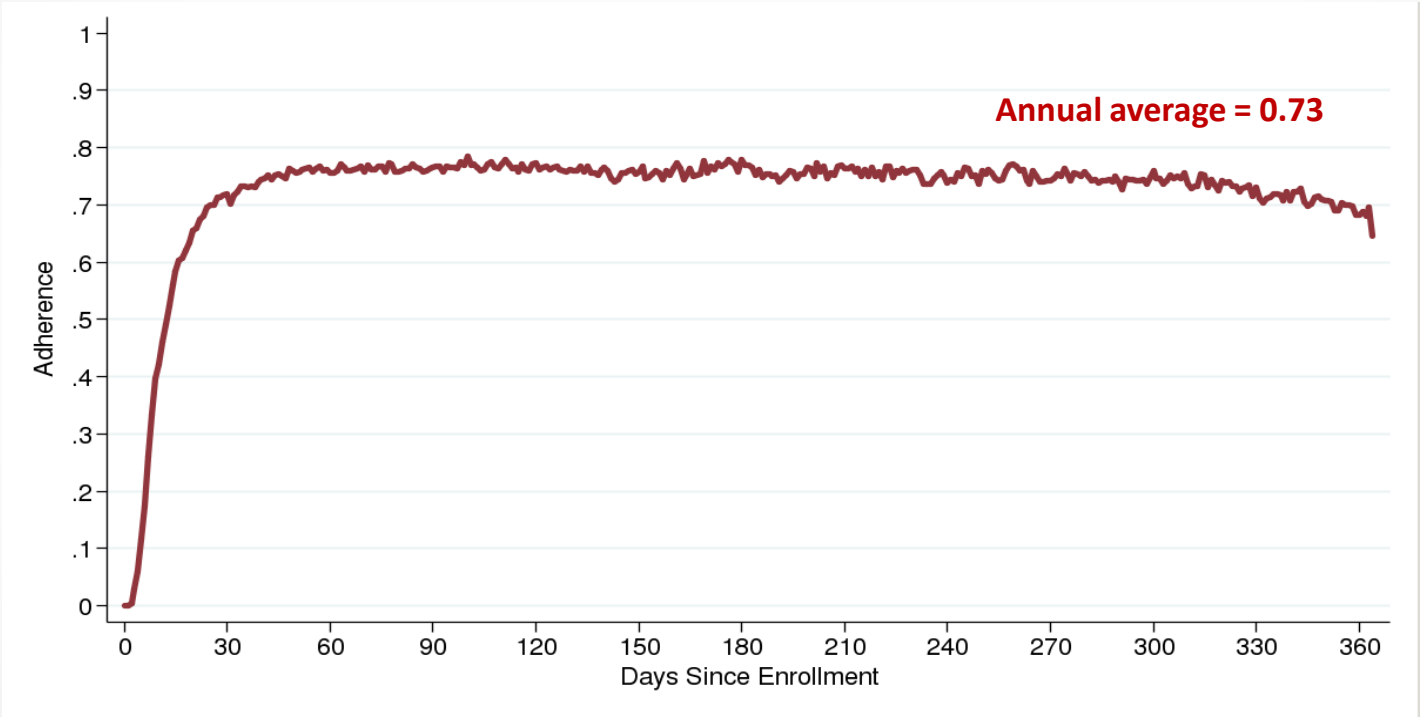


# Regret lottery

- Each patient receives a two digit number, random number selected every day
- Roughly 1 in 5 chance of winning \$5, 1 in 100 chance of winning \$50
- Will only win if patient took medication the day before

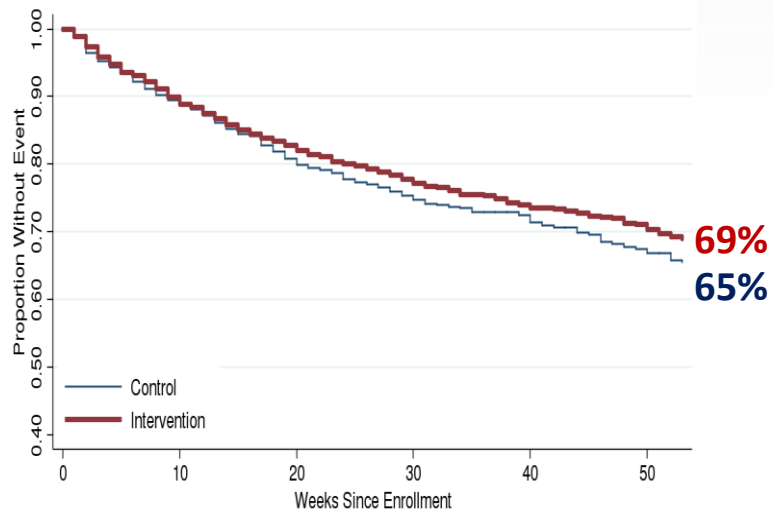
Your number came up! You would have won \$50 if you had taken your medication yesterday. Take your medication today and you may be a winner tomorrow.

# GlowCap adherence (1000 patients, 44 states)



# Outcomes

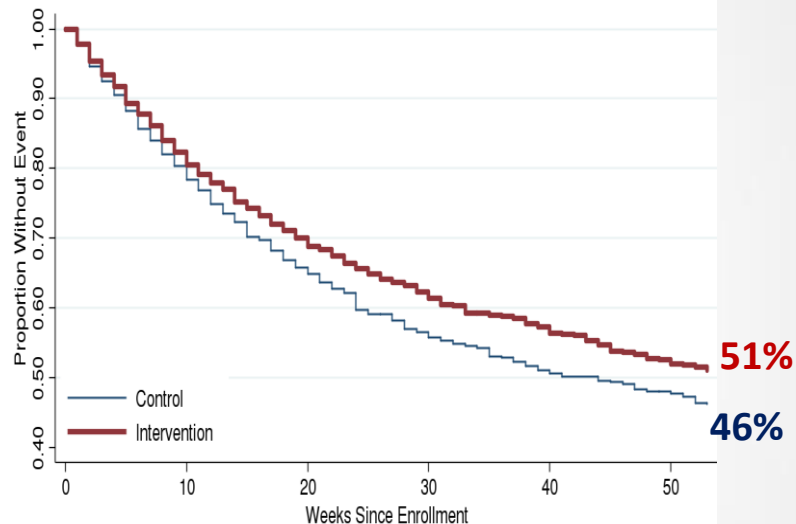
## All-cause inpatient readmission



| Number at risk | 0   | 10  | 20  | 30  | 40  | 50  |
|----------------|-----|-----|-----|-----|-----|-----|
| Control        | 478 | 413 | 355 | 311 | 282 | 241 |
| Intervention   | 975 | 832 | 725 | 656 | 602 | 547 |

1-Year Survival Probability: Control = 0.65; Intervention = 0.69  
 Log-Rank Test:  $\chi^2 = 1.47$ ;  $p\text{-val} = 0.23$


## All-cause inpatient readmission + observation Stays + ER




| Number at risk | 0   | 10  | 20  | 30  | 40  | 50  |
|----------------|-----|-----|-----|-----|-----|-----|
| Control        | 478 | 371 | 291 | 236 | 204 | 179 |
| Intervention   | 975 | 764 | 615 | 528 | 467 | 405 |

1-Year Survival Probability: Control = 0.46; Intervention = 0.51  
 Log-Rank Test:  $\chi^2 = 3.38$ ;  $p\text{-val} = 0.07$

# Opt out framing for remote monitoring

  
*You have  
been  
invited to  
participate  
...*

VS

  
*You have  
been  
invited to  
participate  
...*

+



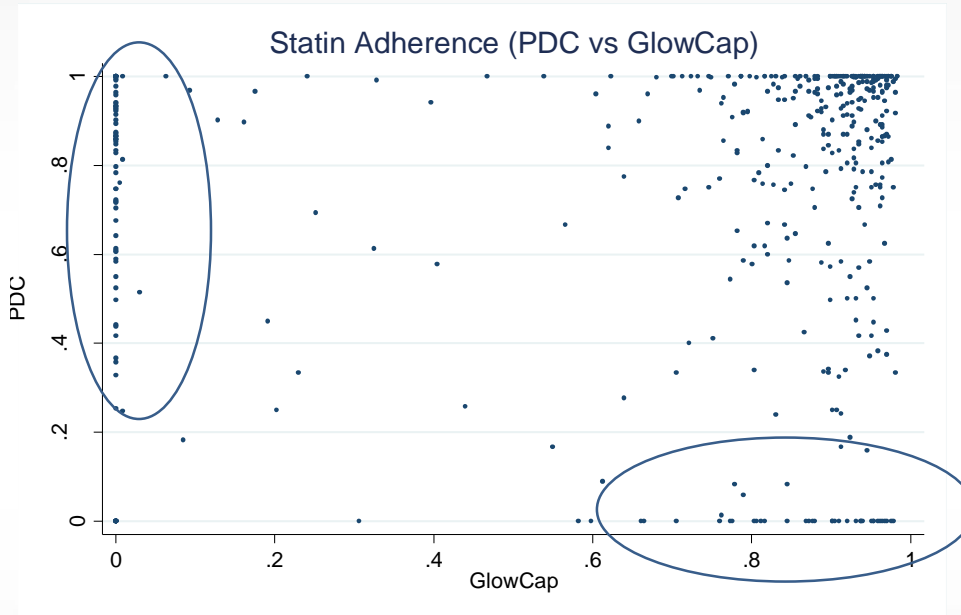
**16 %**

**39 %**

# Measurement of Adherence

|                         | Administration | Accuracy  |
|-------------------------|----------------|---|
| Self report             | Difficult      | Questionable accuracy, and limited time frame                     |
| Pharmacy claims         | Easy           | Often considered gold standard, but only measures filling of meds |
| Electronic pill bottles | Moderate       | Measures opening but could over or undercount medication use      |

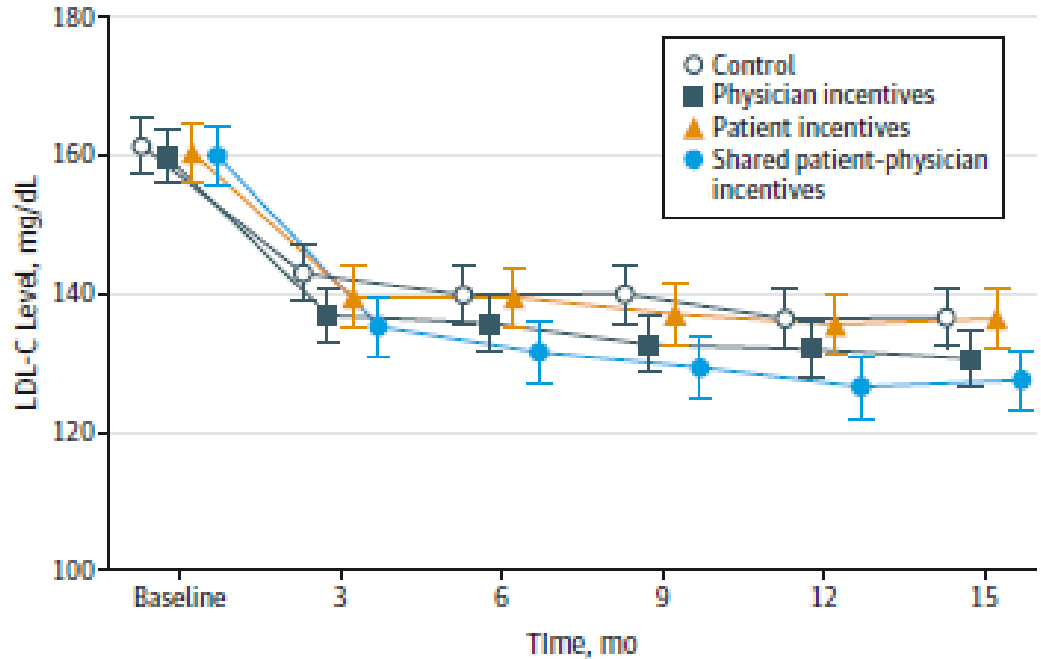
# Correlation of GlowCap and PDC



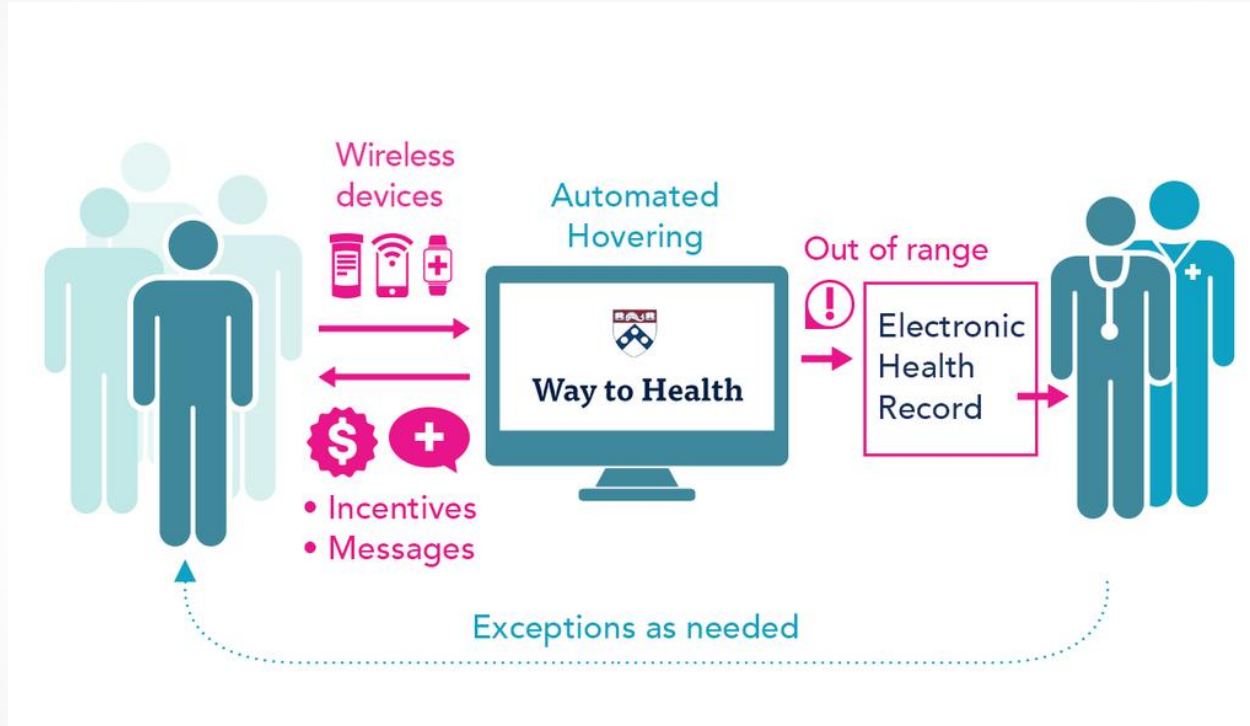
- Annual statin adherence using PDC = 0.73 and GC = 0.70; Spearman coefficient = 0.21
- Larger association between GC adherence and vascular readmissions or death (HR = 0.313) as compared to PDC (HR = 0.435)

# Patient and Provider Incentives for Lipids

- Control
- Physician incentive (\$1000)
- Patient incentive (\$1000)
- **Shared patient-physician incentive (\$500, \$500)**



# Way to Health platform





# Automated Hovering for CHF

## Intervention (500 patients followed for 12 months)

1. Choice of communication (IVR, text, email)
2. Provision of wireless pill bottle and scale
3. Regret lottery dependent on med and scale adherence
4. Social incentive - Friend or family member get automated alerts
5. Integration with CHF nurses and physicians



**Outcome-** Reduction in hospital readmissions

# Conclusion

- Tools from behavioral economics can be leveraged to improve healthy behaviors
- Need technology, behavior change, and clinical context for sustained impact
- Important to rigorously assess whether these interventions impact the outcomes we care about