

# Association between clinical improvement and engagement with telehealth interventions

A case study of compliance

ATA Presentation:

May 17, 2010

## Research question 1: Can we predict who will be compliant?

- 1. Is it possible to predict who will comply with their remote monitoring devices-based treatment plan?**
2. Is there an association between clinical improvement and engagement with a remote monitoring devices-based treatment plan?
3. Is there an association between engagement and reduced utilization of acute healthcare resources?

## Experimental setting: Medicare Demonstration Project in Pacific Northwest

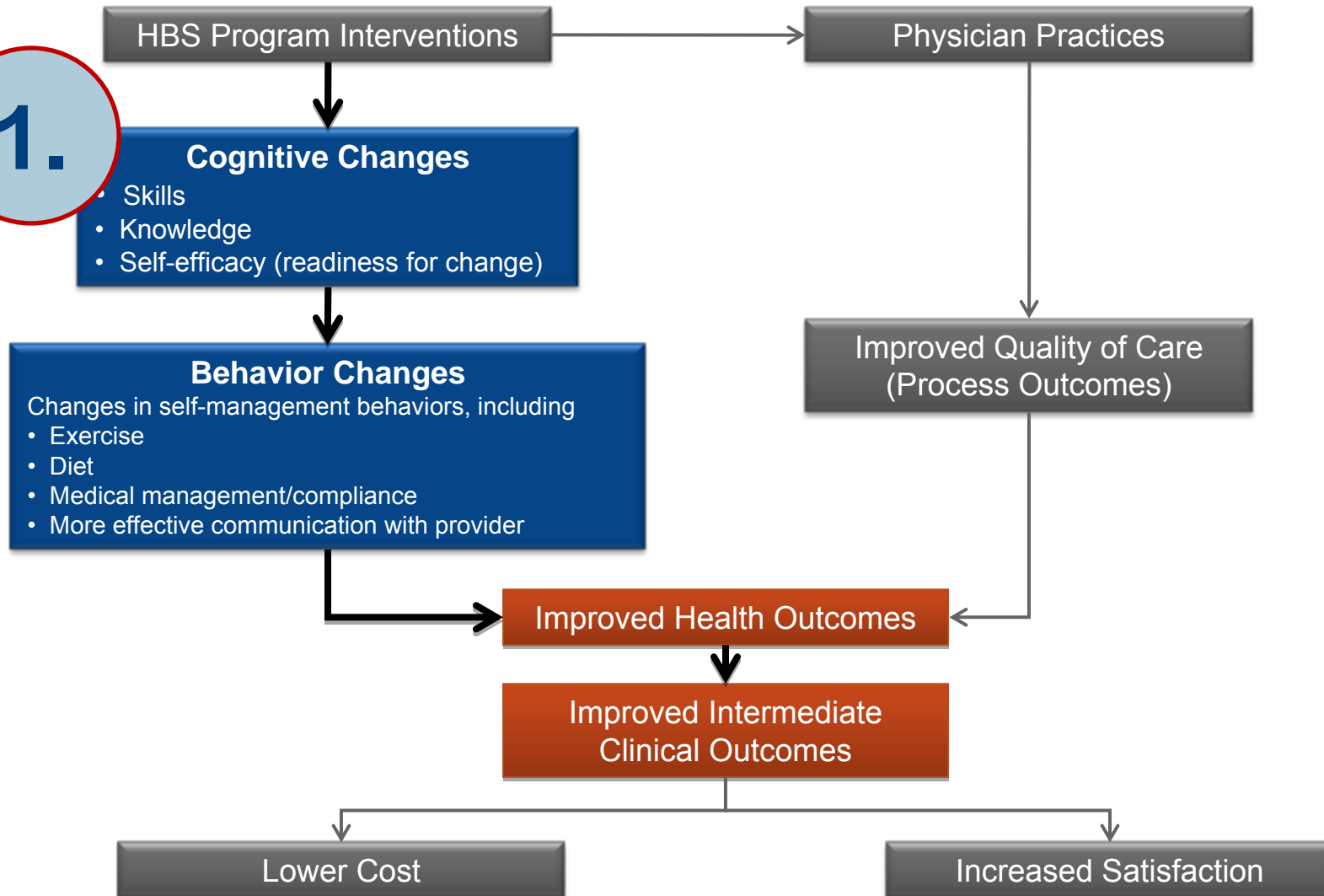
- In February 2006, Health Hero Network (now Robert Bosch Healthcare, Inc.) was awarded a 36-month contract under the Care Management of High Cost Beneficiaries Demonstration Project sponsored by the Centers for Medicare and Medicaid Services (CMS). Clinical sites were established at Wenatchee Valley Medical Center (WVMC) in Wenatchee, WA and Bend Memorial Clinic in Bend, OR
- The Health Buddy program was established to demonstrate that care management, supplemented by technology (the Health Buddy) can effectively decrease the costs and improve the quality of life for Medicare high cost beneficiaries.
- The Health Buddy, a remote monitoring device, gathers information on vital signs, symptoms, behaviors and patient knowledge of their health conditions
- In 2009, the HBS program at Bend and Wenatchee was extended for three more years
- Both CMS and Bosch (along with Analysis Group) are conducting ongoing evaluations to fully assess the program's impact on cost, utilization and other measures. (Results expected summer/fall 2010)

## Compliance: Why is it important?

- “Compliance” is the extent to which a patient’s behavior coincides with medical advice
  
- Poor compliance to treatment regimens has been shown to increase morbidity and mortality in severe diseases like COPD, diabetes, CHF, hypertension, HIV, cancer and other diseases
  - It can be a particular issue in optimizing telehealth effectiveness

# Conceptual framework for assessing a telehealth program

1.



Source:

RTI Conceptual Framework for the Medicare Care Management of High Cost Beneficiaries evaluation. Portions of this model are adapted from other sources, including the Chronic Care Model and the disease management model described in CBO (2004).

## Compliance: Our definition for this presentation

- Engaged: Beneficiaries in the intervention population who were enrolled in the program and had at least one HBS session in the study period

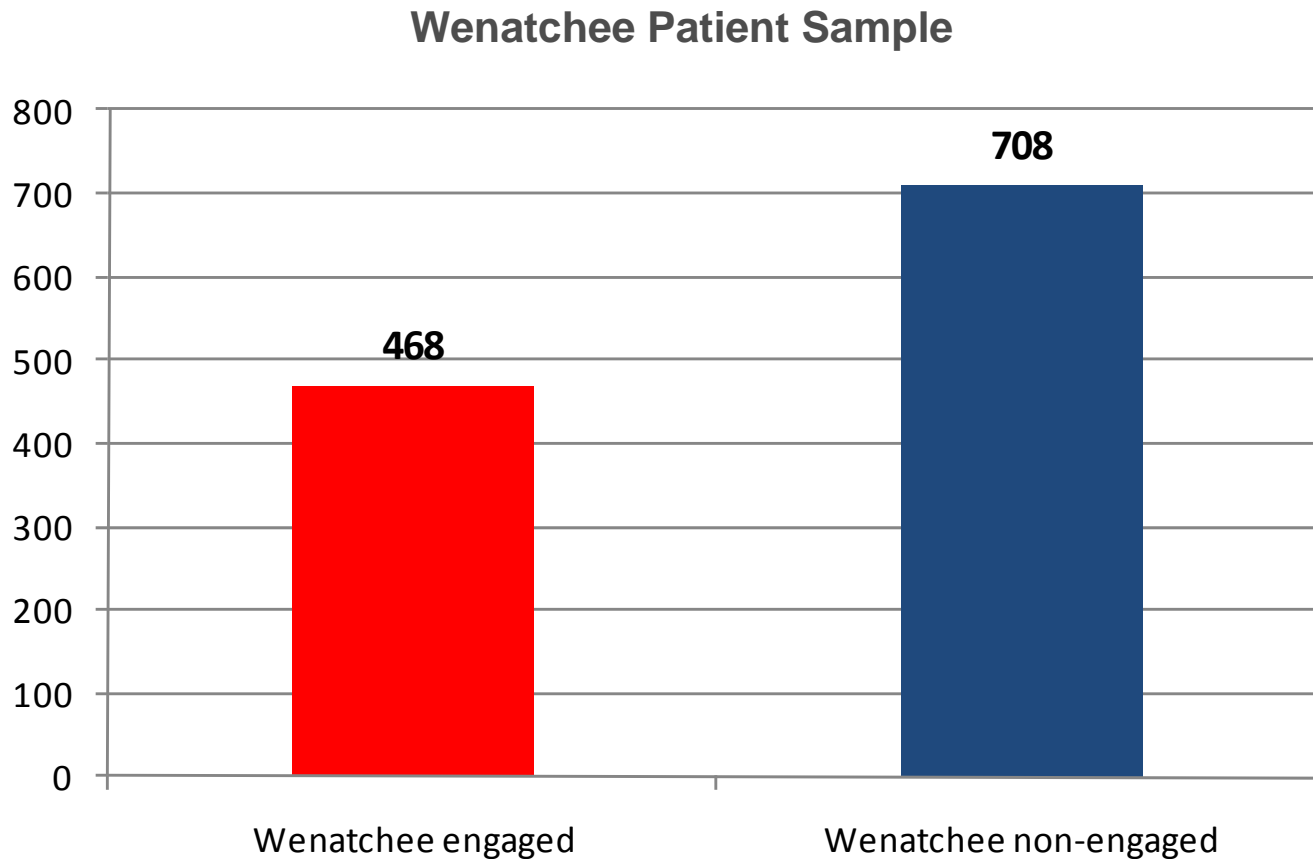


- Non-engaged: Beneficiaries in the intervention populations who were either enrolled in the program and never had even one HBS session, or who never enrolled

## Analytic framework

- Patient characteristics included age, gender, and primary disease type
- Patient subgroups
  - Diabetes Mellitus
  - Chronic obstructive pulmonary disease
  - Congestive heart failure
- Baseline and study periods
  - Baseline data were available for a one year period
  - Study results were for the two years after the baseline period ended
- Data sources
  - Wenatchee electronic medical records: lab test results, diagnosis codes, and procedures from Wenatchee data
  - Health Buddy System: patient demographics and engagement data

## Sample: About 40% of the Wenatchee patients who were offered the telehealth intervention were engaged



## Results: Engaged patients are tended to be slightly younger; having COPD was associated with a higher chance of being engaged

- Engagement model relates baseline characteristics to study period engagement
  - Characteristics of interest include age, gender, and primary disease type
  
- Findings:
  - Engaged patients tended to be younger, by about 1.5 years on average
  - COPD patients had a higher chance of being engaged
  - Many other factors are not related to engagement
  
- Takeaway: Identifying patients who will be engaged in the study period using baseline characteristics is not straight forward

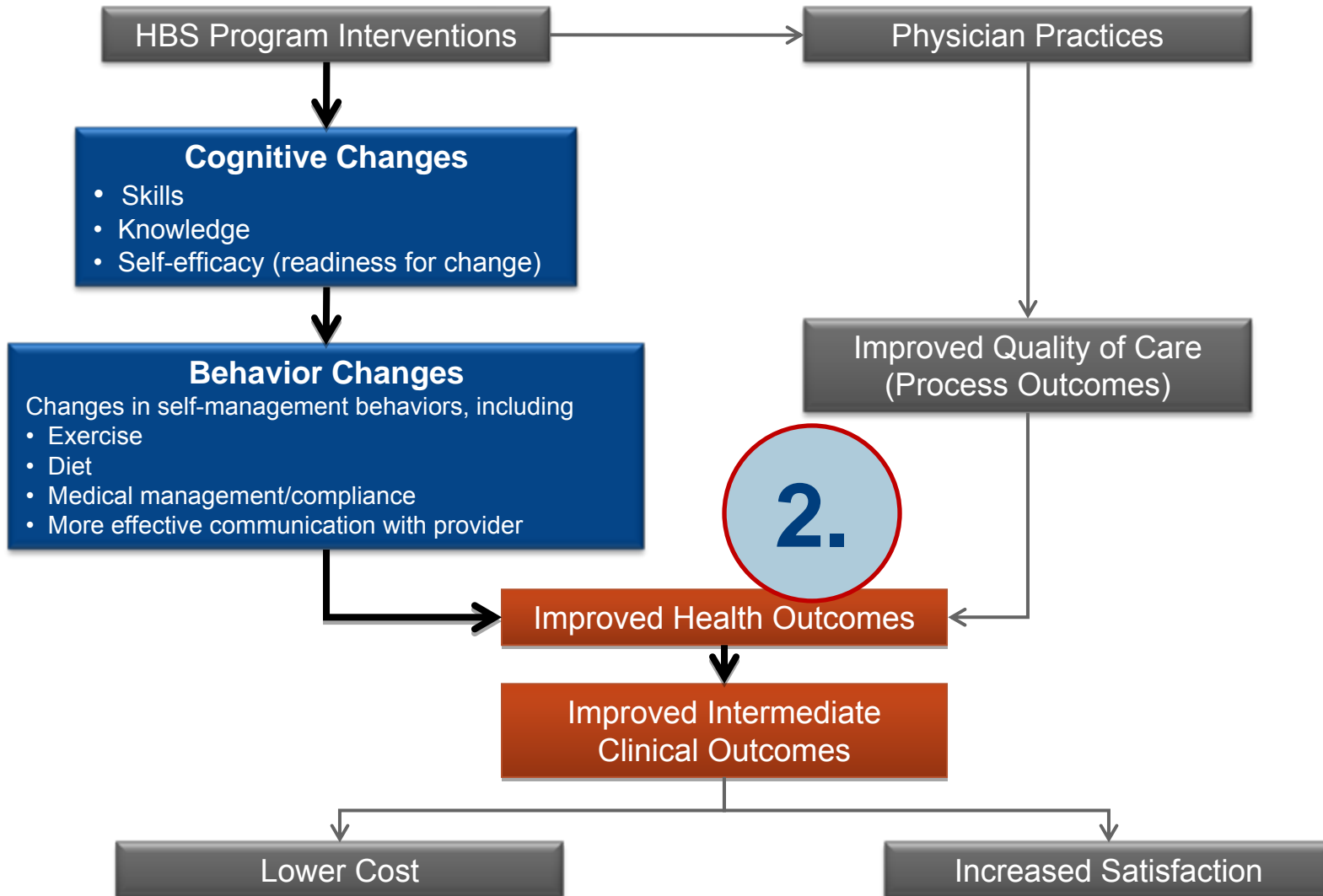
## Research question 2: Is being compliant associated with better clinical outcomes?

1. Is it possible to predict who will comply with their remote monitoring devices-based treatment plan?

**2. Is there an association between clinical improvement and engagement with a remote monitoring devices-based treatment plan?**

3. Is there an association between engagement and reduced utilization of acute healthcare resources?

# Conceptual framework for assessing a telehealth program

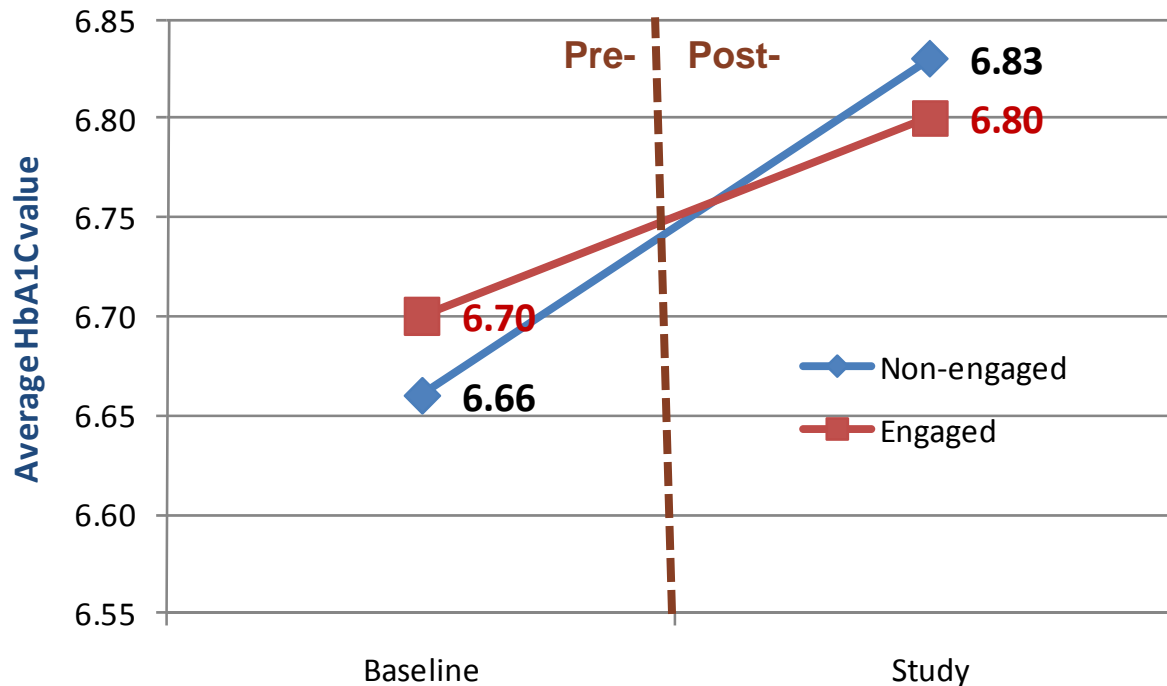


## Analytic framework for research question 2

- DM patients were analyzed in the sub-group analysis to assess if being engaged was associated with clinical improvement
  - HbA1C is a key, clearly identifiable clinical outcome for DM patients
  - It is of significant clinical importance to keep HbA1C values low
  
- Can relate being engaged or not-engaged to changes in HbA1C values to address research question
  
- Required all patients have at least one HbA1C test each in the baseline and study periods

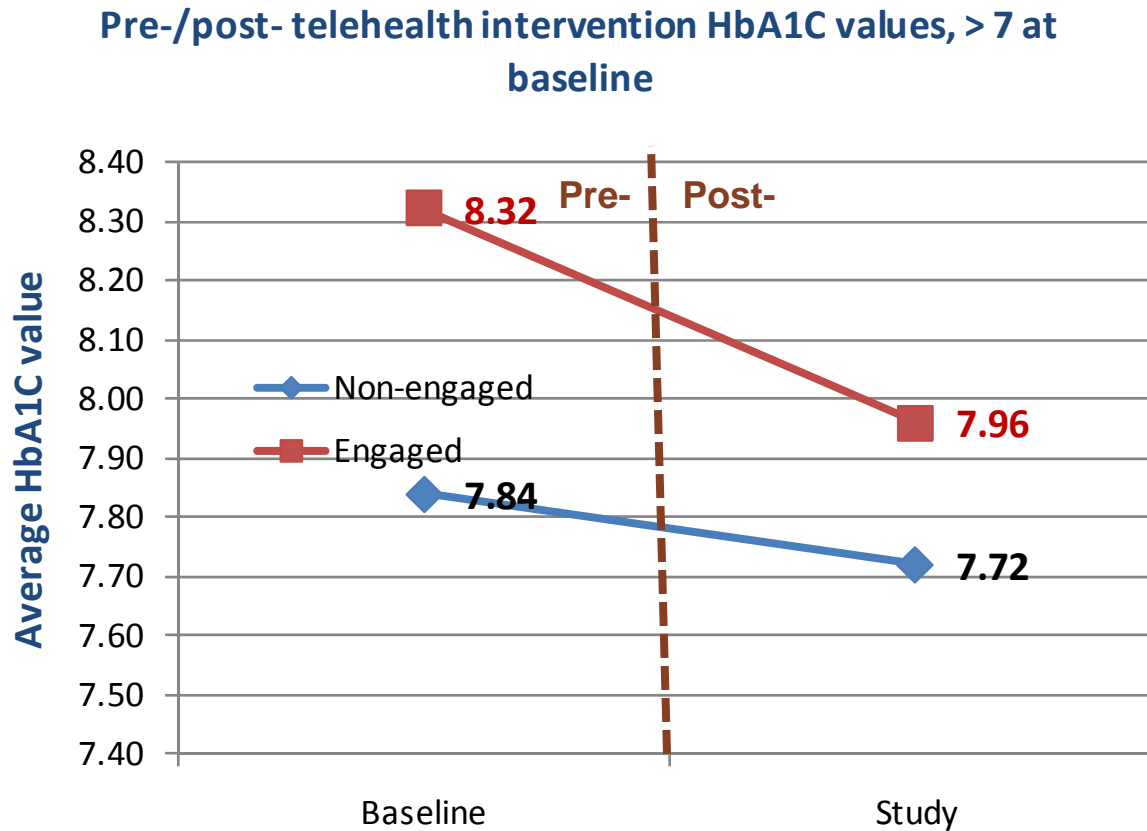
## Results: Being engaged reduces the rate of increase of HbA1C values by 40% - 44% for the average Wenatchee patient (N=452)

Pre-/post- telehealth intervention HbA1C values, all patients



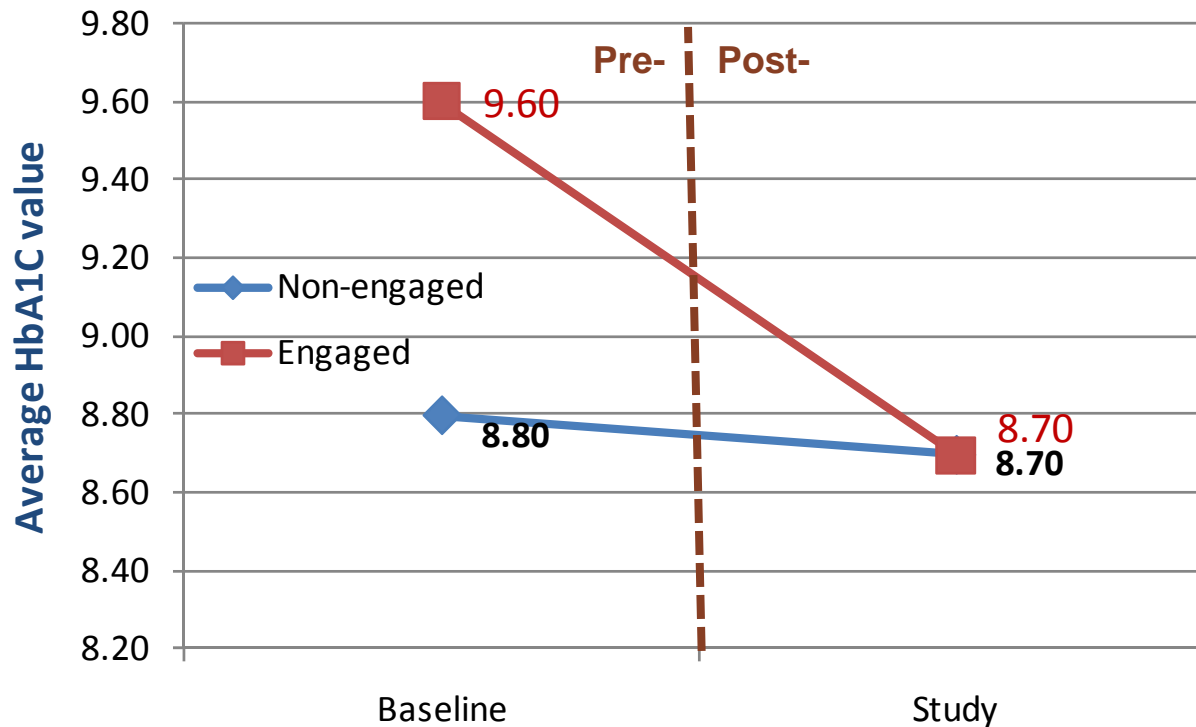
- Results controlled for starting HbA1C, age, gender, disease type, year, and test count

## Results: Being engaged decreases HbA1C values by 4.2 times more than being non-engaged for the average patient with baseline HbA1c > 7 (N=119)



## Results: Being engaged decreases HbA1C values by 9.1 times more than being non-engaged for the average patient with baseline HbA1c > 8 (N=41)

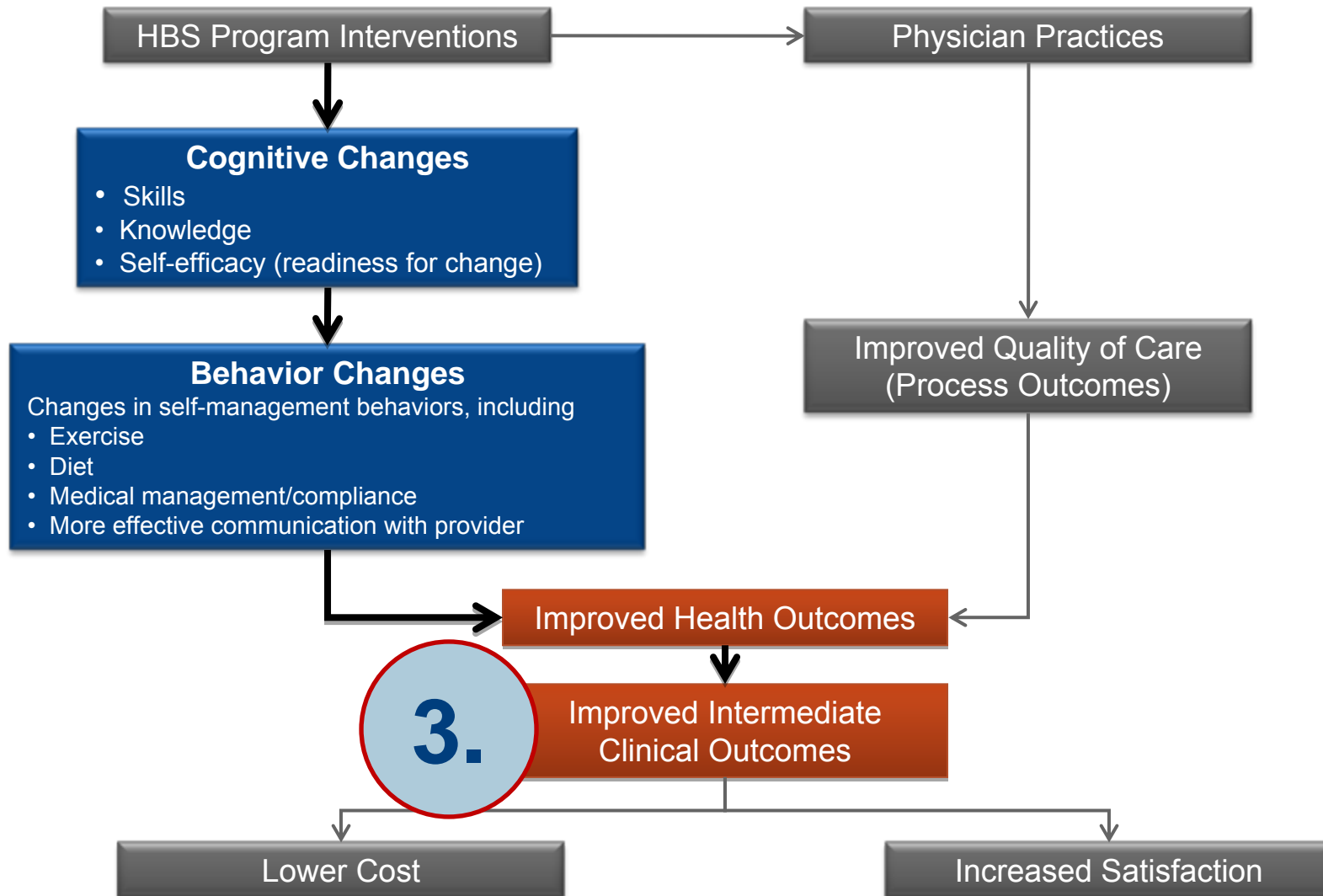
Pre-/post- telehealth intervention HbA1C values, > 8 at baseline



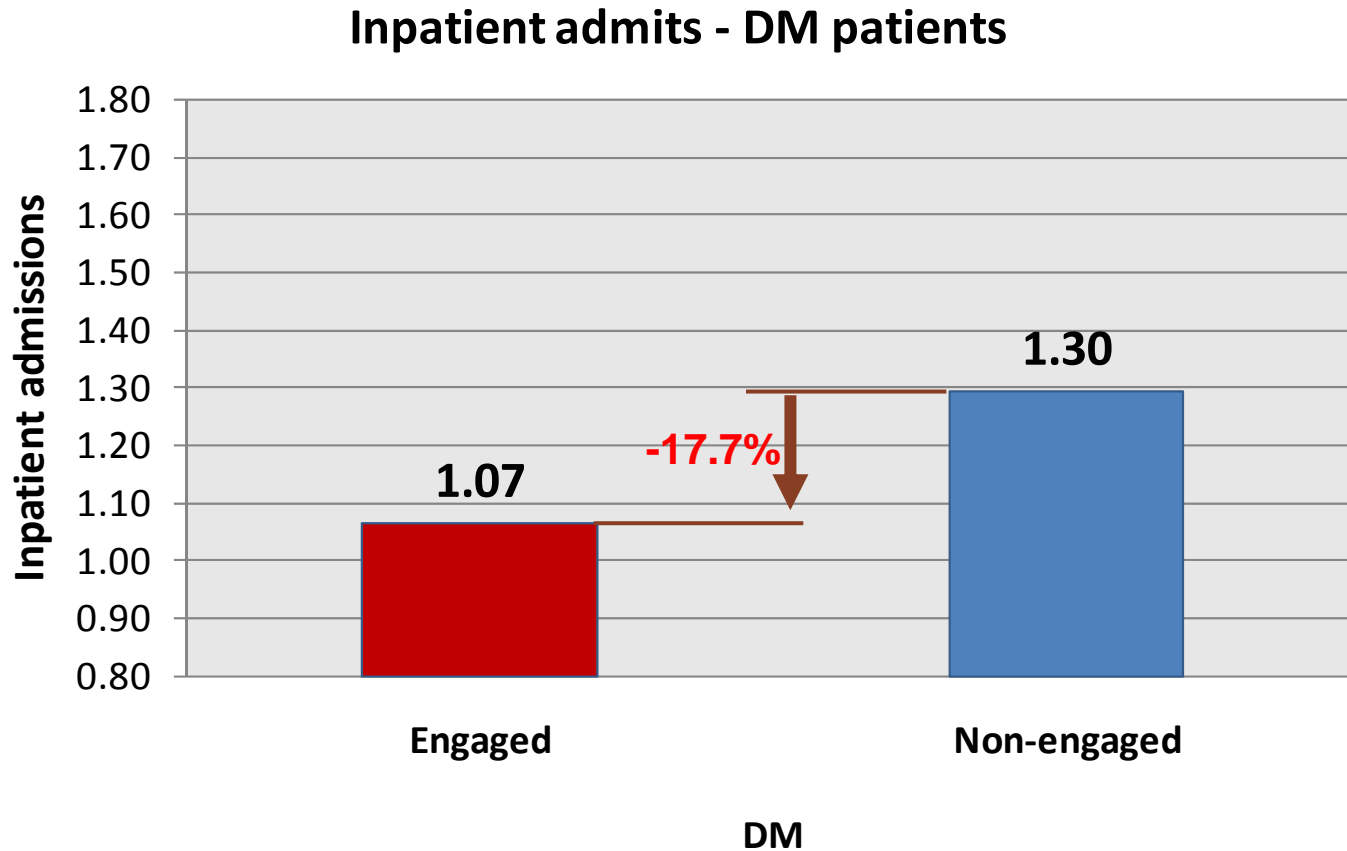
## Research question 3: Does being engaged lead to better use of clinical resources, including reductions in inpatient admissions?

1. Is it possible to predict who will comply with their remote monitoring devices-based treatment plan?
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- 3. Is there an association between engagement and reduced utilization of acute healthcare resources?**

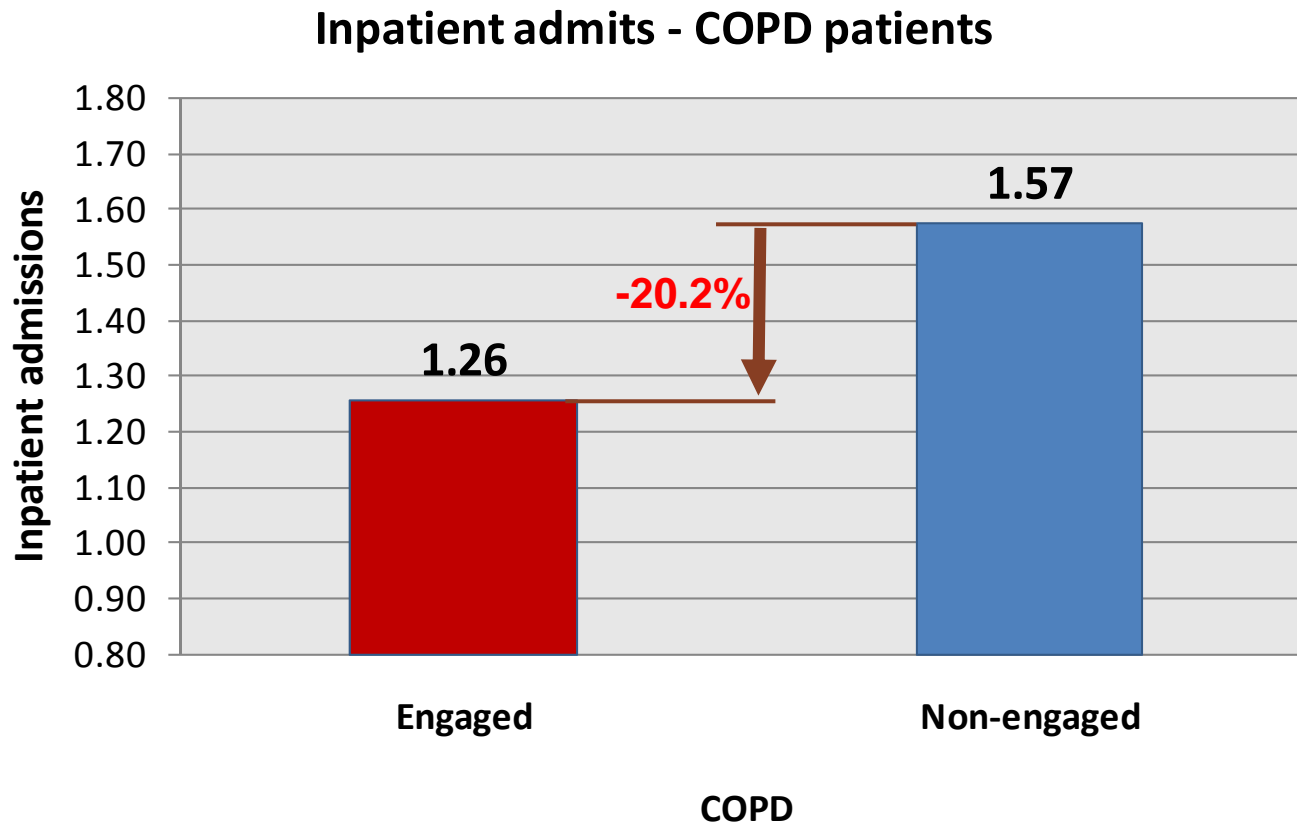
# Conceptual framework for assessing a telehealth program



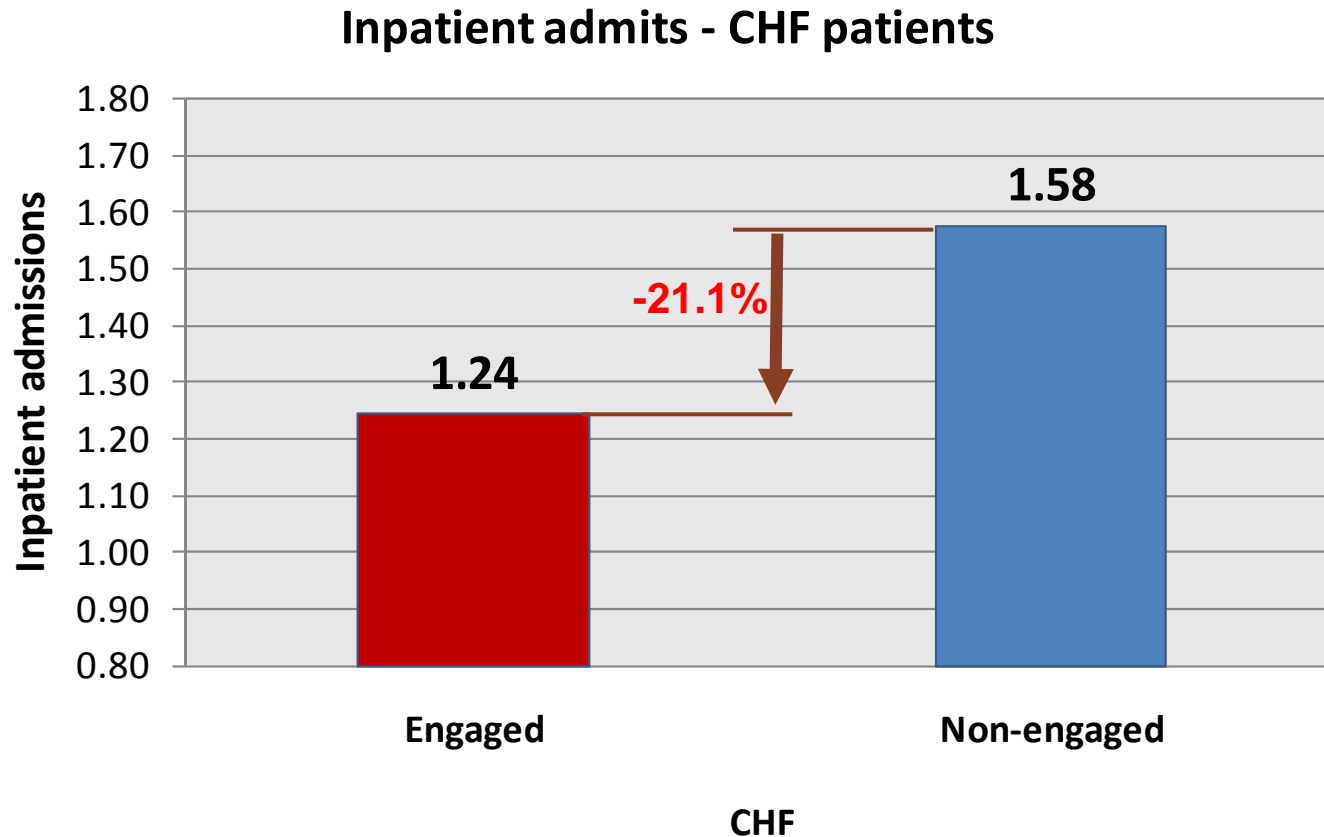
## Being engaged is related to a 17.7% decrease (p=0.11) in inpatient admissions relative to being non-engaged for DM patients



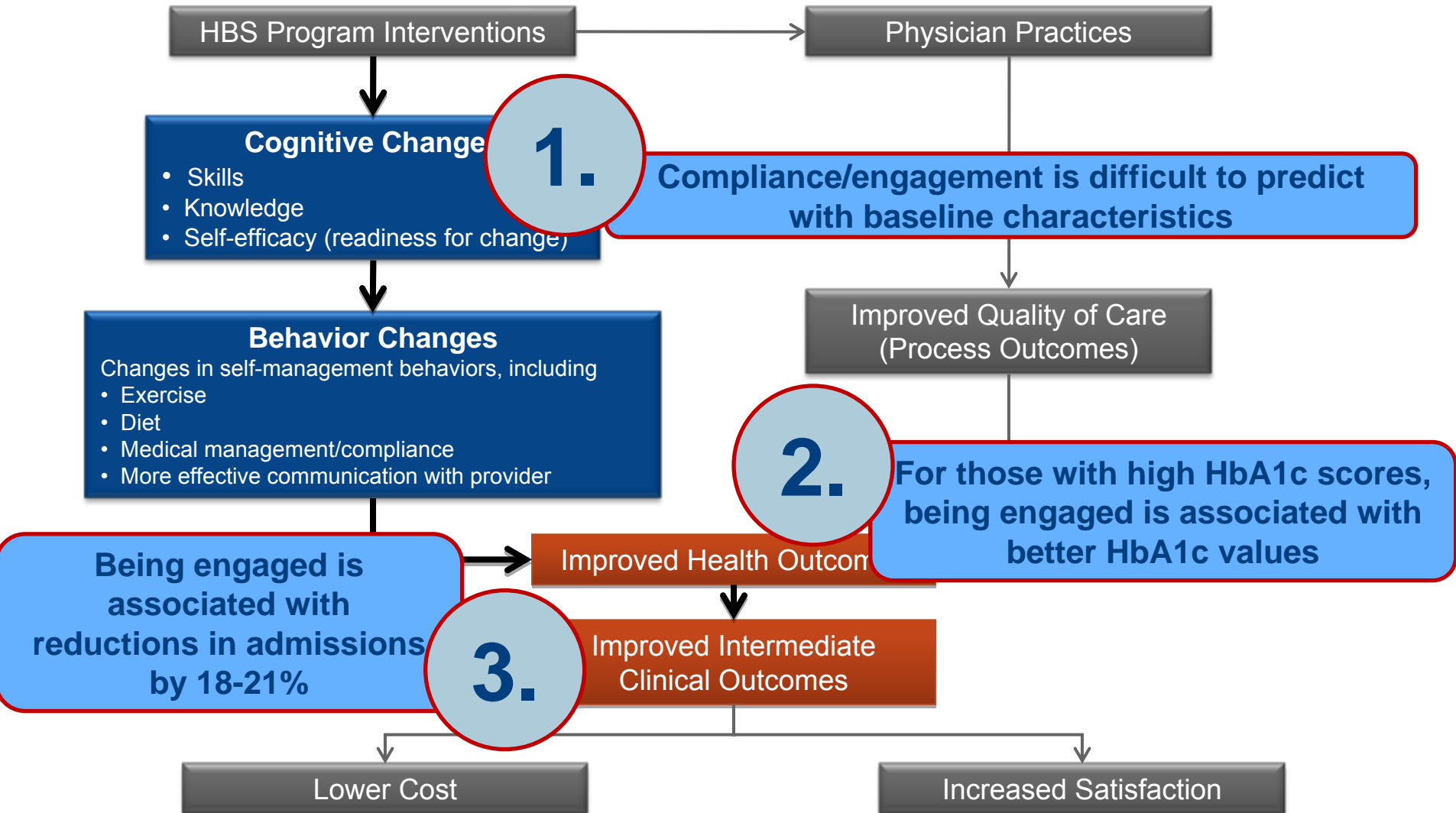
**Being engaged is related to a 20.2% decrease (p=0.07) in inpatient admissions relative to being non-engaged for COPD patients**



## Being engaged is related to a 21.1% decrease (p=0.02) in inpatient admissions relative to being non-engaged for CHF patients



# Importance of compliance



## Conclusions

- Compliance: Compliance is difficult to predict with baseline characteristics.
  - Future research could examine effects of education, marital status, and other factors on engagement.
- Clinical Outcomes: Being engaged is associated with a reduction of HbA1C values by 4 times more than being non-engaged for those with HbA1C values greater than 7 in the baseline period, and 9 times more for patients with HbA1C > 8.
- Patient Utilization: Being engaged is associated with a reduction in the number of inpatient admissions for DM, COPD and CHF subgroups by 18-21%.
  
- Future research will examine cost, mortality and other utilization trends.

# Thank you

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# Additional slides

## Compliance: Importance and our definition

- “Compliance” is the extent to which a patient’s behavior coincides with medical advice
- Poor adherence to treatment regimens has been shown to increase morbidity and mortality in severe diseases like COPD, diabetes, CHF, hypertension, HIV, cancer and other diseases
  - It can be a particular issue in optimizing telehealth effectiveness

### MOST RECENT TELEHEALTH PUBLICATIONS DISCUSSING COMPLIANCE/ADHERENCE/ENGAGEMENT

1. Lehmkuhl HD, et al. Telehealth behavior therapy for the management of type 1 diabetes in adolescents. J Diabetes Sci Technol. 2010 Jan 1;4(1):199-208.
2. Oddsson LI, et al. A robotic home telehealth platform system for treatment adherence, social assistance and companionship - an overview. Conf Proc IEEE Eng Med Biol Soc. 2009;2009:6437-40.
3. Caudle JM, van Dijk A, Rolland E, Moore KM. Telehealth Ontario detection of gastrointestinal illness outbreaks. Can J Public Health. 2009 Jul-Aug;100(4):253-7.
4. Wakefield BJ, et al. Outcomes of a home telehealth intervention for patients with heart failure. J Telemed Telecare. 2009;15(1):46-50.
5. Cocosila M, Archer N, Yuan Y. Would people pay for text messaging health reminders? Telemed J E Health. 2008 Dec;14(10):1091-5.

## Results: Being engaged decreases HbA1C values by 2.5 times more than being non-engaged for the average patient with baseline HbA1c > 9 (N=19)

