**SUPPLEMENTAL MATERIAL**

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## Supplemental Methods

### Information Previously Published in *Circulation: Cardiovascular Quality and Outcomes*[10]

Every 24 hours, a study team member reviewed a list of patients admitted with either a STEMI or type 1 NSTEMI. At JHH/JHBMC, we built an automatic trigger within the Epic electronic medical record to alert the study team to patients admitted with an AMI diagnosis or an elevated troponin to reduce the likelihood of missing eligible patients. At Reading Hospital, the research team received a census every 24 hours of patients admitted with an AMI and at MGH the team reviewed the patient census on the study units. Potentially eligible participants were entered into REDCap (Research Electronic Data Capture), a secure web-based data application designed to support data capture for research studies, and screened by the team member to determine whether they met the eligibility criteria. The team member then approached the patient to determine whether he/she owned a smartphone and if so provided more information to determine whether the patient was interested in participating. If the patient was eligible and elected to participate, the team member consented the patient via an electronic informed consent application built on the Apple ResearchKit platform. The informed consent application, downloaded onto study team iPads or iPhones, enabled a team member to guide participants through the informed consent process and to provide them with the necessary information regarding the risks and benefits to participating, all in an easy-to-understand format. A copy of the electronic informed consent was automatically emailed to both the participant and the team. Once the consent was complete, the participant's username and password to access Corrie was set up. An email was required to create a username for Corrie. In the rare instance a patient did not have an email address we created a free Gmail account for them.

The Corrie application was then downloaded onto the participant's personal device or the participant was given an iShare, preloaded with the Corrie application. All participants received the Corrie application, Apple Watch, and wireless blood pressure monitor, with the exception of those who owned an iPhone 5 which is not compatible with WatchOS 4. Touch ID or Facial Recognition, when available, was activated to streamline the login process. Corrie required WiFi or a data plan for logging-on and syncing with the backend; however, the majority of the features were stored locally and did not require the user to have internet connection. SIM cards were also included in the iShares. A team member provided a Corrie orientation which included reviewing main features of the application, showing the participant how to add, edit, track, and review indications and common side effects of his/her medications, monitor his/her heart rate and step count using the Watch, monitor his/her blood pressure using the iHealth blood pressure monitor, access the educational articles and videos, schedule follow-up appointments, add providers' or health advocates' contact information, and upload stent or insurance cards to the application.

When instructing the participant on how to add his/her medications, the team member printed out the participant's medication list at the time of enrollment and showed him/her how to add one medication. The team member then had the participant enter the other medications to ensure comprehension and reviewed them to make sure the medications were entered correctly. The team member notified the patient that his/her medications would likely change at discharge and potentially after seeing his/her primary care provider or cardiologist, thus it was his/her responsibility to update them as prescribed. Each participant was informed that he/she was expected to use the application with at least the same frequency that his/her medications were due, typically once or twice daily. The application allowed patients to enter their vitals at any point throughout the day. As the optimal frequency of vitals monitoring following AMI is

unknown, the application did not dictate a rigid schedule. Rather, participants entered vitals per their preferences and were not reminded to enter them at scheduled times. Patients could review vitals tracked on previous days. The goal of tracking physiologic parameters within Corrie was to increase awareness of individual susceptibility for CVD risk factors. Goal completion graphics for vitals also served as a call to action. Paired with the other application components, including education on these topics and medications to manage many of these parameters we provided patients with a way to comprehensively self-manage their care. The participant was encouraged to review the educational content while hospitalized or within the first week post-discharge, and prior to discharge was encouraged to schedule and enter at least two follow-up appointments.

For participating in the study, participants were given a Corrie tote bag containing the following: a visual step-by-step quick-start guide on the key features of Corrie and study team contact information, Corrie pill box, iHealth blood pressure monitor, and prepaid return mailer to return loaned devices following study completion. They were instructed to return equipment following 30 days post-discharge. After hospital discharge, participants had no scheduled follow-up appointments with the study team. Follow-up data was collected from participants via emailed REDCap surveys. If participants completed the surveys at both 3 and 30 days post-discharge they received a $10 gift card.

## Supplemental Methods

### Post-hoc Sensitivity Analysis to Estimate the Potential Impact of an Unmeasured Confounder

We computed the E-values for hazard ratios when the outcome prevalence was greater than 15%, based on the methods proposed by VanderWeele.[27,42,43] Assuming that the unmeasured confounder is equally related to exposure and outcome,[27,44] the E-values estimate what the risk ratio would need to be for unmeasured confounders, above and beyond the measured confounders, to explain away the observed associations of being in the DHI group with 30-day readmission in the present study.

We also assessed the potential influence of an unmeasured confounder using the analytical method as described by Lin et al.,[28,45] in which the adjusted effect estimate is multiplied by a factor depending on assumed confounder characteristics[46]. Specifically, the impact of an unmeasured confounder is determined by three parameters: 1) the prevalence of the unmeasured confounder in the unexposed (i.e. those in the control group); 2) the association of the unmeasured confounder with the exposure expressed as a risk ratio (RR) (e.g. a RR = 2 indicates that the unmeasured confounder was twice as common in the DHI versus control group); and 3) the association of the unmeasured confounder with 30-day readmission, independent of the measured confounders, expressed as a RR (e.g. a RR = 2 indicates that the 30-day readmission rate was twice as high in those with the unmeasured confounder compared to those without). Under the assumptions that the unmeasured binary confounder is independent of measured confounders and the exposure (using DHI) is not an effect modifier for the unmeasured confounder's effect on the outcome, the adjusted RR (RR*) of being in the DHI group for 30-day readmission when accounting for the unmeasured confounder was calculated using the following equation[28,45,46]:

$$RR^{*} = RR \times \frac{RR_{zy} \times P_{z|x=1} + (1 - P_{z|x=1})}{RR_{zy} \times P_{z|x=0} + (1 - P_{z|x=0})}$$

For this equation,

Unmeasured confounder = z

Exposure (DHI) = x

Outcome (30-day readmission) = y

RR = Obtained risk ratio from the adjusted analysis (i.e. 0.48 for 30-day readmission)

RR* = Risk ratio adjusted for the unmeasured confounder

Pz|x=0 = Prevalence of the unmeasured confounder in the unexposed control group

Pz|x=1 = Prevalence of the unmeasured confounder in the exposed DHI group

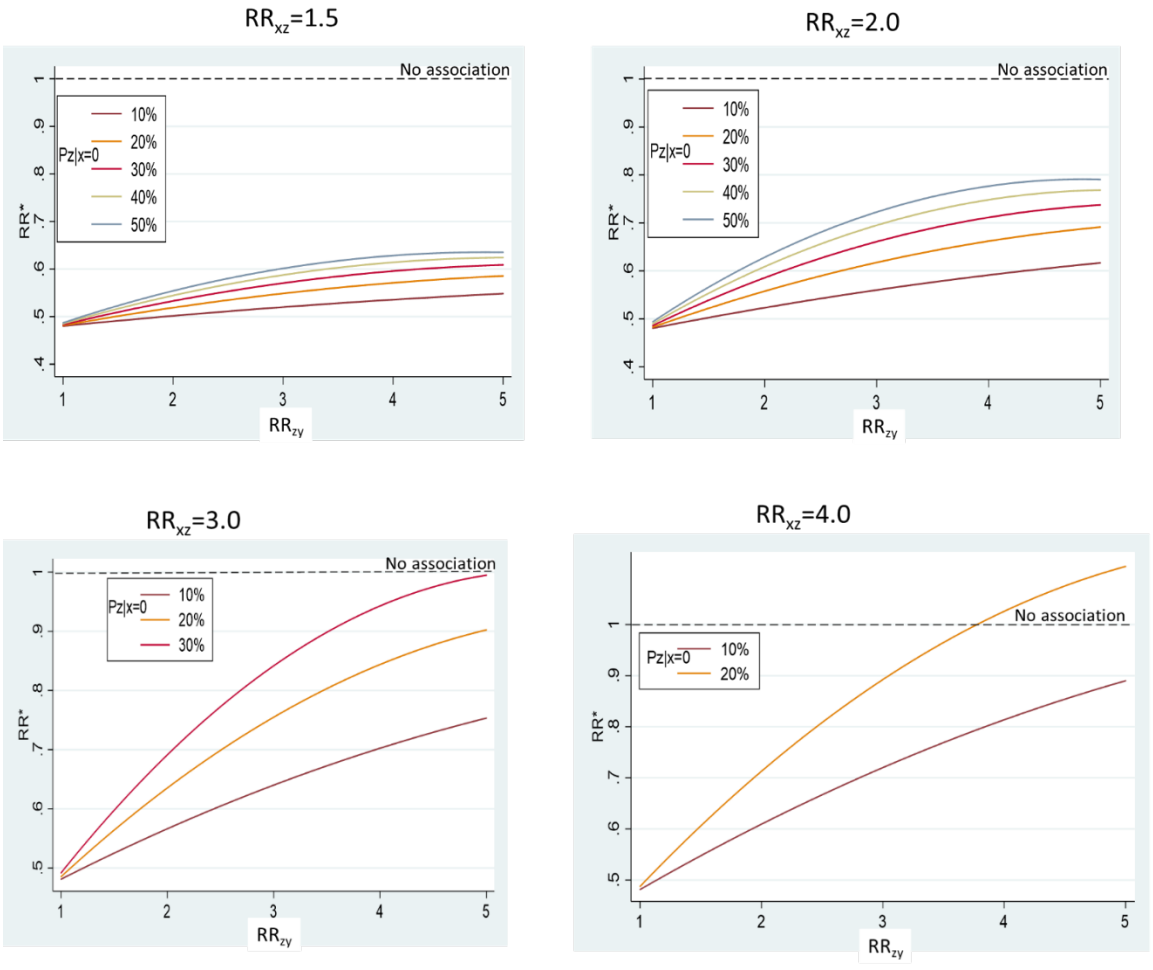
RRxz = The risk ratio for the unmeasured confounder in the exposed DHI group versus the unexposed control group

RRzy = The risk ratio for 30-day readmission in those with the unmeasured confounder versus those without the unmeasured confounder (i.e. a RRzy > 1 indicates that the unmeasured confounder is associated with increased 30-day readmission)[46]

We then evaluated characteristics of the unmeasured confounder that would make the RR increase to a null association between the DHI and readmission, and presented the results in the Supplemental Figure below given a range of these three parameters.

## Supplemental Figures and Figure Legends

**Supplemental Figure I. Post hoc sensitivity analysis to assess the impact of an unmeasured confounder.** Post hoc sensitivity analysis to assess the impact of an unmeasured confounder using the analytical method by Lin et al.[28] The x-axis represents the association between the unmeasured confounder and 30-day readmission and the y-axis is the adjusted risk ratio between DHI and 30-day readmission when accounting for the unmeasured confounder. Each figure displays a different unmeasured confounder/exposure (i.e. DHI) association and the lines represent different prevalence of the unmeasured confounder in the unexposed control group. Please refer to the Supplemental Methods for more details.



**Supplemental Tables**

**Supplemental Table I.** Theoretical basis of behavior change strategies in the DHI.[12-14]

| Theoretical Components | Explanation | Technological Manifestation in the DHI |
|---|---|---|
| *Health Belief Model* | | |
| **Perceived Susceptibility** | Make an individual's perceptions more consistent with his/her actual risk | Short educational articles and videos to increase understanding of risk factors for AMI and **individual susceptibility** |
| **Perceived Benefits and Barriers** | Providing knowledge and arguments in favor of behavior change | Engaging educational articles, animations, and videos to increase **knowledge of the benefits** for altering behavior following AMI versus the **risks** of no behavior modification. |
| | Identify and reduce perceived barriers to behavior change | **Reduce barriers** to medication adherence through reminders, self-management, education, and tracking of vitals (HR, BP, weight); physical activity by self-monitoring steps, Watch reminders to reach activity goals, and education; unhealthy eating habits and smoking through education; follow-up attendance through self-management and reminders |

| | | |
|---|---|---|
| **Cues to action** | Appropriate use of biometrics, progress reports, reminder and recall systems | Automatic **reminders/cues** via push notifications for medications, physical activity, and follow-up appointments. Goal completion graphics for medications, vitals, education, and follow-up appointments also serve as calls to action |
| **Self-efficacy** | Building confidence in ability to perform the health behavior | Active and passive tracking of medication adherence, vital signs, physical activity, educational activities, and follow-up appointments with achievable goal setting and real-time feedback of progress using visuals in Corrie and Watch to build **self-efficacy** |
| *Social Cognitive Theory* | | |
| **Self-efficacy/ Enactive attainment** | Confidence is enhanced through mastery experiences, social modeling, verbal persuasion, and practice | Active and passive tracking of medication adherence, vital signs, physical activity, educational activities, and follow-up appointments with achievable goal setting and real-time feedback of progress using visuals in Corrie and Watch to build **self-efficacy through enactive attainment** |
| **Outcome expectations** | Judgements about the likely consequences of behavior change | Short educational articles and videos to promote **positive judgements** regarding behavior change |

| | | |
|---|---|---|
| **Knowledge** | Knowledge of risks and benefits is a precondition for change | Short educational articles and videos to increase **knowledge of the benefits** for altering behavior following AMI and the **risks** of not doing so to promote change |

**Supplemental Table II.** Risk of readmission between the DHI and control group when using 2:1, 3:1, and 4:1 matching.

| | Matched sample (2:1 caliper matching) | | Matched sample (3:1 caliper matching) | | Matched sample (4:1 caliper matching) | |
|---|---|---|---|---|---|---|
| | DHI (n=170~174) | Control (n=323~329) | DHI (n=153~163) | Control (n=391~395) | DHI (n=145~156) | Control (n=429~434) |
| Marginal Cox model [Hazard Ratios (95% CI)] | 0.49 (0.26-0.94) | | 0.48 (0.24-0.95) | | 0.48 (0.24-0.97) | |

**Supplemental Table III.** Balance of baseline covariates between DHI and control patients in the original sample after stratifying into quintiles and in the propensity score matched sample based on 10 imputed datasets.

| | Original sample after stratifying into quintiles | | | Matched sample (2:1 caliper matching) | | |
|---|---|---|---|---|---|---|
| Baseline variable | DHI (n=200) | Control (n=864) | Standardized difference *(pooled across 10 imputed datasets)* | DHI (n=170~174) | Control (n=323~329) | Standardized difference *(unweighted & pooled across 10 imputed datasets)* |
| Age, years | 59.27 | 60.11 | -0.065 | 59.27 | 59.46 | -0.015 |
| Women | 0.30 | 0.29 | 0.011 | 0.30 | 0.31 | -0.029 |
| White | 0.70 | 0.70 | -0.007 | 0.70 | 0.70 | -0.008 |
| Private insurance/ preferred provider organization/health maintenance organization | 0.54 | 0.54 | 0.002 | 0.54 | 0.55 | -0.017 |
| Married | 0.60 | 0.59 | 0.022 | 0.60 | 0.59 | 0.011 |
| Current smoking | 0.28 | 0.29 | -0.024 | 0.28 | 0.29 | -0.039 |
| Comorbidity count (2nd tertile) | 0.30 | 0.30 | 0.005 | 0.30 | 0.29 | 0.037 |
| Comorbidity count (3rd tertile) | 0.15 | 0.15 | -0.003 | 0.15 | 0.15 | -0.013 |
| NSTEMI | 0.61 | 0.60 | 0.008 | 0.61 | 0.60 | 0.021 |
| Ln (Length of stay in days) (log transformed) | 1.67 | 1.63 | 0.053 | 1.67 | 1.62 | 0.060 |
| Revascularization during admission | 0.91 | 0.92 | -0.019 | 0.91 | 0.93 | -0.036 |
| Discharge disposition to home | 0.83 | 0.83 | -0.001 | 0.83 | 0.83 | -0.006 |

**Supplemental Table IV.** Incidence rates (95% CIs) per 100 person-days for 30-day hospital readmission.

| | Person-days of follow-up | No. of cases | Incidence rate | 95% CI |
|---|---|---|---|---|
| DHI | 5746 | 13 | 0.23 | 0.12-0.39 |
| Control | 23182 | 145 | 0.63 | 0.53-0.74 |