BE THERE SAN DIEGO
HEALTHCARE INNOVATION

Making San Diego a Heart Attack and Stroke Free Zone
Over the course of the Heart Attack and Stroke Free Zone (HASFZ) program, over 3800 patients at ten provider organizations (including three of the four major health systems in the county as well as community health centers) agreed to participate in a program with a dual approach:

- Drs. Anthony DeMaria, R. James Dudl, and Parag Agnihotri, experts in cardiology, preventive medicine, and population health, engaged in educational efforts to encourage primary care physicians to prescribe a bundle of evidence-based medications for patients at risk of cardiovascular disease

- Health coaches, described later in the report, worked with enrolled patients to increase medication adherence, achieve and maintain blood pressure control, and provide patient education about lifestyle modifications

Patients were enrolled in the HASFZ program for 12 months on average. To participate in the program, patients were required to be enrolled in Medi-Cal or Medicare and meet one of the following three criteria:

- Age 50 and older and have diabetes and/or blood pressure over 140/90 mmHg, and/or have a low-density lipoprotein (LDL cholesterol) measurement over 100
- Age 18 and older with a history of cardiovascular disease (CVD)
- Age 18 and older with 10-year risk of heart attack or stroke of 7.5% or above, according to the ASCVD Risk Estimator.

Encounters with health coaches took place in person, by phone, by email, or, in some cases, by text.

Patient Population

Patients from Arch Health Medical Group, Neighborhood Healthcare, North Coast Family Medical Group, North County Health Services, San Ysidro Health, Scripps Clinic and Scripps Coastal Medical Center, Sharp Rees-Stealy Medical Group, UC San Diego Departments of Family Medicine and Internal Medicine, and Vista Community Clinic were recruited by members of their care teams and health coaches. These provider organizations and their patients were located throughout San Diego County.
The patient population had an average age of 68 at the time of enrollment, and the vast majority of patients (89%) were hypertensive.

### Patient Race/Ethnicity

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>White</td>
<td>51.5%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>30.4%</td>
</tr>
<tr>
<td>Black / African American</td>
<td>6.2%</td>
</tr>
<tr>
<td>Asian</td>
<td>5.6%</td>
</tr>
<tr>
<td>Native Hawaiian / Pacific Islands</td>
<td>0.5%</td>
</tr>
<tr>
<td>American Indian / Native Alaskan</td>
<td>0.3%</td>
</tr>
<tr>
<td>Two or more races</td>
<td>0.3%</td>
</tr>
<tr>
<td>Unknown</td>
<td>5.2%</td>
</tr>
</tbody>
</table>

### Patient Gender

- Male: 45%
- Female: 55%

### Payer

<table>
<thead>
<tr>
<th>Payer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medicaid</td>
<td>24%</td>
</tr>
<tr>
<td>Medicare Adv.</td>
<td>41%</td>
</tr>
<tr>
<td>Dual Elig.</td>
<td>6%</td>
</tr>
<tr>
<td>Medicare FFS</td>
<td>29%</td>
</tr>
</tbody>
</table>

### Patient Conditions at Time of Enrollment

- Hypertension: 89%
- High LDL (LDL ≥ 100): 49%
- Diabetes: 43%
- CAD: 15%
A diverse group of health coaches participated in the HASFZ program. Rather than take a one-size-fits-all approach, the participating organizations determined what staff positions would fulfill this role. Health coaches included registered nurses (RNs), certified health coaches, medical assistants (MAs), pharmacists and pharmacy technicians, clinical research coordinators, behavioral specialists, and care coordinators. Many health coaches were bilingual or multilingual, working with populations speaking English, Spanish, and Tagalog. With some care teams, health coaches were drawn from the existing clinic staff. In other cases, teams hired health coaches new to their organizations, with the sole function of coaching patients enrolled in this program.

Health coaches masterfully balanced their varied roles as patient advocates, healthcare providers, educators, and sources of ongoing clinical, and, at times, emotional support for patients. Program participants expressed appreciation for the manner in which health coaches held them accountable, responded to their concerns, and provided education on blood pressure control and benefits of medication adherence. Health coaches were also active in working with clinicians to promote prescription of the recommended medications.

Health Coaching Intervention

Health coaches engaged in over 28,000 encounters with patients over the course of the HASFZ program. The program was designed to include weekly encounters during the first month of enrollment, and until the patient achieved medication adherence and blood pressure control. After that point, encounters were to occur on a monthly basis.

Longer, in-depth encounters, Yearly Measurements (YM), were designed to occur annually. During these extended encounters, health coaches gathered information on cholesterol and hemoglobin A1c (HbA1c) laboratory values, and body mass index (BMI). Patients were also asked to provide any feedback on the program during these extended encounters.

The Patient Activation Measure (PAM®) survey was used to measure patient engagement and activation, and whether patients felt knowledgeable, confident, and able to establish and maintain behaviors to self-manage their chronic conditions.² PAM levels range from Level 1 (lowest level of activation) to Level 4 (highest level of activation). This standard survey tool is considered one predictor of patients’ future emergency department (ED) visits, hospital readmissions, and medication adherence.³,⁴ Patients completed the PAM13 survey at the time of program enrollment, and at six-month intervals throughout their engagement in the program.

“Thanks to the study, I know when my BP is up, that I need to seek out additional support and seek treatment. [My] doctors were impressed that I did this!” – HASFZ Patient

During each encounter, health coaches asked patients a standard set of questions, while also practicing an Ask-Educate-Ask methodology. Coaches did not limit their questions to whether patients were taking their medications regularly, or whether their blood pressure levels were under control. Rather, health coaches asked about the barriers to taking medications, or what concerns patients needed addressed in order to increase the likelihood of medication adherence. From there, coaches educated patients about the benefits of medication adherence and blood pressure control, including providing suggestions for small changes, from purchasing a pillbox, to lifestyle modifications such as increasing exercise or smoking cessation. Finally, coaches would close the loop by asking the patient about next steps, such as what the patient felt would work best for him or her personally, and what specific actions the patient would take in the short term to achieve these goals.

MEDICATION PRESCRIPTION

Three evidence-based combinations of medications were recommended for patients, depending on patient condition. The prescription of the evidence-based bundles of appropriate medications was modelled on earlier work done at Kaiser Permanente.5

Drs. DeMaria, Dudl, and Agnihotri provided presentations to primary care physicians at each site, while physician champions (as well as health coaches) advised clinicians on an ongoing basis about the benefits of these medications in controlling blood pressure and LDL cholesterol levels, and reducing the risk of heart attacks and strokes.

Recommended Bundles Vary by Patient Risk Group

I. Hypertensive and Age ≥ 50 years
   - Aspirin
   - Statin
   - ACE/ARB
   - Thiazide

II. Age ≥ 18 and history of CVD OR Diabetic and age ≥ 50
   - Aspirin
   - Statin
   - ACE/ARB

III. Age ≥ 18 years and CVD risk > 7.5% (ASCVD)
   - Aspirin
   - Statin

Provider Education

“I feel very comfortable in the study and with the current medication regimen. The study and support from the nurses/staff help me feel reassured and confident in managing my hypertension. I feel I have easy access to providers and in receiving care. Very satisfied.” – HASFZ Patient

INNOVATIVE TECHNOLOGIES TO IMPROVE PATIENT OUTCOMES

Five participating teams also engaged in innovative programs for remote monitoring of blood pressure, or for conducting health coach encounters by text.

Three teams from federally qualified health centers participated in a pilot program focused on wireless blood pressure monitoring. In this pilot, patients were randomly assigned either conventional blood pressure cuffs, or Qualcomm Life 2NetHub blood pressure cuffs, which uploaded blood pressure readings to a cloud-based system that enabled health coaches to receive regular reports detailing patients’ blood pressure readings. Values over 140/90 were color-coded to serve as an alert to health coaches to contact the patient and discuss his or her plans to achieve blood pressure control, or advise the patient to see his or her primary care physician.

Three teams used a texting program to conduct health coach encounters with patients who had achieved and maintained medication adherence and blood pressure control. The program allowed for bi-directional communication; in addition to patients responding to standard health coach encounter questions, they were also able to communicate questions and concerns to the care team. Health coaches monitored the incoming messages during regular business hours and responded or escalated the concern as needed.
# FINDINGS

## Data Collection

The impact of the Heart Attack and Stroke Free Zone program was assessed using a mix of patient self-reported data, information from patients’ electronic medical records, Medicare and Medi-Cal claims data, and encounter records for a subset of patients. Data on medication use and adherence were recorded by health coaches, with a sample validated using a database on prescription fills in San Diego County. Lipid levels, HbA1c levels, and BMI were abstracted from patients’ medical records; blood pressure was self-reported by patients, and in some cases also abstracted from patients’ medical records. Effects on medication adherence, lipid levels, and blood pressure were assessed using a pre-post design.

Effects on heart attacks and strokes were assessed using a difference-of-difference design, comparing the pre-post difference in adverse event rate for the intervention group to the pre-post difference in rates for a propensity-score matched control group. These data were obtained from Medicare Fee for Service claims and from Medicare Advantage encounter records.

PAM13 surveys were administered in person by health coaches, or completed by patients independently. Those patients that completed the survey independently did so either during clinic visits, or returned the surveys to health coaches by mail. Changes in patient activation levels before and after the program were assessed using a pre-post design.

## Findings

Medication prescription and adherence increased substantially among enrolled patients. The educational efforts led by the BTSD leadership and the clinical champions within each provider organization had the desired effect of increasing the number of patients prescribed the recommended medications. Among patients who had three or more health coach encounters, the number of patients reporting being prescribed a statin increased by 36%, while the number of patients in risk groups one and two (history of CVD; diabetics age 50 and over; or hypertensives age 50 and over) reporting being prescribed an ACE or ARB grew by 30.1%.

### Percentage of Patients Prescribed Recommended Medications: Pre-enrollment and Last Encounter

<table>
<thead>
<tr>
<th>Medication</th>
<th>Pre-enrollment</th>
<th>Last Encounter</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACE/ARB (Risk Groups 1-2)</td>
<td>61%</td>
<td>74%</td>
</tr>
<tr>
<td>Statin (All Risk Groups)</td>
<td>53%</td>
<td>56%</td>
</tr>
<tr>
<td>Aspirin (All Risk Groups)</td>
<td>44%</td>
<td></td>
</tr>
<tr>
<td>Thiazide (Risk Group 1)</td>
<td>30%</td>
<td>54%</td>
</tr>
</tbody>
</table>

Patients enrolled for at least 90 days, with at least 3 encounters.
The number of patients reporting being adherent to their prescribed medications also increased following the HASFZ program. In a comparison between first and last encounters, among patients recommended aspirin, the percentage reporting adherence (defined by taking the medication six or seven times per week) increased from 74.6% to 91.6%.

Regular interactions with health coaches assisted patients in ways beyond accountability and education. Health coaches assisted patients in overcoming language barriers, assisting them in re-labeling medication containers and translating instructions for taking prescribed medications. Patients concerned about costs of prescriptions received assistance in understanding insurance benefits. Health coaches also facilitated medication and/or dosing adjustments, either by directly communicating with patients’ primary care physicians or clinical pharmacists, or encouraging patients to discuss concerns with their physicians. Two health coaches were pharmacists, and able to directly provide medication prescription, counseling, and titration. Some care teams provided medication therapy management (MTM) services; health coaches connected patients with on-site clinical pharmacists, who were able to initiate and adjust medication therapy as necessary.

Although no significant difference in the number of heart attacks or strokes was observed between patients in intervention and comparison groups in a short 12-month follow-up period, there were sizable reductions in risk factors for heart attacks and strokes. The fraction of patients with uncontrolled blood pressure (140/90 or above) decreased from 45.5% to 20.2%, and the fraction with high LDL cholesterol (defined as an LDL cholesterol measurement of 100 or higher) decreased from 47% to 35.7%.
Levels of patient activation, as measured by PAM® survey scores, increased over the course of the program as well, with a 53% increase in the number of patients at the highest level of activation (four) and a 62% decrease in the number of patients at the lowest level of activation (one).

### Challenges and Limitations

As with any major intervention, some challenges were encountered. Enrolling the target number of patients in the HASFZ program took longer than originally anticipated. One implication was that health coaches had to balance their core function of conducting encounters with patients with the ongoing task of recruiting patients to the program and gathering patients’ baseline information.

Medication use data were self-reported. However, validation work was performed on a sample of 100 patients, and the data reported by patients is largely consistent with prescription fill data obtained. In addition, blood pressure was largely self-reported. While efforts were made to capture changes in LDL cholesterol and HbA1c, not all patients had laboratory tests performed over the course of the program.

For the claims and encounter data analysis, a relatively small sample size and constraint of access to only a 12-month follow-up period limited the ability to observe significant effects on heart attacks and strokes. A larger sample of patients, and a longer follow-up period is needed to understand the true impact of the program on reducing heart attacks and strokes, and to assess the effects of the intervention on health care costs.

### Conclusions

The BTSD Heart Attack and Stroke Free Zone’s health coaching and clinician education intervention had impressive effects on medication adherence and on risk-factor reduction in a diverse group of San Diego County Medicare and Medicaid beneficiaries. The program demonstrated that a relatively low cost intervention can lead to marked reductions in cardiovascular risk within a short period of time. Indeed, as a result of this program, some participating organizations have chosen to incorporate forms of health coaching and/or case management programs into their clinical practice for patients with other chronic conditions.
The program described was supported by the Centers for Medicare & Medicaid Services (CMS) Health Care Innovation Awards (HCIA), through award number 1C1CMS331345. The content is solely the responsibility of the authors and does not necessarily represent the official views of the CMS.

EXECUTIVE COMMITTEE

Anthony N. DeMaria, MD  University of California, San Diego - Chair

Parag Agnihotri, MD  Sharp Rees-Stealy Medical Group

Brian Bronson, MD  Kaiser Permanente

Anthony Chong, MD  Scripps Coastal Medical Center

Jim Dudl, MD  Kaiser Permanente Care Management Institute

Scott Flinn, MD  Blue Shield of California

Larry Friedman, MD  University of California, San Diego

James Hay, MD  North Coast Family Medical Group & San Diego County Medical Society

Rodney Hood, MD  Multicultural Health Foundation

Sunny Ramchandani, MD  Aetna

Jim Schultz, MD  Neighborhood Healthcare

Jennifer Tuteur, MD  County of San Diego

Nick Yphantides, MD  County of San Diego
“Being a part of this study represented a pivotal time in my career path. The study team not only equipped me with the information needed to implement study practices, but gave me the encouragement and freedom to hone my healthcare knowledge and interact with patients who were not always easy to monitor. This study truly sought to understand the patient experience in order to effectively administer aid- and this practice, and interacting with others who desired to constantly do better, impacted my own life deeply. It was an honor to be a part of this regional collaborative and work with the amazing team that was Be There San Diego.” – HASFZ Health Coach