The EUREKA Mobile Health Research Platform

Gregory M Marcus, MD, MAS
Professor of Medicine
UCSF

http://info.EurekaPlatform.org
Resource for Mobilizing Research

Flexible, scalable, secure mHealth Research Platform

Accessible eCohorts for research

mHealth Data Repository & Analytics

Eureka MOBILE RESEARCH PLATFORM

Eureka COMMUNITY

Eureka DATA

(formerly known as Health ePeople)

www.info.EurekaPlatform.org
Components of the Eureka Platform

- **Participant Interface**
- **Cloud Backend**
- **Study Team Interface**

**Study/Participant Management**

**Synchronized Experience**

**Reports & Data Export**
The Eureka Platform

• Remote or in-person enrollment
• Marginal cost & startup time for studies
• Multi-model data collection
  – Surveys & EMAs
  – Connected apps & devices
  – EMR integration
• Customized user flows, tasks and messaging
• Built for collaboration
Eureka Backend: Components

- Configurable, flexible, intelligent messaging
  - Email
  - SMS
  - Mobile system alerts

- Configurable survey engine

- Randomization engine
  - Accepts randomization table schema
Eureka Mobile App

- **1 app—many studies**
- **Dynamic Study Delivery and Study Updates**
  - New studies delivered to app without app updates
  - Study content updates dynamically delivered to app

![Diagram showing delivery of new studies, dynamic study content updates, and synchronized study activities using REST-APIS.](image-url)
Eureka Mobile App: Flexible Consent Flows

Simple Consent

Video Consent

Signed Consent
Eureka Mobile App: Engagement

Gamification of contribution to causes and impact

- You’re already making an impact!
  It can be hard to understand how much your contributions add up, so keep track using points and levels.
  Health data you share ultimately help researchers discover how to prevent, treat, and cure diseases. The data points you earn make a real difference.

- Keep track of your levels of contribution!
  As you sign up for studies and complete tasks, you will earn points and level up for the causes you care about!

- We keep track of impact by cause, too.
  Certain things (like completing a study) can make a big impact on for a cause, while connecting HealthKit helps you contribute to many causes automatically.
  Look for the cause icons to see how different things make an impact.
Eureka Mobile App: Engagement

User Data
Search for your hospital or clinic
To import your health information from your hospital or clinic, enter its name or location below:

Geisinger

Geisinger

Geisinger Bloomsburg Hospital
249 Fair Street, Bloomsburg, PA

Geisinger South Wilkes-Barre
25 Church Street, Wilkes-Barre, PA

Geisinger Community Medical Center
1800 Mulberry Street, Scranton, PA

Geisinger Medical Center
100 North Academy Avenue, Danville, PA

Geisinger Lewistown Hospital
400 Highland Avenue, Lewistown, PA

Geisinger Shamokin Area Community Hospital
Geisinger

Search for your doctor
To import your health information from your doctor, enter their name below:

Olgin

Dr. Jeffrey Olgin, M.D.
California

Gaudencio Olgin, M.D.
5501 S Mccoll Rd, Edinburg, TX 78539

James Dolgin, MD
30 Prospect Ave Hackensack NJ 07601

Stephanie Olin
700 NE 87th Ave, Vancouver, WA

Dr. Chris Ogin, M.D.

Dr. Sanford Dolgin, M.D.

Drew Elgin, M.D.
13111 N Port Washington Rd, Mequon, WI 53097

UC SAN FRANCISCO MEDICAL CENTER

Please enter your credentials to connect:

Username

Password

CONNECT

By using Human API, you accept the Terms of Service

Powered by Human API
Join the HOME Predict-HF study to help us find new ways to manage and treat heart failure.

Are you living with Heart Failure? Have you been hospitalized for heart failure in the past year? Are you interested in helping build cutting-edge technology to monitor your health and predict when your heart failure worsens? The HOME Predict-HF study will test an innovative set of sensors and tools that can be set up at home and used to monitor if your disease is getting worse. Join us, as we try and build a better way to treat heart failure!
<table>
<thead>
<tr>
<th>Pnt ID</th>
<th>Name</th>
<th>Email</th>
<th>DOB</th>
<th>Active?</th>
<th>Consented?</th>
<th>Date Consent Signed</th>
<th>Confirmed?</th>
<th>Admin?</th>
<th>Ginger</th>
<th>Change Log</th>
</tr>
</thead>
<tbody>
<tr>
<td>1217</td>
<td>Danielle Walker</td>
<td><a href="mailto:mariane.ortiz@jast.info">mariane.ortiz@jast.info</a></td>
<td>09/24/1988</td>
<td>yes</td>
<td>true</td>
<td>04/30/2015</td>
<td>04/05/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1216</td>
<td>Conception Sperri</td>
<td><a href="mailto:kenyatta_deckow@howeullrich.org">kenyatta_deckow@howeullrich.org</a></td>
<td>10/22/1988</td>
<td>yes</td>
<td>true</td>
<td>04/06/2015</td>
<td>03/11/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1215</td>
<td>Jeffery Hamill</td>
<td><a href="mailto:daphney.brown@beatty.com">daphney.brown@beatty.com</a></td>
<td>10/11/1989</td>
<td>yes</td>
<td>true</td>
<td>04/03/2015</td>
<td>03/14/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1214</td>
<td>Bert Mitchell</td>
<td><a href="mailto:elsie.rippin@herzogdouglas.com">elsie.rippin@herzogdouglas.com</a></td>
<td>02/21/1992</td>
<td>yes</td>
<td>true</td>
<td>04/24/2015</td>
<td>04/23/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1213</td>
<td>Helene Kozey</td>
<td><a href="mailto:herminia@vonmccullough.info">herminia@vonmccullough.info</a></td>
<td>03/21/1985</td>
<td>yes</td>
<td>true</td>
<td>05/05/2015</td>
<td>03/10/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1212</td>
<td>Mary Bednar</td>
<td><a href="mailto:chanel@hamill.com">chanel@hamill.com</a></td>
<td>12/05/1977</td>
<td>yes</td>
<td>true</td>
<td>05/05/2015</td>
<td>05/04/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1211</td>
<td>Raina Cummings</td>
<td><a href="mailto:arthur.gutmann@corvin.org">arthur.gutmann@corvin.org</a></td>
<td>10/04/1969</td>
<td>yes</td>
<td>true</td>
<td>04/30/2015</td>
<td>04/18/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1210</td>
<td>Carlos Nicolas</td>
<td><a href="mailto:else_little@marksjones.info">else_little@marksjones.info</a></td>
<td>08/10/1977</td>
<td>yes</td>
<td>true</td>
<td>04/20/2015</td>
<td>03/16/2015 05:00PM</td>
<td>no</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Participant & Consent Management

#### Contact Info

- **Email:** chasity.mcdermott@heathcote.name
- **Address:** 59423 Dereck Overpass, Framitown, Ohio, 92679
- **Cell:** 657-101-8379

#### Consents

<table>
<thead>
<tr>
<th>Consent</th>
<th>Date Approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health eHeart Study</td>
<td>04/18/2015</td>
</tr>
<tr>
<td>iHealth Consent</td>
<td>02/13/2015</td>
</tr>
<tr>
<td>Qardio</td>
<td>02/12/2015</td>
</tr>
</tbody>
</table>

#### Connected Devices

- iHealth
- Qardio
- Azumio

### Activity

- **eVisit 1**
  - **Status:** In Progress 02/09/2015
  - **Medical History:** Completed 04/28/2015
  - **Health Profile:** Completed 02/12/2015

- **eVisit 2**
  - **Status:** In Progress 05/06/2015
### Email Confirmation

**Evisit 2**

<table>
<thead>
<tr>
<th>MESSAGE LOGIC</th>
<th>EMAILS</th>
<th>OPEN</th>
<th>CTR</th>
<th>CONVERTS</th>
<th>MEDIUM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Survey Completion 1</td>
<td>143</td>
<td>43</td>
<td>91</td>
<td>143</td>
<td></td>
</tr>
<tr>
<td>Template Name: 011-survey-reminder-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>There's not description yet...</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survey Completion 2a</td>
<td>128</td>
<td>47</td>
<td>85</td>
<td>128</td>
<td></td>
</tr>
<tr>
<td>Template Name: 012-survey-reminder-2a</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>There's not description yet...</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survey Completion 2b</td>
<td>129</td>
<td>38</td>
<td>81</td>
<td>129</td>
<td></td>
</tr>
<tr>
<td>Template Name: 013-survey-reminder-2b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>There's not description yet...</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survey Completion 2c</td>
<td>146</td>
<td>53</td>
<td>93</td>
<td>146</td>
<td></td>
</tr>
<tr>
<td>Template Name: 014-survey-reminder-2c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>There's not description yet...</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Survey Completion Overdue</td>
<td>128</td>
<td>40</td>
<td>85</td>
<td>128</td>
<td></td>
</tr>
</tbody>
</table>
Ongoing Studies

The Health eHeart Study™
Using big data to reduce heart disease

PRODUCE I STOP AFib

HOME PREDICT-HF

SUGAR

shapa

EASE

iBeat

BraineHealth

Cut2Quit

TREAT TAILOR-PCl

LTFU
Long Term Follow Up Study
Join the study to end heart disease.

Be a part of an ambitious study to end heart disease. It only takes a few minutes to make a big difference. Anyone can join — whether you have heart disease or not.

Join the Study
Enrollment

175,000
Accuracy and Usability of a Self-Administered 6-Minute Walk Test Smartphone Application

Gabriel C. Brooks, MD, MAS; Eric Vittinghoff, PhD; Sivaraman Iyer, BS; Damini Tandon, BS; Peter Kuhar; Kristine A. Madsen, MD, MPH; Gregory M. Marcus, MD, MAS; Mark J. Pletcher, MD, MPH; Jeffrey E. Olgin, MD

(Circ Heart Fail. 2015;8:905-913. DOI: 10.1161/CIRCHEARTFAILURE.115.002062.)

Home Use
Correlation to Clinic Test=0.87
Direct Measurements of Smartphone Screen-Time: Relationships with Demographics and Sleep

Matthew A. Christensen¹, Laura Bettencourt², Leanne Kaye³, Sai T. Moturu³, Kaylin T. Nguyen¹, Jeffrey E. Olgin¹, Mark J. Pletcher², Gregory M. Marcus¹*

Heatmap of hourly average screen-time scaled by participant

N=653

<table>
<thead>
<tr>
<th>PSQI scores²</th>
<th>Regression Coefficient</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poor sleep</td>
<td></td>
<td>.13</td>
</tr>
<tr>
<td>(PSQI total &gt; 5)</td>
<td></td>
<td>.06</td>
</tr>
<tr>
<td>PSQI total score</td>
<td></td>
<td>.10</td>
</tr>
<tr>
<td>Quality score</td>
<td></td>
<td>.09</td>
</tr>
<tr>
<td>Latency score</td>
<td></td>
<td>.046</td>
</tr>
<tr>
<td>Duration score</td>
<td></td>
<td>.31</td>
</tr>
<tr>
<td>Efficiency score</td>
<td></td>
<td>.44</td>
</tr>
<tr>
<td>Disturbance score</td>
<td></td>
<td>.85</td>
</tr>
<tr>
<td>Sleep medication score</td>
<td></td>
<td>.008</td>
</tr>
<tr>
<td>Daytime dysfunction score</td>
<td></td>
<td>.009</td>
</tr>
</tbody>
</table>

*Authors

Table modified from original source.
Smartphone-Based Geofencing to Ascertain Hospitalizations

Kaylin T. Nguyen, BS; Jeffrey E. Olgin, MD; Mark J. Pletcher, MD, MPH; Madelena Ng, MPH; Leanne Kaye, PhD, MPH; Sai Moturu, PhD; Rachel A. Gladstone, BA; Chaitanya Malladi, BS; Amy H. Fann; Carol Maguire, RN; Laura Bettencourt, BS; Matthew A. Christensen, BS; Gregory M. Marcus, MD, MAS


- In-person pilot (n=22): 77% sensitivity (95%CI 55-92)
- Remote:
  - 3,443 participants in all 50 US states
  - 243 hospitalizations detected over ~1 year
  - PPV 65% (95% CI 65-72%)
Passive Detection of Atrial Fibrillation Using a Commercially Available Smartwatch

Geoffrey H. Tison, MD, MPH; José M. Sanchez, MD; Brandon Ballinger, BS; Avesh Singh, MS; Jeffrey E. Olgin, MD; Mark J. Pletcher, MD, MPH; Eric Vittinghoff, PhD; Emily S. Lee, BA; Shannon M. Fan, BA; Rachel A. Gladstone, BA; Carlos Mikell, BS; Nimit Sohoni, BS; Johnson Hsieh, MS; Gregory M. Marcus, MD, MAS

- In-person validation (n=51): c-statistic=0.97 (95% CI 0.94-1).
- Ambulatory validation (n=617): c-statistic=0.72 (95% CI 0.64-0.78) %
Individualized Studies of Triggers of Paroxysmal Atrial Fibrillation (I-STOP-AFib)

lack of sleep
anxiety
stress
alcohol
caffeine
exercise
diet
medication
dehydration

The Health eHeart Study

StopAfib.org

Debbe McCall @DebbeMcCall

AF event tracking only
Assess quality of life
N-of-1 Trials to Test Triggers and Receive Results
N-of-1 Study: AF Triggers
STOP AFib

OCTOBER AFIB EPISODES & SLEEP

- Afib
- No Afib
- Today

Emoticons:
- Amazing
- Good
- Average
- Bad
- Horrible
STOP AFib

During the 3 WEEKS TESTING CAFFEINE, you had 6 AFib episodes.

WITH TRIGGER
6
AFIB EPISODES

NO TRIGGER
1
AFIB EPISODES

There is a 64% probability that CAFFEINE triggers your atrial fibrillation.

Dec 29 2017 - Jan 2 2018
YOUR STUDY

If interested, you can contact me:
greg.marcus@ucsf.edu

Or website:
http://info.EurekaPlatform.org
Thank You