The Dallas Heart Study
Increasing Cohort Retention and Collaboration via Mobile Applications
A White Paper

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Background

The Dallas Heart Study (DHS) is a multiethnic population-based study involving 6,101 cohort participants led by the University of Texas Southwestern (UTSW) Medical Center Principal Investigators with an aim of gathering data supporting longitudinal cohort population studies in the area of cardiovascular disease research. This white paper explores the potential of launching a collaborative, modern approach to fueling longitudinal cohort engagement for DHS through a mobile application.

Cohort Engagement

In order to achieve principal investigator and philanthropic support aims for DHS, cohort interaction, retention, and active involvement in current and downstream DHS studies is paramount. At present, cohort updates, engagement, and collaboration for DHS studies can be highly cumbersome and labor-intensive. Current communication methods to ensure continued cohort engagement may be considered dated and include mass mailings, email contact, flyers, telephone-based outreach, and other means which are currently supported by UTSW staff members. We believe the development and release of a DHS centric mobile application specific to the DHS cohort population would greatly enhance the ability for DHS investigators to maintain active collaboration and conversation within the cohort population. A mobile app could ease the communication burden and overhead for DHS investigators while driving analytics and higher cohort collaboration potential for the DHS.

Mobile Application Development and Deployment for DHS Cohort Participants

In order to achieve viability and potential utility of a DHS-centric mobile application, the authors recommend key objectives specific to mobile application architecture and development. We believe these objectives are critical to the success of such a pilot and/or production release of a mobile application:

1. The mobile app must directly meet or exceed needs of the principal investigator when it comes to UTSW real-time communications to the DHS cohort population.

2. The mobile app must directly meet or exceed needs of the DHS cohort population when it comes to communicating or collaborating directly with the DHS cohort study management team and investigators making the mobile application a bi-directional capability engine for communications.

3. The mobile app must support leading mobile phone use cases, including support for both iOS (Apple) and Android (Google) mobile phone technologies. This creates a

platform ubiquitous architecture to support myriad mobile app accessibility options for the cohort population and DHS study leadership

4. The mobile application must meet minimal user login, single-sign on (SSO), authentication, security/profile setups and HIPAA compliance aims as may be applicable specific to DHS cohort mobile app content components

5. The mobile application must be scalable and international in nature comparable with the variant geo-locations of the DHS study cohort population

6. The mobile application must be able to support key UTSW study announcement communications, calendar functionality for DHS cohort appointments, access to 'results' the UTSW investigators wish to make available via mobile for the study participants and other information deemed useful for mobile app communications to/from the DHS cohort study population.

7. The mobile application must be able to capture key user-level analytics and top line 'all cohort' study population analytics for UTSW investigators which may include but are not limited to:

    a. Frequency of user-based logins to the mobile app (engagement metric).

    b. Cohort participant use of the mobile app by demographic details such as age, ethnicity, geo-location, etc. (engagement metrics by detailed meta-data level reporting).

    c. Administrative panel such that DHS study leaders at UTSW can 'provision' users from the 6,101 cohort population to support sign-on security and overall DHS study cohort engagement and access to the mobile app.

    d. Other metrics deemed vital for UTSW investigators as they aim to measure 'engagement analytics' within the DHS study cohort population.

8. The mobile application must be developed leveraging non-profit sector investment or pro bono activities for development, management and expansion of the mobile application over time in support of the cohort needs and UTSW study leadership direction.

Architecture

The architecture from a technical perspective for a prospective DHS mobile application must be considered to support security, scale and use-case driven setups for longitudinal use of the mobile app for the study's ongoing cohort engagement needs. Technologies available today which may be considered for development of the application include but are not limited to:

- iOS and Android development platforms to support ubiquitous mobile app development that is agnostic at a device level, but still scalable to integrate into existing University security systems leveraging Single Sign On (SSO) and Identity Management solutions.

- Push Notifications Services employed to deliver notifications to DHS cohorts from DHS investigators to provide critical information and keep cohorts actively engaged with the study.

- BOX.ORG – a HIPAA-compliant back-end cloud content management (CCM) platform to support retention of critical DHS cohort study content such as health surveys and other content deemed vital to cohort engagement via the mobile app's front-end framework.

- Workplace – a social media platform developed by Facebook that supports mobile engagement and collaboration for the Cohort using group-based collaboration within the mobile application which can support Cohort to DHS investigator communications in a bi-directional manner within the mobile app.

- Analytics platforms to capture and report key cohort engagement analytics within the mobile app's administrative panel to be controlled by UTSW investigators or designated RN and/or administrative support staff.

Mobile App Development Approach

In order to fully explore and exploit the potential of a mobile app to be deployed in support of DHS cohort engagement and communications, a pilot approach may be the best option for DHS investigators to consider for the viability of such a mobile app for the DHS cohort. Under a pilot scenario, key use-cases will be captured and developed within the mobile app framework and piloted at a DHS investigator administrative level before release of any mobile app functionality to the DHS cohort. Upon achievement of use-case captures, wireframe efforts (to prove the initial mobile app development aims), and baseline architecture setups, DHS investigators may 'test' the mobile application in a pilot scenario in order to fully assess it's potential for a downstream release to the DHS cohort with such considerations as user provisioning, security, HIPAA compliance, ease of administration, ease of use regarding the push of new content to the mobile app to be consumed by the cohort, and access to key analytics and data intelligence for the investigators. Upon success of a pilot release, DHS investigators can (a) request that new development take place to support gaps which may be identified in the pilot or (b) authorize release of the mobile application into production such that it's availability to the DHS cohort population is made available via the mobile app store or other mechanisms subject to DHS investigator approvals.

Analytics

In order to derive strategic value from the prospective DHS-centric cohort mobile application, analytics pertaining to cohort user data, logins, etc. can be strategically helpful to DHS investigators. Figures 1 and 2 below highlight potential analytics which can be derived from the use of the mobile app with analytics available to DHS investigators upon launch of the application (based on de-identified user login-data or otherwise):

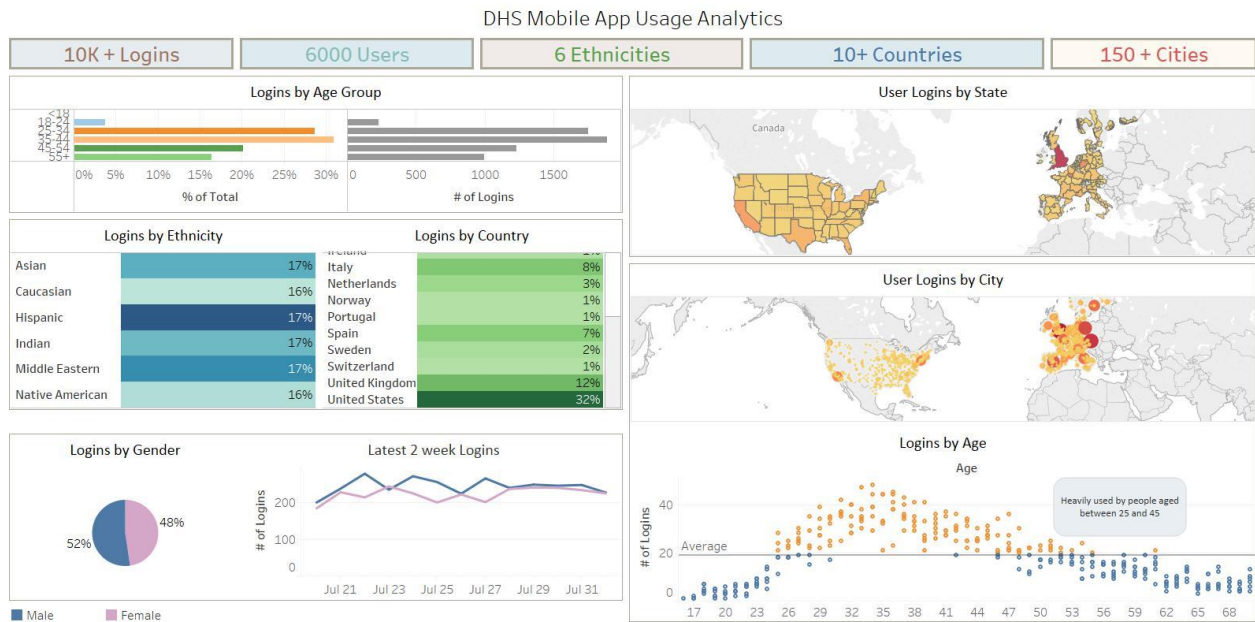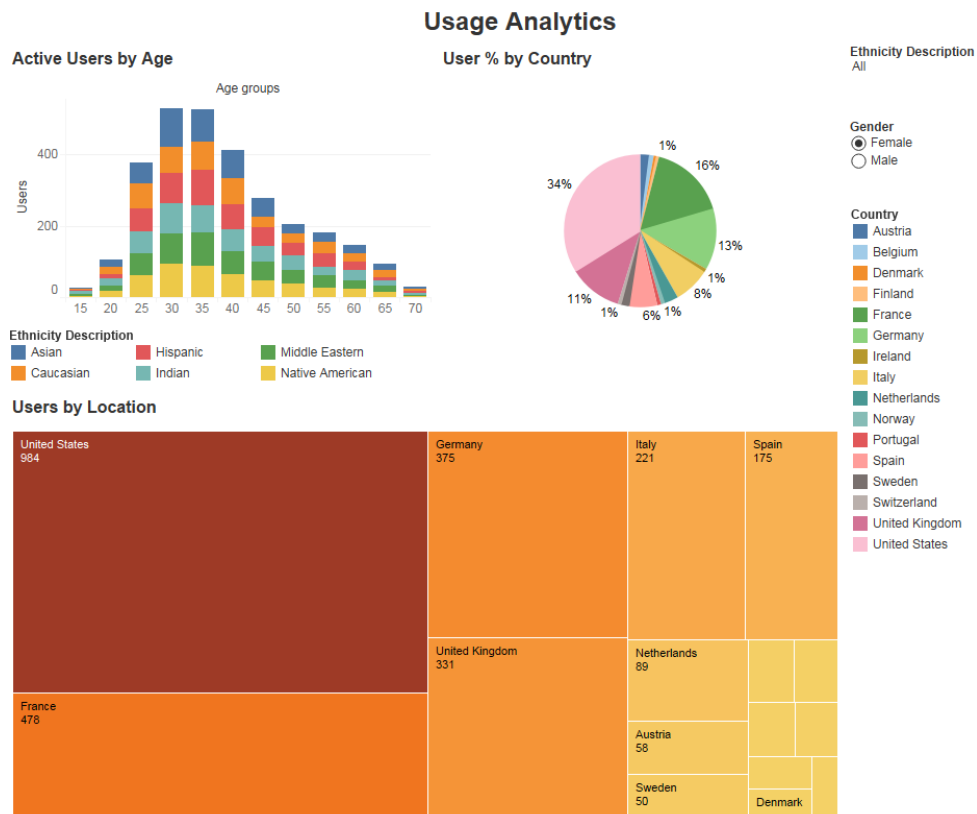## Figure 1: Possible Analytics Dashboard for DHS Investigators

Figure 2: Possible Analytics Dashboard for DHS Investigators

Outcomes

Critical outcomes to be monitored by UTSW investigators upon successful release of the mobile app will be analytic in nature in terms of the success of user-level logins by the DHS cohort into the mobile app, engagement analytics such as demographics (as noted above) considering age, ethnicity, geo-location and other meta data useful for DHS cohort engagement reporting, etc. With successful criteria obtainment, further exploration for the use of a mobile application framework to support longitudinal cohort engagement for the life of the cohort population and DHS study can then be considered and actioned based on UTSW principal investigator analysis and/or approvals.

Summary

The authors believe the DHS cohort population will achieve higher levels of engagement within the DHS study efforts if they are able to engage their studies and investigators in a manner that reduces overhead and which drives 'ease of use' for the cohort population. According to a 2017 Pew Research Center study, over 95% of the U.S. population now has access to mobile phone technology with some 77% in possession of a 'smart phone' supporting access to mobile phone application technologies. For the longitudinal DHS cohort study, we believe the DHS cohort and the UTSW investigators have much to benefit from by the deployment of a DHS Cohort-centric mobile application technology to drive cohort engagement, communications, collaboration, calendar setups for appointments and key analytics to be derived from exploitation of such technologies – a key consideration to be undertaken by DHS investigators at UTSW. <u>The cohort populations of tomorrow will engage in research studies in new and novel ways and mobile app technology is a key consideration as it relates to the DHS</u>.