

The Problem:

Heart Disease – America's #1 killer

The Challenge:

Tens of thousands of lives can be saved annually through prevention behaviors.

Our Solution:

Heart Defense – a web and mobile app for tracking your heart-healthy behaviors.

Design principles employed for Heart Defense

The app should be:

1. Ubiquitously accessible from any web browser or smartphone
2. Simple and easy for a general audience to use
3. Modern in technical implementation – high performance, rich data visualizations
4. Personalized to each user, tracking their data and creating a biofeedback loop
5. Protective of privacy, but also with effective data sharing mechanisms
6. Use behavioral design techniques to motivate engagement

User Experience

1. Read the simple guidelines which summarize the recommendations from reputable sources.
2. Set personal goals: the **number of times per week** to perform each of the 5 activities. Can easily compare goals with the official guidelines.
3. Track actual activities using the simple “+1” button on the dashboard, or by choosing a past date on the calendar and updating the quantities for that day.
4. Look at reports of progress, and optionally share them with loved ones and health care providers by sending a link.
5. Get occasional reminders to trigger engagement.

Activities covered so far

- Exercise (number of 30-minute sessions)
- Drinking alcohol (number of standard drinks)
- Smoking (or chewing) tobacco
- Salt (number of high-sodium meals)
- Fat (number of meals high in trans fat or saturated fat)

Feature:

Easily understandable guidelines, and a simple way to set personal goals.

Drinking

Guideline for men: less than **14 drinks/week**
Guideline for women: less than **7 drinks/week**

Sources: Mayo Clinic

Concise recommendations

Goal 4 times/week **change**

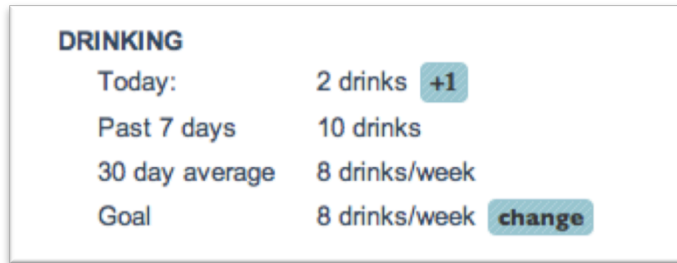
Goal: times/week

Save cancel

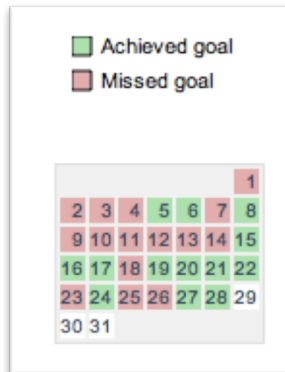
Straightforward goal setting

Feature:

Dashboard and visualizations

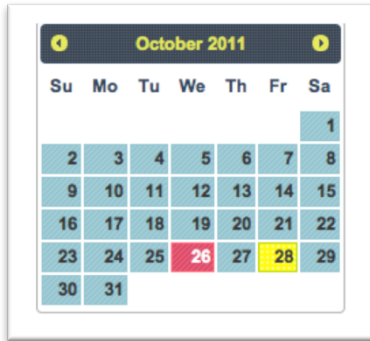


User-friendly presentation of useful, personal statistics



Visualizations to encourage reflection and progress

Feature: Flexibility



Easy data entry for any date in the past

[Report Link](#) (Link expires Dec 1, 2011)

Data sharing is as simple as sending a link.

Date range
From To

Topics

- Exercise
- Drinking
- Smoking
- Salt
- Fat

A screenshot of a calendar for October 2011, similar to the one in the first image. The date 10 is highlighted in red, and the date 28 is highlighted in yellow. The calendar is titled "October 2011" and has navigation arrows on either side.

Operationalization Plans

Coding and Systems Administration

- Build out back-end database. Recommended platform, for high performance and scalability, is nodeJS with MongoDB, hosted on Amazon Elastic Compute Cloud (EC2).
- Current prototype is interactive but does not store data.
- Use GitHub for version control, collaboration, and tracking of bugs and feature requests.
- Ensure that data security is appropriate for the sensitive data.
- Develop Continuity and Disaster Recovery plans.
- Regarding HIPAA: Currently the design should not require HIPAA regulation since no clinician or health care system submits data to it; but this can change. Amazon EC2 even helps with several parts of HIPAA compliance: data can be encrypted in transit and at rest; encrypted backups (snapshots) are automatically be moved to remote sites.

Tracking and Monitoring

- Robust and detailed logging will be built in from the start, to allow for flexibility in auditing.
- Google Analytics can provide basic traffic statistics, such as precise tracking of the fluctuation in popularity of the site over time.
- A custom-built tracking module will process the important user-submitted data to identify trends and other patterns in usage. This will be a critical part of the development cycle: responding to how people are actually using the system.
- Overall performance and uptime of the system will also be monitored, using a basic monitoring package that is triggered (and itself monitored) by alertra.com – which can call the system administrator(s) in the event of an outage or performance problem.

Future development

- **Multiple languages**
 - Since much of the site is graphical rather than textual, it would not be a difficult task to add other languages.
- **Geo-location** features
 - For each user, demonstrate any correlations between their activities (drinking, smoking, bad food) and their locations.
 - Aggregate data for a **community biofeedback** loops.
- Additional activities and guidelines
 - Track **aspirin** for people who should take it; including compliance with dosage and schedule.
 - Summarize **screening** guidelines, and track screening schedules and compliance.
- Additional options for **integrating with PHR and EHR** systems.
 - This system is built with modern standards and open source software, and could send its tracking data to a variety of health care systems. For example, to keep primary care physicians and nurses informed (up to the *day*).
 - The system could also monitor the data for trends, such as an increase in binge drinking, and send out an alert to a care giver (with prior approval from the user).
- Implement versions in iOS and Android as **native smartphone apps**.
 - Although the current implementation is mobile-friendly, a native app will be even easier to use on a daily basis.