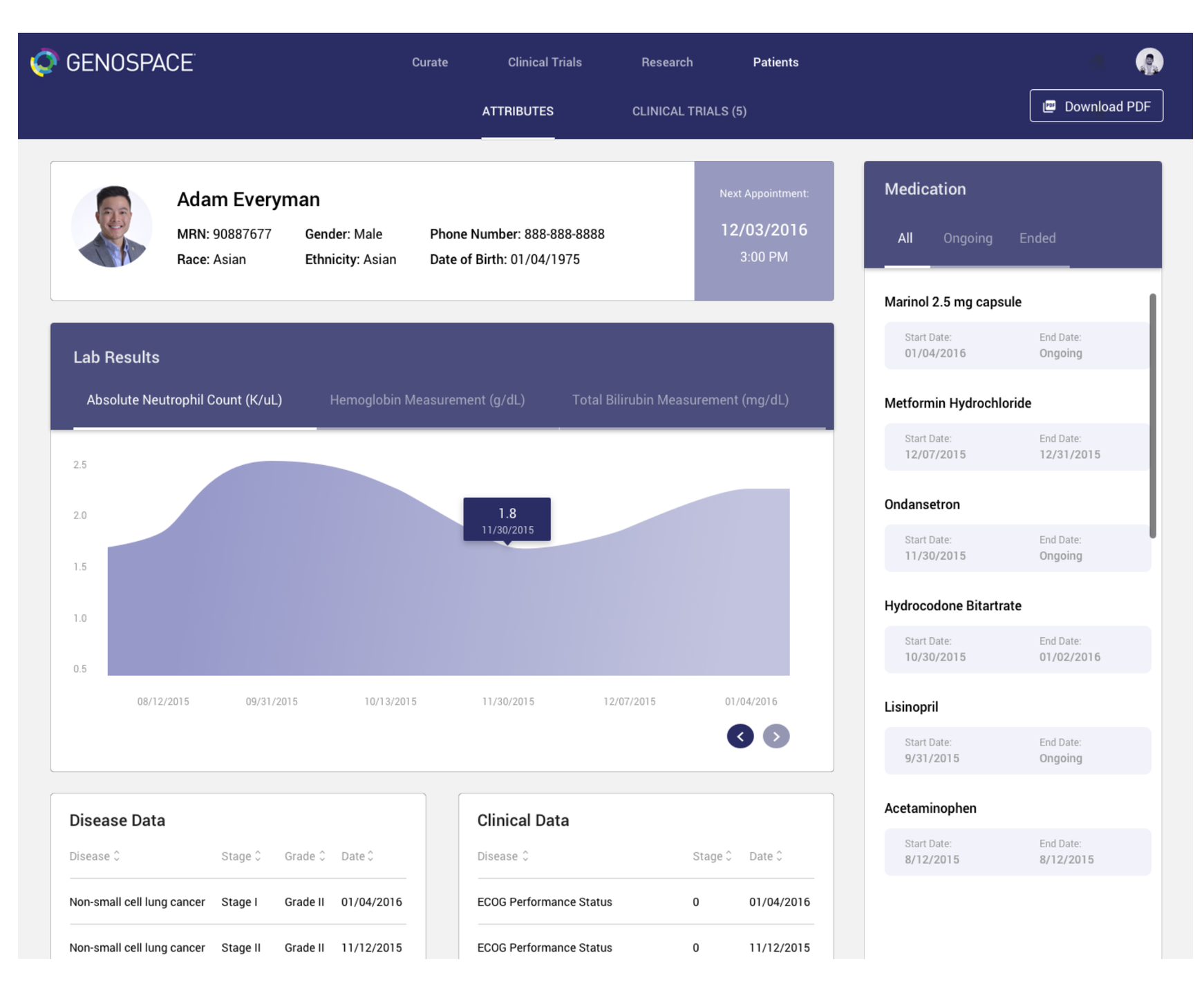
GENOSPACE

Precision Medicine by Sarah Cannon

Intelligent Clinical Trial Patient Matching Platform

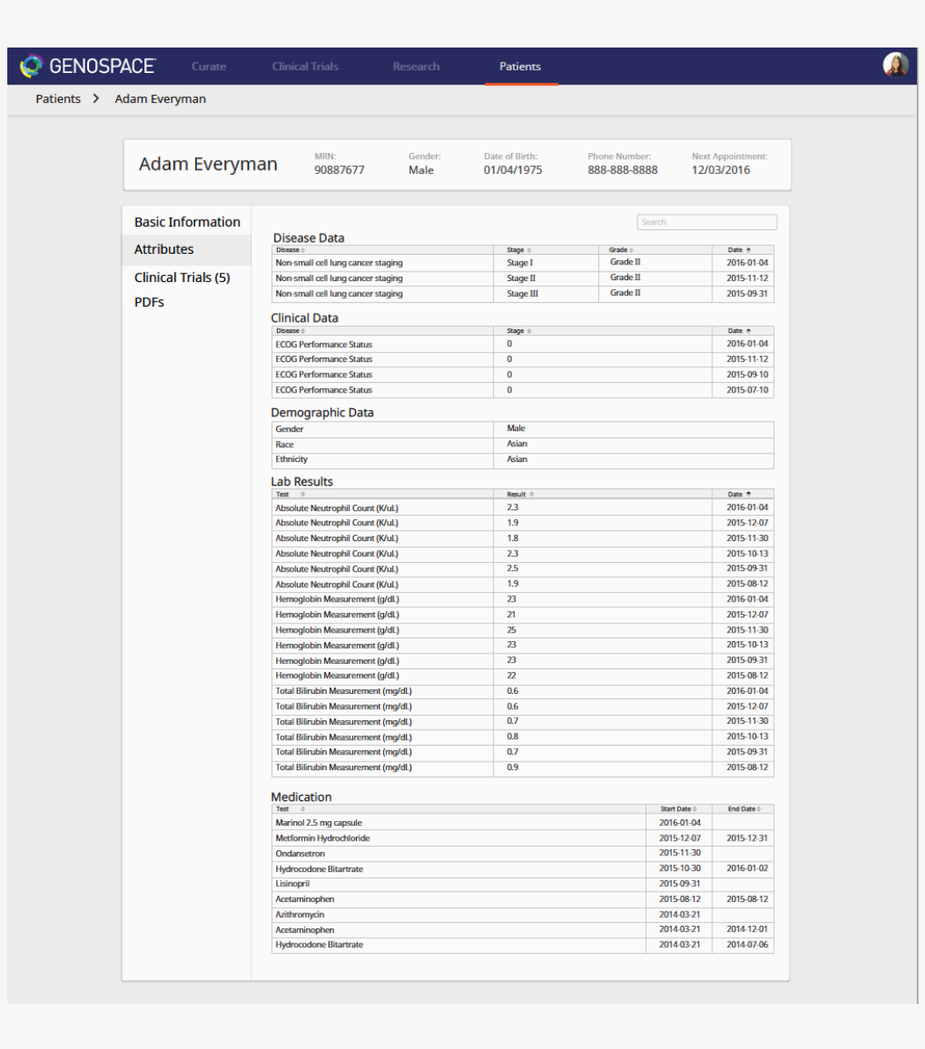


THE CHALLENGE

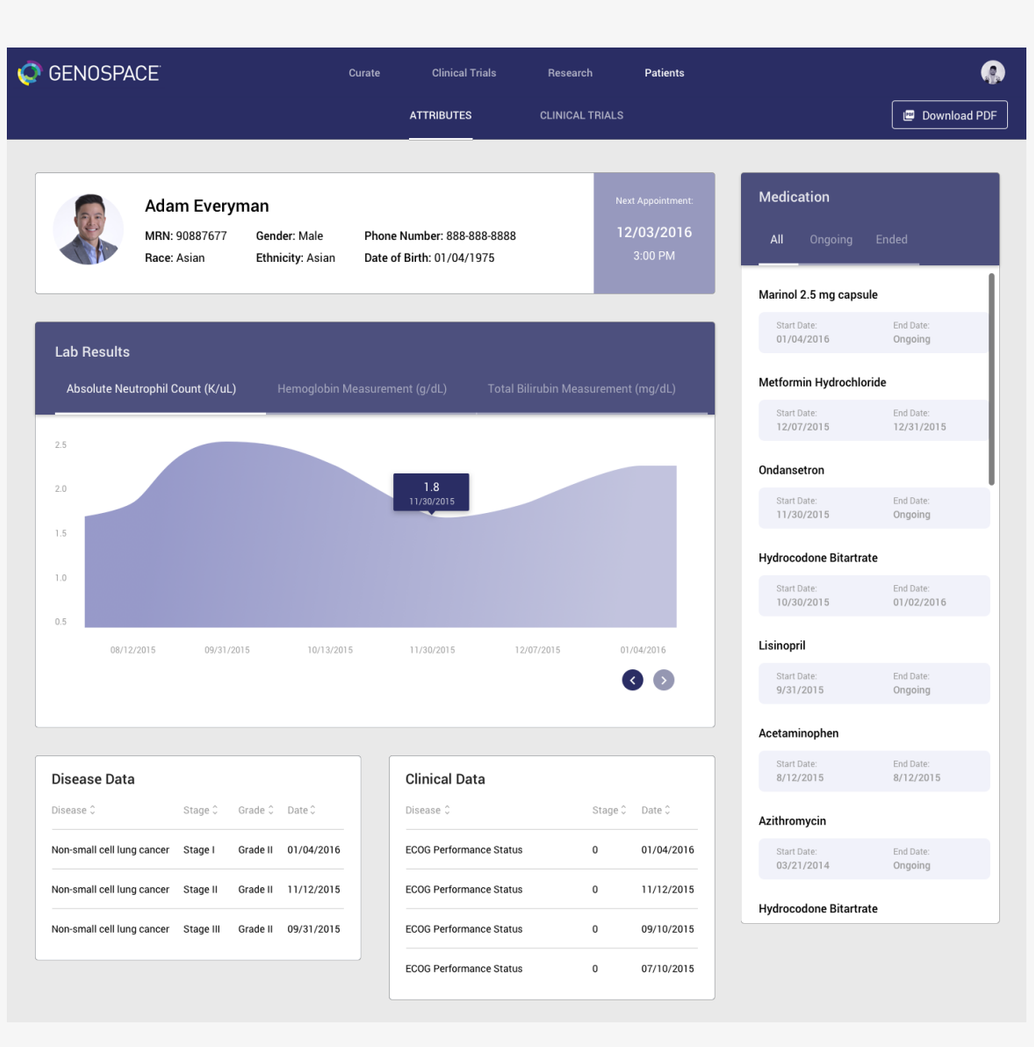
Genospace wants to redesign their patient portal so that a doctor or a nurse can comprehend a patient's record in minutes. Today the portal has tables of information about their disease status, medication, labs, and genes. How can we make the critical informaion easily consumable for doctors and nurses?

SOLUTION OVERVIEW

Visualize the patient information portal so that doctors and nurses can capture patient information at a glance and be able to make informed decisions.



Before



After

PROCESS OVERVIEW

RESEARCH
- The problem space
- Understand users
- Persona

DEFININE PROBLEM
- User story
- Current product evaluation
- Design goal

DESIGN
- Initial sketches
- Concept development
- Design execution

EVALUATE & REFINE
- Design rationale
- Plan for testing
- Further refinement

THE CONTEXT

Background on the problem space

Clinical trials are broadly used in cancer research that involve voluntary patients. Clinical trials help doctors find better treatments and ways to prevent cancer and other diseases. Before Genospace, doctors or nurses had to manually go through a patient's paper record and medical history to look for patients that might match a clinical trial.

Genospace's clinical trial matching platform helps doctors identify and suggest clinical trials for patients. It also serves as a platform to view and manage patients and clinical trials informaion. More specifically, patient information associated with a clinical trial includes disease status, medications, lab results, demographics, etc.

TARGET AUDIENCES

Understand users

Due to the limited time and resources, I have not been able to conduct extensive first-hand user research. However, combining the critical user research insights provided by Genospace and a general literature research, I generated a simplified persona that reflects key user needs and pain points.

Emmy

CLINICAL TRIAL NURSE

BOSTON UNIVERSITY MEDICAL CENTER

ABOUT EMMY

Emmy is a clinical research nurse working in Boston University Medical Center. Emmy's responsibilities include organizing, overseeing, or assisting in clinical trials for new medications or treatment. Emmy often needs to examine patients' medical history as well as their physical health.

NEEDS & GOALS

- View and comprehend a patient's record within a short amount of time
- Have an understanding of the patient's status
- Keep track of the patient's lab data and be able to identify problem quickly

PAIN POINTS

- A large number of patients along with different trial record to oversee and manage
- It takes longer to consume information with the current portal layout

CURRENT PRODUCT

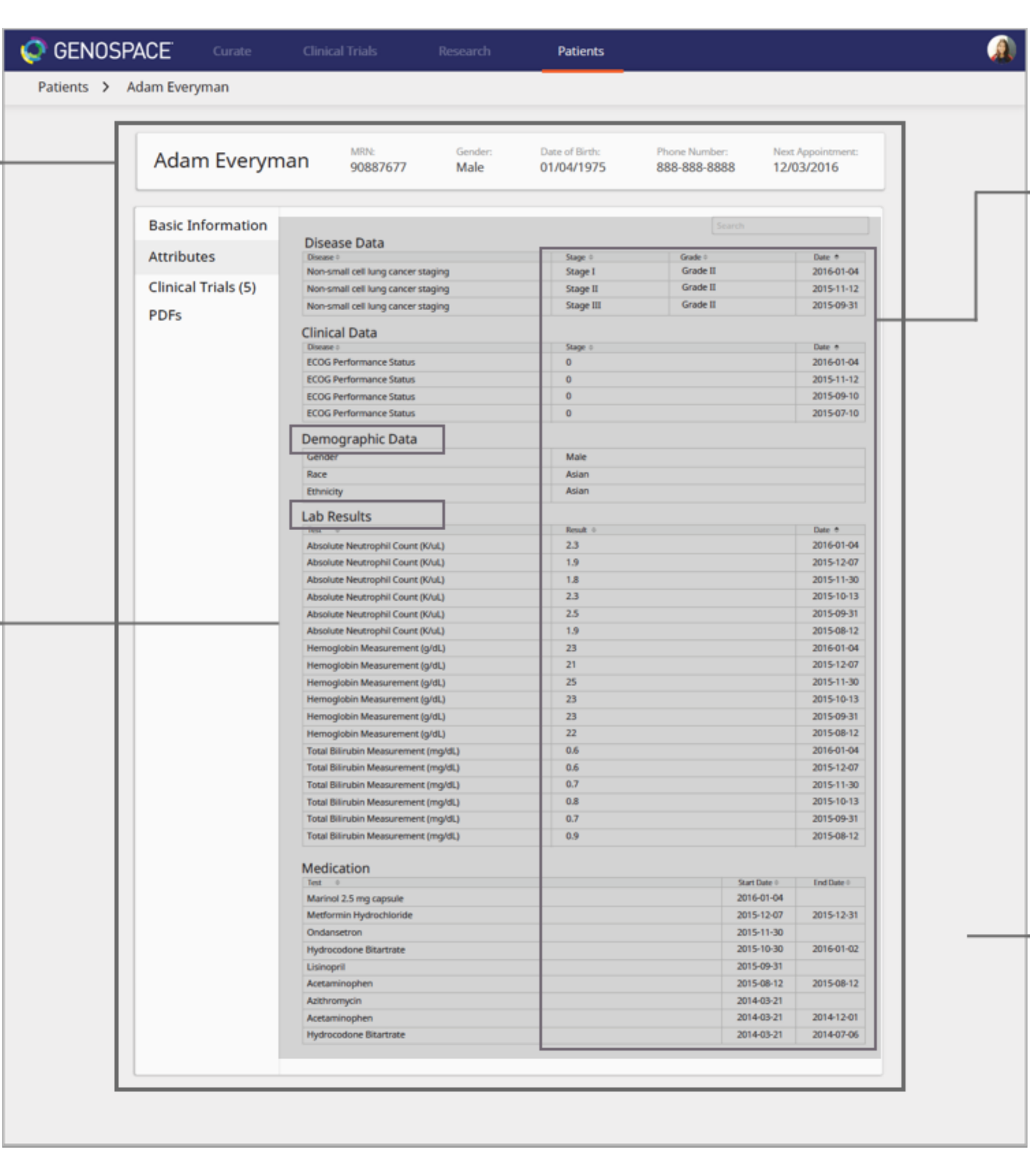
Issues found from evalution

Page Layout
All tables are arraged in the list view, making it hard to fit all tables within one screen, users need to scroll down to see full information

Lack of information hierarchy
Patient demographic info is more salient than the side navigation menu and is more salient than the actual patient medical data

Lack of content focus
While patient data takes up the majority of the page, there is no clear visual focus for users upon a quick glance

No differentiation in representing different data
While different data have different characteristics, they are all grouped in the same data table format, which can be hard to identify critical data quickly, for example "demographic data" vs. "lab results" are very different, but are represented in the same visual format



Alignment issue among different tables
The data grid is displayed unevently among different tables

Relatively low contrast
Contrast can be better utilized to emphasize critical information

Lack of color usage
More colors in combination with texts could be used to differentiate different types of data and to create visual hierarchy

Limited interaction with data
Currently users do not have many ways to manipulate and interact with the existing data

White space could be better utilized
Since this is a web-based application, the white space can be better utilized to display more information without scrolling

DESIGN GOAL

Reframe the problem

> *How might we redesign the patient data attribute page so that users can get a visual summary of patient history quickly and be able to make informed decisions about patients?*

THE DESIGN

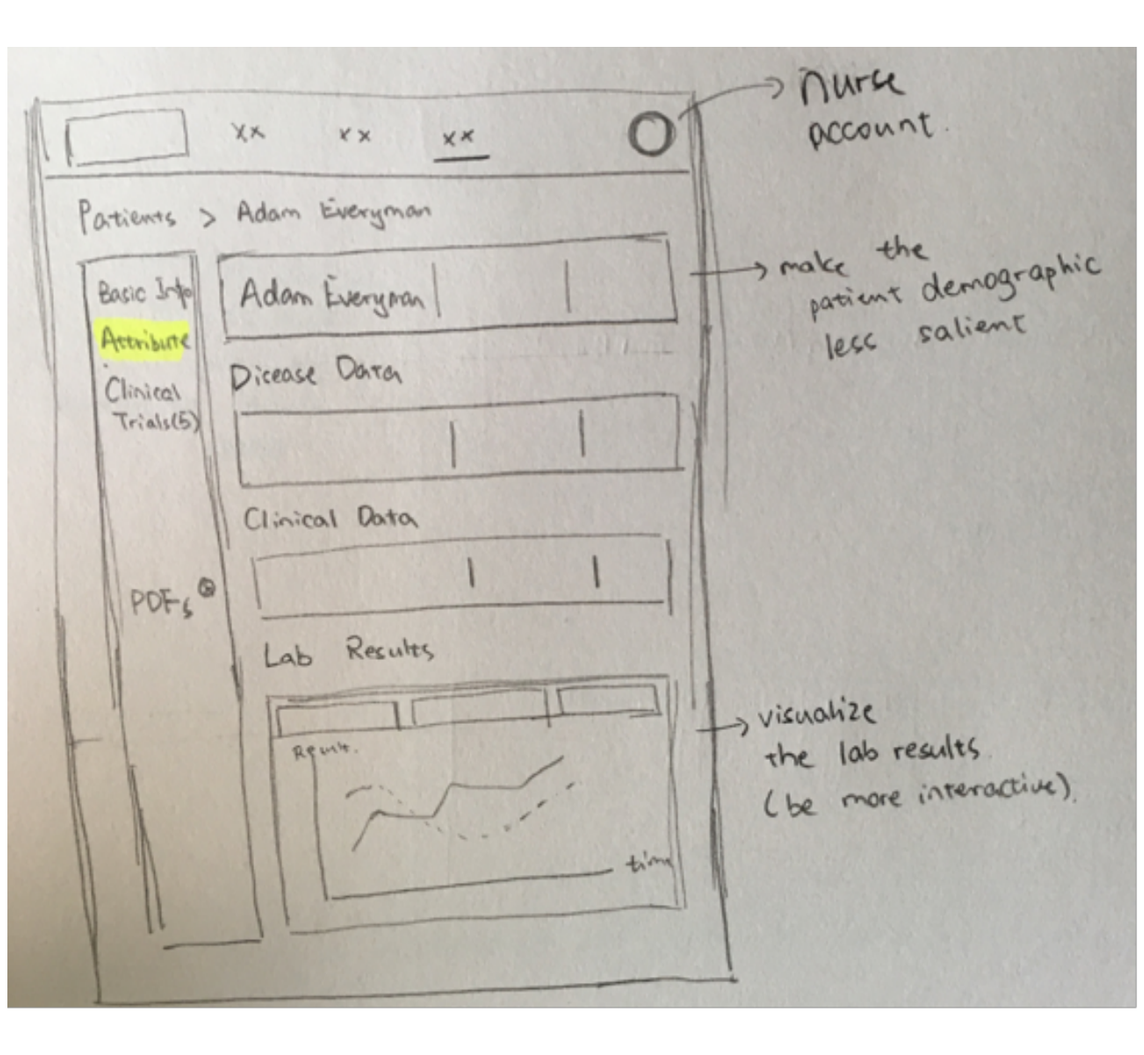
Explore different layouts

With the key user needs and design goal in mind, I started off the actual design process by sketching out different potential layouts of the patient attributes page. There are some questions and principles I used to help myself evaluate and to refine the designs specific to this work:

- *What is a particular user's main reason for viewing the patient attribute page?*
Given the research insight, a nurse as a user would want to quickly understand how a patient's laboratory and medication data have changed over time.

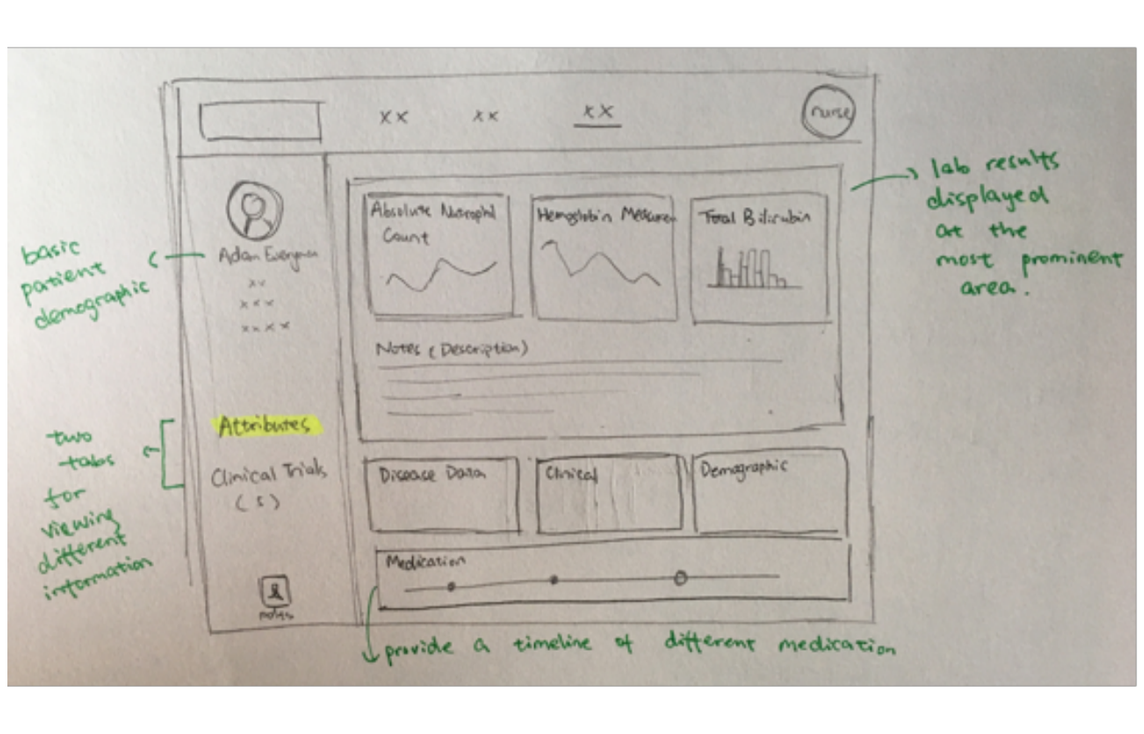
- *What are the critical must-see items? Is there a logical grouping scheme? Would a user want to compare some data with other data?*
All of the patient attributes that are critical to a clinical trial enrollment. There is a logical grouping scheme, the example of lab results, clinical data, and disease data. A user wants to see how data change over time, so there needs to be a straightforward visual representation.

- *How to represent the data? Think of different uses of different charts, bar charts vs. line charts vs. pie charts?*
Go back to the data itself to understand what does the data implicate. A line chart helps user see values and changes over time, it also indicates a relationship between independent and dependent variables. A bar chart helps user compare values or occurrences, and there is a possibility to combine different charts.



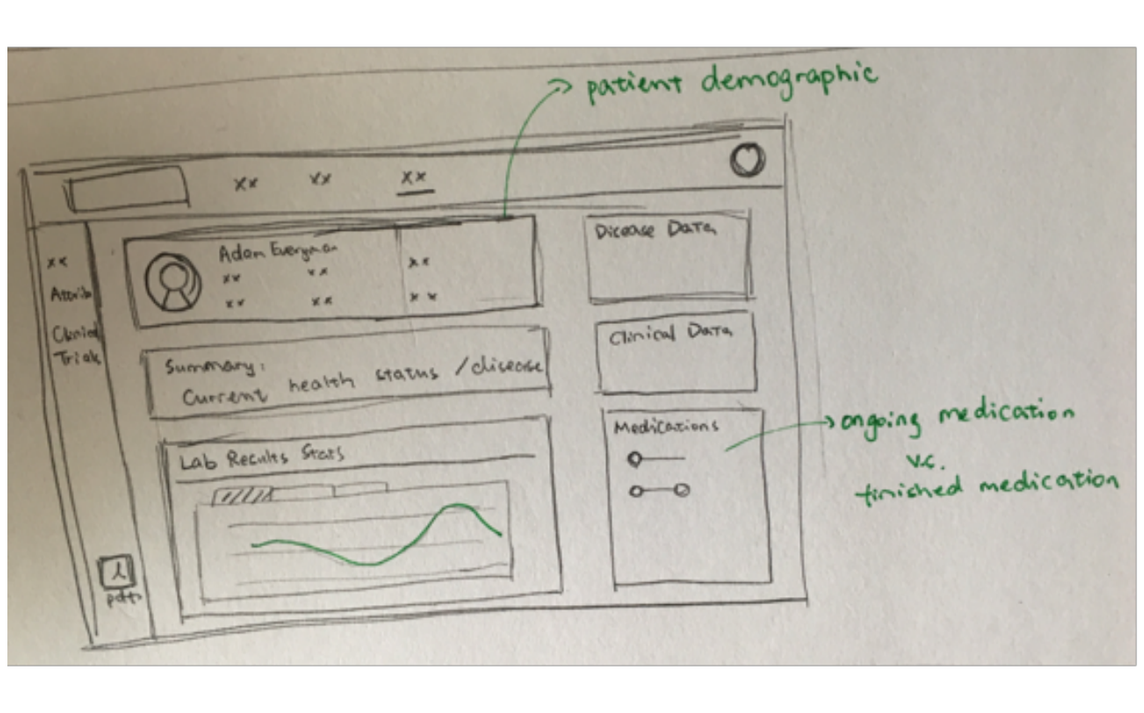
Version 1
Move the patient profile information in to the dashboard;
Keep the Majority of the data tables, but differentiate the lab results, since they are of higher priority

Issues
Users still need to scroll down to see the lab results, upon a quick glance, patient profile data, disease data, and clinical data are still more salient



Version 2
Expand the side navigation and divide the section into two parts: patient profile information, and navigation tabs
Separate the patient medical data from the profile data
Visualize the lab results and place them at the most prominent area, each category of lab results displayed in one chart

Issues
Displaying lab results separately would not be able to accomodate the situations when there are more than 3 categories, the size of each chart is also relatively small upon a quick glance



Version 3
Adopt the idea of the card display and module design, prioritize the more important and complicated data - lab results
Consolidate different categories of lab result data with tabs to account for the fact that different data have different scales and to allow more accurate information display

Issues
Different users might have different preferences over larger display of a chart, it would be a validation question to be examined in a user test

DESIGN DETAILS

Further develop the design

After setting up the basic layout, I further prototyped the patient attribute page using Sketch. A few design principles I followed when working on the visual representations are as following:

- Use law of proximity and similarity to group related pieces of information
- Keep the limits of human cognition in mind, try not to overload users with large amount of information
- Remove unnecessary representations to help users absorb information quickly
- Utilize color usage so that it helps emphasize information but not distract users

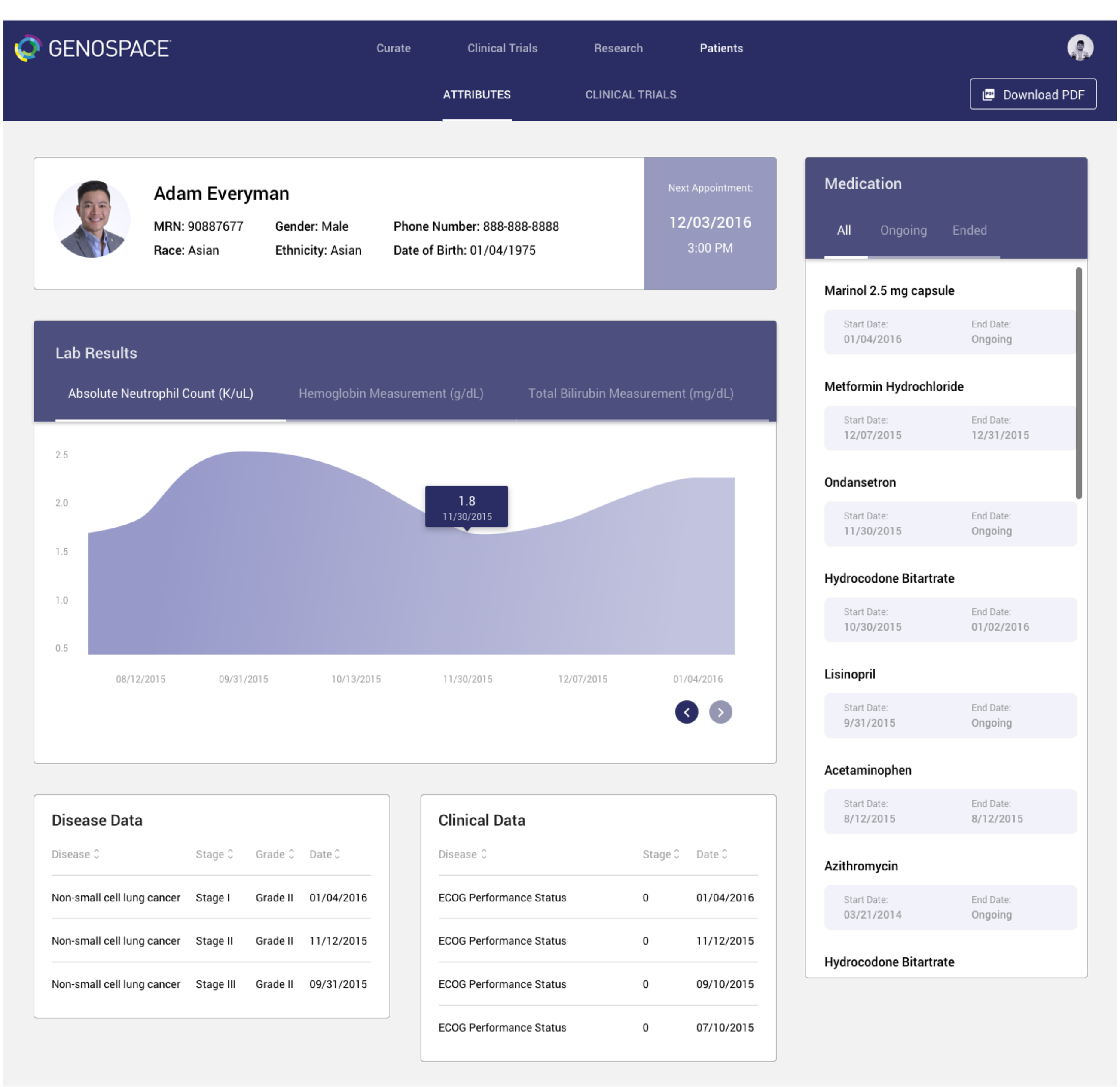
Major design changes include:

- Remove the original side navigation to **create more visual space** for information display

- **Consolidate the patient profile information** and demographic data while still state the difference

- Make the lab results data **more prominent and manipulatable**, visualize the data to help users quickly grasp the information

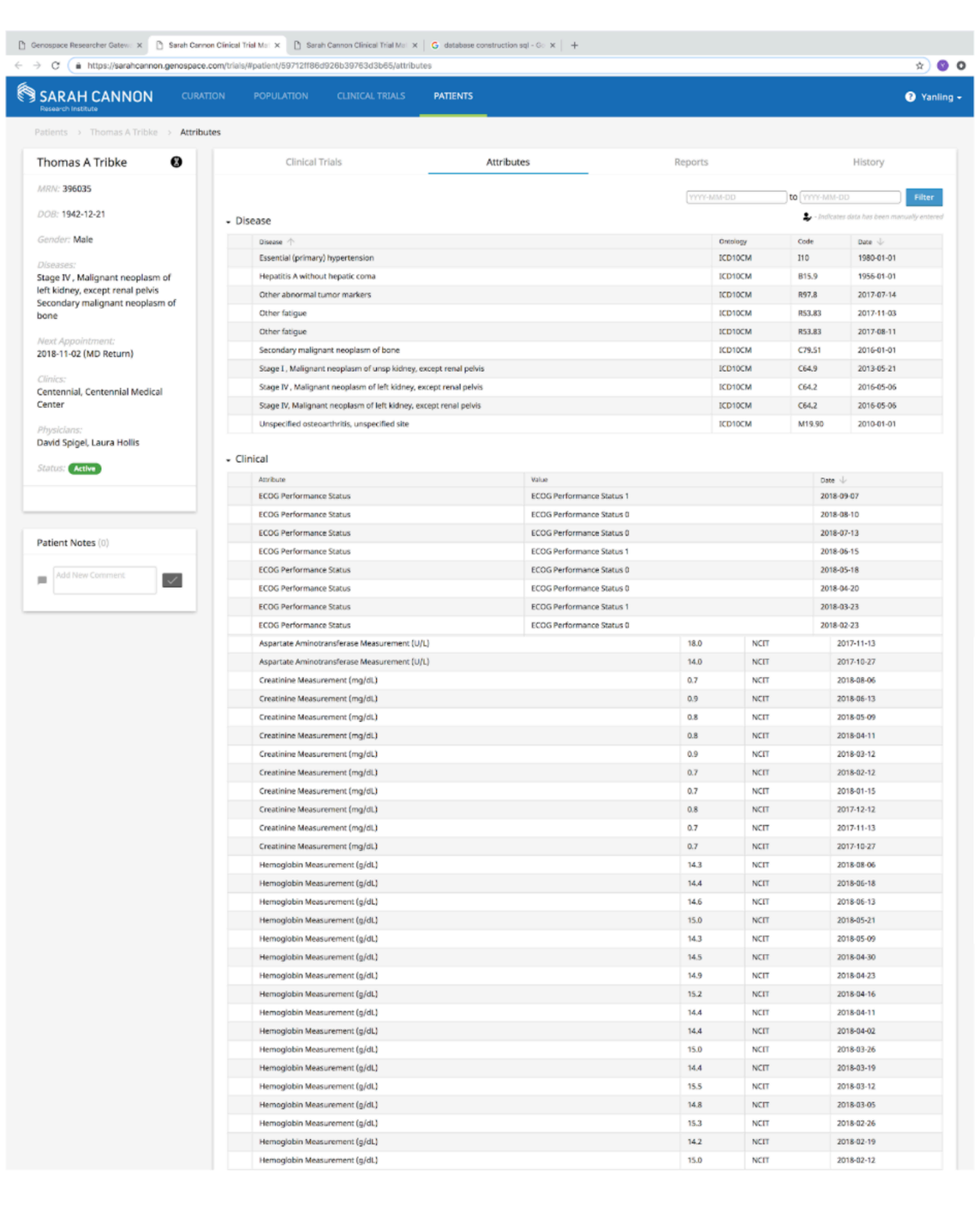
- **Reorganize the Medication data** so the user can quickly sort between ongoing medication and finished medication



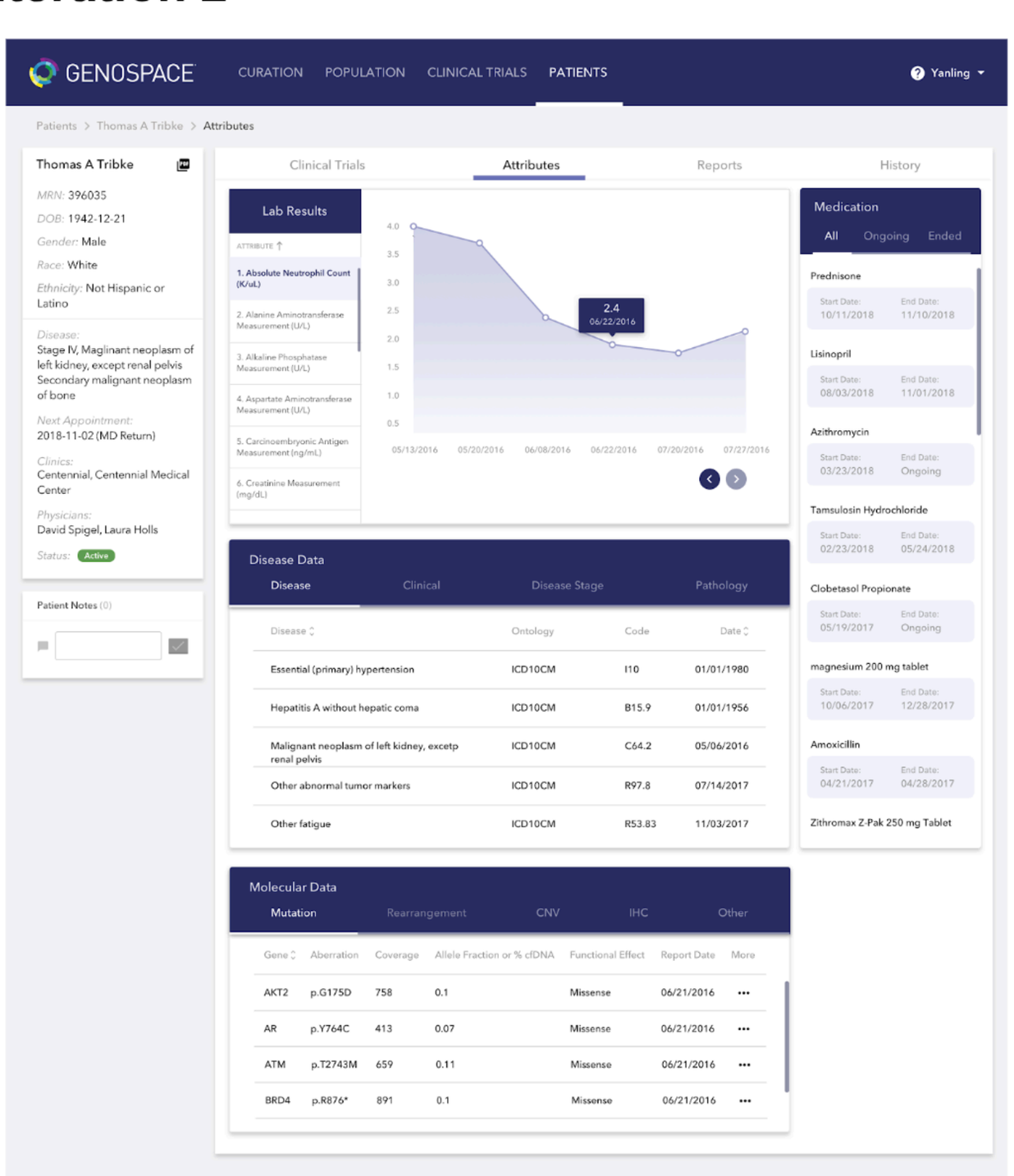
REFINEMENT

2nd Iteration Based on Team Feedback and Customer Platform Requiement

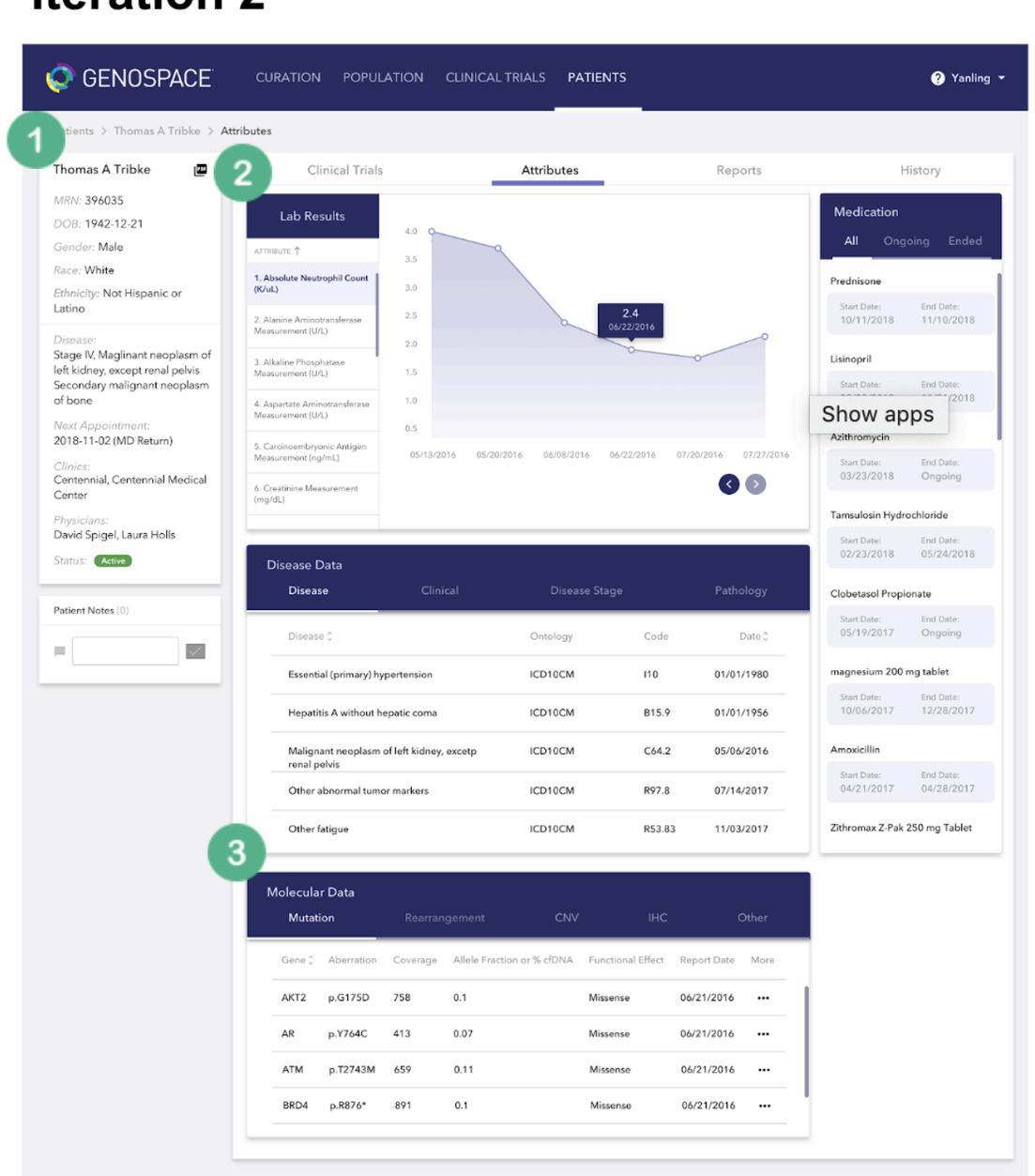
Before



Iteration 2



Iteration 2



1. Be consistent with the client platform, to ease the development workload
2. Change the lab results data design to fit in larger amount of lab test data
3. Prioritize what to be displayed on the disease table and molecular table