

# ullinkers

## Midterm Presentation

Teh Kaixin

Nicole Goh

Sean Kwok

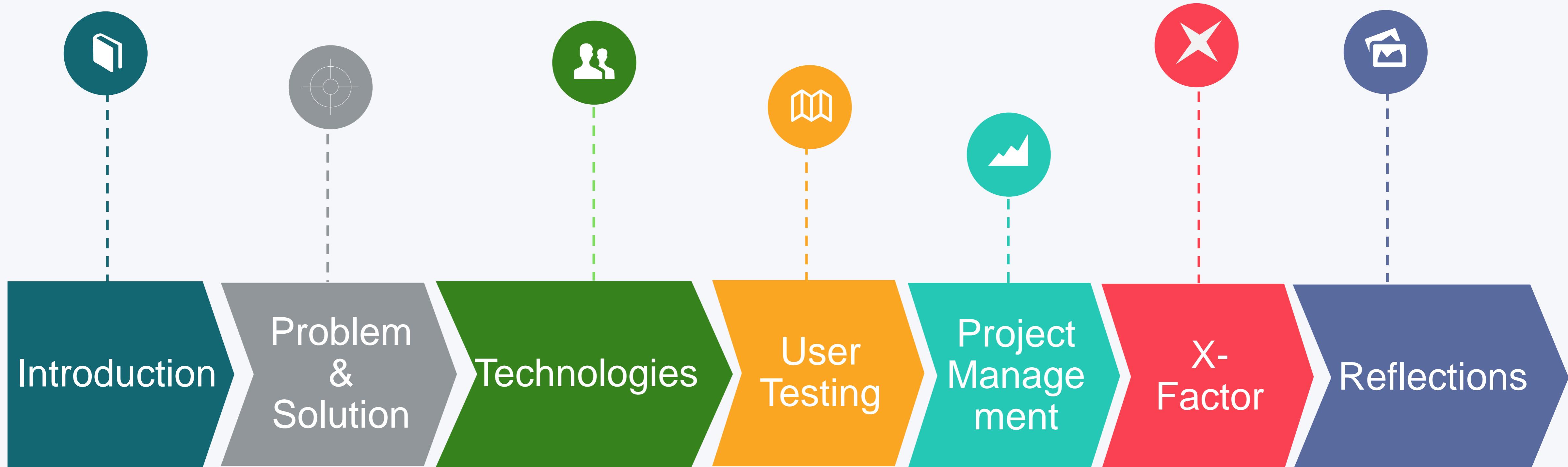
Nabilah Banu

Chien Shu Yan



# Agenda

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**Teh Kaixin**  
Project Manager  
Deputy Quality Assurance



**Sean Kwok**  
Lead Backend Developer



**Professor Steven Hoi**  
Supervisor



**Nabilah Banu**  
Business Analyst  
Deputy Frontend Developer



**Chien Shu Yan**  
Lead Quality Assurance



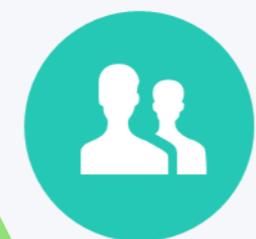
**Nicole Goh**  
Lead Frontend Developer  
Deputy Project Manager



**Linda Siow**  
Sponsor

# Our Sponsor

Ulink Assist Pte Ltd



Operating since 1996



Medical concierge provider:

- Clinic & hospitalisation arrangements
- Treatment plans & price estimates
- Travel arrangements & visas
- Standby assistance in Singapore



Clients:

Indonesia, Malaysia, Cambodia, Vietnam, Myanmar & China



15 Employees

# Problem



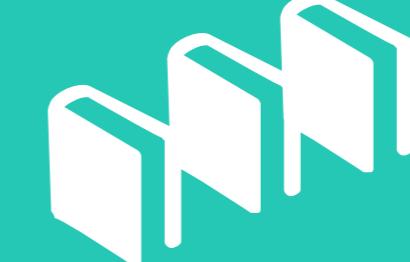
Unable to keep track  
of teams'  
performances



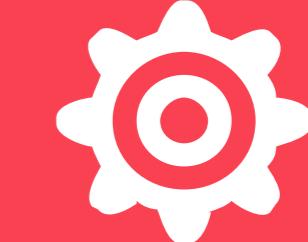
Difficult to determine  
engagements with  
stakeholders



No platform for Ulink to  
recommend screenings  
to client



Unable to generate  
relevant reports from  
current system



No consolidated  
client profile

# Problem

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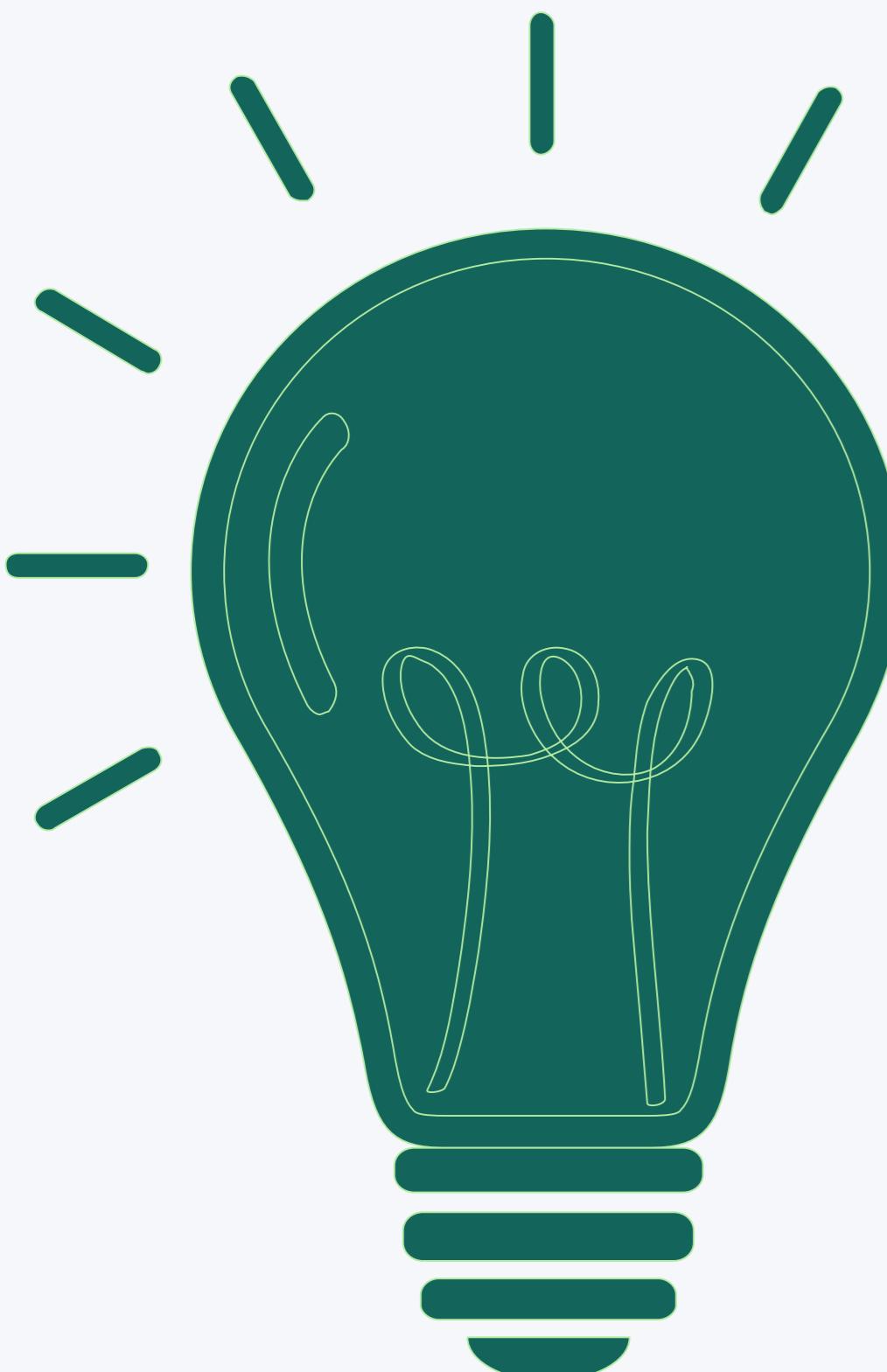
 vivien
X

Show only my records.

Clients			
CLIENT OWNER	CLIENT NAME	DOCTOR	APPOINTMENT DATE AND TIME
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	03/05/2016 09:00
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	23/03/2016 09:00
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	09/11/2015 08:30
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	02/01/2016 09:30
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	05/01/2016 09:30
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	18/01/2016 09:30
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	07/12/2015 09:30
Medical 1	Vivienne Hong Eu Leng	Seah Chee Seng	27/10/2015 01:00
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	23/10/2015 11:00
Medical 1	Vivien Cheng Seng Yee	Ang Peng Tiam	26/10/2015 08:30

[Click here to chat](#)

# Ulink Reporting System



1

Reporting tools for decision making

(Specific KPI of different teams, Gender - Age, Ranking of stakeholders, POC Index)

2

Screenings recommendation

3

Dashboard displays statistics

4

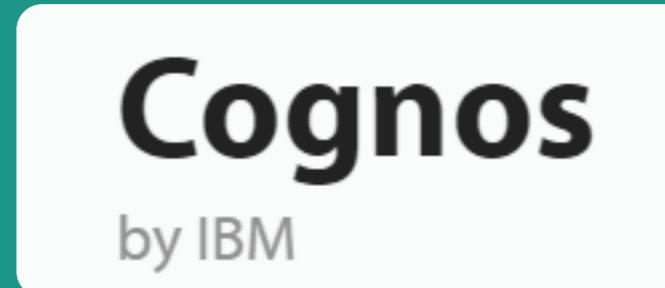
Client profile page

(reduce duplicates, group by client name)

# Research

...

8

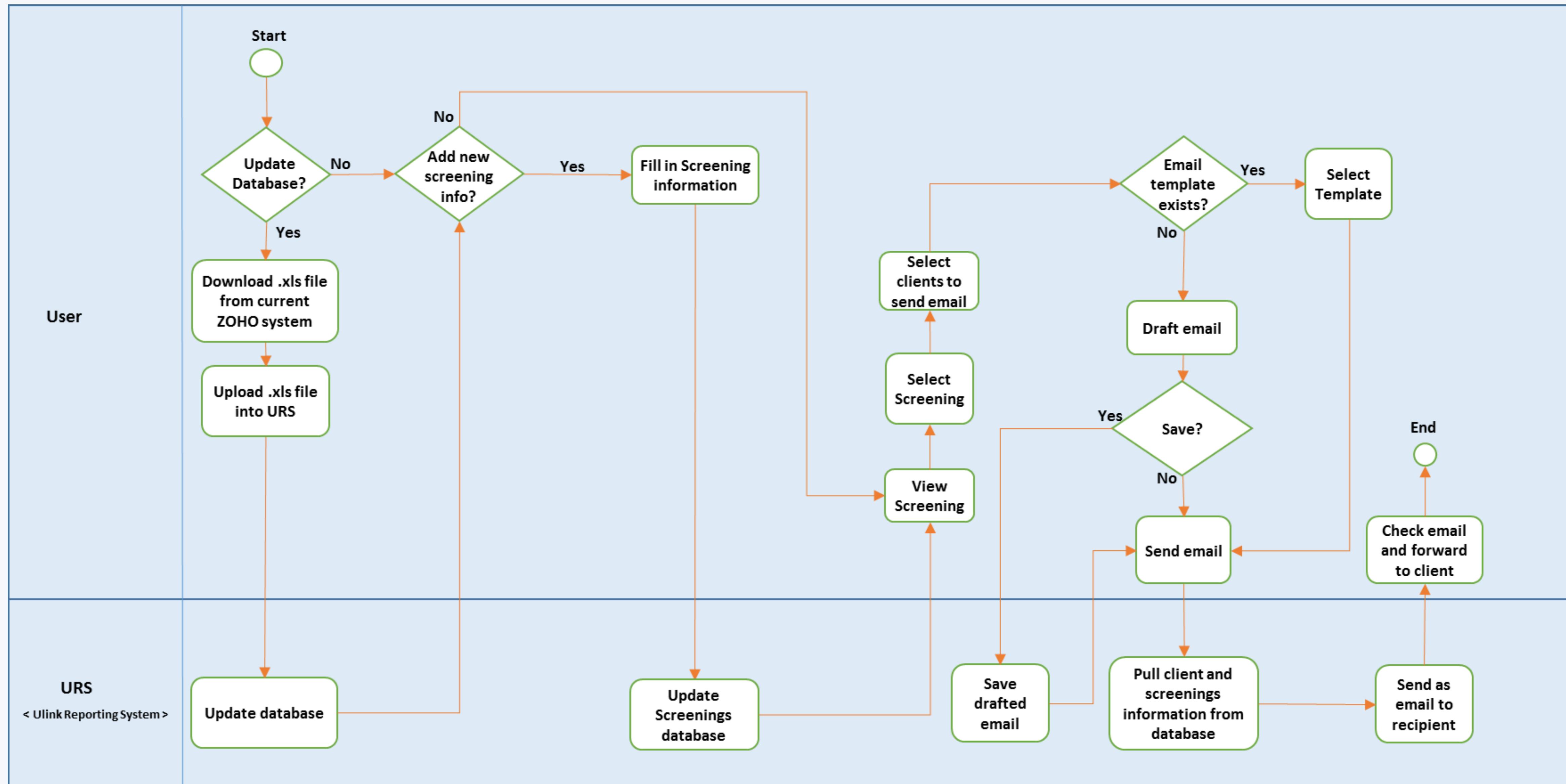
	 Cognos by IBM	 tableau®
Pros:	<ul style="list-style-type: none"><li>• Intuitive Reports</li><li>• Flexible deployment</li></ul>	<ul style="list-style-type: none"><li>• Wide range of data visualization</li></ul>
Cons:	<ul style="list-style-type: none"><li>• Most functions not required</li><li>• Difficult to manage</li><li>• More appropriate for huge organisation</li><li>• Sharing of insights can be complicated</li></ul>	<ul style="list-style-type: none"><li>• Can be cost prohibitive</li><li>• Still need IT expertise for data preparation</li><li>• No functionality for scheduling or notification of reports</li></ul>

# Comparison

		
Recommended screening based on demographic	✓	✗
Dashboard Reporting (Key performance metrics)	✓	✗
Monitor Departments' Performance	✓	✗
Ranking (Stakeholder engagements)	✓	✗
Client Profile (Consolidated profile view of each client)	✓	✗
Email function	✓	✓
Generate Reports	✓	✓

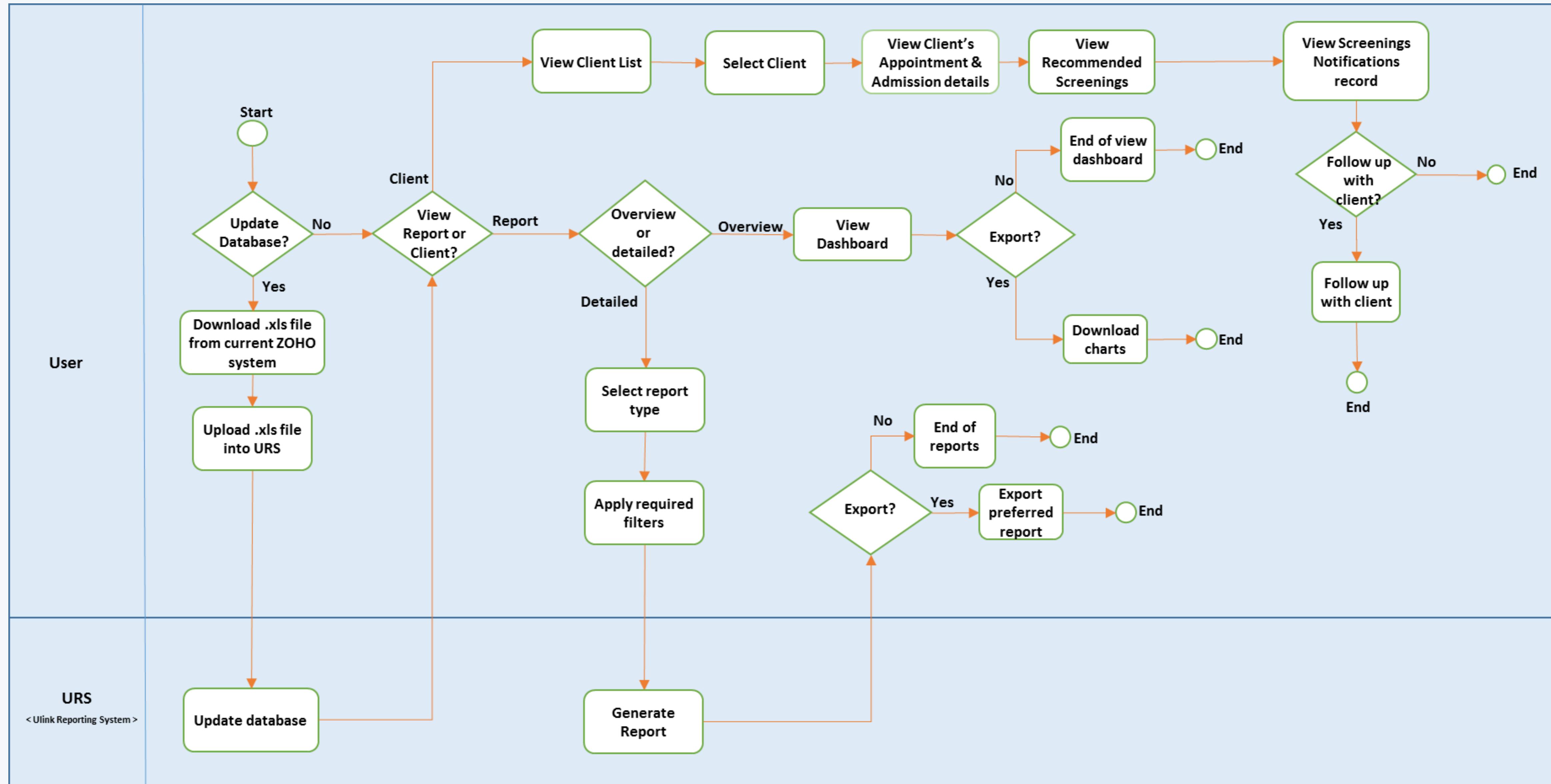
# To-Be Workflow (Screenings and Email)

10



# To-Be Workflow (Client, Dashboard and Reports)

11



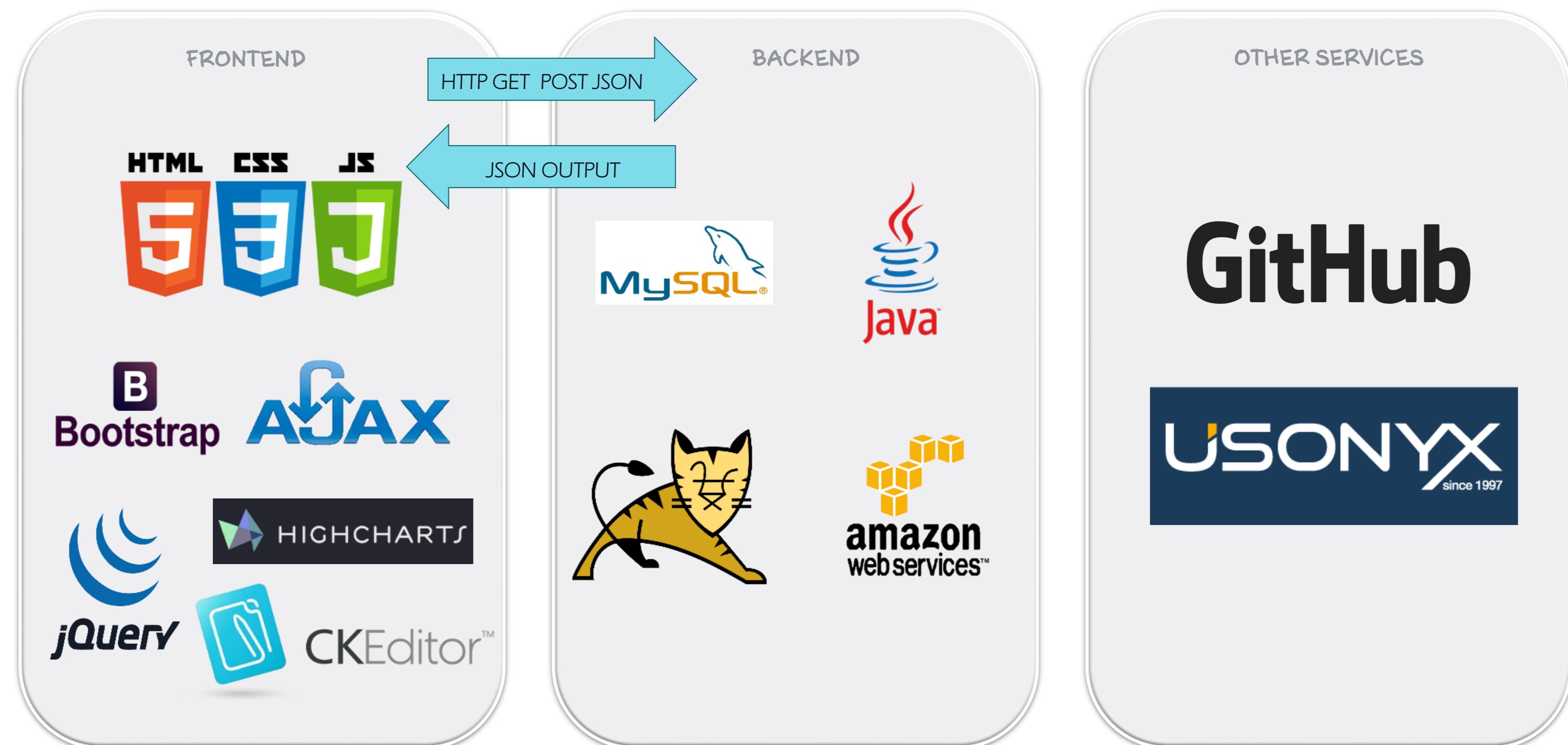


# Technology

- Architecture Diagram
  - Technical Complexity



# Architecture Diagram



# TECHNICAL COMPLEXITY

Introduction

Problem and  
Solution

Technologies

User Testing

Project  
Management

X-Factor

Reflections

# Technical Complexity

## Encoding Character

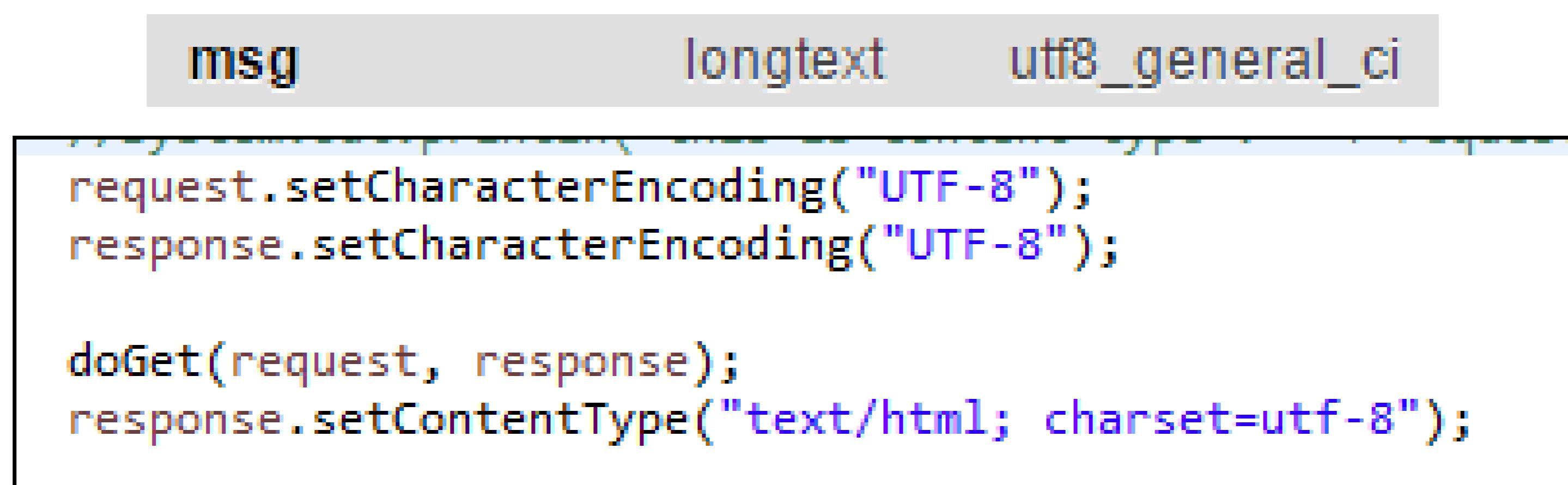
...

Problems:

- Default Encoding value for getParameter - ISO-8859-1
- Unable to read UTF-8 encoding value

Solution:

- Change database storing format and encoding value for getParameter



The screenshot shows a Java code editor with three tabs at the top: `msg`, `longtext`, and `utf8_general_ci`. The `msg` tab contains the following code:

```
request.setCharacterEncoding("UTF-8");
response.setCharacterEncoding("UTF-8");

doGet(request, response);
response.setContentType("text/html; charset=utf-8");
```

# Technical Complexity

...

## Security

Problems:

- To prevent client information being compromised

Solution:

- Encrypt password using SHA-256

email	password
admin	8c6976e5b5410415bde908bd4dee15dfb167a9c873fc4bb8a8...
testNon	a665a45920422f9d417e4867efdc4fb8a04a1f3fff1fa07e99...

```
md = MessageDigest.getInstance("SHA-256");
md.update(password.getBytes());
byte byteData[] = md.digest();
```

# Technical Complexity

...

## Different Date Formats

### Problems:

- Many different types of date format required

```
date.substring(0, 8) + c.getActualMinimum(Calendar.DAY_OF_MONTH);
```

### Solution:

- Joda Time library & calendar from Java

```
date.substring(0, 8) + c.getActualMaximum(Calendar.DAY_OF_MONTH);
```

```
public String changeDateFormat(String date){
    return date.substring(6,10)+ "-" + date.substring(0, 2) + "-" + date.substring(3, 5);
}
public String changeDisplayDateFormat(String date){
    return date.substring(8,10)+ "-" + date.substring(5, 7) + "-" + date.substring(0,4);
}
public String changeDateFormatDatabase(String date){
    return date.substring(6,10)+ "/" + date.substring(3, 5) + "/" + date.substring(0, 2);
}
```

# Technical Complexity

...

## Text Editor (iFrame)

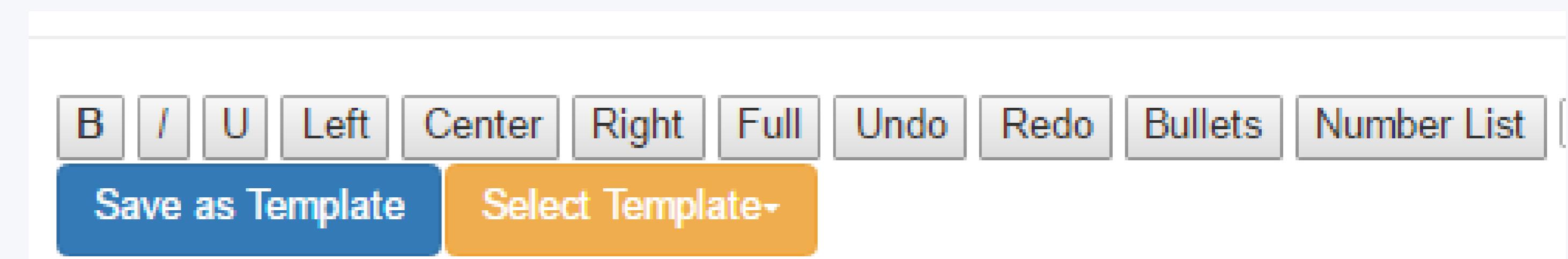
### Problems:

- Edit mode not user-friendly
- Cannot save pasted text directly
- Looks “Raw”

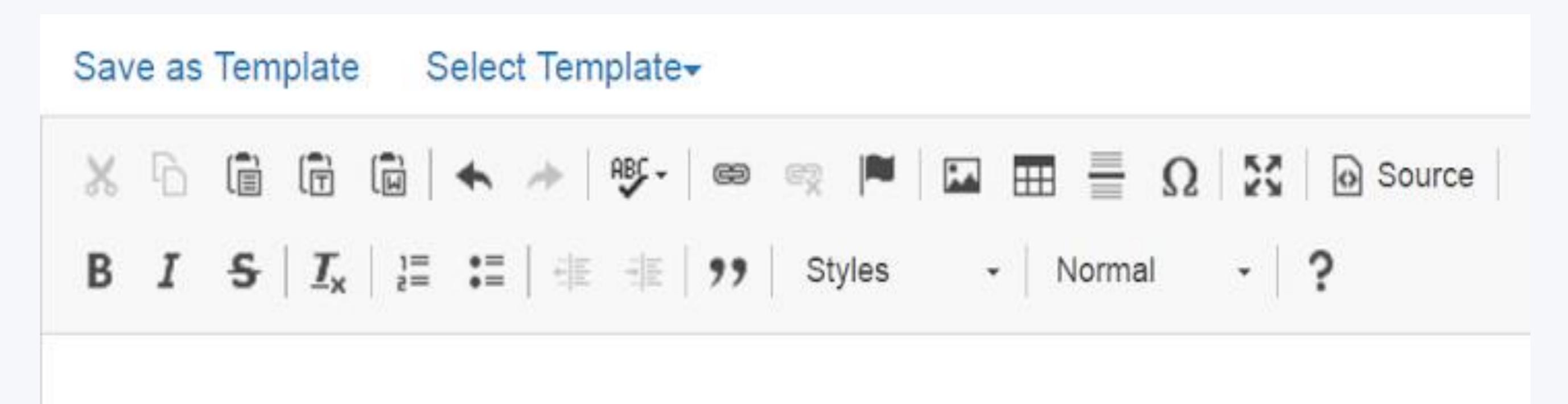
### Solution:



### Before



### After



# Technical Complexity

...

## Saving Email template in HTML format

Problem:

- Need to replace symbols to preserve original format

```
function formatMsg(msg){  
  var res = encodeURIComponent(msg);  
  return res;  
}
```

Solution:

- encodeURIComponent

# Quality Assurance

- User Testing
- Internal Testing



# User Testing 1

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Purpose: Gather UI feedback & detect usability issues

Participant: Linda (Sponsor)

Date: 28 October 2016

Time: 4.00pm

Venue: Ulink Assist Pte Ltd

Scope:

Client Creation Module

Timeline Module

Reports Module

- KPI
- Ranking
- Gender - Age Report



Easy to navigate



Timeline for screenings design is not intuitive

Naming of columns and fields are confusing

# UT 1 Feedback

- Timeline display is not intuitive, user suggested to change to table format
- Stick to one color scheme
- Client prefers to choose which patient to send email to instead of automated sending of email

**Before**

Timeline - Male

18 YEARS -

LIST OF SCREENINGS

Obesity,Hypertension (High blood pressure),Diabetic microalbuminuria,Hearing loss,kidney disorder

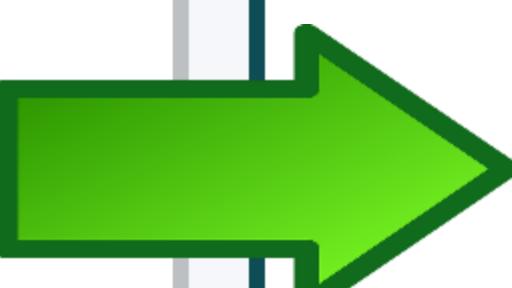
[View Patients](#)

40 YEARS -

LIST OF SCREENINGS

Hyperlipidaemia

[View Patients](#)



**After**

Home Client Invoice Services Report Doctor Timeline Analysis Template Logout Search

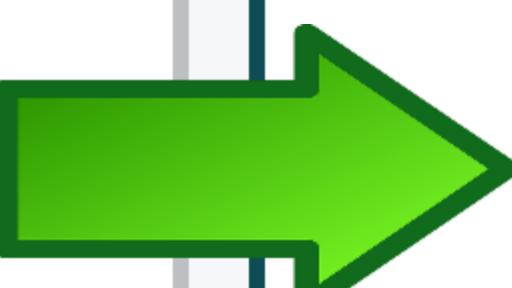
Timeline - Filter

Gender:  Age Range:  0-2 Weeks

[Generate](#)

List of screenings	Patients	Select
Mammogram	Briana Jones Sally Wanna Anna Frank Joanel Telle	<input type="checkbox"/>
Audiometry	Quello Joseph Foo	<input checked="" type="checkbox"/>

[Email me](#)



# UT 1 Feedback

• • •

Rename Regularity field to Frequency of Screening (In Years) for easy understanding

**Before**

Timeline - Add New Screenings

**Age**  
Starting age in which patient might be diagnosed with illness

**Common Illness**

**Recommended screening**

**Demographic affected**  
Infant

**Regularity of Screening**  
How often does one have to go for this screening

**After**

Timeline - Add New Screenings

**Age**  
Starting age in which patient might be diagnosed with illness

**Common Illness**

**Recommended screening**

**Demographic Affected**  
Infant

**Frequency of Screening (In years)**  
How often does one have to go for this screening

Add

# UT 1 Feedback

• • •

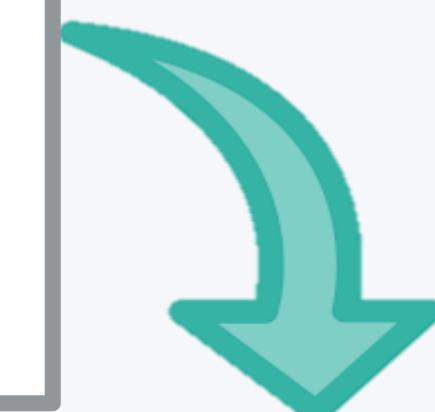
- Top-K function to rename as "Ranking" for easy understanding

- List all results in a ranked list instead of selecting “K” value

**Before**

### Analysis - Top-k

Select "K"
Select Criteria
Select Start Date
Select End Date



**After**

Analysis - Ranking

Select Criteria
Select Start Date
Select End Date

# UT 1 Feedback

Confusing naming

Before

Select Criteria	Select Start Date	Select End Date
Doctor	11/01/2016 12:21 PM	11/30/2016 12:21 PM
<input type="button" value="Generate"/>		
Ranking	Name	value
1	Chew Chuan Tieh	2
2	Kevin Tan Eng Kiat	1
2	Lam Mun San	
2	Tan Eng Choon	



After

**Analysis - Ranking**

Select Criteria	Select Start Date	Select End Date
Doctor	10/01/2016 5:44 PM	11/30/2016 5:44 PM
<input type="button" value="Generate"/>		
Ranking	Name	Number of times doctor was engaged

# User Testing 2

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## Usability & Heuristic Test

Purpose: Identify any usability problems & UI issues

Participant: 5 Ulink employees  
(Management, Medical, Visa, Marketing, Accounts)

Date: 10 January 2017

Time: 3.30pm

Venue: Ulink Assist Pte Ltd

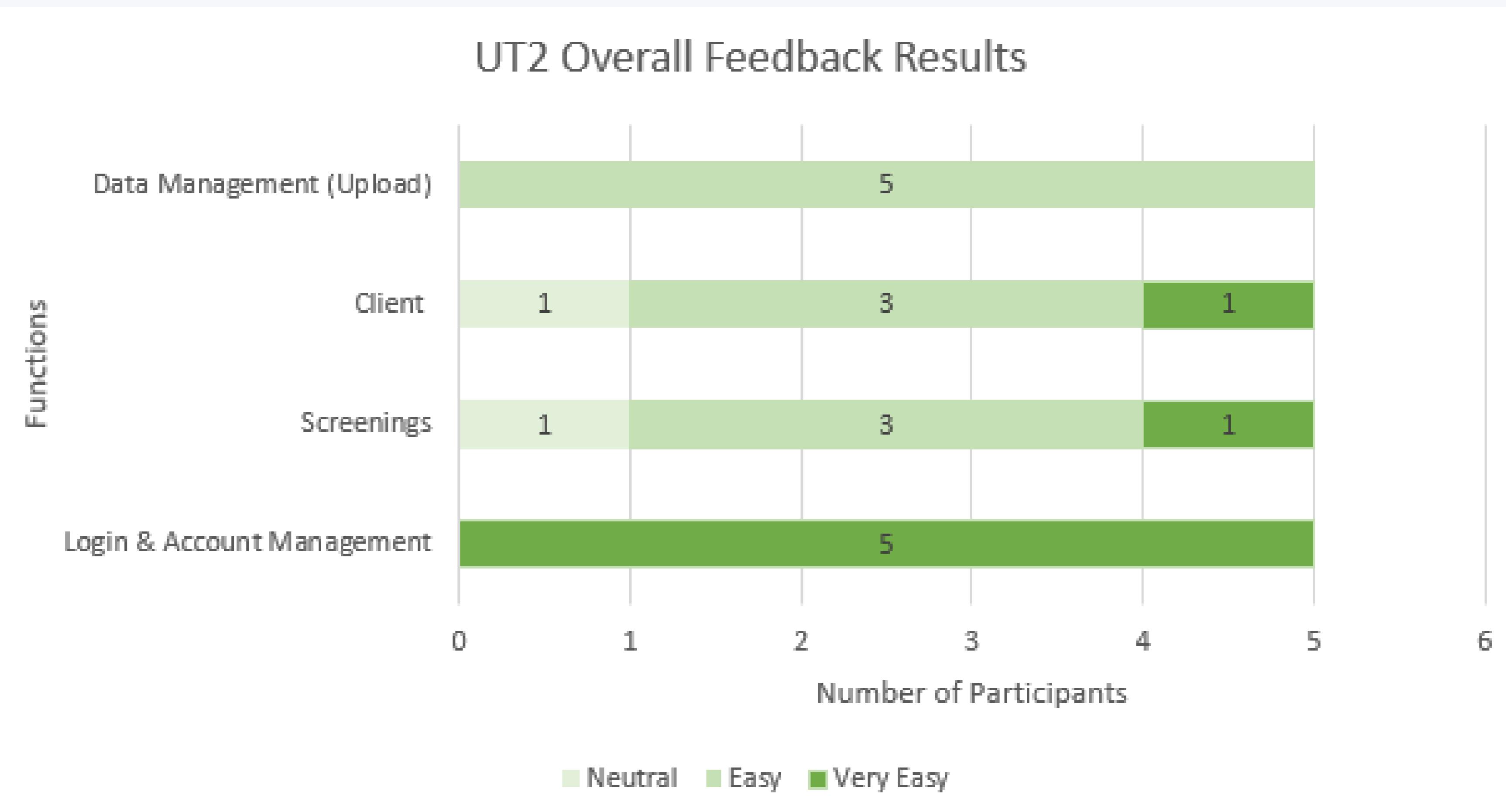
Scope:

- Login/ Logout
- Screenings
- Client
- Data Management

# UT2 Usability

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UT2 Overall Feedback Results



# UT 2 Heuristics Improvements

...

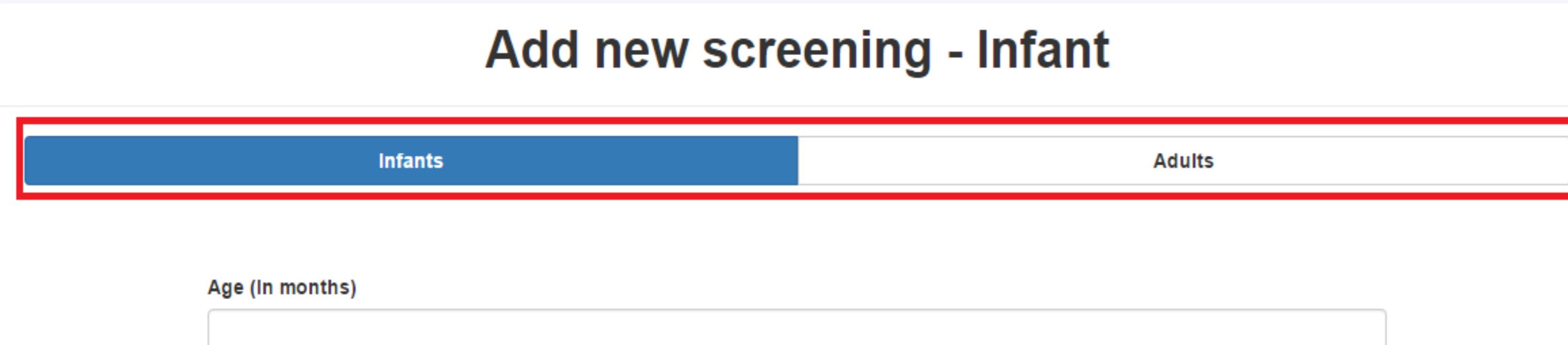
Header of Screening form is not specific

## Before

Add new screening - Infant

Infants      Adults

Age (In months)



## After

Add new screening - Adult

Infants (0-24 months)      Adults (2 years and above)

Age

Starting age in which patient might be diagnosed with illness



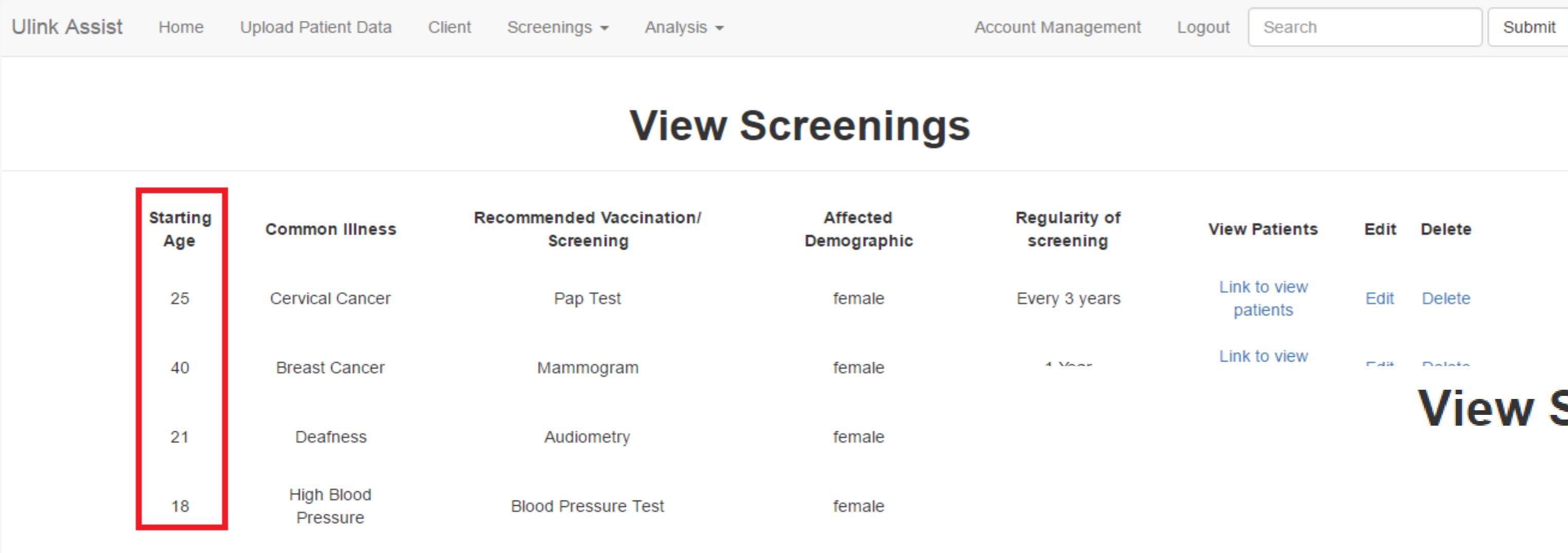
# UT 2 Heuristics Improvements

...

Infants and Adults screenings should have different views

To prevent confusion in age (months, years)

## Before

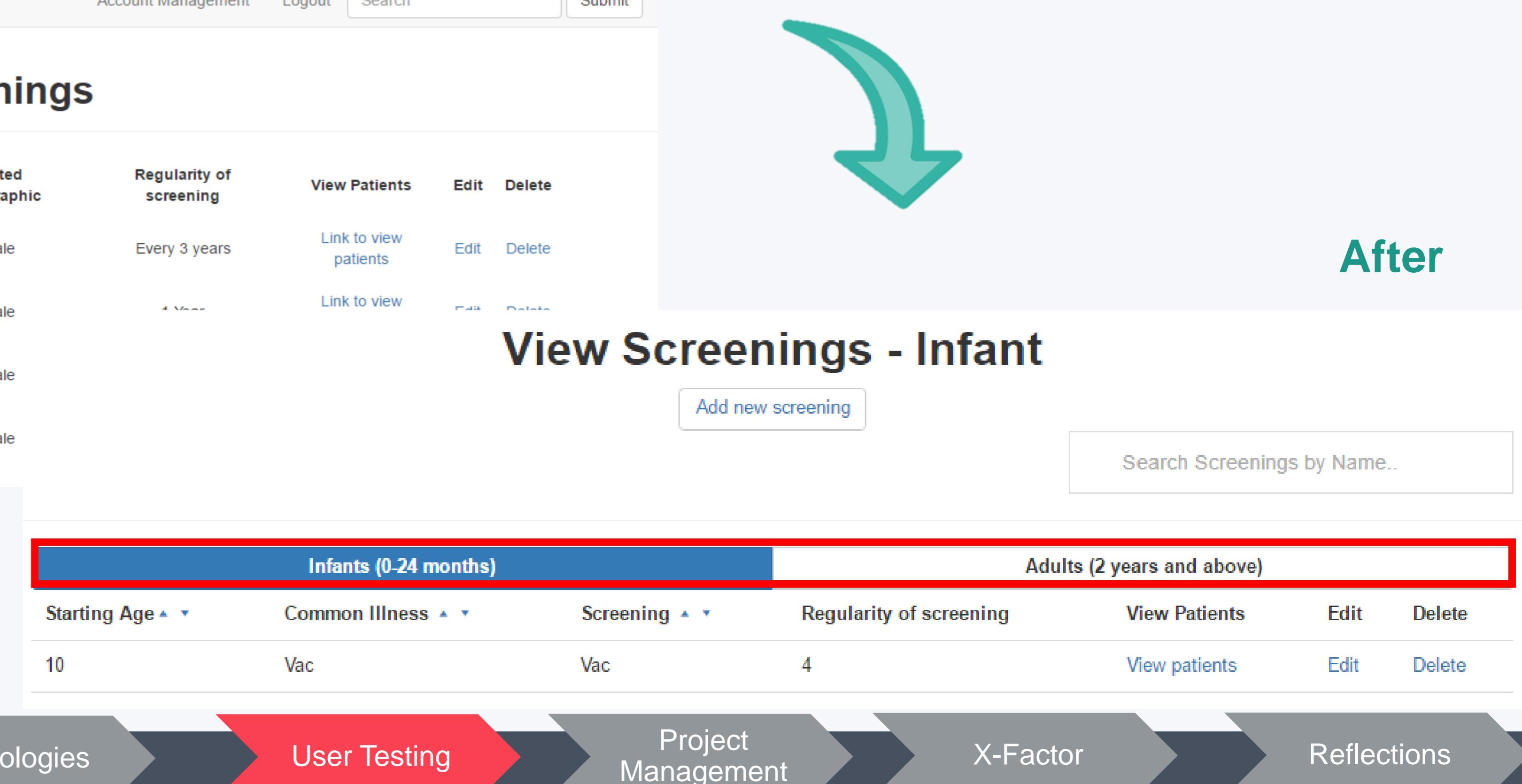


The screenshot shows a 'View Screenings' page with a table of screening data. The columns are: Starting Age, Common Illness, Recommended Vaccination/Screening, Affected Demographic, Regularity of screening, View Patients, Edit, and Delete. The 'Starting Age' column is highlighted with a red border. The data rows are:

Starting Age	Common Illness	Recommended Vaccination/Screening	Affected Demographic	Regularity of screening	View Patients	Edit	Delete
25	Cervical Cancer	Pap Test	female	Every 3 years	<a href="#">Link to view patients</a>	<a href="#">Edit</a>	<a href="#">Delete</a>
40	Breast Cancer	Mammogram	female	Every 2 years	<a href="#">Link to view patients</a>	<a href="#">Edit</a>	<a href="#">Delete</a>
21	Deafness	Audiometry	female	Every 2 years	<a href="#">Link to view patients</a>	<a href="#">Edit</a>	<a href="#">Delete</a>
18	High Blood Pressure	Blood Pressure Test	female	Every 2 years	<a href="#">Link to view patients</a>	<a href="#">Edit</a>	<a href="#">Delete</a>



## After



The screenshot shows a 'View Screenings - Infant' page. The top part is a simplified table with columns: Starting Age ▾, Common Illness ▾, Screening ▾, Regularity of screening, View Patients, Edit, and Delete. The 'Starting Age' column has a dropdown arrow. The data row is:

Starting Age ▾	Common Illness ▾	Screening ▾	Regularity of screening	View Patients	Edit	Delete
10	Vac	Vac	4	<a href="#">View patients</a>	<a href="#">Edit</a>	<a href="#">Delete</a>

The bottom part is a red header bar with the text 'Infants (0-24 months)' and 'Adults (2 years and above)'. Below it is a table with the same columns as the top table, but only one row of data is shown.

# User Testing 3

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## Purpose:

- Gather UI feedback & detect usability issues
- Measure time taken for each task



Participant: 6 Ulink employees  
(Management, Medical, Visa, Marketing, Accounts)

Date: 13 February 2017

Time: 4.30pm

Venue: Ulink Assist Pte Ltd



## Scope:

- Data Management
- Dashboard Module
- Reports Module
  - KPI, Ranking, Gender-Age
- Screenings
- Email Notification
- Text Editor

## Dashboard & Reports

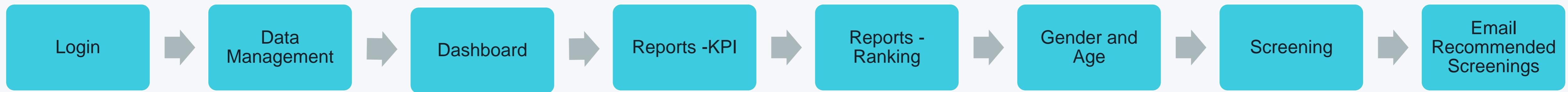
- Visual graphs provides better understanding

## User interface

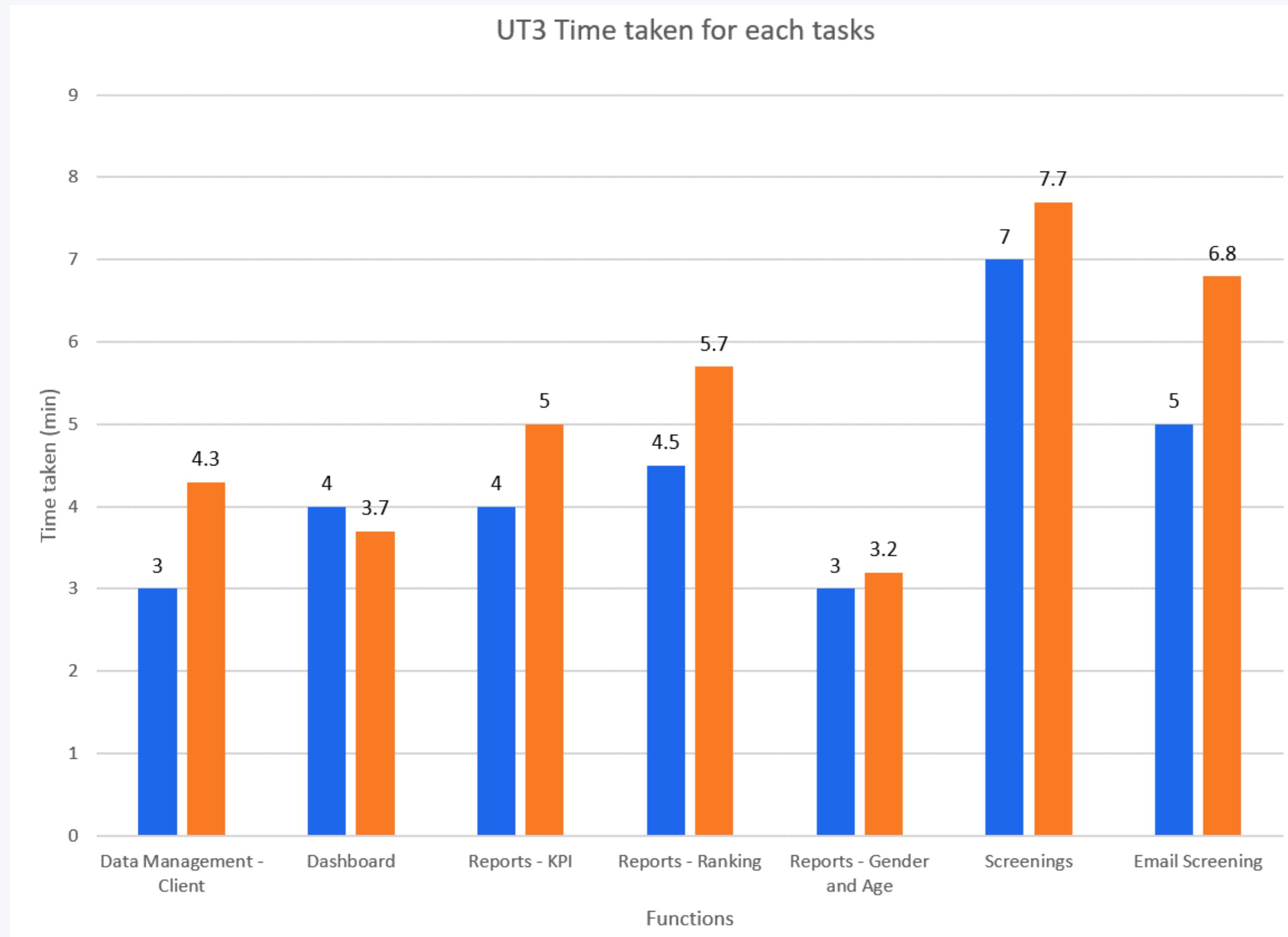
- Straightforward & user-friendly

# User Testing 3 Procedure

...



# User Testing 3 Results



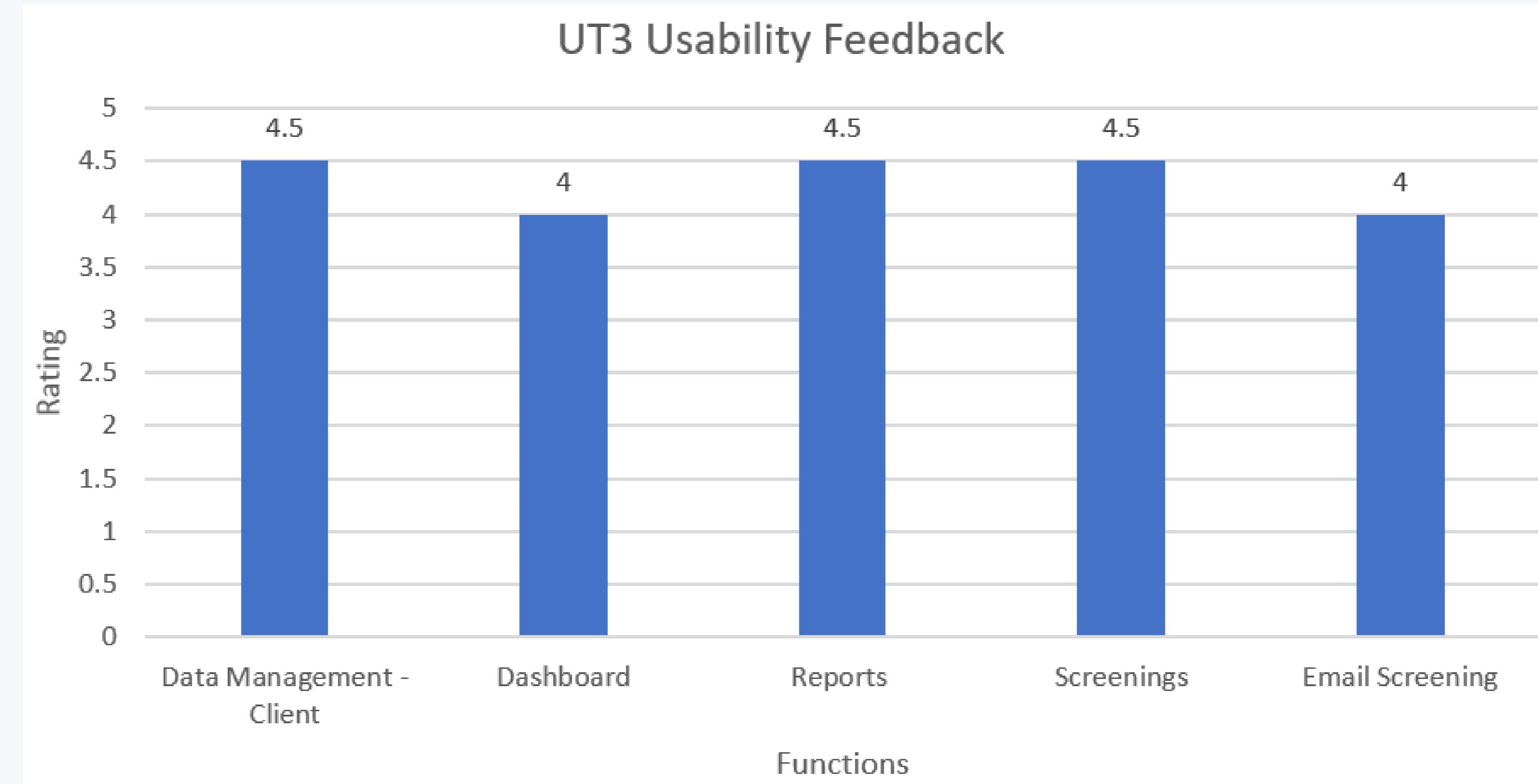
Non-experts should take not more than 150% of expert's time taken

# UT 3 Feedback

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Very Easy

Very Difficult

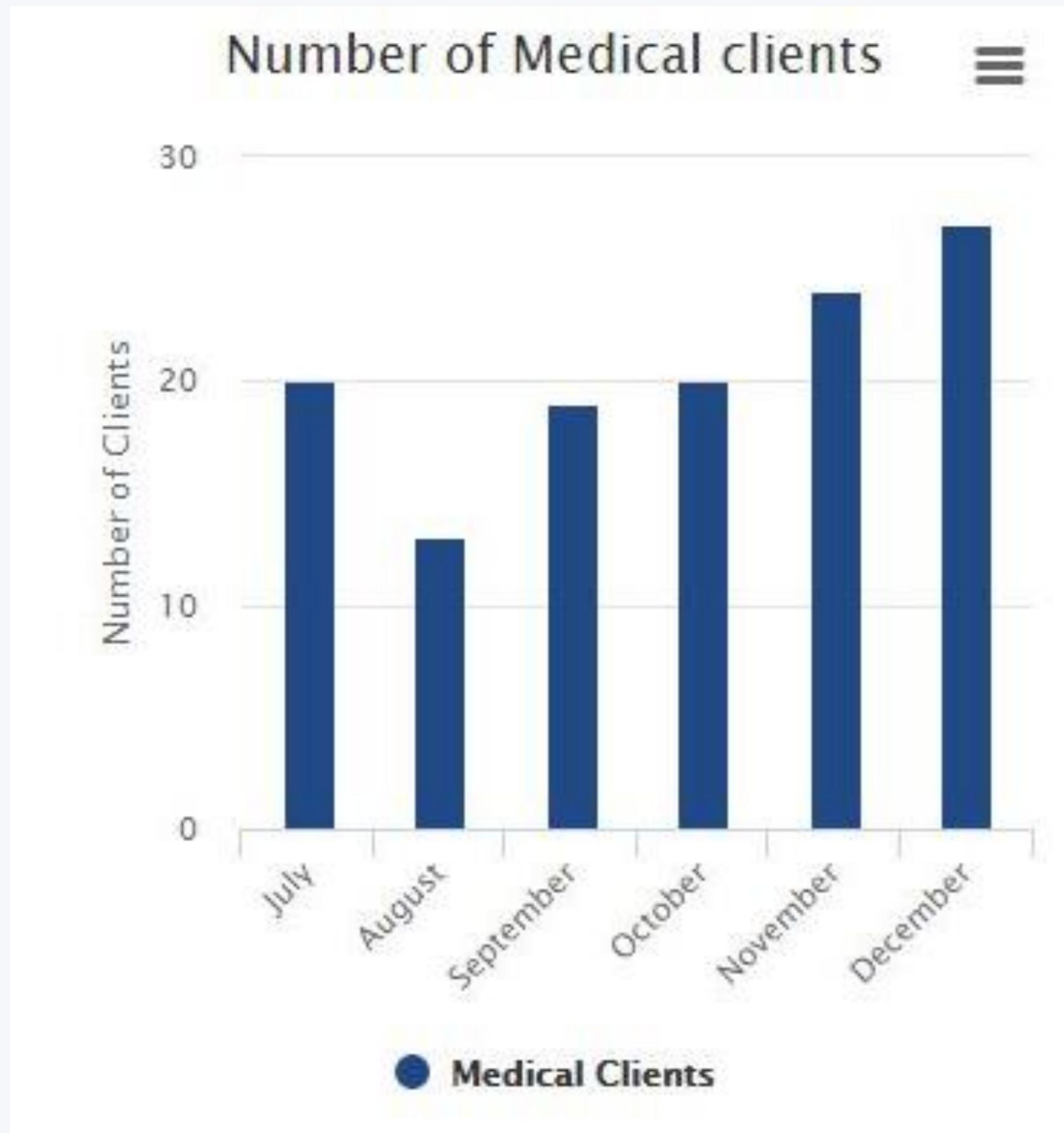


# UT 3 Feedback

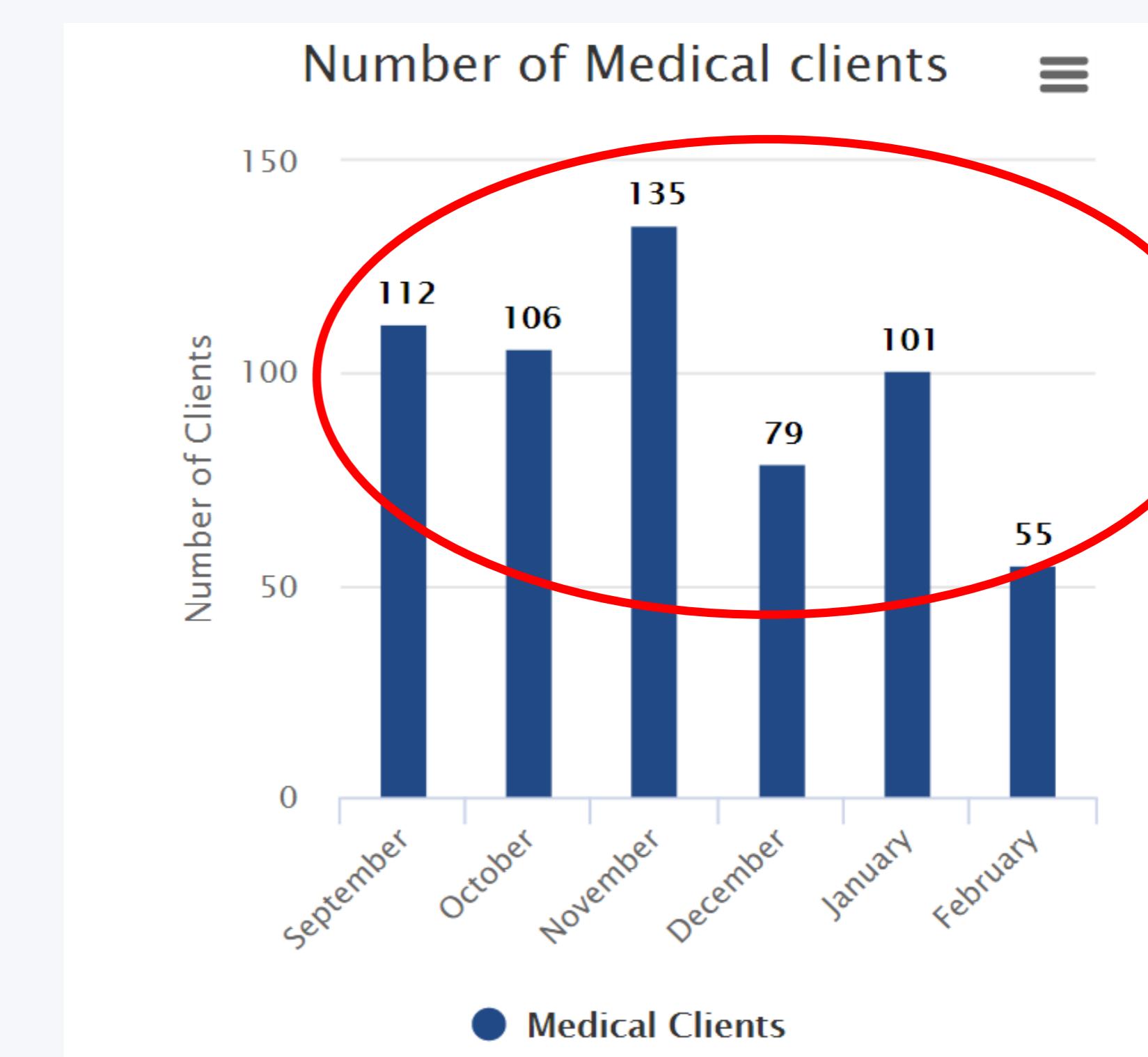
Data labels added

• • •

**Before**



**After**



# UT 3 Feedback

- Select All Button
- 'PIC' column
- 'Email Sent' column (Last sent date)

**View Screenings - Adult**

Add new screening

Search for

Infants (0-24 months) Adults (2 years and above)

**Condition Name:** Cervical cancer screening  
**Screening Name:** Pap Test

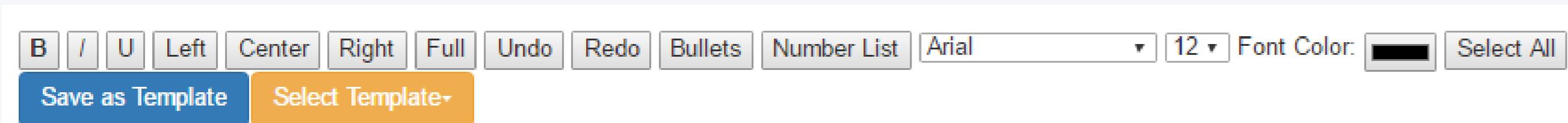
Age	Client Name	Email	Email Sent Date	PIC	Select All <input type="checkbox"/>
48	Alana Marie Brodrick	brodrickalana@gmail.com			<input type="checkbox"/>
31	ALESSANDRA MICHELLE KRAAN	alessandra.m.kraan@gmail.com		Jes	<input type="checkbox"/>
20	Ardiana Polina Natasja	natasja.scovid@gmail.com			<input type="checkbox"/>

# UT 3 Feedback

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Number of clients selected

Before



[clientName]  
[clientEmail]  
[screening]



New Email

Save as Template Select Template-



[clientName]  
[clientEmail]  
[screening]

45 Clients Selected

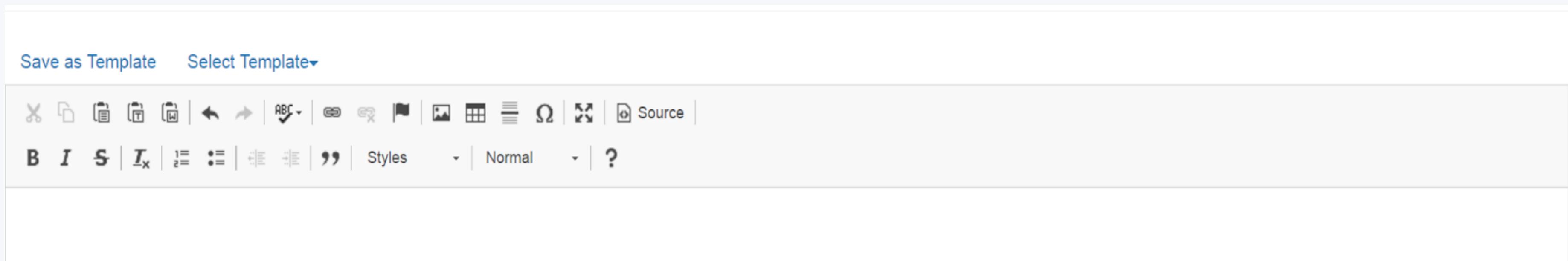
brodrickalana@gmail.com  
alessandra.m.kraan@gmail.com  
natasha.rasyid@gmail.com  
asha.gourinath@mobext.com  
maloymr@state.gov

# UT 3 Feedback

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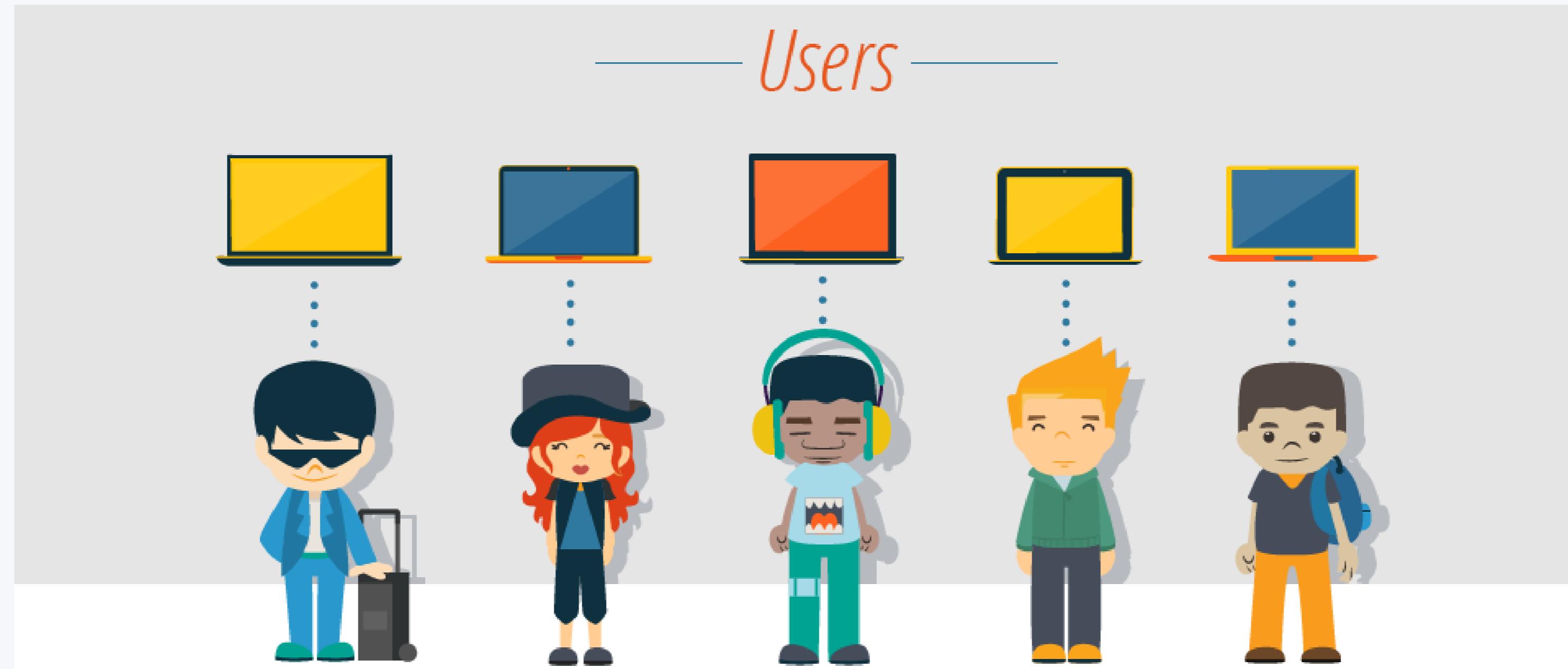
## Improvements to be made

- Uploading images
- Specify recipients



# UT Takeaways

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Many suggestions from different users

Importance of prioritising changes

# Bug Metric

## Bug Metric Impact Score

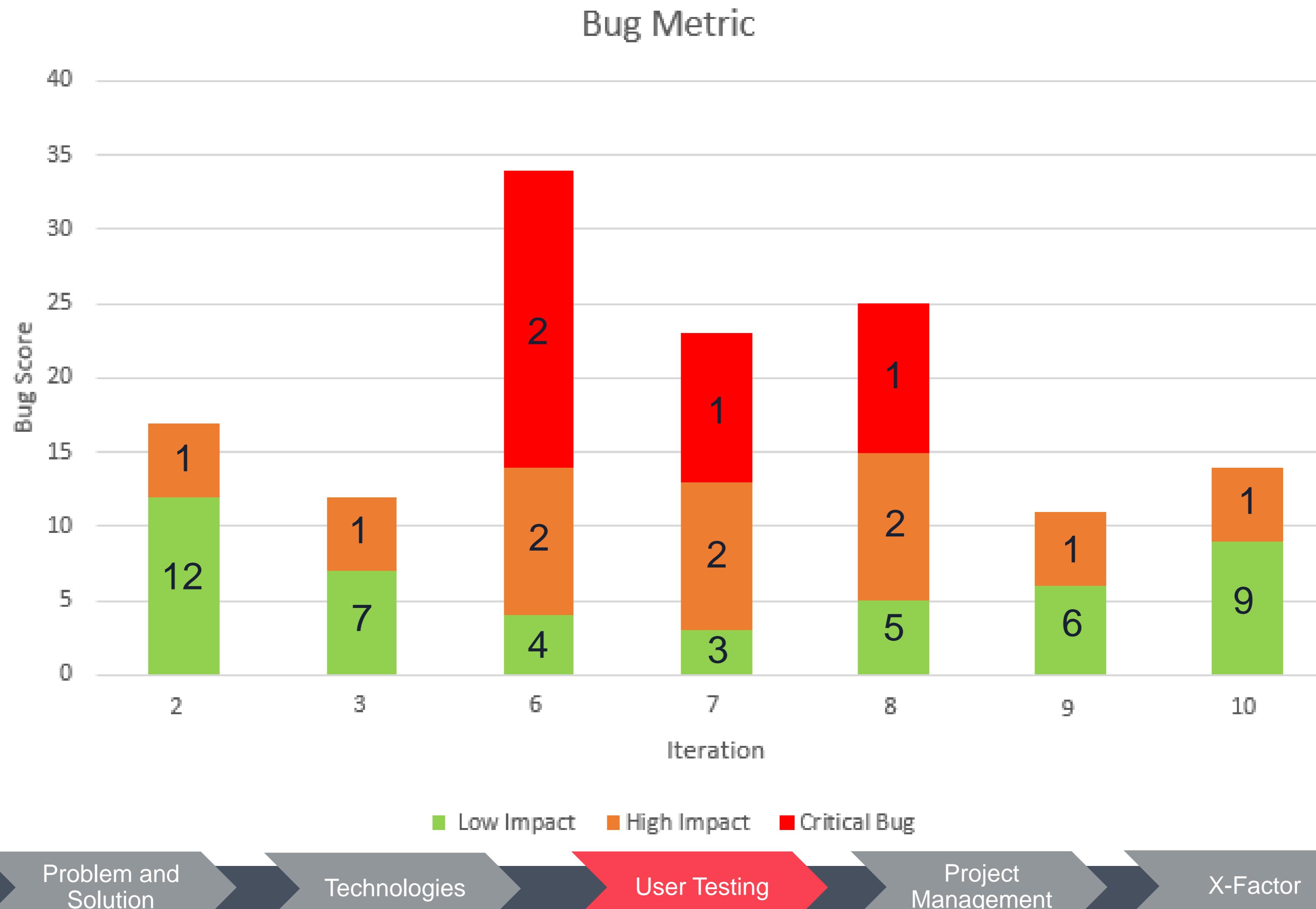
Severity	Description
Low (1 point)	Unimportant. Typo error or small user interface alignment issues.
High (5 point)	The system runs, but some non-critical functionalities are not working.
Critical (10 points)	System is down or un-usable.

## Mitigation Plan

Bug Score	Action
Score <= 10	Fix during buffer time
10 < Score <= 20	Use planned debugging time in the iteration
Score > 20	Stop current development immediately and resolve bugs. PM to reschedule the project.

**Total score = 1 \* (No. of Low Impact) + 5 \* (No. of High Impact) + 10 \* ( No. of Critical Impact)**

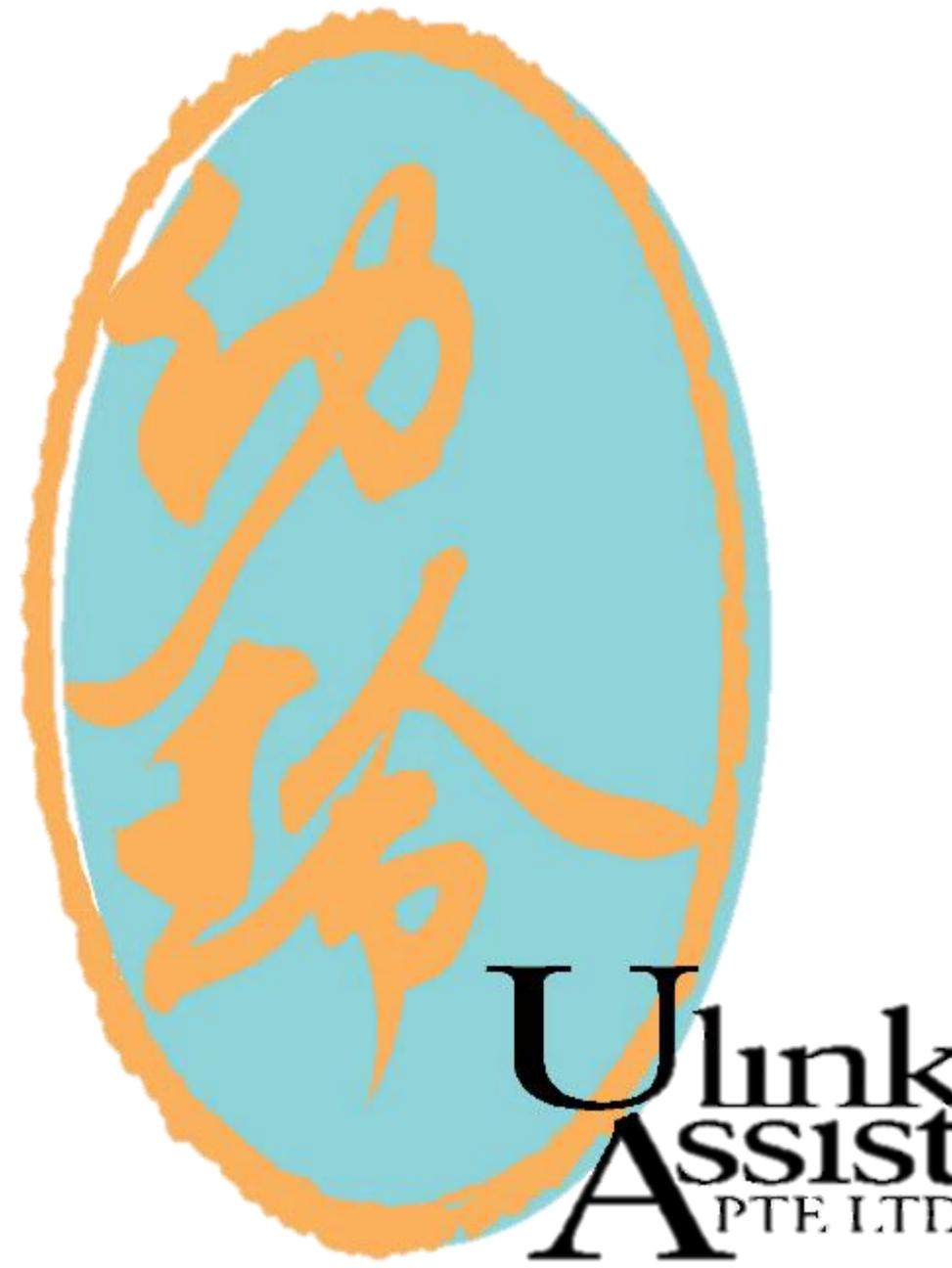
# Bug Metric



# Project Management



# Stakeholder Management



Sponsor: Ms Linda Siow

- Bi-weekly meetings
- Skype & emails
- Update project progress
- User Testing
- Clarify user requirements
- Gather feedback on prototype

# Stakeholder Management



## Supervisor: Professor Steven Hoi

- Bi-weekly meetings
- Update project progress
- Past Iteration & upcoming iteration
- Obtain feedback on project
- Gather suggestions

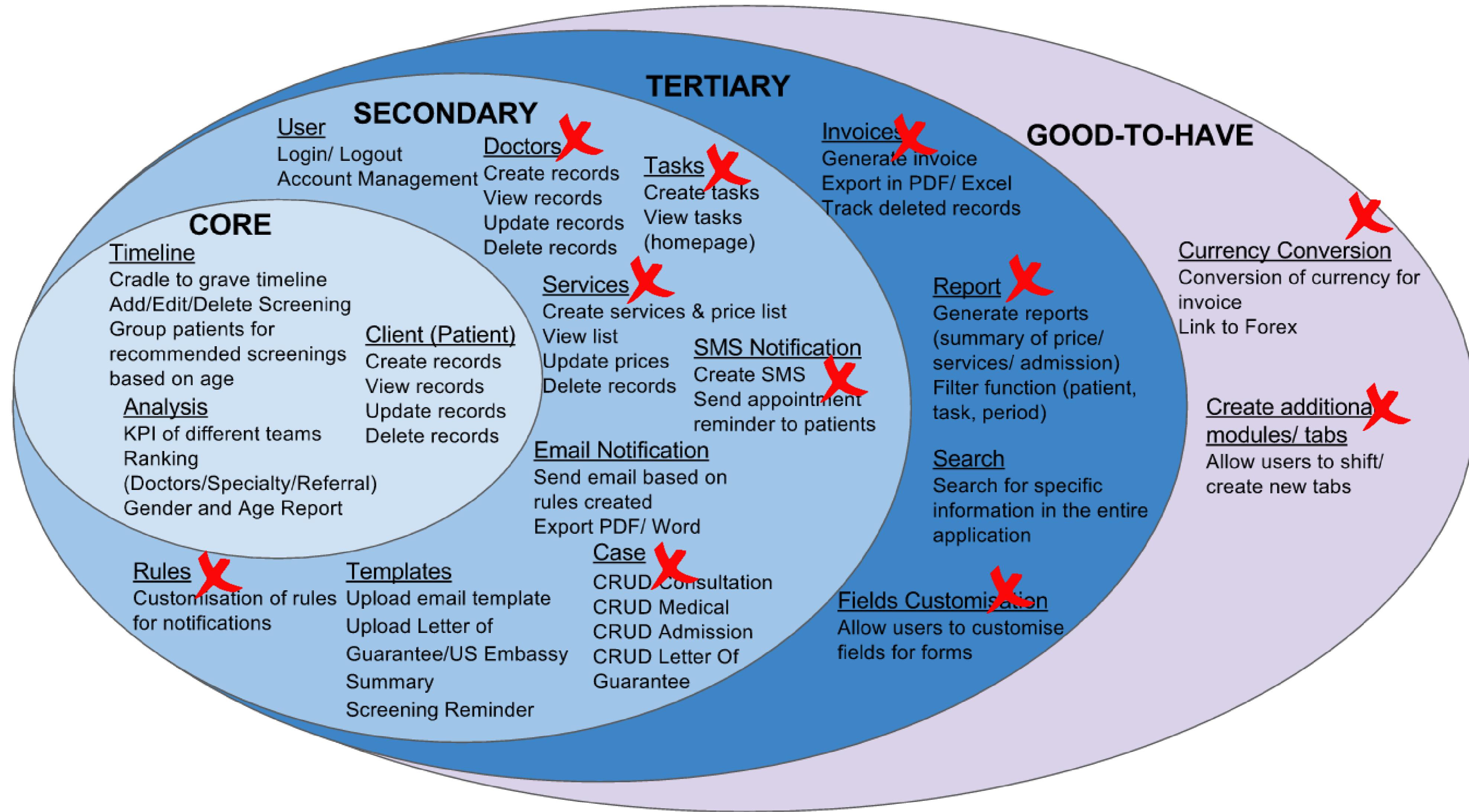
# Stakeholder Management



## Team

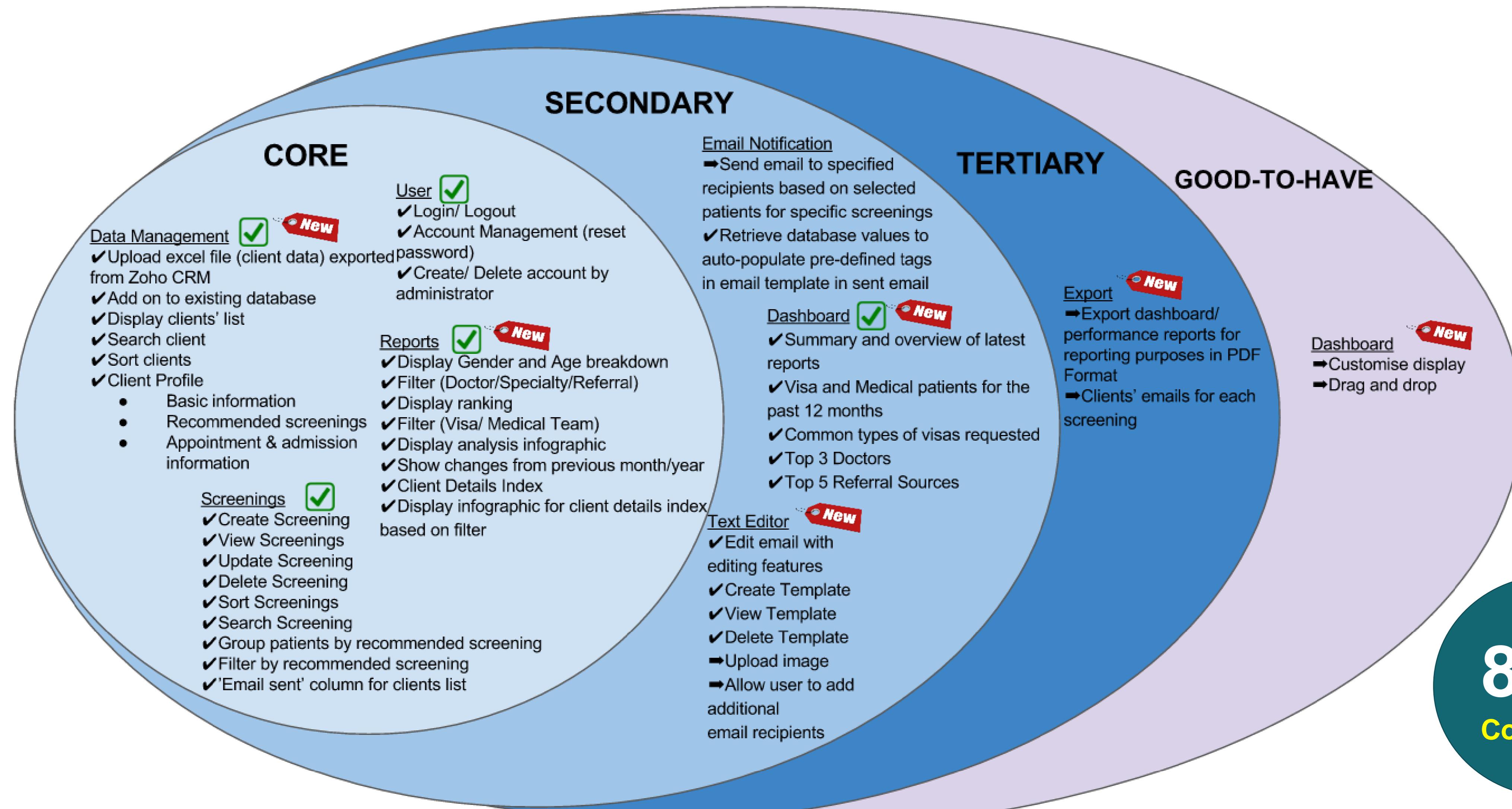
- Weekly meetings
- Changes in scope & timeline
- Integration, testing & debugging sessions

# Acceptance Scope



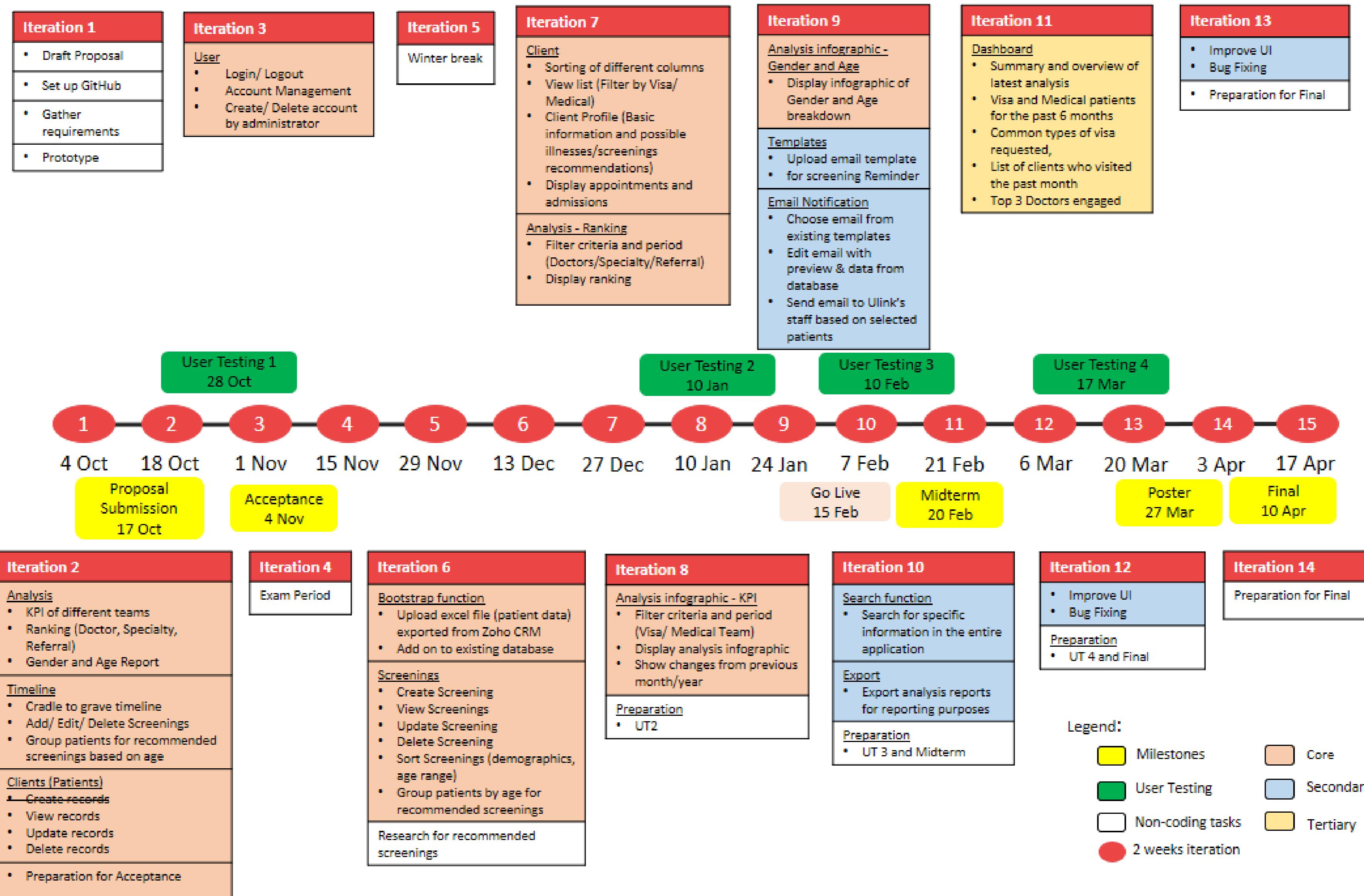
# Actual Scope

• • •

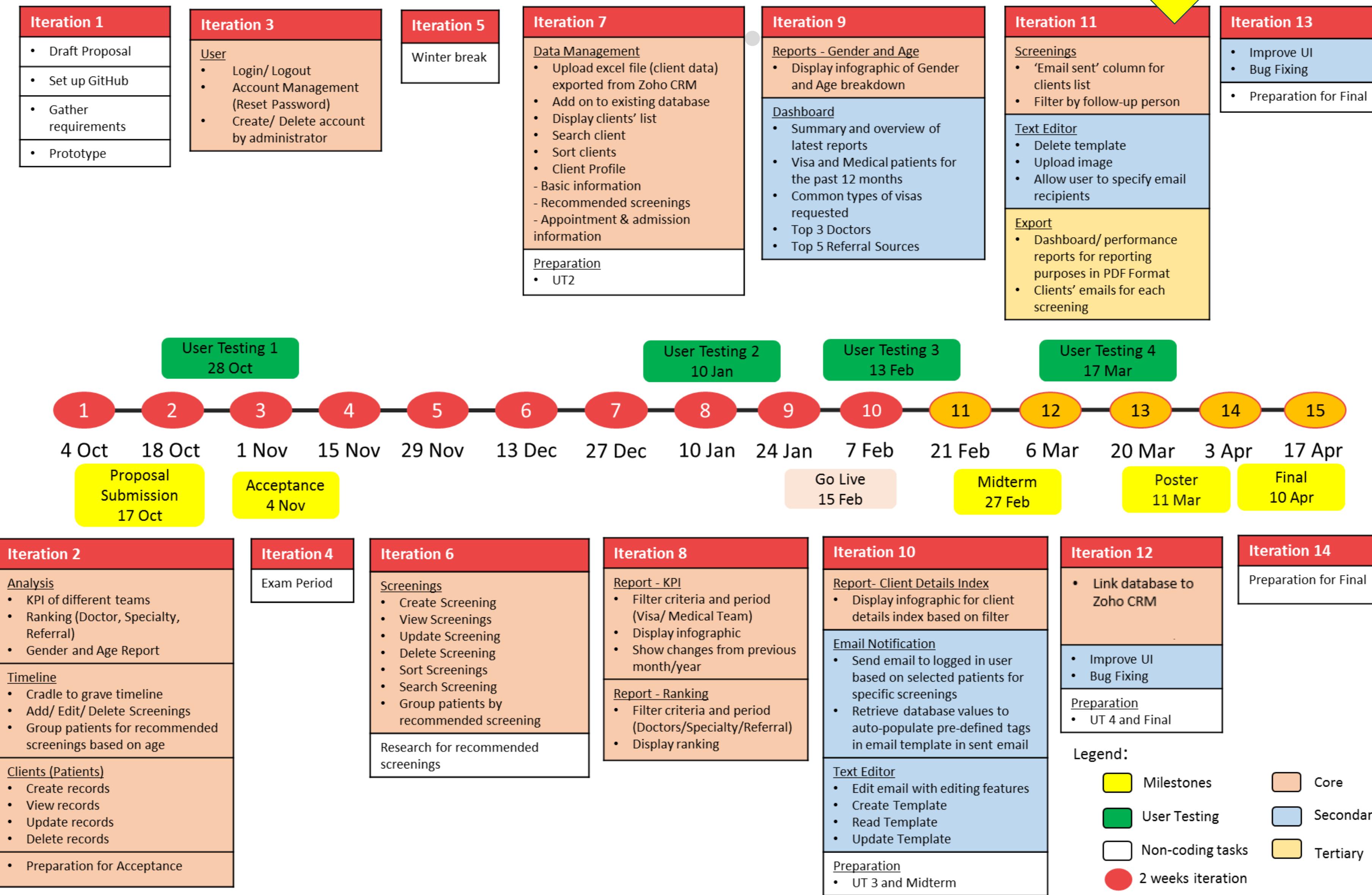


**83%**  
Completed

# Planned Schedule



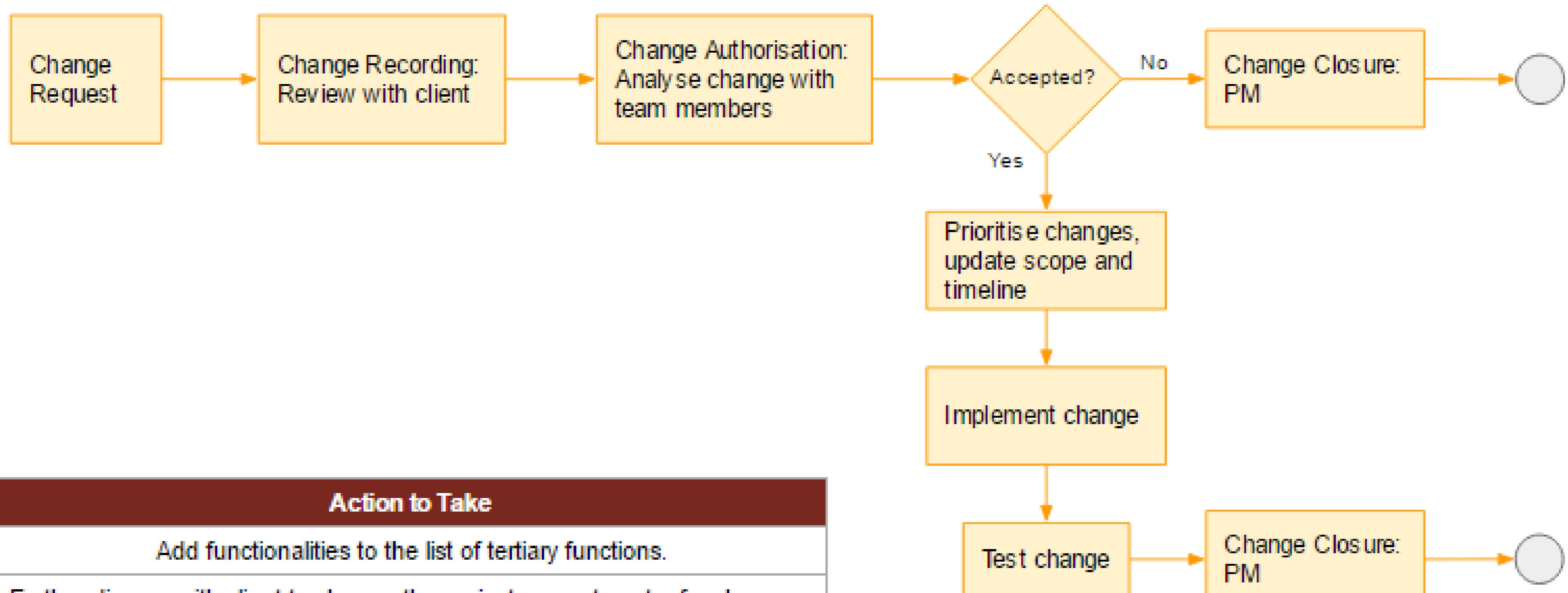
# Actual Schedule



# Change Management



# Change Management Process



# Changes

Added/Modified	Removed
Report – POC Index ✓	Doctors
Database – take in additional fields from excel file ✓	Tasks
CRUD Templates feature ✓	Services
Screenings – follow up person ✓	SMS Notification
Screenings – email sent column	Rules
Text editor allows selection of recipients	Invoices
Text editor allows upload of images	Currency Conversion
Export client emails in excel	Creating additional tabs/ modules

# Change Log

Iteration	Requested On	Change Description	Reason of Change	Change Feasibility	Effort	Priority Level	Accepted/Rejected	Status
4	1 December 2016	To focus on Analysis/ Screening functions instead of replicating current Zoho CRM that client is using	High risk of trying to replace entire system	Change in scope will fit into schedule without causing any delay	-	High	Accepted	Completed
6	24 December 2016	Move "Upload Client's data module" to Iteration 7	High number of bugs to fix for Screenings module leading to delay in completion	Change in scope will fit into schedule without causing any delay	Add 20 man-hours in next Iteration	High	Accepted	Completed
8	17 January 2017	Add in new function: Report - Index (Point System) for clients	Client requested for function that will help with their goal for 2017 - To record more customer contact details	Change in scope will fit into schedule without causing any delay	15 man-hours	High	Accepted	Completed
8	17 January 2017	New function: Report - Index (Point System) requires additional fields (clients' contact information) in database for calculation.	Client requested for function that will help with their goal for 2017 - To record more customer contact details	Change in scope will fit into schedule without causing any delay	1 man-hour	High	Accepted	Completed

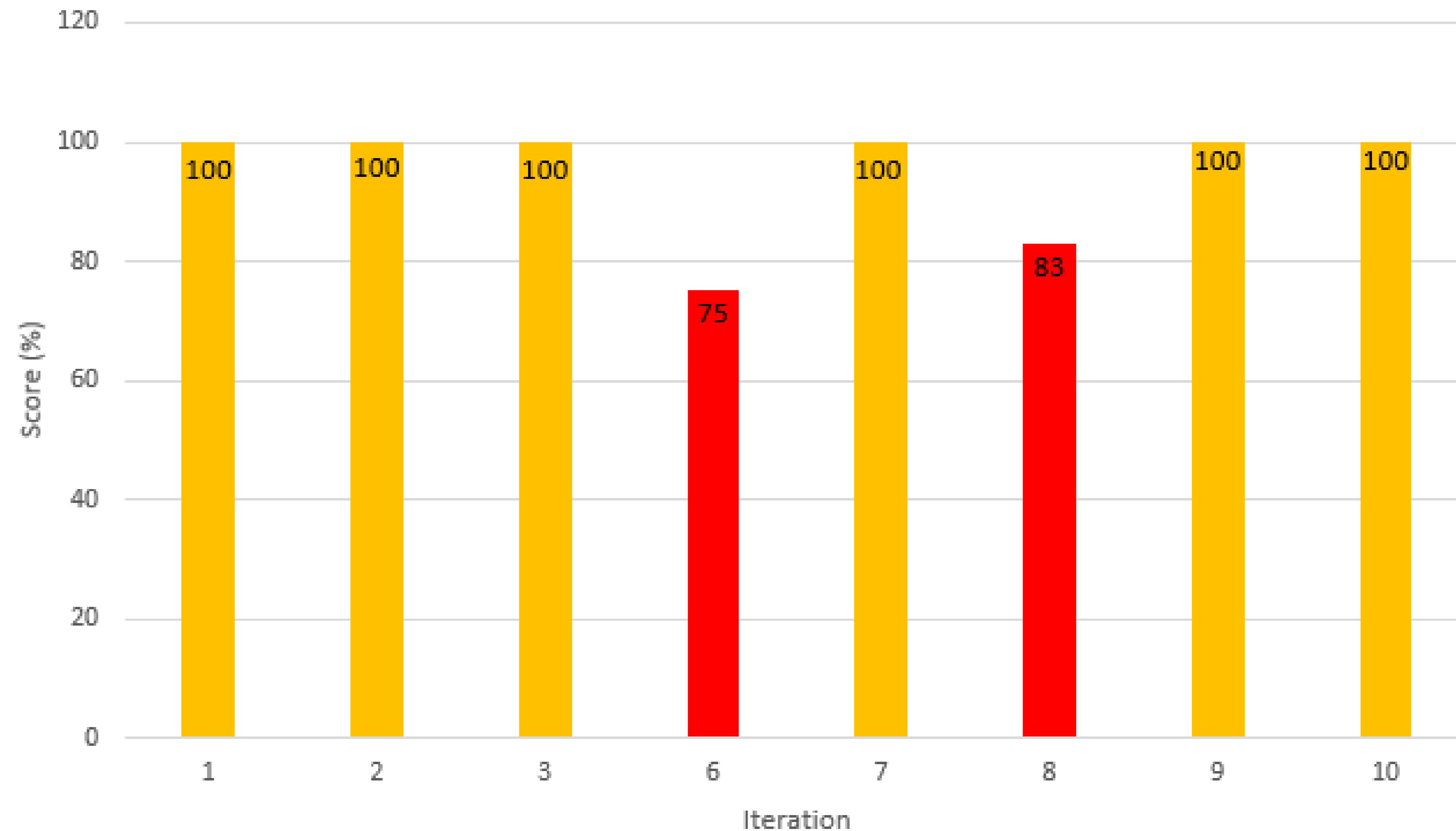
# Change Log

Iteration	Requested On	Change Description	Reason of Change	Change Feasibility	Effort	Priority Level	Accepted/Rejected	Status
8	21 January 2017	Critical bugs requires fixing	Moved Gender-Age to iteration 9	Change in scope will fit into schedule without causing any delay	Add 8 man-hours to iteration 9	High	Accepted	Completed
10	13 February 2017	Added CRUD function for templates created with text editor	Templates should be saved and retrieved easily so user do not have to recreate	Change in scope will fit into schedule without causing any delay	8 man-hours	High	Accepted	Completed
10	13 February 2017	Text editor should allow user to input recipient instead of only sending email to logged in user.	There may be more than one recipient for a particular email.	Change in scope will fit into schedule without causing any delay	5 man-hours	Medium	Accepted	PM to reschedule tasks, update scope and timeline
10	13 February 2017	Added upload image function for text editor	User might need to send out advertisements for screenings	Change in scope will fit into schedule without causing any delay	5 man-hours	Medium	Accepted	PM to reschedule tasks, update scope and timeline

# Change Log

Iteration	Requested On	Change Description	Reason of Change	Change Feasibility	Effort	Priority Level	Accepted/Rejected	Status
10	13 February 2017	Added email sent column for screenings - filtered clients page	he has already sent the recommended screenings email to the clients before	Change in scope will fit into schedule without causing any delay	8 man-hours	High	Accepted	Completed
10	13 February 2017	Added followup person dropdown filter for screenings - filtered clients page	User can easily view their own clients using the filter	Change in scope will fit into schedule without causing any delay	1 man-hour	High	Accepted	Completed
10	16 February 2017	Export list of clients' emails for selected screening	Excel file for easy reference	Change in scope will fit into schedule without causing any delay	5 man-hours	Medium	Accepted	PM to reschedule tasks, update scope and timeline

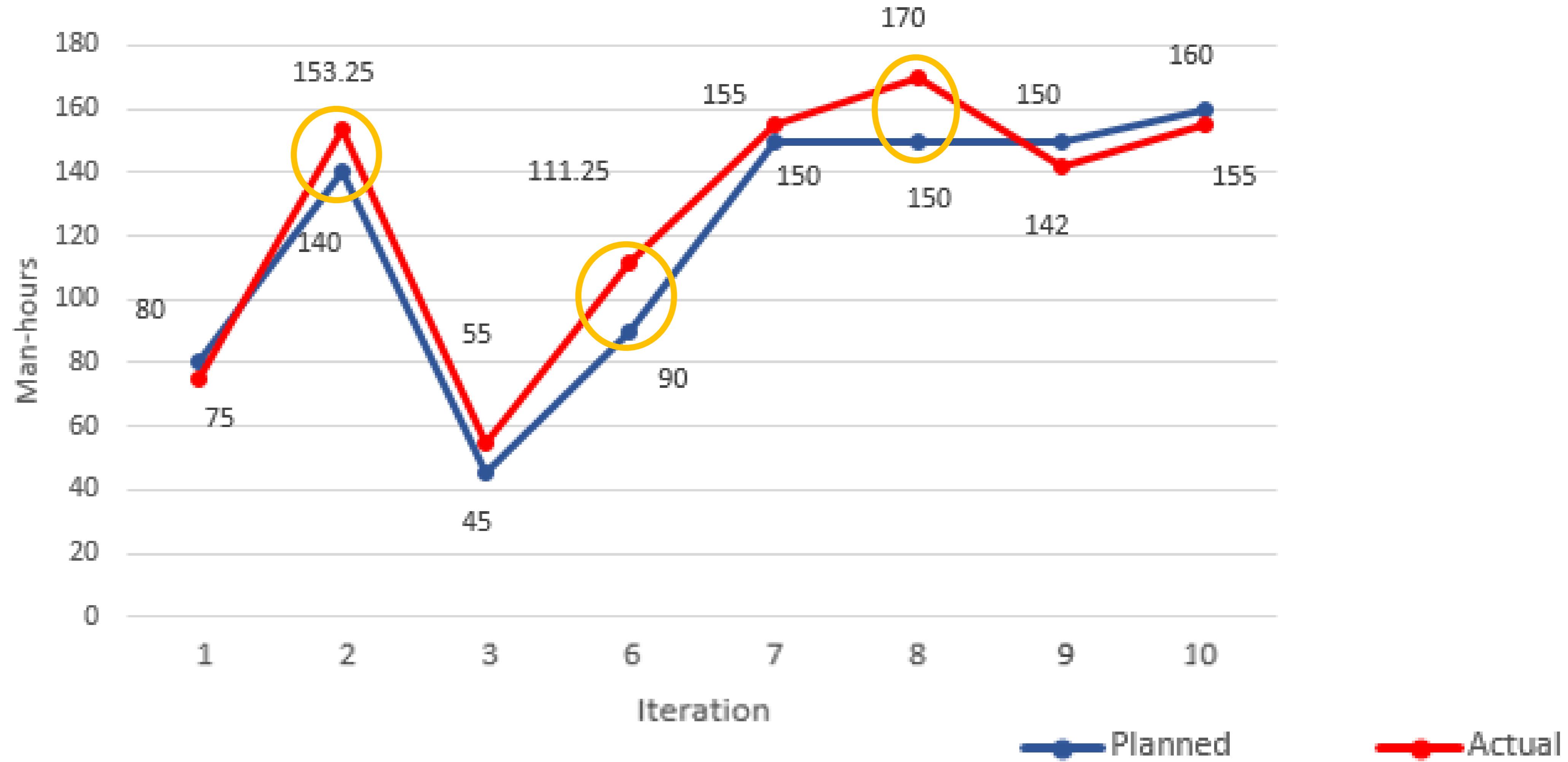
# Task Metric



# Task Metric

Iteration	Iteration 6	Iteration 8
Actual : Planned (Tasks)	6 : 8	5 : 6
TM Score	75%	83%
Problem	<p>Bugs:</p> <p>Screenings</p> <ul style="list-style-type: none"> <li>Edit screenings – unable to update screenings</li> <li>Unable to view filtered clients' list</li> </ul>	<p>Bugs:</p> <p>Reports – KPI and Ranking</p> <ul style="list-style-type: none"> <li>Incorrect data displayed</li> <li>UI – date picker, filtered values</li> </ul>
Action taken	Shifted uploading data to next Iteration	Shifted Gender - Age report to next Iteration

# Effort Metric



# Risk Management

		Likelihood		
		Low	Medium	High
Impact		B	A	A
High		C	B	A
Medium		C	B	A
Low		C	C	B

## Technical Risk



Unfamiliar with coding language  
E.g. Javascript, JQuery



- More experienced developer to share knowledge
- Developers to research & learn technologies
- Assistant developer to help with complex tasks

# Risk Management

		Likelihood		
		Low	Medium	High
Impact		B	A 	A
High		C	B	A
Medium		C	C	B
Low		C	C	B

## Project Management Risk

Allocation of too much/ little time for development of functions

- Buffer days before submission
- Allocate more time for more complex tasks

# Risk Management

		Likelihood		
		Low	Medium	High
Impact		B	A 	A
High		C	B	A
Medium		C	C	B
Low		C	C	B

Client Risk



Change in client's requirement



- Meet & update client bi-weekly
  - Ensure that development is on par with client's requirements
- Present client prototype before development

# X-FACTOR

...

## Midterm

- At least 50% of clients' responses (via email, phone calls)

# X-FACTOR

Thu 16/2/2017 10:30 AM  
  
Ulink health tips: Have you got your colonoscopy?  
To  Linda Siew

Thanks for this.

I may be arranging a visit to Singapore soon. Maybe I can schedule this in

Keep in touch

Regards,  


On Feb 15, 2017, at 19:43, Linda Siew <@> wrote:

Dear 

Happy 2017 from Ulink Assist!

A gentle reminder that it is nearly time for your colonoscopy if you or your loved ones have not done so!

# X-FACTOR

Wed 15/2/2017 6:13 PM

Re: Ulink health tips: The importance of pap smear

To: Linda Siow

Hello,  
Thank You for email.

May I ask how much does the test below cost?

Regards

On Feb 15, 2017, at 18:13, Linda Siow [REDACTED] wrote:

Dear [REDACTED]

Happy 2017 from Ulink Assist!

Tick off your new year resolution to stay healthy by getting a Pap smear done.

# X-FACTOR

• • •

 Wed 15/2/2017 8:54 PM  
Re: Ulink health tips: The importance of pap smear

To  Linda Siow  
 You replied to this message on 16/2/2017 9:57 AM.

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Thank you Linda,

Angele is my daughter and she is 3 yo. Does that apply to her?

Regards



On Feb 15, 2017, at 18:23, Linda Siow  wrote:

Dear 

Happy 2017 from Ulink Assist!

Tick off your new year resolution to stay healthy by getting a Pap smear done.

Pap smear is a simple screening you can take to identify and prevent cervical cancer. When detected early, there is an 80 percent chance of recovery. The [American Cancer Society](#) recommends women 21 years old and above to have a Pap smear every 3 years.

Click [here](#) to learn more about how you can prepare for your Pap smear examination.

We help our clients arrange consultations with the best gynaecologists in Singapore.

# X-FACTOR

...

Final

- Ulink Reporting System fetches live data from Zoho CRM
- Increase user interactions with the system by 15 %

# What's next?

- Text Editor – upload image & allow user to specify email recipients
- Export reports function

Iteration 12  
(6 March 2017)

- Bug fixes for UT 4
- UI Improvements

Iteration 14  
(3 April 2017)

After midterms

- Link database with Zoho CRM
- Bug fixes
- UI Improvements
- UT 4

Iteration 13  
(20 March 2017)

- Bug fixes
- Preparation for Final presentation

# Reflections

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**NICOLE**

I am more familiar with front-end development and feedback from users are very important to me as they help to make the UI more user-friendly

**SHU YAN**

I have learnt the importance of conducting User Testing and different users have different expectations of the system

**SEAN**

Learnt to prioritise changes and adopt suggestions from user so that we can improve the system

**KAIXIN**

Knowing how to prepare for change and understanding business requirements is important to deliver a good product

**NABILAH BANU**

In addition to gathering user requirements, I've learnt more about front-end development as an assistant front-end developer



# Thank you