Development of NSACP Dashboard

FEASIBILITY ASSESSMENT REPORT

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1 INTRODUCTION

1.1 Document Purpose

The feasibility assessment report is a document that assesses potential solutions to the problem or opportunity and determines which of these are viable for further analysis. The purpose of the feasibility assessment report is to present the project parameters and define the potential solutions to the defined problem, need or opportunity. Having brainstormed a variety of potential solutions, the project team expands on each of these potential solutions, providing sufficient details to recommend the viable potential solutions that should be further analyzed. Project constraints and dependencies will be identified to minimize the risk of the project.

This feasibility assessment report will provide a detailed description related to the feasibility study carried out in regards to the “Development of NSACP dashboard” project. The entire report refer to the requirements of end users and technical feasibility of the project. Main intention of this feasibility assessment is to identify key indicators, data sources, data visualization and identify technical capacity which is required to develop the end product.

Further, this feasibility assessment report will provide a set of recommendations on technical and data visualization aspect which will be helpful to operationalize the project. This report can be referenced throughout the implementation process for the better success of this project.

1.2 Project Description

The National STD/AIDS Control Program (NSACP) is responsible for planning and implementing STI/HIV prevention and control activities in the country. It is a well-organized programme under the Ministry of Health with both preventive and curative services. The goal of the NSACP is to interrupt transmission of STI including HIV and provide care and support for those infected and affected. The NSACP coordinates the response, through the development of technical strategies and guidelines, development of annual operational plans and budgets, resource mobilization, and capacity building of all implementing partners.

The main components of the NSACP working towards achieving these objectives are policy development, management and care of sexually transmitted infections, STI /HIV/AIDS surveillance, behavior change communication, counseling, laboratory support, prevention of mother to child transmission of HIV, infection control, research, treatment care and support for those infected and affected with HIV/AIDS.

NSACP is working with lots of datasets related to national level programs and it is an urgent need to have a platform where citizens and any interested party can access this datasets of various purposes. Therefore, NSACP is expected to develop an online dashboard to visualize the relevant information of their programme. The main purpose of the dashboard is to visualize set of identified indicators for key decision making and public awareness.

1.3 Objectives

NSACP expect to accomplish set of objectives by developing the proposed NSACP online dashboard as follows;

- To present a comprehensive view of the programme with details and critical indicators.
- To visualize the NSACP data based on different key indicators to decision makers, internal staff and the general public.
- To generate required documents by using the available data and download them in various formats whenever required for the decision making and reporting purposes.
- Implementing a single point of data access and store all the data in one place based on the key indicators.
- Manage SIMU data of NSACP based on different key indicators and help system admins to analyze them.

2 PROPOSED NSACP ONLINE DASHBOARD

2.1 Solution Overview

The Electronic Information Management System (EIMS) of NSACP is developing gradually and for the time it is available for selected set of clinics. Therefore currently all data is recording, storing and manipulating using MS Excel, until the EIMS implemented in all clinics. Under the proposed dashboard, such data will be visualized according to the identified Key Indicators. Users of Strategic Information Management Unit (SIMU) can upload relevant datasets to the proposed dashboard and it will be graphically visualized against identified key indicators.

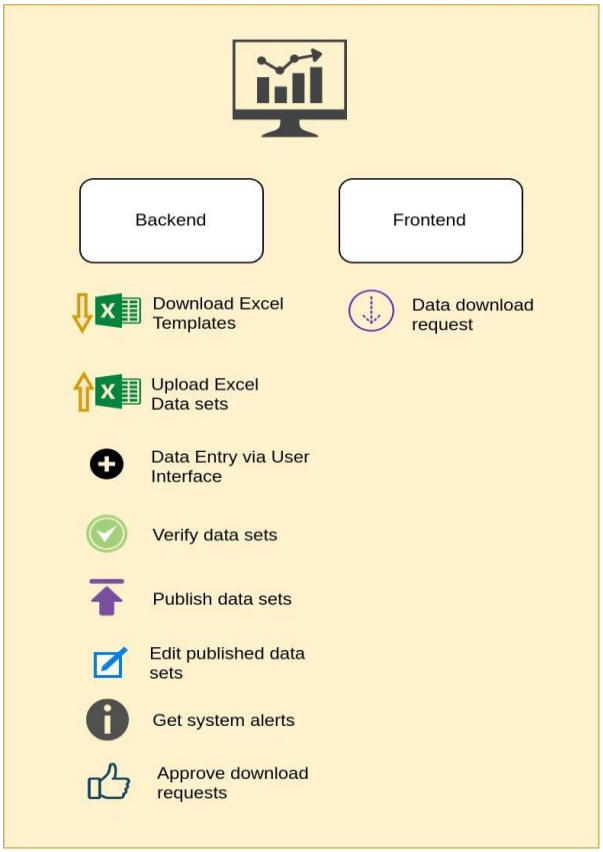

Figure 1: Solution Overview

2.2 Proposed System Architecture

System architecture is the conceptual model that defines the structure, behavior and more views of the system. Architecture is the process of defining a structured solution that meets all of the technical and operational requirements, while optimizing common quality attributes such as performance, security and manageability.

Proposed system will be implemented using 3 tier distributed client architecture, which can be elaborated as below;

- **Client Tier:** Responsible for the presentation of data, receiving user events and controlling user interface.
- **Application Server Tier:** The actual business logic implements here and available to the client tier. This tier protects data from direct access by the clients. Object oriented analysis will be aimed at the development of this layer.
- **Data Server Tier:** Backend tier with the database and responsible for data storage.

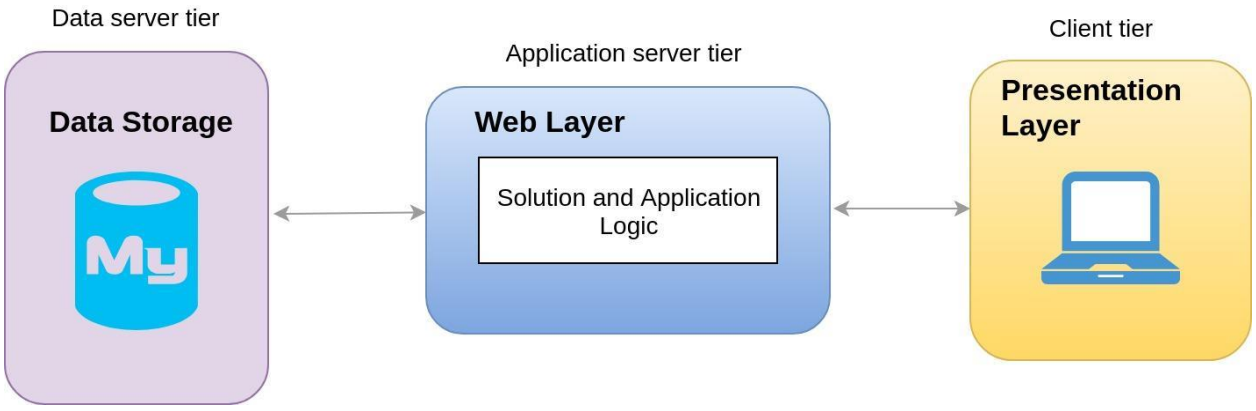

Figure 2: Three Tier Distributed Client Architecture

Proposed architecture enables to achieve the required quality attributes as follows.

- Performance

The decoupling of the clients from the application server enables to use high performance machine for only the application server and the clients can be thin clients. Since the data server and application server reside on the same machine, it would possible to tune the data server and the application programs to achieve the desired performance and network overload is avoided. Dynamic load balancing can be done as well.

- Flexibility

Since there is a different client tier, clients can be thin clients, or full-fledged clients running any operating system. It is easily possible to increase the number of terminals as required.

- Security

The security features can be implemented at the application server layer. Security is bolstered by the decoupling of the application server and the clients. As a rule servers are trusted systems. Therefore it makes sense to run critical business processes that work with security sensitive data on the server.

- Modifiability

Redefinition of the storage strategy will not be influence the clients. Relational database management system offers a certain independence from storage details for the clients. Client access data over a stable and well-designed interface which encapsulates all the storage details. The application server can be built using the Object oriented design paradigm and can provide for the incremental changes.

Following figure 3.0 illustrates the system architecture diagram for the proposed system.

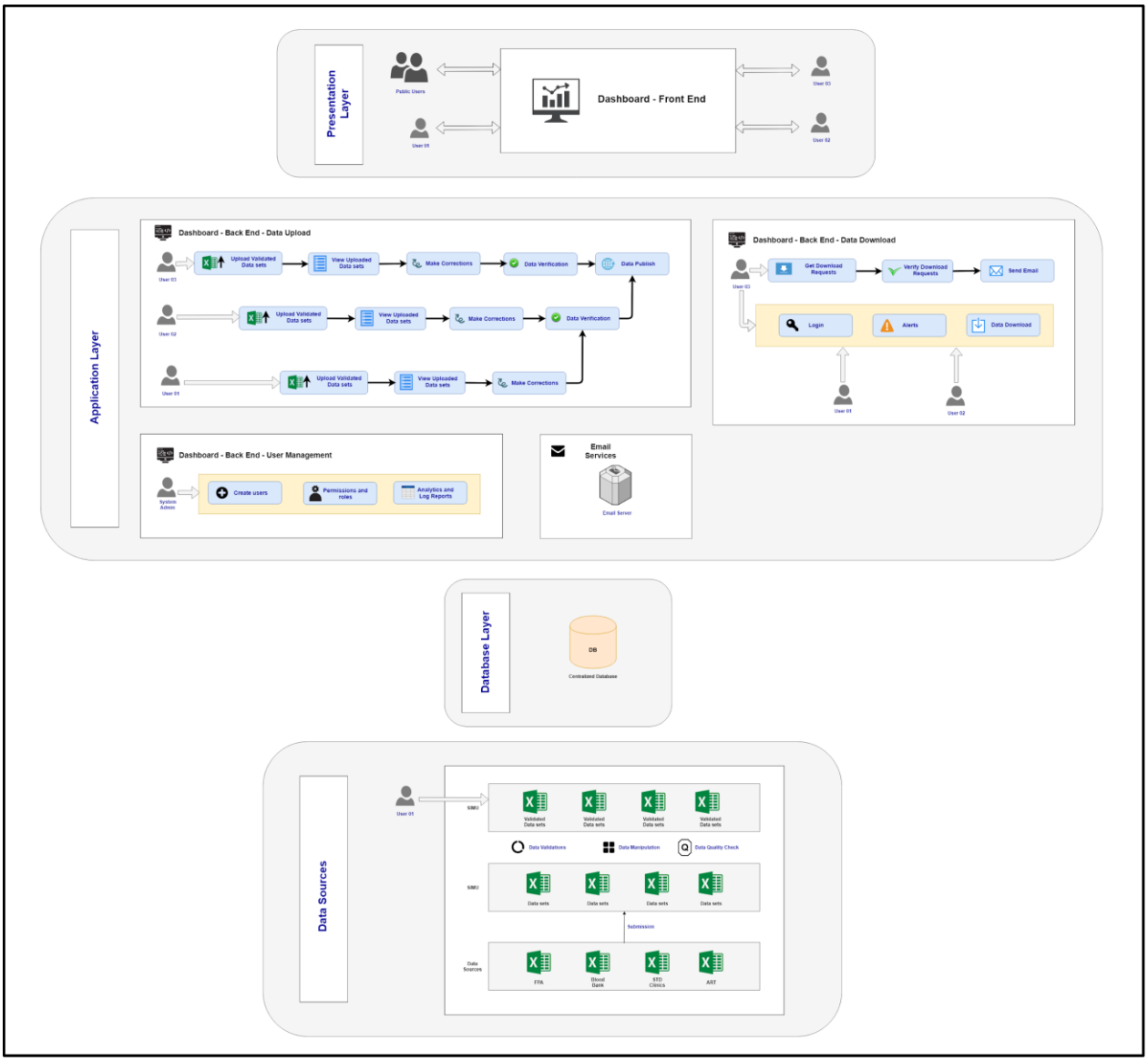

Figure 3: System Architecture Diagram for proposed NSACP dashboard

2.3 Main Processes of the proposed dashboard

2.3.1 User Access Control Process

Role based access control is an approach to restricting system access to authorized users. It defines roles and privileges and makes it simple to perform user assignments. Following Table 1 shows how the proposed dashboard will be developed in user role based manner.

User Management - Access Control		
Entity	**User Levels**	**Functionalities**
NSACP	User Level 1	• Login to backend • Upload data in Excel format • Changes can be done until click on Submit • Submit to Level 02 user • No changes allowed after submission • Data download (Excel/PDF/JPEG/PNG)
	User Level 2	• Login to backend • Upload data in Excel format • Validate and verify added data by Level 01 user • Allow to do necessary changes until verify the data set • Verification for uploaded data set • No changes allowed after verification • Data download (Excel/PDF/JPEG/PNG)
	User Level 3	• Login to backend • Upload data in Excel format • Publish final data sets • Allow changes after publish • Data download (Excel/PDF/JPEG/PNG) • Approval for data download requests by Public user
System Admin	-	• Create users • Create/edit user permissions and roles • Generate analytics and log reports
Public	-	• View all published content/data in the dashboard • Request for Download data sets

Table 1: User Access Control

Following figure 4.0 illustrates the user characteristics of NSACP user level 01.

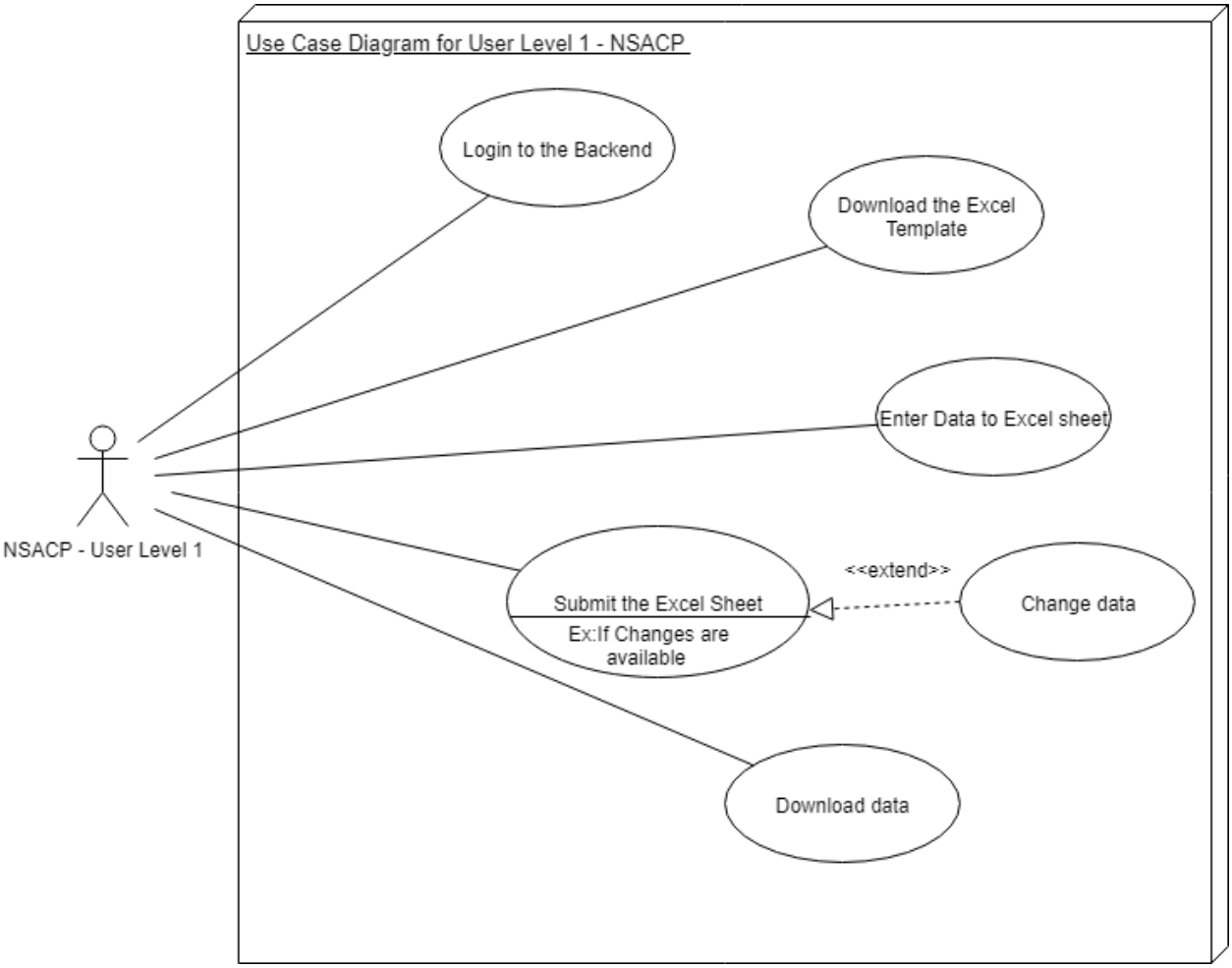

Figure 4: Use Case Diagram for User Level 1 - NSACP

Following figure 5.0 illustrates the user characteristics of NSACP user level 02.

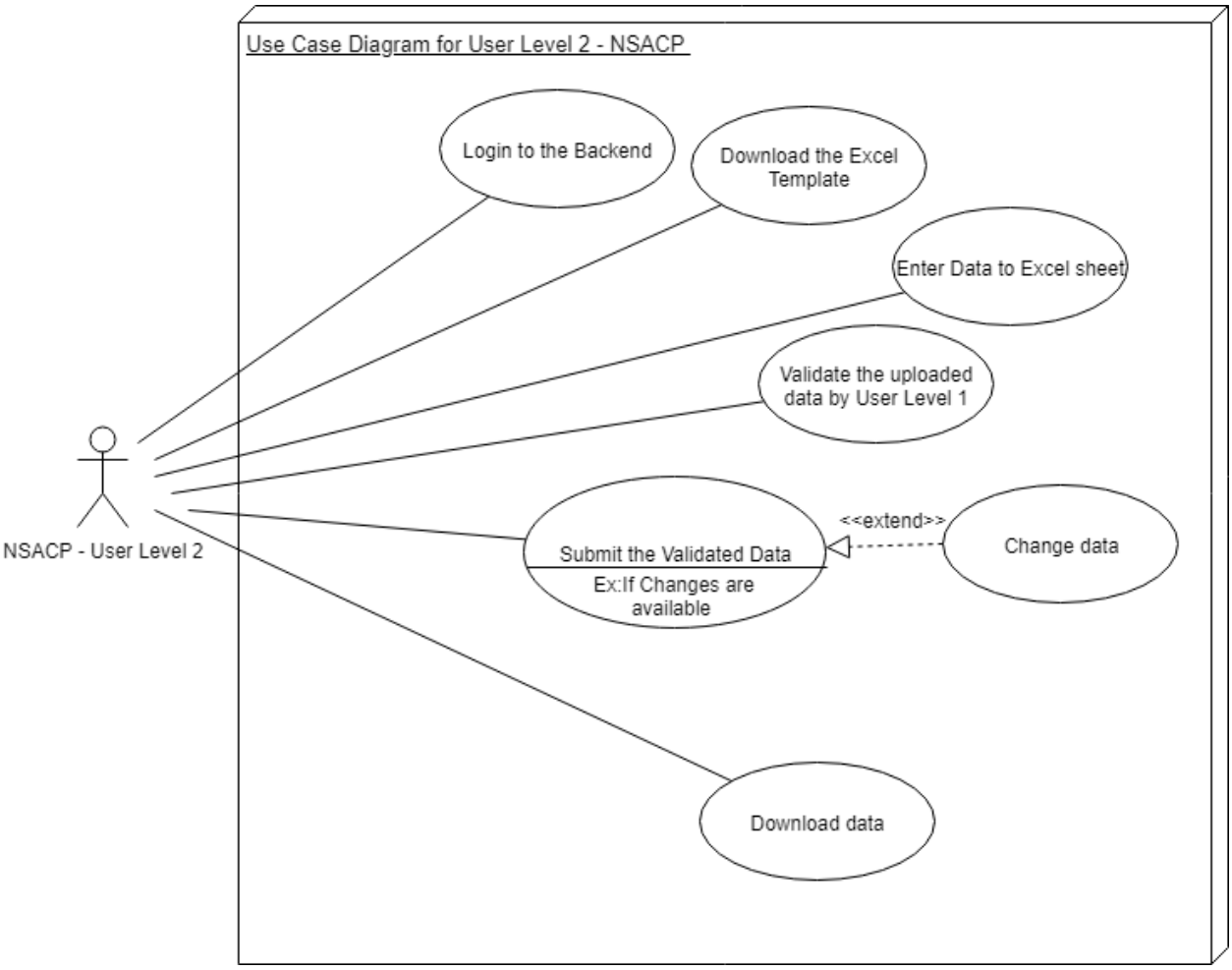

Figure 5: Use Case Diagram for User Level 2 - NSACP

Following figure 6.0 illustrates the user characteristics of NSACP user level 03.

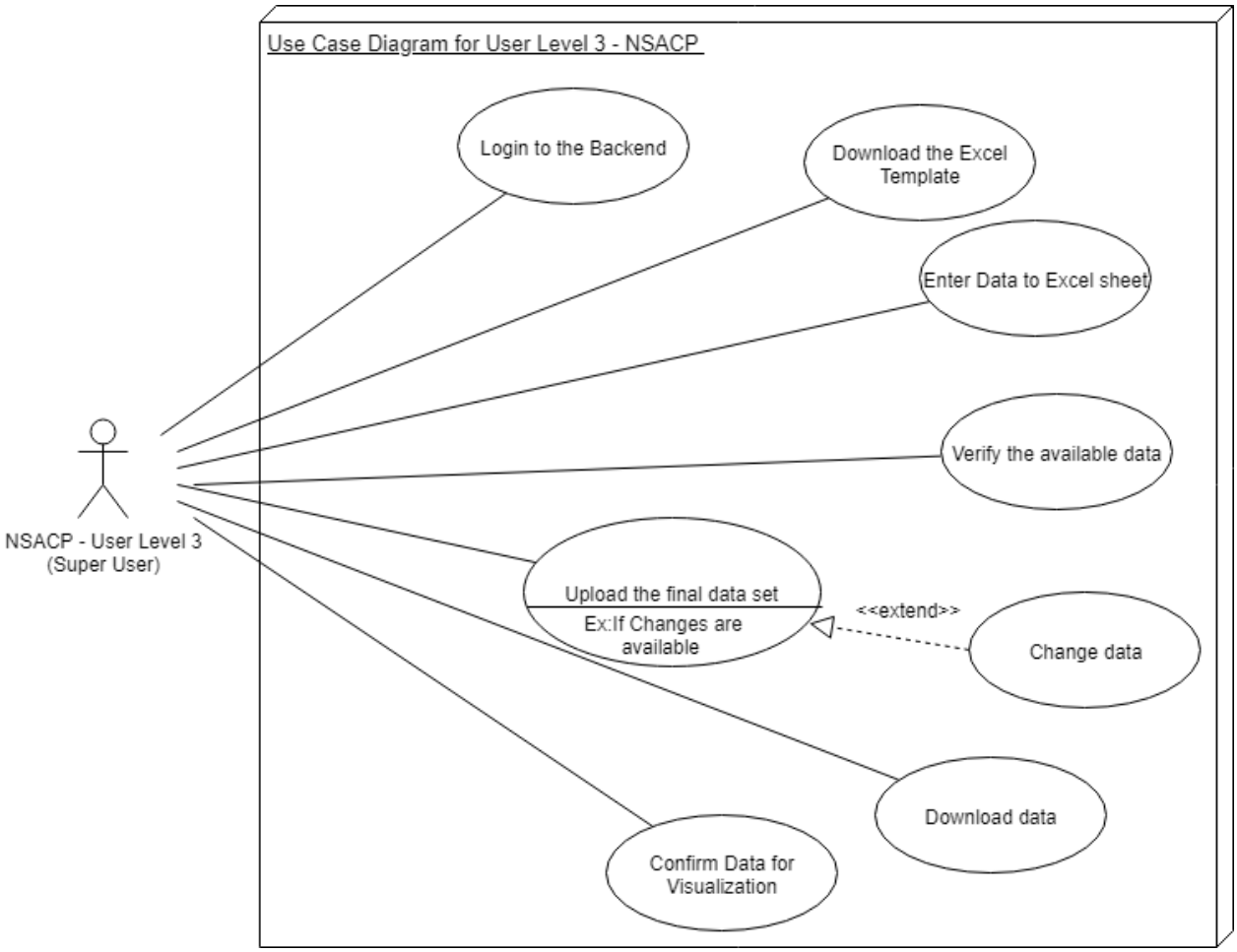

Figure 6: Use Case Diagram for User Level 3 – NSACP

Following figure 7.0 illustrates the user characteristics of System Admin.

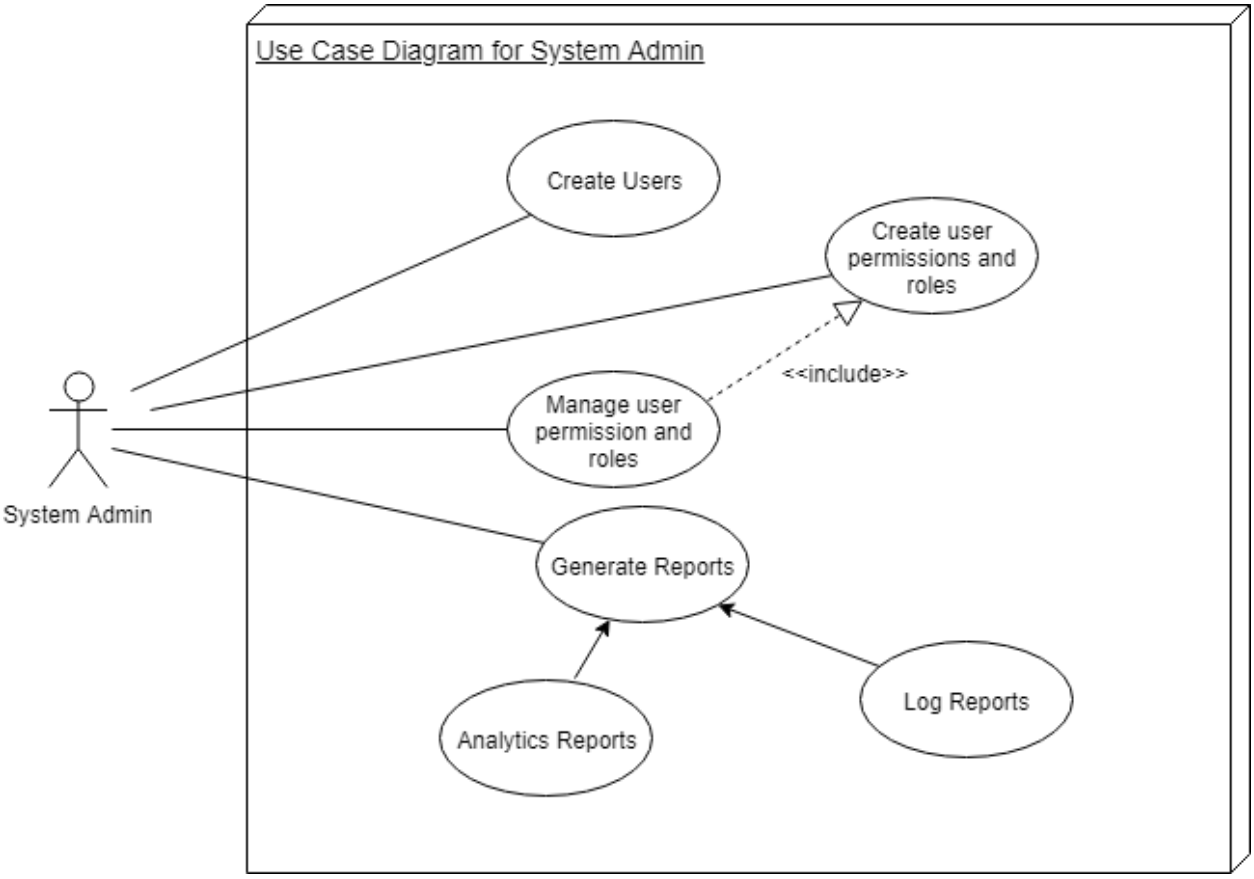

Figure 7: Use Case Diagram for System Admin

Following figure 8.0 illustrates the user characteristics of Public User.

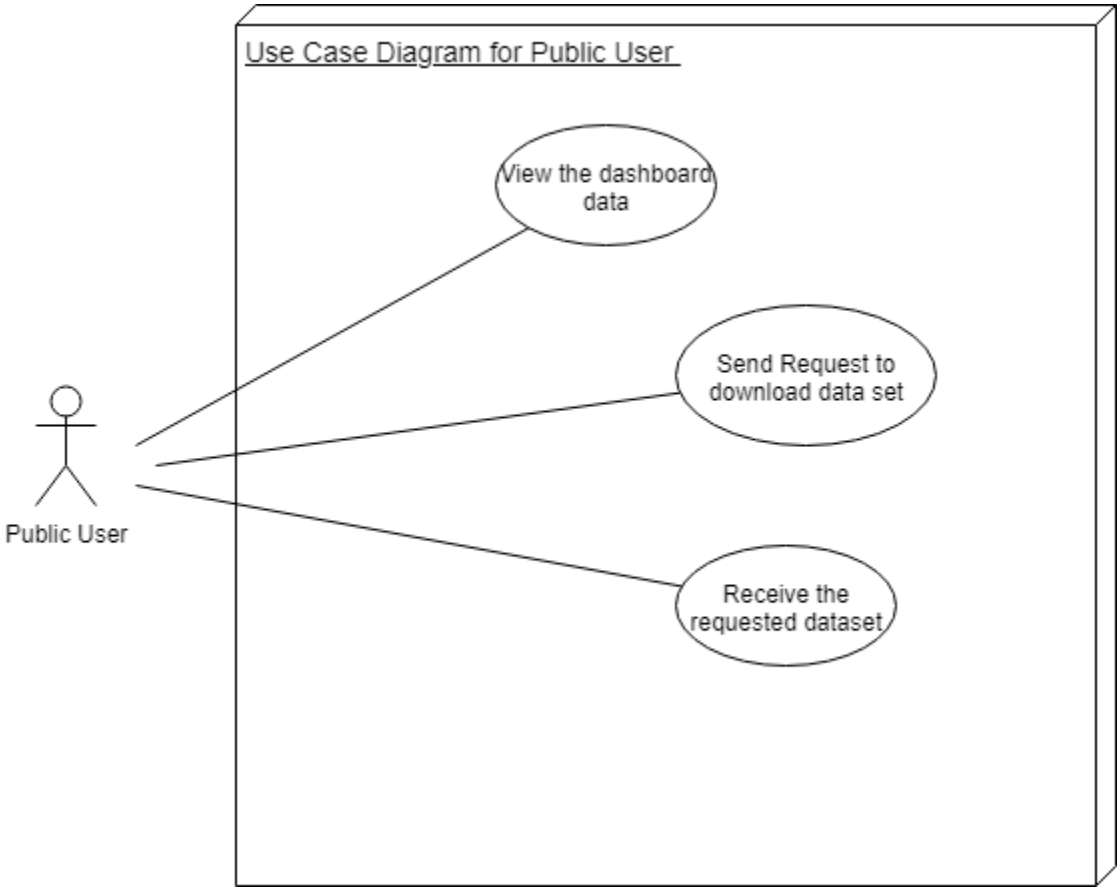

Figure 8: Use Case Diagram for Public User

2.3.2 Data Uploading Process

The proposed NSACP dashboard will contain the data uploading process and NSACP User Level 1, User Level 2 and User Level 3 will perform the relevant functionalities in that process as illustrated in figure 9. In brief, all three users will be able to enter, change and upload NSACP data using Excel format. The data validation option will be done by User Level 2. At the end of the process, User Level 3 will verify the data set and give the confirmation for visualization of the NSACP data.

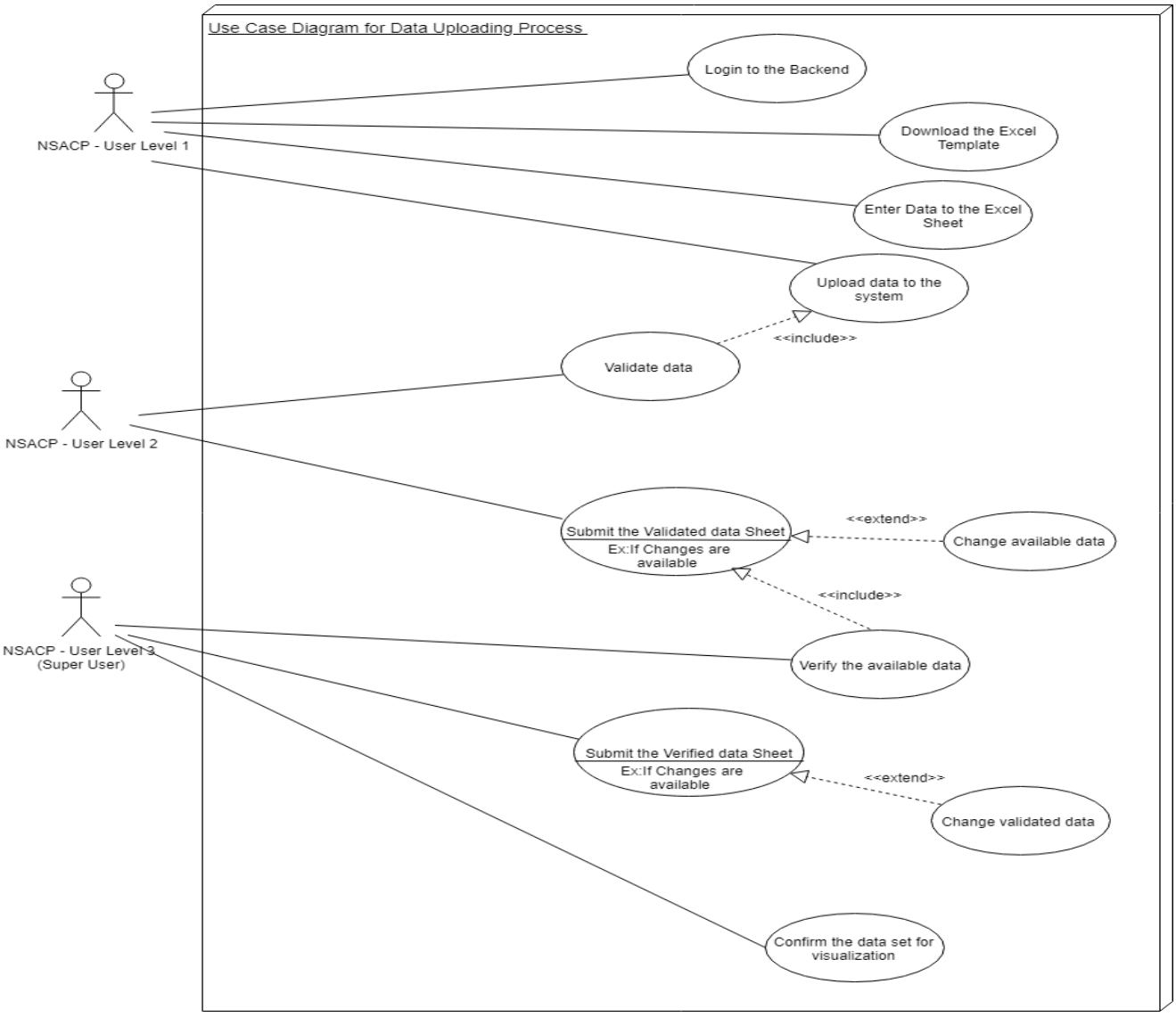

Figure 9: Use Case Diagram for Data Uploading process of proposed NSACP Dashboard

Use Case	Login to the backend
Actor	NSACP - User Level 1, User Level 2 & User Level 3
Description	
Authorized users will login to the backend of the system to perform the suitable functionalities.	
Pre-Conditions	
System admin must have given the user permission to relevant users by creating their roles.	
Flow Events	
1. Enter the username and password. 2. Login to the system backend.	
Post Conditions	
Each and every user will continue the system with own functionalities.	

Table 2: Use Case Narrative - Login to the backend

Use Case	Download the Excel Template
Actor	NSACP - User Level 1, User Level 2 & User Level 3
Description	
User will select the suitable template based on their requirement and download the template.	
Pre-Conditions	
The authorized users must have logged in to the system	
Flow Events	

1. User login to the system 2. Select the suitable template. 3. Download the Excel template
Post Conditions
User will continue the data uploading process.

Table 3: Use Case Narrative - Download the Excel Template

Use Case	Enter data to the Excel sheet
Actor	NSACP - User Level 1, User Level 2 & User Level 3
Description	
User will enter the NSACP data to the Excel sheet based on different user access level.	
Pre-Conditions	
The authorized users must have logged in to the system.	
Flow Events	
1. User login to the system 2. Select the suitable template. 3. Download the Excel template. 4. Enter NSACP data to the Excel sheet.	
Post Conditions	
User will be able to change the available data based on different user access level until submit the data sheet to the system.	

Table 4: Use Case Narrative - Enter data to the Excel sheet

Use Case	Upload data to the system
Actor	NSACP - User Level 1, User Level 2 & User Level 3
Description	
User will enter NSACP data to excel sheets and upload the sheet to the system.	
Pre-Conditions	
The authorized users must have logged in to the system.	
Flow Events	
1. User login to the system 2. Download the Excel template 3. Enter NSACP data to the Excel sheet. 4. Upload the completed Excel sheet. 5. Click the “Submit” button.	
Post Conditions	
● NSACP - User Level 1 will not be able to do any changes once he submits the data set. ● Data set will be locked in the system.	

Table 5: Use Case Narrative - Upload data to the system

Use Case	Validate Data
Actor	NSACP - User Level 2
Description	
User will enter NSACP data to excel sheets and upload the sheet to the system with validating the available data.	
Pre-Conditions	
The authorized user must have logged in to the system. NSACP User Level 1 must have uploaded the dataset to the system.	

Flow Events
1. User login to the system 2. Download the Excel template 3. Enter data to excel sheet. 4. Validate the available data.
Post Conditions
User will continue the data uploading process with validated data set.

Table 6: Use Case Narrative -Validate Data

Use Case	Submit the validated data sheet
Actor	NSACP - User Level 2
Description	
User will upload the validated dataset to the system.	
Pre-Conditions	
The authorized user must have logged in to the system. NSACP User Level 1 must have uploaded the dataset to the system. NSACP User Level 2 must have validated the data set.	
Flow Events	
1. Login to the system. 2. Enter data to the Excel sheet. 3. Validate the available data set. 4. Complete changes for the available dataset, if the changes are required. 5. Upload the validated data set. 6. Click the “Submit” button.	

Post Conditions
• NSACP - User Level 2 will not be able to do any changes once he submits the data set. • Data set will be locked in the system.

Table 7: Use Case Narrative -Submit the validated data sheet

Use Case	Verify the available data in the system
Actor	NSACP- User Level 3
Description	
User will enter the system and verify the available data in the system.	
Pre-Conditions	
The authorized user must have logged in to the system. NSACP User Level 1 must have uploaded the dataset to the system. NSACP User Level 2 must have uploaded the validated data set to the system.	
Flow Events	
1. Login to the system. 2. Download the Excel template. 3. Enter data to the Excel sheet. 4. Verify the available data set in the system.	
Post Conditions	
User will continue the data uploading process with verified data set.	

Table 8: Use Case Narrative -Verify the available data in the system

Use Case	Submit the verified dataset
Actor	NSACP- User Level 3
Description	
User will verify the available data set and upload the verified data set to the system.	
Pre-Conditions	
The authorized user must have logged in to the system. NSACP User Level 1 must have uploaded the dataset to the system. NSACP User Level 2 must have uploaded the validated data set to the system. NSACP User Level 3 must have verified the dataset.	
Flow Events	
1. Login to the system 2. Enter data to the Excel sheet. 3. Verify the available data set in the system. 4. Complete changes for the available dataset, if the changes are required. 5. Upload the verified data set. 6. Click the “Submit” button.	
Post Conditions	
• NSACP - User Level 3 will not be able to do any changes once he submits the data set. • Data set will be locked in the system.	

Table 9: Use Case Narrative - Submit the verified dataset

Use Case	Confirm the dataset for visualization
Actor	NSACP- User Level 3
Description	
User will give the confirmation to verified data set for visualization in the dashboard.	
Pre-Conditions	

The authorized user must have logged in to the system. NSACP User Level 1 must have uploaded the dataset to the system. NSACP User Level 2 must have uploaded the validated data set to the system. NSACP User Level 3 must have uploaded the verified dataset to the system.
Flow Events
1. Login to the system. 2. Verify the available dataset. 3. Upload the verified data set. 4. Confirm the data set for visualization.
Post Conditions
• Once the NSACP User Level 3 confirms the data set for visualization, it will be visualized on the dashboard for any users.

Table 10: Use Case Narrative - Confirm the dataset for visualization

The following figure 10.0 will illustrate the flow of the data uploading process in the proposed NSACP dashboard.

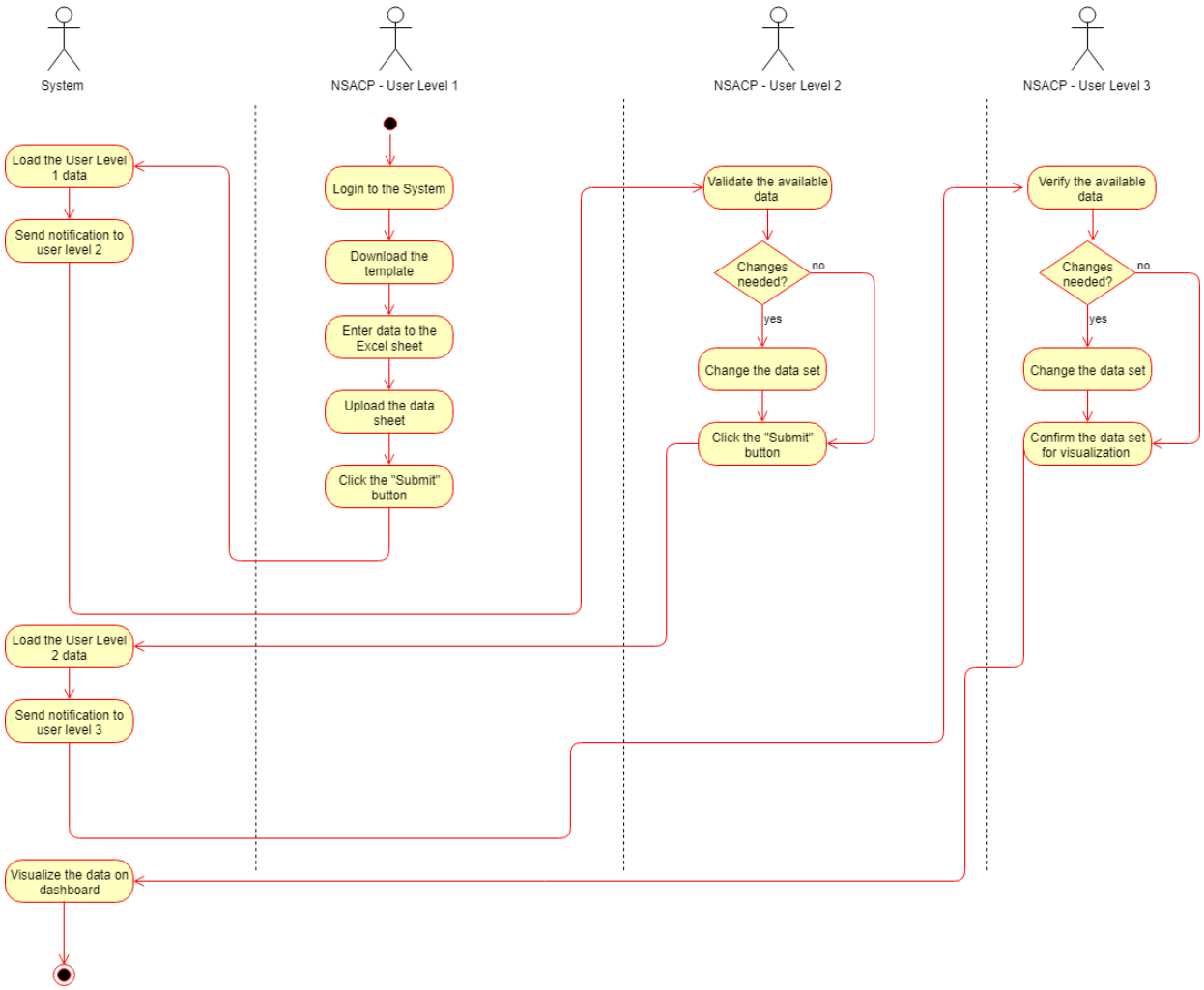

Figure 10: Activity Diagram for Data Uploading process of proposed NSACP Dashboard

2.3.3 Data Downloading Process

Data downloading is another main process of the proposed NSACP dashboard. This process will include the functionalities of public user and NSACP User Level 3. Public user will be able to request the data set to download and NSACP user level 3 will verify the requested data set and send the reply as an email notification.

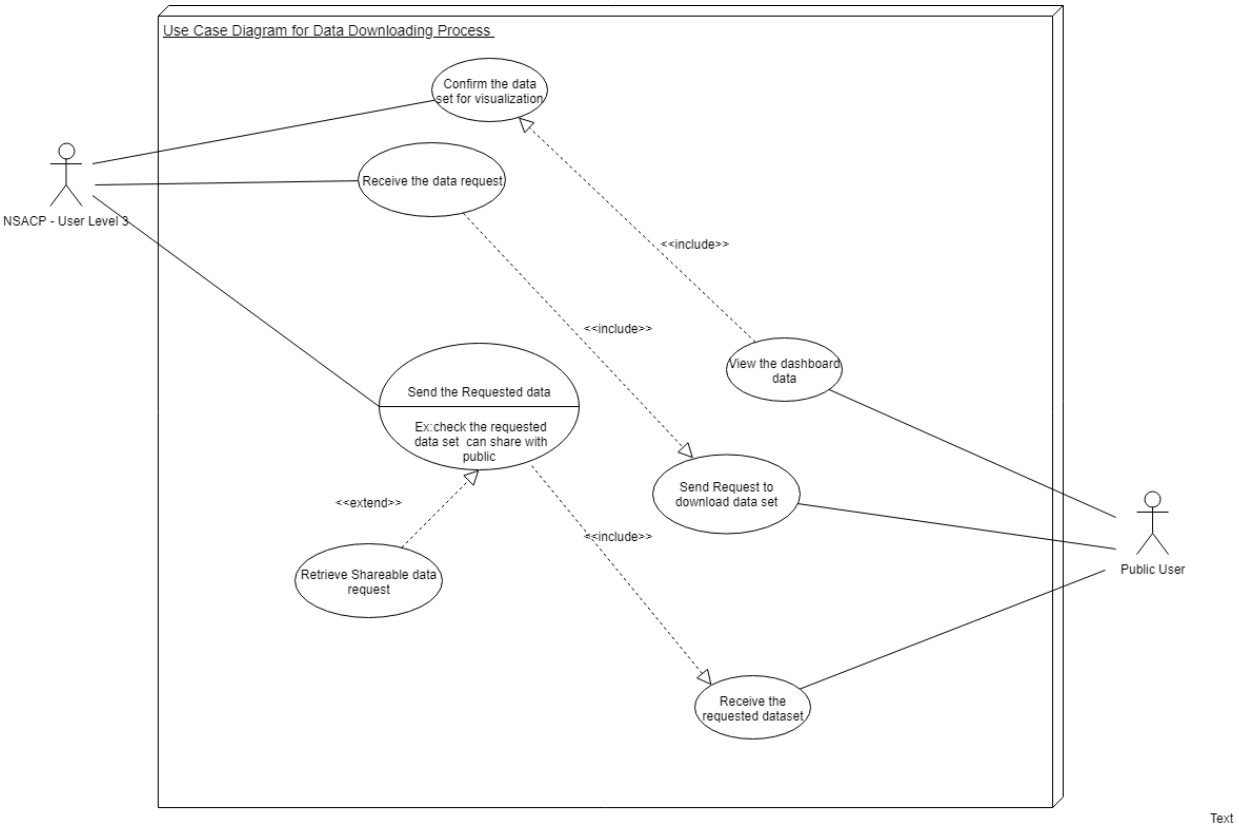

Figure 11: Use Case Diagram for Data Downloading process of proposed NSACP Dashboard

Use Case	Confirm the data set for visualization
Actor	NSACP - User Level 3
Description	
User will confirm the NSACP data for visualization on the dashboard.	
Pre-Conditions	

The authorized user must have logged in to the system. NSACP User Level 1 must have uploaded the dataset to the system. NSACP User Level 2 must have uploaded the validated data set to the system. NSACP User Level 3 must have uploaded the verified dataset to the system.
Flow Events
1. Login to the system. 2. Verify the available dataset. 3. Upload the verified data set. 4. Confirm the data set for visualization.
Post Conditions
• Once the NSACP User Level 3 confirms the data set for visualization, it will be visualized on the dashboard for any users.

Table 11: Use Case Narrative - Confirm the data set for visualization

Use Case	View the dashboard data
Actor	Public User
Description	
Public user will enter the system and view the dashboard data based on different key indicators.	
Pre-Conditions	
NSACP User Level 3 must have confirmed the dataset for visualization on the dashboard.	
Flow Events	
1. Public user enters to the system. 2. Select the key indicators which are available in the dashboard. 3. View the dashboard data in the system.	
Post Conditions	

Public user will be able to continue the dashboard with relevant key indicators. If the public user requires, he will be able to download the data from the dashboard as well.

Table 12: Use Case Narrative -View the dashboard data

Use Case	Send Request to download dataset
Actor	Public User
Description	
Public user will send the request to the system by including the dataset.	
Pre-Conditions	
System must have allowed the download facility to public user.	
Flow Events	
1. Public user enters to the system. 2. View the dashboard based on different key indicators. 3. Select the dataset which needs to be downloaded. 4. Click the “Download Data” button. 5. Enter the Email ID of the public user. 6. Send the request.	
Post Conditions	
The data request will be sent to the NSACP User Level 3 for the verification.	

Table 13: Use Case Narrative -Send request to download dataset

Use Case	Receive the data Request
Actor	NSACP - User Level 3
Description	

User will receive the data request from the public user.
Pre-Conditions
The authorized user must have logged in to the system. Public user must have sent the data request to the system.
Flow Events
1. Login to the system. 2. View the received email. 3. Receive the data request via an email.
Post Conditions
NSACP User Level 3 will verify the requested dataset and send the reply to public user via email.

Table 14: Use Case Narrative - Receive the data request

Use Case	Send the requested data
Actor	NSACP - User Level 3
Description	
User will verify the received dataset from the public user and send the reply for it.	
Pre-Conditions	
The authorized user must have logged in to the system. NSACP User Level 3 must have received the data set from the public user.	
Flow Events	
1. Open the received email from the public user. 2. Check the availability of the data set. 3. Verify whether the requested dataset is possible to shareable or not. 4. Retrieve the requested dataset from the system. 5. Send the reply to the public user via email.	

Post Conditions
• NSACP User level 3 will send the requested dataset to the user as a reply mail. • If the requested dataset is not possible to share with public, send the reply mail by indicating the proper reason.

Table 15: Use Case Narrative - Send the requested data

Use Case	Receive the Requested dataset
Actor	Public User
Description	
Public user will receive the requested dataset from the system or any reply relevant to the data request.	
Pre-Conditions	
Public user must have logged into his email. NSACP User level 3 should have sent the reply mail to public user.	
Flow Events	
1. Login to the Email Account. 2. Check the received email. 3. Check whether the requested dataset is available or not. 4. Download the dataset from the mail.	
Post Conditions	
Public user will use the received data set for the decision making purposes or any other future purposes.	

Table 16: Use Case Narrative - Receive the Requested dataset

The following figure 12.0 will illustrate the flow of the data downloading process in the proposed NSACP dashboard.

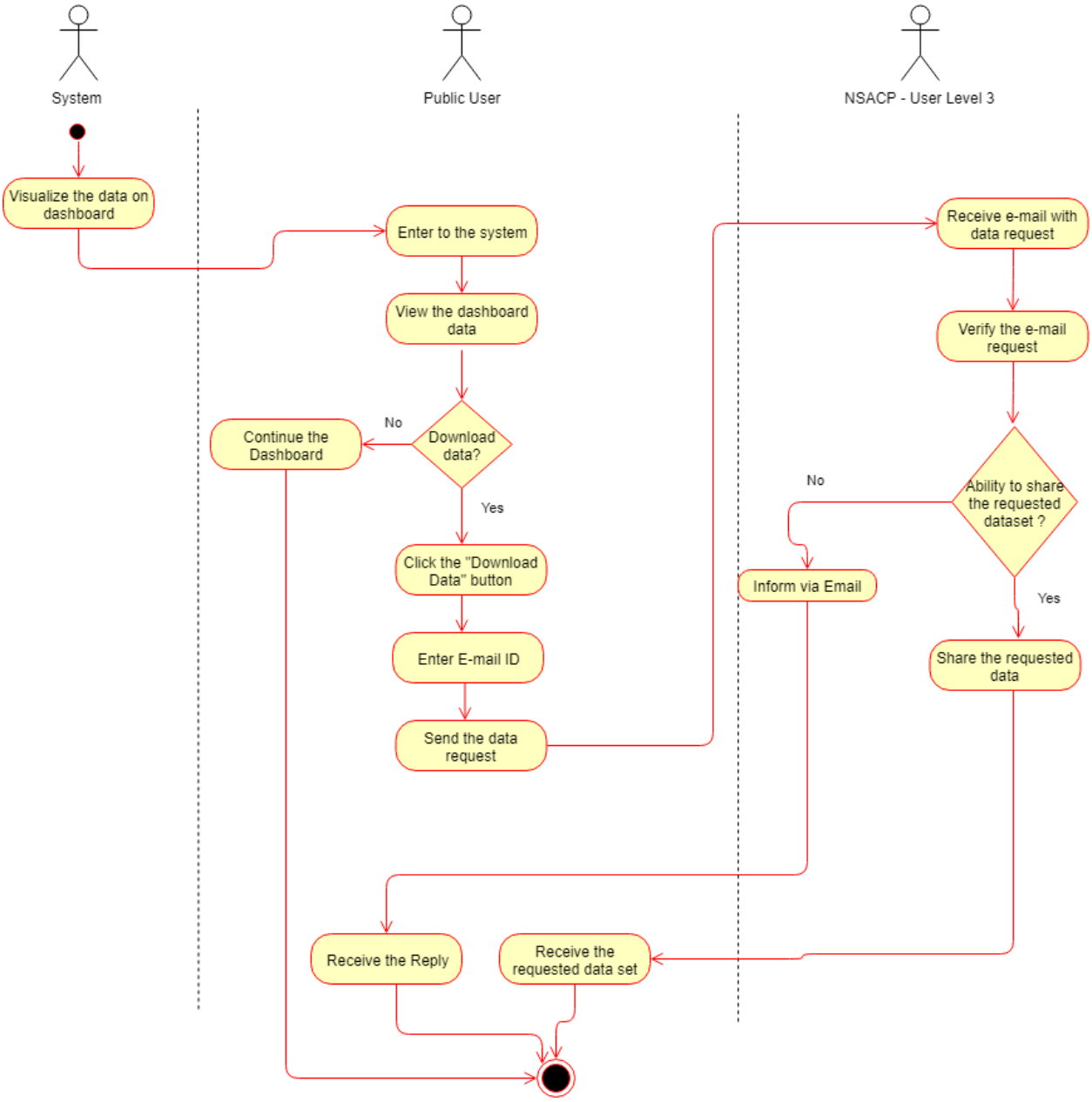

Figure 12: Activity Diagram for Data Downloading process of proposed NSACP Dashboard

2.3.4 Alert Management Process

Alert Management is an important process of the proposed NSACP dashboard where system will automatically generate alerts based on relevant key indicators. The main purpose of using the alert management section in the proposed dashboard is to provide the decision making and statistical analysis facility for the SIMU in NSACP. In the alert management process, the specific NSACP users will receive alerts for the right time based on the different key indicators.

In the flow of the alert management process, system will verify whether alert is available for each indicator. If the alert is available, the suitable condition will be applied to the relevant key indicator. Then, the alert will be generated automatically from the system. In this process, the critical level of the alert will be defined by using specific color code including red, green and yellow.

- Red Color - If the result will be in more than expected level badly
- Yellow Color - The result will be in within the range
- Green Color - The result will not be included the critical range

As mentioned in the above, the generated alerts will be received to all the NSACP user levels such as NSACP- User Level 1, NSACP- User Level 2 and NSACP- User Level 3.

Under the alert management process, the following use case diagram in figure 13.0 will illustrate the functionality of each user who is involved with the process and the activity diagram in figure 14.0 will elaborate the process flow of the alert management process.

In this document, the visualization of alerts in regards to the relevant key indicators in the proposed NSACP dashboard will be shown in figure 13.0

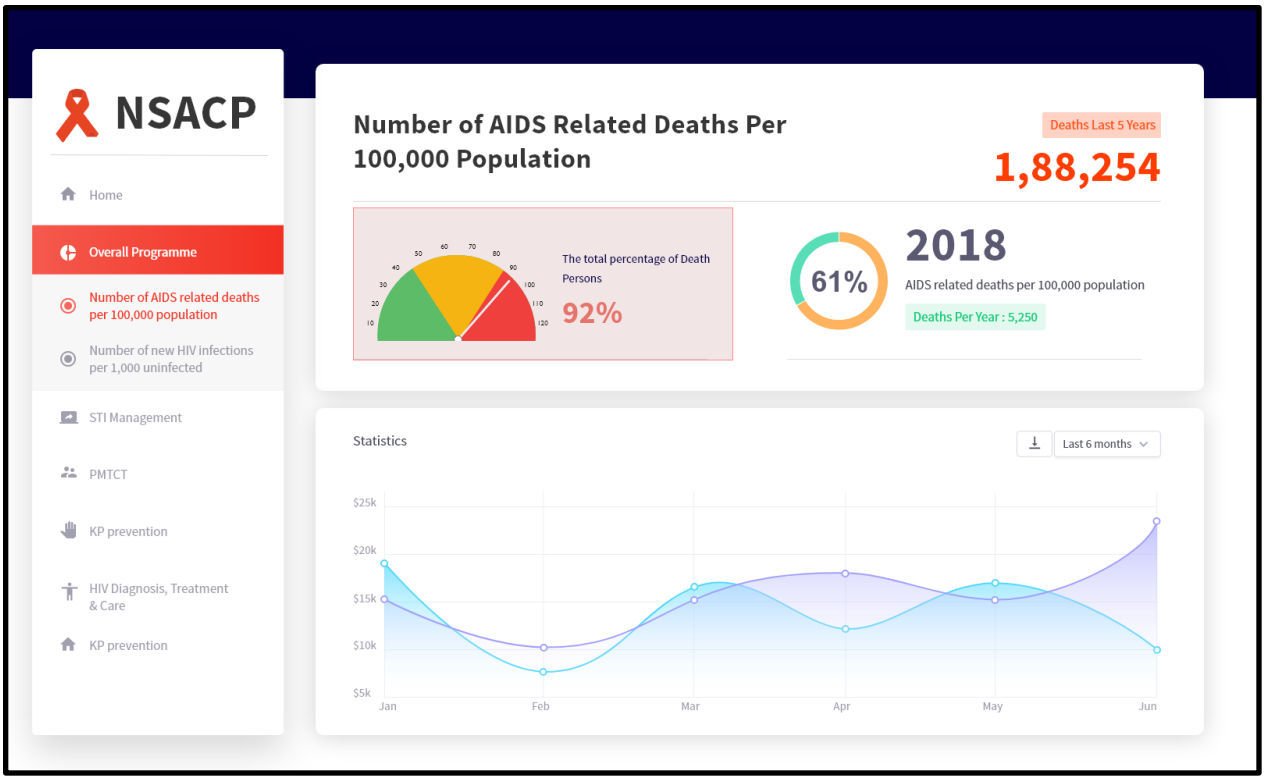

Figure 13: Design for the Alert Visualization

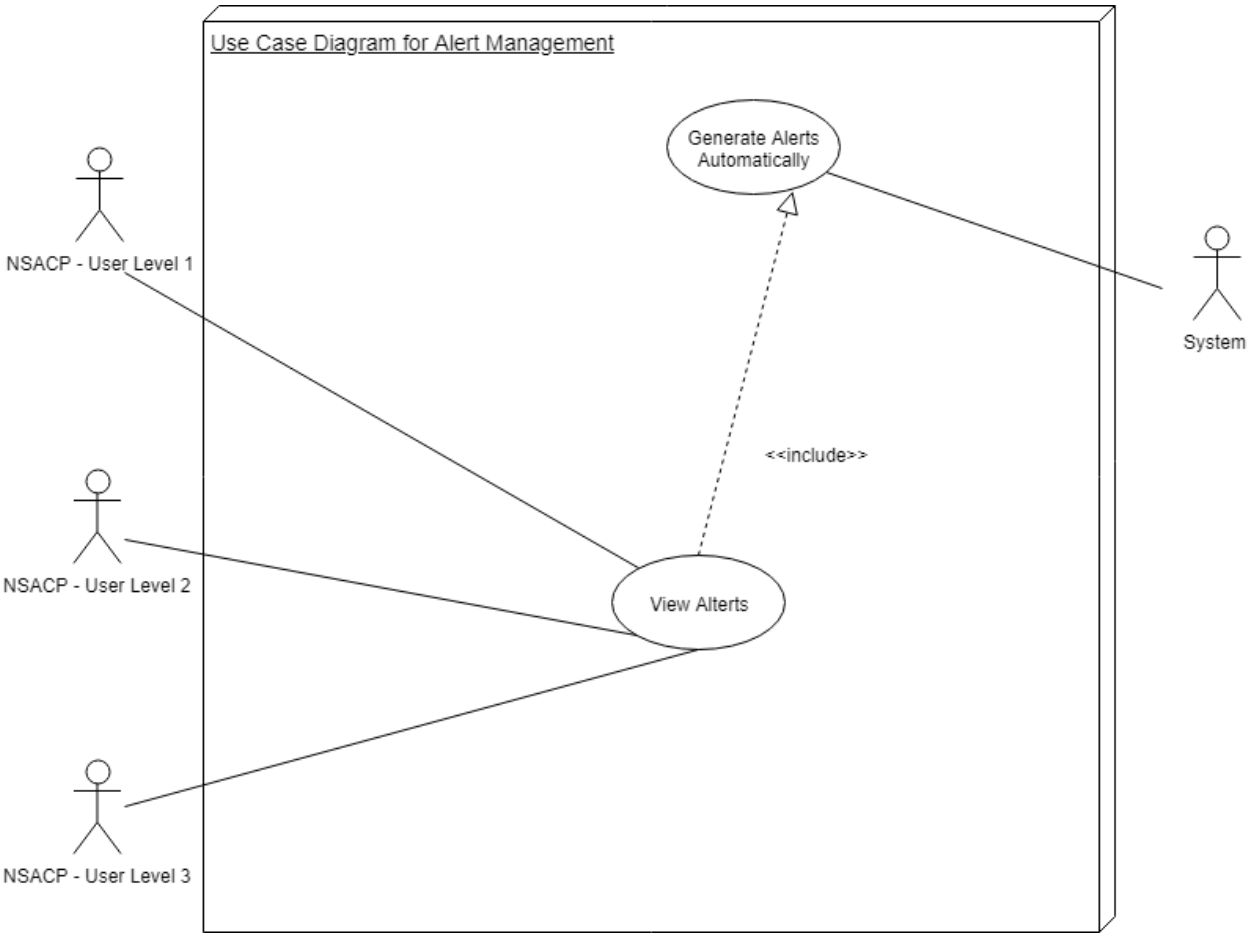

Figure 14: Use Case Diagram for Alert Management process of proposed NSACP Dashboard

Use Case	Generate Alerts Automatically
Actor	System
Description	
System will automatically generate alerts to the dashboard when it is required.	
Pre-Conditions	
Data should be processed to generate alerts.	

Flow Events
1. Data will process for alerts. 2. Alerts will generate automatically.
Post Conditions
Display all the alerts on the dashboard for NSACP user access levels.

Table 17: Use Case Narrative - Generate Alerts Automatically

Use Case	View Alerts
Actor	NSACP - User Level 1, User Level 2 & User Level 3
Description	
User will be able to view the alerts regarding the NSACP online dashboard.	
Pre-Conditions	
The authorized users must have logged in to the system.	
Flow Events	
1. User login to the system 2. Enter the NSACP online dashboard. 3. View the generated alerts of the dashboard.	
Post Conditions	
Users will use the relevant alerts for decision making purposes. Users will get the update about the data in the NSACP online dashboard.	

Table 18: Use Case Narrative - View Alerts

The following figure 14.0 will illustrate the flow of the Alert Management process in the proposed NSACP dashboard.

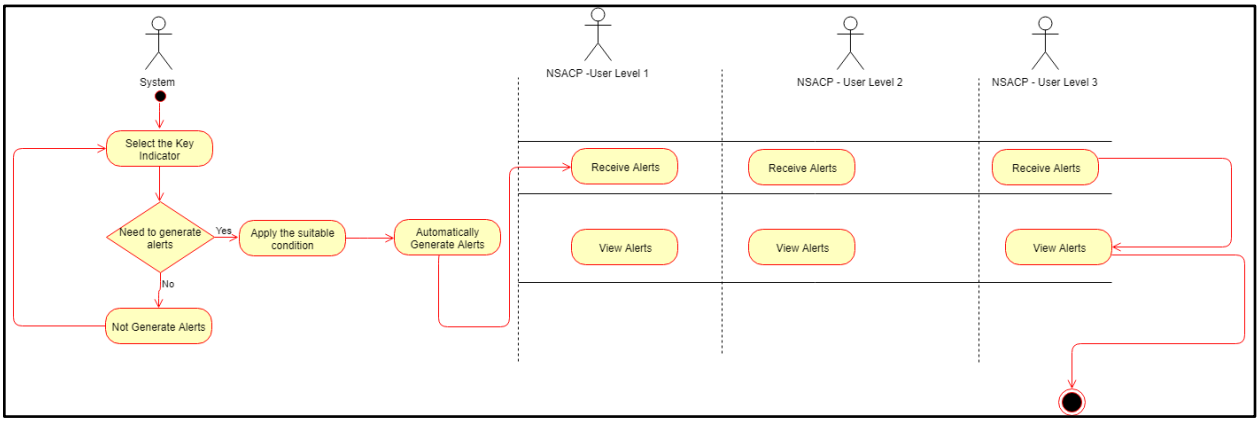

Figure 15: Activity Diagram for Alert Management process of proposed NSACP Dashboard

2.4 Visualizing data on the NSACP dashboard

The main purpose of developing the online dashboard is to visualize the aggregated data for decision making with identified set of key indicators. All the data which should be supposed to visualize on the dashboard will be categorized as follows with the suitable designs. All information will be visualized only in English, there is no language selection option.

2.4.1 Key Indicators

S.No	Type	Proposed Dashboard Indicator
1		**Overall Programme**
1.1	Impact	Number of new HIV infections per 1,000 uninfected population
1.2	Impact	Number of AIDS related deaths per 100,000 population
2		**STI Management**
2.1	Outcome	Percentage of STD clinic attendees with active syphilis
2.2	Outcome	Percentage of men who have sex with men with active syphilis
2.3	Outcome	Percentage of sex workers with active syphilis
2.4	Outcome	Percentage of antenatal care attendees with active syphilis
2.5	Outcome	Gonococcal antibiotic resistance
2.6	Process	Percentage of persons with STIs among STI clinic attendees
3		**KP Prevention**
3.1	Need	Size of KP

3.2	Impact	No. of new HIV cases detected
3.3	Outcome	Consistent Condom Use/Clean N-S Use
3.4	Output	Prevention Coverage of KP
3.5	Process	Percentage of KP tested for HIV
3.6	Process	Condom Gap
3.7	Input	Availability of adequate number of peer educators at all KP interventions
4		**PMTCT**
4.1	Impact	No of new pediatric HIV infections per 100,000 live births
4.2	Impact	Mother to Child Transmission (MTCT) Rate (Estimated percentage of children newly infected with HIV from mother-to-child transmission among women living with HIV delivering in the past 12 months)
4.3	Impact	No of cases of congenital Syphilis per 100,000 live births
4.4	Process	Antenatal Care Coverage (at least one visit)
4.5	Process	Coverage of HIV testing of pregnant women
4.6	Process	Percentage of pregnant women living with HIV who delivered during the past 12 months and received antiretroviral medicines to reduce the risk of mother-to-child transmission of HIV.
4.7	Process	Percentage of infants born to women living with HIV receiving a virological test for HIV within two months of birth
4.8	Process	Coverage of syphilis testing among pregnant women
4.9	Process	Treatment coverage of syphilis-seropositive pregnant women

5		HIV Diagnosis, Treatment & Care
5.1	Impact	Estimated no. of PLHIV
5.2	Impact	Alive and on ART among PLHIV on ART at 12, 24, 36 & 60 months
5.3	Outcome	Percentage of PLHIV aware of their status
5.4	Outcome	Percentage of PLHIV who know their status receiving ART
5.5	Outcome	Percentage of PLHIV receiving ART virally suppressed
5.6	Process	HIV Testing coverage of key and vulnerable population
5.7	Process	Linkage loss/ Lost to follow up between screening – confirmation of HIV test results
5.8	Process	Linkage loss/ Lost to follow up between confirmation and initiation on ART
5.9	Process	Lost to follow-up by ART cohort monitoring
5.10	Process	Viral load testing coverage of PLHIV receiving ART
5.11	Input	No. of ART centers reported ART Drug stock outs during last 12 months

Table 19: Key indicators categorization – NSACP

2.4.2 Wireframes for the proposed visualizations

Following wireframes indicates the visualization of all identified key indicators. All these interfaces will be built using infographics, dynamic charts to make sure the proper user interaction. With all user interfaces, following functionalities will be enabled.

1. Info graphical visualization
2. Option to change chart types as per user intention
3. Chart/dataset download facility
4. Dataset filtration facility
5. Dynamic navigation facility

Overall Programme

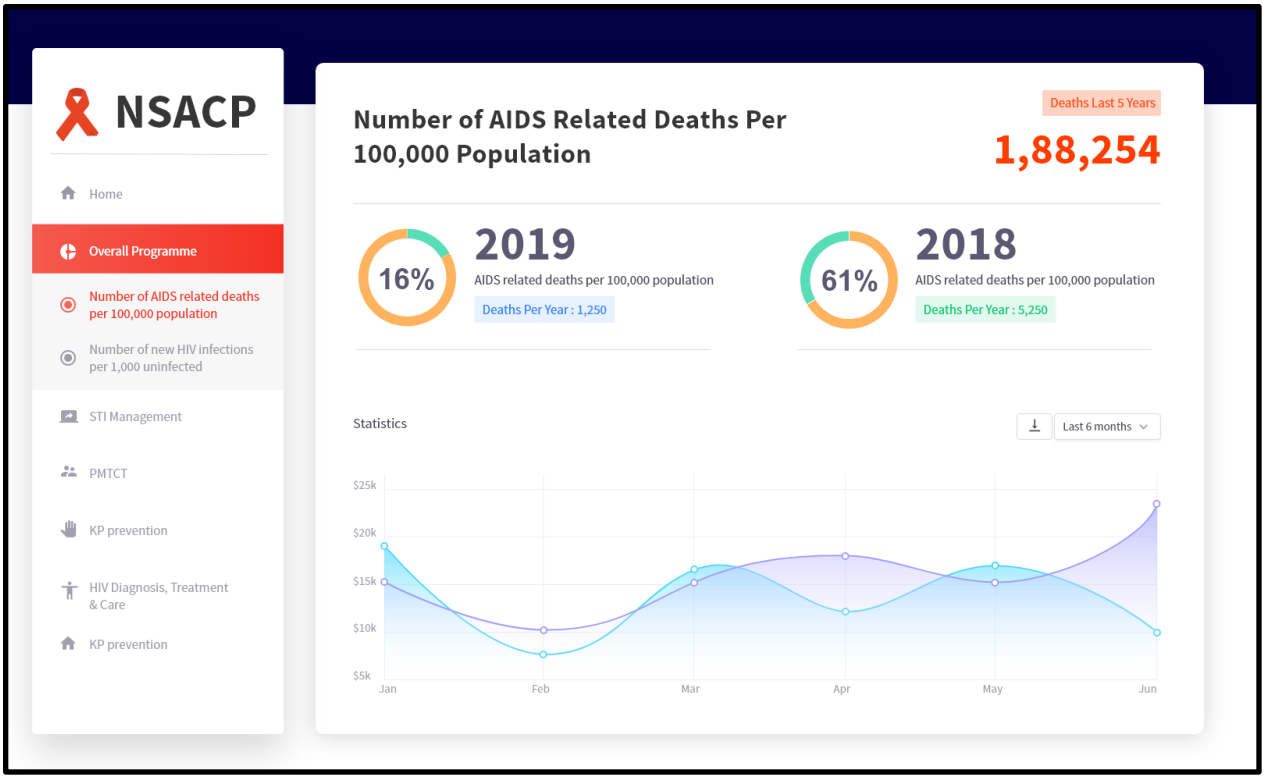

Figure 16: Number of AIDs related deaths per 100,000 population

KP Prevention - National Level

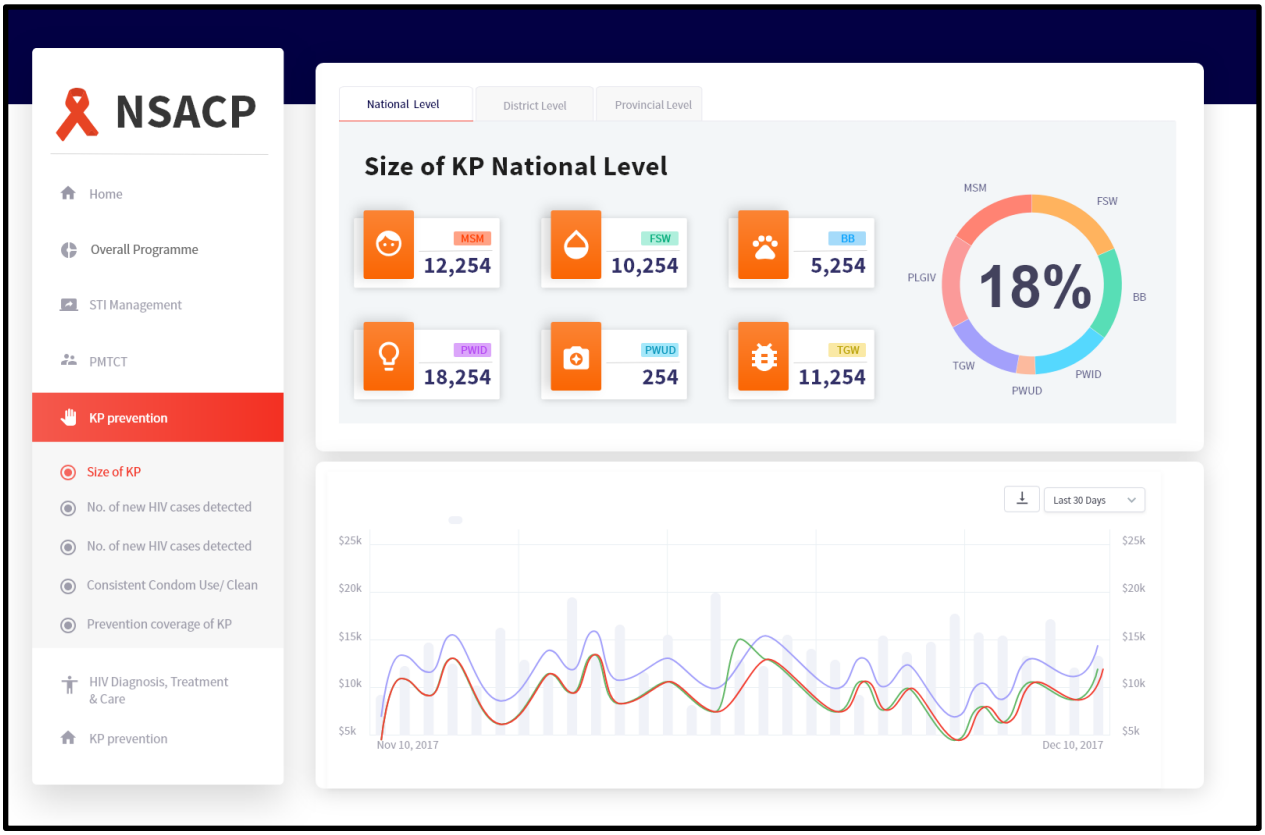

Figure 17: Size of KP - National Level

KP Prevention - District Level

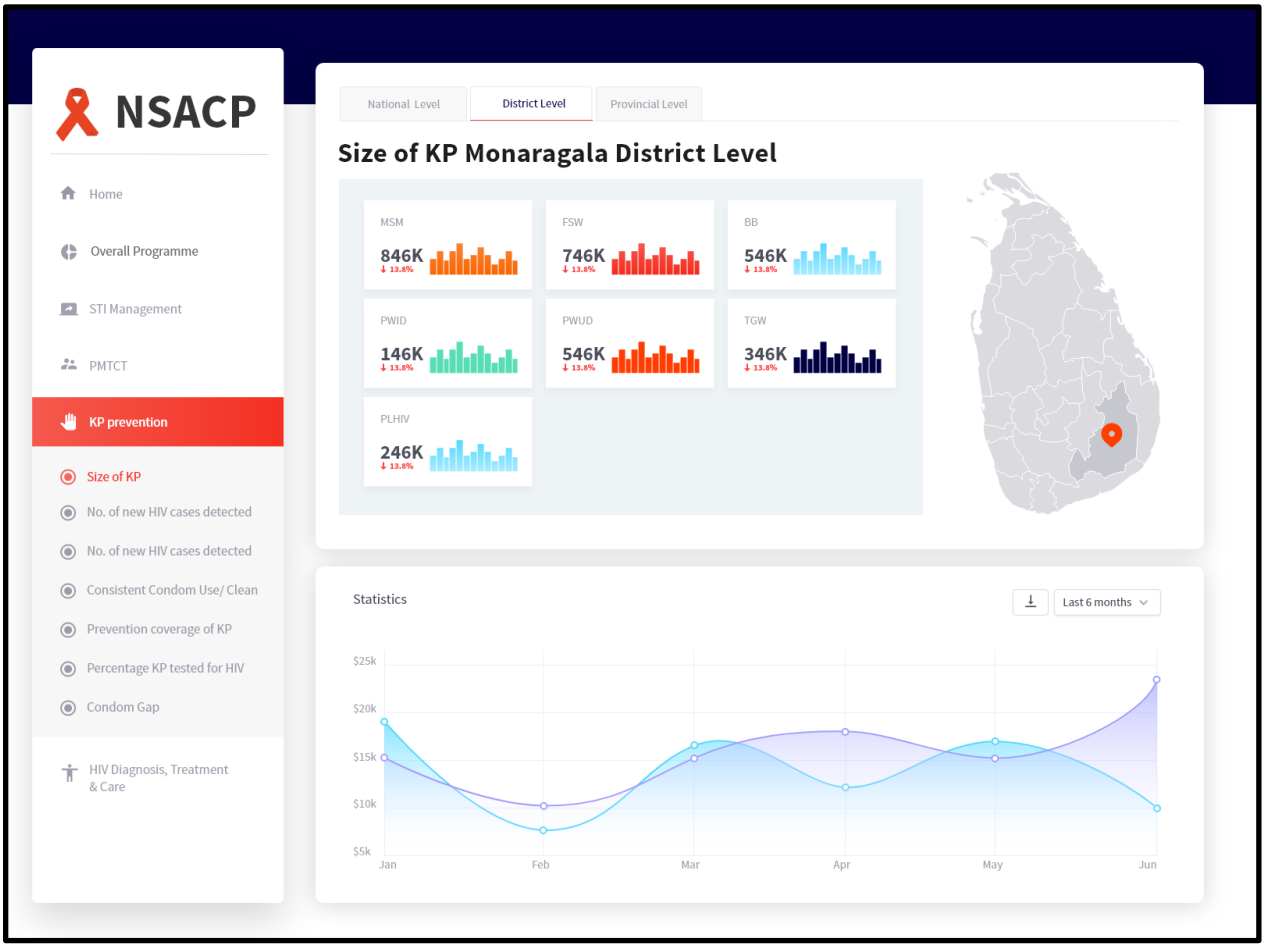

Figure 18: Size of KP - District Level

PMTCT

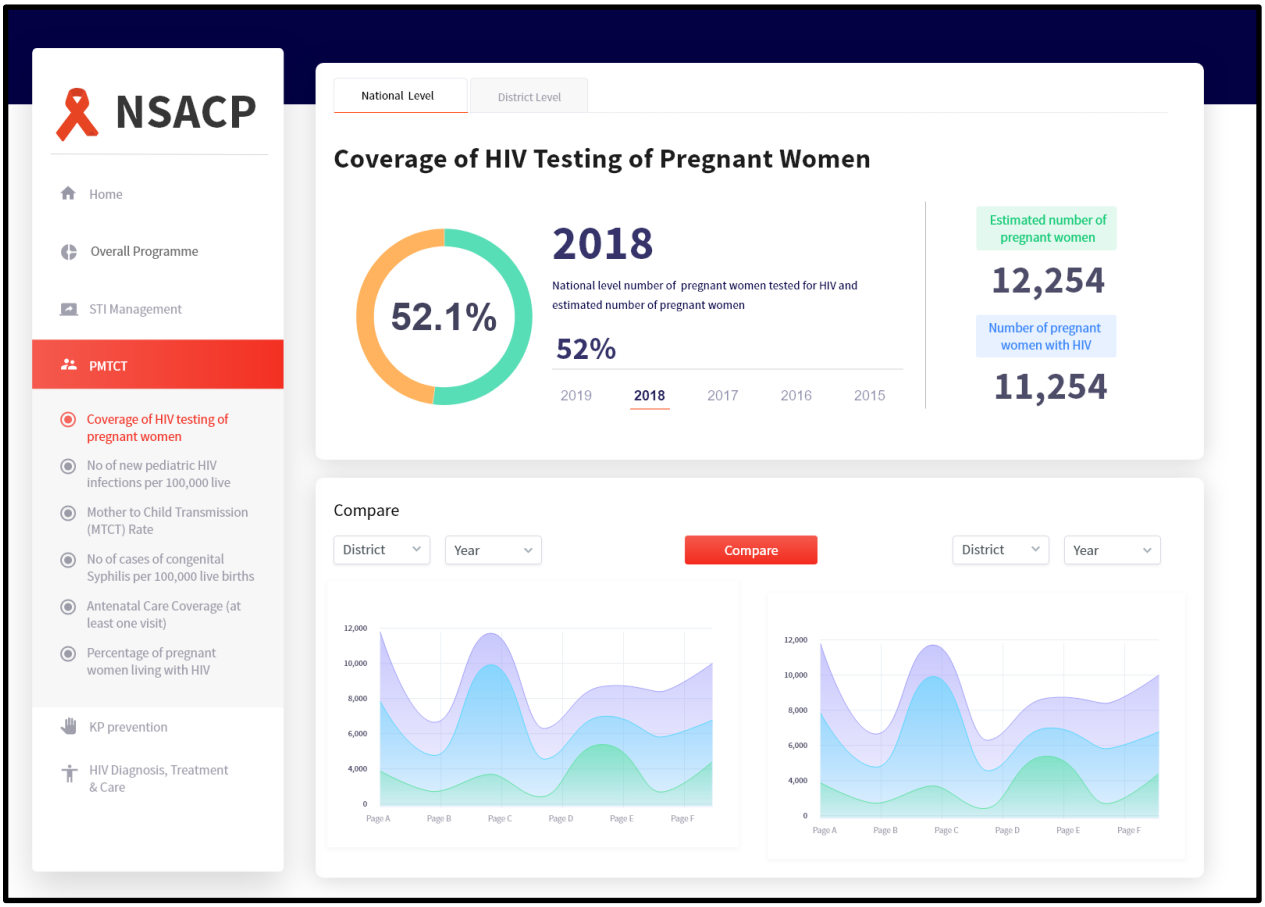

Figure 19: Coverage of HIV Testing of Pregnant Women

Alerts Management

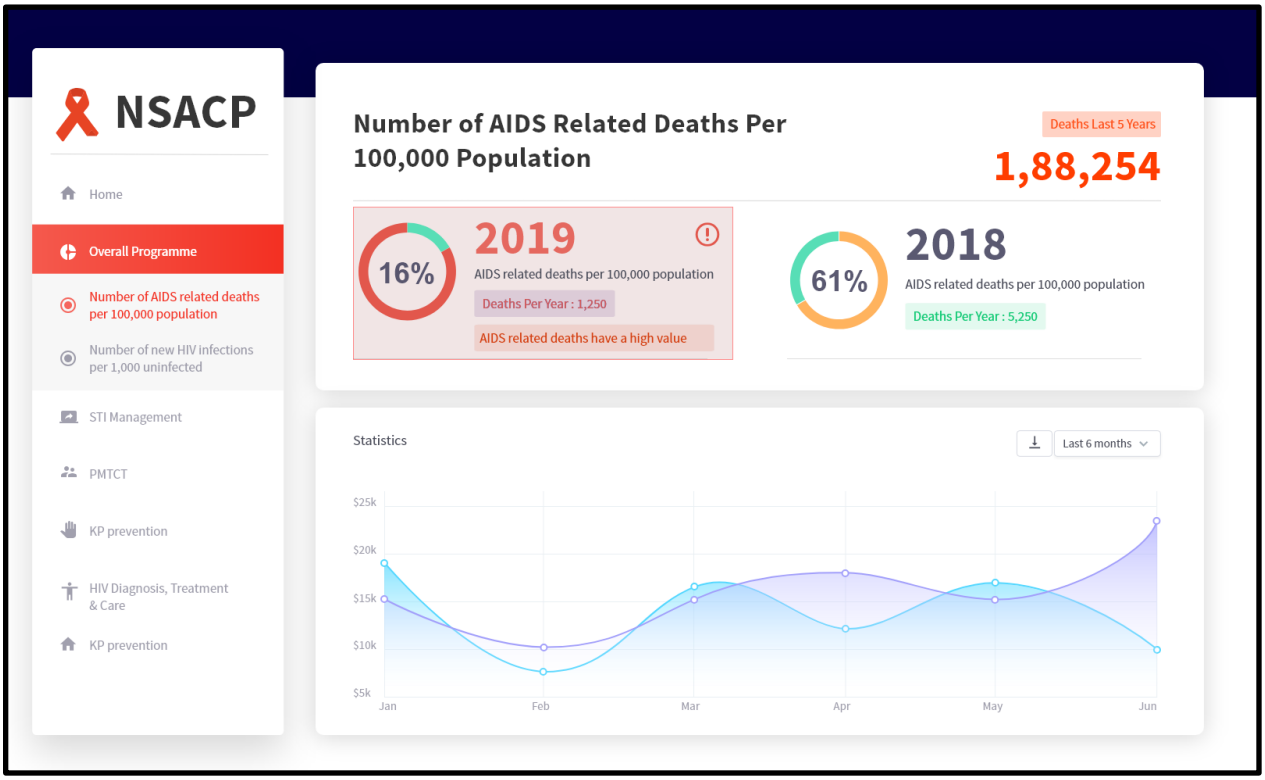

Figure 20: Alerts Management - Overall Programme

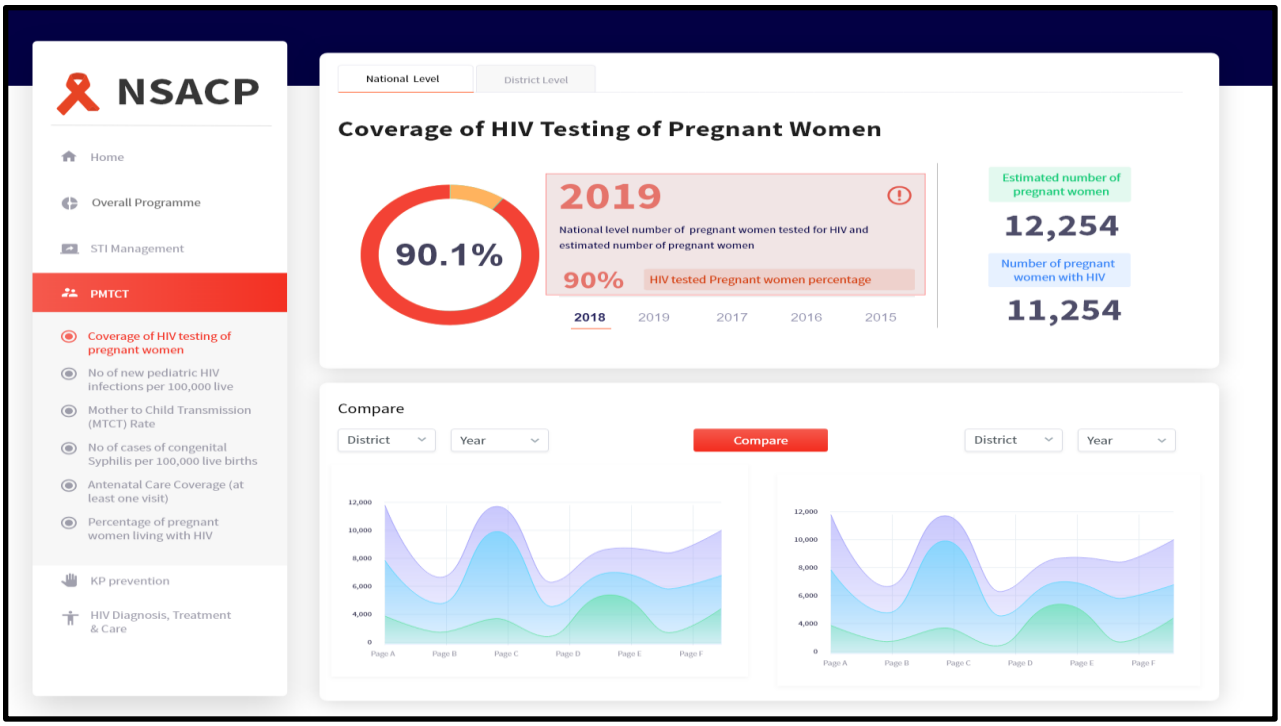

Figure 21: Alerts Management - PMTCT

2.5 Alert management for each indicator

Alert management is another key function of the proposed dashboard, where users get relevant notifications according to the identified key indicators. These alerts can be;

1. Notifications within proposed dashboard
2. Indication with charts (Speed charts, thermometer chart etc)
3. Variance color indications

S.No	Type	Proposed Dashboard Indicator	Alert for each indicator
1		**Overall Programme**	
1.1	Impact	Number of new HIV infections per 1,000 uninfected population	Total number > 0.05
1.2	Impact	Number of AIDS related deaths per 100,000 population	Total number >2 per 100,000 population
2		**STI Management**	
2.1	Outcome	Percentage of STD clinic attendees with active syphilis	-
2.2	Outcome	Percentage of men who have sex with men with active syphilis	-
2.3	Outcome	Percentage of sex workers with active syphilis	-
2.4	Outcome	Percentage of antenatal care attendees with active syphilis	-
2.5	Outcome	Gonococcal antibiotic resistance	-
2.6	Process	Percentage of persons with STIs among STI clinic attendees	When the difference is 20%
3		**KP Prevention**	
3.1	Need	Size of KP	-
3.2	Impact	No. of new HIV cases detected	-

3.3	Outcome	Consistent Condom Use/Clean N-S Use	-
3.4	Output	Prevention Coverage of KP	-
3.5	Process	Percentage of KP tested for HIV	-
3.6	Process	Condom Gap	-
3.7	Input	Availability of adequate number of peer educators at all KP interventions	-
4		**PMTCT**	
4.1	Impact	No. of new pediatric HIV infections per 100,000 live births	Total number > 50
4.2	Impact	Mother to Child Transmission (MTCT) Rate (Estimated percentage of children newly infected with HIV from mother-to-child transmission among women living with HIV delivering in the past 12 months)	-
4.3	Impact	No of cases of congenital Syphilis per 100,000 live births	Total number > 50
4.4	Process	Antenatal Care Coverage (at least one visit)	Total percentage < 95%
4.5	Process	Coverage of HIV testing of pregnant women	Total percentage < 95%
4.6	Process	Percentage of pregnant women living with HIV who delivered during the past 12 months and received antiretroviral medicines to reduce the risk of mother-to-child transmission of HIV.	Total percentage < 95%
4.7	Process	Percentage of infants born to women living with HIV receiving a virological test for HIV within two months of birth	Total percentage < 95%
4.8	Process	Coverage of syphilis testing among pregnant women	Total percentage < 95%
4.9	Process	Treatment coverage of syphilis-seropositive pregnant women	Total percentage < 95%

5		HIV Diagnosis, Treatment & Care	
5.1	Impact	Estimated no. of PLHIV	-
5.2	Impact	Alive and on ART among PLHIV on ART at 12, 24, 36 & 60 months	Total percentage < 75%
5.3	Outcome	Percentage of PLHIV aware of their status	Total percentage < 75%
5.4	Outcome	Percentage of PLHIV who know their status receiving ART	More than 10% in the previous year
5.5	Outcome	Percentage of PLHIV receiving ART virally suppressed	More than 10% in the previous year
5.6	Process	HIV Testing coverage of key and vulnerable population	Total percentage < 50%
5.7	Process	Linkage loss/ Lost to follow up between screening – confirmation of HIV test results	Total percentage > 20%
5.8	Process	Linkage loss/ Lost to follow up between confirmation and initiation on ART	Total percentage > 20%
5.9	Process	Lost to follow-up by ART cohort monitoring	Total percentage > 20%
5.10	Process	Viral load testing coverage of PLHIV receiving ART	Less than 60% of those on ART
5.11	Input	No. of ART centers reported ART Drug stock outs during last 12 months	Total number > 0%

Table 20: Alert Categorization for each Key Indicator

3 TECHNOLOGY AND SYSTEM FEASIBILITY

3.1 Software feasibility

Proposed digital dashboard will be developed using open source platform with latest web technologies. LAMP (Linux,Apache, MySQL,PHP) stack will be used as main technology stack.

(a) PHP

PHP is a computer scripting language which can be used to develop dynamic web pages. This is special for the web development and can be embedded to HTML. The process of PHP is, it will be run on web browser. PHP code is taken as input and web pages will be output. It can be used for most web servers using any platform and operating system. According to the proposed dashboard, PHP can be used as a scripting language.

(b) MySQL

MySQL is an open source relational database management system. MySQL has great features such as fast reliability, flexibility, high performance and multiple user accessible. This is free as well as available on all the platforms.

3.2 Feasibility of Security Features and Encryption of Data

Security features and data encryption are two most important factors relevant to the NSACP dashboard. The most important outcome here is about the feasibility of them. Since NSACP is maintaining huge amount of data, all the relevant data should be secured. Authorization must be applied for each user of the NSACP dashboard. Data should be secured, when they store, retrieve and visualize, because all the data is very sensitive.

All the security features relevant to NSACP dashboard will be feasible enough for the system users. Data encryption is another important factor in the proposed NSACP dashboard. This is one of the most effective ways to achieve the security as well.

3.3 Data upload and user interface for online dashboard

Relevant data has to upload as Excel bulk uploads. All excel templates will be saved within the system and NSACP staff can download the excel template, fill accordingly and upload it to the system. Uploaded data sets will be shown in relevant user interface (UI) and there is the facility to edit data using the UIs as well. Human errors can be occurred in uploading datasets using excel, to minimize that Edit option is enabled according to the authority levels defined.

3.4 Data download facility

All data available in the dashboard can be downloaded as Excel/PDF/Image formats. NSACP staff users has direct access on data downloads. Public can request to download datasets by clicking on “Download” button. That request will come as an Email to User 02, User 02 has to approve the request and then requested data set will be mailed to that requester.

Here, third party mail services are not integrated with the proposed dashboard and only PHP mail() function will be used to send emails.

3.5 Hosting environment

Hosting environment can be defined as a facility in which a third-party holds the data and runs the programs in its own computers. Different host environments are available such as VPS hosting, dedicated hosting, cloud hosting and shared hosting.

Recommendations:

The proposed dashboard will be developed on LAMP stack and will be able to be hosted on any linux based environment of any sort (shared, VPS or cloud). Since NSACP official website is hosted in LAMP based server, same can be used to host the proposed dashboard as well.

3.6 Data validation

In data validation, it will be checked the accuracy and the quality of the entire data of the system. In the proposed online dashboard, all data will be entered/uploaded manually by the users, therefore data validation is essential up to certain level. Adding proper data validation will ensure the quality of final output.

- All the data should be available in the entered/uploaded file in correct format.

- Data formats are available numeric and ASCII values.
- If values are not available in the file, it should be validated.
- Validate whether data amount is appropriate or not.
- When user login to the system, username and password fields must be validated.
- Graphs should be generated based on valid indicators
- Graphs data should be updated, when data is updated in the system.

For some indicators, there are defined data validation criteria available and defined. In that context, denominator and numerator will be considered when applying the validation rules. The following table describes the validation criteria for identified indicators.

Indicator No:	**Indicator**	**Denominator**	**Numerator**	**Validation Criteria**
1	Overall Programme			
1.1	Number of new HIV infections per 1,000 uninfected population	The adult population (15-49 years) not infected at the start of the same year.	To calculate the adult HIV incidence, the estimated number of adults (15-49 years) newly infected with HIV in a given year	Not Available
1.2	Number of AIDS related deaths per 100,000 population	Report as number per 100,000 population	Mortality due to HIV/AIDS is the number of adults and children that have died in a specific year due to HIV/AIDS-related causes based in the modeling of HIV surveillance data using standard and appropriate tools.	Not Available
2	STI Management			
2.1	Percentage of STD clinic attendees with	Number tested for syphilis	No positive for both VDRL and	Total percentage should be less than

	active syphilis		TPHA	100%
2.2	Percentage of men who have sex with men with active syphilis	Number tested for syphilis	No positive for both VDRL and TPHA	Total percentage should be less than 100%
2.3	Percentage of sex workers with active syphilis	Number tested for syphilis	No positive for both VDRL and TPHA	Total percentage should be less than 100%
2.4	Percentage of antenatal care attendees with active syphilis	Number tested for syphilis	No positive for both VDRL and TPHA	Total percentage should be less than 100%
2.5	Gonococcal antibiotic resistance	Gonorrhea infection ABST trend for 5 years		
2.6	Percentage of persons with STIs among STI clinic attendees	New patients registered	New patients registered with STIs	Total percentage should be less than 100%
3	KP Prevention - No validation criteria is applied for this indicator			

4	PMTCT			
4.1	No of new pediatric HIV infections per 100,000 live births	Register General Live births	New pediatric HIV infections from programmatic data	Not Available
4.2	Mother to Child Transmission (MTCT) Rate (Estimated percentage of children newly infected with HIV from mother-to-child transmission among women living with HIV delivering in the past 12 months)	Estimated number of births to women living with HIV who delivered in the previous 12 months	Estimated number of children newly infected with HIV from mother-to-child transmission	Not Available

4.3	No of cases of congenital Syphilis per 100,000 live births	Number of months	Among children born in the previous 12 months to women living with HIV	Not Available
4.4	Antenatal Care Coverage (at least one visit)	Estimated number of pregnant women (RGD LB x 1.1)	Number of pregnant women attending antenatal care services (ANC1 FHB)	Total percentage should be less than 100%
4.5	Coverage of HIV testing of pregnant women	Estimated number of pregnant women (RGD LB x 1.1)	Number of pregnant women tested for HIV (NSACP)	Total percentage should be less than 100%
4.6	Percentage of pregnant women living with HIV who delivered during the past 12 months and received antiretroviral medicines to reduce the risk of mother-to-child transmission of HIV.	Estimated number of HIV-positive pregnant women	Number of pregnant women who received ART	Total percentage should be less than 100%
4.7	Percentage of infants born to women living with HIV receiving a virological test for HIV within two months of birth	Number of pregnant women living with HIV giving birth in the past 12 months	Number of infants who received an HIV test within two months of birth during the reporting period. Infants tested should only be counted once.	Total percentage should be less than 100%
4.8	Coverage of syphilis testing among pregnant women	Number of pregnant women attending antenatal care services (ANC1 FHB)	Number of syphilis testing of pregnant women	Total percentage should be less than 100%

4.9	Treatment coverage of syphilis-seropositive pregnant women	Number of syphilis-seropositive pregnant women	Number of pregnant women appropriately treated for syphilis	Total percentage should be less than 100%
5	HIV Diagnosis, Treatment & Care			
5.1	Estimated no. of PLHIV	Not Available	Estimated number of PLHIV	Not Available
5.2	Alive and on ART among PLHIV on ART at 12, 24, 36 & 60 months	Number of people with HIV who started ART by cohorts (12,24,36,48,60 months previously)	Number alive and on ART	Total percentage should be greater than 100%
5.3	Percentage of PLHIV aware of their status	The estimated number of adults and children living with HIV	Among people living with HIV, the number who know their HIV status	Total percentage should be greater than 100%
5.4	Percentage of PLHIV who know their status receiving ART	People living with HIV Receiving ART	People living with HIV under the care	Total percentage should be less than 100%
5.5	Percentage of PLHIV receiving ART virally suppressed	PLHIV who are on treatment	No. PLHIV receiving ART virally suppressed	Total percentage should be less than 100%

5.6	HIV Testing coverage of key and vulnerable population	Not Available	With size estimation , target for year, reach	Total percentage should be less than 100%
5.7	Linkage loss/ Lost to follow up between screening – confirmation of HIV test results	Number screened positive during the year	Number tested for HIV confirmatory test	Total percentage should be less than 100%
5.8	Linkage loss/ Lost to follow up between confirmation and initiation on ART	Number confirmed positive	Number initiated ART	Total percentage should be less than 100%
5.9	Lost to follow-up by ART cohort monitoring	Number of people with HIV who started ART by cohorts (12,24,36,48,60 months previously)	Number lost to follow up while on ART	Total percentage should be less than 100%
5.10	Viral load testing coverage of PLHIV receiving ART	PLHIV total number receiving ART	Number of Viral load testing done of PLHIV and among total number of receiving ART	Total percentage should be less than 100%
5.11	No. of ART centres reported ART Drug stock outs during last 12 months	No. of ART centres	No. of ART centres reported ART Drug stock outs	Total percentage should be less than 100%

Table 21: Validation Criteria based on each Key Indicator

3.7 Future enhancements of the proposed online dashboard

This proposed online dashboard will have above mentioned features within this project scope, but it is possible to expand for the future. Since this online dashboard is supposed to build with open source software, it can be further expanded with several features. It can be allowed to add new reports to the dashboard and new levels of granularity over time. Mainly this dashboard can further enhance to integrating Application Program Interfaces (APIs) to fetch data automatically from EIMS.

4. CONCLUSION

This report was created as a result of detailed study for the development of NSACP dashboard project. According to the study and identified facts, developing the NSACP dashboard is technically feasible as per mentioned details in the document.