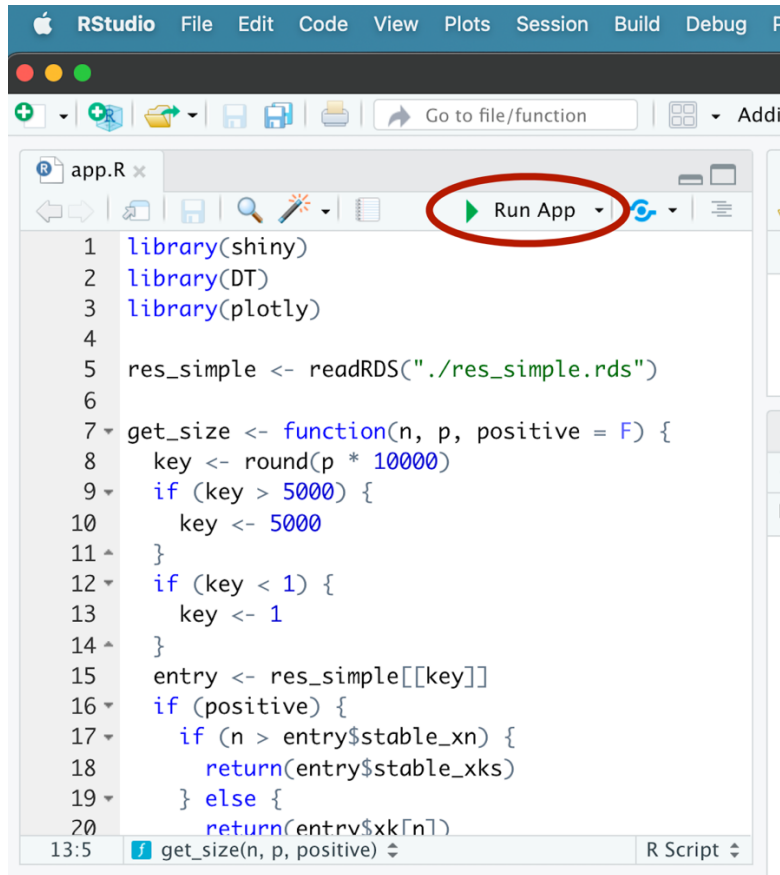


# Tutorial for the ADSP Dashboard

This Shiny app will be hosted on a webserver shortly, so that users can use it via any web browser. Meanwhile users need to run it in RStudio following the instruction provided in this page.

Please ensure that two files “app.R” and “res\_simple.rds” are saved in the **same folder**. User can open the app.R file in RStudio, and then click the “run app” button as shown in the following screenshot.

Three packages need to be installed before running the app, which are shiny, DT, and plotly.

A screenshot of the RStudio interface. The top menu bar includes 'File', 'Edit', 'Code', 'View', 'Plots', 'Session', 'Build', 'Debug', and 'Pl'. Below the menu bar is a toolbar with various icons. The main editor window shows an R script file named 'app.R'. The script contains the following code:

```
1 library(shiny)
2 library(DT)
3 library(plotly)
4
5 res_simple <- readRDS("./res_simple.rds")
6
7 get_size <- function(n, p, positive = F) {
8   key <- round(p * 10000)
9   if (key > 5000) {
10    key <- 5000
11  }
12  if (key < 1) {
13    key <- 1
14  }
15  entry <- res_simple[[key]]
16  if (positive) {
17    if (n > entry$stable_xn) {
18      return(entry$stable_xks)
19    } else {
20      return(entry$xk[n])
21    }
22  }
23 }
```

The 'Run App' button, represented by a green play icon, is circled in red. The status bar at the bottom shows '13:5' and 'get\_size(n, p, positive)'.

```
13:5 get_size(n, p, positive) R Script
```

### Diagnostic Testing Dashboard with Adaptive Sample Pooling

**Initialization**

Total Number of Samples in Cohort

Maximum Pool Size

Choose Initialization Method

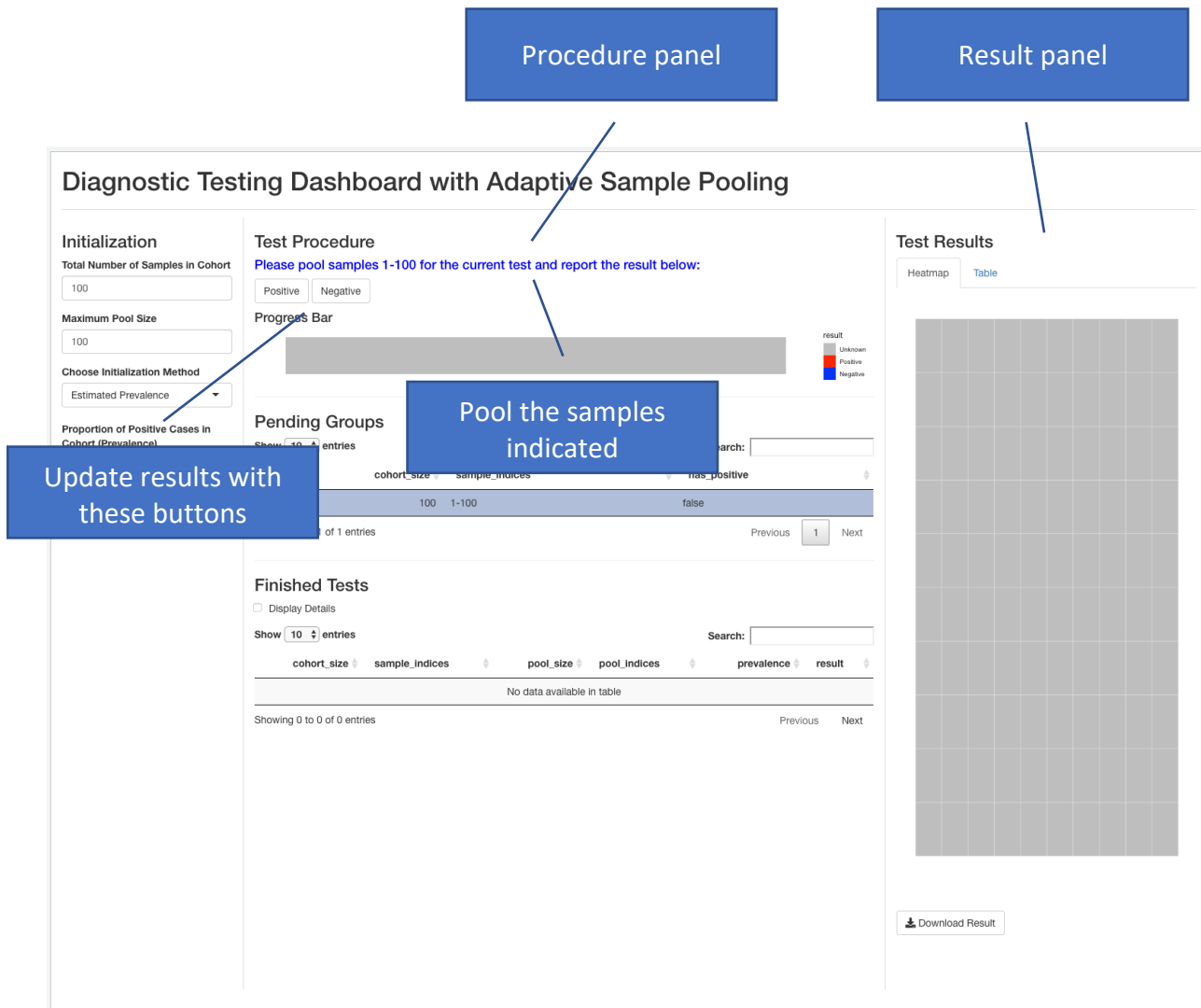
Proportion of Positive Cases in Cohort (Prevalence)

Initialize Parameters

Start Button

#### Initialization:

- Initialize the test procedure using the “Initialization” panel on the left.
- Input the cohort size: the total number of samples to be diagnosed.
- Input the maximum pool size: the sensitivity of a particular diagnostic test method decides how many samples can be pooled.
- One can choose between two different methods to initialize prevalence.
  - “Estimated Prevalence” requires an estimated prevalence value.
  - “Number of Observed Positive/Negative Samples” requires the number of positive and negative samples that were diagnosed in similar cohorts.
- After setting the parameters, press “Start/Restart” to start the test procedure.



**Test procedure starts:**

- After pressing “Start/Restart”, the “Test Procedure” and “Test Results” panels appear.
- The instruction in blue tells the user to pool samples 1-100 for the next test.
- After the test, the user should report the result using the “Positive” or “Negative” button.

# Diagnostic Testing Dashboard with Adaptive Sample Pooling

### Initialization

Total Number of Samples in Cohort

Maximum Pool Size


Choose Initialization Method  
Estimated Prevalence

Proportion of Positive Cases in Cohort (Prevalence)

### Test Procedure

Please pool samples 1-34 for the current test and report the result below:

Progress Bar



Legend: result (Unknown, Positive, Negative)

### Pending Groups

Show  entries

Search:

cohort_size	sample_indices	has_positive
100	1-100	true

Showing 1 to 1 of 1 entries

Previous  Next

### Finished Tests

Display Details

Show  entries

Search:

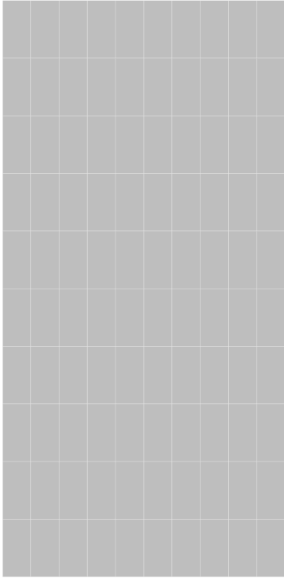
cohort_size	sample_indices	pool_size	pool_indices	prevalence	result
100	1-100	100	1-100	0.01	Positive

Showing 1 to 1 of 1 entries

Previous  Next

### Test Results

Heatmap



One positive test done

## After a positive test:

- “Finished Tests” shows that the last test was positive.
- The pool size for the next test decreases accordingly.
- The instruction tells the user to pool samples 1-34 for the next test.

## Diagnostic Testing Dashboard with Adaptive Sample Pooling

### Initialization

Total Number of Samples in Cohort

Maximum Pool Size

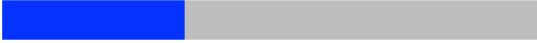
Choose Initialization Method  
Estimated Prevalence

Proportion of Positive Cases in Cohort (Prevalence)

### Test Procedure

Please pool samples 35-55 for the current test and report the result below:

Progress Bar



result  
Unknown  
Positive  
Negative

### Pending Groups

Show  entries

Search:

cohort_size	sample_indices	has_positive
66	35-100	true

Showing 1 to 1 of 1 entries

Previous  Next

### Finished Tests

Display Details

Show  entries

Search:

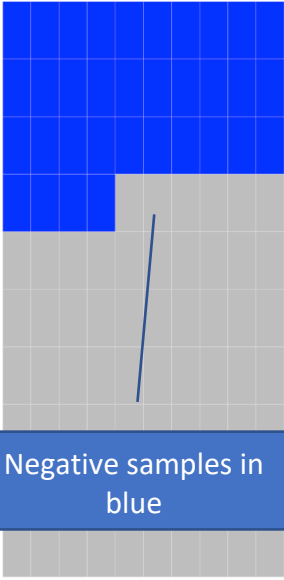
cohort_size	sample_indices	pool_size	pool_indices	prevalence	result
100	1-100	34	1-34	0.01	Negative
100	1-100	100	1-100	0.01	Positive

Showing 1 to 2 of 2 entries

Previous  Next

### Test Results

Heatmap Table



Negative samples in blue

Two tests done

### After a negative test:

- “Finished Tests” shows that the last test was negative.
- The “Progress Bar” and the “Test Results” panel both show that samples 1-34 were diagnosed negative.
- The instruction tells the user to pool samples 35-55 for the next test.

# Diagnostic Testing Dashboard with Adaptive Sample Pooling

### Initialization

Total Number of Samples in Cohort

Maximum Pool Size

Choose Initialization Method  
Estimated Prevalence

Proportion of Positive Cases in Cohort (Prevalence)

### Test Procedure

Please pool samples 36-37 for the current test and report the result below:

Progress Bar

result: Unknown (grey), Positive (red), Negative (blue)

### Pending Groups

Show 10 entries

cohort_size	sample_indices	has_positive
2	36-37	false
5	38-42	false
13	43-55	false
45	56-100	false

Showing 1 to 4 of 4 entries

### Finished Tests

Display Details

Show 10 entries

cohort_size	sample_indices	pool_size	pool_indices	prevalence	result
3	35-37	1	35-35	0.01	Positive
8	35-42	3	35-37	0.01	Positive
21	35-55	8	35-42	0.01	Positive
66	35-100	21	35-55	0.01	Positive
100	1-100	34	1-34	0.01	Negative
100	1-100	100	1-100	0.01	Positive

Showing 1 to 6 of 6 entries

### Test Results

Heatmap Table

Positive samples in red

The last four positive tests

## After a few positive tests:

- After four consecutive positive tests, we diagnosed a positive sample: sample 35, represented by the red block in “Progress Bar” and “Test Results”.
- Now the instruction tells the user to pool samples 36-37 for the next test.
- “Pending Groups” shows the technical details of how the cohort was split by ADSP into groups of samples to be tested. See the illustration on the last page.

## Diagnostic Testing Dashboard with Adaptive Sample Pooling

### Initialization

Total Number of Samples in Cohort

Maximum Pool Size


Choose Initialization Method

Proportion of Positive Cases in Cohort (Prevalence)

### Test Procedure

No pending tests.

Progress Bar



**No Pending Groups**

Show  entries

Search:

cohort_size	sample_indices	has_positive
No data available in table		

Showing 0 to 0 of 0 entries

### Finished Tests

Display Details

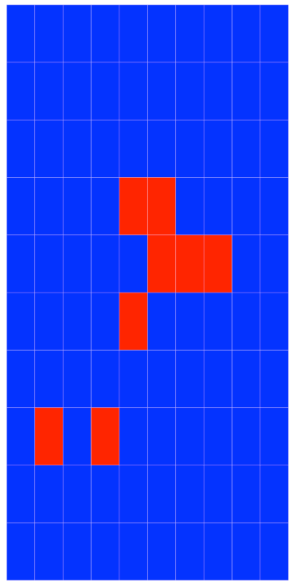
Show  entries

Search:

cohort_size	sample_indices	pool_size	pool_indices	prevalence	result
13	88-100	13	88-100	0.04	Negative
26	75-100	13	75-87	0.05	Negative
2	73-74	1	73-73	0.05	Negative
2	73-74	2	73-74	0.05	Positive
3	72-74	1	72-72	0.05	Positive
5	70-74	2	70-71	0.04	Negative
8	67-74	3	67-69	0.04	Negative
13	62-74	5	62-66	0.04	Negative
19	56-74	6	56-61	0.04	Negative
45	56-100	19	56-74	0.05	Positive

Showing 1 to 10 of 32 entries

### Test Results

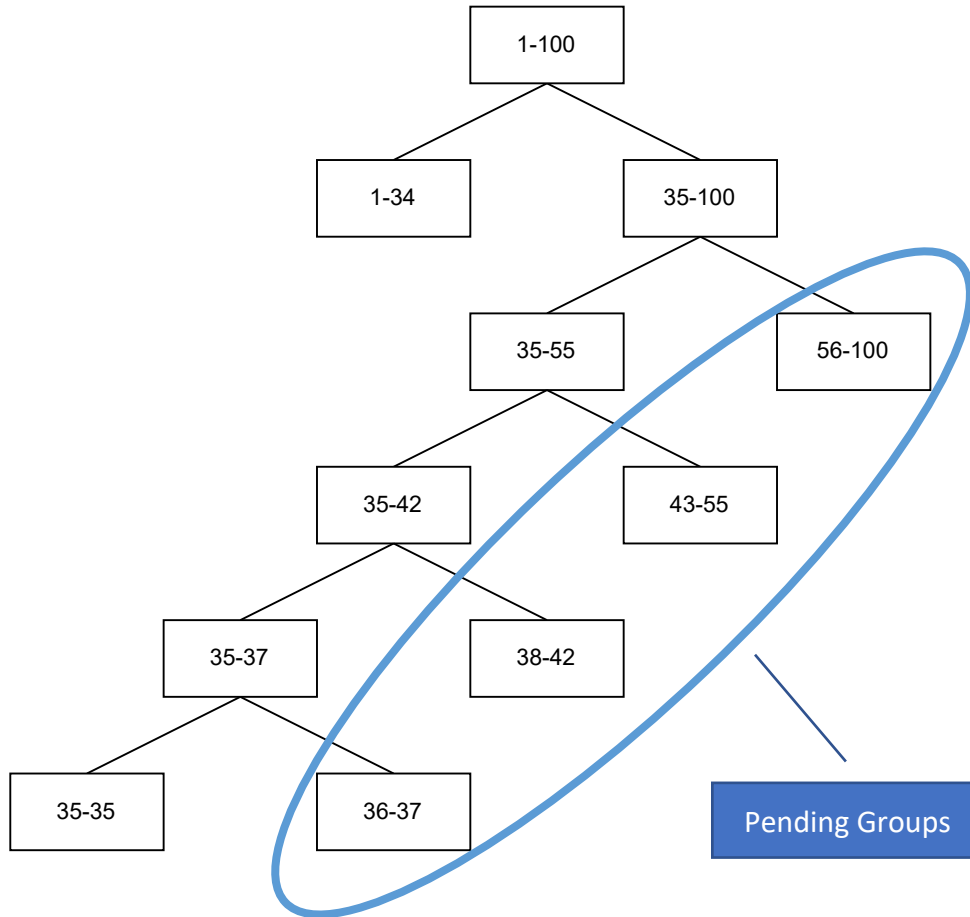


**Restart Button**

**Download Button**

### Test procedure finishes:

- After some more tests, all samples were diagnosed.
- The result of each test can be seen in “Finished Tests”.
- The user can download the test results in CSV format using the download button.
- To restart, update the parameters in the “Initialization” panel and click the “Start/Restart” button.



### Illustration of “Pending Groups”:

- “Pending Groups” represents the groups of samples that remained to be tested.
- This figure shows the “Pending Groups” on page 6.
- The way how ADSP splits the cohort into groups can be represented by a binary tree as shown above.
- The undiagnosed leaves of the binary tree are the pending groups. In this figure, groups 1-34 and 35-35 were diagnosed, so they were not included in the “Pending Groups”.