

# Mobile Hearing Booth to reduce false positives for Level 1 Functional Screening

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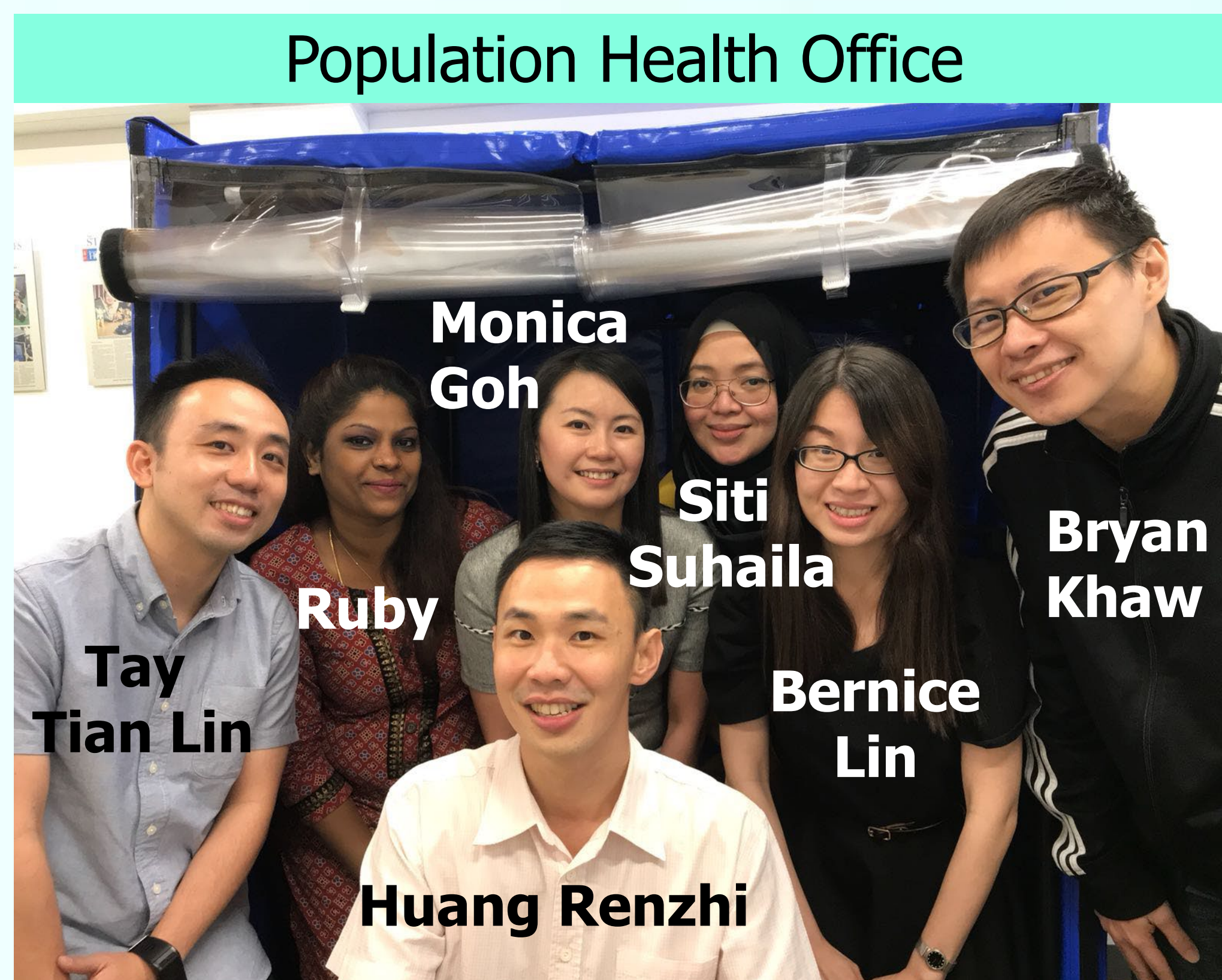
## Mission Statement

**Background:** Population Health Office in NHG conducts Functional Screening (FS) in central region of Singapore. This is part of nationwide functional screening (FS) initiative (by MOH) to help the elderly in Singapore to live better lives.

Our aim for this project is to reduce False Positives in Level 1 Functional Screening Hearing Tests by 50% for elderly residents 60 years and above at screening events.

*False Positive Definition: a test result which wrongly indicates that a particular condition or attribute is present.*

## Team Members

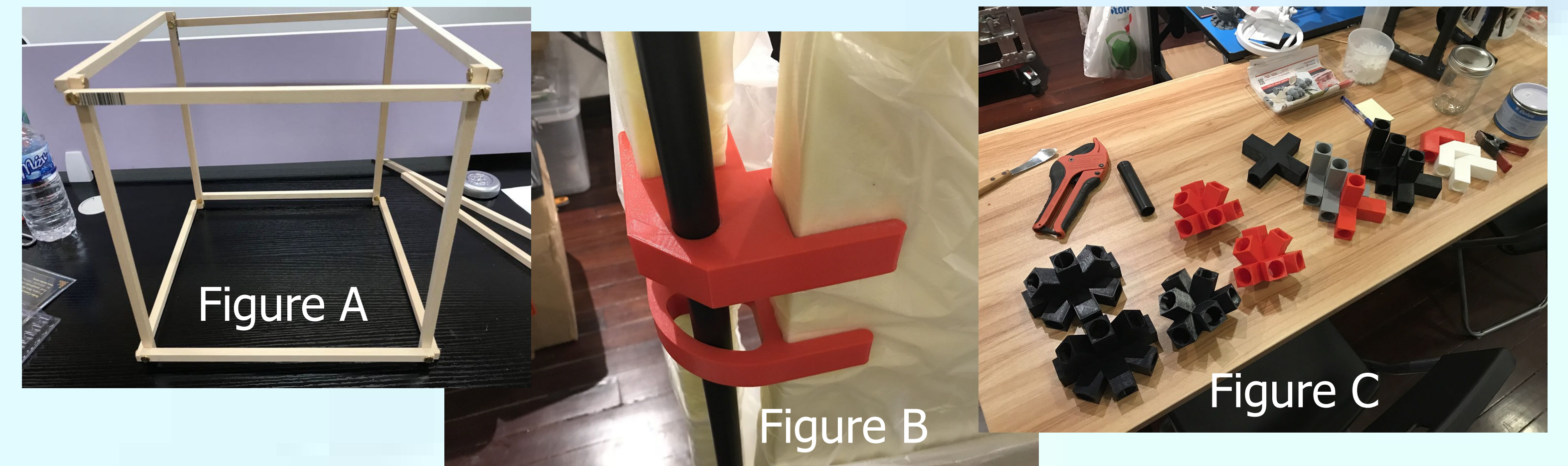


## Implementation

There are several criteria for the model:

- 1. Costs:** Vendor-built temporary booths are ineffective & expensive
- 2. Quality:** Professional sound booth costs S\$17k and is bulky
- 3. Manoeuvrability:** Our invention needs to be easily self assembled
- 4. Safety:** Safe to use and has fire retardant materials
- 5. Care for environment:** Parts should be recyclable or can be reused

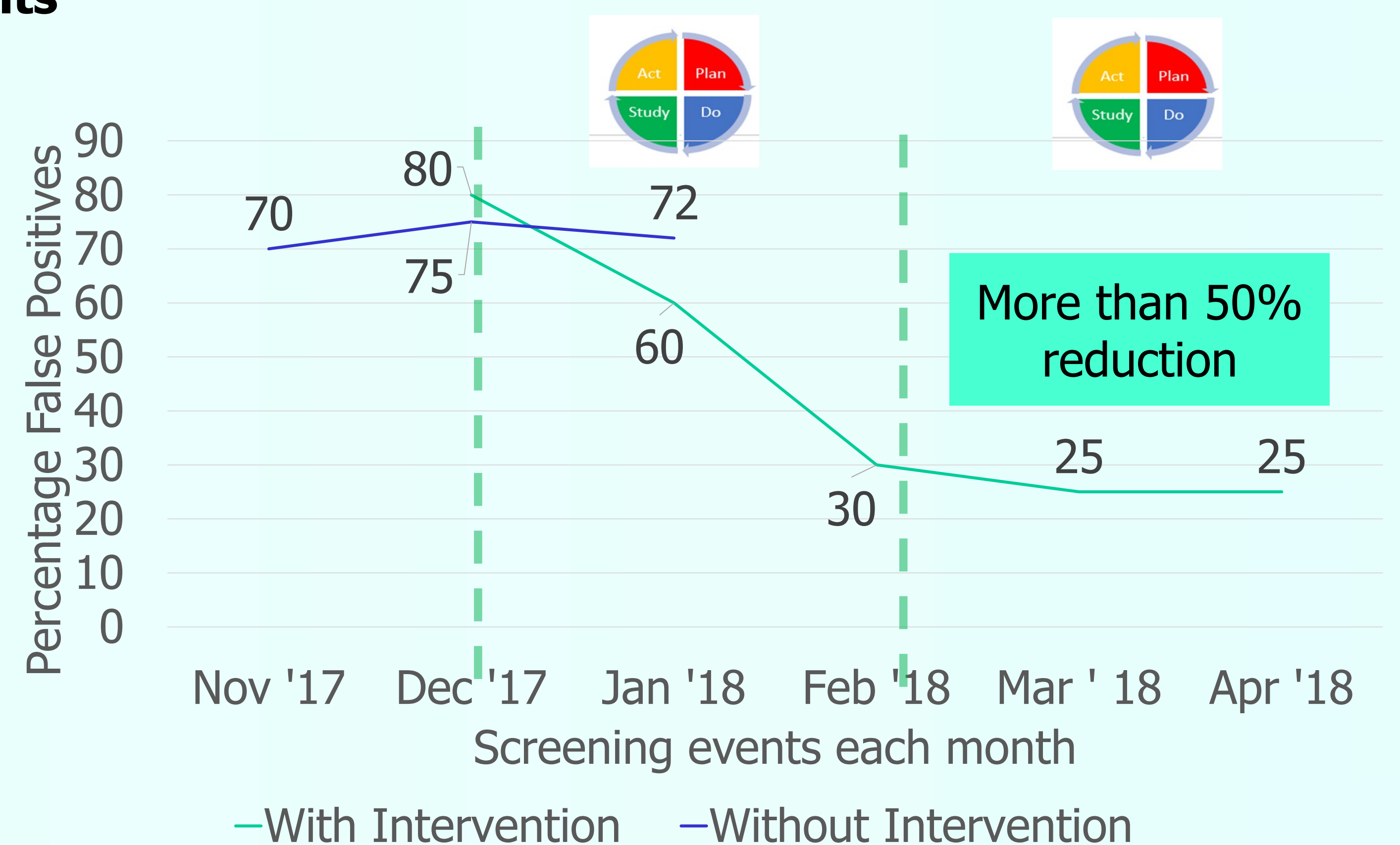
The team discuss and develop the most appropriate design for the booth. (refer to the design of the model figure A). For criteria 3 &4, the team brainstorm on the different methods of building. (Figure B & C)



The team build the mobile hearing booth to reduce ambient noise and allow more accurate results.

## Results

Residents whom were previously distracted by high-levels of ambient (background) noise, now **register more accurate hearing test results**



## Evidence for a Problem Worth Solving

There is high level of ambient noise in current screening locations. These locations are selected based on its high traffic of elderly in that area, as it attract the elderly crowd. These locations include areas beside wet market, near the bus interchange, etc.

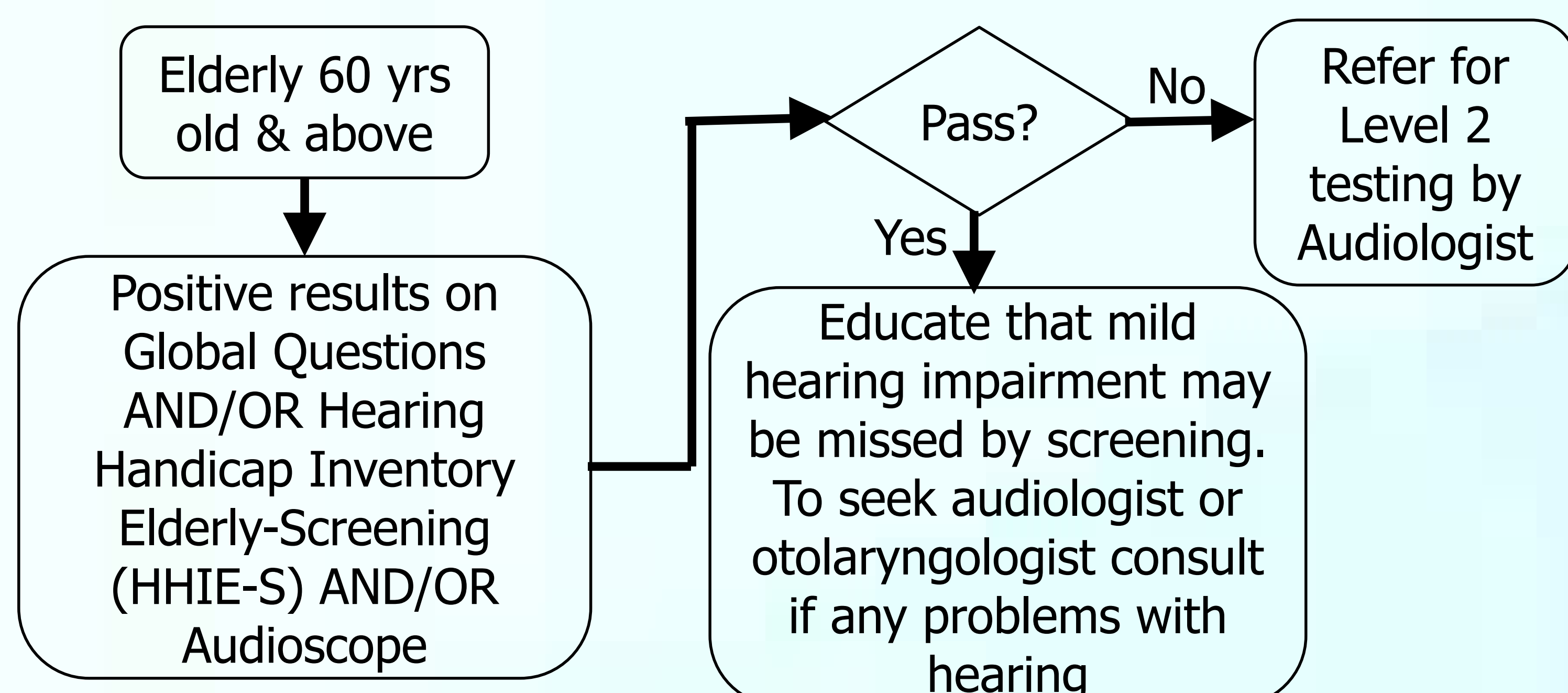
There are 2 levels hearing screening tests. Elderly begin with the Level 1 Screening Hearing Test, and those who fail the test will proceed to the Level 2 Hearing Screening test. There is also a limited slots for Level 2 Hearing Screening test.

## Current Performance of a Process

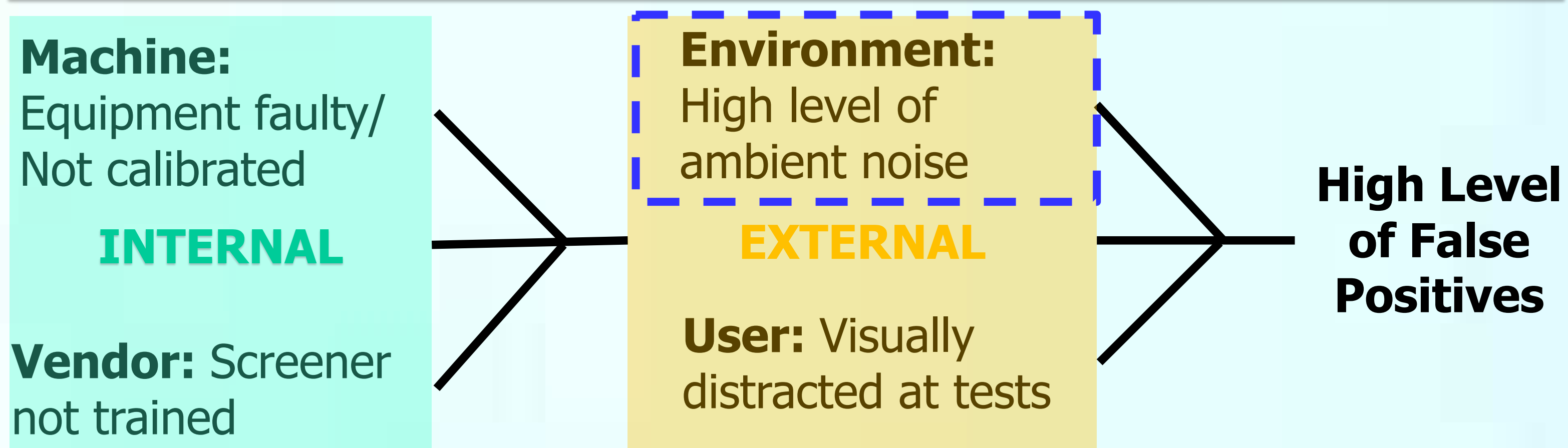
The program have currently screened more than 10,000 elderly in the central region of Singapore. All of them will undergo Level 1 Hearing Screening test.

Currently, 70% of the results contain False Positives during the level 1 tests.

## Flow Chart of Process of Level 1 Hearing Screening



## Cause and Effect Diagram



The team has identified the high ambient noise as the main contributor to the False Positive results.

The team build a mobile hearing booth that is from of recyclable PVC pipes, 3D printed joints and sound proof foam.

This mobile hearing booth that has consistently reduced at least 10 DB from the ambient noise, creating environment conducive for hearing tests, making the level 1 screening tests more accurate



## Cost Savings

The professional sound-proof booth costs \$17,000. It is bulky and difficult to deployed at our screening sites. Alternatively, renting the made-shift booth cause cost us \$1,000 per deployment and our results show that it was not effective in reducing surrounding ambient noise. The Mobile Hearing booth costs **\$3,000** and meet all the needs in our screening program.

## Strategies to Sustain

The next phase of the initiative is to get buy-in from the HPB-appointed vendor to adopt the usage of mobile hearing booth. We need the vendor to setup this hearing booth together with their equipment. Ongoing discussion has taken place and the vendor suggests to pilot test this booth on other screening engagement.

The team is currently planning to deploy the mobile hearing booth as part of the standard procedure (SOP) during of setup of hearing screening test event.