Honduras Vaccine Allocation Tool v1.0  
User’s Guide

**Introduction**

The Vaccine Allocation Tool (VAT) generates an optimized distribution plan for Covid-19 vaccines for a set period using a combination of current vaccine stock, historical immunization data, and external population-level information. The tool leverages a linear optimization algorithm constrained by vaccination capacity, eligible population, and remaining vaccine stock to prescribe a detailed plan of allocation from the National SALMI Warehouse to the 20 regional warehouses and finally to the 298 municipalities. Users can edit the preloaded SALMI stock data as well as upload their own files, facilitating continued use as up-to-date information becomes available. With customizable time periods for plan generation, the VAT adapts to meet the needs of various individuals and circumstances. The entire tool is available in both English and Spanish, and the language can be changed using the selector in the upper-right corner of every page. The VAT was created in R Shiny using data from SALMI, SESAL, and WorldPop. All data processing was done using the R Programming Language. The optimization models were built using version 5.6.18 of the lpSolve R package.

**Vaccine Stock Data**

This tab features an editable table showing the current vaccine stock in the national depot. It allows the user to change information such as number of doses and expiration date in case data is mis-entered. If the stock data falls out of data, the user can upload an entirely new Excel spreadsheet of stock data, provided that it adheres to the standard formatting of such data.

**Distribution Network**

This tab allows users to visualize the existing vaccine distribution network through a series of interactive maps. The first map shows the initial layer of the network, vaccine shipments from the National SALMI Depot to the 20 regional warehouses across Honduras. On its right, a map shows the pathways from regional warehouses to municipalities, with lines showing the connections between each municipality and the warehouse from which it receives its vaccination supply. Finally, the bottom map shows the locations of each of the 1,364 sites. All maps feature interactive mouseover and zoom functionality to further explore the data.

**Proposed Distribution (Adults)**

The Proposed Distribution (Adults) tab generates the plan for adult vaccine allocation using the existing vaccine stock data as modified in the “Vaccine Stock Data” tab. The adult plan will only consider vaccine doses in the stock that can be administered to adults; it will exclude all doses designated for children. The user can adjust the length of the plan in the numeric entry prompt next to the words “Number of Days.” While the default plan is 30 days, the optimization algorithm can accommodate varying lengths according to the needs of each user. When the user is satisfied with the input stock data as well as the length of the plan, they should click the “Run Model” button to run the optimization algorithm itself. Depending on certain factors such as the size of the input data, the computer being used, and internet connectivity, this process may take anywhere from less than one second to several seconds to complete.

When the model finishes running, text will appear confirming a successful outcome to the user. A map and table will populate below the button with the relevant output information. The map will show all routes from regional warehouses (blue) to individual municipalities (red) along which vaccines are being moved during the input time period. Each individual route can be moused over and clicked to display more information about the lot number and batch size being transported. The table at the bottom of the page will show each individual shipment proposed by the plan including the origin warehouse, destination municipality, batch number, batch type, and number of doses allocated. Additionally, the table displays relevant information for the target municipality such as average daily doses that municipality will be able to administer, total number of doses able to be administered during the planned time period, and total eligible adult population. The table can be sorted along any of the columns or downloaded into an excel file for external distribution and analysis.

**Proposed Distribution (Children)**

The Proposed Distribution (Children) tab generates the plan for child vaccine allocation using the existing vaccine stock data as modified in the “Vaccine Stock Data” tab. The child plan will only consider vaccine doses in the stock that can be administered to children; it will exclude all doses of the vaccine types for which children are ineligible. The user can adjust the length of the plan in the numeric entry prompt next to the words “Number of Days.” While the default plan is 30 days, the optimization algorithm can accommodate varying lengths according to the needs of each user. When the user is satisfied with the input stock data as well as the length of the plan, they should click the “Run Model” button to run the optimization algorithm itself. Depending on certain factors such as the size of the input data, the computer being used, and internet connectivity, this process may take anywhere from less than one second to several seconds to complete.

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**Historical Data**

This tab offers visualizations for monthly, site-level 2021 vaccination data. The selectors on the side of the page allow the user to indicate their target population (child vs. adults), dose (1st, 2nd, 1st booster, 2nd booster), and month of interest. These selections filter the data which is subsequently displayed on the interactive map. The map places circles over each site which change in size in accordance with the number of doses administered at each site; larger circles correspond to a greater number of doses administered. The tool also aggregates these site numbers to department-level aggregates which are reflected in the green shading of the base map. All information used to generate the maps is displayed in tabular form at the bottom of the page.

**Model Documentation**

This tab provides a brief overview of the modelling process, highlighting the underpinning assumptions and broader methodological approach.