POD SimPLER

User Guide

Point of Dispensing Simulation Program for Leveraging and Evaluating Resources (POD SimPLER) helps public health emergency planners understand their current capacity, forecast potential bottlenecks, and estimate additional resource needs when planning for operating Points of Dispensing (PODs) during response to an emergency or planned event.

This interactive tool can also be used as a training tool for locations that are beginning to draft POD plans and those who have not conducted full-scale POD exercises.

Disclaimer

These instructions and the corresponding software, POD SimPLER (Point of Dispensing Simulation Program for Leveraging and Evaluating Resources), are based on information obtained from real exercises and calculational models. Reasonable efforts have been made to present accurate and reliable information. The user, however, assumes responsibility for the consequences of using this information. Neither the Centers for Disease Control and Prevention, nor any of their employees, make any warranty, express or implied, or assume any legal responsibility for the accuracy or completeness of the information and instructions contained on this website and in the POD SimPLER software. Use of specific trade names and commercial sources does not constitute an endorsement by the authors or by the Centers for Disease Control and Prevention.

Contents

Overview

The Point of Dispensing Simulation Program for Leveraging and Evaluating Resources (POD SimPLER) is a software tool for response planners to estimate POD outputs, limitations, and resource needs in a public health emergency.

Purpose

During a public health emergency, state and local health departments may use Point of Dispensing (POD) sites to distribute medical countermeasures (MCMs) such as vaccines, antiviral drugs, and antibiotics. Setting up and staffing a POD is a challenging activity requiring extensive planning. POD SimPLER helps public health emergency planners understand their current POD throughput capacity, forecast potential bottlenecks, and estimate additional resource needs when planning for operating PODs during response to an emergency or planned event. This software can also be used as a training tool for locations that are beginning to draft POD plans and those who have not conducted full-scale POD exercises.

Key Features

- Accessible from any computer with internet access
- Simple interface with graphical outputs
- Ability to export data
- Links to references and resources

POD SimPLER focuses on typical or anticipated activities involved in operating PODs during a public health emergency or exercise, such as dispensing drugs, vaccination, triage or screening, observation, and registration.

Design

This program was developed using modeling software and incorporates actual timing data collected from POD exercises and public health emergencies across the country, making predictions more realistic and closer to what might happen during an emergency than using educated guesses. Estimates from this tool have been validated using data provided by public health partners. In addition, POD SimPLER has been tested with state and local planners to ensure that it is easy to use. To provide feedback or inquire about timing data collection, email Simpler@cdc.gov.

Introduction to POD SimPLER

This section describes the content of each screen in POD SimPLER. The next section will provide instructions on how to use POD SimPLER and the outputs the tool provides.

Input Screen

This is the POD SimPLER home screen. This is where you will select inputs to estimate POD throughput and capacity.
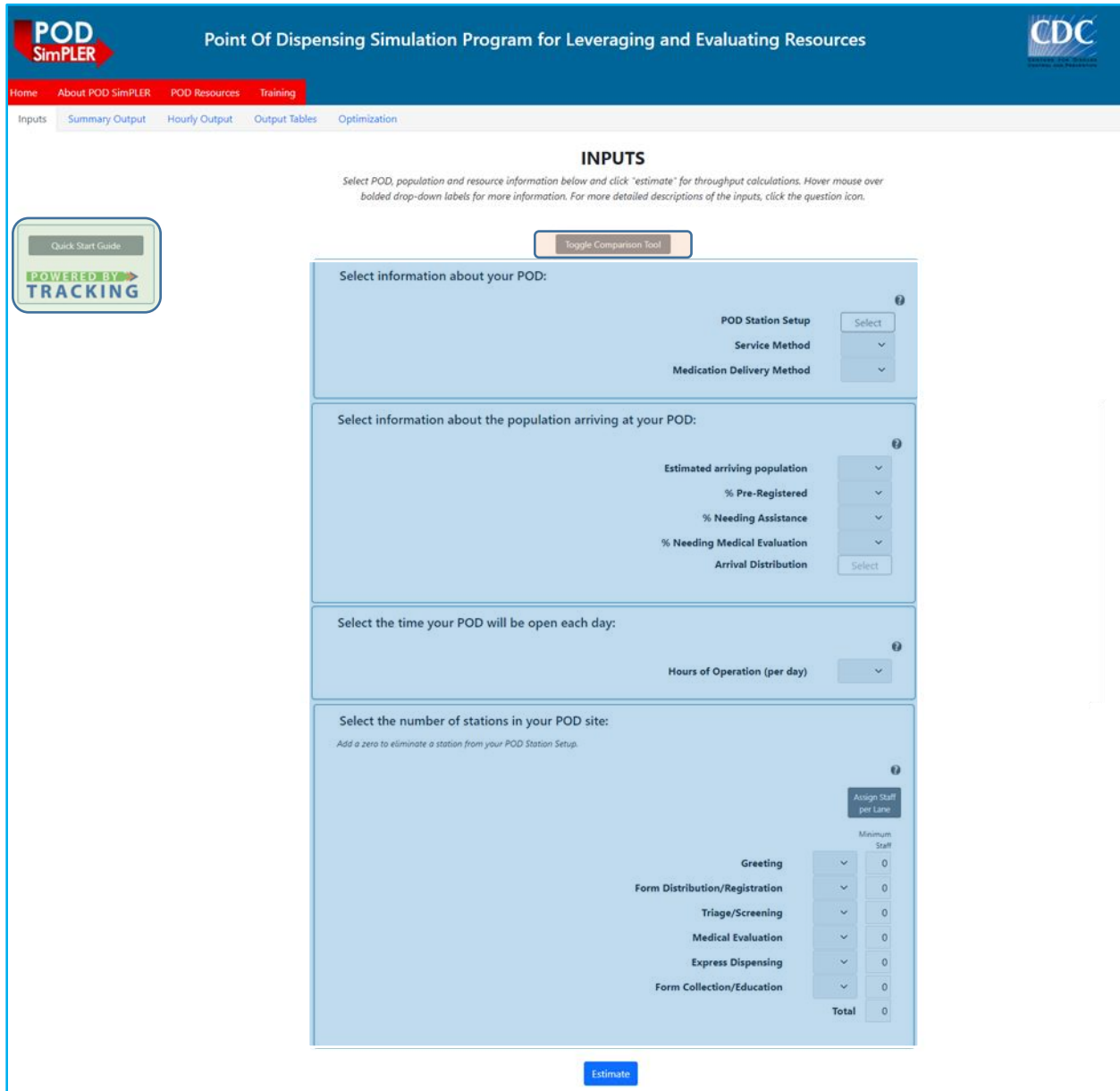
The Inputs Tab includes the following:
- Inputs Area—Enter information into four sections to perform POD SimPLER throughput estimates.

- Toggle Comparison Tool Button—This button turns on and off the comparison feature within POD SimPLER to allow for a side-by-side comparison of two different PODs.
- Quick Start Guide Button (located on the left margin)—New users will be able to click a button that will open a window with helpful information and visual aids outlining how to use the tool.

Inputs Area

The Inputs Area is separated into four sections:

1. **POD Setup:** What is the configuration of stations within the POD? Will people be walking through the POD or is it a drive thru POD? Is the POD dispensing pills or administering vaccines?
   Note: Once a user selects which configuration of POD stations they would like, the appropriate diagram will remain on the screen for reference.
2. **Population:** How many people are anticipated to arrive at the POD on a given day? How many have completed registration paperwork prior to arriving at the POD? How many will need assistance? How might they be arriving?
3. **Hours of Operation:** How long will the POD be open each day?
4. **Number of Lanes and Staffing:** How many lanes will be operating at each station within the POD? If there is an observation area, how much seating will there be? How many staff members will you assign to each lane or station?

Toggle Comparison Tool

Toggle Comparison Tool: This is a feature that allows for users to do a side-by-side comparison of two POD scenarios. By selecting this button, an additional column for input selection becomes available to the right of the input area. To turn off the comparison tool, select the button again. More information on how to use the Comparison Tool is found in the following sections.

Helpful Information
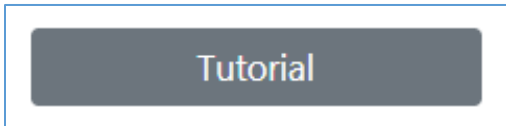
Tutorial

Tutorials: A pop-up window appears on each screen of POD SimPLER that provides a click-through tutorial on using that screen.

Quick Start Guide

Quick Start Guide: A pop-up window appears that provides step-by-step instructions for using POD SimPLER.

Tool tips are available as hover tool tips and pop-up tool tips throughout the POD SimPLER site.

Estimated arriving population	⌄
% Pre-Registered	⌄
% Needing Assistance	⌄
% Needing Medical Evaluation	⌄
Arrival Distribution	Select

Predicted number of individuals that will arrive over the course of one operational shift

Hover tool tips are available when you hover over drop-down menus. These are meant to provide a quick explanation or description of the drop down.

Option Descriptions ✕

Estimated Arriving Population During Shift: The number of individuals that will arrive at a POD on a given day. Depending on the type of incident and purpose of the POD, it might be difficult to estimate the arriving population. PODs may operate over several days and at many locations so this need to be taken into consideration when selecting an arriving population. For this calculation, focus on one POD site. Sample scenarios are provided in the user guide.

% needing assistance: The percent of the arriving population that is predicted to need assistance or require additional time and instruction. This percent will apply to your estimated arriving population and determine how many individuals will have longer services times when filling out forms or receiving dispensed drugs. An individual needing assistance can include but is not limited to: translation, interpreters, and mobility aid. It is recommended that planners coordinate with their local public health and emergency managers to best decide what percent is most likely for their response plans. Sample scenarios are provided in the user guide.

% needing Medical Evaluation: The percent of arriving population that are predicted to need medical evaluation. This can be due to medical concerns about the drug being dispenses such as contraindicating conditions or where additional medical screening from a medical professional is needed prior to receiving the drug.

% Preregistered: Percent of the population that are predicted to have completed registration prior to arriving

Arrival Distribution: The default arrival distribution is uniform. To adjust the type of arrival distribution for the population, select "enable ". For a closer look at each distribution, click the "View Arrival Distribution Examples" button on the left

Pop-up tool tips are identified by the question mark symbol ❓. Clicking on the question mark will open a pop-up window with tool tips that provide more information on each bolded section found on the Inputs Screen.

Assign Staff per Lane

Assign Staff per Lane: A pop-up window that allows users to change staffing assignments per lane at each station of their POD.

Summary Outputs
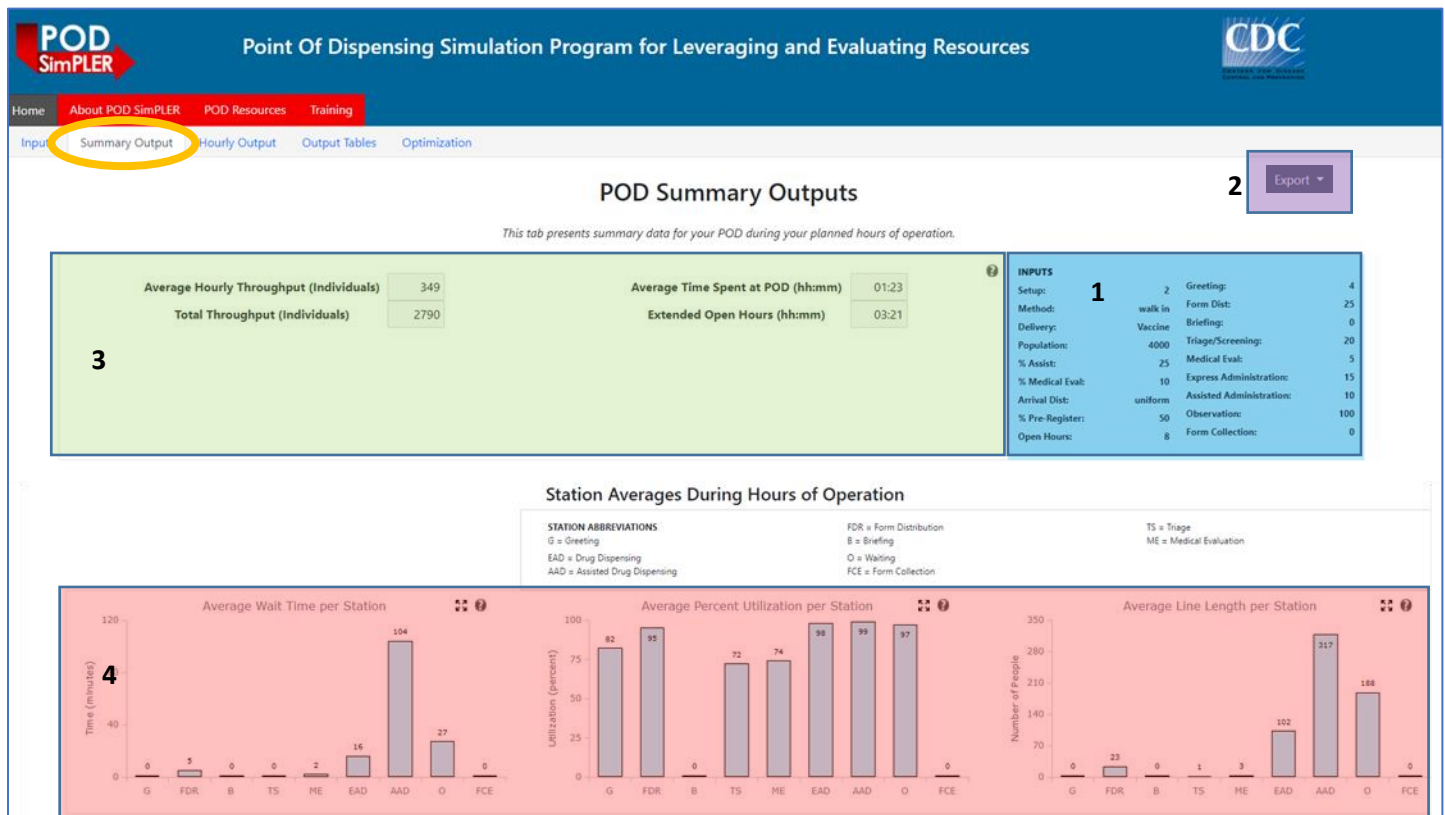
POD Summary Outputs present summary data for your POD during your planned hours of operation.

The Summary Output Screen includes the following:
1. Inputs Summary— This box displays inputs for the current POD scenario, allowing users to have an overall picture of their POD.
2. Export Button— This button displays a printable page of the screen, allowing users to print out a hardcopy of their data for easy presentation to decision-makers and other planners.
3. POD Summary Outputs for whole POD— This box displays calculated data based on the information used on the input screen. Provides the user with an overview of the entire POD operation.
4. POD Station Averages— This box displays calculated data based on the information used on the input screen. Provides the user with estimates of the performance of individual stations during the planned hours of operation based on wait time, station utilization, and line length.

POD Information as a Whole
The information presented in the top portion of the Summary Output Screen applies to the entire POD.

| Average Hourly Throughput (Individuals) | 349 | Average Time Spent at POD (hh:mm) | 01:23 |
| Total Throughput (Individuals) | 2790 | Extended Open Hours (hh:mm) | 03:21 |

- **Average hourly throughput (individuals):** Average number of individuals processed each hour
- **Total throughput (Individuals):** Number of individuals who have completed receiving services at the POD site
- **Average time spent at POD (hh:mm):** Average time spent by an individual receiving services at the POD
- **Extended open hours (hh:mm):** Additional staff time needed beyond the planned hours of operation to process remaining individuals

POD Stations

The information presented in the bottom portion of the **Summary Output Screen** is broken down by station and is averaged during the planned hours of operation. Each graph focuses on one characteristic that often affects throughput and highlights bottlenecks. Using all three graphs together allows you to get a more detailed perspective of each station within your POD.

Station Averages During Hours of Operation

STATION ABBREVIATIONS
G = Greeting
EAD = Drug Dispensing
AAD = Assisted Drug Dispensing

FDR = Form Distribution
B = Briefing
O = Waiting
FCE = Form Collection

TS = Triage
ME = Medical Evaluation
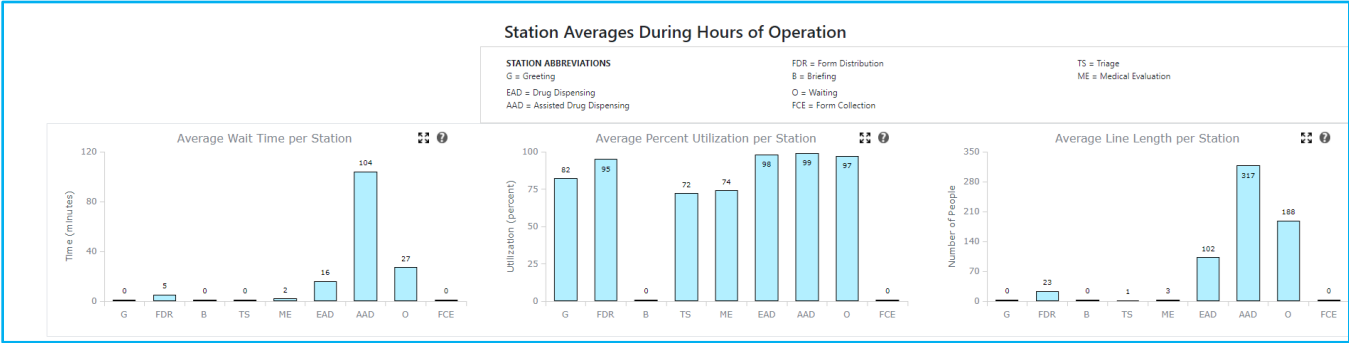
Average wait times per station: The average amount of time an individual spends waiting in line before receiving service at each station.

Average utilization per station: Think of this as the percent of time that the station is busy. For example, during an 8-hour period, a staff member at a station that is utilized 99% on average is not idling or waiting to serve additional individuals and they are busy for the full 8 hours. Meanwhile a staff member at a station that is utilized 50% might be waiting to receive individuals and only be busy for 4 out of the 8 hours of the planned open hours. Stations might be utilized at capacity for the beginning-of-the-day surge and then decrease as the day progresses, so it is important to look at both average and hourly utilization.

Average line length per station: The average number of individuals who are waiting in line before receiving service at each station.

POD station graphs can be expanded with the four-arrow button

By pressing the four-arrow ⤢ buttons in the upper right-hand corner of each graph, users will be able to look at each POD station graph more closely. The abbreviated station names are also fully spelled out in the expanded graphs.

Average Line Length per Station
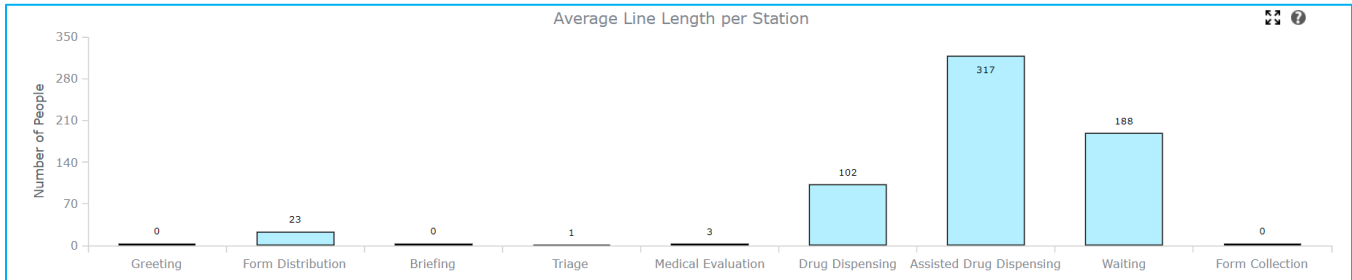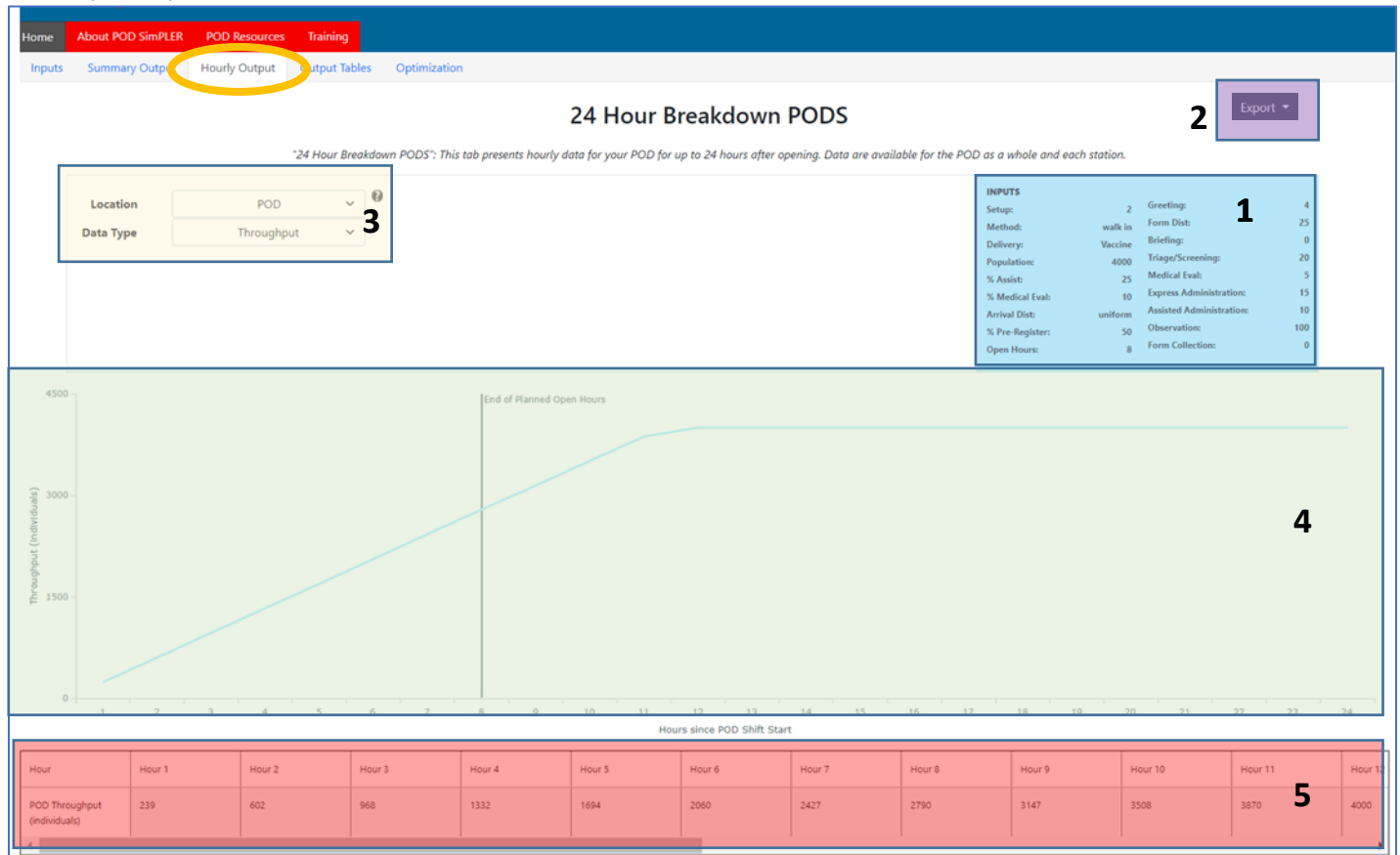
Hourly Outputs

Hourly outputs lets you view hourly data from the start of POD opening through 24 hours after opening.

The Hourly Output Screen includes the following:

1. Inputs Summary—This box displays inputs for the current POD scenario, allowing users to have an overall picture of their POD.
2. Export Button—This button displays a printable page of the screen, allowing users to print out a hardcopy of their data for easy presentation to decision-makers and other planners.
3. Selection Drop-Downs—The two types of drop-down menus are "**Location**" and "**Data Type**." All combinations are found in Table 1 below.

Table 1: Available option combinations for 24-hour plot

	Wait Time	Line Length	Utilization	Throughput	Individual Time
POD				X	X
Greeting	X	X	X	X	
Form Distribution /Registration	X	X	X	X	
Triage/Screening	X	X	X	X	

Briefing	X	X	X	X	
Medical Evaluation	X	X	X	X	
Express Admin/ Dispensing	X	X	X	X	
Assisted Admin/ Dispensing	X	X	X	X	
Form Collection/Education	X	X	X	X	

4. Hourly Output Plot Area—This is a line plot corresponding to drop-down selections. The vertical line marks the end of open processing hours. The "0" hours point marks the opening of the POD.
5. Hourly Output Corresponding Data Table—This is the table corresponding to data on the line plot.

Output Tables

The **Output Tables Tab** lets you view data in table form and export data.

The Output Tables Screen includes:
1. Inputs Summary—This box displays inputs for the current POD scenario, allowing users to have an overall picture of their POD. Users can take screen shots for easy presentation to decision makers and other planners.
2. Table Type and Data Type Drop Down Menu—This menu provides options for selecting information to display in the Table Area.
3. Table Area—This area displays output data corresponding to Table and Data Type selection from drop down menu.
4. Export to Excel—Using the Export Table button will export all POD SimPLER inputs and outputs to an Excel file.

Summary (Average) Tables

Data from the graphs on the **Summary Output Tab** are presented here on the **Output Table** screen in table form.

Station Name	Average Wait Time (min)	Average Utilization (%)	Average Line Length (people)
Greeting	0	82	0
Form Distribution/Registration	5	95	23
Triage/Screening	0	72	1
Briefing	0	0	0
Medical Evaluation	2	74	3
Express Administration/Dispensing	16	98	102
Assisted Administration/Dispensing	104	99	317
Observation	27	97	188
Form Collection/Education	0	0	0

You can choose to include standard deviation by selecting the **Include Standard Deviation Box**.

Detailed (Hourly) Tables

Data from the graphs on the **Hourly Output Tab** are presented here in table form. You can choose to include standard deviation by selecting **Include Standard Deviation Box**.

Station Name	Wait Time Hour 1	Wait Time Hour 2	Wait Time Hour 3	Wait Time Hour 4	Wait Time Hour 5	Wait Time Hour 6	Wait Time Hour 7	Wait Time Hour 8	Wait Time Hour 9	Wait Time Hour 10	Wait Time Hour 11	Wait Tim
Greeting	0	0	0	0	0	0	0	0	0	0	0	0
Form Distribution/Registration	1	3	4	3	3	2	2	5	6	0	0	0
Triage/Screening	0	0	0	0	0	0	0	0	0	0	0	0
Briefing	0	0	0	0	0	0	0	0	0	0	0	0
Medical Evaluation	0	0	0	2	2	0	0	0	0	0	0	0
Express Administration/Dispensi	0	1	2	2	3	5	9	16	22	24	0	0
Assisted Administration/Dispensi	9	22	37	52	65	78	91	104	119	133	136	0
Observation	2	4	7	11	15	19	23	27	31	35	39	39
Form Collection/Education	0	0	0	0	0	0	0	0	0	0	0	0

Optimization

The Optimization Feature identifies your top three POD resource scenarios that are projected to reach your throughput goals using the fewest additional resources.

The Optimization tab includes the following:
1. Inputs Summary—This box displays inputs for the current POD scenario, allowing users to have an overall picture of their POD.
2. Summary Output—This box presents calculated data based on the information used in the input screen, showing POD information for operations as a whole. These are the results from the top of the Summary Outputs Tab.
3. POD Constraints—Users can set new maximum limitations for lanes operating at each station, seating (if the POD has an Observation Area), or overall POD operational restrictions.
4. Estimate—By clicking the button, users will generate results that appear on the right-hand side of the tab.
5. Optimization Results—This box displays data for the top three POD planning scenarios and the number of additional resources needed to reach each scenario.

Using POD SimPLER

This section uses an example to show how the tool works.

Step 1. Entering POD and Population Information

You will go through each section and select information on the **Input Screen** then click "**Estimate**" to produce your POD SimPLER outputs.

1. **Select the type of POD you will be using**—Choose a diagram for the layout of stations within your POD. If you wish to eliminate any unneeded stations from your POD setup, you will be able to do so below in Section 4. Next, select if people will be walking into the POD or if the POD offers drive-thru services. Lastly, choose if the POD is dispensing pills or administering vaccines.

A. The **POD station setup** determines how your POD is configured (the flow of people through the POD). Choose between a selection of different POD diagrams. The diagrams should be viewed as a starting place for your POD operations. If you wish to eliminate any unneeded stations from your POD setup, you will be able to do so below. Diagrams are found in Appendix D.
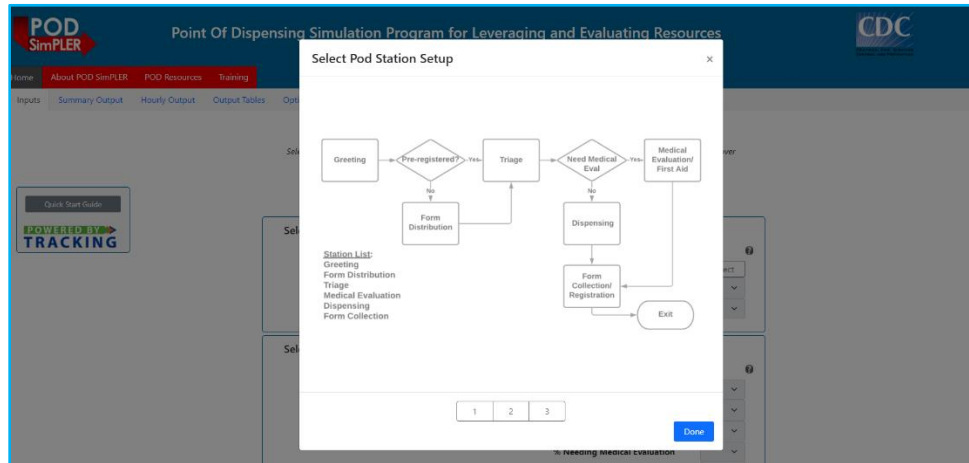
B. The **service method** determines if people will be walking through the POD or if the POD offers drive thru services.
C. The **medication delivery method** allows you to choose between the ultimate function of the POD. Currently, the user can pick between dispensing pills and administering vaccines.

2. **Select information about the arriving population at your POD**—It is possible that you may not know all information about the potential arriving population. Suggestions are provided in the tool for each input value.

Select information about the population arriving at your POD:

❓

Estimated arriving population	**A**	⌄
% Pre-Registered	**B**	⌄
% Needing Assistance	**C**	⌄
% Needing Medical Evaluation	**D**	⌄
Arrival Distribution	**E**	Select

A. The **estimated arriving population** is the number of people you anticipate will arrive during the planned open hours of your POD. This is essentially your desired throughput. This number depends on many factors including the type of public health emergency, location, and availability of medicine.

> **TIPS:**
> If you are unsure of the population size that might be arriving during each day, you can start with a smaller population size for your first SimPLER estimate and see if your POD set up is achieving the desired throughput.
>
> If your POD achieves *desired throughput*, you can go back to the Input Screen and raise the population size to determine the maximum for throughput capacity of your POD based on current resources.
>
> If you have only 1500 vaccines or pills available, then select 1500 or less as the estimated arriving population as the POD will not be able to provide additional countermeasures beyond the current supply. SimPLER assumes that you have enough supplies to service the entire arriving population.

B. The **percent preregistered** is the portion of your arriving population who have completed the registration process before arriving at the POD. Typically, this option would apply to jurisdictions who offer individuals a registration option online. This percent will be applied to your estimated arriving population to estimate how many individuals will require less total time processing through the POD.

C. The **percent needing assistance** is the percent of the arriving population who are predicted to need assistance or require additional time and instruction. This percent will apply to your estimated arriving population and determines how many individuals will have longer services times when filling out forms or receiving a dispensed drug or vaccine. An individual needing assistance can include but is not limited to individuals with access or functional needs, which refers to any individual with and without

disabilities, who may need additional assistance because of any condition (temporary or permanent) that may limit their ability to act in an emergency. Examples include individuals needing mobility assistance, individuals with limited sight and hearing, individuals requiring translation and interpretation services due to limited English proficiency, older adults, families with children, and individuals with a physical, mental, or emotional impairment. It is recommended that planners coordinate with their local public health and emergency managers to best decide what percent is most likely for their response plans.

TIPS:
The following resources can help public health planners estimate who in their jurisdiction has access and functional needs or could be considered most at risk during an emergency:

Planning for an Emergency: Strategies for Identifying and Engaging At-Risk Groups

Public Health Workbook to Define, Locate, and Reach Special, Vulnerable, and At-Risk Populations in an Emergency

Access and Functional Needs Toolkit: Integrating a Community Partner Network to Inform Risk Communication Strategies

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D. The **percent needing medical evaluation** is the percent of the arriving population who are predicted to need medical evaluation onsite after undergoing basic screening and triage services. The need for further medical evaluation may result from the general pre-threat health conditions or treat-exposure rates of the targeted population. The array of medications being dispensed/administered, expected medication contraindications, the availability of medical evaluation resources onsite or breadth of screening taking place onsite.

E. The **arrival distribution** influences the rate that the population will be arriving at the POD. The default arrival distribution is uniform which represents a constant rate over the hours of operation.

To change the **arrival distribution**, select the drop down and click through the other types of arrivals, including front-loaded and busload. The arrival options are accompanied by simple graphs that visually demonstrate how people will be arriving at the POD throughout open hours.

% Needing Medical Evaluation	10 ∨	
Arrival Distribution	Select	Vary arrival distribution to see impact on throughput estimates
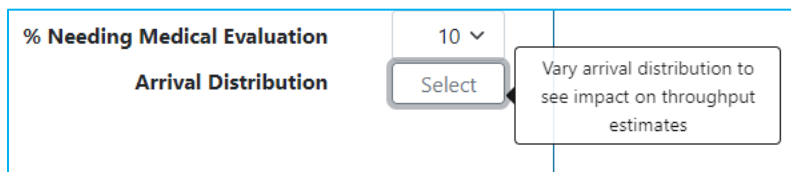
TIPS:
It is difficult to predict how a population may arrive at your POD (rate of arrival). Starting with a Uniform Arrival distribution and then comparing with other distributions will allow users to see how different types of arrivals might affect their throughput estimates. It is possible that the Summary Outputs might not vary as much with changing arrival distributions. Hourly Outputs will show a more direct impact of changing the arrival distributions.

3. **Select the time your POD will be open each day**—"Planned hours of operation" is the time, in hours, that your POD will be open and providing services to the arriving population each day.

Select the time your POD will be open each day:

Hours of Operation (per day)   8 ⌄

TIPS:
If you are operating more than one shift during the day with few to no stops in service, select the total number of hours your POD will be open to see total throughput for the POD over the course of the day.

If you are operating more than one POD, you should calculate throughput estimates separately for each POD.

4. **Select the number of resources used at your POD**—If you do not have a resource or that station is not utilized in your plans, select "0" here. For the Observation Area, you will be selecting the number of seats or parking spots instead of stations.

TIPS:
As resources are selected, the minimum staff number at each station will auto populate on the right. The minimum staff number is a measure for how many staff members are needed to reasonably operate the station. You are able to change the baseline staff level assignments for each station by clicking the Assign Staff per Lane Button. This feature allows planners to customize for their specific staffing plans. The minimum staff number does not include staff members such as the incident manager, safety officers, security officers, and traffic control personnel.

Select the number of stations in your POD site:

Add a zero to eliminate a station from your POD Station Setup.

❓

Assign Staff per Lane

		Minimum Staff
Greeting	⌄	0
Form Distribution/Registration	⌄	0
Briefing	⌄	0
Triage/Screening	⌄	0
Medical Evaluation	⌄	0
Express Administration	⌄	0
Assisted Administration	⌄	0
Observation Area	⌄	0
Form Collection/Education	⌄	0
Total		0

Click **Estimate** to view your POD throughput estimates and results.

Drug Dispensing Stations	⌄	0
Form Collection Stations	⌄	0
Total		0

Estimate

Step 2. View Summary Outputs

This section will walk through how to use the information provided on the **Summary Output Screen**.

Remember: Hover over tool tips are available for the top section of the screen. Pop-up tool tips are available for the top section and each graph.

Interpreting the Data
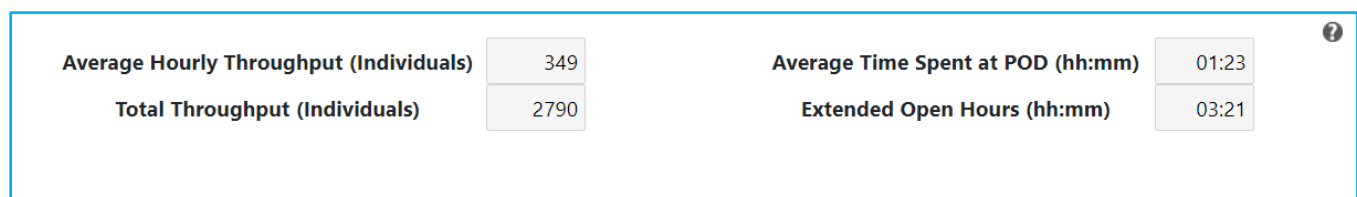
Average Hourly Throughput

Often this is a metric that is set by emergency planners and POD managers to determine if they are on track to achieve a projected throughput. This is meant to help those who have throughput goals expressed as an hourly rate to determine if they are achieving their throughput goals.

Total Throughput

This answers the question "Can I achieve my throughput goals based on the selected resources?" If the total throughput at the end of the planned hours of operation does not equal the population that was assumed to be arriving on the input screen, then throughput goals have not been achieved.

Average Time Spent at POD by an Individual

This can be used to determine the efficiency of wait times and total processing time for individuals arriving at the POD. If someone spends more time at the POD, more resources may be needed.

Extended Time Open

This answers the question, "How much longer will I need to stay open past the POD planned hours of operation to process the remaining individuals through my POD?" This helps determine if additional staff members will need to be called in and/or if overtime is needed for current staff members.

Average Wait Time per Station
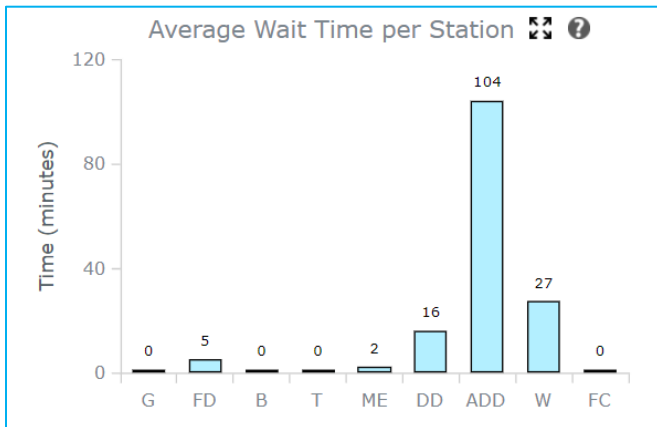
Average Wait Time per Station

Definition: The average amount of time an individual spends waiting in line before receiving service at each station for the planned hours of operation.

How to use: Wait times can be useful when considering where to add additional lanes of service, where additional security or line monitoring might be needed, or if adjustments to service times can be made to shorten wait times. For example, shortening service time could be accomplished by shortening registration forms and by removing questions that are not required for immediate or short-term follow-up for individuals. Basic contact information can be collected allowing for additional collection later.

Average Percent Utilization per Station
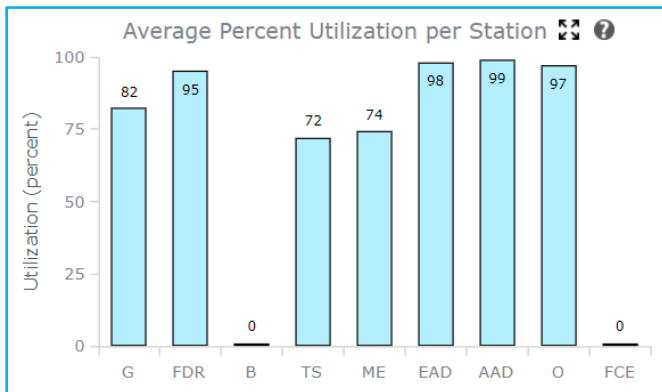
Average Percent Utilization per Station

Definition: This is the percent of the total planned open hours that the station is being used. Think of this as the percent of time that the station is busy. A staff member at a station that is 99% utilized on average is not idling or waiting to serve additional individuals while a staff member at a station that is 60% utilized might have some down time and be waiting to receive individuals. Stations might be utilized at capacity for the beginning of the opening surge and then, as the day progresses, they can decrease in utilization.

How to use: Average utilization is useful for determining where additional resources can be added or removed. Utilization above 90% is a good starting point when looking to add more resources. As resources become more readily available, lower rates of utilization can be used to evaluate where to place additional equipment or personnel. For a closer look at where additional staff members or resources could be temporarily placed to alleviate surges, view the 24-hour breakdown of the utilization in the Hourly Outputs Tab.

Correlating information across graphs: If utilization is high along with long lines and excessive wait times, the station is most likely a bottleneck and additional resources will be most effective if placed here. If utilization is high but line lengths and wait times are relatively low, priority might be placed lower on requesting additional resources for this station.
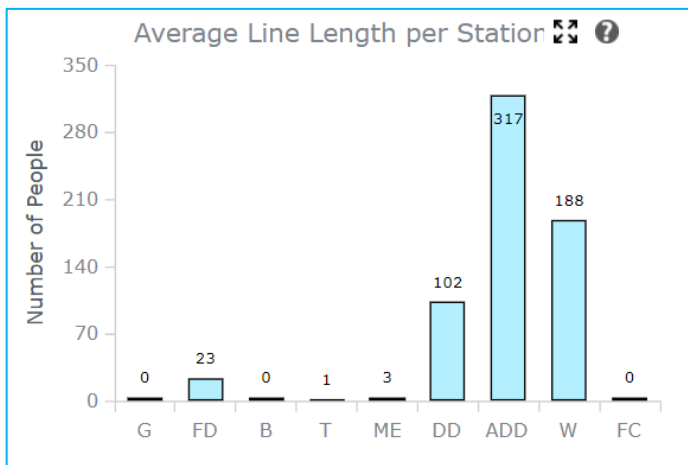
Average Line Length per Station

Definition: The average number of individuals who are waiting in line before receiving service at each station.

How to use: Average line length can be used to assess space allocations for lines and POD set up. It is important to note that if the lines are long but wait times are low, this is not necessarily a bottleneck but will require enough building capacity to hold the individuals.

Step 3. View Hourly Outputs

Hourly Outputs can be viewed by selecting the location and data type from the two drop down menus at the top of the page. The data begin at the start of POD opening and go through 24 hours from the opening of the POD. The vertical line represents the end of the planned hours of operation.

Remember: The pop-up tool tip provides more details and suggestions on how to use the data.

24 Hour Breakdown PODS

"24 Hour Breakdown PODS": This tab presents hourly data for your POD for up to 24 hours after opening. Data are available for the POD as a whole and each station.

Location **1** POD
Data Type **2** Throughput

INPUTS
Setup:	2	Greeting:	4
Method:	walk in	Form Dist:	25
Delivery:	Vaccine	Briefing:	0
Population:	4000	Triage/Screening:	20
% Assist:	25	Medical Eval:	5
% Medical Eval:	10	Express Administration:	15
Arrival Dist:	uniform	Assisted Administration:	10
% Pre-Register:	50	Observation:	100
Open Hours:	8	Form Collection:	0

Hour	Hour 1	Hour 2	Hour 3	Hour 4	Hour 5	Hour 6	Hour 7	Hour 8	Hour 9	Hour 10
POD Throughput (individuals)	239	602	968	1332	1694	2060	2427	2790	3147	3508

1. Select the **location** corresponding to the output you would like to view for the 24-hour plot.
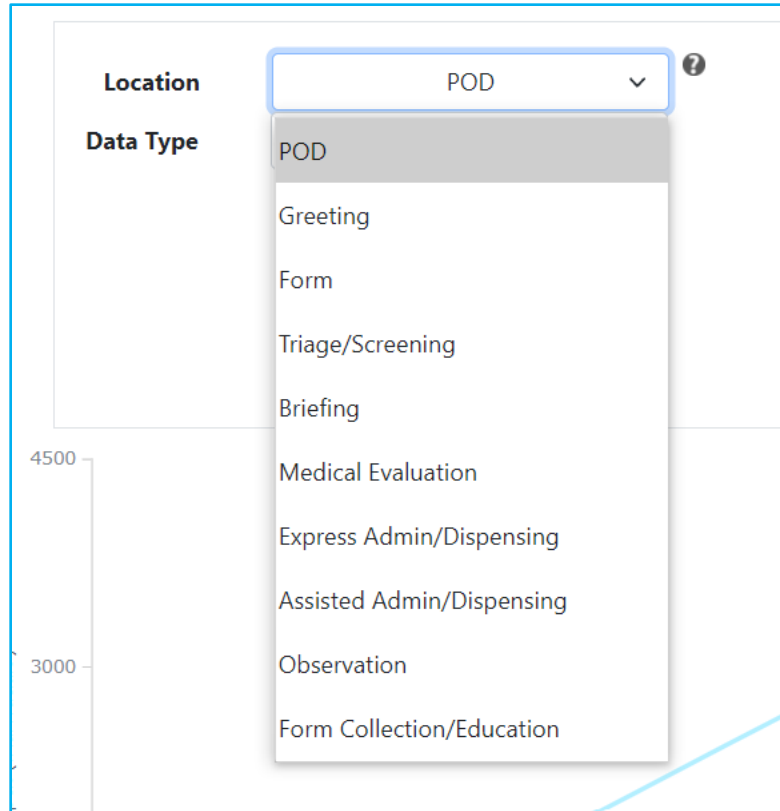
2. Select the **data type** corresponding to the output you would like to view for the 24-hour plot.
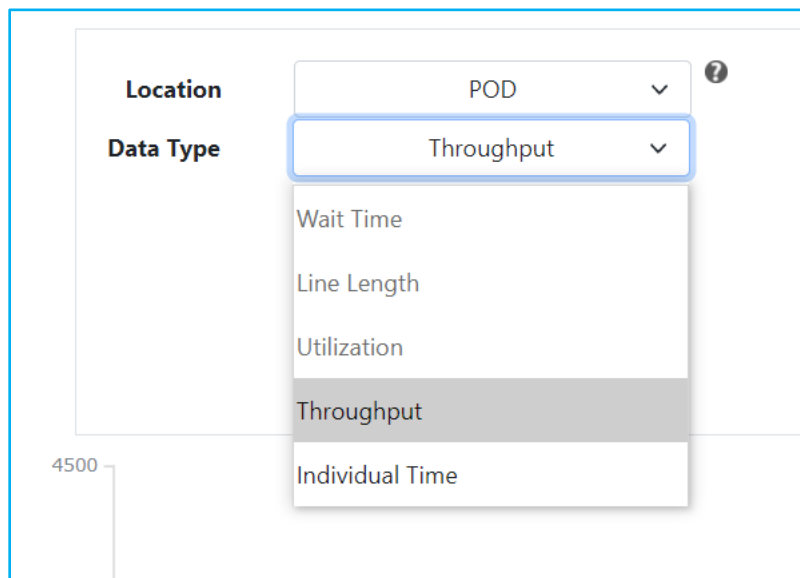
24-hour Breakdown Option Combinations

Detailed data can be useful for understanding how and when bottlenecks may develop, the impact of line build-up over time, and when stations may reach their maximum capacity. These data can be useful to understand how stations continue to operate after the planned hours of operation and how long remaining individuals will be at each station.

	Wait Time	Line Length	Utilization	Throughput	Individual Time
POD				X	X
Greeting	X	X	X	X	
Form Distribution /Registration	X	X	X	X	
Triage/Screening	X	X	X	X	
Briefing	X	X	X	X	
Medical Evaluation	X	X	X	X	
Express Admin/ Dispensing	X	X	X	X	
Assisted Admin/ Dispensing	X	X	X	X	
Form Collection/Education	X	X	X	X	

- **POD throughput (individuals):** This presents cumulative throughput for each hour of POD operation and extends to 24 hours after POD opening.
  - **How to use:** Cumulative throughput can be used to evaluate when throughput begins to slow down and when additional resources or staff members might need to be added during the day. This can be a good indicator of when bottlenecks may begin to appear.
 - This answers the question "Can I achieve my throughput goals based on the selected resources?" If the total throughput at the end of the planned hours of operation does not equal the population that was arriving on the input screen, then throughput goals have not been achieved.

- **POD individual time (hh:mm):** This provides the average time an individual would spend receiving services at the POD for each hour of POD operation and extends to 24 hours after POD opening. Individual time includes all wait times and processing time for each station that the individual goes through.
  - **How to use**: This can be used to determine the efficiency of wait times and total processing time for individuals arriving at the POD. If someone spends more time at the POD, more resources may be needed.

- **Station wait time (hh:mm):** This presents average individual wait times at each station for each hour of POD operation and extends to 24 hours after POD opening.
  - **How to use:** Station wait times can be useful when considering where to add additional lanes of service, where additional security or line monitoring might be needed, or if adjustments to service times can be made to shorten wait times. For example, shortening service time could be accomplished by shortening registration forms by removing questions that are not required for immediate or short-term follow-up for individuals.

- **Station utilization (percent):** This is the cumulative percentage that the station is being used starting at the opening of the POD and extending to 24 hours after POD opening. Think of this as the percent of time that the station is busy.
  - **How to use:** Station utilization is useful for determining where additional resources can be added or removed. Utilization above 90% is a good starting point when looking to add more resources. As resources become more readily available, lower rates of utilization can be used to evaluate where to place additional equipment or personnel.

- **Station line length (individuals):** This is the average number of individuals who are waiting in line before receiving service at each station for each hour of POD operation from the start of POD opening and extends to 24 hours after POD opening.
  - **How to use:** Average line length can be used to assess space allocations for lines and POD set up. It is important to note that if lines are long but wait times are low, this is not necessarily a bottleneck but will require enough building capacity to hold the individuals.

- **Station throughput (individuals):** This presents hourly station throughput for each hour of POD operation and extends to 24 hours after POD opening.
  - **How to use:** Hourly station throughput can be used to evaluate when throughput begins to slow down and when additional resources or staff members might need to be added during the hours of operation. This can be a good indicator of when bottlenecks begin to appear. Throughput should decrease after the planned hours of operation.

Correlating information across graphs: If utilization is high along with long lines and excessive wait times, the station is most likely a bottleneck and additional resources will be most effective if placed here. If utilization is high but line lengths and wait times are relatively low, there would be a lower priority for requesting additional resources for this station.

Step 4. View Output Tables

Summary and hourly output tables are available in the **Output Tables Tab**.

Remember: The pop-up tool tip provides more details and suggestions on how to use the data.

1. Select the **table type** you would like to view.

2. Select the **data type** you would like to view.

3. Select "**Include Standard Deviation**" if you would like to add standard deviation to the table.

Step 5. Exporting and Saving Data

To export data from POD SimPLER, click the **Export Table Button**. All POD SimPLER inputs and outputs are exported as a .xlsx file where you can name your file. Default file name is results.xlsx.

Station Name	Average Wait Time (min)	Average Utilization (%)	Average Line Length (people)
Greeting	0	82	0
Form Distribution/Registration	5	95	23
Triage/Screening	0	72	1
Briefing	0	0	0
Medical Evaluation	2	74	3
Express Administration/Dispensing	16	98	102
Assisted Administration/Dispensing	104	99	317
Observation	27	97	188
Form Collection/Education	0	0	0

Export Table

Your download (filename.xlsx) from POD SimPLER include the following:
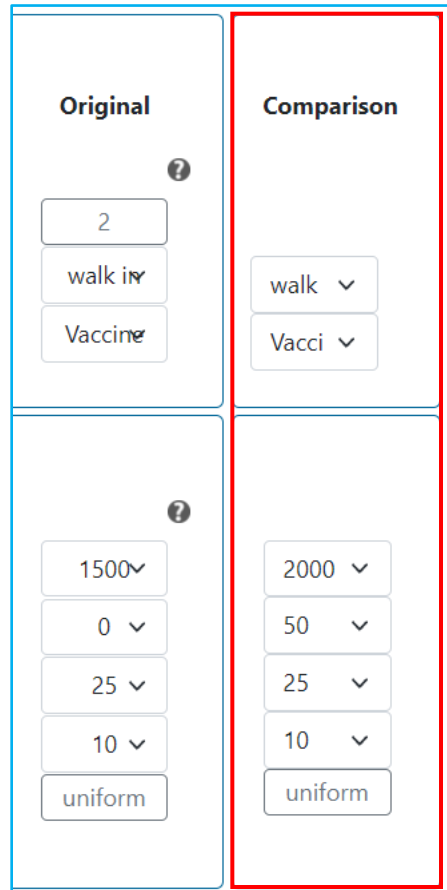
- All input information
- Summary Output Data
- Hourly Output Data

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Step 6*: Using the Comparison Tool (optional)

Now that you have walked through using the tool, go back to the **Input Tab** and select the **Toggle Comparison Tool Button**.

Toggle Comparison Tool

Select information for the comparison inputs the same way that you previously entered information in **Step 1**.

Click "**Estimate**" to view your POD throughput estimates and results for the original and comparison scenarios.

Step 7*: Comparison Tool Outputs

The **Summary Output, Hourly Output,** and **Output Tables** tabs all function the same as steps 2–5. The key difference is that now two scenarios are present on each screen. Differences for **Summary Output** and **Hourly Output** tabs are presented below.

Summary Output

The original and comparison scenarios are presented on the Summary Output Tab below. Corresponding data for each scenario in the *Station Averages* Section match the color represented on

the top left of the screen. The original scenario is the left bar, and the comparison scenario is the right bar in each pair.

POD Summary Outputs

This tab presents summary data for your POD during your planned hours of operation.

Average Hourly Throughput (Individuals)	349	Average Time Spent at POD (hh:mm)	01:23	
Total Throughput (Individuals)	2790	Extended Open Hours (hh:mm)	03:21	

INPUTS - Original

Setup:	2	Greeting:	4
Method:	walk in	Form Dist:	25
Delivery:	Vaccine	Briefing:	0
Population:	4000	Triage/Screening:	20
% Assist:	25	Medical Eval:	5
% Medical Eval:	10	Express Administration:	15
Arrival Dist:	uniform	Assisted Administration:	10
% Pre-Register:	50	Observation:	100
Open Hours:	8	Form Collection:	0

Average Hourly Throughput (Individuals)	433	Average Time Spent at POD (hh:mm)	00:54
Total Throughput at Shift End (Individuals)	3466	Extended Time Past Shift (hh:mm)	01:49

INPUTS - Comparison

Setup:	2	Greeting:	4
Method:	walk in	Form Dist:	25
Delivery:	Vaccine	Briefing:	0
Population:	4000	Triage/Screening:	25
% Assist:	25	Medical Eval:	5
% Medical Eval:	10	Express Administration:	15
Arrival Dist:	uniform	Assisted Administration:	15
% Pre-Register:	50	Observation:	150
Open Hours:	8	Form Collection:	0

Station Averages During Hours of Operation

STATION ABBREVIATIONS		
G = Greeting	FDR = Form Distribution	TS = Triage
EAD = Drug Dispensing	B = Briefing	ME = Medical Evaluation
AAD = Assisted Drug Dispensing	O = Waiting	
	FCE = Form Collection	

Average Wait Time per Station — Average Percent Utilization per Station — Average Line Length per Station

Hourly Output

The original and comparison scenarios are presented on the Hourly Output Tab below. The original scenario is represented by the line with circles and the comparison scenario is represented by the line with squares.
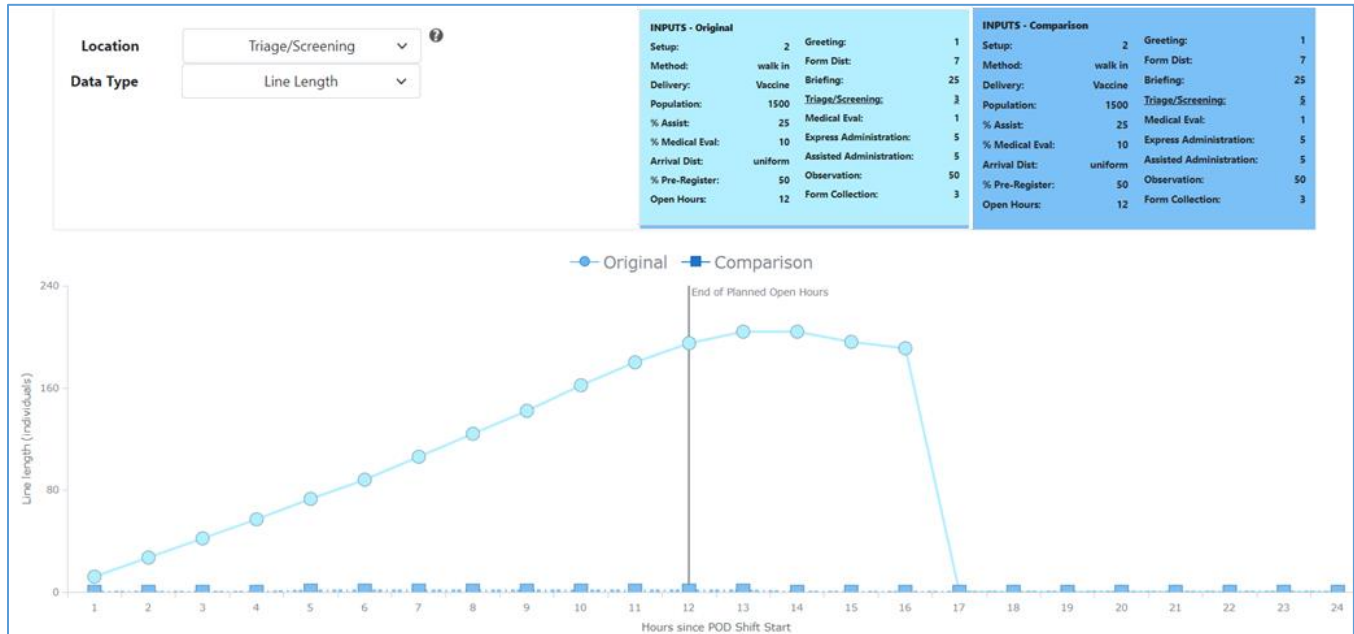
Step 8*: Using the Optimization Tool (optional)

If your current POD scenario is not allowing you to hit your desired throughput, you can use the Optimization Tool to find the best way to use the resources that you have or could potentially request. The optimization feature will provide you with the top three POD planning scenarios that let you reach your throughput goals while working within your stated resource limits.

1. Add new **POD constraints** to your plan—Constraints can be either limits on lanes operating at each station or overall operational limits, including the maximum time an individual will spend at the POD, the maximum wait time per station, and the maximum line length per station. The Minimum Staff Column is taken from the corresponding column on the inputs page.

> Suggestions for how to set operational limits: For a POD with limited space, planners may wish to select a shorter line length per station. Long lines may also be unfeasible for a POD operating in a location with severe heat or cold (i.e., people could not wait safely in lines that snake outside). For a population that has a higher percentage of older adults, planners may wish to lower the wait time per station.

A. **Select the maximum number of lanes you can spare at your POD for each station**. If a station is not utilized in your plans, select "0" here. For the observation area, you will be selecting the number of seats or parking spots instead of stations.

B. **Select operational limits for your POD**. To enable an option, click the check mark and then select from the drop down.

- **Max time spent at POD (hh:mm):** This is the maximum time an individual would spend receiving services at the POD.
- **Max wait time (minutes) per station (mm):** This is the maximum time an individual would wait in line for services at a station within the POD.
- **Max line length per station (individuals):** This is the longest line within the POD.

2. Select the **Estimate Button** to return your results—

A "minimize" feature has been added to hide the POD Constraints Box as needed. By pressing "Estimate" you will automatically minimize the POD constraints. If you wish to pull out the POD constraints again, click on the minimize feature, shown below.

3. Interpret your top three **optimization results**—The tool will generate three different POD scenarios that will put you as close as possible to your throughput goals while working within your stated resource limits. The following data will be displayed for each of the three optimized scenarios.
   a. **Resources**: The number of active lanes operating at each station in the POD scenario.
   b. **Additional resources**: The number of lanes that must be added to each station in your current POD scenario to realize the new, optimized POD scenario.
   c. **Total staff**: The number of individuals on your staff needed to operate the necessary stations. This does not include staff members who are not assigned to a particular station, such as the incident manager, safety officers, security officers, traffic control personnel.
   d. **Maximum line (individuals)**: The longest line in the POD scenario, measured in individuals.
   e. **Maximum wait time (mm)**: The longest station wait time in the POD scenario, measured in minutes.
   f. **Maximum individual time spent at POD (hh:mm)**: The average time an individual would spend receiving services at the POD for each hour of POD operation and extending to 24 hours after POD opening, measured in hours and minutes (hh:mm).
   g. **Extended open hours (hh:mm)**: The additional time after the planned hours of operation that is needed to process all remaining individuals.
   h. **Hourly throughput (individuals)**: The average number of individuals processed each hour during the hours of operation.
   i. **Total throughput (individuals)**: The number of people who have received POD services by the planned close of doors.

Optimization Results

Stations	Resources	Additional Resources	Total Staff	Max Line	Max Wait (mm)	Max Indiv Time Spent at POD (hh:mm)	Extended Open Hours (hh:mm)	Hourly Throughput	Total Throughput
ORIGINAL INPUTS									
Greeting	2	0							
Form Distribution/Registration	7	0							
Briefing	0	0							
Triage/Screening	6	0							
Medical Evaluation	1	0	26	39	27	00:47	01:15	116	1393
Express Administration	4	0							
Assisted Administration	4	0							
Observation Area	40	0							
Form Collection/Education	0	0							
OPTIMAL OPTIONS									
Greeting	2	0							
Form Distribution/Registration	10	3							
Briefing	0	0							
Triage/Screening	6	0							
Medical Evaluation	2	1	32	5	7	00:28	00:12	124	1492
Express Administration	6	2							
Assisted Administration	4	0							
Observation Area	40	0							
Form Collection/Education	0	0							
Greeting	2	0							
Form Distribution/Registration	10	3							
Briefing	0	0							
Triage/Screening	6	0							
Medical Evaluation	1	0	33	5	7	00:30	00:13	124	1492
Express Administration	8	4							
Assisted Administration	4	0							
Observation Area	40	0							
Form Collection/Education	0	0							
Greeting	2	0							
Form Distribution/Registration	15	8							
Briefing	0	0							
Triage/Screening	6	0							
Medical Evaluation	1	0	36	6	20	00:30	00:07	125	1497
Express Administration	6	2							
Assisted Administration	4	0							
Observation Area	40	0							
Form Collection/Education	0	0							

4. Click "**Add to Comparison"** button—Select an optimized scenario to compare with your original scenario on the Summary Output screen. The button is located to the right of your optimized scenarios. The Add to Comparison feature is useful if you would like to visualize differences in wait time, utilization, or line length in table form.

OPTIMAL OPTIONS									
Greeting	2	0							
Form Distribution/Registration	10	3							
Briefing	0	0							
Triage/Screening	6	0							
Medical Evaluation	2	1	32	5	7	00:28	00:12	124	1492	Add to Comparison
Express Administration	6	2							
Assisted Administration	4	0							
Observation Area	40	0							
Form Collection/Education	0	0							
Greeting	2	0							
Form Distribution/Registration	10	3							
Briefing	0	0							
Triage/Screening	6	0							
Medical Evaluation	1	0	33	5	7	00:30	00:13	124	1492	Add to Comparison
Express Administration	8	4							
Assisted Administration	4	0							
Observation Area	40	0							
Form Collection/Education	0	0							
Greeting	2	0							
Form Distribution/Registration	15	8							
Briefing	0	0							
Triage/Screening	6	0							
Medical Evaluation	1	0	36	6	20	00:30	00:07	125	1497	Add to Comparison
Express Administration	6	2							
Assisted Administration	4	0							
Observation Area	40	0							
Form Collection/Education	0	0							

Using POD SimPLER to Answer Specific Questions

This section takes specific questions that you might be trying to answer by using POD SimPLER and provides guidance on where to find the information in the tool and how to apply the data to aid in planning and decision making.

Can I achieve my throughput goals with my current resources?

Information Location: "**Total Throughput**" on the **Summary Output Tab**

Average Hourly Throughput (Individuals) 349	**Average Time Spent at POD (hh:mm)** 01:23
Total Throughput (Individuals) 2790	**Extended Open Hours (hh:mm)** 03:21

What does the information mean?

Total throughput can be used to assess if throughput goals are being met for a given POD based on current resource inputs.

- If **total throughput** is close to or equal to the population size selected on the input screen, then throughput goals can be achieved with the current POD setup.
- If **total throughput** is at least 5–10% lower than the population size selected on the input screen, then desired throughput goals likely are not being met. Station specific data can be used to identify which stations might potentially be causing bottlenecks and where additional resources would be most impactful for improving throughput.

Note: A range (5-10%) is provided in the explanation above to accommodate for the fluctuation of values that come from simulated data. This is not a limit or cut off but meant to help the user determine if they are close to meeting their throughput goals or if the estimate deviates enough from the goal value that warrants requesting additional resources.

For example, if the goal throughput value is 5000, a total throughput value of 4450 would be 11% lower than the goal. This would mean that throughput goals might not be achieved. Users may decide that this value is still close enough to their desired throughput such that it does not warrant changes.

As the difference between the goal throughput and the total throughput value increases, it is less likely that the current POD setup, resources, and staffing will be able to process the population within the desired timeframe.

How do you apply the data to decide which actions to take?

Likely bottlenecks can be identified by large lines, long wait times, and near 100% utilization. After determining which stations are causing bottlenecks, perform another POD SimPLER calculation adding resources to the bottleneck stations. Continue to adjust resources until desired throughput is met or an acceptable increase in total throughput is found.

Example: The Assisted Dispensing Station has been identified as a bottleneck. Consider reassigning staff members from stations with lower utilization rates. You identify that the Greeting Station is working at a 60% average utilization rate, meaning that staff members are probably idle, or at least not providing services to people, for 40% of the hours of operation. Your current plan has four lanes operating at the Greeting station.

Option 1: One possibility could be to close a lane at the Greeting Station and reassign staff members from the closed lane to the Assisted Dispensing Station. Planners would have to check that this change did not create an unacceptable bottleneck at the Greeting Station and verify how the change impacted their total throughput.

Option 2: Another possibility could be to keep all lanes operating at the Greeting Station but use fewer staff members to manage the lanes. If the Greeting Station has four staff members per four lanes, a planner could use the "Assign Staff per Lane" feature to lower this ratio to two staff members per four lanes at the Greeting Station. The extra workers at the Greeting Station could then be reassigned to the backlogged Assisted Dispensing Station.

How much longer will I need to stay open to process everyone arriving at the POD?

Information Location: **Extended Open Hours** on **Summary Output** tab

Average Hourly Throughput (Individuals)	349	Average Time Spent at POD (hh:mm)	01:23	
Total Throughput (Individuals)	2790	Extended Open Hours (hh:mm)	03:21	

What does the information mean?

Extended open hours can be used to determine how much longer the POD will need to stay open to finish dispensing or vaccination activities. This time is based on the POD operating with the same resources and set up after the POD stops receiving new individuals.

How do you apply the data to decide which actions to take?

Planners should determine how long they are comfortable staying open past the POD closing to finish processing all remaining individuals. It is possible that the time left to process the remaining individuals is low enough that planners feel there is no action needed to be taken. If the amount of time is longer than planners would like to stay open or can stay open, resources should be adjusted, and another POD SimPLER estimate should be done.

To help reduce the amount of additional time needed to process remaining individuals, the stations that were causing bottlenecks should be identified. When performing the next POD SimPLER estimate, those stations and their resources should be adjusted to determine the impact of adding one or more additional resources. It is possible that a combination of additional resources, such as adding one additional registration lane and one additional assisted dispensing lane would be more beneficial than adding two assisted dispensing lanes.

> **Tip:** Adding resources to the station that had the highest utilization along with line length and wait times is the easiest way to reduce additional time required to process remaining individuals.

How long can individuals arriving at my POD expect to be there?

Information Location: **Average Time Spent at POD** on the **Summary Output Tab**

Average Hourly Throughput (Individuals)	349	**Average Time Spent at POD (hh:mm)**	01:23
Total Throughput (Individuals)	2790	**Extended Open Hours (hh:mm)**	03:21

What does the information mean?

Average time spent at POD is an individual's time spent receiving services at the POD. This value can be used to determine the efficiency of wait times and total processing time for individuals arriving at the POD. If someone spends more time at the POD, it may require more resources.

How do you apply the data to decide which actions to take?

It is hard to set a limit on how long someone should spend at the POD receiving services. Planners should determine what they think is appropriate and if they have the personnel and security in place to manage individuals who become unruly as their processing time increases.

Example: a POD manager feels that people who need to receive services are likely to start leaving or stop coming to a POD should their wait and processing times exceed 2 hours. Depending on the jurisdiction's capabilities and the type of incident or event, it might be appropriate to issue public

messaging indicating that pre-registering before coming to the POD (typically by completing registration activities through an online form) or going to location B will result in shorter waiting times. It is also possible that due to the type of event or incident and restricted resources, planners might decide that processing times of 4–6 hours are acceptable. It is worth considering that the longer someone is idling in lines at the POD, the more likely they will need additional resources or staff attention.

To reduce the amount of time someone spends at the POD, identify the stations with the highest wait times. In the next POD SimPLER estimate, add additional resources to that station and the results should show lower wait times and lower overall average time someone spends at the POD. Users should continue this process until an acceptable average processing time is reached or it is not feasible to acquire more resources for those stations.

What station is causing bottlenecks?

Information Location: **Station Graphs** on **Summary Output tab**
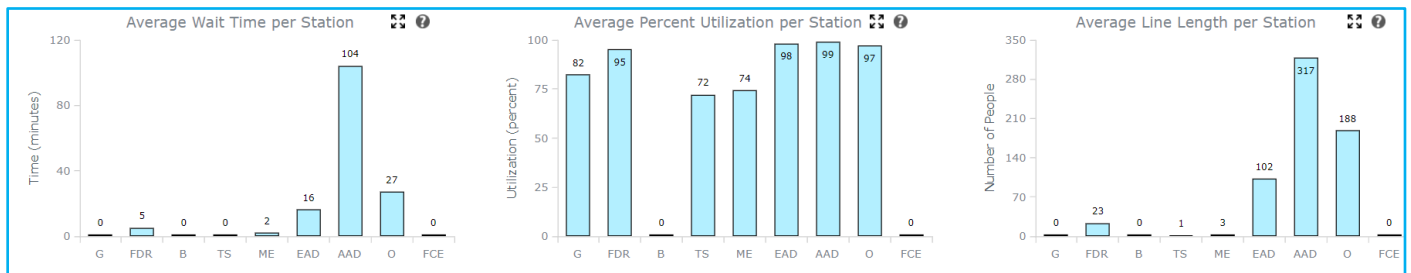
What does the information mean?

If station Utilization is 90% or higher, it is likely a potential bottleneck. If in addition to high utilization there are long lines and excessive wait times, the station is most likely a bottleneck and additional resources will be most effective if placed here. If utilization is high but line lengths and wait times are relatively low, there is a lower priority for requesting additional resources for this station.

How do you apply the data to decide which actions to take?

Hourly Outputs Tab provides more information on when bottlenecks begin to appear and if additional resources are needed throughout the hours of operation or at certain time frames during the day. Instructions on applying 24-hour data are found in the next section, *How quickly do bottlenecks appear?*

How quickly do bottlenecks appear?

Information Location: Station plots on **Hourly Tab**

24 Hour Breakdown PODS

"24 Hour Breakdown PODS": This tab presents hourly data for your POD for up to 24 hours after opening. Data are available for the POD as a whole and each station.

Location: Assisted Admin/Dispensing

Data Type: Utilization

INPUTS			
Setup:	2	Greeting:	4
Method:	walk in	Form Dist:	25
Delivery:	Vaccine	Briefing:	0
Population:	4000	Triage/Screening:	20
% Assist:	25	Medical Eval:	5
% Medical Eval:	10	Express Administration:	15
Arrival Dist:	uniform	Assisted Administration:	10
% Pre-Register:	50	Observation:	100
Open Hours:	8	Form Collection:	0

What does the information mean?

When utilization approaches 90% and remains steady at high utilization, this is likely the start of the bottleneck. If utilization is high along with long lines and excessive wait times, the station is most likely a bottleneck and additional resources will be most effective if placed here. If utilization is high but line lengths and wait times are relatively low, priority might be placed lower on requesting additional resources for this station.

Another possibility is that utilization is very high in the beginning of the hours of operation or for a period in which surges of people are arriving, but it quickly falls and returns to an acceptable utilization rate. This is most likely not the highest priority bottleneck so other stations should be viewed to determine where additional resources would be most beneficial over the course of the whole day.

How do you apply the data to decide which actions to take?

If bottlenecks seem to appear almost immediately or within the first hour or two of the hours of operation and remain constant, the POD will not have enough resources to process all arriving individuals. Planners should add additional resources to this station and perform another POD SimPLER estimate to see if the addition of resources pushes the bottlenecks to later in the day or removes them completely.

If bottlenecks seem to appear almost immediately or within the first hour or two of the hours of operation but seem to decrease as the day goes on, POD managers might move staff members or resources from other stations to overcome the initial bottleneck and then return to their own stations as the opening surge is complete. Make sure that staff members and resources are not being taken from stations with high utilization as they are needed there.

If bottlenecks appear later or near the end of the hours of operation, it might be possible for staff members or resources to be moved from lower utilized stations to help bottleneck stations temporarily alleviate their hold ups.

Do I have enough space to handle bottlenecks?

Information Location: "**Average Line Length per Station**" on the **Summary Output TAB**
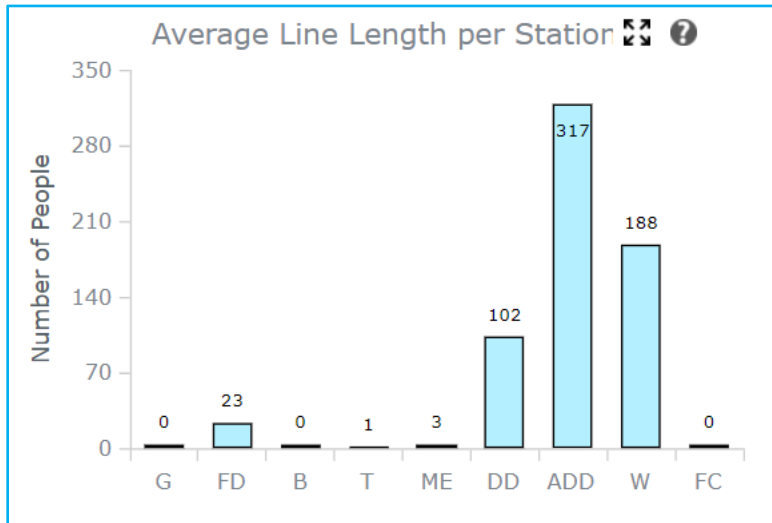
What does the information mean?
Average line length is the average number of individuals who are waiting in line before receiving service at each station. It is important to note that if there are long lines but wait times are low, this is not necessarily a bottleneck but will require enough building capacity to hold the individuals.

How do you apply the data to decide which actions to take?
Average line length can be used to assess space allocations for lines and POD set up. Planners should use average line length to determine if their POD location has the capacity for the lines that may develop during POD operation. Hourly averaged line length can be viewed in the Hourly Output Tab. This will show peaks in line length and when lines might start to decrease over a 24-hour period.

In the example below, the line length at express drug dispensing continues to increase after the planned close of the hours of operation. This is because individuals are arriving from other stations within the POD, but the station does not have enough personnel to process individuals at a rate faster than they are arriving.

24 Hour Breakdown PODS

"24 Hour Breakdown PODS": This tab presents hourly data for your POD for up to 24 hours after opening. Data are available for the POD as a whole and each station.

Location: Express Admin/Dispensing
Data Type: Line Length

INPUTS			
Setup:	2	Greeting:	4
Method:	walk in	Form Dist:	25
Delivery:	Vaccine	Briefing:	0
Population:	4000	Triage/Screening:	20
% Assist:	25	Medical Eval:	5
% Medical Eval:	10	Express Administration:	15
Arrival Dist:	uniform	Assisted Administration:	10
% Pre-Register:	50	Observation:	100
Open Hours:	8	Form Collection:	0

Where can I possibly pull additional staff members from to alleviate my bottlenecks?

Information Location: "**Average Percent Utilization per Station**" on the **Summary Output Tab** and **Hourly Output Tab**
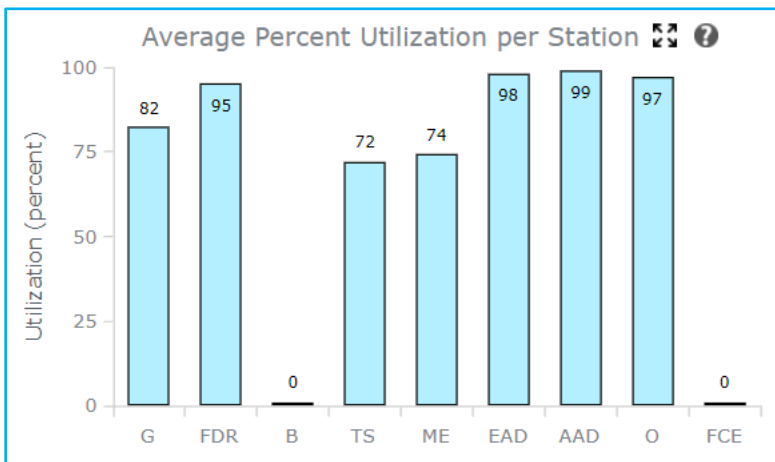
What does the information mean?

Average utilization is the percent of time that the station is being used for the hours of operation. Think of this as the percent of time that the station is busy. A staff member at a station that is 99% utilized on average is not idling or waiting to serve additional individuals while a staff member at a station that is 60% utilized might have some down time and will be waiting to receive individuals. It is possible that stations might be utilized at capacity for the beginning of the hours of operation and then decrease in utilization as the day progresses.

How do you apply the data to decide which actions to take?

Average utilization is useful for determining where additional resources can be added or removed. Utilization above 90% is a good starting point when looking to add more resources. As resources become more readily available, lower rates of utilization can be used to evaluate where to place additional equipment or personnel.

In this example, almost all stations have high utilization. For a closer look at where additional staff members or resources could be temporarily placed to alleviate surges, view the 24-hour breakdown of the utilization in the hourly breakdown tab.
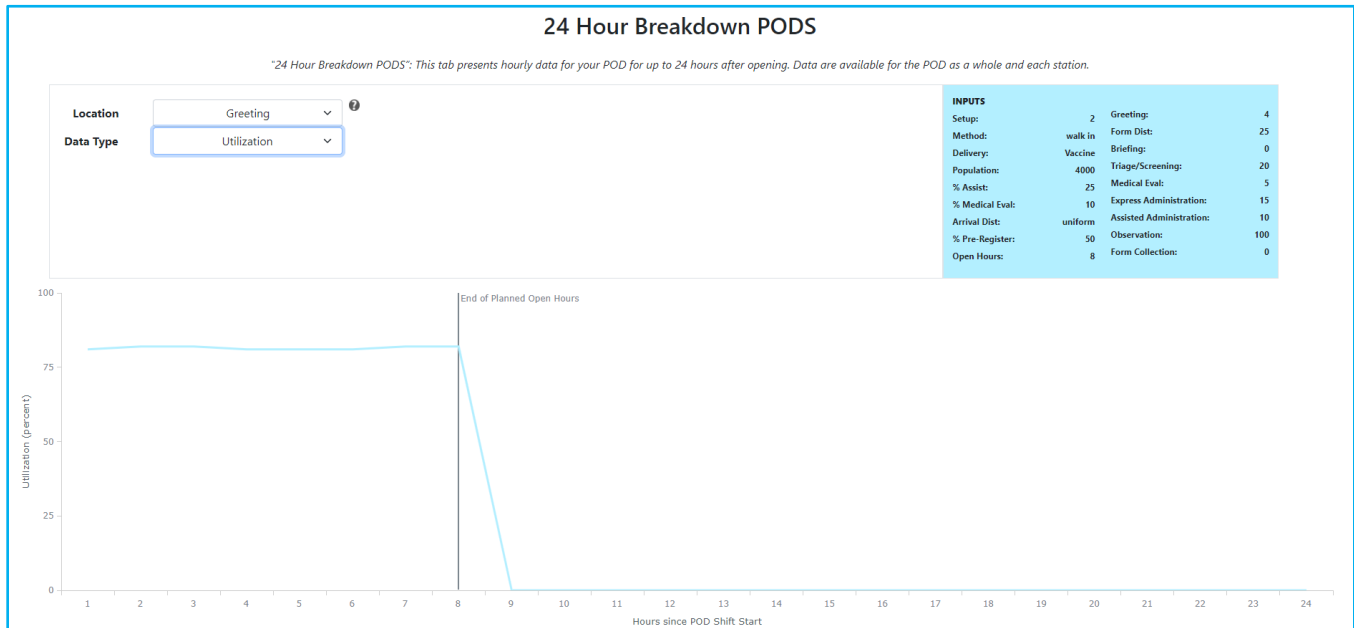
The Greeting Station is the first station where individuals receive service, so it is likely the first station to have personnel available to assist at other stations. The Greeting Utilization Plot shows that the Greeting Station remains busy over the course of the day at around 81–82% utilization with a sharp decrease after the end of the planned hours of operation. Staff members would not be able to assist during the planned hours of operation but might be able to move to other stations at the 8-hour mark. This station would not be the best choice to move personnel from initially.

Since the Medical Evaluation Station also had one of the lower utilization rates on average for the hours of operation, let us look at this station's 24-hour utilization.

INPUTS			
Setup:	2	Greeting:	4
Method:	walk in	Form Dist:	25
Delivery:	Vaccine	Briefing:	0
Population:	4000	Triage/Screening:	20
% Assist:	25	Medical Eval:	5
% Medical Eval:	10	Express Administration:	15
Arrival Dist:	uniform	Assisted Administration:	10
% Pre-Register:	50	Observation:	100
Open Hours:	8	Form Collection:	0
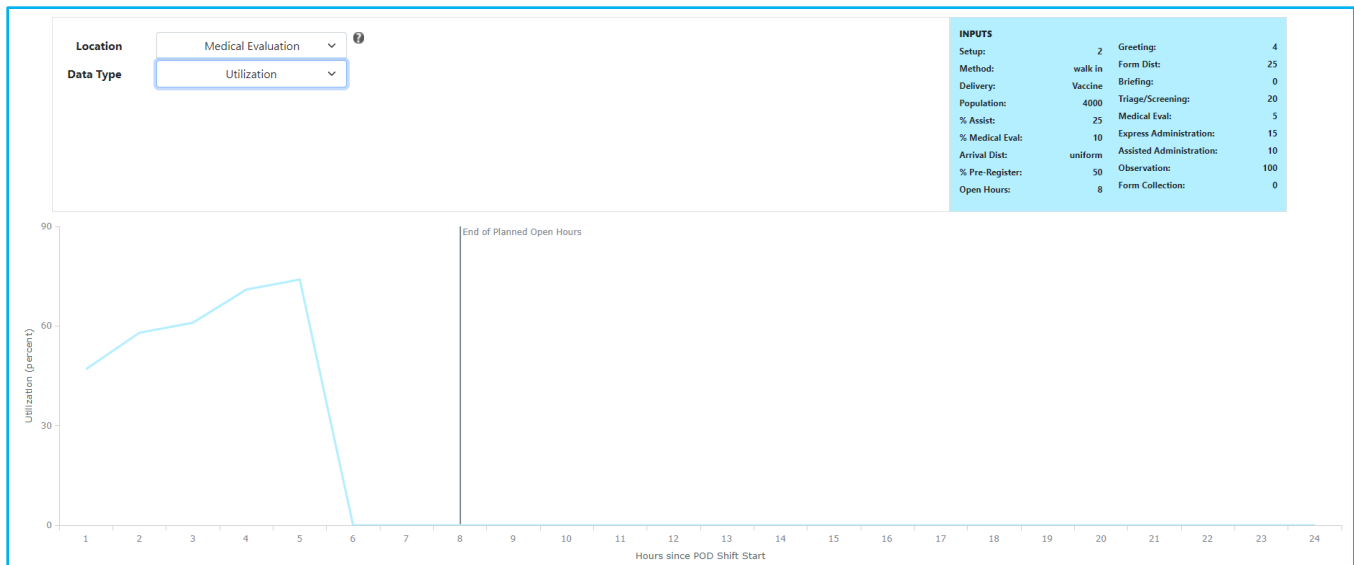
As we can see, while average utilization climbs for the Medical Evaluation Station during the early hours of operation, utilization drops sharply at hour 6. This is a strong indication that some of the medical personnel at the Medical Evaluation Station could be reassigned later in the day to help the backlogged Assisted Administration Station.

Appendix 1 – Scenario Walk Throughs

To assist new users in understanding the features and functions of POD SimPLER, this appendix provides three step-by-step walk-through scenarios. If you need assistance running specific scenarios contact simpler@cdc.gov.

Scenario 1

This first scenario will start with basic inputs for POD SimPLER based on a potentially high casualty public health emergency. We will be using all stations in the selected POD Station Setup.

Topics Covered

- Basic tool functionality
- Multiple POD sites

Narrative

A hospital located in a city on the eastern seaboard receives several persons with an unknown illness. Doctors suspect each patient is suffering from the same highly infectious disease based on presenting signs and symptoms. City public health authorities alert public health officials at the state and federal level; experts confirm that the illness is due to infection from Virus A. National security agencies, working together with federal, state, and local health officials, determine the disease is the result of an intentional release of Virus A. You have just received a phone call from the state emergency operations center (EOC) and are tasked with setting up and operating PODs to administer vaccines to 12,000 people potentially exposed in your jurisdiction, within 48 hours. That means on average processing 6,000 people per day.

Given Inputs for Input Screen:

Your current POD plan looks most like the POD Station Setup #2 (shown below) and will operate as a walk-in POD, administering the vaccine for Virus A. The staff will help the incoming population fill out their information at registration. Since this is not a routine vaccination and you believe people might have questions about the vaccine, you will have a 5-minute briefing video that groups of 25 individuals will watch before receiving the vaccine. Individuals will need to be screened to determine the need for medical services, so you will assign staff members to sort the population to appropriate vaccine administration stations. You plan to have an observation area with chairs where those who have received the vaccine will wait for approximately 15 to 30 minutes, depending on their likelihood for an adverse reaction. Following this waiting period, individuals will be asked to sign up for a symptom-monitoring text service and to receive additional educational materials.

Flowchart

Enter → Greeting

Greeting → Completed Pre-registration? (Decision)

Completed Pre-registration? — Yes → Triage/Screening

Completed Pre-registration? — No → Form Distribution → Triage/Screening

Triage/Screening → Need Medical Evaluation? (Decision)

Need Medical Evaluation? — Yes → Medical Evaluation

Need Medical Evaluation? — No → Need Assistance? (Decision)

Need Assistance? — Yes → Assisted Admin/Dispense

Need Assistance? — No → Express Admin/Dispense

Medical Evaluation → Assisted Admin/Dispense

Assisted Admin/Dispense → Observation*

Express Admin/Dispense → Observation*

Observation* → Form Collection/Education → Exit

Legend: Station —Path→ Decision

Select information about your POD:

POD Station Setup	2
Service Method	walk in
Medication Delivery Method	Vaccine

You decide that you will operate four POD sites, each of which will process 1,500 people in 12 hours each day. Each POD will operate with the same staffing and setup. You don't feel you have time to create an online form for people to fill out prior to arriving at the PODs, so you decide that none of your arrivals will pre-register, meaning that they will all have to register on site at the POD. Based on data available to you about your community, you estimate that 25% of the arriving population will need assistance based on some type of access and/or functional needs. Ten percent will require some degree of medical evaluation before receiving the vaccine. You are unsure of the rate that people will arrive and since you are not offering appointments you assume that people will arrive at an even arrival rate.

Select information about the population arriving at your POD:

❓

Estimated arriving population	1500˅
% Pre-Registered	0 ˅
% Needing Assistance	25 ˅
% Needing Medical Evaluation	10 ˅
Arrival Distribution	uniform

You plan on administering shots for 12 hours each day and setting your hours of operation to be 7 a.m. to 7 p.m. (12 hours).

Select the time your POD will be open each day:

❓

Hours of Operation (per day)	12 ˅

For the first day of your POD operations, you will assume that one staff member will service each lane, except for the briefing session and Observation Area, where one staff member will be assigned to monitor up to 25 and 30 people respectively. Your POD will have two greeting lanes, 12 lanes for on-site registration services, briefing sessions for groups of 25 people at a time, five lanes for triage/screening, one lane for your Medical Evaluation Station, five lanes at both Express and Assisted Administration stations, 50 seats in the Observation Area, and three lanes for education where each lane will have a table where individuals will sign up for symptom-monitoring and to receive additional information.

Select the number of stations in your POD site:

Add a zero to eliminate a station from your POD Station Setup.

❓

	Assign Staff per Lane	Minimum Staff
Greeting	2 ⌄	2
Form Distribution/Registration	12 ⌄	12
Briefing	25 ⌄	1
Triage/Screening	5 ⌄	5
Medical Evaluation	1 ⌄	1
Express Administration	5 ⌄	5
Assisted Administration	5 ⌄	5
Observation Area	50 ⌄	2
Form Collection/Education	3 ⌄	3
Total		36

After completing the information about your POD on the input page, you will be able to assess if you can administer vaccines to the throughput target of 1,500 people per day, given the selections below.

Select information about your POD:

POD Station Setup	2
Service Method	walk in
Medication Delivery Method	Vaccine

Select information about the population arriving at your POD:

Estimated arriving population	1500
% Pre-Registered	0
% Needing Assistance	25
% Needing Medical Evaluation	10
Arrival Distribution	uniform

Select the time your POD will be open each day:

Hours of Operation (per day)	12

Select the number of stations in your POD site:

Add a zero to eliminate a station from your POD Station Setup.

Assign Staff per Lane

		Minimum Staff
Greeting	2	2
Form Distribution/Registration	12	12
Briefing	25	1
Triage/Screening	5	5
Medical Evaluation	1	1
Express Administration	5	5
Assisted Administration	5	5
Observation Area	50	2
Form Collection/Education	3	3
Total		36

Hours of Operation: 12 hours
# of people Arriving: 1500
Percent Pre-registered: 0%
Percent Needing Assistance: 25%
Percent Needing Medical Eval: 10%
Arrival Distribution: Uniform
Number of Stations:
Greeting: 2
Form Distribution/Registration: 12
Briefing: 25
Triage/Screening: 5
Medical Eval: 1
Express Administration: 5
Assisted Administration: 5
Observation Area (seats): 50
Form Collection/Education: 3

Summary Output Screen

POD Summary Outputs

This tab presents summary data for your POD during your planned hours of operation.

Average Hourly Throughput (Individuals)	116	Average Time Spent at POD (hh:mm)	00:52	
Total Throughput (Individuals)	1386	Extended Open Hours (hh:mm)	01:12	

INPUTS

Setup:	2	Greeting:	2
Method:	walk in	Form Dist:	12
Delivery:	Vaccine	Briefing:	25
Population:	1500	Triage/Screening:	5
% Assist:	25	Medical Eval:	1
% Medical Eval:	10	Express Administration:	5
Arrival Dist:	uniform	Assisted Administration:	5
% Pre-Register:	0	Observation:	50
Open Hours:	12	Form Collection:	3

Station Averages During Hours of Operation

STATION ABBREVIATIONS
G = Greeting
EAD = Drug Dispensing
AAD = Assisted Drug Dispensing

FDR = Form Distribution
B = Briefing
O = Waiting
FCE = Form Collection

TS = Triage
ME = Medical Evaluation

Takeaways from Summary Outputs

Looking at the Summary Outputs Screen (see snippet above and below) we will walk through the questions listed in the *Using POD SimPLER to Answer Specific Questions* section.

Average Hourly Throughput (Individuals)	116	Average Time Spent at POD (hh:mm)	00:52	
Total Throughput (Individuals)	1386	Extended Open Hours (hh:mm)	01:12	
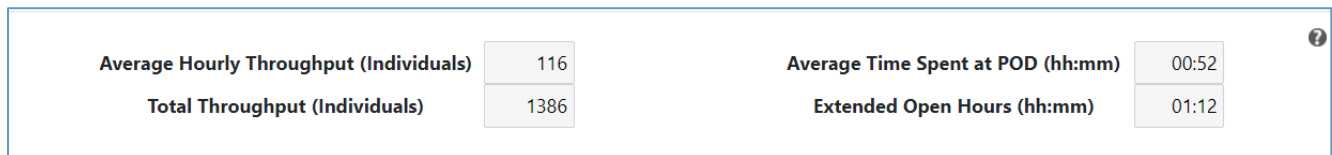
- **Can I achieve my throughput goals?**
  Yes, we can achieve our throughput goals with our current POD setup and plans. **Total throughput** is 1,386. This is within 5–10% of our desired throughput of 1,500 individuals.

- **How much longer will I need to stay open to process everyone at the POD?**
  The entry for "**Extended Open Hours**" is 1 hour and 12 minutes. The POD should be able to finish processing most individuals within their planned hours and only extend for about another hour. Note that POD SimPLER provides estimates based on modeling and values should be taken as approximations.

- **How long can individuals arriving at the POD expect to be there?**
  The entry for "**Average Time Spent at POD**" by an individual is approximately 52 minutes. Looking at the station average graphs, we see that, on average, the lines and wait times are short. This means individuals are flowing quickly through the POD.

- Which station is causing my bottlenecks?
  For this POD SimPLER estimate, no stations would be considered major bottlenecks. The station with the highest utilization is the Registration Station, but on average the line and wait time is short enough to not be of concern. The station with the longest wait time is the Medical Evaluation Station with a wait time of 38 minutes. Since only a small fraction of
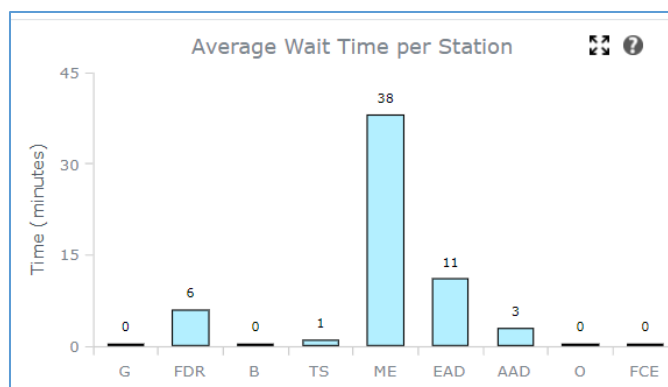
people are arriving at this station during hours of operation, it's possible that this average length of wait could be acceptable (note that this is the average wait and not the maximum). Examples of factors that might contribute to deciding if a 38-minute average wait at the Medical Evaluation Station is a concern requiring action include the type of medical issues being identified and whether the facility size or configuration can accommodate the line that would form. By looking at our station averages, we can see the average line length at the Medical Evaluation Station is 9 people. Although wait times swell at certain parts of the day, the line length does not grow particularly long.

- How quickly do bottlenecks appear?
  Major bottlenecks do not appear in this POD SimPLER estimate.

- Do I have enough space for when bottlenecks occur?
  Major bottlenecks do not appear in this POD SimPLER estimate. The longest average line at a station is 19 people, so there may not be a concern about space allocation. However, the square footage of the POD site should be considered.

- Where can I possibly pull additional resources?
  Major bottlenecks do not appear in this POD SimPLER estimate, but if we wanted to increase capacity at the Registration or Medical Evaluation stations, we may want to increase the number of staff members and lanes available at those stations. We might consider moving a staff member from the Greeting Station or Education Station since output metrics from those stations (utilization, wait time, and line length) are low.

Hourly Output Screen

24 Hour Breakdown PODS

"24 Hour Breakdown PODS": This tab presents hourly data for your POD for up to 24 hours after opening. Data are available for the POD as a whole and each station.

| Location | POD |
| Data Type | Throughput |

INPUTS			
Setup:	2	Greeting:	2
Method:	walk in	Form Dist:	12
Delivery:	Vaccine	Briefing:	25
Population:	1500	Triage/Screening:	5
% Assist:	25	Medical Eval:	1
% Medical Eval:	10	Express Administration:	5
Arrival Dist:	uniform	Assisted Administration:	5
% Pre-Register:	0	Observation:	50
Open Hours:	12	Form Collection:	3

Key Takeaways from Hourly Output Screen

This POD SimPLER estimate shows that our POD has no major bottlenecks, so we will check the 24-hour breakdown for the POD (snippet above) cumulative throughput just to confirm that we completed processing all individuals shortly after the end of the hours of operation. While we do not process everyone within 12 hours, we do see that we are able to process them within 14 hours. Due to the simulated nature of the estimates in the tool, a real event may complete their goal throughput of 1,500 individuals within 12 hours depending on population needs and other factors.

Suggested Actions

From looking at all information, we find that it is likely that we will be able to process the arriving population with our current POD plans and resources in a 12-hour operational period or shortly after. Other factors (operational, behavioral, and psychosocial) could potentially enhance or diminish POD processes, but the utilization and wait times are estimated to be low. The on-site staff will need to maintain close and routine operational awareness and, if necessary, adapt operations.

Scenario 2

This scenario is the same scenario as above, but the number of available staff members has decreased, and you now have the option of pre-registration. This is an example of how changing pre-registration availability and staffing for a POD can impact the overall throughput of individuals.

Topics Covered:
- Adjusting staff member numbers per lane
- Implementing off-site pre-registration
- Using the POD SimPLER Comparison Tool

Narrative

Several news media outlets have released alarming reports about the Virus A incident and many of your volunteers, concerned for their safety, have decided not to assist with your POD. You know that registration paperwork can take significant time for the staff, so you are considering using a neighboring community's vaccine registration system. This would allow people to enter information online prior to arriving for their vaccination. Fortunately, you already have a communications infrastructure in place to message your jurisdiction about the online form option, increasing the likelihood that arriving people will fill it out ahead of time. You estimate that half (50%) of the jurisdiction will complete the form. There will still be individuals who choose not to do so or are unable to fill out the form prior to arrival, and this means you will still offer registration services on site. However, you might be able to dedicate a portion of the staff formerly assigned to the Registration Station to help with other stations that are understaffed due to lack of volunteers. Before committing to the online form, you want to see how your POD might operate with the new online service and a reconfiguration of the staff.

Given Inputs for Input Screen:

You will still use "POD Station Setup" option 2 and will operate the POD as a walk-in, meaning everyone will still physically enter the building for administration of the vaccine. The information about your population is the same, keeping the "% pre-registered" at 0. You will have 12 hours of operation where you are administering vaccines to the public.

Select information about your POD:

POD Station Setup	2
Service Method	walk in
Medication Delivery Method	Vaccine

Select information about the population arriving at your POD:

Estimated arriving population	1500
% Pre-Registered	0
% Needing Assistance	25
% Needing Medical Evaluation	10
Arrival Distribution	uniform

Select the time your POD will be open each day:

Hours of Operation (per day)	12

Due to your reduced numbers of staff members, inputs for your stations will be different. When entering information about the number of lanes at each station, you will reduce the number of lanes for the Registration, Triage/Screening, and Education stations. Your POD will have one greeting lane, seven lanes for on-site registration services, briefing sessions for groups of 25 people at a time, three lanes for triage/screening, one lane active for the Medical Evaluation Station, five lanes at both the Express and Assisted Administration stations, 50 seats in the Observation Area, and three lanes for the Education Station. You will assume that one staff member will be servicing each lane except for the briefing session and Observation Area where one staff member will be assigned to watch up to 25 and 30 people, respectively.

Select the number of stations in your POD site:

Add a zero to eliminate a station from your POD Station Setup.

Hours of Operation: 12 hours
# of people Arriving: 1500
Percent Pre-registered: 0%
Percent Needing Assistance: 25%
Percent Needing Medical Eval: 10%
Arrival Distribution: Uniform
Number of Stations:
Greeting: 1 (-1)
Form Distribution/Registration: 7 (-5)
Briefing: 25
Triage/Screening: 3 (-2)
Medical Eval: 1
Express Administration: 5
Assisted Administration: 5
Observation Area (seats): 50
Form Collection/Education: 3

Assign Staff per Lane

		Minimum Staff
Greeting	1 ⌄	1
Form Distribution/Registration	7 ⌄	7
Briefing	25 ⌄	1
Triage/Screening	3 ⌄	3
Medical Evaluation	1 ⌄	1
Express Administration	5 ⌄	5
Assisted Administration	5 ⌄	5
Observation Area	50 ⌄	2
Form Collection/Education	3 ⌄	3
Total		28

Summary Output Screen
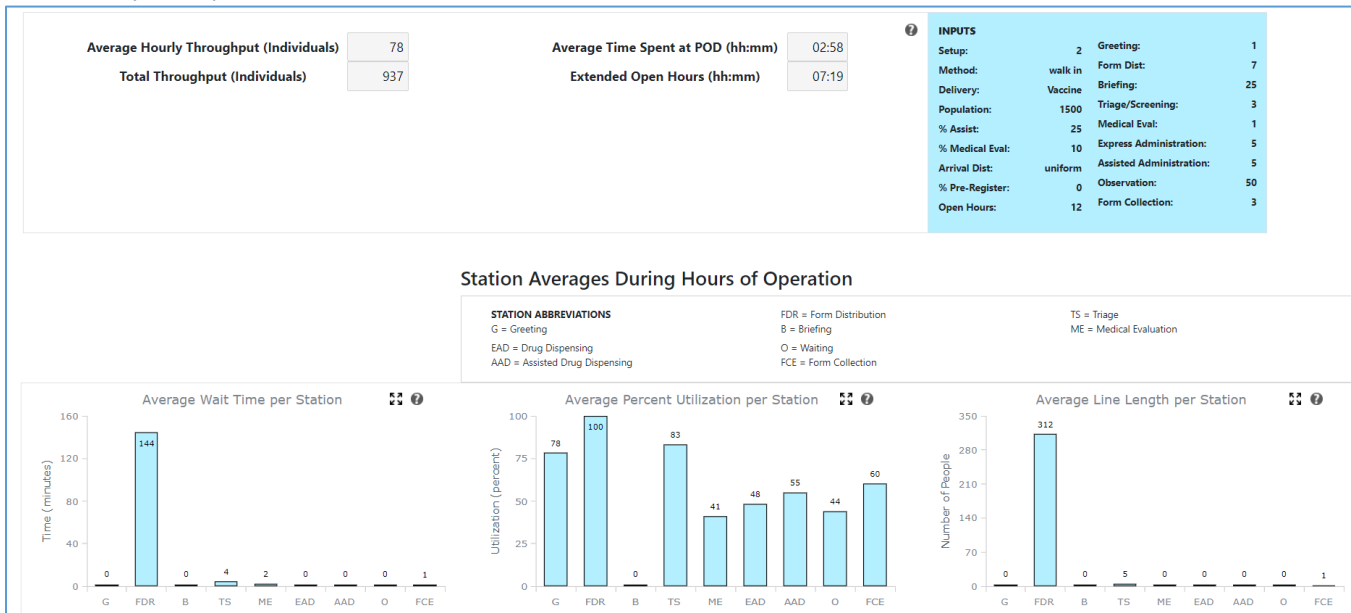
Takeaways from Summary Outputs

Looking at this information, we can quickly assess that we are not processing all individuals within our 12 hours of operation and that the Registration Station (abbreviated as FDR) appears to be a bottleneck. Below we will walk through the questions from the *Using POD SimPLER to Answer Specific Questions* section.

- Can I achieve my throughput goals?
  No, we will not be able to achieve our throughput goal of 1,500 individuals in 12 hours. The **total throughput** is 937 individuals, approximately 60% of our throughput goal. This indicates there is at least one bottleneck in our POD.

- How much longer will I need to stay open to process everyone at the POD?
  The **extended open hours** is 7 hours and 19 minutes. The POD would need to stay open approximately 8 additional hours beyond the current hours of operation to process all individuals. A nearly 20-hour operation would require more staff members than a 12-hour operation and therefore POD planners might consider adding an additional day of vaccination or consider reducing bottlenecks, which we address below through adjusting staffing and adding pre-registration. Note that POD SimPLER provides estimates based on modeling and values should be taken as approximations.

- How long can individuals arriving at the POD expect to be there?
  The **average time spent at POD** by an individual is approximately 3 hours. For our current example, we will say that we have concluded that a 3-hour average time spent at POD is unacceptable and that we want individuals to be at the POD for less than an hour and a half. We will try to reduce bottlenecks and bring down the average individual processing time in additional POD SimPLER estimates in this example.
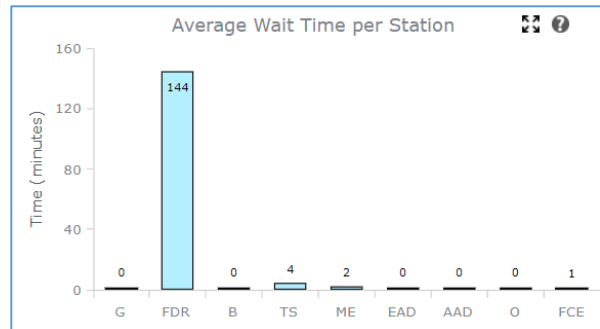
- Which station is causing my bottlenecks?
  Registration appears to be the main bottleneck with an average wait time of over 2 hours, average utilization of 100%, and average line length of 312 people. The Registration Station is likely the station that will benefit the most if we add pre-registration. **Note:** since registration is at the beginning of the process, making adjustments that increase the throughput of registration may result in bottlenecks at later stations in the process. We may want to be proactive and add at least one more resource at the Triage/Screening Station as the utilization rate will only increase beyond its current 83%. A potential reason we don't see other bottlenecks is because our population is stuck at the Registration Station.
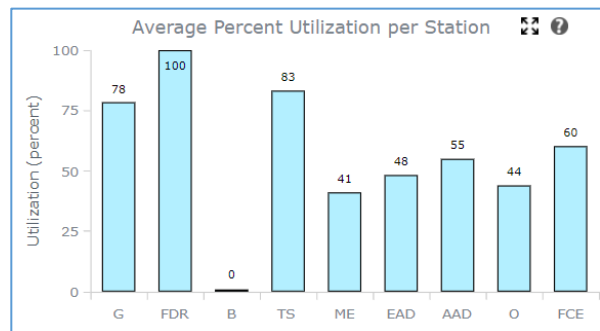
- Do I have enough space for when bottlenecks occur?
  Due to the size of the facility we have chosen, we do not have enough space for the bottleneck at the Registration Station. The average line length for registration during the hours of operation is 312 people. Let us assume that the room with the Registration Station has an occupancy of 150 people with chairs, tables, and a standing room area. This means that we need to find a way to reduce the long lines building up at the Registration Station. Note that 312 is the average line length for the Registration Station, not the maximum. We will check the potential maximum line length for the Registration Station on the Hourly Output Screen.
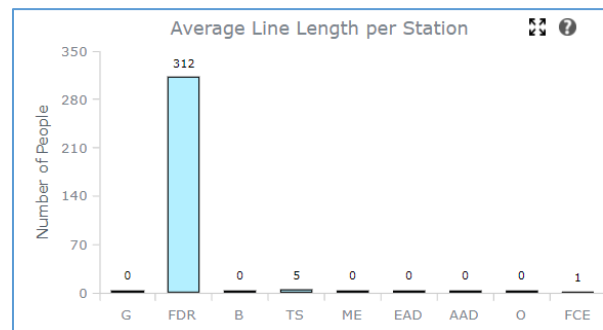
- Where can I possibly pull additional resources?
  The Education Station has lower utilization and no lines. This station could be a potential place to move staff members from, to reduce the bottleneck at the Registration Station. Since we are unsure about the impact removing the bottleneck at the Registration Station will have, we will

wait to move staff members from other stations until we see the impact of adding pre-registration.

Hourly Output Screen

The Hourly Output screen can provide us with a more detailed view of the bottleneck at registration.
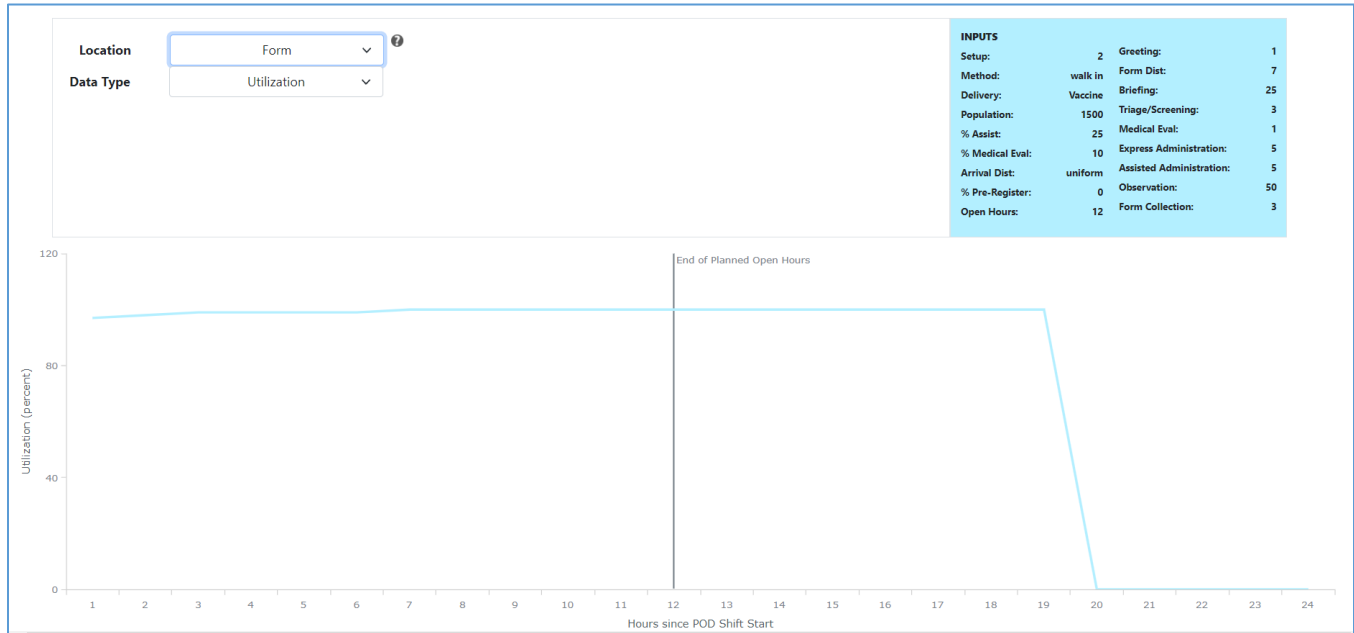
- <u>How quickly do bottlenecks appear?</u>
  Registration starts with high utilization and stays at 90% or higher for the entire hours of operation. Registration continues to be 100% utilized until 7 hours after end of processing hours (19 hours total). The Registration Station is a major limiting station for your POD throughput.

				INPUTS			
Location	Form			Setup:	2	Greeting:	1
Data Type	Line Length			Method:	walk in	Form Dist:	7
				Delivery:	Vaccine	Briefing:	25
				Population:	1500	Triage/Screening:	3
				% Assist:	25	Medical Eval:	1
				% Medical Eval:	10	Express Administration:	5
				Arrival Dist:	uniform	Assisted Administration:	5
				% Pre-Register:	0	Observation:	50
				Open Hours:	12	Form Collection:	3
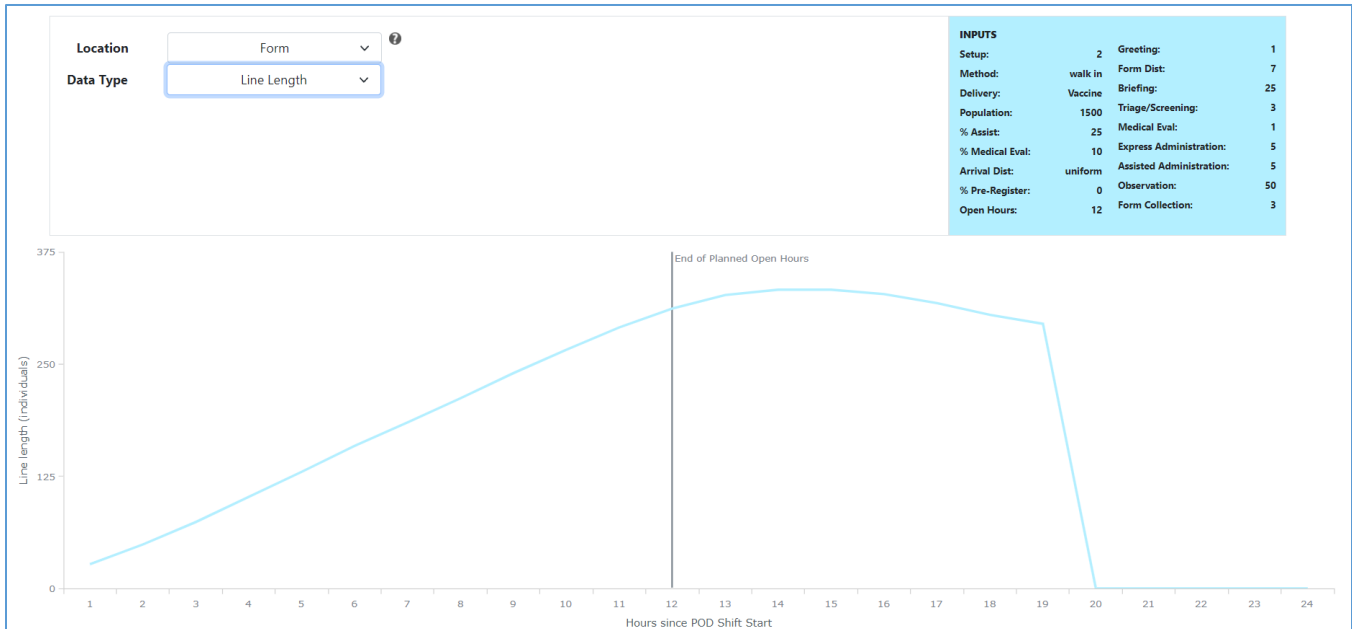
- <u>Do I have enough space for when bottlenecks occur? Continued</u>
  We know that we do not have enough space for registration and can use the Hourly Output Screen to see how long the lines might grow while we continue to process all remaining individuals.

  The line length continues to increase after planned hours of operation and does not decrease until several hours later.

Key Takeaways From Hourly Output Screen
Registration is the largest bottleneck and is limiting movement of the population through the rest of our POD. We will run a few additional POD SimPLER estimates in the next section to see how our proposed changes will impact our estimated throughput and total time needed to process all arriving individuals.

Suggested Actions
We will explore two POD SimPLER estimates to evaluate the impact of adding online pre-registration and changing staff member allocation per lane which allows us to add resources at other stations.

POD Estimate With the Addition of Pre-registration
First, we will try a POD setup where we employ pre-registration. The population will receive a web-link to the registration form with instructions via various media channels. We will assume that 50% of the population will preregister prior to arriving at the POD. Using the Toggle Comparison Tool, we will add this new scenario to our other scenario which will allow us to do a side-by-side comparison.

Given Inputs for Input Screen

All inputs will remain the same, but we will change "% preregistered" to 50%

Comparison Summary Outputs

Our original scenario is displayed in a lighter blue color with overall POD data located on the top row of the Summary Output Screen (see below). In the Station Averages tables, the original scenario is represented by the bars on the left in each bar graph pairing. The new estimate is represented by the darker-colored blue box and in the station averages by the bars on the right in each bar graph pairing. For reference, the original estimate will be labelled "Original," and the new scenario will be labelled "Comparison" in the POD Summary Output Page below.

Average Hourly Throughput (Individuals)	78	Average Time Spent at POD (hh:mm)	02:58	
Total Throughput (Individuals)	937	Extended Open Hours (hh:mm)	07:19	

INPUTS - Original

Setup:	2	Greeting:	1
Method:	walk in	Form Dist:	7
Delivery:	Vaccine	Briefing:	25
Population:	1500	Triage/Screening:	3
% Assist:	25	Medical Eval:	1
% Medical Eval:	10	Express Administration:	5
Arrival Dist:	uniform	Assisted Administration:	5
% Pre-Register:	0	Observation:	50
Open Hours:	12	Form Collection:	3

Average Hourly Throughput (Individuals)	93	Average Time Spent at POD (hh:mm)	02:02	
Total Throughput at Shift End (Individuals)	1117	Extended Time Past Shift (hh:mm)	04:06	

INPUTS - Comparison

Setup:	2	Greeting:	1
Method:	walk in	Form Dist:	7
Delivery:	Vaccine	Briefing:	25
Population:	1500	Triage/Screening:	3
% Assist:	25	Medical Eval:	1
% Medical Eval:	10	Express Administration:	5
Arrival Dist:	uniform	Assisted Administration:	5
% Pre-Register:	50	Observation:	50
Open Hours:	12	Form Collection:	3

Station Averages During Hours of Operation

STATION ABBREVIATIONS
G = Greeting
EAD = Drug Dispensing
AAD = Assisted Drug Dispensing

FDR = Form Distribution
B = Briefing
O = Waiting
FCE = Form Collection

TS = Triage
ME = Medical Evaluation
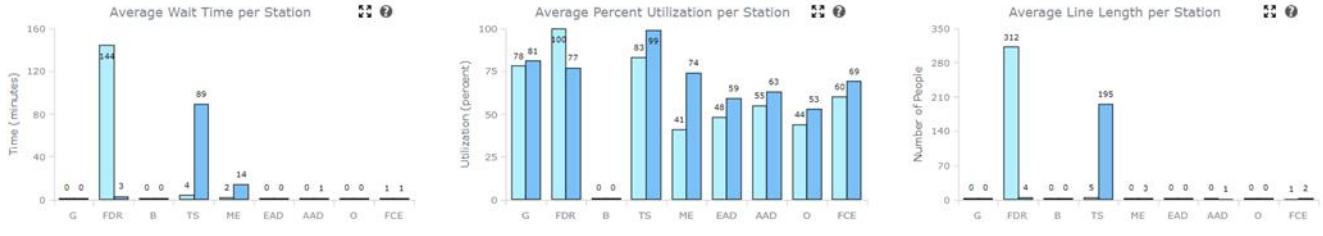
By having 50% of the population preregister prior to arriving at the POD, we have increased our total throughput during the hours of operation to 1117 individuals, a 20% increase from our original POD set up. The average time spent at the POD by an individual has been reduced by almost an hour and is now a little over 2 hours. We now only need to stay open an additional 4 hours to finish processing individuals as opposed to the 7–8 hours.

Comparing the average wait times per station for registration, we notice that we have decreased the wait time from over 2 hours to a 3-minute wait. As predicted, the bottleneck has moved to the Triage/Screening Station. We will attempt to reduce this wait time even more in the next POD SimPLER estimate.
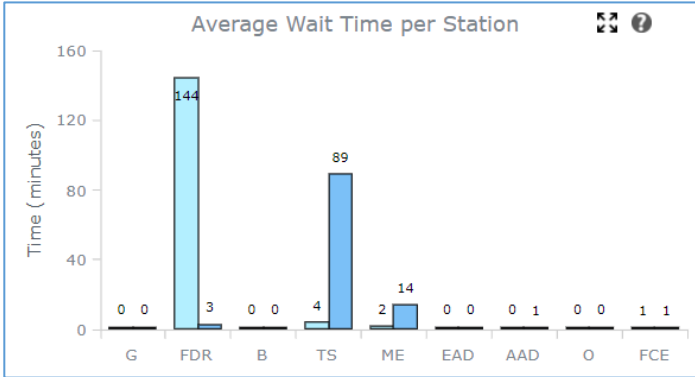
The average utilization for registration has decreased from 100% to 77% while average utilization for triage/screening has increased from 83% to 99%. While maintaining the number of available stations for registration is clearly important, we can possibly change how we have assigned Registration Station staff members such that we can move a few staff members to the Triage/Screening Station.

Average Percent Utilization per Station
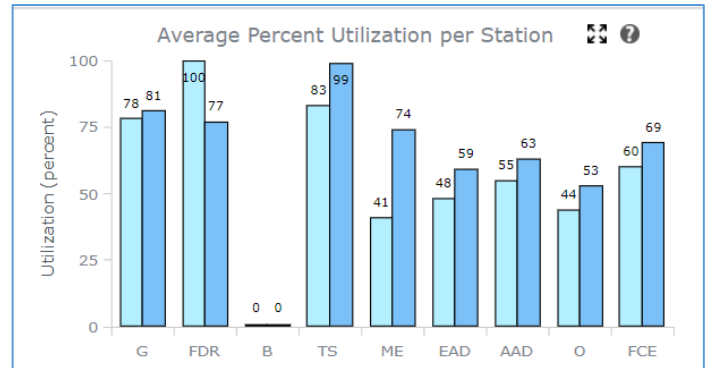
POD Estimate with Preregistration and Staff Rearrangement

In addition to implementing preregistration, we will set up stations where people arriving at the POD can fill out their own registration information instead of requiring staff members to work with each person to fill out the form. We will assign registration staff to stand by and help answer questions or give assistance when needed. This change means that we can move a few of the Registration Station staff members to other stations. Using the Toggle Comparison Tool, we will add this new scenario to our pervious scenario (only adding preregistration), which will allow us to do a side-by-side comparison.

Given Inputs for Input Screen

All inputs for the first three sections on the input screen will be the same. Remember to keep "% preregistered" at 50%. We will use the Assign Staff per Lane Button to change the number of staff members that we will assign to each lane. At "Form Distribution/Registration," you will assign one staff member to monitor and assist with two registration lanes. All other staffing defaults will remain the same.

Enter the number of staff you will assign to each lane at a station				
Greeting	1	Per	1	Lanes
Form Distribution/Registration	1	Per	2	Lanes

Now that you have 2–3 more staff members to use at other stations, you decide to add two to the Triage/Screening Station which allows you to have five total lanes.

		Minimum Staff		Minimum Staff
Greeting	1 ⌄	1	1 ⌄	1
Form Distribution/Registration	7 ⌄	7	7 ⌄	4
Briefing	25 ⌄	1	25 ⌄	1
Triage/Screening	3 ⌄	3	5 ⌄	5
Medical Evaluation	1 ⌄	1	1 ⌄	1
Express Administration	5 ⌄	5	5 ⌄	5
Assisted Administration	5 ⌄	5	5 ⌄	5
Observation Area	50 ⌄	2	50 ⌄	2
Form Collection/Education	3 ⌄	3	3 ⌄	3
Total		28	Total	27

Comparison Summary Outputs

The new POD scenario is represented by the darker-colored bar graphs on the right in each bar graph pairing. Overall POD outputs are located below the original POD outputs. In the snippet of the POD Summary Output Page below, the previous estimate (preregistration only) is labelled "Original," and the new estimate (preregistration and staffing rearrangement) is labelled "Comparison." Below, the box with the green dotted border shows the POD SimPLER estimates from the first part of the scenario in which staffing was decreased and the preregistration option was not available.

				❓
Average Hourly Throughput (Individuals)	78	Average Time Spent at POD (hh:mm)	02:58	
Total Throughput (Individuals)	937	Extended Open Hours (hh:mm)	07:19	

Average Hourly Throughput (Individuals) 93
Total Throughput (Individuals) 1117

Average Time Spent at POD (hh:mm) 02:02
Extended Open Hours (hh:mm) 04:06

Average Hourly Throughput (Individuals) 120
Total Throughput at Shift End (Individuals) 1438

Average Time Spent at POD (hh:mm) 00:52
Extended Time Past Shift (hh:mm) 00:38

Station Averages During Hours of Operation

STATION ABBREVIATIONS
G = Greeting   FDR = Form Distribution   TS = Triage
EAD = Drug Dispensing   B = Briefing   ME = Medical Evaluation
AAD = Assisted Drug Dispensing   O = Waiting
FCE = Form Collection

Average Wait Time per Station

Average Percent Utilization per Station

Average Line Length per Station

By increasing the available lanes at the Triage/Screening Station from three to five, we have increased our total throughput to 1,438 individuals, a 50% increase from our original POD scenario. We are now well within 5–10% of our total throughput goal of 1,500. The average time spent at the POD by an individual has been reduced to a little under an hour, which is one third of the original value of 2 hours and 58 minutes. We now only need to stay open an additional hour to finish processing individuals, as opposed to the 8 hours in the original estimate or 4 hours in the estimate where we first implemented preregistration.
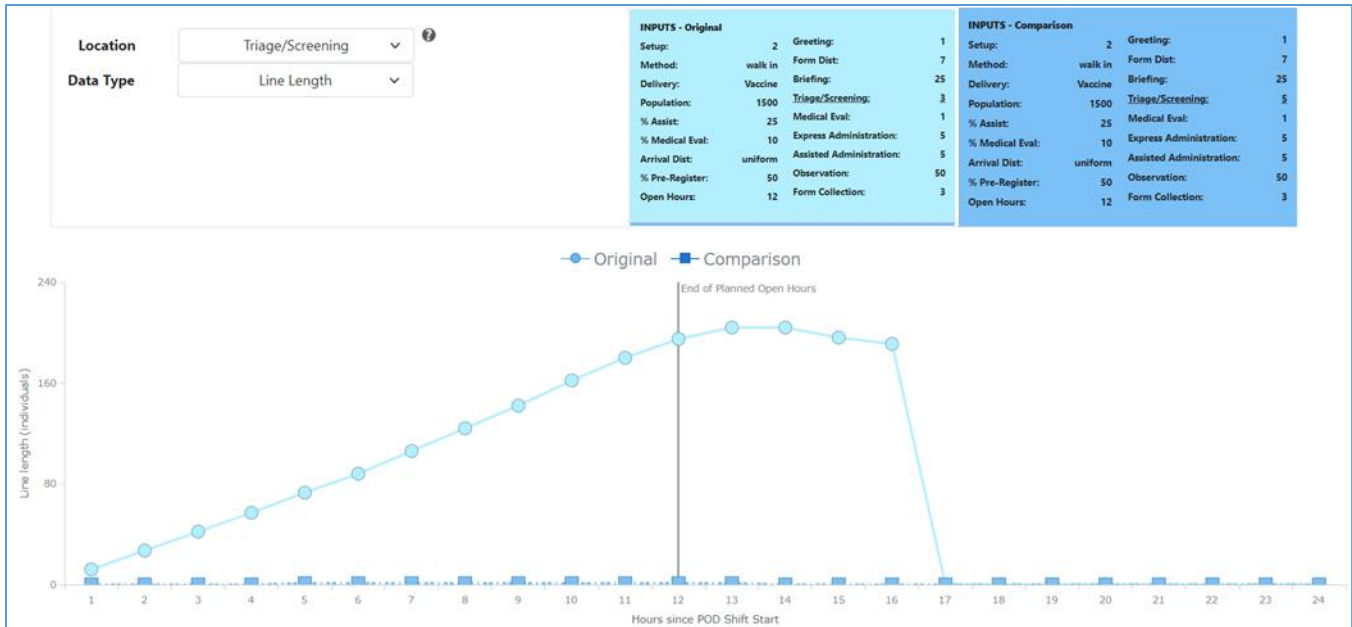
In the above, a 24-hour view of line length at the Triage/Screening Station is displayed for two of our scenarios. The line with circles represents the 50% preregistration-only scenario while the line with squares represents the new POD setup with two additional lanes of triage/screening. We can see how adding lanes for triage/screening not only decreased the total amount of time we would need to stay open to process all individuals from 16 hours to 13 hours, but also greatly decreased the size of the line that would be at the Triage/Screening Station. Our largest line length at the Triage/Screening Station was over 200 individuals and remained high until a few hours beyond the planned operational hours. With the addition of two triage/screening lanes, we bring the maximum line length down to almost no line at all. This new POD setup—which combines online preregistration, self-registration on site with fewer staff members to monitor and assist at registration, and five lanes of triage/screening—allows us to fall within our space and throughput constraints for the POD location.

Scenario 3

This scenario shows how to remove stations from the POD station setup for the same scenario we have been working through. We will also use the Optimization Tab to find an optimum scenario for our POD.

Topics Covered:
- Removing stations
- Optimization Tab

Narrative

The Joint Information Center (JIC) has been pushing out notifications to the jurisdiction of where and when the POD will open and how to preregister. They have also been successfully sending out educational messages about the vaccine and addressing key concerns that the population might have about receiving the vaccine. Since you anticipate that people will be eager to move through the process as quickly as possible, you believe that at least 50% of the population will preregister prior to arriving at the POD. While planning for tomorrow's POD opening, you are asked by a senior official if you can process more people through your POD, especially since you now have an online system to make the registration process smoother, and if you can reduce your hours of operation. You want to evaluate your current resources and the impact shorter hours of operation will have on your throughput. You are expecting 2,000 individuals to arrive, and your hours of operation will now cover 8 hours. Will your current scenario be able to handle the new population over a shorter period? If not, which stations can you do without or modify so that you can use those staff members elsewhere?

Given Inputs for Input Screen:

All inputs will be the same from the previous scenario where the percent preregistration was 50% except for population and hours of operation. You will assume 2,000 individuals will arrive at your POD during your 8 hours of operation. You will use previous staffing assignments per lane.

Summary Output Screen

This example will focus on comparing how different hours of operation and reducing stations may affect throughput.
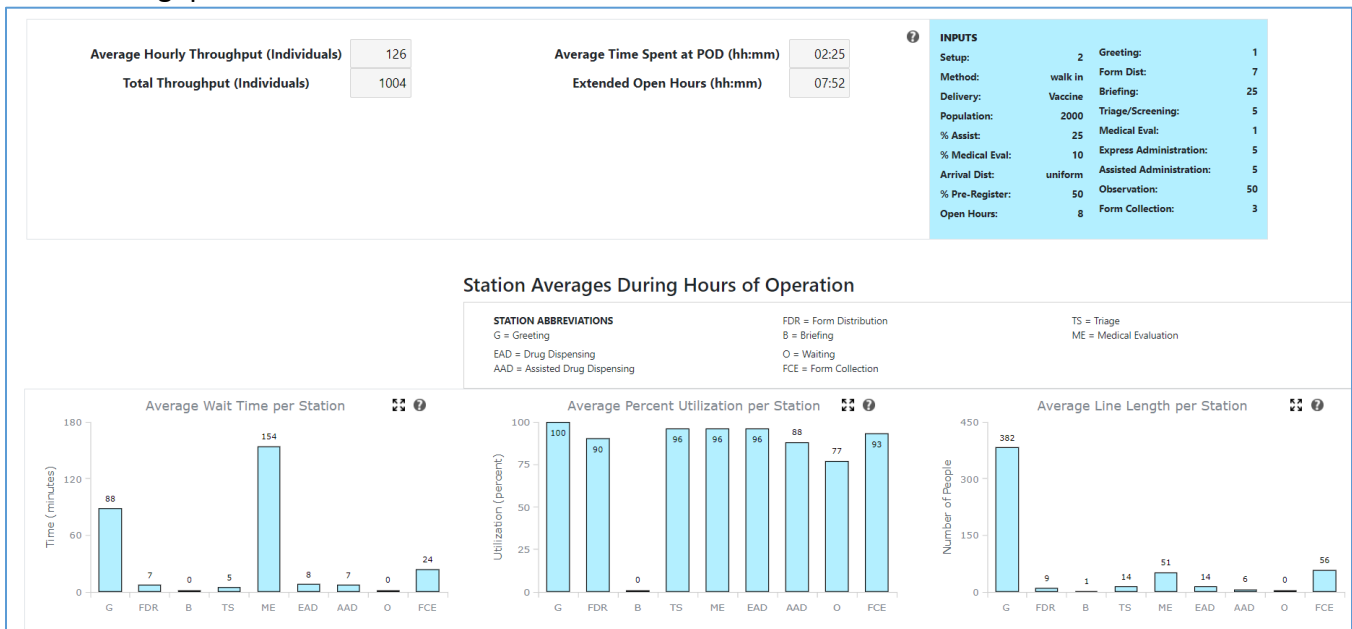
Takeaways from Summary Outputs

Looking at the summary outputs, we notice that the overall **total throughput** is approximately 1,000 or half of our goal. **Extended open hours** total 8 hours and 37 minutes**.** The station averages for each station show that the Greeting and Medical Evaluation stations are bottlenecks. We predict once we alleviate the bottleneck at the Greeting Station, other stations will become backlogged. We might be able to request additional medical personnel, but first we will see if we can decrease some bottlenecks by eliminating stations and consolidating the staff.

Suggested Actions

We know that due to the increase in individuals arriving at the POD over a shorter timeframe and our staffing shortages, we now have several bottlenecks. Since our JIC has been promoting educational messages about the vaccine and alleviating vaccine concerns, you feel that it is possible to eliminate both the Briefing Station and the Education Station. We will attempt to alleviate bottlenecks with additional POD SimPLER estimates. We also want to know where the additional medical personnel we will request might be most useful, so we will use the Optimization Tab to try to further increase throughput.

POD Estimate with the Elimination of Briefing and Form/Collection Stations – Staff Moved

Given Inputs for Input Screen:

As a comparison, you will look to see if eliminating the Briefing and Education stations will improve your throughput. Instead of asking people to watch a 5-minute video in groups prior to receiving their vaccine, the video will be playing on a loop so they can hear it while waiting in line. You will also ask all vaccine administrators to collect any forms at the Express and Assisted Administration stations and to

hand everyone a fact sheet with information about the symptom monitoring system that they can sign up for. All inputs on the first 3 sections will remain the same as for your previous scenario.

On the input screen, we will select "0" for number of stations for both the Briefing and Education stations. Eliminating these two stations frees up four staff members to move elsewhere. We will move two of the staff members to the Greeting Station and two to the Triage/Screening Station. We feel that each staff member at the Registration Station can monitor five self-registration lanes at a time, and we will pull a few of them to help at other stations. We will leave three staff members at the Registration Station to monitor 15 lanes for self-registration and move one of them to the Triage/Screening Station, bringing our total lanes at the Triage/Screening Station to eight. Since SimPLER does not have the option for eight lanes of triage[1], we will select 10 since we feel we may be able to get two additional volunteers. We will keep the number of lanes the same for the Medical Evaluation, Express Administration, and Assisted Administration stations. We will also keep the same number of chairs in the Observation Area.

		per Lane			Minimum Staff
			Minimum Staff		
				3 ⌄	3
Greeting	1 ⌄	1		15 ⌄	3
Distribution/Registration	7 ⌄	3		0 ⌄	0
Briefing	25 ⌄	25		10 ⌄	10
Triage/Screening	5 ⌄	5		1 ⌄	1
Medical Evaluation	1 ⌄	1		5 ⌄	5
Express Administration	5 ⌄	5		5 ⌄	5
Assisted Administration	5 ⌄	5		50 ⌄	2
Observation Area	50 ⌄	2		0 ⌄	0
orm Collection/Education	3 ⌄	3		Total	29
	Total	50			

Shift length: 8 hours
# of people Arriving: 2000
Percent Pre-registered: 50%
Percent Needing Assistance: 25%
Percent Needing Medical Eval: 10%
Arrival Distribution: Uniform
Number of Stations:
Greeting: 3 (+2)
Form Distribution/Registration: 15(+8)
Briefing: 0
Triage/Screening: 10 (+5)
Medical Eval: 1
Express Administration: 5
Assisted Administration: 5
Observation Area (seats): 50
Form Collection/Education: 0

Note: You may wish to make incremental changes one station at a time to see the impact of eliminating a station or adding more staffing to one station at a time. For this scenario, we have combined a few of these steps.

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[1] SimPLER is built on an expanding database that continuously adds options. To be able to provide the user with a free tool that requires no large-scale computer, the SimPLER team runs all simulation options and then uploads them to the tool. This means that options available are tied to the already run simulations. If you would like specific options added, please email SIMPLER@cdc.gov to request specific data sets to be run.

Comparison Summary Outputs

The original estimate for this scenario is shown in the lighter-colored bars and labeled "Original." The new estimate is shown in the darker-colored bars on the right and labeled "Comparison."
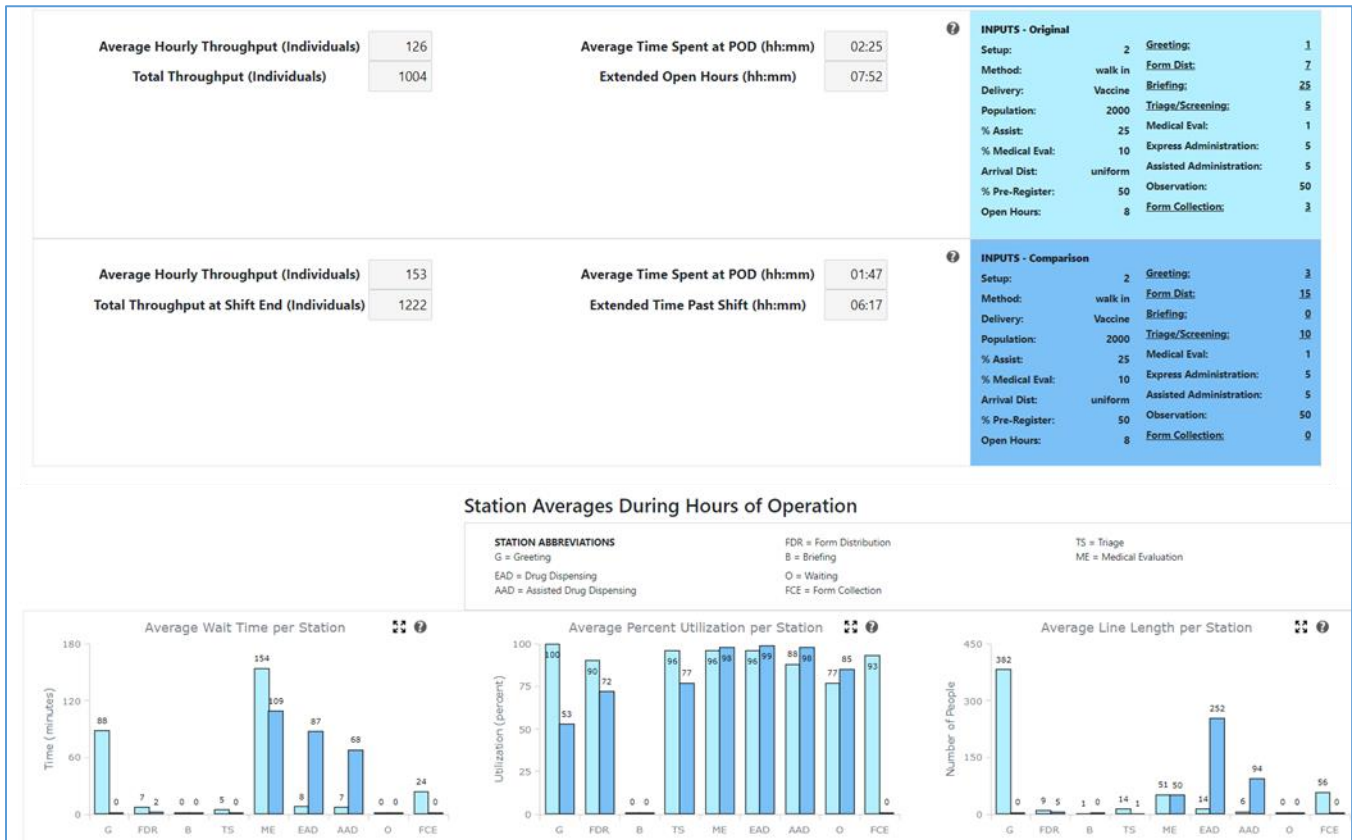
By eliminating the Briefing and Education stations along with our staff rearrangement, we have increased our total throughput at the end of our planned hours of operation to 1,222 individuals, a 22% increase from our original POD set up. The average time spent at the POD by an individual has been reduced by approximately half an hour. We now need to stay open an additional 6 hours to finish processing individuals as opposed to 9 hours. The stations where medical personnel are working (Medical Evaluation, Express Administration, and Assisted Administration) have now become bottlenecks. Since we have been asked to process more people, we will request additional medical personnel. We have been asked to request the least number of additional staff members possible to achieve our desired throughput of 2,000. In the next POD SimPLER estimate, we will see where additional medical personnel may have the most impact our POD throughput.

> It is important to see the impacts that alleviating one bottleneck might have on the rest of the POD process.

POD Estimate Using Optimization Tab

Given Inputs for Input Screen:

Even though we have eliminated stations and added lanes to bottlenecked stations, we have discovered new bottlenecks at the stations with medical personnel. This is likely because we have unclogged bottlenecks upstream or at the beginning of our process, so now all individuals are getting stuck at later stations. Let us examine how increasing lanes at the Medical Evaluation, Express Administration, and Assisted Administration stations might affect our throughput and where placing medical personnel will have the most impact. We will use the Optimization Tab to find our top three POD scenarios within our selected resource and operational constraints and examine each scenario to determine how many medical personnel we should request and where they should be placed.

We will adjust our resource limits for our POD to include potential to add staff members and lanes at the Medical Evaluation, Express Administration, and Assisted Administration stations. We will set our limit for the Medical Evaluation station to be two lanes, while we will set our limits for the Express Administration and Assisted Administration stations to 10. We will also increase the number of seats available for the observation area to 75 seats, just to see what happens. All other stations will remain constant.

POD Constraints	
Select the Resource limits for your POD	
Greeting Stations	3
Form Distribution Stations	15
Briefing Stations	25
Triage Stations	10
Medical Evaluation Stations	2
Express Drug Dispensing Stations	10
Assisted Drug Dispensing Stations	10
Waiting Stations	75
Form Collection Stations	3

Greeting: 3
Form Distribution/Registration: 15
Briefing: 25
Triage/Screening: 10
Medical Eval: 2 (+1)
Express Administration: 10 (+5)
Assisted Administration: 10 (+5)
Observation Area (seats): 75 (+25)
Form Collection/Education: 3

We don't want people spending long amounts of time at the POD so we will set our maximum time spent at the POD to one hour. Since we saw extremely long wait times previously, we will set our maximum wait time to be 45 minutes. We will leave the maximum line length unselected just to see what estimates we get.

Select the Operational limits for your POD	
Max time spent at POD (hh:mm) ☑	1:00
Max wait time (Minutes) per station (mm) ☑	45
Max Line Length per Station ☐	96

Optimization Outputs:

Optimization Results ❓

| Stations	Resources	Additional Resources	Total Staff	Max Line	Max Wait (mm)	Max Indiv Time Spent at POD (hh:mm)	Extended Time Past Shift (hh:mm)	Hourly Throughput	Total Throughput
ORIGINAL INPUTS									
Greeting	1	0							
Form Distribution	7	0							
Briefing	25	0							
Triage	5	0							
Medical Evaluation	1	0	107	382	154	02:25	07:52	126	1004
Drug Dispensing	5	0							
Assisted Drug Dispensing	5	0							
Waiting	50	0							
Form Collection	3	0							
Greeting	3	0							
Form Distribution	15	0							
Briefing	0	0							
Triage	10	0							
Medical Evaluation	2	0	132	62	40	00:42	00:31	241	1931
Drug Dispensing	10	0							
Assisted Drug Dispensing	7	0							
Waiting	75	0							
Form Collection	0	0							
Greeting	3	0							
Form Distribution	15	0							
Briefing	0	0							
Triage	10	0							
Medical Evaluation	2	0	135	18	33	00:32	00:37	241	1926
Drug Dispensing	10	0							
Assisted Drug Dispensing	10	0							
Waiting	75	0							
Form Collection	0	0							
Greeting	3	0							
Form Distribution	15	0							
Briefing	0	0							
Triage	10	0							
Medical Evaluation	2	0	132	99	33	00:45	02:17	211	1691
Drug Dispensing	7	0							
Assisted Drug Dispensing	10	0							
Waiting	75	0							
Form Collection	0	0							

All our optimized scenarios show improvement from our original POD setup, which was only able to process 1,222 individuals within the hours of operation. Now we will take a closer look to see the level of improvement and which setup will best help us achieve our throughput goals.

First Choice

Optimization Results ❓

Stations	Resources	Additional Resources	Total Staff	Max Line	Max Wait (mm)	Max Indiv Time Spent at POD (hh:mm)	Extended Time Past Shift (hh:mm)	Hourly Throughput	Total Throughput
Greeting	3	0							
Form Distribution	15	0							
Briefing	0	0							
Triage	10	0							
Medical Evaluation	2	0	132	62	40	00:42	00:31	241	1931
Drug Dispensing	10	0							
Assisted Drug Dispensing	7	0							
Waiting	75	0							
Form Collection	0	0							

Our top optimized scenario has a maximum time spent at the POD of 42 minutes, a maximum wait time of 40 minutes, and a total throughput of 1,931 individuals. This is a 58% increase in total throughput, placing this within 5–10% of our throughput goal of 2,000. The maximum line length is 62 individuals. This is still a little higher than we would like, but much lower than the previous setup. We note that one additional lane has been added to the Medical Evaluation Station, five lanes for the Express Administration Station, and two lanes for the Assisted Administration Station. That would mean requesting an additional eight medical personnel. Twenty-five additional seats have been added to the Observation Area as well.

We want to take a closer look and do a side-by-side comparison, so we will select "Add to Comparison." This takes us to the Summary Output Tab, where we can see the new optimized scenario added to the comparison view.
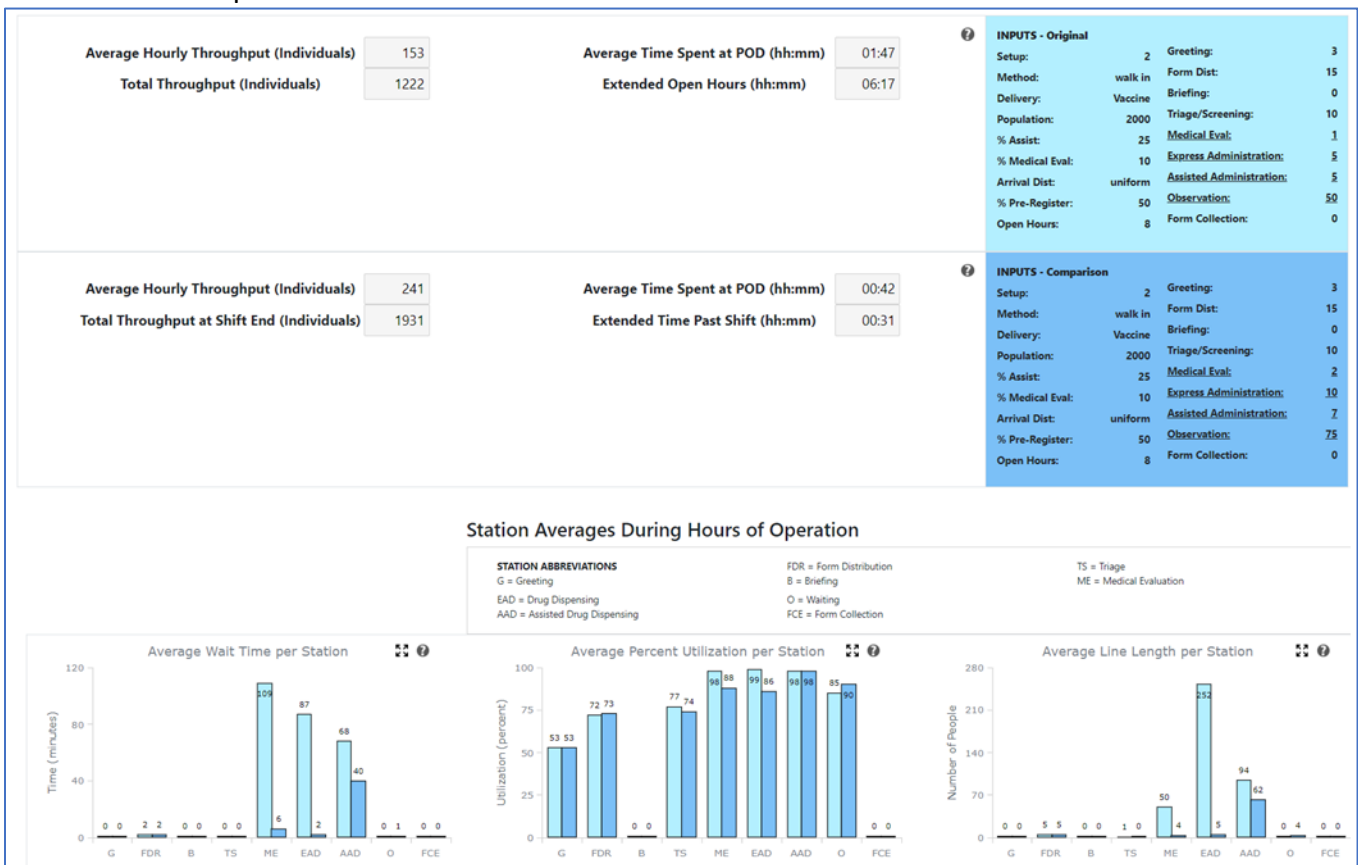
From this tab it is clear that adding additional lanes and corresponding staff members has led to dramatic improvements. We want to compare all three options so we will look at the other two choices and weigh them against our goals.

Second Choice

Optimization Results ❓

Stations	Resources	Additional Resources	Total Staff	Max Line	Max Wait (mm)	Max Indiv Time Spent at POD (hh:mm)	Extended Time Past Shift (hh:mm)	Hourly Throughput	Total Throughput
Greeting	3	0							
Form Distribution	15	0							
Briefing	0	0							
Triage	10	0							
Medical Evaluation	2	0	135	18	33	00:32	00:37	241	1926
Drug Dispensing	10	0							
Assisted Drug Dispensing	10	0							
Waiting	75	0							
Form Collection	0	0							

Our second optimized scenario has a maximum time spent at the POD of 32 minutes, a maximum wait time of 33 minutes, and a total throughput of 1,926 individuals. This is a 56% increase in total throughput. We are now within 5–10% of our throughput goal of 2000.

> Note that since SimPLER is a simulation tool, these values are estimates with a level of uncertainty and standard deviation. This means that the result of 1,926 as opposed to the previous 1,930 is essentially the same value.

The maximum line length is 18 individuals, a considerable decrease from our first optimized choice, which had a maximum line length of 62 individuals. We note that one additional lane has been added to the Medical Evaluation Station, five lanes for the Express Administration Station, and five lanes for the Assisted Administration Station. That would mean requesting an additional 11 medical personnel. Twenty-five additional seats have been added to the Observation Area as well.

A planner would need to evaluate what is most important and feasible for their jurisdiction. It may be that you are unable to justify the additional three staff members required by this setup and since the total throughput numbers do not vary greatly, you decide to stay with the first choice. On the other hand, you may also decide that requesting more staff members is justifiable if you can greatly reduce your line length and keep time spent at the POD to around half an hour.

Third Choice

Optimization Results ❓

Stations	Resources	Additional Resources	Total Staff	Max Line	Max Wait (mm)	Max Indiv Time Spent at POD (hh:mm)	Extended Time Past Shift (hh:mm)	Hourly Throughput	Total Throughput
Greeting	3	0							
Form Distribution	15	0							
Briefing	0	0							
Triage	10	0							
Medical Evaluation	2	0	132	99	33	00:45	02:17	211	1691
Drug Dispensing	7	0							
Assisted Drug Dispensing	10	0							
Waiting	75	0							
Form Collection	0	0							

Our third optimized scenario has a maximum time spent at the POD of 47 minutes, a maximum wait time of 33 minutes, and a total throughput of 1,691 individuals. While the total throughput is lower than the previous two options, it is still a 38% increase in total throughput and 84% of your total throughput goal.

The maximum line length is 99 individuals, which is a little long, but our maximum wait time is still much lower than before. Since this option requires the least number of additional staff members, some planners may find it to be a good option. We note that one additional lane has been added to the Medical Evaluation Station, two lanes for the Express Administration Station, and two lanes for the Assisted Administration Station. That would mean requesting an additional seven medical personnel. Twenty-five additional seats have been added to the Observation Area as well.

A planner would need to evaluate what is most important and feasible for their jurisdiction. It may be that you can only request a handful of staff members and adding the lowest possible number of additional resources is more important than processing all 2,000 people in 8 hours. Based on your extended open hours, you will likely only need two additional hours to process everyone.

Summary

Each optimized scenario has its benefits and drawbacks. Planners can use POD SimPLER to visualize their different options, consider the facility that the POD will operate, and decide which optimized scenario is preferrable considering their POD plans, goals, available staffing, and the particular POD location, configuration, layout, and square footage.

Appendix 2 – Glossary

This section provides definitions for terms used throughout the *POD SimPLER User Guide*.

Arrival distribution: The way in which individuals will arrive at the POD. For example, people could arrive in a steady, constant stream (uniform) or in waves or large groups (bus loads). This considers the probability or likelihood that someone arrives within a set amount of time. For information about the arrival distributions and when to use each option, see the distribution description found under each option or *Appendix 3* in this document.

Bottleneck: Station within POD that is processing arriving individuals too slowly, causing long lines or wait times. This can happen when there are not enough resources and staffing to provide services for the people arriving at the station. Other structural drivers may help create the conditions for a bottleneck (e.g., if a POD is not using pre-registration as an option, it is more likely that the Registration Station could become a bottleneck, as all individuals will have to complete that activity at the POD).

Comparison tool: Option to look at two POD SimPLER estimates in a side-by-side comparison. This feature can be toggled on and off.

Hours of operation: Length of time, in hours, that your POD will be open each day for processing individuals. This does not include the time to set up your POD, change over staff members, demobilize your POD, or finishing processing remaining individuals in the POD after the POD has officially closed.

Joint Information Center (JIC): An organization established to coordinate all incident-related public information activities. It is the central point of contact for all news media at the scene of the incident. Public information officials from all participating agencies should collaborate within the JIC.

Lane: Lines that route people to and through a station within a POD. Each active station within a POD will operate one or more lanes.

Medical countermeasures (MCMs): Vaccines, antiviral drugs, antibiotics, antitoxins, and chemical antidotes used to effectively prevent, mitigate, or treat adverse health effects of an intentional, accidental, or naturally occurring public health emergency.[2]

Point of dispensing (POD) site: Community locations in which state and local agencies dispense medical countermeasures (MCMs) to the public during a public health emergency.

Service time (also called processing time): Amount of time required to provide a specific service to an individual such as vaccination, dispensing of pills, or registration.

Station: A location within a POD that provides a service (e.g., a Registration Station, an Administration Station, a Dispensing Station, etc.).

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[2] For more, see *Medical Countermeasures (MCM) and Points of Dispensing (POD) Basics*, dated September 18, 2020, https://www.cdc.gov/cpr/readiness/healthcare/closedpodtoolkit/factsheet-mcm.htm.

Throughput: Number of individuals that have completed all necessary processing through stations at the POD.

Utilization: The percent of time that the station is being used during the hours of operation. Think of this as the percent of time that the station is busy.

Wait time: Amount of time an individual spends waiting in line before receiving service at each station.

Appendix 3 – Arrival Distribution Descriptions

Overview

This document will go through each of the arrival distribution options providing an example of when they should be used.

- Uniform
- Front loaded (opening line)
- Stair stepped (bus loads)

Uniform (Constant) *Default*

The default arrival distribution is a **uniform** distribution. Using a uniform arrival rate is a good starting point when estimating throughput capacity. Think of this as a steady rate of people over the course of your hours of operation.

Shown below is an example of how a uniform arrival would look over the course of your hours of operation.
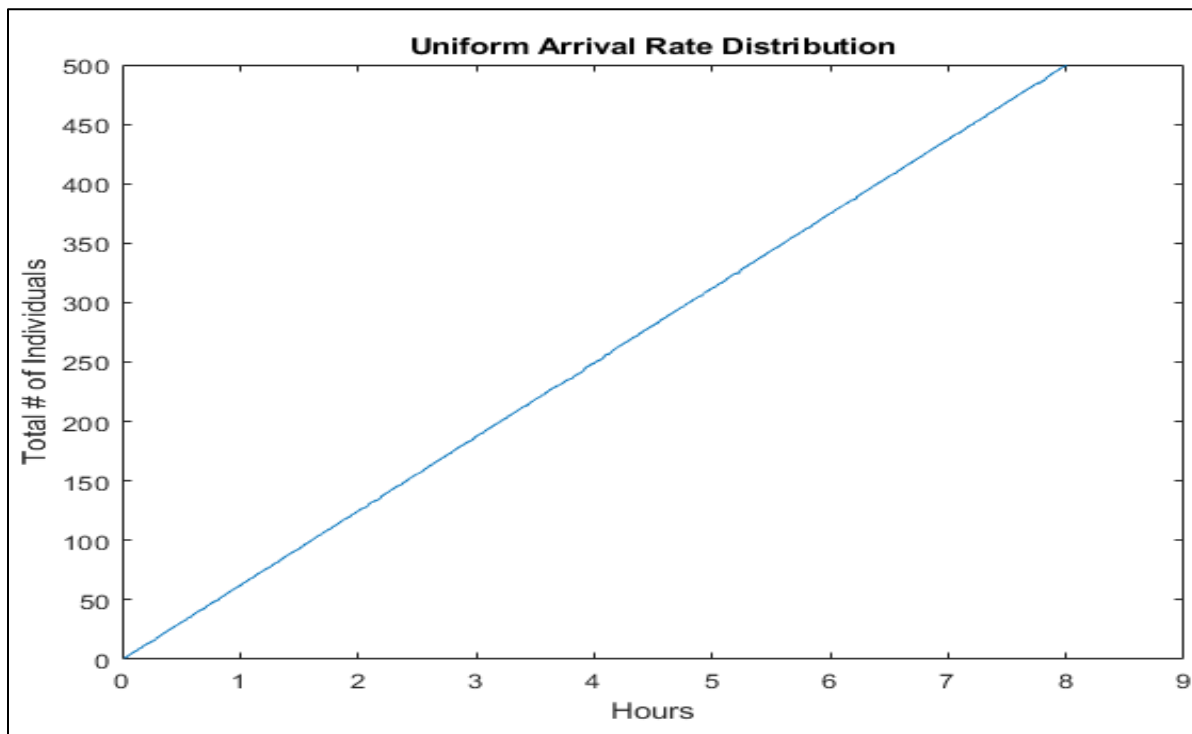
An example of how to calculate this arrival rate is:

Over 8 hours of operation, 1,000 people are set to arrive. This means that each hour, we would anticipate 125 people to arrive; 2–3 people will arrive about every minute.

Front Loaded (Opening Line)

A **front-loaded** arrival distribution starts with a certain number of people already at the door at the opening of the POD. As the POD remains open, people continue to arrive but fewer and fewer as you near the end of your planned hours of operation.

Think of it like a ticket sales booth where people arrive before the opening of sales so they are more likely to get a ticket.

When would you use this arrival distribution option? If plans are in place for pre-communication or early messaging about where and when the POD will open, it is possible that a line will build prior to the POD opening.

Shown below is an example of how a front-loaded arrival would unfold over the course of your hours of operation.
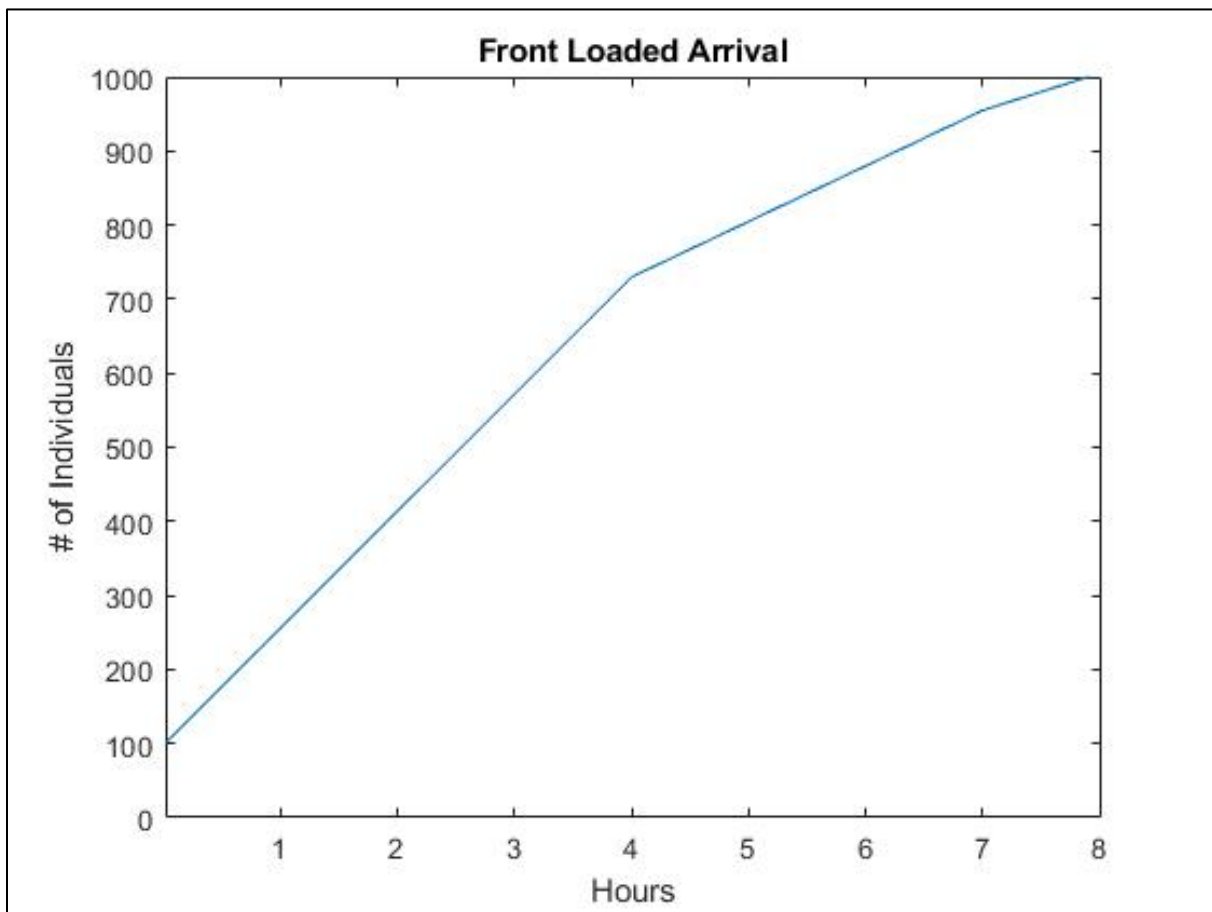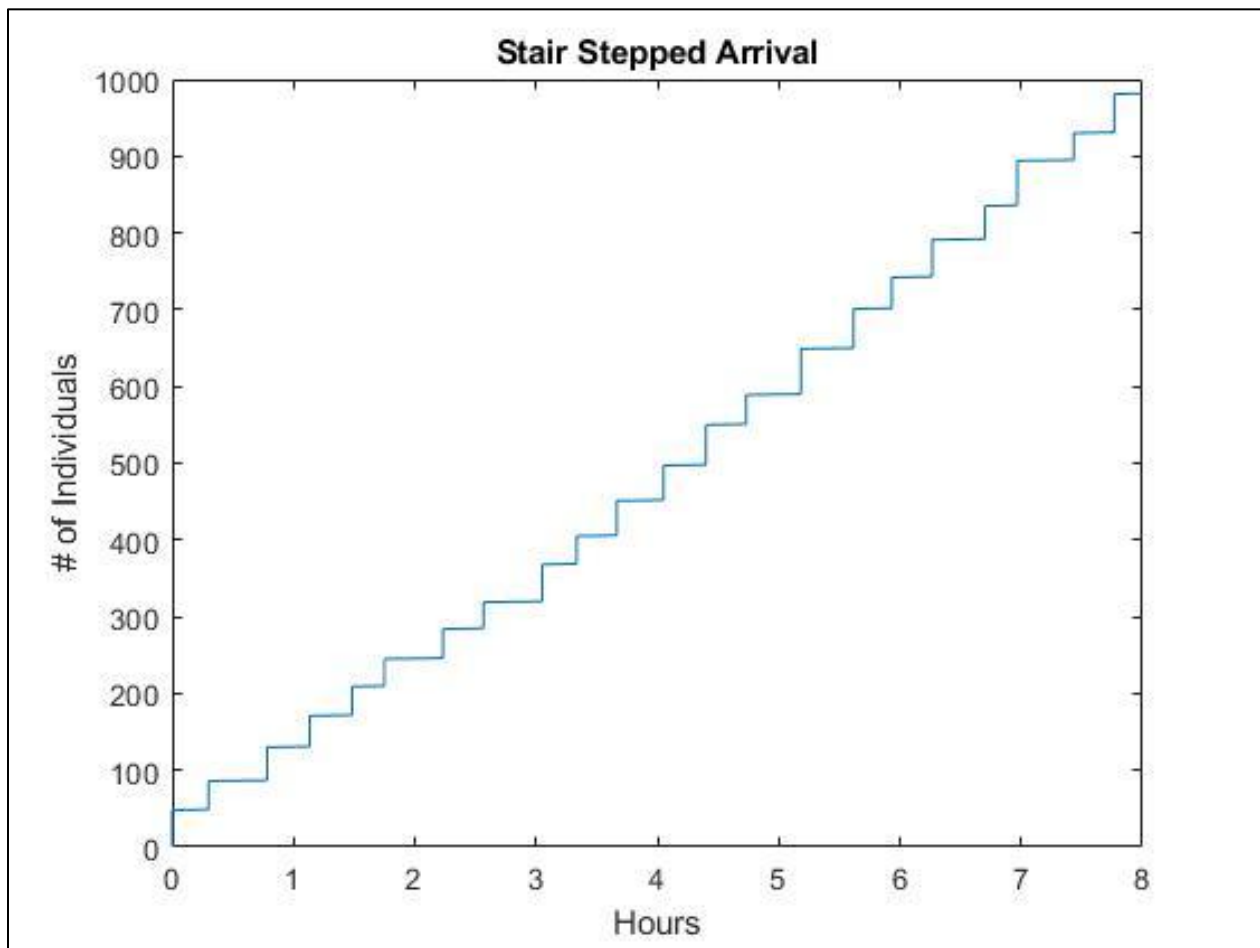

How would you calculate this arrival rate?

Over 8 hours of operation, we anticipate that 1,000 people will arrive. We will assume that 100 or 10% of the total population will be in line when the POD doors open. As the day progresses, fewer and fewer individuals will arrive.

Stair Stepped (Bus Loads)

A **stair stepped** arrival distribution represents a situation where people are being directed from other areas and transported in groups via bus loads. Another way to use this distribution would be if POD planners were able to implement a scheduling system that allowed people to sign up for appointment slots and then arrive at expected times throughout the day.

When would you use this arrival distribution option? If the anticipated response would involve scheduling appointment times to arrive at the POD in clusters/groups or if people were being evacuated or transported by bus loads from other areas.

Shown below is an example of how a stair stepped arrival would unfold over the course of your hours of operation.
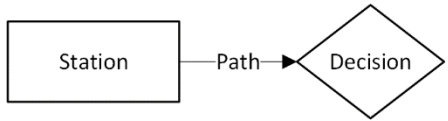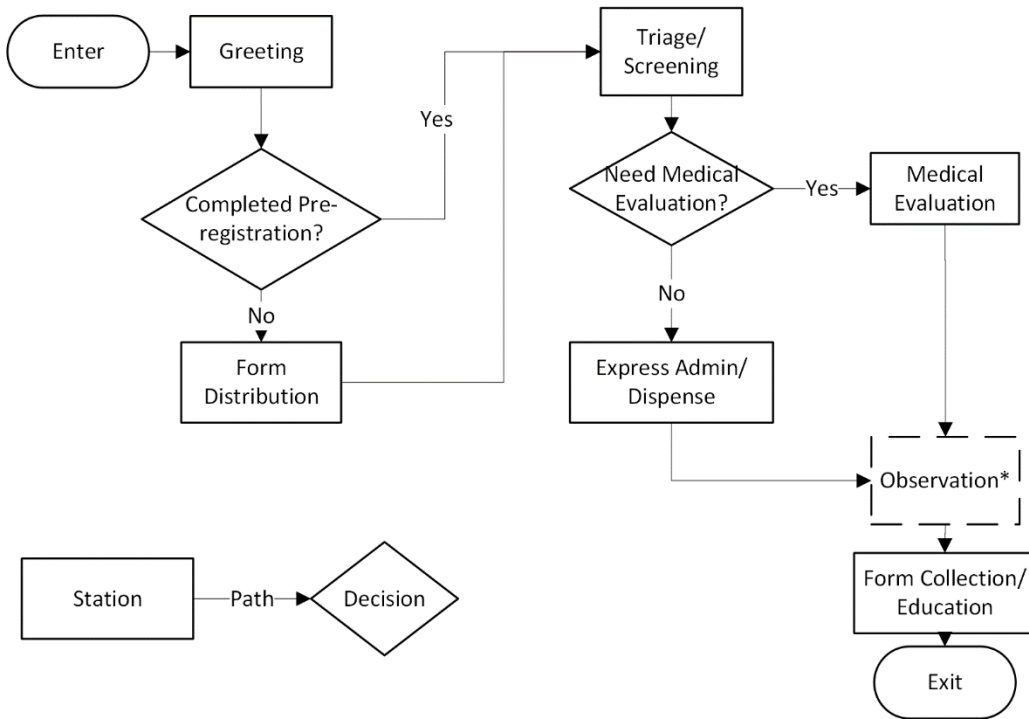

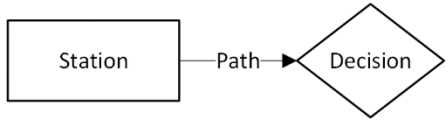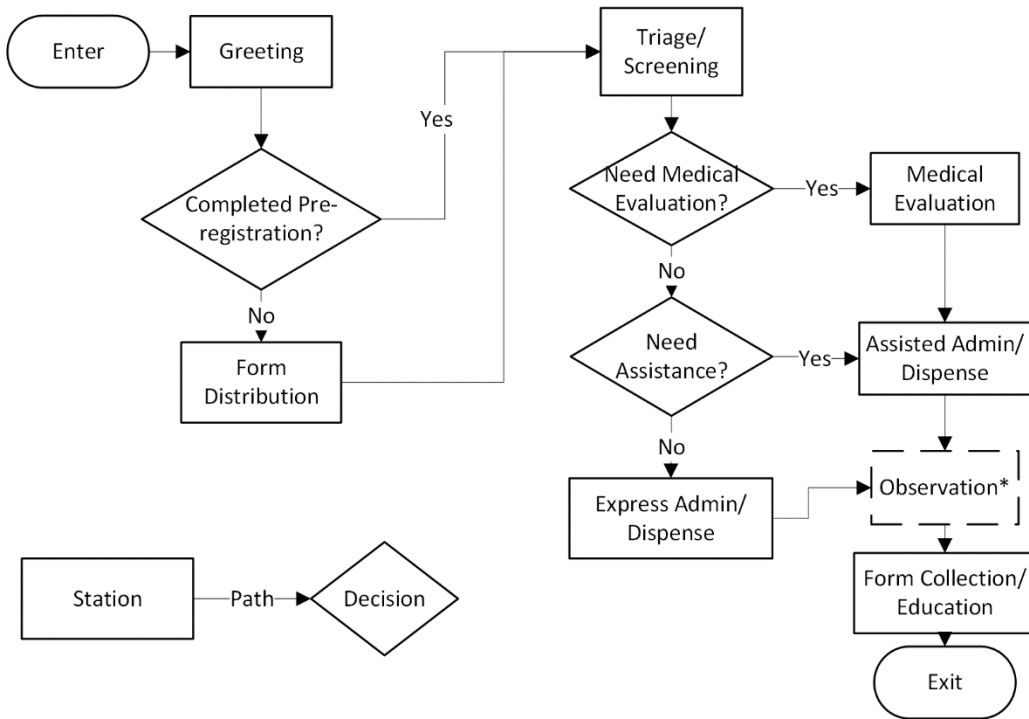How would you calculate this arrival rate?

Over 8 hours of operation, we will anticipate that 1,000 people will arrive. We will assume that each bus load can have 30–60 individuals and 1–3 bus loads may arrive within the same hour. This means that 30–180 individuals could arrive each hour.

Appendix 4 – POD Station Setup Flow Diagrams

Option 1

Option 2

Option 3

Enter → Greeting

Greeting → Completed Pre-registration?

Completed Pre-registration? — Yes → Briefing

Completed Pre-registration? — No → Form Distribution

Form Distribution → Briefing

Briefing → Triage/Screening

Triage/Screening → Need Medical Evaluation?

Need Medical Evaluation? — Yes → Medical Evaluation

Need Medical Evaluation? — No → Need Assistance?

Need Assistance? — Yes → Assisted Admin/Dispense

Need Assistance? — No → Express Admin/Dispense

Medical Evaluation → Assisted Admin/Dispense

Assisted Admin/Dispense → Observation*

Express Admin/Dispense → Observation*

Observation* → Form Collection/Education

Form Collection/Education → Exit

Legend:

Station — Path → Decision