WORKING
PAPER

Operational Assessments for SNS Readiness

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HEALTH

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1. OVERVIEW

State and local governments play the key role in receiving, distributing, and dispensing materiel from the Strategic National Stockpile (SNS). Assessing their operational capability to perform these functions is critical to the success of the SNS program.

The current system for assessing state and local SNS readiness – developed by the Centers for Disease Control and Prevention's Division of the Strategic National Stockpile (CDC/DSNS) – draws upon a written checklist tool for evaluating SNS capacities through plans and related documents. A growing consensus has emerged that this plans-based assessment approach needs to be supplemented by operations-based assessments that measure jurisdictions' abilities to implement and adapt these plans in real-world situations (see, e.g., Nelson, Lurie, & Wasserman, 2007; Lurie, Wasserman & Nelson, 2006).

In an earlier report we proposed an assessment system built around a set of small drill-based assessments. Each assessment focuses on one of the "building block" capabilities that must be deployed, combined, and adapted in response to situations requiring mass countermeasure distribution. The assessments can be used both for *performance improvement* as well as to report performance-related information to external audiences for *accountability* purposes.

We selected five building-block capabilities for initial assessment development:

- *Staff call down*: the ability to quickly contact sufficient numbers of personnel in the event of an emergency. The assessment measures the time needed to perform the call down, the time needed for acknowledgments to be received, and the percentage of people who report that they could assemble in the time required.
- *Site call down*: the ability to quickly contact owners or managers of sites (such as warehouse or dispensing locations) that would be required for use in an emergency. The assessment measures the time needed to perform the call down, the time needed for acknowledgements to be received, and the percentage of sites who report they could make the site available in the time required.
- *Pick-list generation*: the ability to use the warehouse inventory system to generate instructions for warehouse staff to pick orders.
- *POD facility set up*: the ability to quickly set up a facility for use as a Point-of-Dispensing (POD). The assessment measures the time needed to set up the facility, and includes a walk-through checklist to assess the completeness of the set up.

- *Dispensing*: the ability to rapidly dispense countermeasures to persons at a POD. The assessment measures the time needed to perform each step in the POD, and estimates the maximum possible throughput that can be achieved at the POD.

This paper contains new versions of the instruction manuals for the five assessments. The manuals explain what data to collect while conducting drills, and how to collect that data, and how to compute performance metrics for assessing the operational capabilities being tested. These instruction manuals are being circulated for review, testing and comment, and will likely undergo minor revisions before they are finalized for publication.

Appendix

A. ASSESSING STAFF CALL-DOWN CAPABILITY

Instruction Manual
Revised – 5/9/08

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INTRODUCTION

This manual provides guidance on collecting data and computing metrics to assess the operational capability to perform a call-down of personnel in the event of an emergency.

Data for the assessment should come from a call-down drill. This drill should be conducted with no notice to those being called in order to provide more insight as to how many people on their call-down list would be unavailable on any given day. The drill does not require the actual assembly of the persons being called.

The manual contains a data collection spreadsheet (described later) used to record all drill and call information and to compute the following performance metrics:

- *Call-down completion time*. The amount of time required to call all staff on the call-down list.
- *Acknowledgement completion time*. The amount of time required to receive acknowledgement from staff confirming receipt of the call-down message, regardless of ability to assemble.
- *Acknowledgment percentage*. The percentage of staff on the call-down list who acknowledged receipt of the call-down message regardless of ability to assemble.
- *Assembly percentage*. The percentage of staff on the call-down list who reported being able to assemble at a designated site by a pre-determined target time.

PREPARING FOR THE DRILL

This assessment is intended to work with a wide variety of calling equipment. However, users must ensure: (a) the availability of key participants and (b) that the drill format meets certain key assumptions.

Participants

For purposes of this call-down drill, participants include the following:

- *Players.* Players are the personnel who do the calling during the exercise. The players in the exercise should be the people who would do the calling in a real emergency. If a calling tree is used, all persons making calls are considered players.
- *Controller (optional).* The controller declares when the drill starts and ends and manages the flow of the drill. Controllers are the only participants who will provide information or direction to the players. However, because the drill focuses on the collection of time-based metrics, the Controller should *not* intervene in timed activities while the drill is in progress. In this drill, the role of Controller may be combined with that of Evaluator, below.
- *Evaluator.* The Evaluator is responsible for timing the overall drill, gathering individual call data collection sheets, computing metrics, and taking notes to identify areas for improvement.

  For an automated calling system. Evaluators should remain unobtrusive and not intervene with player action.

  For a manual calling system. Evaluators should not intervene with player action. Ideally, the evaluator should be able to listen in on the calls that the players make.

Drill Assumptions

Call-down list to be tested. Jurisdictions have different lists of staff that would be called in an emergency. Example call-down lists include: Emergency Operations Center (EOC) staff, warehouse staff, Point of Dispensing (POD) staff and volunteers, security staff, etc. Contact lists should be kept up-to-date, readily accessible, and usable. Jurisdictions should select one or more of these lists for use during this call-down drill.

Ideally jurisdictions should call **all** of the people on the list being tested. However, some lists in some jurisdictions may be considered too large to test in a regular call-down drill. If so, users

may consult the guidance provided at the end of this manual for using a sampling strategy to gather realistic call-down performance metrics without calling every individual on large lists (with greater than 500 people, see instructions below).

No-notice/no-assembly drill. To collect the best possible performance metrics, call-down drills should not involve prior notice to those being called; however, the drills need not require actual assembly of persons.

No-notice. Given that the purpose of the assessment is to estimate the percentage of the calling list members who are reachable and available on a given day, we recommend the drill be conducted on a no-notice basis. At most, only the players who are required to initiate the call-down procedure should be notified of the drill, but even they need not be warned beforehand.

If using an automated calling system, only players who must activate the automated system need to be notified.

If using a calling tree, only the first tier of callers, i.e., the callers initiating the calling tree, need to be notified.

No player assembly required. To reduce the burden associated with gathering performance metrics, persons on the call-down list are not required to actually assemble at any site.

Calling equipment. Players should have access to all calling equipment and any call response monitoring technology that would be used during a real emergency in order to track the call responses received.

Automated calling system. Jurisdictions using automated calling systems should collaborate with the provider of their calling system to perform the call-down drill.

Manual calling system. Jurisdictions using manual calling systems should run the drill using the same equipment and facilities that would be used during a real emergency. If this is not practical, the drill should be conducted using equipment and facilities that are as similar as possible.

Response method. Jurisdictions should determine the method by which persons on the call-down list will acknowledge receipt of the call-down message and report their ability to assemble.

<u>Automated calling system</u>

If an automated response function is available. Persons on the call-down list should follow the instructions of the automated calling system to acknowledge receipt of the call-down

message and report whether or not they are able to assemble. Typically, persons called can enter a number on their phone after a prompt.

If an automated response function is not available. Upon being called, persons on the call-down list should acknowledge receipt of the call-down message and report their ability to assemble. The response can be in the form of an e-mail, phone call, or text message to a phone number specially designated for this purpose. Another option is to set up a call center to receive responses. Only responses received within a pre-determined amount of time should be recorded for use in the performance metrics.

Calling tree or manual calling system

During successful phone calls, the caller can manually record receipt of the call-down message and the ability of each person on the call-down list to assemble. If using a calling tree, callers can be instructed to call into a central number, or call back up the tree (i.e., call back the person who called them) to report their call acknowledgement data. Alternatively, calling tree callers could record their acknowledgment data and submit this information as soon as possible by fax or e-mail.

Protocol for non-respondent follow up. For the purposes of this drill, the following non-responses indicate that the person on the call-down list has *not* acknowledged receipt of the call-down message:

- Busy signal
- No answer
- Voicemail
- Wrong person answering but correct person is unavailable
- Wrong number.

Jurisdictions should determine the protocol for how callers or automated calling systems should handle non-responses. Consider such issues as: If leaving a message is an option, should the caller or automated calling system leave a message? Should the caller or automated calling system attempt to contact non-respondents again? If so, how many additional attempts should be made and under what circumstances (e.g., only if a message could not be left on voicemail)? In addition, how will those receiving a message acknowledge receipt of the call and report their ability to assemble?

Standard script for calls. Callers and automated calling systems should use a standard script to ensure accuracy and consistency of messages and to ensure that time estimates taken from the drill reflect the pace of activity in a true emergency. The script should: 1) clearly state that this

is a drill; 2) assess ability to assemble (at a hypothetical location and by a hypothetical time); and 3) in the case of a calling tree, provide instructions for further calls.

Sample Call-Down Script

- This is a call-down drill being conducted by [jurisdiction]. Your name is on [jurisdiction]'s list of emergency staff. If this were a real emergency, you would be asked to report to your designated site.
- Are you prepared to report to [designated site] by [the designated time]? (Yes/No)
- Again, this is only a drill. There is no need for you to report to any location as a result of this call.
- (Calling Tree) As part of [jurisdiction]'s calling tree, you should now call the people on your designated call-down list and follow this script. You should also instruct others to call the people on their call-down lists (if applicable). Be sure to follow the procedures on your data collection sheet, noting the time you make calls, the times you reach people, and the outcome of those calls. *(Describe protocol for follow-up of non-respondents, and describe who callers should notify once they have finished attempting to contact people on their list or when the drill ends).*

DATA COLLECTION DURING THE DRILL

Here we describe the responsibilities of evaluators and players (callers) for collecting data during the call-down drill and for computing performance metrics. Data collection responsibilities depend on the calling system used.

Automated Calling System Instructions

The drill evaluator is responsible for:

1. *Recording the drill information*, including date and location of drill, number of players, etc. (see Excel-based data collection spreadsheet).
2. *Recording the following process time stamps (to the hour and minute):*
    a. When the automated system begins contacting people on the call-down list
    b. When the automated system completes contacting people on the call-down list
    c. When all persons have acknowledged receipt of the call-down message and reported their ability to assemble by a pre-determined target time, or a pre-determined amount of time has passed.
3. *Computing the performance metrics after the drill.*

Manual Calling System Instructions

The players (callers) are responsible for:

1. *Recording the following time stamps (to the hour and minute):*
    a. When the player begins contacting people on the call-down list
    b. When the player completes contacting people on the call-down list
2. *Recording for each person on the call-down list:*
    a. Whether the person acknowledged receipt of the call-down message
    b. Whether the person reported that he/she was able to assemble by the target time

The drill evaluator is responsible for:

1. *Recording the drill information*, including date and location of drill, number of players, etc. (see Excel-based data collection spreadsheet).
2. *Gathering the data collection spreadsheets from each player.*
3. *Computing the performance metrics after the drill.*

Calling Tree Instructions

The players (callers) are responsible for:

1. *Recording the following time stamps (to the hour and minute):*
    a. When the player begins contacting people on their call-down list
    b. When the player completes contacting people on their call-down list
    c. Note that the caller at the top of the calling tree list will be responsible for recording times that each lower branch point (or tier) reports back, if they are "calling back up the tree" as the response method.
2. *Recording for each person on their call-down list:*
    a. Whether the person acknowledged receipt of the call-down message
    b. Whether the person reported that he/she was able to assemble by the target time
3. *Recording if additional calling instructions are given for continuing the drill*
    a. Note that players in the second, third, etc. tier of a calling tree are also responsible for recording all call data as "players."

The drill evaluator is responsible for:

1. *Recording the drill information*, including date and location of drill, number of players, etc. (see Excel-based data collection spreadsheet).
2. *Gathering above process information from each player.*
3. *Computing the performance metrics after the drill.*

Sampling Strategies for Call-Down Lists of Greater Than 500 People

In some larger jurisdictions, the size of the full call-down list could make frequent call-down drills infeasible. In these cases, it may be desirable to supplement regular drills involving the full list with drills using a random sample drawn from the full call-down list. In order to collect a sufficient amount of data to detect whether a performance metric falls below some specified performance target, a list of approximately 250 randomly selected individuals is sufficient to reliably estimate performance (i.e., as if you had tested the whole list). It is best to use software (e.g., Excel) to select your random sample. However, when this is not feasible, a simple way to generate a pseudo-random sample is as follows:

Step 1. Start with the full call-down list. Divide the number of people by 250. Round down to the nearest whole number, and call this number X. This number will be used in Step 3.

Step 2. From the first six names in the full call-down list, randomly select a person to be the first name in the random sample. Do this by rolling a die.

Step 3. Starting with the name selected with the die roll, place every X^{th} person on the full call-down list into the random sample.

Example: A call-down list contains 1235 people. (Step 1) Divide 1235 by 250 = 4.94; round this number down to arrive at X = 4. (Step 2) A die roll yields the number 5, that is, the fifth person on the full call-down list becomes the first person in the random sample. (Step 3) Since X = 4, every 4^{th} person on the full call-down list after the person selected with the die roll is put into the random sample. In this example, the random sample would consist of the 5^{th}, 9^{th}, 13^{th}, 17^{th}, etc. persons in the full call-down list.

COMPUTING METRICS AFTER THE DRILL

After the drill, evaluators should compute the following performance metrics from this drill, either by hand or using the Excel-based data collection spreadsheet that computes the metrics automatically.

Call-down completion time. The amount of time required to call all staff on the call-down list.

Acknowledgement completion time. The amount of time required to receive acknowledgements from all staff, confirming receipt of the call-down message. Because even one late response can skew this metric, percentile times should also be reported: (a) the time for 50% of acknowledgments to be received, and (b) the time for 75% of acknowledgments to be received.

Acknowledgement percentage. The percentage of staff who acknowledged receipt of the call-down message regardless of ability to assemble, out of all staff on the call-down list. This is

calculated by counting the number of staff who acknowledged receipt of the call-down message and dividing it by the total number of staff on the call-down list.

$$\text{Acknowledgment Percentage} = \frac{(\#\text{ Staff who Acknowledged Receipt of the Call-Down Message})}{(\#\text{ Staff on the Call-Down List})}$$

Assembly percentage. The percentage of staff on the call-down list who reported being able to assemble at a designated site by the target time.

$$\text{Assembly Percentage} = \frac{(\#\text{ Staff who Indicated Being Able to Assemble at a Designated Site by the Target Time})}{(\#\text{ Staff on the Call-Down List})}$$

DATA COLLECTION SPREADSHEET

To facilitate data collection and calculations, a Microsoft Excel-format file is included which contains spreadsheets for recording call data and computing performance metrics.

The set of data collection spreadsheets is includes:

- Instructions Sheet
- Drill Information Sheet
- Call Information Sheet
- Metrics Computation Sheet
- Filled-in examples of the all sheets (except instructions)

An alternate version of the Excel spreadsheet is available for agencies using calling trees.

Agencies can print out hard copies of the data collection spreadsheet. Participants can use this hard copy to record data during the drill.

DATA COLLECTION SPREADSHEET
for
Assessing Call-Down Capability

Instructions

Purpose: To collect data and calculate performance results from the call down drill.

User Guide: Cells for the user to complete are highlighted in **yellow**. Cells that are highlighted in **blue** are the cells that contain formulas to calculate the performance results.

The second sheet below ("Drill Information") provides information about the drill such as the date, location, duration of the drill, and the parameters under which the drill was conducted. For example, the type of calling system used, the message delivered during the drill, etc.

The third sheet ("Call Information") collects data on each call made such as how many people received the call down message as well as how many people can be ready to be work within the specified time period. Jurisdictions using automated calling sytems may not require this sheet.

Once the data have been entered into the "Drill Information" and "Call Information" sheets, the performance results are calculated and displayed on the "Metrics Computation" sheet.

The final three sheets have been included as examples of how the sheets will look after the data have been entered and the performance results calculated.

Submission: After completion of the drill, the worksheets should be sent to the DSNS PPB email address: sns_ppb@cdc.gov.

Name of Jurisdiction Completing this Drill:

Drill Information

Date of drill (mm/dd/yyyy)	
Day of the week of drill (note if this is a holiday)	
Drill start time (24 hour clock time HH:MM, e.g., 13:00)	
Drill end date (date the drill will be declared done, mm/dd/yyyy)	
Drill end time (time the drill will be declared done 24 hour clock time HH:MM)	
Location of drill	
Number of players	
Number of evaluators	

Calling Method Information

Call-down list used	☐ EOC ☐ RSS ☐ Distribution ☐ POD ☐ Public Information ☐ Security ☐ Other (please specify)
Number of people on the call-down list	= N1 on the "Metrics Computation" sheet
Extent of notice of drill	☐ No-notice ☐ Partial-notice (please specify) ☐ Full-notice
If partial- or full-notice, please describe how participants were notified of the drill	
Calling equipment used	☐ Automated ☐ Manual ☐ Other (please specify)
Protocol for non-respondent follow-up Number of different contact modes that will be attempted, e.g., 2 phone numbers and 1 e-mail	
If the person is not reached, will the system leave a message? For each contact mode?	
How many times will each contact mode be attempted if the person is not reached, e.g., once for each contact mode?	
For automated calling systems: Is there a way to verify the identify of the person answering the call, e.g., is a PIN # required?	

What different methods can people use to acknowledge the call-down message?

Please check all that apply.

Automated Calling System	**Manual Calling System**
☐ Press button during call	☐ Respond during call
☐ E-mail	☐ E-mail
☐ Return phone call	☐ Return phone call
☐ Text message	☐ Text message
☐ Log into website	☐ Log into website
☐ Other (please specify)	☐ Other (please specify)

What different methods can people use to indicate their ability to assemble?

Please check all that apply.

Automated Calling System	**Manual Calling System**
☐ Press button during call	☐ Respond during call
☐ E-mail	☐ E-mail
☐ Return phone call	☐ Return phone call
☐ Text message	☐ Text message
☐ Log into website	☐ Log into website
☐ Other (please specify)	☐ Other (please specify)

Describe any limitations of your calling system that preclude data from being collected as described in this manual	
Type of assembly (real, hypothetical, other)	☐ Real ☐ Hypothetical ☐ Other (please specify)
Time of assembly (24 hour clock time HH:MM)	
Location of assembly	

Please attach a copy of the call-down script

Prior to the drill, add as many rows as needed to include all persons on the call-down list. Rows should be added prior to the "Last Person." One column has been left blank for record keeping. Users may keep track of phone numbers used or call outcomes in this column.

Call Information

List all times in 24 hour clock time (HH:MM)

Time of day calling started

Time of day calling ended

			Column A	Column B	Column C
Person on call-down list	Name of person	Column left blank for record keeping	Acknowledged receipt of call-down message (1=yes, 0=no)	Time acknowledged receipt (HH:MM)	Would be able to assemble by target time? (1=yes, 0=no)
Person 1					
Person 2					
Person 3					
Person 4					
Person 5					
Person 6					
Person 7					
Person 8					
Person 9					
Last Person					

Provides information on how many people received the message.

Gives the time it took for all the people to acknowledge the message was received.

Provides information on how many people can report to the location provided in the message within the time period specified in the message.

Metrics Computation

List all times in 24 hour clock time (HH:MM)

Call-Down Completion Time

Time of day the call-down process started	0:00
Time of day the call-down process ended	0:00
Call-Down Completion Time	0:00

Acknowledgement Completion Time

Time of day the call-down process started	0:00
Time of day acknowledgement process ended	0:00
Acknowledgment Completion Time	0:00
50% Acknowledgement Time	#NUM!
50% Acknowledgment Completion Time	#NUM!
75% Acknowledgement Time	#NUM!
75% Acknowledgment Completion Time	#NUM!

Acknowledgment Percentage

Number of people on the call-down list	0
Number of people who acknowledged receipt of the call, regardless of ability to assemble	0
Acknowledgment Percentage	#DIV/0!

Assembly Percentage

Number of people who report being able to assemble at a designated site by a pre-determined target time	0
Assembly Percentage	#DIV/0!

Drill Information

Date of drill (mm/dd/yyyy)	23-Apr-08
Day of the week of drill (note if this is a holiday)	Wednesday
Drill start time (24 hour clock time HH:MM, e.g., 13:00)	13:50
Drill end date (date the drill will be declared done, mm/dd/yyyy)	23-Apr-08
Drill end time (time the drill will be declared done 24 hour clock time HH:MM)	15:00
Location of drill	Hometown, CA
Number of players	2
Number of evaluators	1

Calling Method Information

Call-down list used

☐ EOC	☐ RSS	☐ Distribution	☐ POD
X Public Information	☐ Security	☐ Other (please specify)	

Number of people on the call-down list: 13 = N1 on the "Metrics Computation" sheet

Extent of notice of drill

☐ No-notice	X Partial-notice (please specify)	☐ Full-notice

If partial- or full-notice, please describe how participants were notified of the drill: People on the call-down list were told that a call-down drill would occur during a specific week but were not told the exact date or time frame.

Calling equipment used

☐ Automated	X Manual	☐ Other (please specify)

Protocol for non-respondent follow-up

Number of different contact modes that will be attempted, e.g., 2 phone numbers and 1 e-mail: One contact mode (cell phone) per person was used.

If the person is not reached, will the system leave a message? For each contact mode?: Our protocol is to leave a message if no one answers and if voicemail is activated.

How many times will each contact mode be attempted if the person is not reached, e.g., once for each contact mode?: Each contact mode will be attempted only once.

For automated calling systems:
Is there a way to verify the identify of the person answering the call, e.g., is a PIN # required?:

What different methods can people use to acknowledge the call-down message?

Please check all that apply.

	Automated Calling System	**Manual Calling System**
	☐ Press button during call	☐ Respond during call
	☐ E-mail	X E-mail
	☐ Return phone call	X Return phone call
	☐ Text message	☐ Text message
	☐ Log into website	X Log into website
	☐ Other (please specify)	☐ Other (please specify)

What different methods can people use to indicate their ability to assemble?

Please check all that apply.

	Automated Calling System	**Manual Calling System**
	☐ Press button during call	☐ Respond during call
	☐ E-mail	X E-mail
	☐ Return phone call	X Return phone call
	☐ Text message	☐ Text message
	☐ Log into website	X Log into website
	☐ Other (please specify)	☐ Other (please specify)

Describe any limitations of your calling system that preclude data from being collected as described in this manual:

Type of assembly (real, hypothetical, other)

☐ Real	X Hypothetical	☐ Other (please specify)

Time of assembly (24 hour clock time HH:MM): 15:00

Location of assembly: Department Conference Room

Please attach a copy of the call-down script

Prior to the drill, add as many rows as needed to include all persons on the call-down list. Rows should be added prior to the "Last Person." One column has been left blank for record keeping. Users may keep track of phone numbers used or call outcomes in this column.

Call Information

List all times in 24 hour clock time (HH:MM)

Time of day calling started: 13:50 = T1 on the "Metrics Computation" sheet

Time of day calling ended: 14:32 = T2 on the "Metrics Computation" sheet

			Column A	Column B	Column C
Person on call-down list	Name of person	Column left blank for record keeping	Acknowledged receipt of call-down message (1=yes, 0=no)	Time acknowledged receipt (HH:MM)	Would be able to assemble by target time? (1=yes, 0=no)
Person 1	Sandra Smith	answered	1	13:55	1
Person 2	Carol Jones	mailbox full	0		
Person 3	Wally Chang	answered	1	14:03	1
Person 4	Bob Zuckerman	answered	1	14:08	0
Person 5	Jane Doe	voicemail	0		
Person 6	Jack Chang	voicemail	0		
Person 7	Linda Buchanan	answered	1	14:14	1
Person 8	Charlie Brown	answered	1	14:16	1
Person 9	Harold Weiss	voicemail	0		
Person 10	Arthur Broadway	wrong number	0		
Person 11	Mary Chernoff	answered	1	14:25	0
Person 12	Kenneth Waverly	answered	1	14:28	0
Last Person	Linda Birch	answered	1	14:31	1
This column is not required for the "Metrics Computation" sheet.	This column is not required for the "Metrics Computation" sheet.	This column is not required for the "Metrics Computation" sheet.	The sum of values in Column A is equal to the number of people who acknowledged receipt of the call-down message, regardless of ability to assemble; it is N2 on the "Metrics Computation" sheet.	The latest time in Column B is the time that the acknowledgement process was completed; it is T3 on the "Metrics Computation" sheet.	The sum of values in Column C is equal to the number of people who report that they are able to assemble by the target time; it is N3 on the "Metrics Computation" sheet.

Metrics Computation

List all times in 24 hour clock time (HH:MM)

Call-Down Completion Time

Time of day the call-down process started	13:50	= T1 from the "Call Information" sheet
Time of day the call-down process ended	14:32	= T2 from the "Call Information" sheet
Call-Down Completion Time	0:42	= T2 - T1

Acknowledgement Completion Time

Time of day the call-down process started	13:50	= T1 from the "Call Information" sheet
Time of day acknowledgement process ended	14:31	= T3 = Maximum of all times in Column B from the "Call Information" sheet
Acknowledgment Completion Time	0:41	= T3 - T1
50% Acknowledgement Time	14:15	= T4 = the time that corresponds to when 50% of acknowledgments are received, from Column B on the "Call Information" sheet
50% Acknowledgment Completion Time	0:25	= T4 - T1
75% Acknowledgement Time	14:25	= T5 = the time that corresponds to when 75% of acknowledgments are received, from Column B on the "Call Information" sheet
75% Acknowledgment Completion Time	0:35	= T5 - T1

Acknowledgment Percentage

Number of people on the call-down list	13	= N1 from the "Drill Information" sheet
Number of people who acknowledged receipt of the call, regardless of ability to assemble	8	= N2 = sum of values in Column A from the "Call Information" sheet
Acknowledgment Percentage	62%	= N2/N1

Assembly Percentage

Number of people who report being able to assemble at a designated site by a pre-determined target time	5	= N3 = sum of values in Column C from the "Call Information" sheet
Assembly Percentage	38%	= N3/N1

Appendix

B. ASSESSING SITE CALL-DOWN CAPABILITY

Instruction Manual
Revised – 5/8/08

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INTRODUCTION

In a public health emergency, health departments may need to make use of sites that are not ordinarily under their ownership or control. Examples of such sites would be facilities that would serve as points of dispensing (PODs) or as warehouses. This manual provides guidance on collecting data and computing metrics to assess the operational capability to perform a site call-down in the event of an emergency.

Data for the assessment should come from a site call-down drill. This drill should be conducted with no notice to those being called in order to provide more insight as to how many facilities on their site call-down list would be unavailable on any given day. The drill does not require the actual activation of the sites being called.

The manual contains a data collection spreadsheet (described later) used to record all drill and call information and to compute the following performance metrics:

- *Site call-down completion time*. The amount of time required to call all sites on the site call-down list.
- *Acknowledgement completion time*. The amount of time required to receive acknowledgement from sites confirming receipt of the call-down message, regardless of ability to make the site available.

- *Acknowledgment percentage*. The percentage of sites on the site call-down list that acknowledged receipt of the call-down message regardless of ability to make the site available.
- *Availability percentage*. The percentage of sites on the site call-down list that reported being able to make their site available for use by the health department by a pre-determined target time.

PREPARING FOR THE DRILL

This assessment is intended to work with a wide variety of calling equipment. However, users must ensure: (a) the availability of key participants and (b) that the drill format meets certain key assumptions.

Participants

For purposes of this site call-down drill, participants include the following:

- *Players*. Players are the personnel who do the calling during the exercise. The players in the exercise should be the people who would do the calling in a real emergency.
- *Controller (optional)*. The controller declares when the drill starts and ends and manages the flow of the drill. Controllers are the only participants who will provide information or direction to the players. However, because the drill focuses on the collection of time-based metrics, the Controller should *not* intervene in timed activities while the drill is in progress. In this drill, the role of Controller may be combined with that of Evaluator, below.
- *Evaluator*. The Evaluator is responsible for timing the overall drill, gathering individual call data collection sheets, computing metrics, and taking notes to identify areas for improvement.

  For an automated calling system. Evaluators should remain unobtrusive and not intervene with player action.

  For a manual calling system. Evaluators should not intervene with player action. Ideally, the evaluator should be able to listen in on the calls that the players make.

Drill Assumptions

Site call-down list to be tested. Jurisdictions have different lists of sites that would be called in an emergency. Example site call-down lists include PODs and warehouse locations. Site call-down lists should be kept up-to-date, readily accessible, and usable. Jurisdictions should select one or more of these lists for use during this site call-down drill.

No-notice/no-availability drill. To collect the best possible performance metrics, site call-down drills should not involve prior notice to those being called; however, the drills need not require actually making the site available for use by the health department.

No-notice. Given that the purpose of the assessment is to estimate the percentage of the sites on the calling list that are reachable and available on a given day, we recommend the drill be conducted on a no-notice basis. At most, only the players who are required to initiate the site call-down procedure should be notified of the drill, but even they need not be warned beforehand. If using an automated calling system, only players who must activate the automated system need to be notified.

No site activation required. To reduce the burden associated with gathering performance metrics, sites on the call-down list are not required to actually make their site available for use by the health department.

Calling equipment. Players should have access to all calling equipment and any call response monitoring technology that would be used during a real emergency in order to track the call responses received.

Automated calling system. Jurisdictions using automated calling systems should collaborate with the provider of their calling system to perform the site call-down drill.

Manual calling system. Jurisdictions using manual calling systems should run the drill using the same equipment and facilities that would be used during a real emergency. If this is not practical, the drill should be conducted using equipment and facilities that are as similar as possible.

Response method. Jurisdictions should determine the method by which sites on the call-down list will acknowledge receipt of the call-down message and report their ability to make their site available.

<u>Automated calling system</u>

If an automated response function is available. Sites on the call-down list should follow the instructions of the automated calling system to acknowledge receipt of the call-down

message and report whether or not they are able to make their site available. Typically, persons called can enter a number on their phone after a prompt.

If an automated response function is not available. Upon being called, sites on the call-down list should acknowledge receipt of the call-down message and report their ability to make their site available. The response can be in the form of an e-mail, phone call, or text message to a phone number specially designated for this purpose. Another option is to set up a call center to receive responses. Only responses received within a pre-determined amount of time should be recorded for use in the performance metrics.

Manual calling system

During successful phone calls, the caller can manually record receipt of the call-down message and the ability of each site on the call-down list to make their site available.

Protocol for non-respondent follow up. For the purposes of this drill, the following non-responses indicate that the site on the call-down list has *not* acknowledged receipt of the call-down message:

- Busy signal
- No answer
- Voicemail
- Wrong person answering but correct person is unavailable
- Wrong number.

Jurisdictions should determine the protocol for how callers or automated calling systems should handle non-responses. Consider such issues as: If leaving a message is an option, should the caller or automated calling system leave a message? Should the caller or automated calling system attempt to contact non-respondents again? If so, how many additional attempts should be made and under what circumstances (e.g., only if a message could not be left on voicemail)? In addition, how will those receiving a message acknowledge receipt of the call and report their ability to make their site available?

Standard script for calls. Callers and automated calling systems should use a standard script to ensure accuracy and consistency of messages and to ensure that time estimates taken from the drill reflect the pace of activity in a true emergency. The script should: 1) clearly state that this is a drill; 2) assess ability to make their site available (by a hypothetical time); and 3) in the case of a calling tree, provide instructions for further calls.

Sample Call-Down Script

- This is a site call-down drill being conducted by [jurisdiction]. Your site is on [jurisdiction]'s list of facilities that may be used in an emergency. If this were a real emergency, you would be asked to make your site available for use by [jurisdiction]'s health department.
- Are you prepared to make your facility available by [the designated time]? (Yes/No)
- Again, this is only a drill. There is no need for you to make your site available as a result of this call.

DATA COLLECTION DURING THE DRILL

Here we describe the responsibilities of evaluators and players (callers) for collecting data during the site call-down drill and for computing performance metrics. Data collection responsibilities depend on the calling system used.

Automated Calling System Instructions

The drill evaluator is responsible for:

1. *Recording the drill information*, including date and location of drill, number of players, etc. (see Excel-based data collection spreadsheet).
2. *Recording the following process time stamps (to the hour and minute):*
    a. When the automated system begins contacting sites on the call-down list
    b. When the automated system completes contacting sites on the call-down list
    c. When all sites have acknowledged receipt of the call-down message and reported their ability to make their site available by a pre-determined target time, or a pre-determined amount of time has passed.
3. *Computing the performance metrics after the drill.*

Manual Calling System Instructions

The players (callers) are responsible for:

1. *Recording the following time stamps (to the hour and minute):*
    a. When the player begins contacting sites on the call-down list
    b. When the player completes contacting sites on the call-down list
2. *Recording for each site on the call-down list:*
    a. Whether the site acknowledged receipt of the call-down message

b. Whether the site reported being able to make their site available by the target time

The drill evaluator is responsible for:

1. *Recording the drill information*, including date and location of drill, number of players, etc. (see Excel-based data collection spreadsheet).
2. *Gathering the data collection spreadsheets from each player.*
3. *Computing the performance metrics after the drill.*

COMPUTING METRICS AFTER THE DRILL

After the drill, evaluators should compute the following performance metrics from this drill, either by hand or using the Excel-based data collection spreadsheet that computes the metrics automatically.

Site call-down completion time. The amount of time required to call all sites on the site call-down list.

Acknowledgement completion time. The amount of time required to receive acknowledgements from all sites, confirming receipt of the call-down message. Because even one late response can skew this metric, percentile times should also be reported: (a) the time for 50% of acknowledgments to be received, and (b) the time for 75% of acknowledgments to be received.

Acknowledgement percentage. The percentage of sites that acknowledged receipt of the call-down message regardless of ability to make their site available, out of all sites on the call-down list. This is calculated by counting the number of sites that acknowledged receipt of the call-down message and dividing it by the total number of sites on the call-down list.

$$\text{Acknowledgment Percentage} = \frac{(\#\text{ Sites that Acknowledged Receipt of the Call-Down Message})}{(\#\text{ Sites on the Call-Down List})}$$

Availability percentage. The percentage of sites on the call-down list that reported being able to make their site available by the target time.

$$\text{Availability Percentage} = \frac{(\#\text{ Sites that Reported Being Able to Make Their Site Available by the Target Time})}{(\#\text{ Sites on the Call-Down List})}$$

DATA COLLECTION SPREADSHEET

To facilitate data collection and calculations, a Microsoft Excel-format file is included which contains spreadsheets for recording call data and computing performance metrics.

The set of data collection spreadsheets is includes:

- Instructions Sheet
- Drill Information Sheet
- Call Information Sheet
- Metrics Computation Sheet
- Filled-in examples of the all sheets (except instructions)

Agencies can print out hard copies of the data collection spreadsheet. Participants can use this hard copy to record data during the drill.

DATA COLLECTION SPREADSHEET
for
Assessing Site Call-Down Capability

Instructions

Purpose: To collect data and calculate performance results from the site activation call down drill.

User Guide: Cells for the user to complete are highlighted in **yellow**. Cells that are highlighted in **blue** are the cells that contain formulas to calculate the performance results.

The second sheet below ("Drill Information") provides information about the drill such as the date, location, duration of the drill, and the parameters under which the drill was conducted. For example, the type of calling system used, the message delivered during the drill, etc.

The third sheet ("Call Information") collects data on each call made such as how many sites received the call down message as well as how many sites can be ready to be used within the specified time period. Jurisdictions using automated calling sytems may not require this sheet.

Once the data have been entered into the "Drill Information" and "Call Information" sheets, the performance results are calculated and displayed on the "Metrics Computation" sheet.

The final three sheets have been included as examples of how the sheets will look after the data have been entered and the performance results calculated.

Submission: After completion of the drill, the worksheets should be sent to the DSNS PPB email address: sns_ppb@cdc.gov.

Name of Jurisdiction Completing this Drill:

Drill Information

Date of drill (mm/dd/yyyy)	
Day of the week of drill (note if this is a holiday)	
Drill start time (24 hour clock time HH:MM, e.g., 13:00)	
Drill end date (date the drill will be declared done, mm/dd/yyyy)	
Drill end time (time the drill will be declared done 24 hour clock time HH:MM)	
Location of drill	
Number of players	
Number of evaluators	

Calling Method Information

Site call-down list used	☐ POD ☐ Warehouse ☐ Other (please specify)
Number of sites on the site call-down list	= N1 on the "Metrics Computation" sheet
Extent of notice of drill	☐ No-notice ☐ Partial-notice (please specify) ☐ Full-notice
If partial- or full-notice, please describe how sites were notified of the drill	
Calling equipment used	☐ Automated ☐ Manual ☐ Other (please specify)
Protocol for non-respondent follow-up Number of different contact modes that will be attempted, e.g., 2 phone numbers and 1 e-mail	
If the site is not reached, will the system leave a message? For each contact mode?	
How many times will each contact mode be attempted if the site is not reached, e.g., once for each contact mode?	
For automated calling systems: Is there a way to verify the identify of the site answering the call, e.g., is a PIN # required?	

What different methods can sites use to acknowledge the call-down message?

Please check all that apply.

Automated Calling System	Manual Calling System
☐ Press button during call	☐ Respond during call
☐ E-mail	☐ E-mail
☐ Return phone call	☐ Return phone call
☐ Text message	☐ Text message
☐ Log into website	☐ Log into website
☐ Other (please specify)	☐ Other (please specify)

What different methods can sites use to indicate their ability to make their site available?

Please check all that apply.

Automated Calling System	Manual Calling System
☐ Press button during call	☐ Respond during call
☐ E-mail	☐ E-mail
☐ Return phone call	☐ Return phone call
☐ Text message	☐ Text message
☐ Log into website	☐ Log into website
☐ Other (please specify)	☐ Other (please specify)

Describe any limitations of your calling system that preclude data from being collected as described in this manual	
Type of site availability (real, hypothetical, other)	☐ Real ☐ Hypothetical ☐ Other (please specify)
Time of site availability (24 hour clock time HH:MM)	

Please attach a copy of the site call-down script

Prior to the drill, add as many rows as needed to include all sites on the call-down list. Rows should be added prior to the "Last Site." One column has been left blank for record keeping. Users may keep track of phone numbers used or call outcomes in this column.

Call Information

List all times in 24 hour clock time (HH:MM)

Time of day calling started

Time of day calling ended

			Column A	Column B	Column C
Site on call-down list	Name of site	Column left blank for record keeping	Acknowledged receipt of call-down message (1=yes, 0=no)	Time acknowledged receipt (HH:MM)	Would be able to make site available by target time? (1=yes, 0=no)
Site 1					
Site 2					
Site 3					
Site 4					
Site 5					
Site 6					
Site 7					
Site 8					
Site 9					
Last Site					

Provides information on how many sites received the message.

Gives information on how long it took to receive information from the sites that the message was received.

Provides information on how many sites can be ready to be used within the time period given in the message.

List all times in 24 hour clock time (HH:MM)

Site Call-Down Completion Time

Time of day the site call-down process started	0:00
Time of day the site call-down process ended	0:00
Site Call-Down Completion Time	0:00

Acknowledgement Completion Time

Time of day the site call-down process started	0:00
Time of day acknowledgement process ended	0:00
Acknowledgment Completion Time	0:00
50% Acknowledgement Time	#NUM!
50% Acknowledgment Completion Time	#NUM!
75% Acknowledgement Time	#NUM!
75% Acknowledgment Completion Time	#NUM!

Acknowledgment Percentage

Number of sites on the call-down list	0
Number of site who acknowledged receipt of the call, regardless of ability to make their site available	0
Acknowledgment Percentage	#DIV/0!

Assembly Percentage

Number of sites who report being able to make their site available by a pre-determined target time	0
Assembly Percentage	#DIV/0!

Drill Information

Date of drill (mm/dd/yyyy)	23-Apr-08
Day of the week of drill (note if this is a holiday)	Wednesday
Drill start time (24 hour clock time HH:MM, e.g., 13:00)	13:50
Drill end date (date the drill will be declared done, mm/dd/yyyy)	23-Apr-08
Drill end time (time the drill will be declared done 24 hour clock time HH:MM)	15:00
Location of drill	Hometown, CA
Number of players	2
Number of evaluators	1

Calling Method Information

Site call-down list used	X POD	☐ Warehouse	☐ Other (please specify)
Number of sites on the site call-down list	10 = N1 on the "Metrics Computation" sheet		
Extent of notice of drill	☐ No-notice	X Partial-notice (please specify)	☐ Full-notice
If partial- or full-notice, please describe how sites were notified of the drill	Sites on the call-down list were told that a call-down drill would occur during a specific week but were not told the exact date or time frame.		
Calling equipment used	☐ Automated	X Manual	☐ Other (please specify)
Protocol for non-respondent follow-up Number of different contact modes that will be attempted, e.g., 2 phone numbers and 1 e-mail	One contact mode (cell phone) per person was used.		
If the site is not reached, will the system leave a message? For each contact mode?	Our protocol is to leave a message if no one answers and if voicemail is activated.		
How many times will each contact mode be attempted if the site is not reached, e.g., once for each contact mode?	Each contact mode will be attempted only once.		
For automated calling systems: Is there a way to verify the identify of the site answering the call, e.g., is a PIN # required?			

What different methods can sites use to acknowledge the call-down message?

Please check all that apply.

	Automated Calling System	**Manual Calling System**
	☐ Press button during call	☐ Respond during call
	☐ E-mail	X E-mail
	☐ Return phone call	X Return phone call
	☐ Text message	☐ Text message
	☐ Log into website	X Log into website
	☐ Other (please specify)	☐ Other (please specify)

What different methods can sites use to indicate their ability to make their site available?

Please check all that apply.

	Automated Calling System	**Manual Calling System**
	☐ Press button during call	☐ Respond during call
	☐ E-mail	X E-mail
	☐ Return phone call	X Return phone call
	☐ Text message	☐ Text message
	☐ Log into website	X Log into website
	☐ Other (please specify)	☐ Other (please specify)

Describe any limitations of your calling system that preclude data from being collected as described in this manual			
Type of site availability (real, hypothetical, other)	☐ Real	X Hypothetical	☐ Other (please specify)
Time of site availability (24 hour clock time HH:MM)	15:00		

Please attach a copy of the site call-down script

Prior to the drill, add as many rows as needed to include all sites on the call-down list. Rows should be added prior to the "Last Site." One column has been left blank for record keeping. Users may keep track of phone numbers used or call outcomes in this column.

Call Information

List all times in 24 hour clock time (HH:MM)

Time of day calling started: 14:05 = T1 on the "Metrics Computation" sheet

Time of day calling ended: 14:32 = T2 on the "Metrics Computation" sheet

			Column A	Column B	Column C
Site on call-down list	Name of site	Column left blank for record keeping	Acknowledged receipt of call-down message (1=yes, 0=no)	Time acknowledged receipt (HH:MM)	Would be able to make site available by target time? (1=yes, 0=no)
Site 1		answered	1	14:08	0
Site 2		voicemail	0		
Site 3		voicemail	0		
Site 4		answered	1	14:14	1
Site 5		answered	1	14:16	1
Site 6		voicemail	0		
Site 7		wrong number	0		
Site 8		answered	1	14:25	0
Site 9		answered	1	14:28	0
Last Site		answered	1	14:31	1
This column is not required for the "Metrics Computation" sheet.	This column is not required for the "Metrics Computation" sheet.	This column is not required for the "Metrics Computation" sheet.	The sum of values in Column A is equal to the number of sites who acknowledged receipt of the call-down message, regardless of ability to make their site available; it is N2 on the "Metrics Computation" sheet.	The latest time in Column B is the time that the acknowledgement process was completed; it is T3 on the "Metrics Computation" sheet.	The sum of values in Column C is equal to the number of sites who report that they are able to make their site available by the target time; it is N3 on the "Metrics Computation" sheet.

Metrics Computation

List all times in 24 hour clock time (HH:MM)

Site Call-Down Completion Time

Time of day the site call-down process started	14:05	= T1 from the "Call Information" sheet
Time of day the site call-down process ended	14:32	= T2 from the "Call Information" sheet
Site Call-Down Completion Time	0:27	= T2 - T1

Acknowledgement Completion Time

Time of day the site call-down process started	14:05	= T1 from the "Call Information" sheet
Time of day acknowledgement process ended	14:31	= T3 = Maximum of all times in Column B from the "Call Information" sheet
Acknowledgment Completion Time	0:26	= T3 - T1
50% Acknowledgement Time	14:20	= T4 = the time that corresponds to when 50% of acknowledgments are received, from Column B on the "Call Information" sheet
50% Acknowledgment Completion Time	0:15	= T4 - T1
75% Acknowledgement Time	14:27	= T5 = the time that corresponds to when 75% of acknowledgments are received, from Column B on the "Call Information" sheet
75% Acknowledgment Completion Time	0:22	= T5 - T1

Acknowledgment Percentage

Number of sites on the call-down list	10	= N1 from the "Drill Information" sheet
Number of site who acknowledged receipt of the call, regardless of ability to make their site available	6	= N2 = sum of values in Column A from the "Call Information" sheet
Acknowledgment Percentage	60%	= N2/N1

Assembly Percentage

Number of sites who report being able to make their site available by a pre-determined target time	3	= N3 = sum of values in Column C from the "Call Information" sheet
Assembly Percentage	30%	= N3/N1

Appendix

C. ASSESSING WAREHOUSE PICK LIST GENERATION

Instruction Manual
Revised 5/9/08

TABLE OF CONTENTS

INTRODUCTION

This manual provides guidance on collecting data and computing metrics to assess the ability of jurisdictions to use their warehouse inventory system. Since measuring all components of the inventory system would be time consuming and difficult, this assessment focuses on one critical component: the time required to generate a set of warehouse pick lists. Pick lists are the instructions that tell workers at the Receiving, Staging, and Storing (RSS) warehouse which items should be retrieved and packaged for shipment to a location, such as a Point of Dispensing (POD) or a treatment center. The assessment may be conducted as a stand-alone drill, or may be done as part of a larger RSS exercise without otherwise interfering with the RSS exercise.

This manual describes how to collect data to compute performance metrics during a pick list generation drill, but is not intended to be a complete drill guide. Also included is an Excel-based data collection spreadsheet (described later) used to record all drill information and to compute the following performance metric:

- *Pick list generation time*. Average time required for jurisdictions to generate a pick list for warehouse personnel.

Depending on whether data for the metrics are collected as part of a larger RSS exercise and what type of warehouse inventory system is used by your jurisdiction, the following optional performance metrics may also be computed:

- *Inventory data input time.* Time required for jurisdictions to input inventory data into their warehouse inventory system.
- *Add new item time.* Time required for jurisdictions to add a new item to their warehouse inventory system.
- *Add new delivery destination time.* Time required for jurisdictions to add a new delivery destination to their warehouse inventory system.

PREPARING FOR THE DRILL

Users must ensure (a) the availability of key participants and (b) that the drill format meets certain key assumptions.

Participants

For purposes of this pick list drill, participants include the following:

- *Players.* Players are the people who operate the warehouse inventory system at the RSS warehouse during the exercise. The players in the exercise should be the people who perform this role during a real emergency.
- *Controller (optional).* The controller manages the flow of the exercise. He/she declares when the drill starts and ends. Controllers are the only participants who will provide information or direction to the players. However, because the drill focuses on the collection of time-based metrics, the controller should *not* intervene in timed activities while the drill is in progress. In this drill, the role of controller may be combined with that of evaluator, below.
- *Evaluator.* The evaluator is responsible for timing the overall drill, completing the data collection sheets, and taking notes to identify areas for improvement. Evaluators should remain unobtrusive and not intervene with player action.

Drill Assumptions

Scenario Assumptions

For stand-alone pick list assessments (i.e., drills performed outside of a larger RSS exercise).

For pick list drills performed outside of a larger RSS exercise, the drill will consist of the following steps:

- Assume that the initial shipment of a 12-hour push package arrived at the RSS site and was put away and reconciled.

- The electronic inventory data file for this 12-hour push package must be input into the warehouse inventory system. Jurisdictions may obtain a sample file directly from the CDC or use the "pipe-delimited" computer file included as part of this assessment tool. This input process is timed as part of the assessment. (For jurisdictions using the web-based CDC RITS system, the system may have been pre-loaded with this information.)
- A set of pick lists must be generated in response to approved orders from PODs, or in response to your approved Department Operations Center (DOC) inventory apportionment strategy. The pick list generation process is timed as part of the assessment.
- After the pick lists have been generated, a second shipment of inventory, from a source other than the SNS push package (e.g., managed inventory, inventory shipped directly from a supplier) is assumed to arrive at the RSS site.
- The inventory data for this second shipment needs to be input into the warehouse inventory system. The inventory data may be in electronic or paper form. Jurisdictions may use the inventory file included as part of this assessment tool or previously used managed inventory data. This input process is timed as part of the assessment.
- Physical warehouse activities—e.g., put away, inventory reconciliation, picking, palletizing—need not be included in the assessment.

Optional Steps

- During a real emergency, it is possible that warehouses may receive a new category of inventory that is not already listed in the warehouse inventory system. Thus, we encourage jurisdictions to input a new item into their system. For jurisdictions using paper warehouse inventory systems, this step will be quick. This addition of a new item may be timed as part of the assessment.
- During a real emergency, it is possible that warehouses may be required to deliver materiel to a destination not previously accounted for in the warehouse inventory system. Thus, we encourage jurisdictions to input a new delivery destination into their system. For jurisdictions using paper warehouse inventory systems, this step will be quick. This addition of a new delivery destination may be timed as part of the assessment.

For pick list assessments performed as part of a larger RSS exercise.

Pick list drills performed as part of a larger RSS exercise should follow along with the events of the RSS exercise scenario. The drill will consist of the following steps:

- Assume that the initial inventory shipment arrived at the RSS site and was put away and reconciled.
- The inventory information must be input into the warehouse inventory system. This input process is timed as part of the assessment.
    - *If the RSS exercise assumes a 12-Hour Push Package*. The electronic inventory data file for this 12-hour push package must be input into the warehouse inventory system. Jurisdictions may obtain a sample file directly from the CDC or use the "pipe-delimited" computer file included as part of this assessment tool. This input process is timed as part of the assessment. (For jurisdictions using the web-based CDC RITS system, the system may have been pre-loaded with this information.)
    - *If the RSS exercise assumes Managed Inventory*. For Managed Inventory, the inventory data may or may not be in electronic form. During the drill itself, players may input these data into their warehouse inventory system, either manually or electronically.
- A set of pick lists must be generated in response to approved orders from PODs or in response to your approved DOC inventory apportionment strategy. The pick list generation process is timed as part of the assessment.
- The process repeats with subsequent incoming shipments and subsequent pick lists for outgoing shipments, according to the RSS exercise scenario.

Facility and Equipment

- *Facility*. Ideally, the drill should be run in the same room that would be used during a real emergency. In most instances, this is a room at the RSS facility. If this is not practical, the drill can also be run in a room that resembles one at the RSS. Special attention should be paid to the location of office furniture, electrical outlets, and telecommunications support (e.g., phone jacks, computer connections).
- *Computer equipment and software*. Players should use whatever computer equipment and peripherals that would be used during a real emergency, assuming that electricity and internet capabilities are available. The warehouse inventory system used in the drill should be whatever system – automated or manual – that would be used according to the jurisdiction's plans.

DATA COLLECTION DURING THE DRILL

Evaluators are responsible for collecting data during the pick list drill and computing performance metrics. The data that evaluators collect are *time stamps*—the time, to the minute, at which some activity occurs. The data collection spreadsheet developed for this drill, as well as instructions for computing performance metrics by hand, are described in the next sections.

For this drill, the evaluator is responsible for:

1. *Recording drill information,* including date and location of drill, number of players, and description of warehouse inventory system used. Scenario parameters should be noted, e.g., whether the pick list drill occurred as part of a larger RSS exercise, number of pick lists generated, whether the pick lists were generated in response to orders from PODs or as part of the DOC inventory apportionment strategy, etc. In addition, target and predicted performance levels should be noted.
2. *Recording the following process time stamps, as applicable to the assumed or planned scenario*:
    a. When the player begins uploading inventory data into the warehouse inventory system
    b. When the player completes uploading inventory data into the warehouse inventory system
    c. When the player begins generating a pick list.
    d. When the player completes generating a pick list.
    e. (Optional) When the player begins adding a new item to the warehouse inventory system
    f. (Optional) When the player completes adding a new item to the warehouse inventory system
    g. (Optional) When the player begins adding a new delivery destination to the warehouse inventory system
    h. (Optional) When the player completes adding a new delivery destination to the warehouse inventory system
3. *Computing the performance metrics.*

COMPUTING METRICS AFTER THE DRILL

After the drill, evaluators should compute the following performance metrics, either by hand or using the Excel-based data collection spreadsheet that computes the metrics automatically.

Inventory data input time. Jurisdictions not using the RITS program (into which the 12-Hour Push Pack inventory data are pre-loaded) may record the amount of time required to input the inventory data into their warehouse inventory system.

Pick list generation time. Time required to generate a pick list. If more than one pick list is generated, compute the average pick list generation time.

(Optional) Add new item time. Time required to add a new item to the warehouse inventory system.

(Optional) Add new destination time. Time required to add a new destination to the warehouse inventory system.

DATA COLLECTION SPREADSHEET

An Excel spreadsheet is available to use to record information about the drill, record pick list generation data, and compute performance metrics for this drill. The data collection spreadsheet file includes:

- Instructions Sheet
- Drill Information Sheet
- Process Time Stamps Sheet
- Metrics Computation Sheet
- Filled-in examples of all sheets

Agencies can print out hard copies of the data collection spreadsheet. Participants can use this hard copy to record data during the drill.

DATA COLLECTION SPREADSHEET
for
Assessing Warehouse Pick List Generation

Instructions

PURPOSE: To collect data and calculate performance results from the pick-list generation drill.

User Guide: Cells for the user to complete are highlighted in **yellow**. Cells that are highlighted in **blue** are the cells that contain formulas to calculate the performance results.

The second sheet below ("Drill Information") provides the information about the scope of the drill, information about the types of systems used in the drill, and basic information such as the time, date, and length of the drill.

The third sheet ("Process Time Stamps") is filled out by the evaluator as tasks are completed. If more than 3 pick lists are generated, additional rows should be added.

Once the data is entered into the "Process Time Stamps" sheet, the performance results will be calculated and shown on the fourth sheet ("Metrics Computation").

The final three sheets have been included as examples of how the sheets will look after the data have been entered and the performance results calculated.

Submission: After completion of the drill, the worksheets should be sent to the DSNS PPB email address: sns_ppb@cdc.gov.

Name of Jurisdiction Completing this Drill:

Drill Information

Date of drill (mm/dd/yyyy)	
Day of the week of drill (note if this is a holiday)	
Drill start time (24 hour clock time HH:MM, e.g., 13:00)	
Drill end time (24 hour clock time HH:MM)	
Location of drill	
Number of players	
Number of evaluators	

Warehouse Inventory System Information

Warehouse inventory system used during the drill:	☐ RITS		☐ Other (please describe)		
Is your warehouse inventory system manual or electronic?	☐ Manual		☐ Electronic		☐ Other (please describe)
Does your warehouse inventory system create documents other than pick lists?	☐ Yes		☐ No		☐ Other (please describe)
If so, what other types of documents does it create?	☐ Packing List		☐ Pallet Label		☐ Bill of Lading
	☐ Route Ticket/Plan		☐ Order Receipt		☐ Transfer Form
	☐ Other (please describe)				
What are these documents used for?					

Drill Assumptions

Are the pick lists being generated as part of larger RSS exercise?	☐ Yes		☐ No	☐ Other (please describe)
Pick lists are being generated in response to:	☐ approved POD or other customer orders		☐ approved DOC inventory apportionment strategy	☐ Other (please describe)
Is access to the internet and electricity part of the drill scenario?	☐ Yes		☐ No	☐ Other (please describe)
Type of inventory received (check all that apply):	☐ 12-hour Push Package		☐ Managed Inventory	☐ Other (please describe)
Is physical management of inventory included in the exercise?	☐ Yes		☐ No	☐ Other (please describe)
# of delivery destinations supported				
# of pick lists generated				

Attach a copy of a pick list.

Prior to the drill, add as many rows as needed for the number of pick lists generated. Rows should be inserted prior to the "Final Pick List Generation" row.

Drill Information

Task	Time Task Began (HH:MM)	Time Task Finished (HH:MM)	Task Completion Time (HH:MM)	Task Completion Time (minutes)	Average Task Completion Time (minutes)
First Pick List Generation			0:00	0.00	
Second Pick List Generation			0:00	0.00	
Final Pick List Generation			0:00	0.00	0.00
(Optional) Inventory Data Upload			0:00	0.00	
12-Hour Push Package					
(Optional) Inventory Data Upload			0:00	0.00	
Managed Inventory or similar					
(Optional) Add New Item			0:00	0.00	
(Optional) Add New Destination			0:00	0.00	

Metrics Computation

Pick List Generation Time

Pick List Generation Time (minutes)	0.00	average of all pick list generation times

(Optional) Inventory Data Upload Time (12-Hour Push Package)

Inventory Data Upload Time (minutes)	0.00	average time it takes to upload data

(Optional) Inventory Data Upload Time (Managed Inventory or similar)

Inventory Data Upload Time (minutes)	0.00	average time it takes to upload data

(Optional) Add New Item Time

Add New Item Time (minutes)	0.00	average time it takes to add new items

(Optional) Add New Destination Time

Add New Destination Time (minutes)	0.00	average time it takes to add a new destinati

Drill Information

Date of drill (mm/dd/yyyy)	10/11/2008
Day of the week of drill (note if this is a holiday)	Monday
Drill start time (24 hour clock time HH:MM, e.g., 13:00)	12:03
Drill end time (24 hour clock time HH:MM)	12:39
Location of drill	Hometown, CA
Number of players	1
Number of evaluators	1

Warehouse Inventory System Information

Warehouse inventory system used during the drill:	☐ RITS	X Other (please describe)--inventory system written by members of our health department	
Is your warehouse inventory system manual or electronic?	☐ Manual	X Electronic	☐ Other (please describe)
Does your warehouse inventory system create documents other than pick lists?	X Yes	☐ No	☐ Other (please describe)
If so, what other types of documents does it create?	X Packing List	☐ Pallet Label	☐ Bill of Lading
	☐ Route Ticket/Plan	☐ Order Receipt	☐ Transfer Form
	☐ Other (please describe)		
What are these documents used for?	A packing list is a list used by the delivery destination to ensure that all pallets have been received.		

Drill Assumptions

Are the pick lists being generated as part of larger RSS exercise?	☐ Yes	X No	☐ Other (please describe)
Pick lists are being generated in response to:	X POD or other approved customer orders	☐ approved DOC inventory apportionment strategy	☐ Other (please describe)
Is access to the internet and electricity part of the drill scenario?	X Yes	☐ No	☐ Other (please describe)
Type of inventory received (check all that apply):	☐ 12-hour Push Package	X Managed Inventory	☐ Other (please describe)
Is physical management of inventory included in the exercise?	☐ Yes	X No	☐ Other (please describe)
# of delivery destinations supported	3		
# of pick lists generated	3		

Attach a copy of a pick list.

Prior to the drill, add as many rows as needed for the number of pick lists generated. Rows should be inserted prior to the "Final Pick List Generation" row.

Drill Information

Task	Time Task Began (HH:MM)	Time Task Finished (HH:MM)	Task Completion Time (HH:MM)	Task Completion Time (minutes)	Average Task Completion Time (minutes)
First Pick List Generation	12:21	12:24	0:03	3	
Second Pick List Generation	12:24	12:30	0:06	6	
Final Pick List Generation	12:31	12:35	0:04	4	4.33
(Optional) Inventory Data Upload			0:00	0	
12-Hour Push Package					
(Optional) Inventory Data Upload	12:03	12:20	0:17	17	
Managed Inventory or similar					
(Optional) Add New Item	12:36	12:39	0:03	3	
(Optional) Add New Destination	12:40	12:45	0:05	5	

Metrics Computation

Pick List Generation Time

Pick List Generation Time (minutes)	4.33	='Process Time Stamps Example'!G12 = average of all pick list generation times

(Optional) Inventory Data Upload Time (12-Hour Push Package)

Inventory Data Upload Time (minutes)	0.00	='Process Time Stamps Example'!F14

(Optional) Inventory Data Upload Time (Managed Inventory or similar)

Inventory Data Upload Time (minutes)	17.00	='Process Time Stamps Example'!F17

(Optional) Add New Item Time

Add New Item Time (minutes)	3.00	='Process Time Stamps Example'!F20

(Optional) Add New Destination Time

Add New Destination Time (minutes)	5.00	='Process Time Stamps Example'!F22

Appendix

D. ASSESSING POD SET-UP CAPABILITY

Instruction Manual
Revised 5/9/08

TABLE OF CONTENTS

INTRODUCTION

This manual provides guidance on collecting data and computing metrics to assess the ability to quickly set up a facility for use as a Point of Dispensing (POD). Data for the metrics should come from:

1. *Timed set-up drill*: The agency starts with the facility in the condition they would expect to receive it from the owner, and proceed to set it up as a POD. This process is timed.
2. *Walk-through*: After the facility has been set up, an untimed walk-through is conducted to assess the quality of the set-up and identify areas of potential improvement.

Assessment of the POD set-up may be conducted as a small, stand-alone drill without the need for a full POD exercise. Alternatively, the assessment can be conducted by timing the set up process prior to using the POD as part of a larger dispensing exercise.

PREPARING FOR THE DRILL

Users must ensure (a) the availability of key participants and (b) that the drill format meets certain key assumptions.

Participants

For purposes of this POD set-up drill, participants include the following:

- *Players*. Players are the people who set up the POD during the exercise, and should be the people who perform this role during a real emergency. (Jurisdictions should

also be careful not to use persons who would have other responsibilities in an actual emergency that would prevent them from helping with set-up.)

- *Controller (optional).* The controller declares when the drill starts and stops, and manages the flow of the exercise. Controllers are the only participants who will provide information or direction to the players. However, because the drill focuses on the collection of time-based metrics, the controller should *not* intervene in timed activities while the drill is in progress. In this drill, the role of controller may be combined with that of Evaluator, below.
- *Evaluator.* The evaluator is responsible for timing the overall drill, completing the data collection sheets, and taking notes to identify areas for improvement. Evaluators should not intervene with player action.

Drill Assumptions

Prior to the drill, the agency is assumed to have done the following:

Ensure access to the facility. The drill is most useful when the participants and facilities utilized during the drill are the same as would be activated in a real emergency. Agencies are encouraged to include in their memoranda of understanding (MOU) with facility owners provisions for periodic access to the facility for drill purposes. (If this is not possible, performing the drill in a substitute location is a second-best option). For the drill, the facility is assumed to be in the condition it would be upon the decision to activate a POD during an emergency.

Develop a set-up plan. The agency should have developed a plan and checklist for the facility to be used as the POD. The plan should describe layout, space requirements, patient flow, traffic flow and control, barriers, signage, office equipment, furniture, computers and communications, utilities and environmental controls, supplies, and security. This plan will be used by the players as they set up the facility as a POD.

Ensure availability of necessary supplies and equipment. Drill players should have access to whatever equipment, materials, and supplies that would be used during a real emergency. This would include computers and communications equipment, etc.

DATA COLLECTION DURING THE DRILL

The timed portion of the drill consists of the following sequence of events:

1. TIMING BEGINS when the controller, evaluators, and players are in place, the controller declares the start of the drill. Assume that handoff from facility owner to the agency has occurred. Work should begin after the POD manager so orders. Players should be

instructed to work at the pace that they would during a real emergency, but should be cautioned not to sacrifice safety.

2. TIMING ENDS when the POD manager declares to the controller that the set up of the POD is complete.

Evaluators are responsible for recording the Start time and End time of the POD set-up and taking notes on observations and possible improvements during the set up.

CONDUCTING A WALK-THROUGH AFTER THE DRILL

After the timed portion of the drill, the controller, evaluators and key players should walk through the POD to assess, step by step, whether all needed components are in place. To assist participants, we have developed a checklist which essentially follows the path of materiel arriving at the POD, and the path of patients who would go through the POD. The checklist should be completed from the perspective of both ambulatory adults and persons with special needs (e.g., those with disabilities, pediatric patients, or persons for whom English is not a primary language).[1] The checklist can be found in the accompanying data collection spreadsheet (see below).

DATA COLLECTION SPREADSHEET

To facilitate data collection and calculations, a Microsoft Excel format file is included which contains spreadsheets for recording the timing of the facility set-up drill, as well as a checklist for the walk-through after the drill.

The data collection spreadsheet is comprised of:

- Instructions Sheet
- Drill Information Sheet
- Timing and Checklist Sheet
- Metrics Computation Sheet

Agencies can print out hard copies of the spreadsheet and use them to record data during the drill and conduct the walk-through.

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[1] The names of the steps listed in the checklist correspond to those identified in the SNS Guidance, v.10.02. Not all jurisdictions include all steps in their PODs. Jurisdictions should adapt the checklist to correspond to their POD designs.

DATA COLLECTION SPREADSHEET
for
Drill-Based Tool to Assess Facility Set-up

Instructions

Purpose: To collect data and calculate performance results from the facility set up drill.

User Guide: Cells for the user to complete are highlighted in **yellow**. Cells that are highlighted in **blue** are the cells that contain formulas to calculate the performance results.

The second sheet below ("Drill Information") is a record of the drill information, including drill assumptions and performance targets.

The third sheet ("Timing and Checklist") captures the drill time and provides items to be included in facility set-up. The checklist provided on this sheet is strictly an example. Jurisdictions should utilize their own checklists, protocols, procedures, or other guidance developed for facility set-up.

The fourth sheet ("Metrics Computation") uses the data collected in the "Tracking Information" sheet to calulate performance results relevant to the facility set-up process.

The final three sheets have been included as examples of how the sheets will look after the data have been entered and the performance results calculated.

Submission: After completion of the drill, the worksheets should be sent to the DSNS PPB email address: sns_ppb@cdc.gov.

Name of Jurisdiction Completing this Drill:

Drill Information

Date of Drill (mm/dd/yyyy)	
Location of Drill	
Number of Players	
Number of Evaluators	

Drill Assumptions

Extent of Notice of Drill: none, partial (please specify), full	
Predetermined Amount of Time From Start of Drill Within Which a Facility Set Up Must be Complete (HH:MM)	
Time of Operational Facility (HH:MM, real or hypothetical)	
Service Area (real or hypothetical)	

Timing

Drill Start Time (HH:MM)		Time when drill controller declares the start of the drill and POD workers proceed to being setting up the facility.
Drill Completion Time (HH:MM)		Time when the POD manager declares to the controller that the setup is complete.

Walk-Through Checklist

Material flow

Step	*Checklist item*	✓
Arrival of medication	Signage to direct trucks to unloading site	
	Barriers/cones present to ensure path for truck	
	Locations where security will be posted have been identified	
Material handling	Material handling equipment (pallet jack, dock, etc.) is present and operational	
	Workers have tested material handling equipment to ensure items can be moved from truck to POD	
Inventory storage	Ample storage space	
	Area is secured	
	Proper temperature can be maintained. Refrigerator present and operational (if needed)	
	Necessary equipment for managing inventory (paper, computer, communication equipment, software, etc.) has been set up.	
	Necessary equipment for managing inventory is operational: Turn on computer and start inventory management software. (if applicable)	

Patient flow

Step	*Checklist item*	✓
Parking	Signage to direct people to entrance of POD parking	
	Ample parking for staff and patients	
	Barriers/cones have been set up	
	Locations where security will be posted have been identified	
	Signage to direct patients to entrance of POD	
Greeting/entry	PA System present and operational	
Forms distribution	Forms, clipboards, supplies, etc.	
	Space provided for patients to sit or stand while filling out forms	
	Signage to direct patients to the next step	
Briefing (if used)	Appropriate equipment (PA system, VCR, audio player, etc.) is present and operational	
	Signage to direct patients to the next step	
Registration or entry of form information	Furniture set up for staff and patients	
	Computer equipment (if used) has been set up	
	Computer equipment (if used) has been tested: turn on computer, start up software, print sample form	
	Signage to next step	
Interview of patients to determine proper drug	Furniture set up for staff and patients	
	Computer equipment (if used) has been set up	
	Computer equipment (if used) has been tested: turn on computer, start up software, print sample form	
	Signage to next step	
Dispensing	Furniture set up for staff and patients	
	Sufficient space for supply of medication	
	Computer equipment (if used) has been set up	
	Computer equipment (if used) has been tested: turn on computer, start up software, print sample form	
	Signage to next step (or exit)	
Exit	Exit clearly marked	
	Additional instructions for patients posted	

Patient care (if applicable)

Step	*Checklist item*	✓
Mental health/counseling (if applicable)	Necessary furniture	
	Able to offer patients privacy	
	Communication equipment present and operational	
Medical evaluation for symptomatic patients (if applicable)	Necessary furniture	
	Able to offer patients privacy	
	Communication equipment present and operational	
Healthcare-center transport	Patient transport equipment present (wheelchair, gurney, etc.)	
	EMS has a clear, unobstructed path to evacuate patients	

Command and Support Staff

Step	*Is equipment present?*	✓
Command Post	Communication equipment present and operational	
Office	Ability to make copies, print, fax, call, communications	
Security	Locations where security will be posted have been identified	
	POD access list (sign-in area for staff intake?)	
	Badge-making supplies	
	Necessary signage	

Metrics Computation

Facility Set-Up Completion Time

Time the set-up process began (HH:MM)	0:00
Time the set-up process (all items on checklist) was completed (HH:MM)	0:00
Set-up Completion Time	0:00

Checklist Completion Rate

Number of items on the set-up list	
Number of items fully completed	
Completion Rate	#DIV/0!

Appendix

E. ASSESSING MASS DISPENSING CAPABILITY IN A POD DRILL USING TIME STUDIES

Instruction Manual
Revised 5/9/08

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INTRODUCTION

This manual provides guidance on assessing the capability to quickly dispense countermeasures to large numbers of people at a Point of Dispensing (POD). The assessment is designed to be used during a POD drill and focuses on measuring maximum possible *throughput* (i.e., the number of patients processed per hour).

POD Drills often lack enough volunteer patients to stress the system, thus reducing the reliability of drill-based throughput estimates. To compensate for this problem, this manual offers a two-step approach:

1. During the POD drill, conduct a time study to measure the ***processing time*** (i.e., how long each step takes) for each step. Evaluators posted at each station of the POD record the start time and end time for each patient observed. This time study can be performed without interfering in the operations of the POD.
2. After the POD drill, input the processing time information from the time study into a computer model to estimate the maximum possible ***throughput*** of the POD.

This manual provides instructions for gathering data and computing performance metrics but is not intended to be a complete guide to planning and conducting a dispensing drill. The instructions in this manual should be adaptable enough to work with most POD designs, including streamlined or rapid-dispensing PODs, "closed" PODs which serve limited populations (e.g., first responders, staff), and drive-through PODs. A glossary of terms is provided at the end of the manual.

PREPARING FOR A POD DRILL

This assessment is intended to work with a wide variety of POD drills. However, users must ensure (a) the availability of key participants and (b) that the drill format meets certain key assumptions.

Participants

The POD drill requires the following participants:

- *Players*. Players are the personnel who work as POD staff in the exercise. The players in the exercise should be people who would work in a POD in a real emergency.
- *Actors*. Actors are people who play the role of patients going through the POD. The simulated patient population should be representative of the different types of patients to be served by the POD (e.g., pediatric and elderly patients, and patients with contraindications to the primary drug being dispensed). If the POD design routes patients toward different sets of stations based on their patient-type, we recommend that at least 65 patient actors of each patient-type pass through each route in the POD in order to collect enough data to compute accurate statistics.[1]
- *Controller*. The controller declares when the drill starts and stops and manages the flow of the drill. Controllers are the only participants who provide information or direction to the players. However, because the drill focuses on the collection of time-based metrics, the controller should *not* intervene while the drill is in progress.

[1] For example, some PODs have one route for "express" patients without contraindications who will receive the primary drug being dispensed; another route for pediatric patients or families with children; and a third route for patients with contraindications to the primary drug and therefore need more assistance. In this example, 65 patient actors would be needed to go through each of the three lines. (Some exercises "recycle" their actors, sending them through the POD more than once to play different patients. While this is not ideal, since actors go more quickly through the POD upon repeated trips, it is sometimes necessary.)

- *Evaluators.* Evaluators are responsible for timing the overall drill, gathering dispensing data and computing the metrics, as well as taking notes to identify areas for improvement. Evaluators should not intervene with player action. The number of evaluators needed depends on the number of steps that patients pass through in the POD. The approach described in this manual requires at least one evaluator per step.

Placement of Evaluators Inside the POD

During the drill, at least one evaluator must be positioned at each step in the POD. If the POD contains multiple routes, then evaluators must be positioned at each step for every possible route. During the course of the drill, the evaluators should observe and time different stations within that step. Figure 1 shows an example of a patient flow plan, and where evaluators would be positioned within the POD.

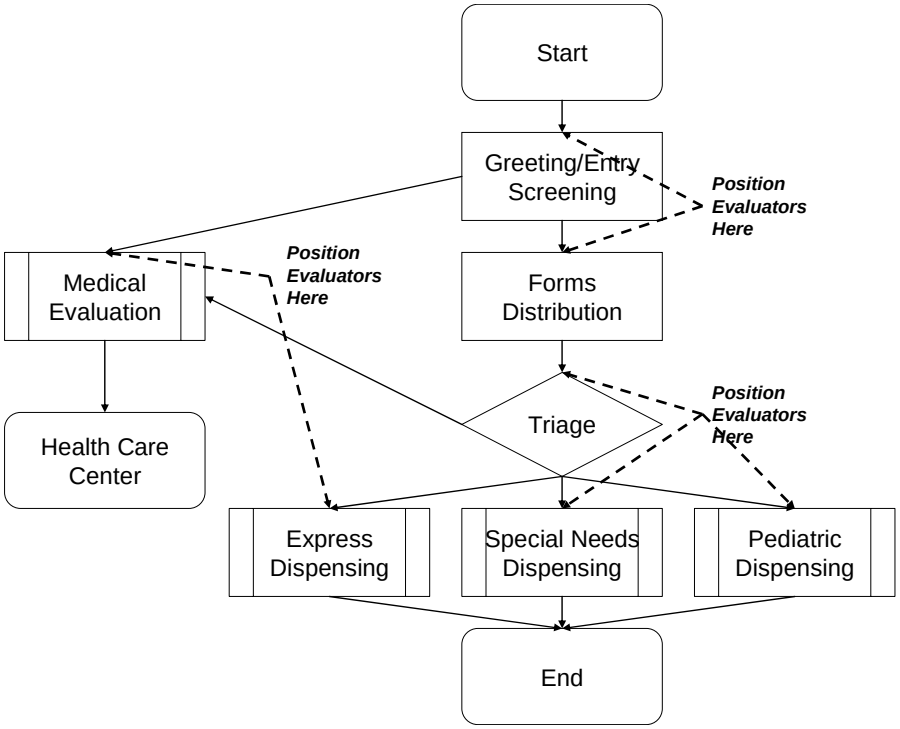

Figure 1. Sample POD Flow Plan with Evaluator Positions

Drill Assumptions

The drill planning team should take the following into consideration:

Facility. The drill should be conducted in the same facility that would be used during a real emergency. Special attention should be paid to the configuration of equipment that controls the flow of patients through the POD (e.g., barriers, rope lines, etc.). The number, type, and location of steps in the POD should be the same as that planned for an actual emergency response.

Medical Countermeasures. Players should dispense mock countermeasures and instructions to the patient actors. Ideally, the mock countermeasures (e.g., empty pill bottles, bags of candy, etc.) should be approximately the same size as actual countermeasures to more accurately simulate the physical workload and the need for resupply of material. Medication instructions provided to patients should take into account patient mix and language difficulties.

Patient Mix. Drill planners should seek to ensure that actors playing the roles of patients are assigned characteristics of the community. While doing this may reduce the throughput generated in the exercise, it will provide a more realistic measure of what the POD will be able to do in an actual emergency.

DATA COLLECTION DURING THE DRILL

Record drill information. Just prior to the start of the drill, one of the evaluators should record general information about the drill including:

- Date and location of drill
- Number of players
- Number of patient actors of each patient type
- Number and placement of evaluators

Record POD information. Evaluators at each step should describe the patient flow plan:

- What tasks are performed at each step in the POD?
- How many stations does the POD include for each step?
- Are there rules at that step that dictate the routing of patients through the POD? Examples include routing of symptomatic patients, or the routing of patients receiving the primary drug vs. pediatric patients or patients with contraindications.

Conduct time study. When the drill begins and patients start passing through the POD, the evaluator at each step will measure the processing time at one of the stations by recording, for <u>each</u> patient observed:

- The time, down to the second, the patient started at the station, i.e., began receiving services at the station. (Do <u>not</u> include time spent by the patient waiting in line before entering the station.)

- The time, down to the second, the patient finished at the station, i.e., finished receiving services at the station. (Do not include time spent by the patient waiting to exit the station, as might be the case if there is a long line to get to the next step.)

Timing the patients does not require any special equipment; it only requires a pen, paper, and a watch (preferably digital) that shows seconds. A data collection sheet is included in a Microsoft Excel file that accompanies this manual.

Record as many observations during the exercise as possible; the more observations recorded, the more accurate the statistics will be. Some studies have found that the processing time changes over the course of an exercise, e.g., POD workers speed up as they become more efficient at their tasks, or alternatively, slow as they get tired. Continuing the time study over the course of the exercise will help account for these effects.

Observing multiple stations. At most PODs, there will be multiple stations performing the same step. (For example, there may be 5 workers, each conducting an interview with a different patient; thus 5 stations for the interview step.) Evaluators should sample among the different stations within the step, in case there are variations across the POD workers being measured. Evaluators are encouraged to record the start and finish times for 10 to 20 patients at one station, do the same for another station in the same step, and so on.

Alternative methods of timing. Another possible method is time-stamping. In some exercises, as the patient goes through the POD, the patient's form is marked with the time at which the patient reaches a station in the POD, and the form is collected by POD staff at the end. By adding one additional time stamp–marking the times at which patients start *and* finish at each step–the processing time for each step can be computed.

COMPUTING STATISTICS AFTER THE DRILL

Computing Summary Statistics from the Time Study

After the drill, evaluators should use the start and finish time observations from the time study to compute the processing time for each patient at that step. The processing time is computed by subtracting the patient's start time from the corresponding finish time. These computations will result in a set of patient processing times for each step.

From this set of processing times, two summary statistics will be computed:

(For each step) Mean processing time. This is the average of the patient processing times observed for that step.

(For each step) Variance of the processing time. This is the variance of the patient processing times observed for that step.

The Microsoft Excel file accompanying this manual includes formulae for computing these summary statistics.

Using Computer Models to Estimate Throughput

Computer models of PODs can be used to estimate the maximum possible throughput of the POD, based on the design and staffing levels at the POD, and the processing time information collected in the time study. Several different computer models are available free of charge to help assess POD performance.[2] Detailed instructions on the use of these computer models are beyond the scope of this manual. However, to assist jurisdictions in understanding how such models work, we describe below the inputs and outputs of one freely available model, Clinic Generator, created by the University of Maryland.

Clinic Generator Computer Model

Inputs. Users input the following parameters:

- Scenario Parameters (upper left of "Main" tab within Clinic Generator)
  - Size of population to be treated
  - Total time allotted for treatment, and number of hours of operation each day
  - Number of POD/clinic sites[3]
- Patient arrival characteristics ("Model Parameters" tab within Clinic Generator)
  - *Batch arrival size*, i.e., number of patients in each batch that arrives at the POD[4]

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[2] Clinic Generator is produced by the Institute for Systems Research at the University of Maryland, College Park. It can be downloaded from http://www.isr.umd.edu/Labs/CIM/projects/clinic/.

Other available computer models include:

The Weill/Cornell Bioterrorism and Epidemic Outbreak Response Model (BERM) produced by the Weill Medical College of Cornell University. BERM can be downloaded from http://www.ahrq.gov/research/biomodel.htm#down. An on-line version is available at http://www.ahrq.gov/research/biomodel3/.

RealOpt produced by the Center for Operations Research in Medicine and HealthCare, School of Industrial and Systems Engineering at Georgia Institute of Technology. It can be requested via http://www2.isye.gatech.edu/~evakylee/medicalor/research.htm#realopt.

[3] The model assumes that the population is evenly divided among all PODs.

[4] If patients arrive individually, then the number of patients in a batch would be 1. If patients arrive on buses, then the number of patients in a batch would be the capacity of the bus.

- *Inter-arrival time variance*, i.e., variability in the time between patient arrivals[5]
- *Arrival size variance*, i.e., variability in the number of patients in each batch[6]

- POD configuration ("Routing Table" tab within Clinic Generator)
  - Types of stations in the patient flow plan[7]
  - Probability that a patient will pass from one type of station to another[8]

Outputs. Based on the inputs, Clinic Generator generates the following POD-level performance metrics:

- Staffing requirements (bottom left of "Main" tab within Clinic Generator)
  - Minimum number of staff required at each type of station per shift to treat the entire population under the scenario parameters[9]
- Overall POD performance (upper right of "Main" tab within Clinic Generator)
  - Mean flow time (in the model, this is called "time in clinic")
  - Average number of patients in clinic, i.e., average number of patients waiting in line or being serviced at any station at any given time[10]
  - Average patient batch inter-arrival time (in the model, this is called "batch interarrival mean"), i.e., how much time can occur between arrivals of batches of patients to support the required throughput[11]

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[5] Variance values of 1 or less mean that patients arrive in regularly spaced intervals. Variance values of greater than 1 mean that patients arrive erratically, some arriving close together, and some arriving after many minutes have passed.

[6] Lower variance values mean that the number of patients in each batch is relatively consistent. Higher variance values mean that the number of patients in each batch varies greatly across batches.

[7] Types of stations in the patient flow plan include reception, triage, and dispensing. Users can also define their own station types as well.

[8] If, for example, the triage station identifies 10% of patients as requiring hospitalization and 90% of patients being able to move directly to dispensing, then the user will need to input this information into the Routing Table.

[9] The computer model derives the minimum number of staff required at each station by making sure each station achieves the required throughput necessary to achieve the required POD throughput. Users are allowed to input their own number of staff in the green boxes.

[10] Large numbers of patients in the clinic can lead to space constraint issues if the POD is located in an enclosed space such as a gymnasium. Room capacities dictated by fire codes should be checked against this number to ensure that POD operations are in fire code compliance.

  - Throughput (in the model, this is called "clinic capacity")[12]
  - Total staff per shift across all PODs, not including incident command staff, e.g., site director or liaison officer
- Station-level results (lower right of "Main" tab within Clinic Generator)
  - Station time
  - Station queue length
  - Utilization rate at each station[13]

Modifying inputs to improve accuracy of POD-level performance metrics. After Clinic Generator has generated the minimum staffing requirements based on the jurisdiction's POD configuration, the user may modify some inputs to improve the accuracy of the POD-level outputs, including:

- *Mean station time* and *station time variance* ("Model Parameters" tab within Clinic Generator)

  These station-level metrics can be computed using the Excel-based data collection spreadsheet for this drill. The mean processing time for all patient types computed from the data collection spreadsheet "Step Summary Statistics" sheet should be input under "Processing Time." The variance of processing time for all patient types computed from the data collection spreadsheet "Step Summary Statistics" sheet should be input under "Variance." If patients arrive in groups of greater than one, this fact can be updated in "Batch Size" within the "Model Parameters" tab within Clinic Generator.

- *Number of staff at each station per shift* (lower left of "Main" tab within Clinic Generator)

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[11] If this number is less than 1 minute, meaning that batches of patients must arrive one right after the other, then there may be throughput issues. The POD will likely need to increase the capacity of the POD to meet the service requirements.

[12] Note that the description of "clinic capacity" is misleading in the May 22, 2007 User's Guide for Clinic Generator. It should describe "clinic capacity" as the number of patients the POD is capable of processing per hour.

[13] The *utilization rate* of a station is the percentage of servers at that station that are not idle. For example, if the utilization rate is 100%, then servers are never idle at that station. Utilization rates close to 100% may indicate a need for additional staff at the station to offset variability in patient arrival times, processing times, and staff fatigue.

Users may input their own numbers of staff at each station according to the jurisdiction's POD plan using the green boxes. The model immediately re-computes POD-level performance metrics based on the newly inputted staff numbers. Users should check whether the computer model estimates that the POD staffing plan will result in the desired throughput; whether the patient batch inter-arrival time is feasible; and whether there is sufficient space within the POD for each station queue. By increasing the number of staff at certain stations, users may pinpoint where additional staff are needed.

- Change of patient flow plan

  Note that any significant change to the patient flow plan, e.g., adding a reception station to the beginning of the POD, requires the user to input the new patient flow plan and create a new computer model. Increasing the number of staff at the same type of station does not constitute a change in the patient flow plan.

- *Distance between stations* ("Distance Table" on the "Routing Table" tab within Clinic Generator)

  Users may input the distance between stations to model the time it takes for patients to walk between stations. The model assumes that patients walk at 4.05 feet per second. This assumption can be altered on the "Model Parameters" tab. Entering the distance between stations affects two outputs on the "Main" tab within Clinic Generator: "time in clinic" (also known as mean flow time) and "average number of patients in clinic."

By modifying inputs to the computer model to reflect a jurisdiction's POD plan, users can evaluate whether a jurisdiction's POD plan may be expected to achieve the desired throughput, or whether it results in queue lengths that cannot be accommodated within the POD location. If POD-level performance is not as desired, then jurisdictions may consider ways to improve POD performance, including:

- Adding more staff (i.e., more stations) to certain steps
- Streamlining the process at the POD, by reducing the number of steps or consolidating services provided at multiple steps into a single step
- Shortening the processing time at each step by improving training of staff or by improving or simplifying the process at the step. (E.g., reducing the length of forms, simplifying the drug decision protocol, etc.)
- Reconfiguring the patient flow plan, e.g., moving patients that require additional time out of the main route and towards a separate set of steps.

GLOSSARY OF TERMS

Steps. We use the term *steps* to mean the different procedures or operations that patients pass through as they move through a POD. At each step, there is an interaction between the patient and a POD worker. Each step takes a certain amount of time. Patients proceed from step to step within the POD. Not all patients will go through every single step in the POD. Examples of steps include: registration, interview for medical history, and dispensing.

Stations. A *station* is the physical place where a step happens. It is where the POD worker is located; think of it as the table where the POD worker interacts with the patient. Each step may have multiple stations. For example, if there were 6 POD staff, each performing interviews with a patient, then we would say there were 6 *stations* at the interview *step*.

Routes. In some PODs, patients are directed toward a different series of steps, depending on the patient's condition or medical history. We will refer to these as *routes*. For example, a POD may have one route for patients without contraindications to the primary drug being dispensed, another route for patients with contraindications who will need a different drug, and possibly a third route for families with pediatric patients. Each route (e.g., express, assisted) consists of a series of steps (e.g., interview, dispensing), and each step within that route may have multiple stations (e.g., several dispensing stations).

DATA COLLECTION SPREADSHEET

To facilitate data collection and calculations, a Microsoft Excel format file is included, which contains spreadsheets for collecting dispensing data and computing station-level performance metrics that can be used with a computer model to improve the accuracy of the overall POD performance metrics.

The data collection spreadsheet is comprised of:

- Instructions Sheet
- Drill Information Sheet
- Patient Time Stamps Sheet
- Step Summary Statistics Sheet
- Filled-in examples of all sheets (except instructions)

Agencies can print out hard copies of the data collection spreadsheet. Exercise evaluators can then use the hard copies to record data during the drill.

DATA COLLECTION SPREADSHEET
for
Assessing Mass Dispensing Capability in a POD Drill Using Time Studies

Instructions

Purpose: To collect data and calculate performance results from the POD drill.

User Guide: Cells for the user to complete are highlighted in **yellow**. Cells that are highlighted in **blue** are the cells that contain formulas to calculate the performance results.

The second sheet below ("Drill Information") provides information on the date, location, and scope of the drill. It also provides parameters under which the drill will be conducted.

The third sheet ("Patient Time Stamps") should be copied for each evaluator. At least one evaluator should be positioned at each step and fill out the cells "Time Patient Began Receiving Services" and "Time Patient Finished Receieving Services" on this sheet. For alternative methods of timing, such as a time-stamping, this sheet may not be necessary.

The fourth sheet ("Summary Statistics") uses the data collected in the "Patient Time Stamps" sheet. A copy of this worksheet should be made for each step, because separate metrics computations must be made for each step. The results of the "Summary Statistics" sheet are input into the computer model Clinic Generator. Clinic Generator is used to estimate the maximum possible throughput of the POD.

The final three sheets have been included as examples of how the sheets will look after the data have been entered and the performance results calculated.

Submission: After completion of the drill, the worksheets should be sent to the DSNS PPB email address: sns_ppb@cdc.gov.

Name of Jurisdiction Completing this Drill:

Add additional rows if there are more than five patient actors types.

Drill Information

Date of drill (mm/dd/yyyy)			
Day of the week of drill (note if this is a holiday)			
Drill start time (24 hour clock time HH:MM, e.g., 13:00)			
Drill end time (time the drill will be declared done 24 hour clock time HH:MM)			
Location of drill			
Number of players			
Number of evaluators			
Number of patient actors			
Number of patient types			
Number of patients of type 1		Describe patient type 1	
Number of patients of type 2		Describe patient type 2	
Number of patients of type 3		Describe patient type 3	
Number of patients of type 4		Describe patient type 4	
Number of patients of type 5		Describe patient type 5	

Patient Flow Plan Information

Name of step and description of task(s) performed at the step	Number of stations at this step	Number of evaluators positioned at this step

Describe the rules that dictate the routing of patients through the POD.
(Ex: Symptomatic patients are directed from "Screening" to "Emergency Care.")

Attach a copy of the patient flow plan

A copy of this worksheet should be carried by each evaluator.
At least one evaluator should be positioned at each step in the patient flow plan.

Prior to the drill, add as many rows as actor patients are expected at this step.

We recommend that an evaluator record 10-20 observations for each station at this step.

Step Information

Name of step

Number of stations at this step

Include a sketch of the floor plan for this step, including numbering and placement of stations.

Patient Time Stamps

Do not include time spent by the patient waiting in line before entering the station or waiting to exit the station.

Station #	Patient #	Time Patient Began Receiving Services (HH:MM:SS)	Time Patient Finished Receiving Services (HH:MM:SS)	Comments (e.g., # in party, reasons for delay)	Station Time	Station Time (minutes)
	1				0:00	0.00
	2				0:00	0.00
	3				0:00	0.00
	4				0:00	0.00
	5				0:00	0.00
	6				0:00	0.00
	7				0:00	0.00
	8				0:00	0.00
	9				0:00	0.00
	10				0:00	0.00
	11				0:00	0.00
	12				0:00	0.00
	13				0:00	0.00
	14				0:00	0.00
	15				0:00	0.00
	16				0:00	0.00
	17				0:00	0.00
	18				0:00	0.00
	19				0:00	0.00
	20				0:00	0.00
	21				0:00	0.00
	22				0:00	0.00
	23				0:00	0.00
	24				0:00	0.00
	25				0:00	0.00
	26				0:00	0.00
	27				0:00	0.00
	28				0:00	0.00
	29				0:00	0.00
	30				0:00	0.00
	31				0:00	0.00
	32				0:00	0.00
	33				0:00	0.00
	34				0:00	0.00
	35				0:00	0.00
	36				0:00	0.00
	37				0:00	0.00
	38				0:00	0.00
	39				0:00	0.00
	40				0:00	0.00
	41				0:00	0.00
	42				0:00	0.00
	43				0:00	0.00
	44				0:00	0.00
	45				0:00	0.00
	46				0:00	0.00
	47				0:00	0.00
	48				0:00	0.00
	49				0:00	0.00
	50				0:00	0.00

A copy of this worksheet should be created for each step.

Step Processing Time

Name of Step		
Mean Processing Time (minutes)	0.00	=AVERAGE('Patient Time Stamps'!H31:H80)
Variance of Processing Time (minutes)	0.00	=VAR('Patient Time Stamps'!H31:H80)

Add additional rows if there are more than five patient actors types.

Drill Information

Date of drill (mm/dd/yyyy)	29-Nov-07		
Day of the week of drill (note if this is a holiday)	Hometown Health Dept		
Drill start time (24 hour clock time HH:MM, e.g., 13:00)	8:30		
Drill end time (time the drill will be declared done 24 hour clock time HH:MM)	12:30		
Location of drill	Hometown, CA		
Number of players	80		
Number of evaluators	6		
Number of patient actors	300		
Number of patient types	3		
Number of patients of type 1	Symptomatic	Describe patient type 1	Patients exhibiting symptoms
Number of patients of type 2	Pediatric	Describe patient type 2	Patients under 18 years of age
Number of patients of type 3	General	Describe patient type 3	Patients who are neither symptomatic nor pediatric
Number of patients of type 4		Describe patient type 4	
Number of patients of type 5		Describe patient type 5	

Patient Flow Plan Information

Name of step and description of task(s) performed at the step	Number of stations at this step	Number of evaluators positioned at this step
Greeting/Screening--patients are greeted and screened for symptoms	10	1
Forms Distribution--forms are distributed to identify possible contraindications	5	1
Triage--patients are divided into "Express" or "Special Needs" screening.	5	1
Medical Evaluation--symptomatic patients are given medical care	1	1
Express Dispensing--patients with no special needs are dispensed prophylaxis	2	1
Special Needs Dispensing--pediatric patients, patients with contraindications, or patients with families are given prophylaxis	10	1

Describe the rules that dictate the routing of patients through the POD.
(Ex: Symptomatic patients are directed from "Screening" to "Emergency Care.")

Symptomatic patients are screened at "Greeting/Screening" and directed to "Medical Evaluation."
Pediatric patients and their families are directed to "Special Needs Dispensing."
All other patients pass through "Express Dispensing."

Attach a copy of the patient flow plan

A copy of this worksheet should be carried by each evaluator.
At least one evaluator should be positioned at each step in the patient flow plan.

Prior to the drill, add as many rows as actor patients are expected at this step.

We recommend that an evaluator record 10-20 observations for each station at this step.

Step Information

Name of step: Express Dispensing

Number of stations at this step: 2

Include a sketch of the floor plan for this step, including numbering and placement of stations.

Patient Time Stamps

Do not include time spent by the patient waiting in line before entering the station or waiting to exit the station.

Station #	Patient #	Time Patient Began Receiving Services (HH:MM:SS)	Time Patient Finished Receiving Services (HH:MM:SS)	Comments (e.g., # in party, reasons for delay)	Station Time	Station Time (minutes)
1	1	11:59:23	12:01:35		0:02	2.20
1	2	12:01:40	12:02:10		0:00	0.50
1	3	12:02:20	12:03:27		0:01	1.12
1	4	12:04:30	12:05:40		0:01	1.17
1	5	12:05:49	12:06:56		0:01	1.12
1	6	12:06:59	12:07:15		0:00	0.27
1	7	12:07:20	12:09:10		0:01	1.83
1	8	12:09:13	12:13:40	language issues	0:04	4.45
1	9	12:14:05	12:17:29		0:03	3.40
1	10	12:17:32	12:18:35		0:01	1.05
1	11	12:18:40	12:19:50		0:01	1.17
1	12	12:20:00	12:22:07		0:02	2.12
1	13	12:23:03	12:30:39	symptomatic	0:07	7.60
1	14	12:31:00	12:32:49		0:01	1.82
1	15	12:33:01	12:34:39		0:01	1.63
1	16	12:34:49	12:35:58		0:01	1.15
1	17	12:36:08	12:37:01		0:00	0.88
1	18	12:39:00	12:43:07		0:04	4.12
1	19	12:43:10	12:45:39		0:02	2.48
1	20	12:45:49	12:46:20		0:00	0.52
1	21	12:46:25	12:47:29		0:01	1.07
1	22	12:48:00	12:49:39		0:01	1.65
1	23	12:50:10	12:52:39		0:02	2.48
1	24	12:53:22	12:58:10		0:04	4.80
1	25	12:59:05	13:01:09		0:02	2.07
2	26	13:01:01	13:13:29	symptomatic	0:12	12.47
2	27	13:14:03	13:15:58		0:01	1.92
2	28	13:15:59	13:16:56		0:00	0.95
2	29	13:17:37	13:18:00		0:00	0.38
2	30	13:19:07	13:20:00		0:00	0.88
2	31	13:21:03	13:22:03		0:01	1.00
2	32	13:22:10	13:24:29		0:02	2.32
2	33	13:25:01	13:26:39		0:01	1.63
2	34	13:27:09	13:32:03	had lots of questions	0:04	4.90
2	35	13:33:03	13:37:07		0:04	4.07
2	36	13:39:00	13:42:29		0:03	3.48
2	37	13:45:32	13:47:33		0:02	2.02
2	38	13:49:04	13:51:28		0:02	2.40
2	39	13:52:09	13:58:22		0:06	6.22
2	40	13:59:22	14:01:33		0:02	2.18
2	41	14:01:39	14:02:42		0:01	1.05
2	42	14:03:00	14:05:39		0:02	2.65
2	43	14:07:07	14:08:32		0:01	1.42
2	44	14:08:40	14:10:38		0:01	1.97
2	45	14:11:01	14:12:38		0:01	1.62
2	46	14:13:09	14:15:00		0:01	1.85
2	47	14:16:22	14:17:39		0:01	1.28
2	48	14:17:49	14:20:00		0:02	2.18
2	49	14:21:02	14:23:39		0:02	2.62
2	50	14:25:49	14:27:59		0:02	2.17

A copy of this worksheet should be created for each step.

Step Processing Time

Name of Step	Express Dispensing	
Mean Processing Time (minutes)	2.37	=AVERAGE('Patient Time Stamps Example'!H31:H80)
Variance of Processing Time (minutes)	4.31	=VAR('Patient Time Stamps Example'!H31:H80)

REFERENCES

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