

# Animal Disease Spread Model (ADSM)

## Text Support Document for Training

The slide-based training was designed to optimize visual interest. This format does not always create a slide bank that is printer friendly. In some sections, there are many images and little text. This text support document is intended to be a printer-friendly version of the slides that can be used as a reference. This document is not intended to take the place of the main training slides.

### Training 7 Results - Model Output

Slide	Image	Text
1	Laying Hens	Animal Disease Spread Model Results - Model Output
2	ADSM Application Sample Scenario with Outputs	Table of Contents Results Home Navigation Tabs Output Files Raw Data What's Next?
3	No Image	Document Conventions The following conventions are used throughout the training modules: <b><u>TRAINING MODULES</u></b> other than the one you are currently in will use all capital letters, bold face, italics and underline. <i>Rhetorical questions</i> and <i>extra notes</i> will be in orange italics. Conventions applying to the ADSM application are: Navigation tabs on right and Admin panels on left are designated with an underline. Examples are <u>Project Panel</u> or <u>Population tab</u> . Items with an action on click, such as [Apply] Button or [Save As] icon are enclosed in square brackets. <i>Parameter fields</i> (inputs) are in blue italics and <i>Variables</i> (outputs) are in green italics. <u>Navigation Tabs</u> > <i>Parameter field</i> indicates to go to the given navigation tab to find the given field. Hyperlinks appear in bright green type with underline <a href="http://navadmc.github.io/ADSM/">http://navadmc.github.io/ADSM/</a>
4	Gear Section Break	Results Home
5	Watusi cow and calves	Results Home Results Home will cover the details of: Population Heat Map Selected Variable Summary Navigation Tabs with output How to use Calculate Summary File How to view Supplemental Output Files Since understanding what your model did is so important, we are presenting this training in 2 parts.

		<p>The first part, <b><u>MODEL OUTPUT</u></b>, is intended to familiarize you with the types of output the application is creating. It is important to understand what the output means before you try to understand if it represents the scenario you expect.</p> <p>The second part, <b><u>DETAILED EVALUATION OF RESULTS - VALIDATION AND VERIFICATION</u></b>, is a more critical evaluation of how the parameters that were inputs are behaving to create the results set.</p>
6	ADSM Results home	<p>Results Home</p> <p>This is the initial screen shown when ADSM iterations have completed.</p>
7	ADSM Results home	Let's get familiar with Results Home
8	ADSM Population Heat map with results	<p>Results Home - Population Heat Map</p> <p>The grey box in the center of Results Home displays a relational layout of the units included in the population file. The image shows the population units as they are related to each other based on a coordinate system, but they are not geo-referenced or projected for a GIS system. For example, the population of Texas would show the shape of Texas, but there is not a true reference to any geospatial data layers of Texas.</p> <p>The units appear as black square symbols. The size of the square relates to the number of animals in the unit, so a smaller square has fewer animals, and a larger square has more animals.</p>
9	ADSM Population Heat map with results	<p>Population Heat Map Zoomed In</p> <p>The blue areas represent zones. If zones are not used, there will be no blue areas. The mouse scroll button allows you to magnify the map. Resolution of the map is limited in the Map Summary. On populations covering a large geographical area, details may not be visible. An image of the map is automatically created in the outputs section. This image can be enlarged to a fine level of detail.</p> <p><i>Details are always available from the raw data.</i></p>
10	ADSM Population Heat map with results	<p>Probability of involvement in an iteration</p> <p>The color intensity of the zones also communicates information about the data. The darker the blue color, the more likely the unit was involved in more iterations. This shows the probability that the unit was in a zone triggered by infection. The colors fade out to white. This gradation allows the visualization of the full geographical spread of the outbreak over all iterations.</p>
11	ADSM Population Heat map with results	<p>Population Heat Map– Control Measures</p> <p>The Population Map is a summary of all iterations. The units that have at least one event show small graph boxes instead of black squares.</p> <p>The graphs represent how often events happen in the iterations. In the example graph, 10 iterations were run. This unit was infected in all 10 iterations. This unit was also destroyed in all 10 iterations. In 5 of the iterations, the unit was vaccinated. That is a clue that the parameter <i>Vaccinate detected units</i> was turned on in this example.</p>

12	ADSM Population Heat map with results	Population Heat Map– Control Measure Example Here are some examples of the small graphs and control measure events that happened in this scenario. The legend at the bottom describes the events and the color associated to the event. Only vaccinated Never infected, vaccinated or destroyed in any iteration but within zone Only infected possibly not detected Infected, vaccinated and destroyed in the same number of iterations, possibly not the same iterations
13	Cow eye	To be clear, a summary visualization of the data doesn't provide all the details. It does present a quick overview to start understanding what is in the data. We will continue to explore the data in other ways.
14	Results Home	Selected Variables Summary On the right side of Results Home, there is a panel with a subset of <i>variables</i> calculated for the median. These variables were selected because they are frequently used by epidemiologists to determine the severity of an outbreak. Combined with the Population Heat Map, this output allows a quick view to determine the scope of the outbreak. <i>The Data Dictionary can provide field level definitions, use the ? Panel in the ADSM application to find the Data Dictionary</i>
15	Gear Section Break	Navigation Tabs
16	Egyptian art with livestock	Navigation tabs with variables Keeping track of how many animals are in each status has been important for a long time. Managing these details is especially important in simulation. Navigation tabs allow a more detailed view of each type of observation that was generated by the simulation. These variables are tracked by the time step unit, usually a day.
17	Results Home Navigation tabs	Navigation tabs with variables On the left side of Results Home, the Navigation tabs organize the <i>output variables</i> from ADSM that are created by day of the iteration. ADSM creates 244 fields in the output tables. These tables are organized into logical groups. Results by Production Type are broken down into logical subsets due to the large number of variables. Some <i>variables</i> are only available in the raw data due to the difficulty in providing a clear visualization.
18	Countryside with sheep ADSM documentation	Understanding Variables Because there are many <i>output variables</i> , this training will not provide an extended definition on each variable as it is referenced. Use the Help (?) Panel to open the Data Dictionary if you need to review a definition. The data gives a day by day count of events, broken down by production type when possible. To show a single example, we will focus on exposure. <i>Details are always available from the raw data.</i>

19	ADSM Results Exposures	<p><i>Exposure example - 10 iterations</i></p> <p>When less than 20 iterations are completed, visualizations are shown as string graphs. Looking at a small set of iterations allows a simplified view of a trend.</p>
20	ADSM Results Exposures with call outs	<p><i>Exposure after 10 iterations (call outs)</i></p> <p>The string graph on the left is a summary of data for daily new Exposures by Direct, Indirect, and Airborne contact. This allows you to evaluate the number of unit-to-unit contacts that are occurring throughout the simulation. Note that not every exposure results in disease spread.</p> <p>Clicking on any of the variables will give you the graph of the specific data for that variable.</p> <p>Both graphs have a box and whisker plot to the right of the graph.</p> <p>The string graph on the right is a summary of data for <i>Exposures by Direct, Indirect and Airborne contacts</i> as they accumulate by day. Lines go flat when exposures stop happening.</p> <p>The iterations under columns 1, 2, 3, 4, and 5 allow you to view the production type level data of the first 5 iterations that completed.</p> <p>Variable Name here</p> <p>Click here on link</p>
21	ADSM Results Exposures with call outs	<p><i>Exposure after 10 iterations</i></p> <p><i>How to read a box and whisker plot:</i></p> <p><i>Both graphs have a box and whisker plot to the right of the graph.</i></p>
22	ADSM Results Exposures Heat maps	<p><i>Exposure as an example - 100 iterations</i></p> <p><i>When more than 20 iterations are completed, visualizations are shown as reverse heat maps. Looking at a large set of iterations allows a clear view of the outliers as seen by the contrasting coloration.</i></p>
23	ADSM Results Exposures with call outs	<p><i>Exposure after 100 iterations (call outs)</i></p> <p>The reverse heat map on the left is a summary of data for daily new Exposures for Direct, Indirect and Airborne contact. This allows you to evaluate the number of unit-to-unit contacts that are occurring throughout the simulation. The graph shows both the number of exposures that occur each day (data points on graph) as well as how often they occur among all iterations (heat map coloration). Note that not every exposure causes disease spread.</p> <p>Both graphs have a legend to the left of the graph and a box and whisker plot to the right of the graph.</p>

		<p>The reverse heat map on the right is a summary of Exposures for Direct, Indirect and Airborne contacts as they accumulate by day. Lines go flat when exposures stop happening. Clicking on any of the variables will give you the graph of the specific data for that variable.</p> <p>The reverse heat map on the right is a summary of Exposures for Direct, Indirect and Airborne contacts as they accumulate by day. Lines go flat when exposures stop happening.</p> <p>The iterations under 1, 2, 3, 4, and 5 allow you to view the production type level data of the first 5 iterations that completed.</p> <p>Variable Name here</p> <p><a href="#">Click here on link</a></p>
24	ADSM Results Exposures with call outs	<p><i>Exposure</i> after <b>100</b> iterations (call outs)  Heat Map = the frequency that specific exposure types occurred across all iterations (the darkest color means that unit-to-unit contact type occurred in every iteration).</p> <p>Data points = number of exposure contacts that occurred on a specific day of the simulation.</p> <p>How to read a box and whisker plot:</p>
25	ADSM examples of variables	<p>Fields in the Visualizations  The fields have a shortened name in the database. Some examples are:  expcU = Exposure Cumulative Units for Any reason  expcUDir = Exposure Cumulative Units – Direct contact  expcUInd = Exposure Cumulative Units – Indirect contact  The data is reported at both a <b>Unit</b> count and an <b>Animal</b> count level. Output is also broken down into <b>New</b> values on a given day, as well as <b>Cumulative</b> values. It is further broken down into details that are relevant to a particular variable. In this example, <b>exposure</b> can happen through <b>Direct</b> contact, <b>Indirect</b> contact or <b>Airborne</b> spread. A data dictionary is available to provide a more detailed definition of each output variable. The data dictionary is created in the format of the database output tables. ADSM is using the data in the database to provide these visualizations.  <i>Note: there are a few fields available in the database that are not visualized.</i></p>
26	ADSM examples of variables	<p><i>All these fields are captured Daily by Production Type</i>  Exposure</p> <ul style="list-style-type: none"> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units - Direct Contact</li> <li>• Cumulative Units - Indirect Contact</li> <li>• Cumulative Units Airborne Spread</li> <li>• Cumulative animals For Any Reason</li> <li>• Cumulative animals - Direct Contact</li> </ul>

		<ul style="list-style-type: none"> <li>• Cumulative animals - Indirect Contact</li> <li>• Cumulative animals Airborne Spread</li> <li>• New Units For Any Reason</li> <li>• New Units - Direct Contact</li> <li>• New Units - Indirect Contact</li> <li>• New Units Airborne Spread</li> <li>• New animals For Any Reason</li> <li>• New animals - Direct Contact</li> <li>• New animals - Indirect Contact</li> <li>• New animals Airborne Spread</li> </ul> <p>Adequate Exposure</p> <ul style="list-style-type: none"> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units - Direct Contact</li> <li>• Cumulative Units - Indirect Contact</li> <li>• Cumulative Units Airborne Spread</li> <li>• New Units For Any Reason</li> <li>• New Units - Direct Contact</li> <li>• New Units - Indirect Contact</li> <li>• New Units Airborne Spread</li> </ul> <p><i>Adequate fields are not visualized</i></p> <p>Infection</p> <ul style="list-style-type: none"> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units Initially</li> <li>• Cumulative Units - Direct Contact</li> <li>• Cumulative Units - Indirect Contact</li> <li>• Cumulative Units Airborne Spread</li> <li>• Cumulative animals For Any Reason</li> <li>• Cumulative animals Initially</li> <li>• Cumulative animals - Direct Contact</li> <li>• Cumulative animals - Indirect Contact</li> <li>• Cumulative animals Airborne Spread</li> <li>• New Units For Any Reason</li> <li>• New Units Initially</li> <li>• New Units - Direct Contact</li> <li>• New Units - Indirect Contact</li> <li>• New Units Airborne Spread</li> <li>• New animals For Any Reason</li> <li>• New animals Initially</li> <li>• New animals - Direct Contact</li> <li>• New animals - Indirect Contact</li> <li>• New animals Airborne Spread</li> </ul>
27	ADSM examples of variables	<p><i>All these fields are captured Daily by Production Type</i></p> <p>Detection</p> <ul style="list-style-type: none"> <li>• Detection Cumulative Units For Any Reason</li> <li>• Detection Cumulative Units Clinical</li> <li>• Detection Cumulative Units from Lab Tests</li> <li>• Detection Cumulative animals For Any Reason</li> <li>• Detection Cumulative animals Clinical</li> <li>• Detection Cumulative animals from Lab Tests</li> <li>• Detection New Units For Any Reason</li> <li>• Detection New Units Clinical</li> </ul>

		<ul style="list-style-type: none"> <li>• Detection New Units from Lab Tests</li> <li>• Detection New animals For Any Reason</li> <li>• Detection New animals Clinical</li> <li>• Detection New animals from Lab Tests</li> </ul> <p>Destruction</p> <ul style="list-style-type: none"> <li>• New Units For Any Reason</li> <li>• New Units because of Ring</li> <li>• New Units because of Detection</li> <li>• New Units Initially</li> <li>• New Units because of Direct Forward Trace</li> <li>• New Units because of Indirect Forward Trace</li> <li>• New Units because of Direct Back Trace</li> <li>• New Units because of Indirect Back Trace</li> <li>• New animals For Any Reason</li> <li>• New animals because of Ring</li> <li>• New animals because of Detection</li> <li>• New animals Initially</li> <li>• New animals because of Direct Forward Trace</li> <li>• New animals because of Indirect Forward Trace</li> <li>• New animals because of Direct Back Trace</li> <li>• New animals because of Indirect Back Trace</li> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units because of Ring</li> <li>• Cumulative Units because of Detection</li> <li>• Cumulative Units Initially</li> <li>• Cumulative Units because of Direct Forward Trace</li> <li>• Cumulative Units because of Indirect Forward Trace</li> <li>• Cumulative Units because of Direct Back Trace</li> <li>• Cumulative Units because of Indirect Back Trace</li> <li>• Cumulative animals For Any Reason</li> <li>• Cumulative animals because of Ring</li> <li>• Cumulative animals because of Detection</li> <li>• Cumulative animals Initially</li> <li>• Cumulative animals because of Direct Forward Trace</li> <li>• Cumulative animals because of Indirect Forward Trace</li> <li>• Cumulative animals because of Direct Back Trace</li> <li>• Cumulative animals because of Indirect Back Trace</li> <li>• Wait Time Unit</li> <li>• Wait Time Animal</li> </ul> <p>Vaccination</p> <ul style="list-style-type: none"> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units Initially</li> <li>• Cumulative Units because of Ring</li> <li>• Cumulative animals For Any Reason</li> <li>• Cumulative animals Initially</li> <li>• Cumulative animals because of Ring</li> <li>• New Units For Any Reason</li> <li>• New Units Initially</li> <li>• New Units because of Ring</li> <li>• New animals For Any Reason</li> <li>• New animals Initially</li> </ul>
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		<ul style="list-style-type: none"> <li>• New animals because of Ring</li> </ul> <p><i>Variables not visualized</i></p> <ul style="list-style-type: none"> <li>• Wait Time Units</li> <li>• Wait Time Units Max</li> <li>• Wait Time Units Day with Max</li> <li>• Wait Time Units Max Time</li> <li>• Wait Time Units Average Time</li> <li>• Wait Time Units Days in Queue</li> <li>• Wait Time animals</li> <li>• Wait Time animals Max</li> <li>• Wait Time animals Day with Max</li> <li>• Wait Time animals Max Time</li> <li>• Wait Time animals Average Time</li> <li>• Wait Time animals Days in Queue</li> </ul>
28	ADSM examples of variables	<p><i>All these fields are captured Daily by Production Type</i></p> <p>Tracing</p> <ul style="list-style-type: none"> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units For Any Reason Possible</li> <li>• Cumulative Units - Direct Contact</li> <li>• Cumulative Units - Direct Contact Possible</li> <li>• Cumulative Units - Indirect Contact</li> <li>• Cumulative Units - Indirect Contact Possible</li> <li>• Cumulative animals For Any Reason</li> <li>• Cumulative animals For Any Reason Possible</li> <li>• Cumulative animals - Direct Contact</li> <li>• Cumulative animals - Direct Contact Possible</li> <li>• Cumulative animals - Indirect Contact</li> <li>• Cumulative animals - Indirect Contact Possible</li> <li>• New Units For Any Reason For Any Reason</li> <li>• New Units For Any Reason Possible</li> <li>• New Units - Direct Contact For Any Reason</li> <li>• New Units - Direct Contact Possible</li> <li>• New Units - Indirect Contact For Any Reason</li> <li>• New Units - Indirect Contact Possible</li> <li>• New animals For Any Reason For Any Reason</li> <li>• New animals For Any Reason Possible</li> <li>• New animals - Direct Contact For Any Reason</li> <li>• New animals - Direct Contact Possible</li> <li>• New animals - Indirect Contact For Any Reason</li> <li>• New animals - Indirect Contact Possible</li> </ul> <p>Testing</p> <ul style="list-style-type: none"> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units because of Direct Forward Trace</li> <li>• Cumulative Units because of Indirect Forward Trace</li> <li>• Cumulative Units because of Direct Back Trace</li> <li>• Cumulative Units because of Indirect Back Trace</li> <li>• Cumulative animals For Any Reason</li> <li>• Cumulative animals because of Direct Forward Trace</li> <li>• Cumulative animals because of Indirect Forward Trace</li> <li>• Cumulative animals because of Direct Back Trace</li> <li>• Cumulative animals because of Indirect Back Trace</li> </ul>

		<ul style="list-style-type: none"> <li>• Cumulative Units True Positives</li> <li>• Cumulative Units False Positives</li> <li>• Cumulative Units True Negatives</li> <li>• Cumulative Units False Negatives</li> <li>• New Units For Any Reason</li> <li>• New Units because of Direct Forward Trace</li> <li>• New Units because of Indirect Forward Trace</li> <li>• New Units because of Direct Back Trace</li> <li>• New Units because of Indirect Back Trace</li> <li>• New Units True Positives</li> </ul> <p>Exams</p> <ul style="list-style-type: none"> <li>• New Units For Any Reason</li> <li>• New Units because of Ring</li> <li>• New Units because of Direct Forward Trace</li> <li>• New Units because of Indirect Forward Trace</li> <li>• New Units because of Direct Back Trace</li> <li>• New Units because of Indirect Back Trace</li> <li>• New Units because of Detection</li> <li>• New animals For Any Reason</li> <li>• New animals because of Ring</li> <li>• New animals because of Direct Forward Trace</li> <li>• New animals because of Indirect Forward Trace</li> <li>• New animals because of Direct Back Trace</li> <li>• New animals because of Indirect Back Trace</li> <li>• New animals because of Detection</li> <li>• Cumulative Units For Any Reason</li> <li>• Cumulative Units because of Ring</li> <li>• Cumulative Units because of Direct Forward Trace</li> <li>• Cumulative Units because of Indirect Forward Trace</li> <li>• Cumulative Units because of Direct Back Trace</li> <li>• Cumulative Units because of Indirect Back Trace</li> </ul>
29	ADSM examples of variables	<p>These fields are recorded daily, but grouped differently</p> <p>By Zone</p> <ul style="list-style-type: none"> <li>• Area of zone</li> <li>• Perimeter of zone</li> <li>• Number of zones</li> </ul> <p>By Zone and Production Type</p> <ul style="list-style-type: none"> <li>• Units in zone</li> <li>• Unit days in zone</li> <li>• Animal days in zone</li> </ul>
30		<p>These fields are recorded daily, across all production types</p> <p><i>Note in some of the control activity variables, the data is a yes/no condition. These yes/no activity graphs are accurate, but less intuitive to interpret. We will do a more critical interpretation of data in <b><u>VERIFICATION AND VALIDATION</u></b>.</i></p> <ul style="list-style-type: none"> <li>• Cost of Surveillance</li> <li>• Cost of Vaccination Setup</li> <li>• Cost of Vaccination</li> <li>• Cost of Vaccination Subtotal</li> <li>• Cost of Destruction Appraisal</li> </ul>

		<ul style="list-style-type: none"> <li>• Cost of Destruction Euthanasia</li> <li>• Cost of Destruction Indemnity</li> <li>• Cost of Destruction Disposal</li> <li>• Cost of Destruction Cleaning</li> <li>• Cost of Destruction Subtotal</li> <li>• Total Costs</li> <li>• Disease Duration</li> <li>• Outbreak Duration</li> <li>• Destruction Wait Days Units Max</li> <li>• Destruction Wait Days Units Max Day</li> <li>• Destruction Wait Days Units Max Time</li> <li>• Destruction Wait Days Units Average Time</li> <li>• Destruction Wait Days Units in Queue</li> <li>• Destruction Wait Days Animals Max</li> <li>• Destruction Wait Days Animals Max Day</li> <li>• Destruction Wait Time Animals Max Time</li> <li>• Destruction Wait Time Animals Average Time</li> <li>• Destruction Wait Days Animals in Queue</li> <li>• Vaccination Occurred</li> <li>• Vaccination Triggered</li> <li>• Detection For Any Reason</li> <li>• Destruction For Any Reason</li> <li>• First Detection Units Infected</li> <li>• First Detection Animals Infected</li> </ul>
31	Gear Section Break	Output Files
32	ADSM Workspace file structure	<p>Generate Summary File</p> <p>ADSM offers the option to generate a summary file at the completion of all iterations. This process can be completed using the button below the Population Heat Map. The summary file will automatically be saved into the ADSM Workspace file structure. The arrows will circle while the file is calculating. When complete, the file path will show in Results Home. It is not necessary to download again, but you can delete the file from this window if needed.</p>
33	ADSM example of Summary File	<p>Summary File</p> <p>The Summary File is a comma-separate value file. These actions make it easier to read:</p> <ul style="list-style-type: none"> <li>- Expand the columns to fit the fields</li> <li>- Sort the columns A – Z, which groups similar items together</li> </ul> <p>The <i>Field Name</i> and a short <i>explanation</i> are followed by descriptive statistics. The Summary File has only the subset of fields that make sense to look at over a whole iteration. Summary statistics are provided, such as the <i>mean, standard deviation, minimum/maximum values</i>, and the <i>5<sup>th</sup>/25<sup>th</sup>/50<sup>th</sup>/75<sup>th</sup>/95<sup>th</sup> percentile values</i>. Here's a small example that matches the <b>100</b> iterations of the Sample Scenario.</p>
34	ADSM Output Settings	<p>Supplemental Output Files</p> <p><i>Supplemental Output Files</i> are the output records that give the detail by unit by day. One file per iteration is created for each file type</p>

		<p>requested. These records can add a whole new dimension to the data you have available for analysis. They also create large volumes of output and possibly large output files.</p> <p><i>Supplemental Output Files</i> are not created automatically due to the large volume of data they create. A good practice is to experiment with your scenarios at a small scale before starting a large project with many iterations and large export files.</p> <p>Use these check boxes on the Output Settings tab to turn on the <i>Supplemental Outputs</i>. The [Apply] button will save your change.</p>																
35	ADSM Results Home	<p>Supplemental Output Files – <b>10</b> iterations</p> <p>This example completed 10 iterations. If you scroll down on Results Home, the files are visible at the bottom. The files are saved in the ADSM Workspace Directory, so there is no need to download them.</p>																
36	ADSM Daily output example States	<p>Supplemental Output Files – Daily States Iteration 1</p> <p>Looking at iteration 1, the non-susceptible units start at day 1 and begin to count through each day of the outbreak as more units become infected. Note the susceptible units are not included in this file.</p> <p><i>Why aren't susceptible units included?</i> The output files could be extremely large if they contained that level of detail. You can assume units not shown in Daily_States were in a susceptible status. The status code is the same code used in the population file to describe starting disease status. The Sample Scenario example has 1,099 records for iteration 1, which had a duration of 66 days. The data dictionary provides field level definitions.</p> <table border="1"> <thead> <tr> <th>Disease State</th> <th>Single Character Code</th> </tr> </thead> <tbody> <tr> <td>Susceptible</td> <td>S</td> </tr> <tr> <td>Latent</td> <td>L</td> </tr> <tr> <td>Subclinical</td> <td>B</td> </tr> <tr> <td>Clinical</td> <td>C</td> </tr> <tr> <td>Naturally Immune</td> <td>N</td> </tr> <tr> <td>Vaccine Immune</td> <td>V</td> </tr> <tr> <td>Destroyed</td> <td>D</td> </tr> </tbody> </table>	Disease State	Single Character Code	Susceptible	S	Latent	L	Subclinical	B	Clinical	C	Naturally Immune	N	Vaccine Immune	V	Destroyed	D
Disease State	Single Character Code																	
Susceptible	S																	
Latent	L																	
Subclinical	B																	
Clinical	C																	
Naturally Immune	N																	
Vaccine Immune	V																	
Destroyed	D																	
37	ADSM Daily output example Events	<p>Supplemental Output Files – Daily Events Iteration 1</p> <p>Looking at iteration 1, the events by day and by units are detailed. The Sample Scenario created 206 records for iteration 1. The data dictionary provides field level definitions.</p>																
38	ADSM Daily output example Exposures	<p>Supplemental Output Files – Daily Exposures Iteration 1</p> <p>Looking at iteration 1, the exposures by day and by unit are detailed. The Sample Scenario has 80 records for iteration 1. The reason code “ini” means initial, or the index unit(s); therefore, it has no source of infection. The data dictionary provides field level definitions.</p>																
39	ADSM Daily output example Map Output	<p>Supplemental Output Files – Map Iteration 1</p> <p>The Map output makes a file folder called Map which contains many files that can represent the outbreak spatially on a weekly basis. Map contains both disease state and zone areas. The data dictionary provides field level definitions.</p>																

40	Gear Section Break	Raw Data
41	ADSM File structure	<p>Raw Data</p> <p>The daily data behind all the visualizations in ADSM is stored in a SQLite database. Database files can be accessed with tools that use Structure Query Language (SQL) to ask the database questions. A SQL query tool is built into ADSM, called SQL Explorer. It is available on the <a href="#">SQL Panel</a>.</p> <p>A database has the same tables for every scenario, but each one is filled with the specific <i>parameters</i> and <i>outputs</i> for the given scenario.</p>
42	Pig and ADSM File structure	<p>Raw Data - Help with SQL</p> <p>Before going into SQL Explorer, there are some example queries already packaged with ADSM.</p> <p>A database has the same tables for every scenario, but each one is filled with the specific parameters and outputs for the given scenario. We can write the question once and execute it on any database. Save any new queries you write into a .txt file to transfer between scenarios.</p>
43	ADSM SQL Explorer Form	<p>Raw Data – SQL Explorer</p> <p>The <a href="#">SQL panel</a> brings up SQL Explorer. An empty window appears to create a new query.</p> <p><i>Not familiar with writing a query?</i></p> <p>Copy and paste one of the examples from the Example Database Queries directory or see the example on the next page.</p>
44	ADSM SQL Explorer Form with query	<p>Raw Data – New Query</p> <p>Here is a first attempt to run a query. The queries in the Example Database Queries will have documentation at the top as shown in this example. Now that there is SQL code in place, hit the Save and Run button at the bottom.</p> <p><i>This query can be cut and pasted into your SQL Window. Add a Title before running.</i></p> <p>Production Type with descriptive name  Query to link Production Type name to population file, instead of showing only numeric ID</p> <p>-----</p> <pre>--      Sample Query: Production Type with descriptive name --      Date:      3/19/2015 --      By:       Schoenbaum, Missy --      Notes: where clause 1=1 allows for easy editing of subsequent clauses --      Where clause rowid &lt; 100 allows for return of a subset of --      data, which is quicker when tuning --      -- allows for line to be commented (omitted)</pre> <p>-----</p> <pre>SELECT u.User_notes, pt.name, -- this is the description name, not an identifier u.initial_state, u.initial_size, Latitude, Longitude FROM ScenarioCreator_unit u JOIN ScenarioCreator_productiontype pt</pre>

		<p>ON u.production_type_id = pt.id  -- Example of WHERE clause  WHERE 1=1 AND u.ROWID &lt; 100 AND u.initial_state = 'L' -- upper case surrounded by ' is required</p>
45	ADSM SQL Explorer Form with query results	<p>Raw Data – Production Type with Name  Scrolling down, there are now results at the bottom of the screen. That’s a simple example of accessing the raw data behind ADSM. Using the pull-down on the Save button allows you to quickly export your results set.</p>
46	Resting cow	<p>There are many ways to explore the results set using SQL. It is worth taking a few minutes to learn a little SQL to be able to manipulate your outputs rapidly to observe what happened in your simulation.</p>
47	Gear Section Break	<p>What’s Next?</p>
48	Resting goat	<p>In this training, we covered:  Results Home – visualization of a summary of the scenario outputs  Navigation Tables – visualizations of individual output variables  Output files      Summary - descriptive statistics of the scenario output      Supplemental Outputs – Unit level detailed data on disease states, events, and exposures  Raw Data – detailed data at a daily level  There is a lot of data to understand out of every scenario you run.</p>
49	Nosey cow	<p>Results Summary  As noted at the beginning, understanding the results of ADSM is going to be a 2-step process.  This training module has presented the simplified version of what the results look like, and where they are located.  In the next training, <b><u>VERIFICATION AND VALIDATION</u></b>, more emphasis will be placed on understanding how the parameters that you input created the simulation outputs and allowing you to determine if those outputs are a valid representation of the disease systems you are attempting to simulate.</p>
50	Flock of Sheep	<p><b>Join the flock!</b>  <b>Learn more about ADSM or try an example</b>  <b>ADSM is currently available at</b>  <a href="https://github.com/NAVADMC/ADSM/releases/latest">https://github.com/NAVADMC/ADSM/releases/latest</a>  Try the sample scenario  <a href="https://github.com/NAVADMC/ADSM/wiki/A-Quick-Start-Guide:-Running-the-sample-scenario">https://github.com/NAVADMC/ADSM/wiki/A-Quick-Start-Guide:-Running-the-sample-scenario</a>  Read the wiki pages link <a href="https://github.com/NAVADMC/ADSM/wiki">https://github.com/NAVADMC/ADSM/wiki</a></p>
51	Goat on with green foliage	<p>What’s Next?  Addition training material is be posted at <a href="http://navadmc.github.io/ADSM/">http://navadmc.github.io/ADSM/</a>  Training includes:      Overview      Populations and Production Types      Getting Started      Disease Parameters      Control Parameters</p>

		<p>Output Settings and Run Results</p> <p>Detailed Evaluation of Results - Verification and Validation</p> <p>Vaccination Strategy Administration</p>
52	Cows grazing with blue sky and green grass	<p>The outcome of an ADSM simulation (as with any computer simulation model) depends heavily on the quality of the scenario input parameters; the assumptions of the modeler who created the scenario; and the capabilities and limitations of the model framework itself. The utility of disease models like those created with ADSM critically depends on input and interpretation of experts familiar with the behavior of disease within populations, and with the limitations, assumptions, and output of the model. While ADSM is available as a service to animal health communities, the ADSM team does not necessarily endorse results obtained with the ADSM application or any conclusions drawn from such results. Note that the parameters provided in the Sample Scenario are simple examples to clarify concepts in the application. These parameters do not represent any real population or disease event.</p>
52	Cattle image	<p>This work was funded in whole through Cooperative Agreement AP18VSCEAH00C005 with the University of Tennessee Department of Animal Science by the Animal and Plant Health Inspection Service, an agency of the United States Department of Agriculture. University of Tennessee Animal Science logo</p> <p>Photo credits</p> <p>Canva.com</p> <p>Rutledge Farm, Big Sky MT, Darci Darlington</p> <p>Pincroft Farms, Woodstock CT, Mariah Chapman</p> <p>Jennie Steiner</p> <p>Jason Leung, unsplash</p> <p>University of Arkansas</p>
	Metadata	<p>Last Update: 1/2/2024</p> <p>By: Schoenbaum</p> <p>Approved: Freifeld</p>