

Animal Disease Spread Model

Vaccination Strategy



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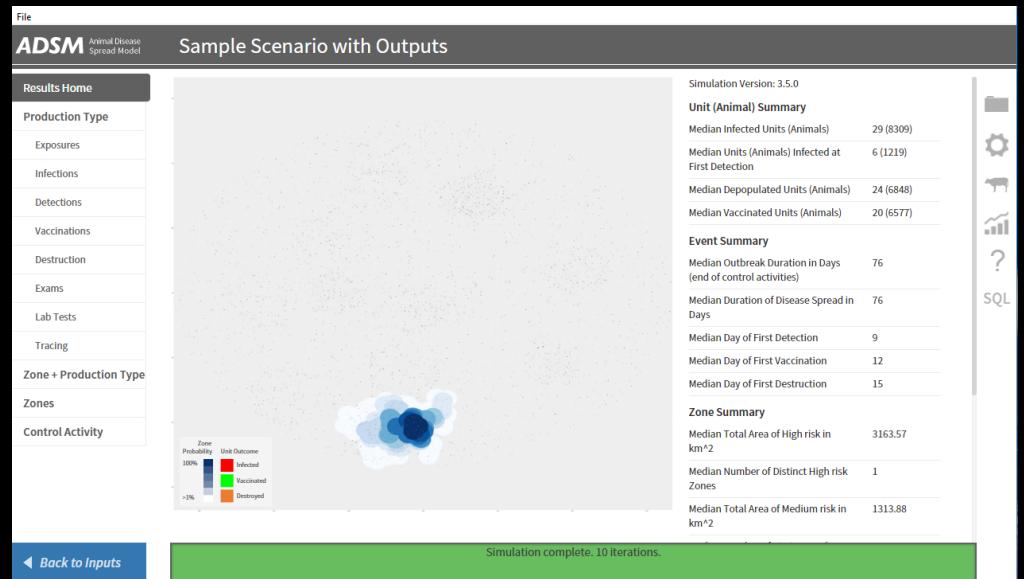
Overview

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Document Conventions

The following conventions are used throughout the training modules:

Other **TRAINING MODULES** in this series will be referred to using all capital letters, bold face, italics and underline.

Rhetorical questions and *extra notes* 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 Project Panel or Population tab.

Items with an action on click, such as [Apply] Button or [Save As] icon are enclosed in square brackets.

Parameter fields (inputs) are in blue italics and *Variables* (outputs) are in green italics.

Navigation Tabs > *Parameter field* indicates to go to the given navigation tab to find the given field.

Hyperlinks appear in bright green type with underline <http://navadmc.github.io/ADSM/>

Overview



Vaccination Strategy – *What does that mean?*

ADSM allows great flexibility in how it can apply the vaccination parameters. Your goal might be to compare different aspects of vaccination and the results affecting the outbreak. For example:

What happens if we increase the vaccination ring size?

What happens if we vaccinate only production types that have long production cycles (dairy cows) and omit those production types that are scheduled for harvest (feedlot cattle)?

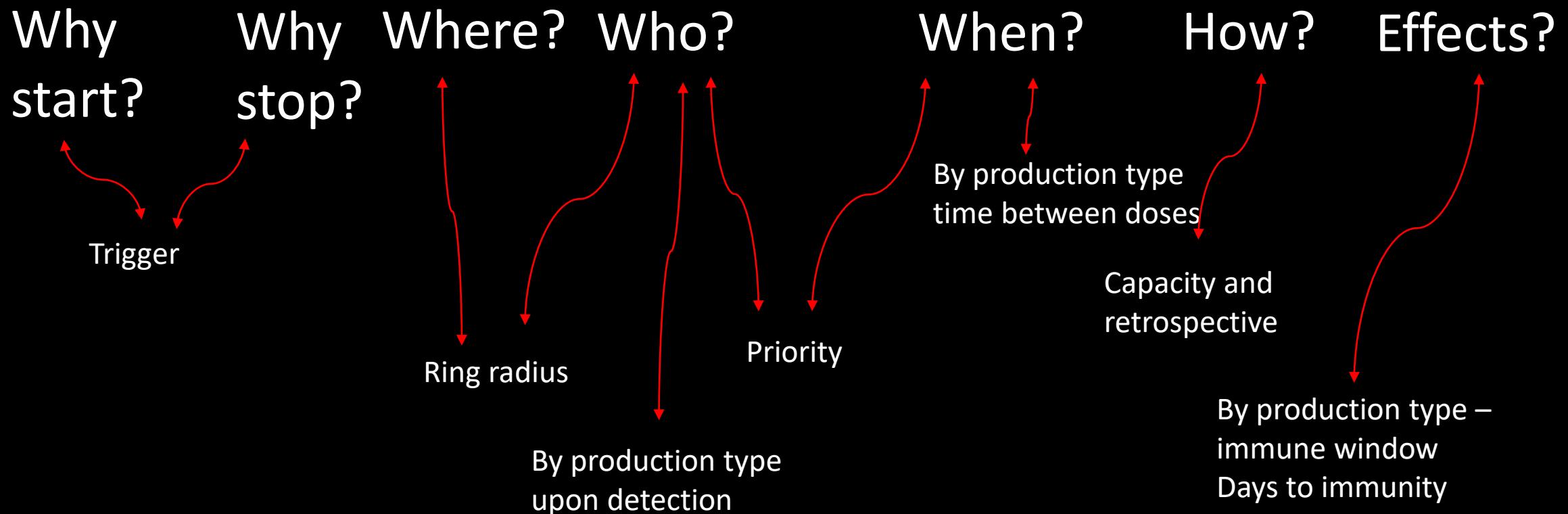
What are the costs if we vaccinate all susceptible animals, and can we reduce the total cost by vaccinating only a subset of animals?

What happens if we vaccinate large units before we vaccinate small units?

You can explore many questions by modifying parameters to create varied results.

Vaccination Strategy – Flexibility

Vaccination is more than a yes/no decision. Providing flexibility means that ADSM has complexity in the ways it allows you to parameterize a vaccination strategy. The inputs are in different tabs depending on how you apply the parameters.



Vaccination Strategy – Vaccination Queue

The vaccination queue is a construct that is active behind all parts of the vaccination strategy.

In very simple words, we know that the units must be put into an order for the simulation to determine the next action.

The parameters related to vaccination interact with the queue. We will discuss the queue in more detail later in this training.



Here are examples of how parameters alter the vaccination queue.

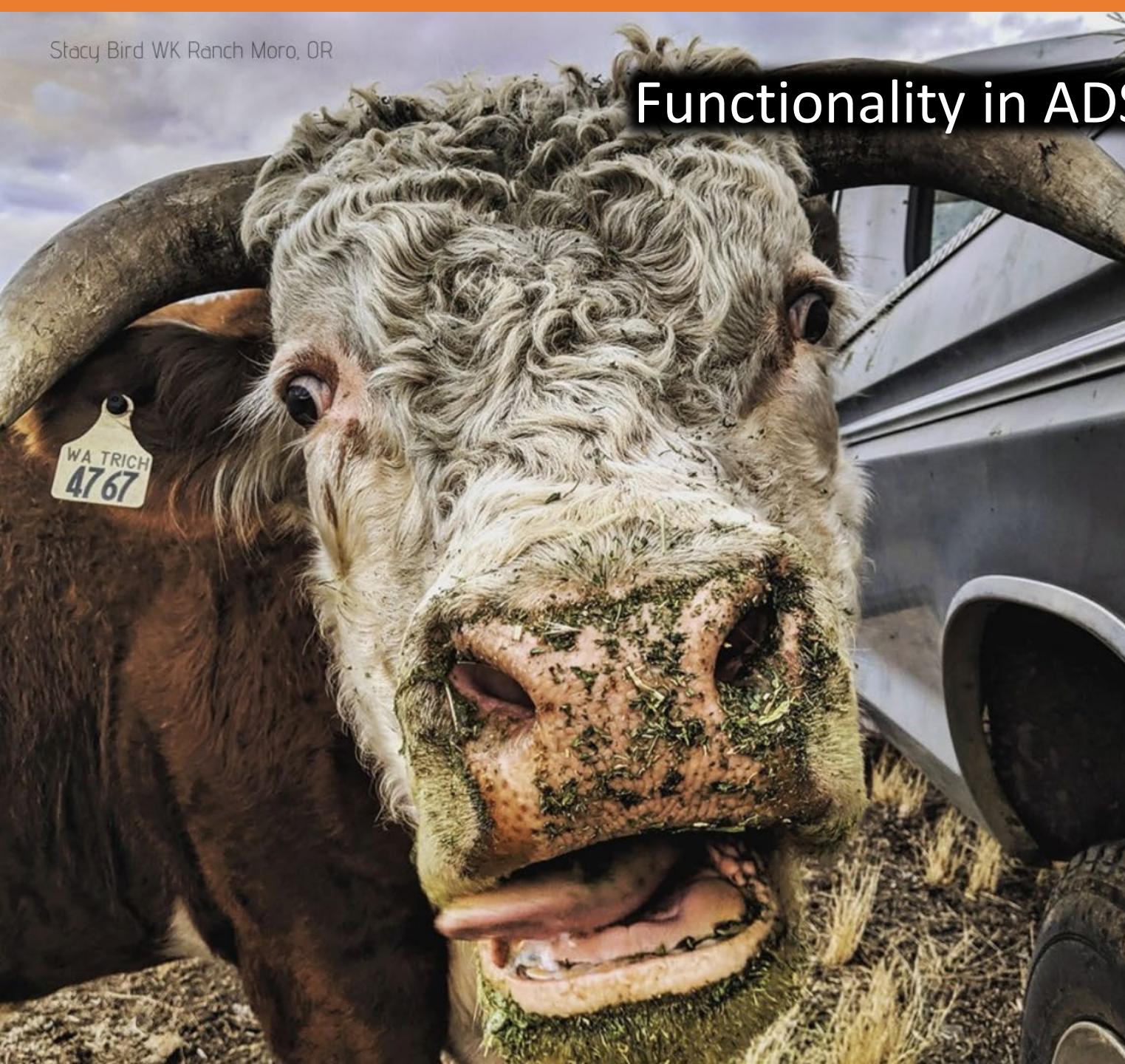
- ⚙️ A trigger starts the queue
- ⚙️ A ring defines which units go into the queue
- ⚙️ Capacity sets how fast the vaccination event happens to the unit
- ⚙️ Control Protocol – Vaccination defines the time frame to a second vaccination
- ⚙️ Control Protocol – Vaccination defines the time immunity will persist





ADSM vaccination has
several features that
were modified or were
not available in NAADSM

Functionality in ADSM that was not in NAADSM



Additional Triggers
Start, Stop and Restart
Retrospective Vaccination
Vaccination Rings
Vaccination Priorities

We will discuss each parameter block in detail in this training.

Vaccination parameters are applied at 3 levels:

- ⚙ Some vaccination parameters interact with a specific production type.
- ⚙ Some vaccination parameters happen when an event in one production type triggers an event in another production type.
- ⚙ Some vaccination parameters happen across all production types.

As a result, vaccination parameters are not in a single navigation tab in ADSM. This training is organized to look at parameters in these groups.

Between Production Types

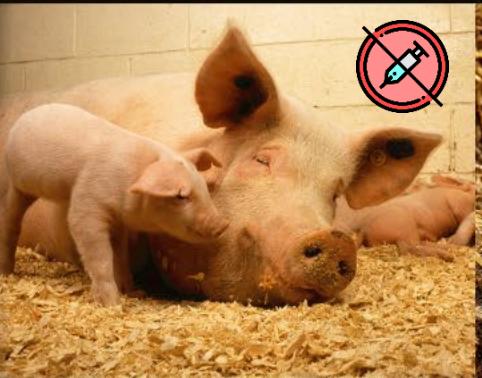




What does “Between Production Types” mean?

There are times when we want detection in one production type to start the vaccination strategy in certain production types.

If the detected unit was a cattle production type, the vaccination strategy could start in cattle, and in swine and small ruminants.



Scenario Description

Population

Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls

on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

Zones

Zone Effects

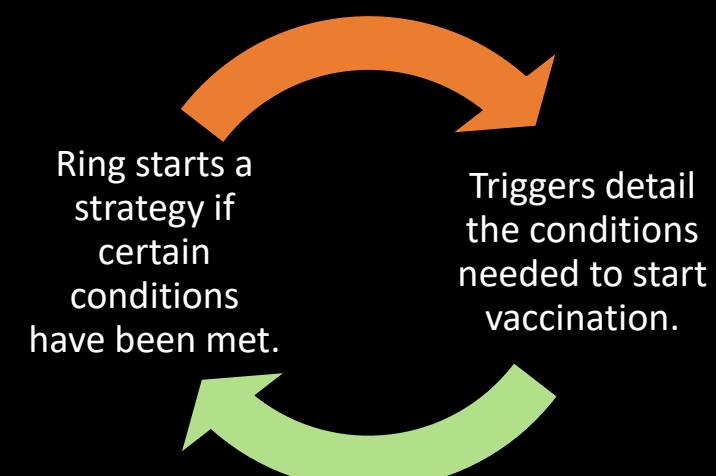
Assign Effects

Output Settings

The 2 parameter blocks that are implemented between production types are:

- ⚙️ Vaccination Rings
- ⚙️ Vaccination Triggers

We are starting with these items for an important reason, as they are the parameters that start the vaccination strategy.



Vaccination Rings

The navigation tab named Vaccination Ring holds the ring parameters. The ring indicates the area to be covered by a vaccination strategy.

The Sample Scenario has a ring rule implemented. Hover your mouse over the name to see the full text.

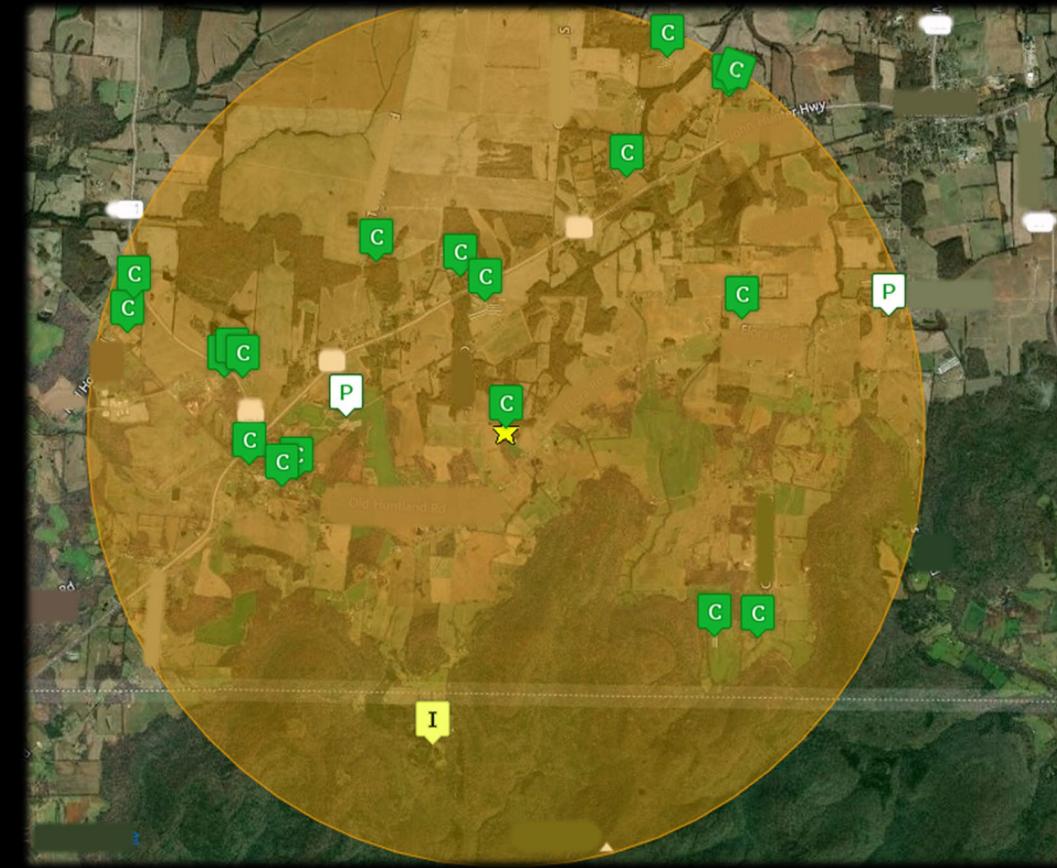
Create Vaccination Ring Rules

▼ Vaccination Ring Rule

Cattle detection triggers Cattle vaccination within 5.0 km

+ New Vaccination Ring Rule





Use the *+ New Vaccination Ring Rule* to add an additional ring.

Sample Scenario's ring rule

The ring rule:

Cattle detection triggers Cattle vaccination within 5.0 km

The screenshot shows the 'Create Vaccination Ring Rules' interface. On the left, under 'Vaccination Ring Rule', there is a list item 'Cattle detection triggers Cattle vaccination within 5.0 km'. To the right of this list item is a yellow-highlighted box containing the rule's logic: 'Once a vaccination program has been initiated by any start/restart trigger, then detection of disease in these production type(s)' followed by a list of 'Cattle'. Below this, another yellow-highlighted box states 'will result in vaccination of units of these production type(s)' followed by another list of 'Cattle'. At the bottom of the main panel, there are input fields for 'inner radius' (empty) and 'outer radius' (set to '5.0 km'), along with 'Cancel' and 'Apply' buttons. To the right of the main panel is a sidebar titled 'Population Production Types' showing 'Swine (460 units)' and 'Cattle (3497 units)' each with four circular icons (three green, one grey). Below this is a section for 'Production Type Groups' with a '+ define new group' button. At the bottom right of the sidebar is a section for 'Export Population' with buttons for 'Export Population as XML' and 'Export Population as CSV', and a note about saving to an 'Exports' folder.

Hint: Select the yellow box first; the box will have a highlight outline when selected. Click on production type from list to add to box. Click again on production type within yellow box to remove. Hover text appears on both Add and Remove.

Cattle detection triggers **Cattle** vaccination within 5.0 km

Let's break this down

- 1) After trigger conditions are fulfilled (set on Vaccination Triggers tab), then...
- 2) Detection of disease in **Cattle** production type...
- 3) Results in vaccination in **Cattle** production types, and...
- 4) A vaccination ring around each detected unit will include all units of **Cattle** with a radius of 5 km.

Note that the vaccination pattern can omit an inner section if needed by including an inner radius value.

Once a vaccination program has been initiated by any start/restart trigger, then detection of disease in these production type(s)

Cattle

To add Production Types to this list, click in this box then click on a Type in the Population Panel

will result in vaccination of units of these production type(s)

Cattle

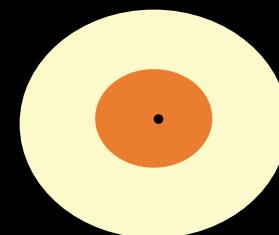
To add Production Types to this list, click in this box then click on a Type in the Population Panel

within a ring with an inner radius of km (optional)
and outer radius of 5.0 km

Cancel **Apply**

In what situation would an inner radius make sense?

There may be many reasons to use an inner radius. One example is when a destruction ring has been set to pre-emptively depopulate units that are within 1 km. There is no reason for the simulation to apply both a destruction event and attempt to apply a vaccination event.



Once a vaccination program has been initiated by any start/restart trigger, then detection of disease in these production type(s)

Cattle

To add Production Types to this list,
click in this box then click on a Type in the Population Panel

will result in vaccination of units of these production type(s)

Cattle

To add Production Types to this list,
click in this box then click on a Type in the Population Panel

within a ring with an inner radius of km (optional)

and outer radius of 5.0 km

Cancel

Apply

Production types in rings

Which production types can be used?

Create Vaccination Ring Rules

▼ Vaccination Ring Rule
Swine, Cattle detection triggers Swine,...  

[+ New Vaccination Ring Rule](#)

Once a vaccination program has been initiated by any start/restart trigger, then detection of disease in these production type(s)

Swine

Cattle

To add Production Types to this list,
click in this box then click on a Type in the Population Panel

will result in vaccination of units of these production type(s)

Swine

Cattle

To add Production Types to this list,
click in this box then click on a Type in the Population Panel

within a ring with an inner radius of km (optional)
and outer radius of 5.0 km

[Cancel](#) [Apply](#)

What are the conditions that start vaccination?

The Sample Scenario has a trigger implemented as the condition to start vaccination, named *3 infected units detected in Swine, Cattle*.

ADSM has 6 conditions that can be set by one or more production types.

In addition, there is also a trigger you can set to stop vaccination.

If vaccination has been stopped, it is possible to restart vaccination with the same 6 triggers that are used to start the vaccination strategy initially.

We will cover capacity for vaccination later. Note that start capacity and restart capacity can be different.

The screenshot shows the 'Vaccination Triggers' configuration panel in ADSM. On the left, a vertical navigation bar lists various scenario components: Scenario Description, Population, Disease, Disease Progression, Assign Progression, Disease Spread, Review Disease Spread, Controls (with a green 'on' button), Control Protocol, Vaccination Triggers (which is currently selected and highlighted in grey), and Vaccination Rings. To the right of this bar is a main panel titled 'Vaccination Triggers'. It contains three sections: 'Start Triggers' (which includes '+ New Disease Detection', '+ New Rate Of New Detections', '+ New Dissemination Rate', '+ New Spread Between Groups', '+ New Time From First Detection', and '+ New Destruction Wait Time'), 'Stop Triggers' (which includes '+ New Stop Vaccination'), and 'Restart Triggers'. A red arrow points from the text '3 infected units detected in Swine, Cattle' in the first bullet point of the 'Start Triggers' list back to the 'Vaccination Triggers' section in the navigation bar.

Trigger - 3 infected units detected in Swine, Cattle

In this example, the trigger group contains both Swine and Cattle. The Sample scenario example is triggered by the number of units detected. Therefore, the trigger name reflects the details of the trigger. To make the trigger a restart trigger, use the yes/no checkbox at the bottom of the parameter.

The screenshot shows the 'Vaccination Triggers' configuration interface. On the left, under 'Start Triggers', there is a selected item: '3 infected units detected in Swine, Cattle'. A red arrow points from this item to the 'Trigger group*' section in the center. The 'Trigger group*' section contains 'Swine' and 'Cattle' with a note: 'To add Production Types to this list, click in this box then click on a Type in the Population Panel'. Below this is a 'Number of units*' input field set to '3'. At the bottom of this section are 'Cancel' and 'Apply' buttons. To the right of the central panel is a 'Population Production Types' panel showing 'Swine (460 units)' and 'Cattle (3497 units)' with green icons. Below this are 'Production Type Groups' and export options: 'Export Population as XML' and 'Export Population as CSV'.

Hint: Select the yellow box first; the box will have a highlight outline when selected. Click on production type from list to add to box. Click again on production type within yellow box to remove. Hover text appears on both Add and Remove.

What if I have multiple triggers? Which one starts vaccination?

You can use multiple triggers. When any one of the triggers meets the requirements, vaccination will start.

Vaccination Triggers

▼ Start Triggers

- 3 infected units detected in Swine, Cattle  
- 1 infected units within 1 days, detected in Cattle  
- 10 days elapsed since First Detection in Swine, Cattle  
 - + [New Disease Detection](#)
 - + [New Rate Of New Detections](#)
 - + [New Dissemination Rate](#)
 - + [New Spread Between Groups](#)
 - + [New Time From First Detection](#)
 - + [New Destruction Wait Time](#)



Vaccination queue – the simulation determines an order

We have the ring rule

Cattle detection triggers Cattle vaccination within 5.0 km

And the trigger

3 infected units detected in Swine, Cattle

Note these assumptions as we step through this example:

Vaccination has been triggered.

Vaccination Capacity is set to allow unlimited vaccinations in a day.

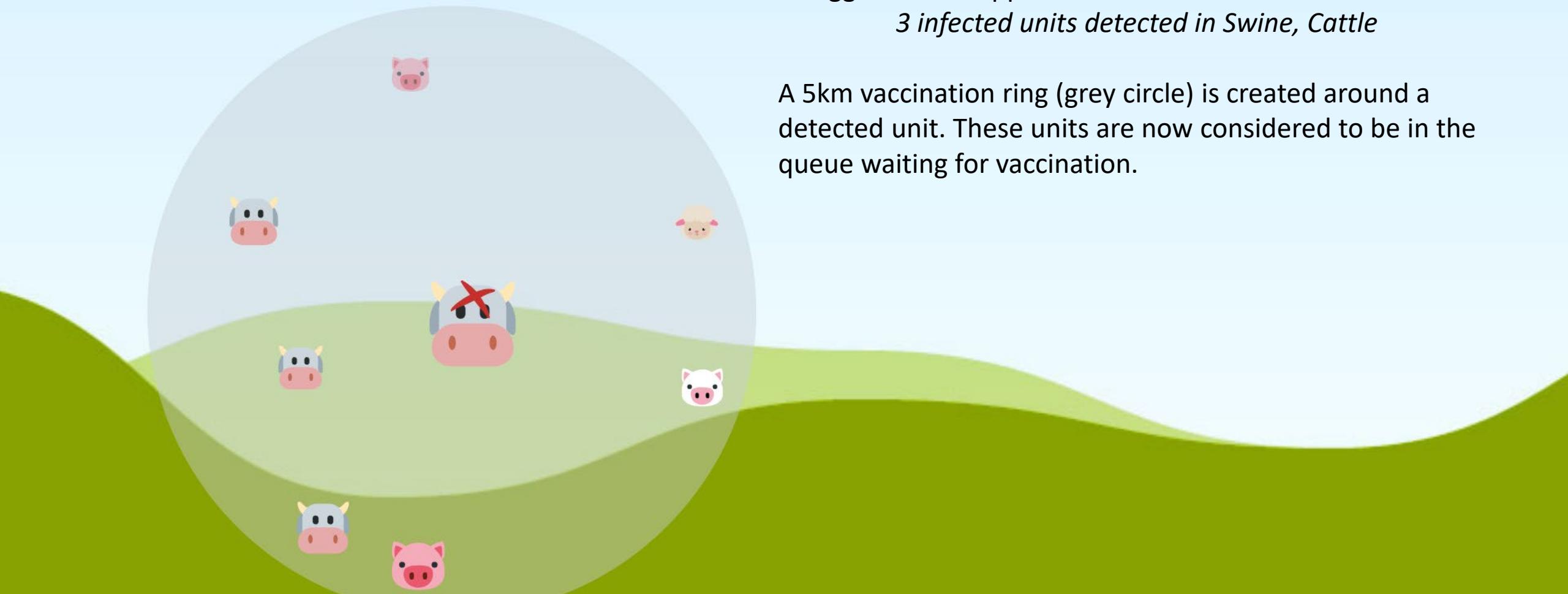
Detected units are not being vaccinated (simpler than the Sample Scenario).

Events happen in a daily step, with detection happening on one day and vaccination happening on the next day.



The vaccination queue is happening in the simulation's processes and is not visible.

Vaccination Ring, Day 1 Post Trigger Event



A trigger event happens.

3 infected units detected in Swine, Cattle

A 5km vaccination ring (grey circle) is created around a detected unit. These units are now considered to be in the queue waiting for vaccination.

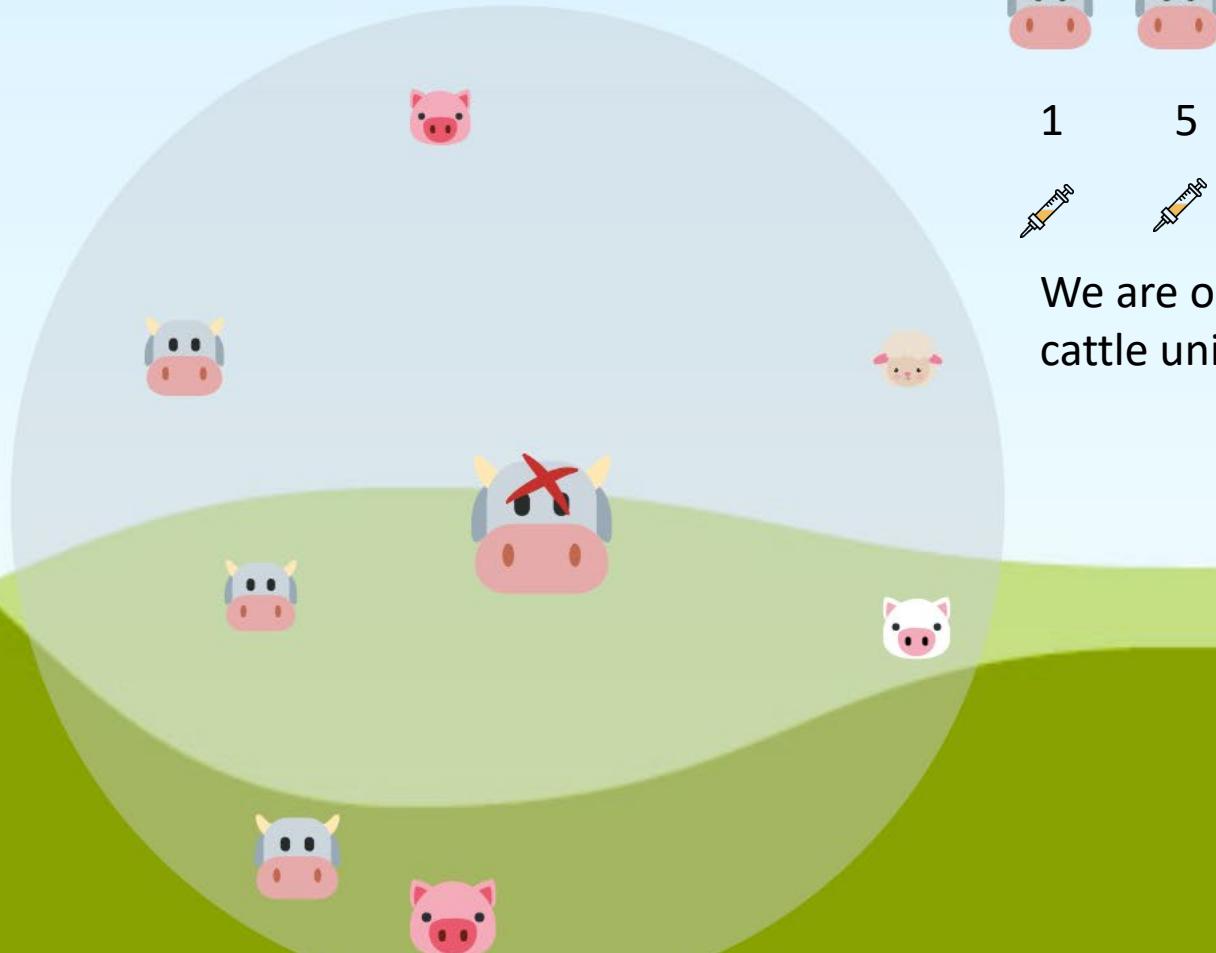
Vaccination Ring, Day 1 Post Trigger Event

Units are placed into the queue according to order set in Vaccination Priorities; cattle first. We will cover Vaccination Priorities in more detail later in this training.

Vaccination Global	
Vaccination Priorities	
Reason	Cattle
Production Type	Swine
Days Holding	
Size	
Direction	



We are only vaccinating cattle, according to the ring rule. All cattle units are vaccinated in a day, as capacity is unlimited.



Once a vaccination program has been initiated by any start/restart trigger, then detection of disease in these production type(s)

Cattle
To add Production Types to this list, click in this box then click on a Type in the Population Panel

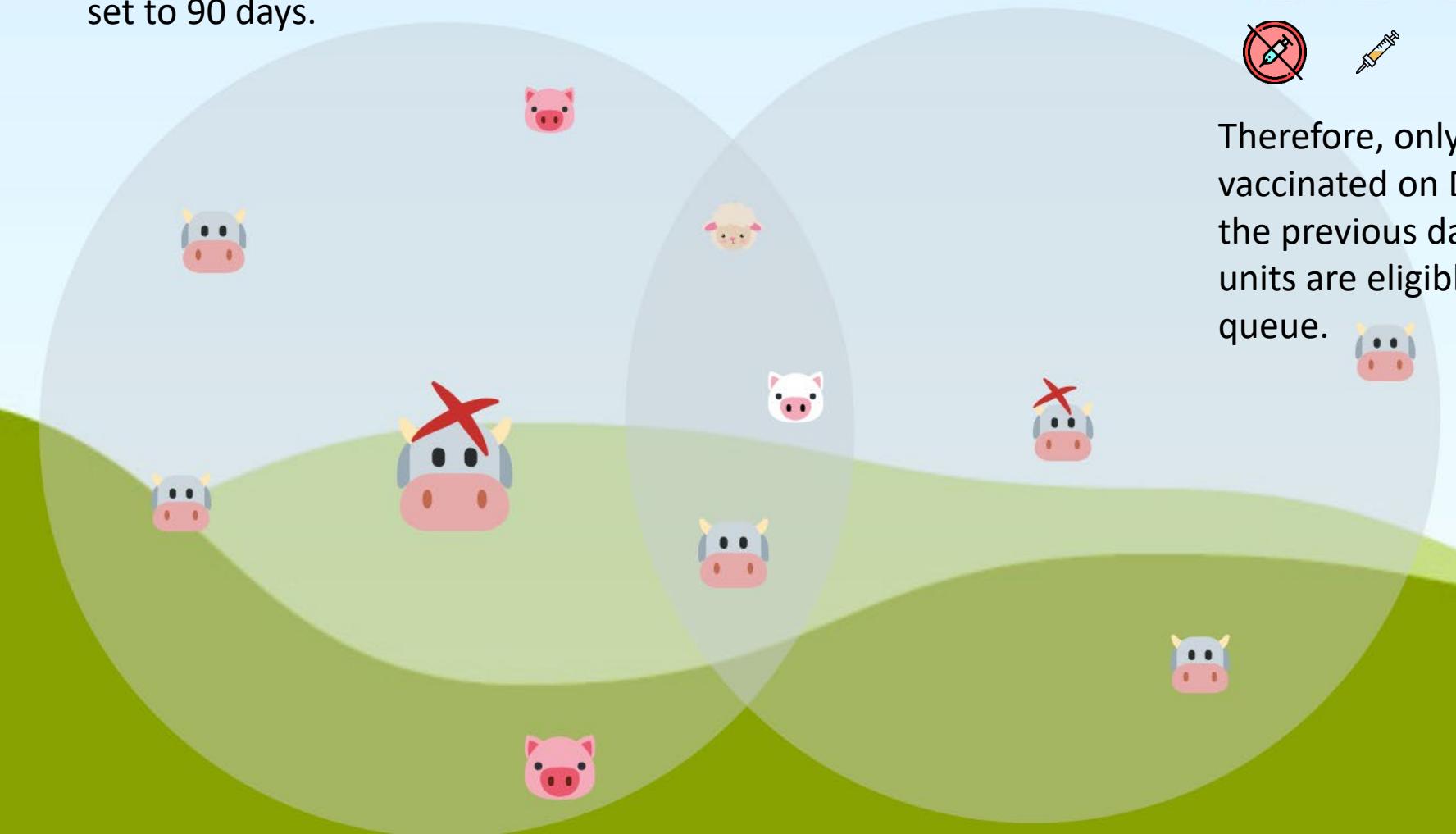
will result in vaccination of units of these production type(s)

Cattle
To add Production Types to this list, click in this box then click on a Type in the Population Panel

within a ring with an inner radius of km (optional)
and outer radius of 5.0 km

Vaccination Ring, Day 2 Post Trigger Event

A second ring is created due to detection event, with some of the same units as on Day 1. All units go into the queue. The minimum time between vaccinations is set to 90 days.



Therefore, only 2 units of cattle are eligible to be vaccinated on Day 2, as one unit was vaccinated the previous day. The simulation assesses which units are eligible as it encounters them in the queue.

Create Control Protocols

+ New Control Protocol

Cattle Control

- Detection
- Tracing
- Testing
- Exams
- Destruction
- Vaccination
- Cost Accounting

Name*
Cattle Control
Name your Protocol so you can recognize it later. Ex: "Quarantine"

Vaccinate detected units
Indicates if detection in units of this production type will be included in vaccination.

Minimum time between vaccinations*
90
The minimum time in days between vaccination for units of this production type. Default value set to 99999 to stop duplicate vaccinations.

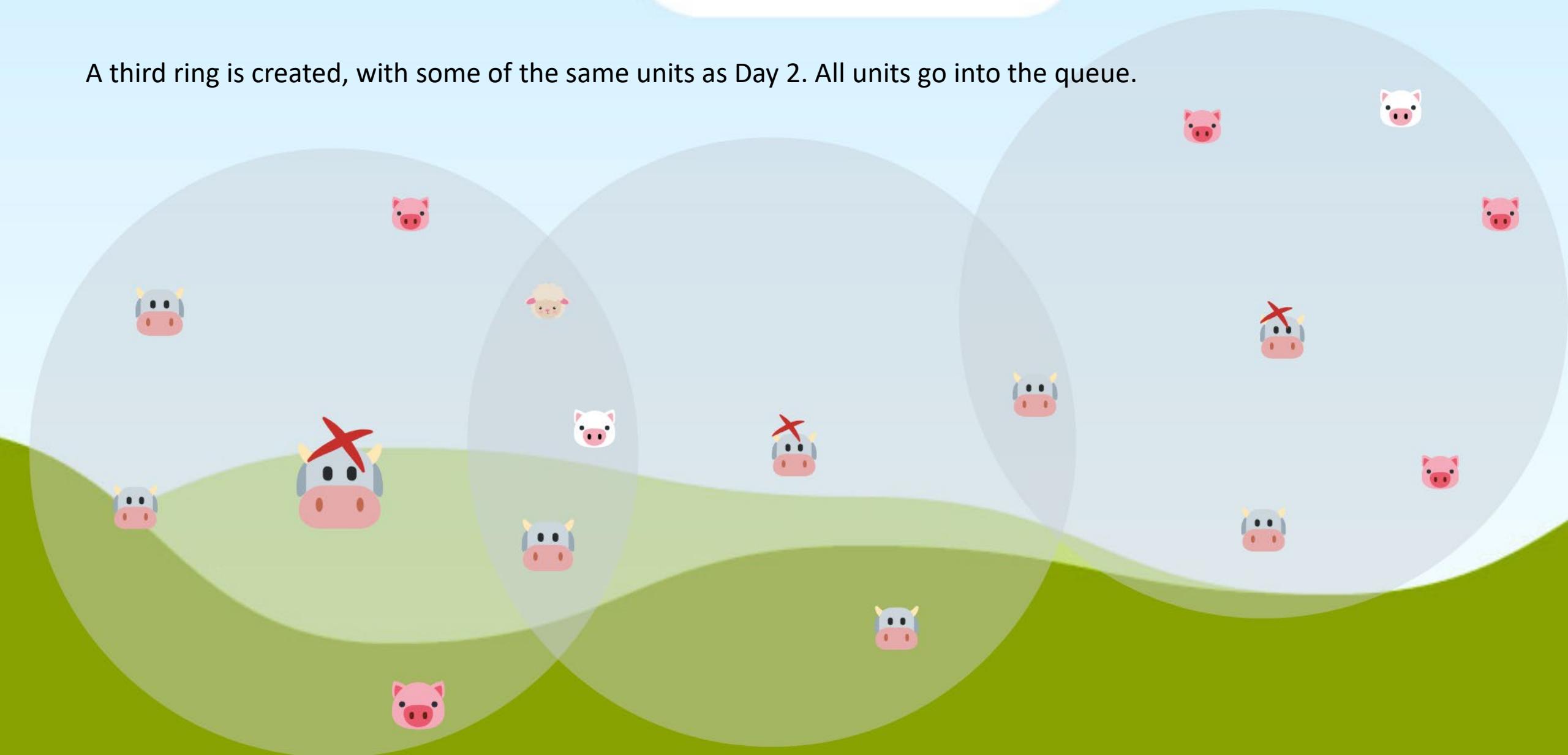
Days to immunity
7
The number of days required for the onset of vaccine immunity in a newly vaccinated unit of this type.

Vaccine immune period
Immune period vaccination
Defines the vaccine immune period for units of this production type.

Cancel Apply

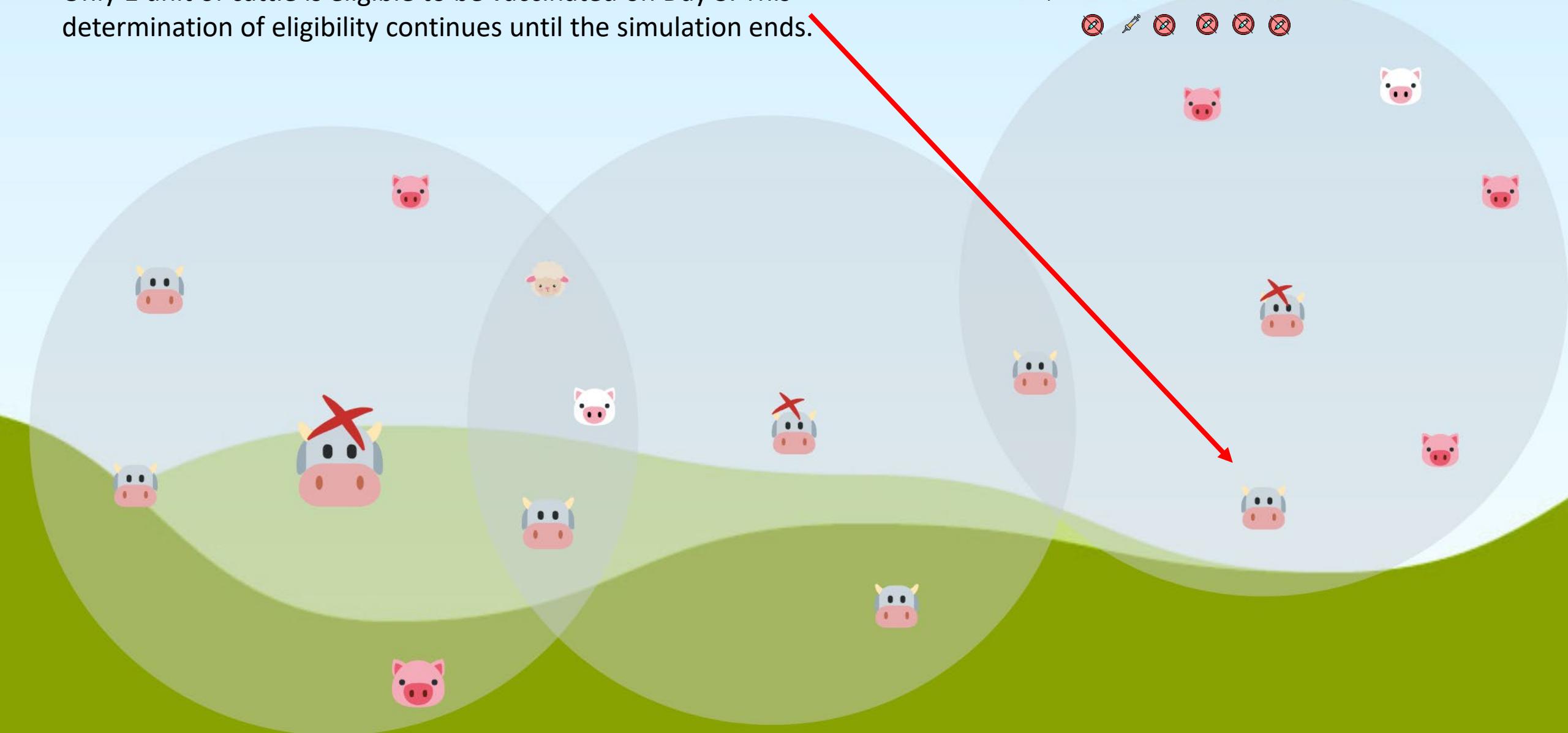
Vaccination Ring, Day 3 Post Trigger Event

A third ring is created, with some of the same units as Day 2. All units go into the queue.



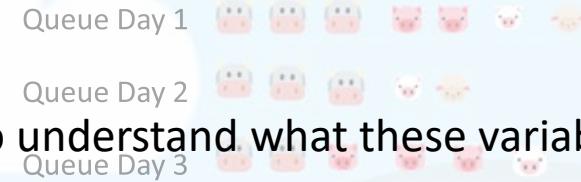
Vaccination Ring, Day 3 Post Trigger Event

Only 1 unit of cattle is eligible to be vaccinated on Day 3. This determination of eligibility continues until the simulation ends.



Vaccination Ring, Day 3 Post Trigger Event

The results set is capturing information about the queue. It is important to understand what these variables mean.



vacwU – the count of units waiting for vaccination, including those units that will be determined later to be ineligible for vaccination on that day

vacwUMax – the maximum number of units that have been waiting for vaccination, including those units that will be determined later to be ineligible for vaccination

vacwUMaxDay – the day of the simulation where the maximum number of units were waiting for vaccination

vacwUDaysInQueue – Number of days units have been waiting in the queue for vaccination, including those unit days that will be determined later to be ineligible for vaccination

vacwUTimeAvg – Average number of days that units have been waiting for vaccination, including those unit days that will be determined later to be ineligible for vaccination.

vacwUTimeMax – Maximum number of days that a unit had to wait for vaccination, including those units that will be determined later to be ineligible for vaccination

Vaccination – Who is Eligible?

The last slide described some units as “ineligible.” *What does that mean?*

The input parameters determine which units are eligible and which are ineligible. Here are a few examples of ineligible units.

Vaccination ring input for the field “will result in vaccination of units of these production types” must include the production types intended for vaccination.

A unit will not be vaccinated the second (or more) time it is identified in the queue, unless the “minimum time between vaccinations” has been met. This parameter stops repeated vaccination events. The lowest number accepted in this field is 1, so vaccination could repeat in one day if needed. The default value in this field is 99,999 days, which makes it extremely unlikely that a repeated vaccination event will happen unless the parameter is modified to a lesser number of days that is appropriate for a given strategy.

When a unit within the ring is detected, it relies on the parameter “Vaccinate detected units” to determine if the unit is eligible.

Once a vaccination program has been initiated by any start/restart trigger, then detection of disease in these production type(s)

Cattle

To add Production Types to this list, click in this box then click on a Type in the Population Panel

will result in vaccination of units of these production type(s)

Cattle

To add Production Types to this list, click in this box then click on a Type in the Population Panel

within a ring with an inner radius of [] km (optional) and outer radius of [] 5.0 km

Cancel

Apply

Create Control Protocols

+ New Control Protocol

▼ Cattle Control

Detection

Tracing

Testing

Exams

Destruction

Vaccination

Cost Accounting

Name*

Cattle Control

Name your Protocol so you can recognize it later. Ex: “Quarantine”

Vaccinate detected units

Indicates if detection in units of this production type will be included in vaccination.

Minimum time between vaccinations*

[90]

The minimum time in days between vaccination for units of this production type. Default value set to 99999 to stop duplicate vaccinations.

Days to immunity

[7]

The number of days required for the onset of vaccine immunity in a newly vaccinated unit of this type.

Vaccine immune period

Immune period vaccination

Defines the vaccine immune period for units of this production type.

Cancel

Apply

Vaccinate detected units

Indicates if detection in units of this production type will be included in vaccination.

All the eligible/ineligible decisions are happening in the simulation's processes.

Vaccination Queue Summary

The vaccination queue is a process taking place in the simulation to determine which units to vaccinate. This process is mostly invisible to the end user. It requires extensive research and comparison of various outputs to follow through the decision that takes place regarding each unit.

The vaccination queue in ADSM uses the same process as NAADSM 3.X. NAADSM 4.x uses a different methodology to determine the vaccination queue. ADSM will place units in the vaccination queue more than one time if they are identified by more than one vaccination ring. However, ADSM will not vaccinate the unit more than one time unless parameters allow that to happen.

The input parameters drive all the decisions in the queue. Modifying the parameters will change the vaccination strategy.

Daily output parameters around vaccination should not be treated as an indicator of a vaccination event or the day-to-day need for vaccination resources. The Supplemental File Daily_events_X.csv list vaccination events but doesn't indicate vaccine immunity. Daily_states_X.csv will indicate by iteration by day, by herd which units have transitioned into vaccine immune state indicated with the letter "V."

Summary - Between Production Types

This section has looked at parameters that allow events in one production type to result in action on other types. These parameters are set to start vaccination.

Next, we will review the vaccination parameters that are assigned to a specific production type.

To a Specific Production Type





What Does “To a Specific Production Type” Mean?

There are times when we want parameters to act a certain way for a specific production type.

For example, Cattle may only require a single dose of vaccine to gain immunity. However, Swine might require an initial dose and a secondary dose (booster) to reach the desired level of immunity. Therefore, specific parameters are set to each production type.



Vaccination Parameters to a Specific Production Type

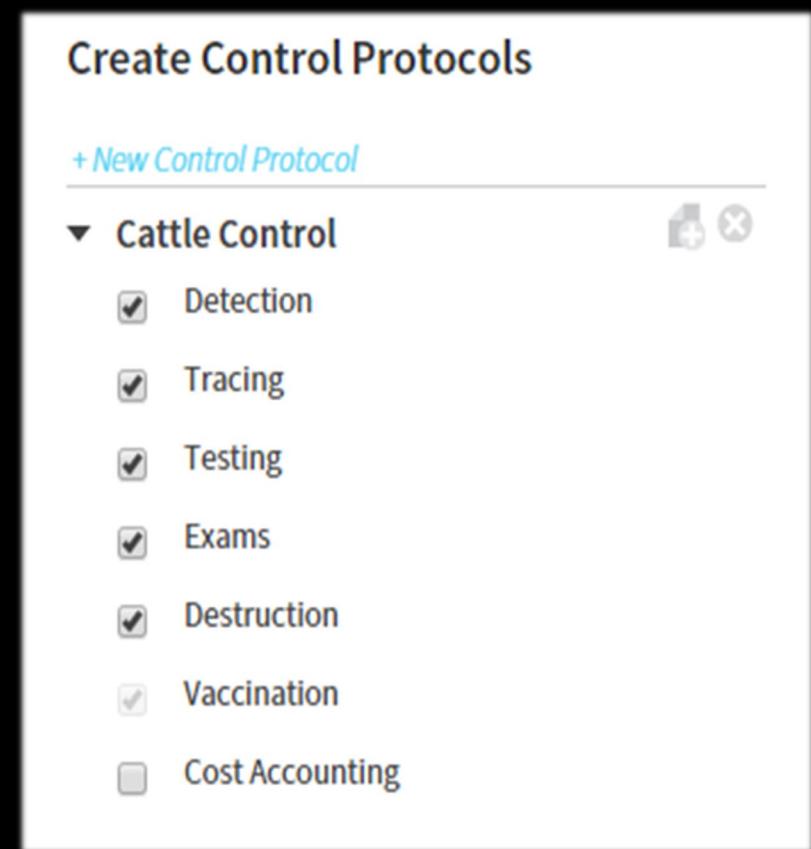
Vaccination parameters within a Control Protocol are assigned to specific production types. Recall that a Control Protocol allows integrated control measures to be applied at a production type level.

The Sample Scenario is a very simple example and shows only Cattle Control as a control protocol.

Notice that the vaccination option is both checked and is set as inactive (greyed out). The reason the parameter is greyed out is because the Control Protocol is not the place to flip the switch to turn the vaccination strategy on. Recall that the vaccination switch was turned on because of the vaccination ring.

If the vaccination box is checked, there are parameters that need to be set in that form. Click on Vaccination to open the form.

Use the *+ New Control Protocol* to add an additional control protocol.



Integrated Control Measures – What Does That Mean?

Control Protocols allow multiple control interventions

It is possible to depopulate one production type, change movements of a different production type, and vaccinate a third production type.

All actions are flexible to allow a customized vaccination strategy.



Sample Scenario's Control Protocol **Cattle Control**

Recall that the protocol will be assigned to a production type once completed.

There are 4 parameters to set.

Vaccinate detected units is a yes/no option.

Minimum time between vaccinations. This field allows for a secondary (booster) vaccination to happen a number of days after the initial vaccination. The default value is set to 99,999 days, which makes only one vaccination per unit happen during the iteration. If needed, the parameter is changed to a more reasonable value, down to 1 day between vaccinations. The parameter cannot be empty.

Days to immunity describes the number of days (whole number) that are needed for the vaccine to generate an immune response. This field is required.

Vaccine immune period is a probability density function that allows a range to be set for the window of vaccine-induced immunity.

The screenshot shows a configuration form for a protocol named 'Cattle Control'. The form includes fields for 'Vaccinate detected units' (checked), 'Minimum time between vaccinations' (set to 90), 'Days to immunity' (set to 7), and a dropdown for 'Vaccine immune period' (set to 'Immune period vaccination'). Buttons for 'Cancel' and 'Apply' are at the bottom.

Name*
Cattle Control
Name your Protocol so you can recognize it later. Ex:"Quarantine"

Vaccinate detected units
Indicates if detection in units of this **production type** will be included in vaccination.

Minimum time between vaccinations*
90
The minimum time in days between vaccination for units of this **production type**. Default value set to 99999 to stop duplicate vaccinations.

Days to immunity
7
The number of days required for the onset of **vaccine immunity** in a newly vaccinated unit of this type.

Vaccine immune period
Immune period vaccination
Defines the **vaccine immune** period for units of this **production type**.

Cancel **Apply**

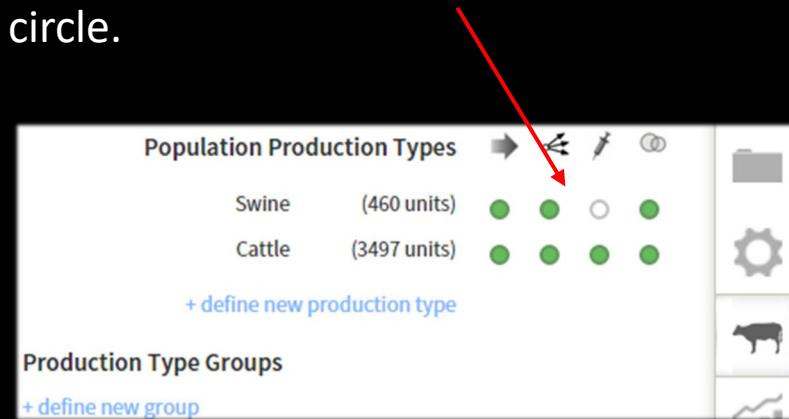
Assign Control Protocol Cattle Control

The navigation tab Assign Protocol is used to associate a Control protocol to a specific production type.

Scenario Description	Assign a Control Protocol to each Production Type		
	Production type	Control protocol	Notes
Population	Swine	-----	
Disease	Cattle	Cattle Control	
Disease Progression			
Assign Progression			
Disease Spread			
Review Disease Spread			
Controls	on		
Control Protocol			
Vaccination Triggers			
Vaccination Rings			
Vaccination Global			
Destruction Global			
Assign Protocols			

The list of available production types is presented by the application. A pull-down list is provided of all the Control Protocols that have been created. The ----- indicates that no assignment has been made.

Assign Control protocols as needed to a given production type. In the Sample Scenario, the Swine Production type is set to null, or no assignment. Notice the lack of assignment can also be seen in the Production Type panel, indicated by an uncolored circle.



Summary - To a Specific Production Type

This section has looked at parameters that are specific to a production type. These parameters can be built in blocks and assigned to one or more production types. This process supports the vaccination strategy after it has been started.

Next, we will review the vaccination parameters that are assigned to all production types.

Across all Production Types





Scenario Description

Population

Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls

on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

Zones

Zone Effects

Assign Effects

Output Settings

Terminology - Global

Edit the Scenario

Description

This file contains a sample scenario for an outbreak of a highly contagious disease. This file may serve as an example that can be modified for other uses, but parameters in this file should not be considered definitive or accurate for any particular disease or situation.

The description of the scenario.

There are 2 blocks of parameters that apply across all production types.
The word “Global” is used to describe these parameters.

Vaccination Global
Destruction Global



This section will explore the Vaccination Global parameter blocks in detail.

Cancel

Apply

Vaccination Global

Vaccination Global are the parameters that apply across all production types. For example, let's say we want to set a high priority for vaccination on a certain production type and a low priority for vaccination on other production types. In that case, we must look across all the production types to set the priority order.

Disease
Disease Progression
Assign Progression
Disease Spread
Review Disease Spread
Controls on
Control Protocol
Vaccination Triggers
Vaccination Rings
Vaccination Global
Destruction Global
Assign Protocols
Zones
Zone Effects
Assign Effects
Output Settings

Reason
Production Type
Days Holding
Size
Direction
Vaccination capacity
High vaccination capacity
Relational function used to define the vaccination capacity
Restart vaccination capacity

Define if the daily vaccination capacity is constant or based on a trend
Vaccinate retrospective days
0
Once a trigger has been activated, determine how many days before the trigger to step into vaccination mode

On the previous slide, we gave the example of setting a high priority for vaccination on a certain production type and a low priority for vaccination on other production types. Production type is one of the reasons that you can use to set priority, but there are several more options. You also have the ability to set a secondary priority. Additional information about priority concepts with descriptive images is available at <https://github.com/NAVADMC/ADSM/wiki/RFC-20121101%3A-New-Vaccination-Priorities>.

Let's start by reviewing all reasons:

Priority	Secondary priority
Reason	Ring
Production Type	List of available production types
Days Holding	Oldest or newest
Unit Size	Smallest or largest
Direction	Outside-in or Inside-out

- Disease
- Disease Progression
- Assign Progression
- Disease Spread
- Review Disease Spread
- Controls** on
- Control Protocol
- Vaccination Triggers
- Vaccination Rings
- Vaccination Global**
- Destruction Global
- Assign Protocols
- Zones
- Zone Effects
- Assign Effects
- Output Settings

The screenshot shows the 'Vaccination Global' section of the ADSM application. On the left, there's a sidebar with various menu items. The 'Vaccination Global' item is currently selected, highlighted with a dark grey background. The main area contains a table-like structure for defining vaccination priorities. The columns are labeled 'Reason', 'Production Type', 'Days Holding', 'Size', and 'Direction'. The 'Production Type' row is currently being moved, as indicated by a grey background and a green vertical bar to its right. A tooltip 'Drag to change Vaccination Priority' is displayed over the 'Days Holding' row. The other rows ('Reason', 'Days Holding', 'Size', 'Direction') have white backgrounds with black text.

Vaccination Global	
Vaccination Priorities	
Reason	
Production Type	Cattle
Days Holding	Drag to change Vaccination Priority
Size	
Direction	

The Priority Widget is the drag and drop section of the ADSM application that allows you to drag items up and down to set the preferred order. The hover text gives the hint to drag items.

There is an assumption operating in the background of vaccination priority. We call that assumption the “Round Robin” approach. This approach takes all the vaccination resources that are available and applies them equally to the units that have been identified for vaccination. Round Robin runs as the default when the simulation needs to decide about the next action to take. Round Robin is overridden when other priorities have been set in the Priority widget.

Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls

on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

Zones

Zone Effects

Assign Effects

Output Settings

Reason

Production Type

Days Holding

Size

Direction

Reason for vaccination is included in the priority list. There is only one option, which is “Ring.” This indicates that the priority will be set simply because the unit has fallen within a vaccination ring. You could think of this as the default setting.

Vaccination capacity

High vaccination capacity

Relational function used to define th

Restart vaccination capacity

Define if the daily vaccination capaci

Vaccinate retrospective days

0

Once a trigger has been activated, de
many days before the trigger to step

Production Type in the priority list will provide a secondary sorting option. The list of available production types will be presented, and you can rearrange with drag and drop.

Days Holding is included in the priority list. The options are “Oldest,” meaning those units that have been waiting the most days, or “Newest,” meaning the units that have been waiting the fewest days. These options are presented, and you can rearrange with drag and drop.

Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls

on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

Zones

Zone Effects

Assign Effects

Output Settings

Reason

Production Type

Days Holding

Size

Direction

Size of unit is included in the priority list. The options are “Largest,” meaning those units that have a higher animal count, or “Smallest” meaning the units that have the fewest animals. These options are presented, and you can rearrange with drag and drop.

Vaccination capacity

High vaccination capacity

Relational function used to define th

Restart vaccination capacity

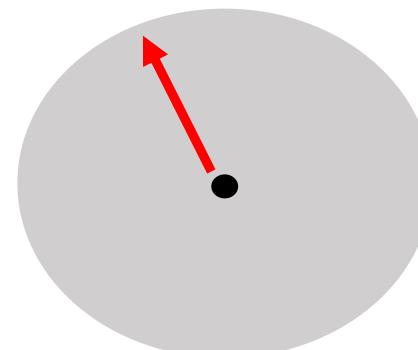
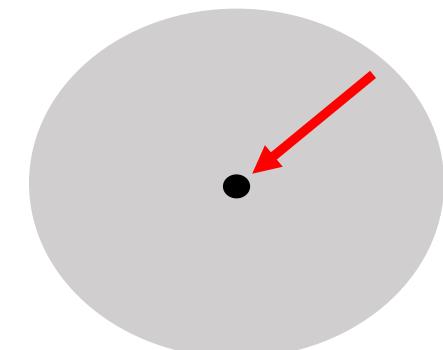
Define if the daily vaccination capaci

Vaccinate retrospective days

0

Once a trigger has been activated, de
many days before the trigger to step

Direction is included in the priority list. The options are “Outside-in”, or “Inside-out”. What does this mean? The units closest to the outside of the ring can be vaccinated first or the units closest to the center of the ring (closest to the detected unit) can be vaccinated first. These options are presented, and you can rearrange with drag and drop.



Disease

Disease Progression

Assign Progression

Disease Spread

Review Disease Spread

Controls

on

Control Protocol

Vaccination Triggers

Vaccination Rings

Vaccination Global

Destruction Global

Assign Protocols

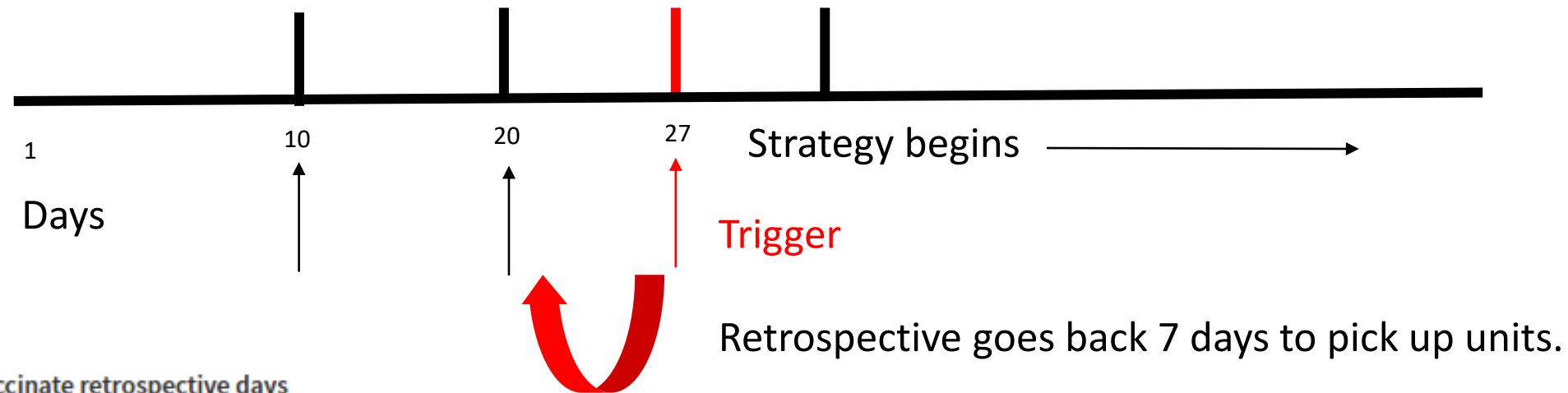
Zones

Zone Effects

Assign Effects

Output Settings

Retrospective vaccination parameter requires you to think like the simulation. During an actual vaccination in real life, we might automatically vaccinate around all detections regardless of when they happened. However, the simulation is much simpler, and only knows to start vaccination after the trigger has been reached. The ‘Retrospective days’ setting allows you to consider all detections that have happened X days before the trigger and include those units (rings) in the vaccination queue. These units could be considered “older” and therefore have a specific priority that can be used.



Once a trigger has been activated, detected units prior to the trigger day can be retrospectively included in the vaccination strategy. This number defines how many days before the trigger to step back, and incorporate detected units.

Summary – Across all Production Types

This section has looked at parameters that apply across all production types. This process supports the vaccination strategy after it has been started.

What's Next?





Join the flock!

Learn more about ADSM or try an example

ADSM is currently available at <https://github.com/NAVADMC/ADSM/releases/latest>

Try the sample scenario

<https://github.com/NAVADMC/ADSM/wiki/A-Quick-Start-Guide:-Running-the-sample-scenario>

Read the wiki pages link

<https://github.com/NAVADMC/ADSM/wiki>

Additional training materials will be posted at

<http://navadmc.github.io/ADSM/>

Training includes:

Overview

Populations and Production Types

Getting Started

Disease Parameters

Control Parameters

Output Settings and Run

Results

Detailed Evaluation of Results - Verification and Validation

Vaccination Strategy

Administration



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.



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