

Progress towards an Integrated and Companion Animal Zoonotic Disease Surveillance System within the DoD



U.S. ARMY PUBLIC HEALTH CENTER



Sheldon Waugh, MSc, PhD
Epidemiologist
One Health Division

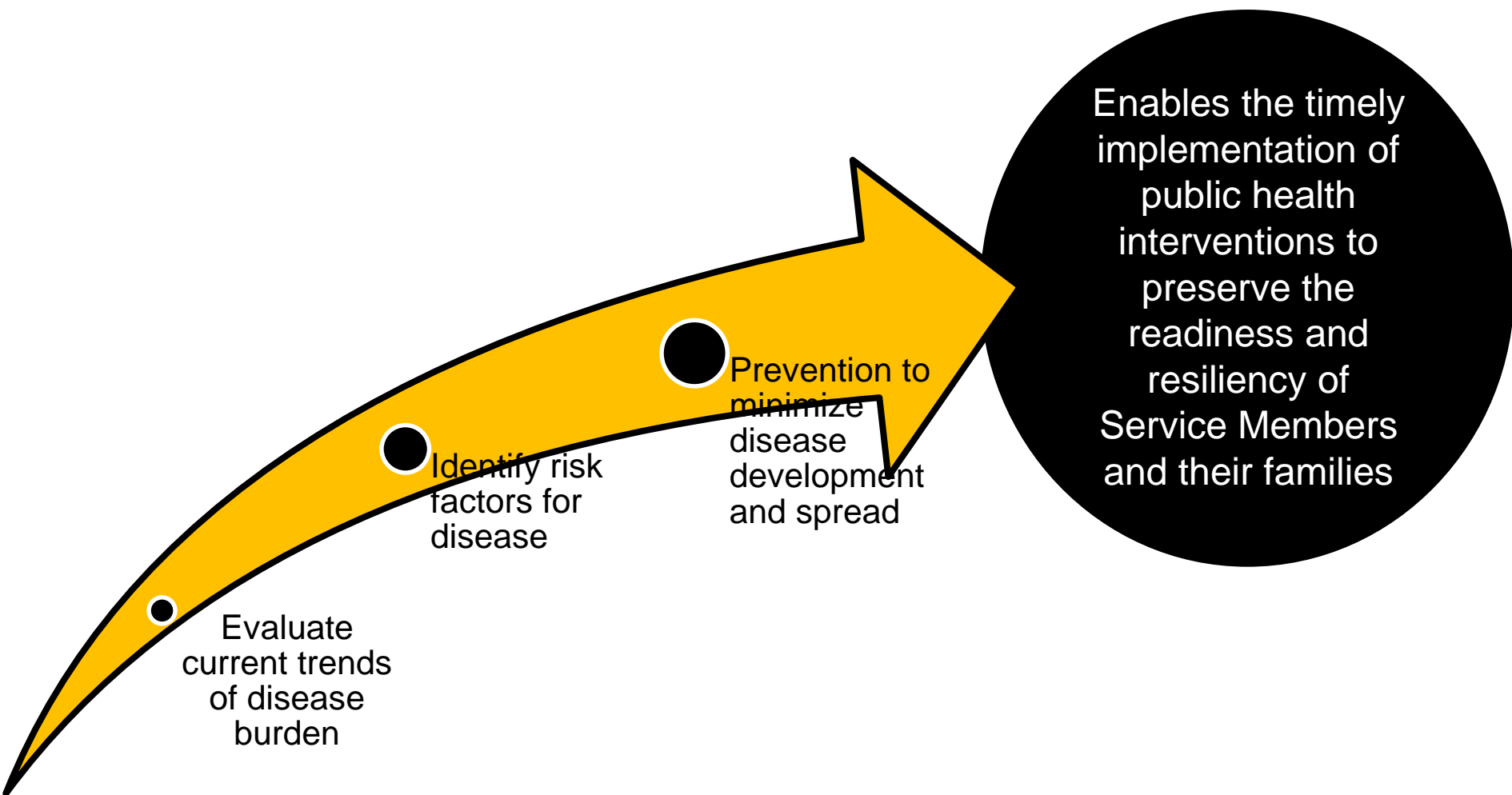
Veterinary Services and Public Health Sanitation Directorate

- Background and GPAWSS
- GPAWSS-Zoonoses
- How are we going to do it?
- Future Initiatives

Disclaimer: The views expressed in this document are those of the author(s) and do not necessarily reflect the official policy of the Department of Defense, Department of the Army, U.S. Army Medical Department or the U.S. Government.

Background and GPAWSS





- The Army is the lead service for veterinary public health and animal health services
 - Responsibility to champion biosurveillance efforts to support One Health initiatives, improving Service Member, family, and veteran health across the Joint Force
 - Army Regulation (AR) 40-905 tasks Veterinary Corp Officers (VCOs) to “conduct disease surveillance programs for DOD-owned and Government-owned (non-DOD) animals”

Government Owned Animals (GOAs)



Privately Owned Animals (POAs)



- Centralized disease surveillance in Privately and Government Owned Animals (POAs and GOAs) has been non-existent
 - Prior to the Remote Online Veterinary Record (ROVR): constrained by paper records or private commercial software with no central data-sharing capabilities
 - Knowledge gap of overall burden, distribution, risk factors, and potential impact of diseases
- ROVR gives us the capability to pull data centrally
 - Limitations still exist
 - Need specific guidance to ensure accurate data capture



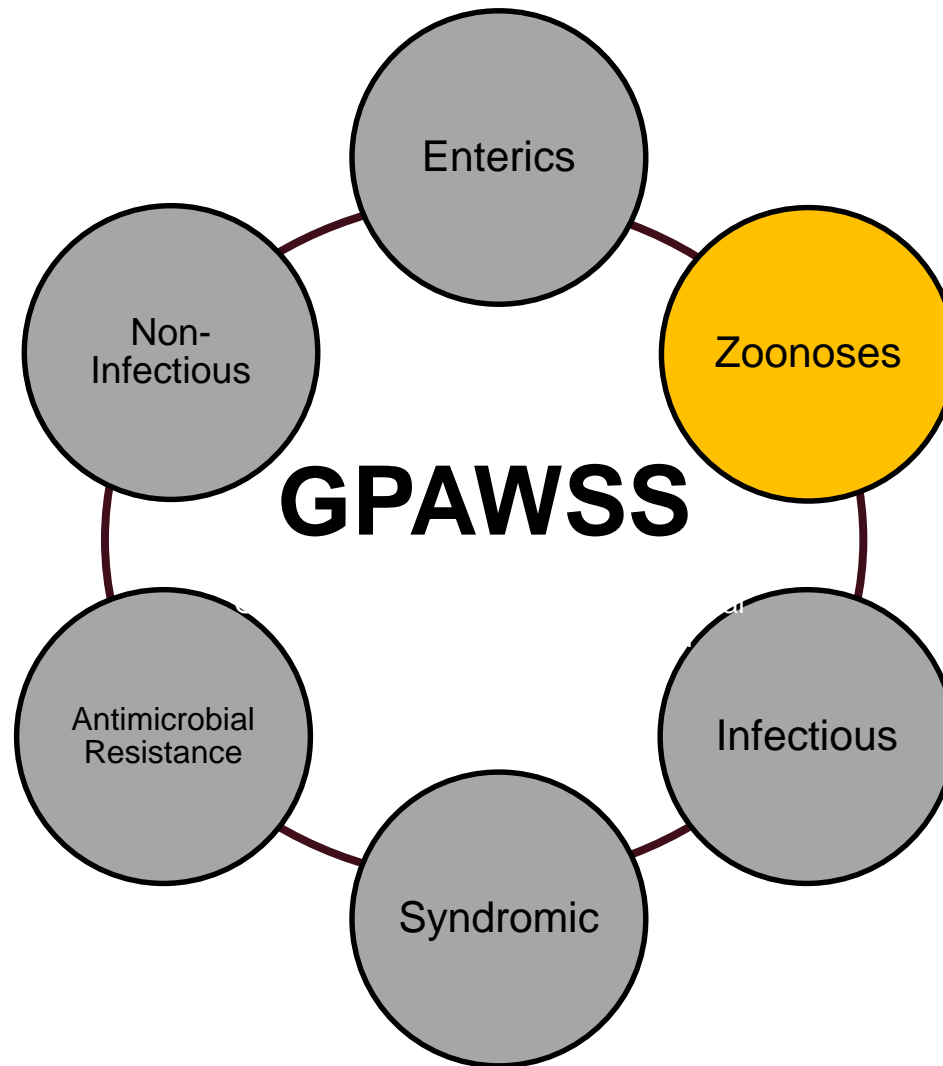
Government and Privately-owned Animal Worldwide Surveillance System



- Surveillance platform designed to inform commanders and VCOs of the distribution, frequency, and incidence of various companion animal diseases
 - Interactive, web-based platform
- Will utilize multiple data sources
 - ROVR data
 - Laboratory data
 - Data from a civilian corporate companion animal practice
- Managed by VSPHS One Health Division

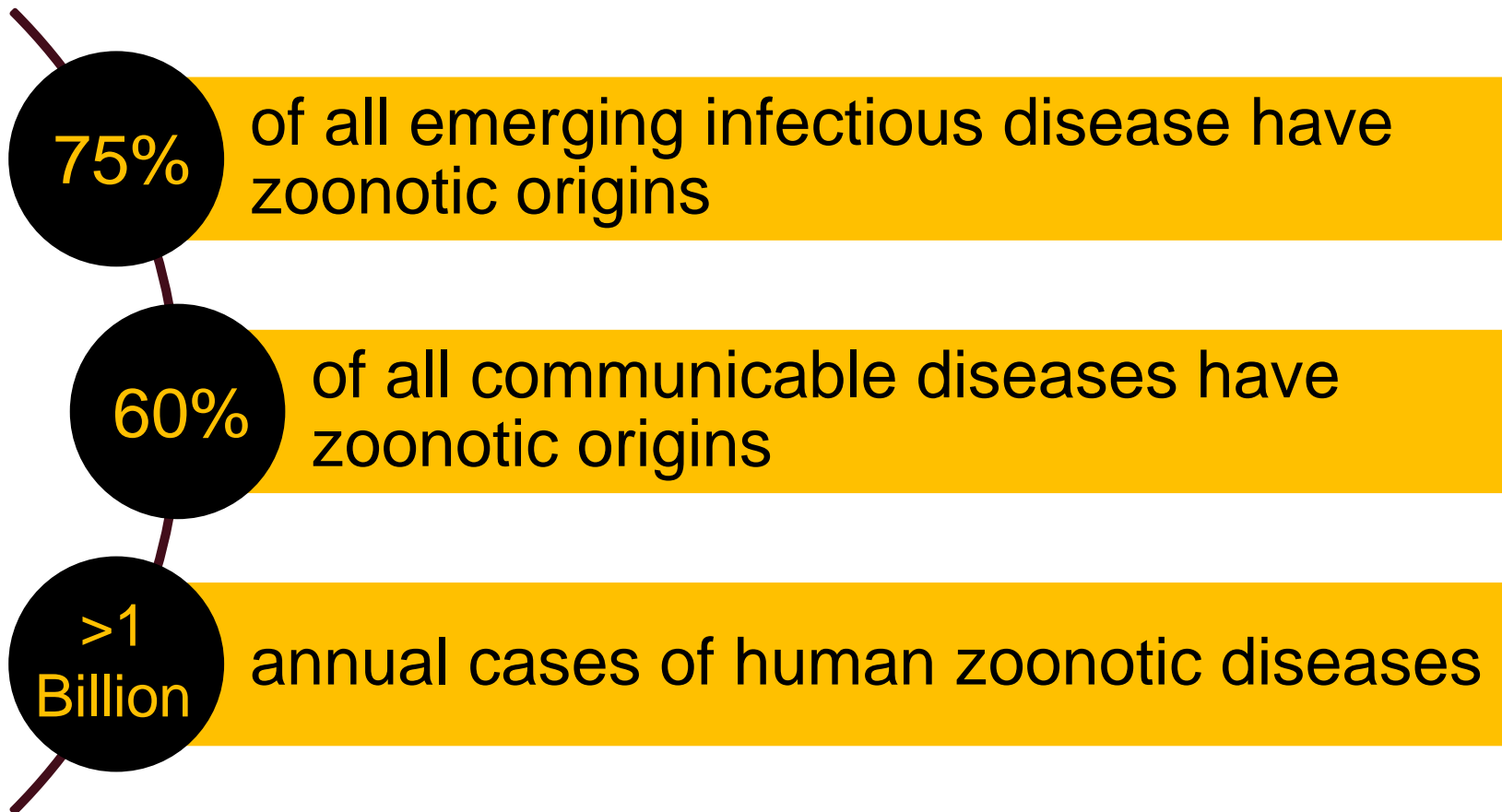


GPAWSS



GPAWSS- Zoonoses

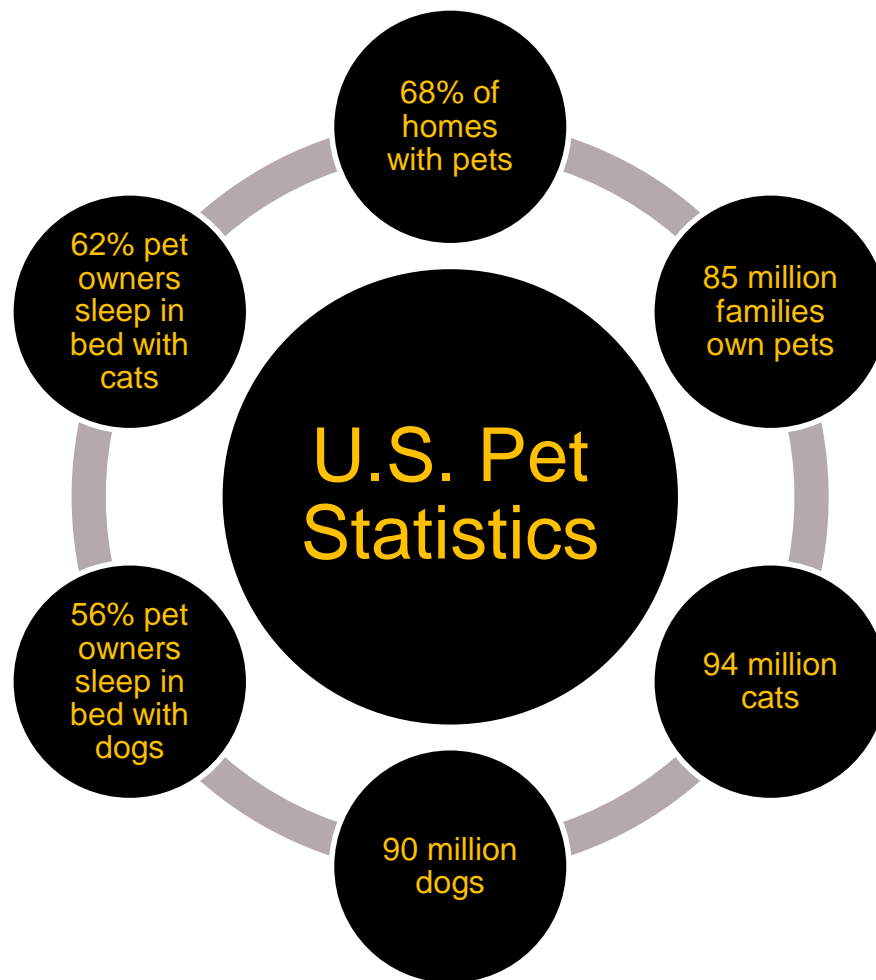




Substantial burden on global health!

Factors influencing the occurrence of companion animal zoonoses:

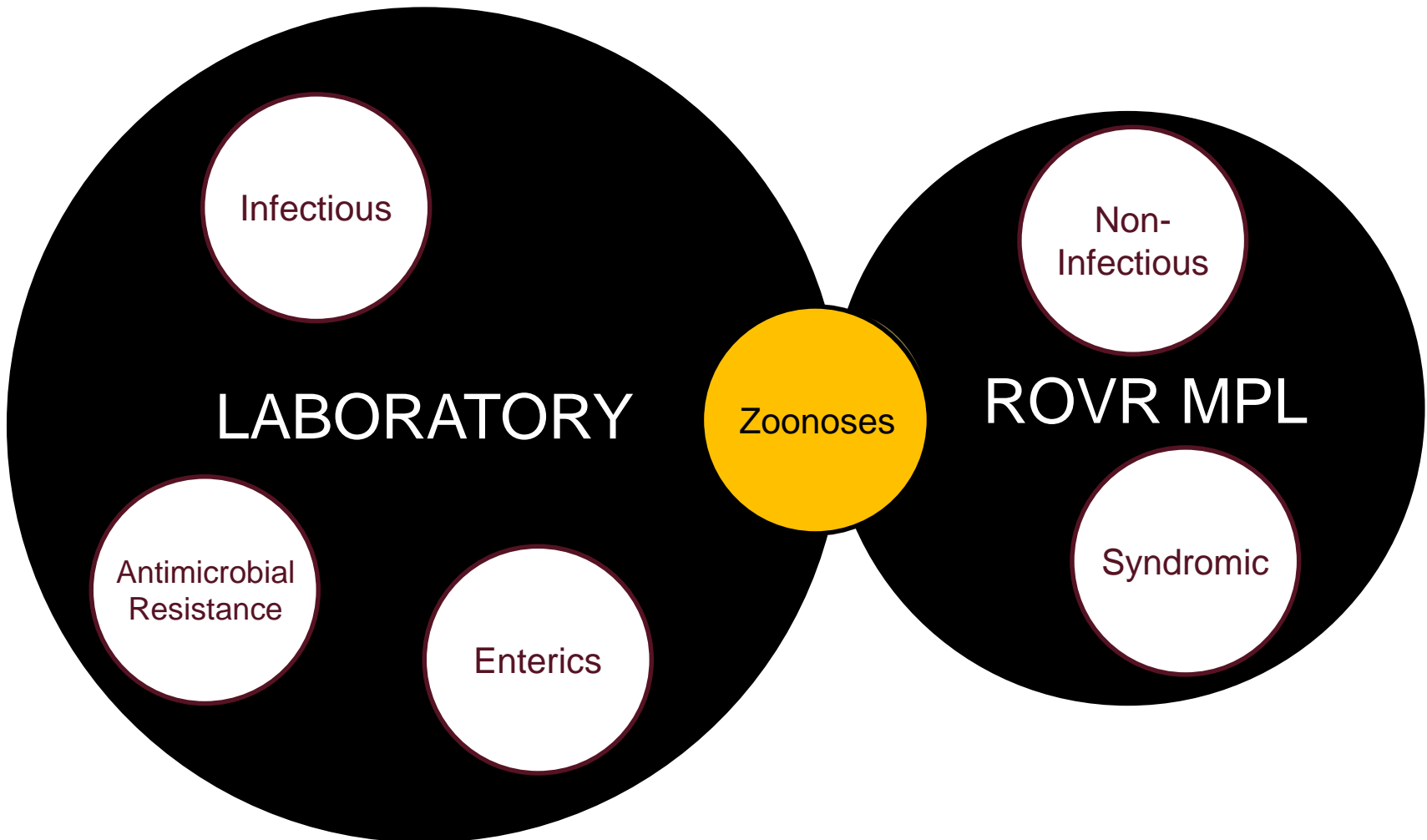
- Growing human population
- Growing pet population
- Shared environments & activities
- Increased urbanization
- Increased global travel and trade
- Microbial adaptation and emergence
- Occupational risks



- Risk of zoonotic disease transmission increases with persistent contact
 - Especially the immunocompromised
- Human and companion animal interactions have a wide range of benefits to human health
 - Enhancing human physical health
 - Enhancing psychological well-being
- We need to better understand disease burden and useful interventions to minimize risk

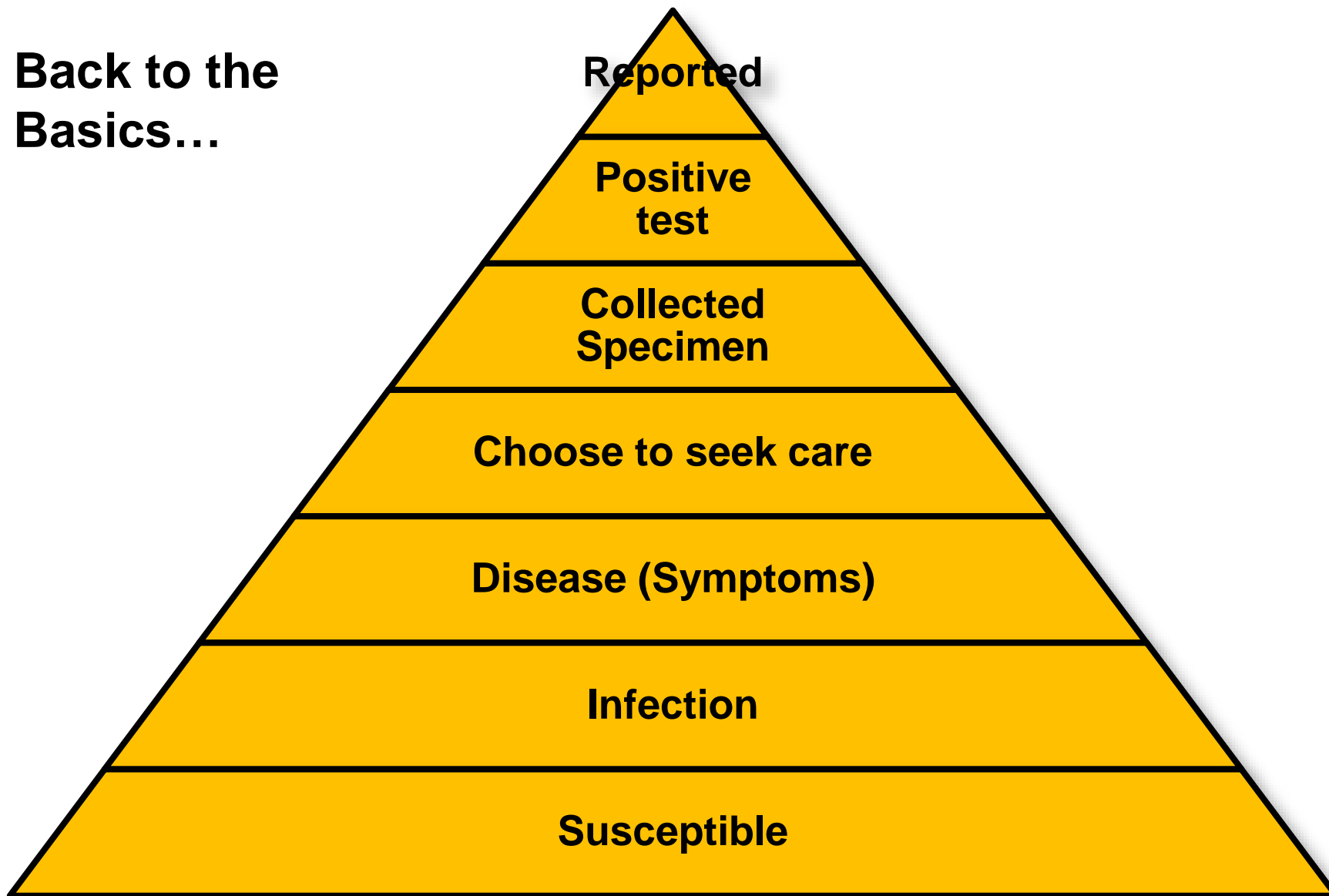


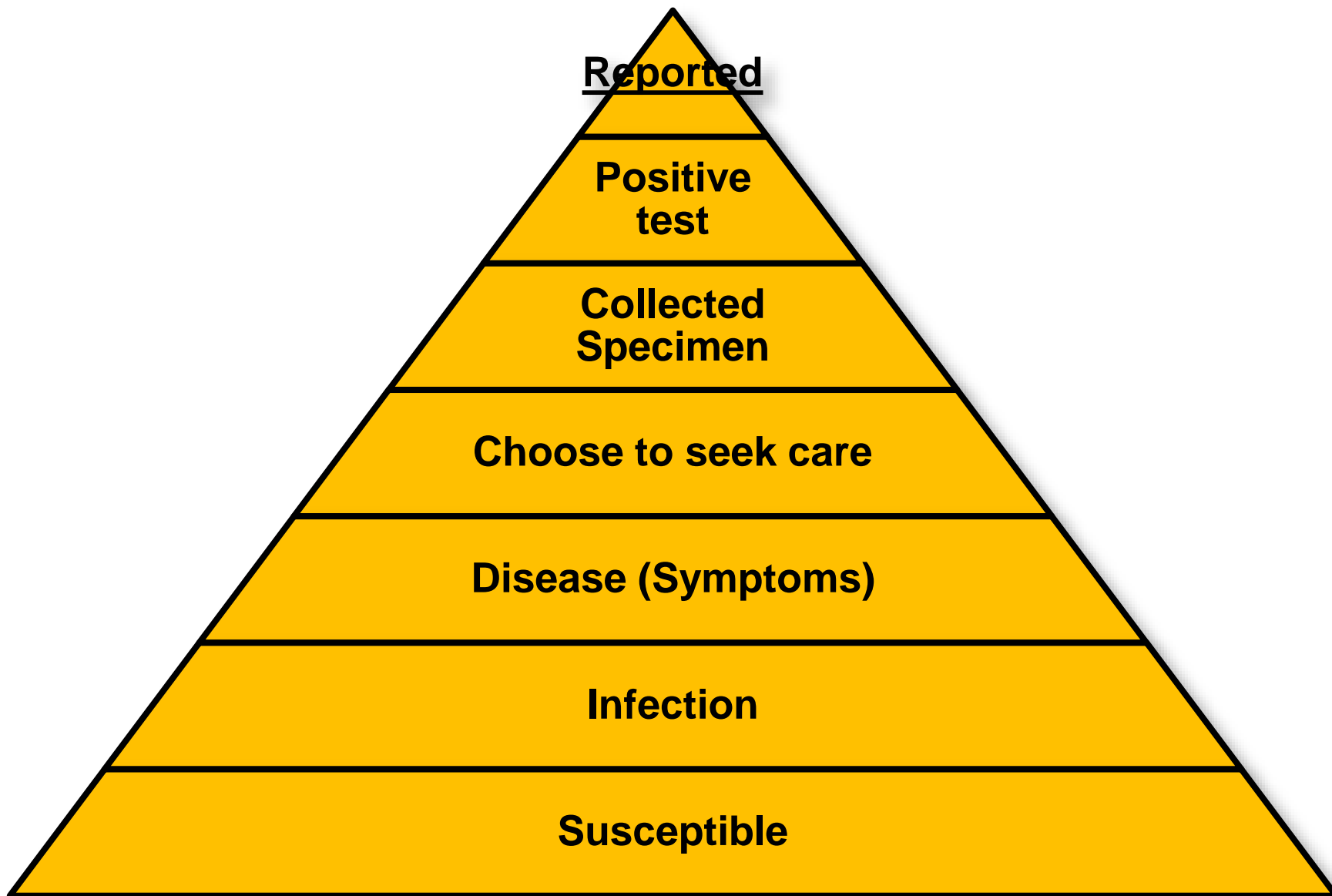
How Are We Going To Do It?

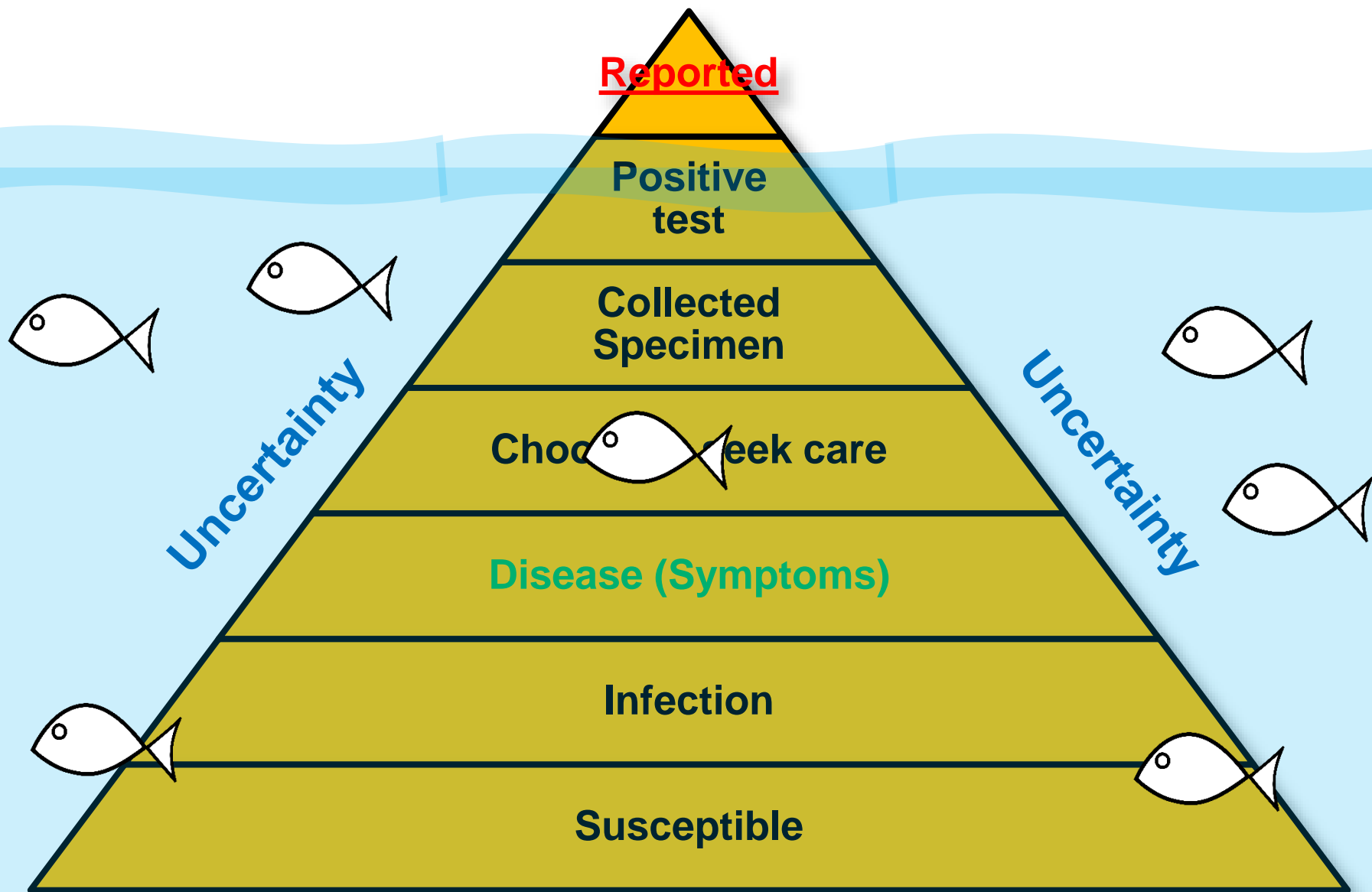


- The master problem list (MPL) is the only data point in ROVR that can be:
 - Input by VTF personnel via a non-free text entry
 - Systematic data entry
 - Exported via an existing central report that is NOT a registry report (i.e., will not crash ROVR accidentally)
 - Easily accessed by a central reporting element

Back to the Basics...







#DRAINTHEOCEAN

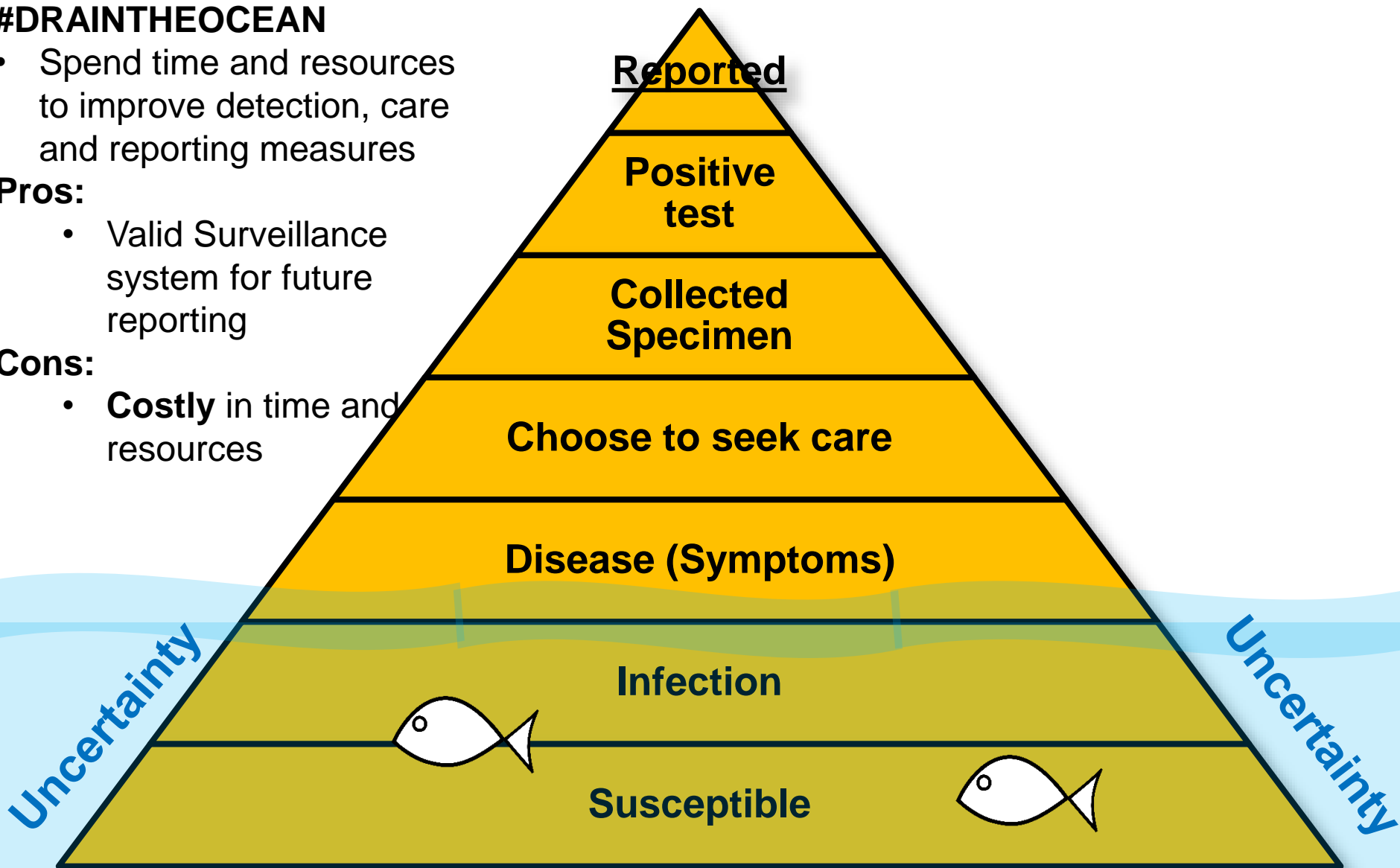
- Spend time and resources to improve detection, care and reporting measures

Pros:

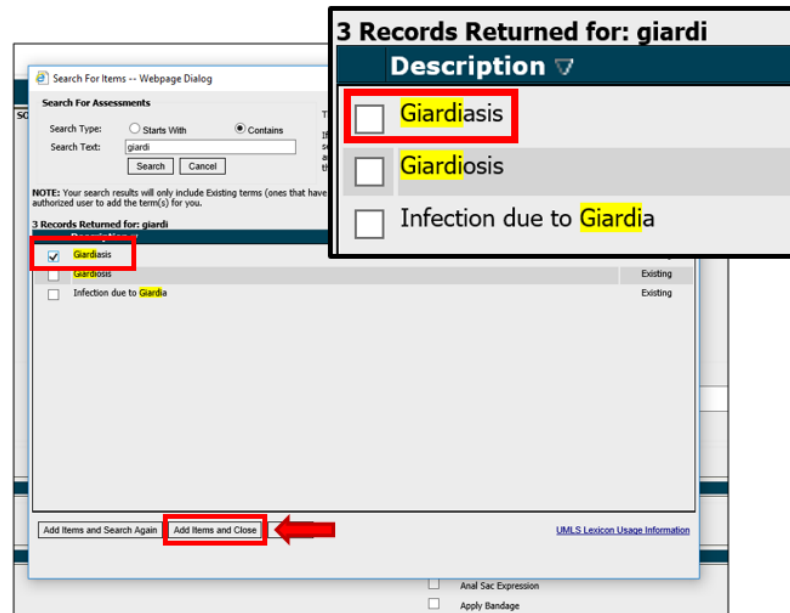
- Valid Surveillance system for future reporting

Cons:

- **Costly** in time and resources



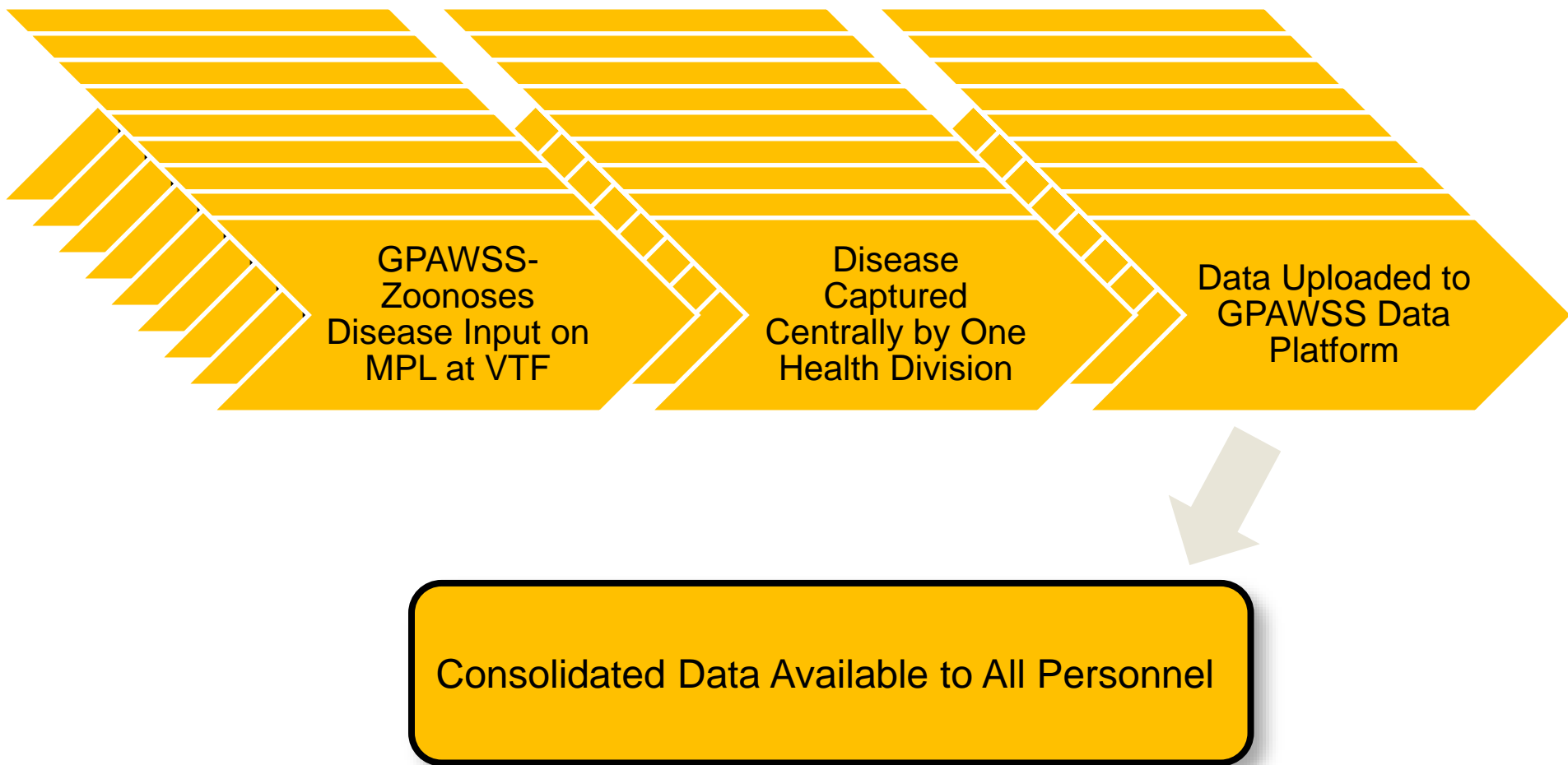
Using the MPL search function and selecting the exact search term outlined in the GPAWSS-Zoonoses Reporting Guide will make data capture systematic, reducing errors and requirement for scrubbing



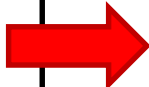
64 different MPL entries for Anaplasmosis alone!

Anaplasma IFA +, PCR -
Seropositive for Anaplasma spp
Anaplasma positive-4DX
Light anaplasma positive (AB) on 4DX
anaplasmosis +
ANAPLASMOSIS PCR neg
Anaplasma Positive on SNAP (faint)
Anaplasma SNAP ELISA Antibody Positive
Seropositive for Anaplasmosis
Anaplasma IFA 1:512
Anaplasmosis: Seropositive (IFA) PCR negative for Anaplasma and Ehrlichia spp
Seropositive for Anaplasma spp.
Anaplasma Snap Positive
anaplasma PCR negative for Anaplasma spp and Ehrlichia spp
Anaplasmosis exposure
Anaplasma IFA POSITIVE ticks, anaplasmosis +
Seropositive for Anaplasma spp.; PCR not detected
Anaplasma +, Anaplasma PCR - Anaplasma POSITIVE on SNAP (faint), still asymptomatic
Anaplasma IFA + Ehrlichia and Anaplasma positive (4Dx)
Anaplasma POSITIVE on SNAP, poss symptomatic (occas inappetance), tx w/doxycycline
Anaplasma positive (Snap 4Dx)
Anaplasma POSITIVE, asymptomatic, new exposure/infection since last 4DX test performed
Anaplasma 4DX +
Anaplasma positive
Seropositive Anaplasmosis
Anaplasma positive by 4dx
Anaplasma IFA pos 1:64
Anaplasma PCR Neg
Anaplasma IFA (+)
Anaplasma platys positive (4Dx)
anaplasma anhd ehrlichia positive
Anaplasma Canis (+) 1:128
bruised and swollen scrotal area, anaplasma boarderline positive
Anaplasma positive on Snap 4Dx
Infection due to Anaplasma
Anaplasma IFA+
Seropositive for Anaplasma spp by IFA
Anaplasma IFA (+) (4DX Neg) 1:2048 PCR neg
Anaplasma positive (4DX Snap4Dx)
SEROPOSITIVE; ANAPLASMOSIS
Anaplasma POSITIVE on SNAP test, asymptomatic
Seropositive: Anaplasmosis; PCR negative
Anaplasma positive
Seropositive: Anaplasma spp; PCR not detected
Positive Lyme and Anaplasma Titers at 1:512
Anaplasma positive (faint) on Snap 4Dx
Anaplasmosis Positive
Positive on 4DX for Anaplasmosis (slight)
seropositive; anaplasmosis (IFA)
Anaplasma exposure
Seropositive by IFA - Anaplasmosis
Anaplasma positive 4dx
Anaplasma POS
Anaplasma positive Snap 4Dx
Anaplasma +


Anaplasmosis




Link to GPAWSS website




Navigation icons link to the two dashboards





Dashboard Descriptions







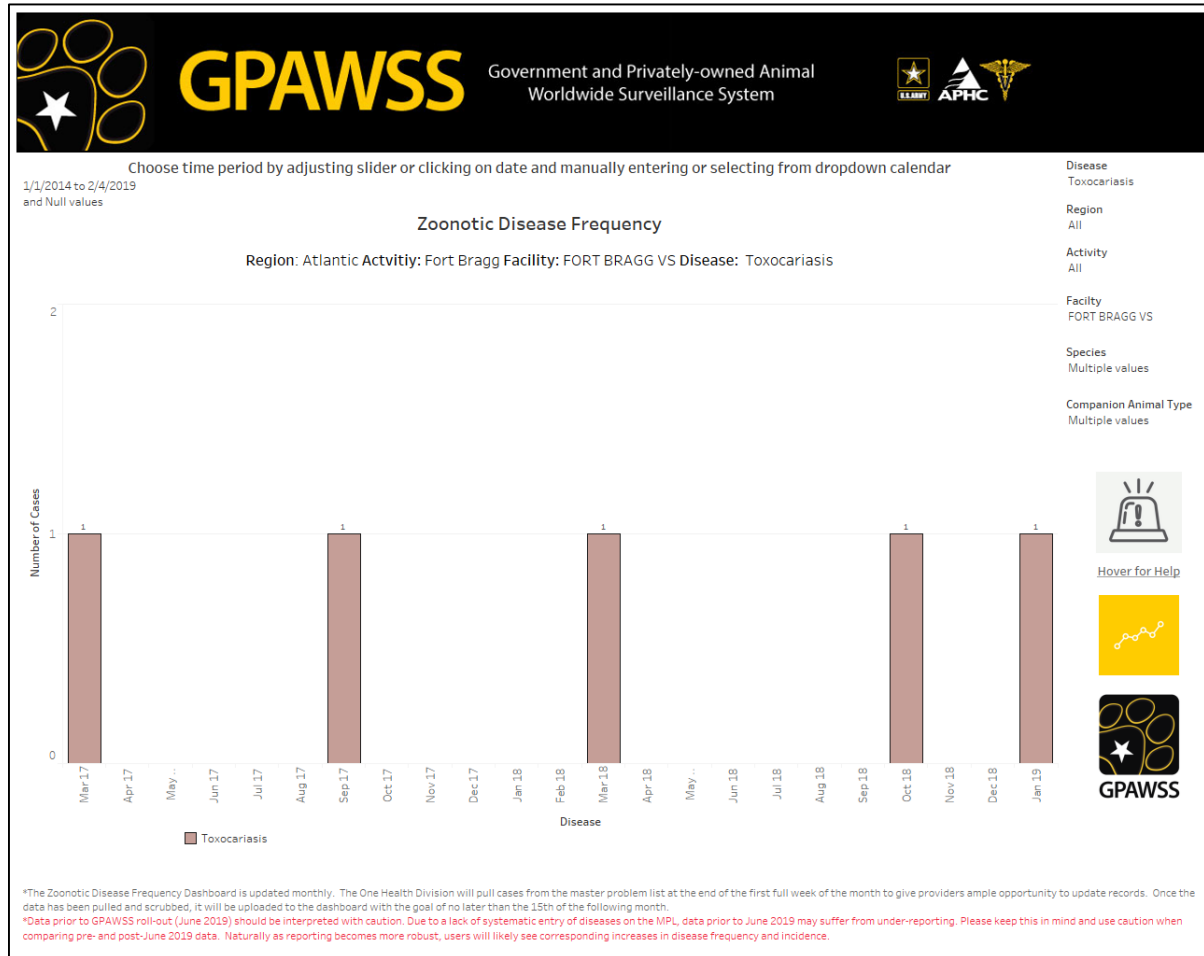
Government and Privately-owned Animal Worldwide Surveillance System Data Platform

Welcome to the GPAWSS Data Platform. This platform contains multiple dashboards displaying all data captured through the GPAWSS initiative. Hover and click on the icons to navigate to the available data dashboards. Additional dashboards are in development and will be available in the future.

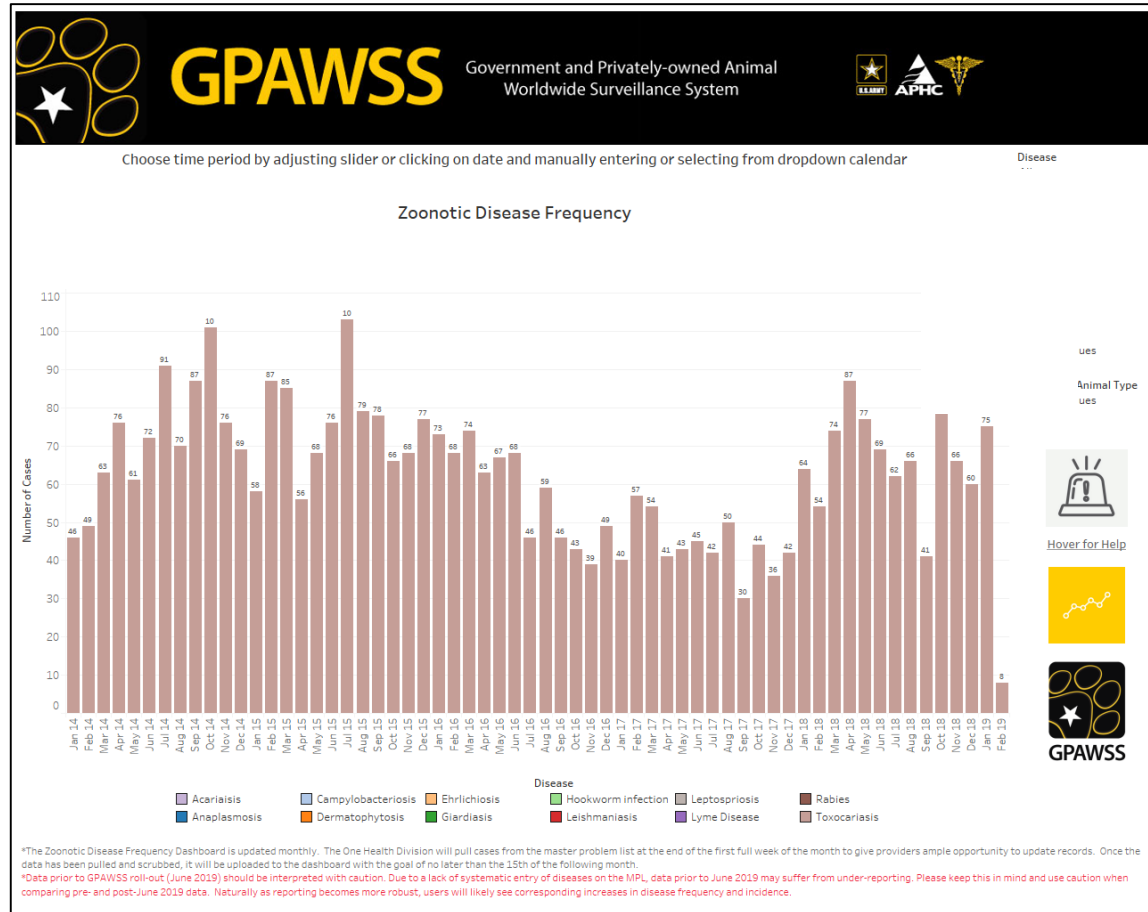
	
<h3>Zoonotic Disease Frequency</h3>	<h3>Zoonotic Disease Incidence Trend Analysis</h3>
<p>The zoonotic disease frequency dashboard displays all centrally captured individual cases by monthly count (frequency). A case is captured if it meets the following criteria: 1) the disease is on a companion animal patient's master problem list in ROVR and 2) the disease is on the GPAWSS- Zoonoses disease list. At this point in time, probable, confirmed, and unknown confirmation cases are included in the case counts. Cases are displayed by the month of diagnosis, and are counted only once. Therefore if a case is still on the MPL over multiple months, it is only displayed one time for the month it was diagnosed (incident cases, not prevalent cases). Users can view cases by disease of interest and then filter by VTF, Region, Activity, Facility, Species, and Companion Animal Type (for example, GOA vs. POA). Remember that VTFs have varying caseloads, so using this dashboard to make comparisons in disease diagnoses is not recommended. This dashboard is more useful for providers to verify clinical cases are captured by GPAWSS-Zoonoses surveillance, and to visualize the overall raw data.</p>	<p>The incidence dashboard displays the number of new cases of disease per 1000 OPVs per month. The numerator for this calculation is the monthly case zoonotic disease frequency (see explanation under Zoonotic Disease Frequency). The denominator is total monthly outpatient visits (OPVs). This fraction is then multiplied by 1,000 to yield the monthly disease incidence. This calculation allows for comparison between facilities or geographic areas regardless of caseload. There are two views on this dashboard. One view displays a VTF incidence trend line that can be filtered by disease and time period. This is useful for monitoring changes in disease over time and detecting potential unexpected increase (or decrease) in disease. The second view allows the user to view multiple trend lines on one graph for side-by-side comparison. The user can select any VTF, Region, Activity, and State to compare incidence in various locations for any of the diseases of interest.</p>

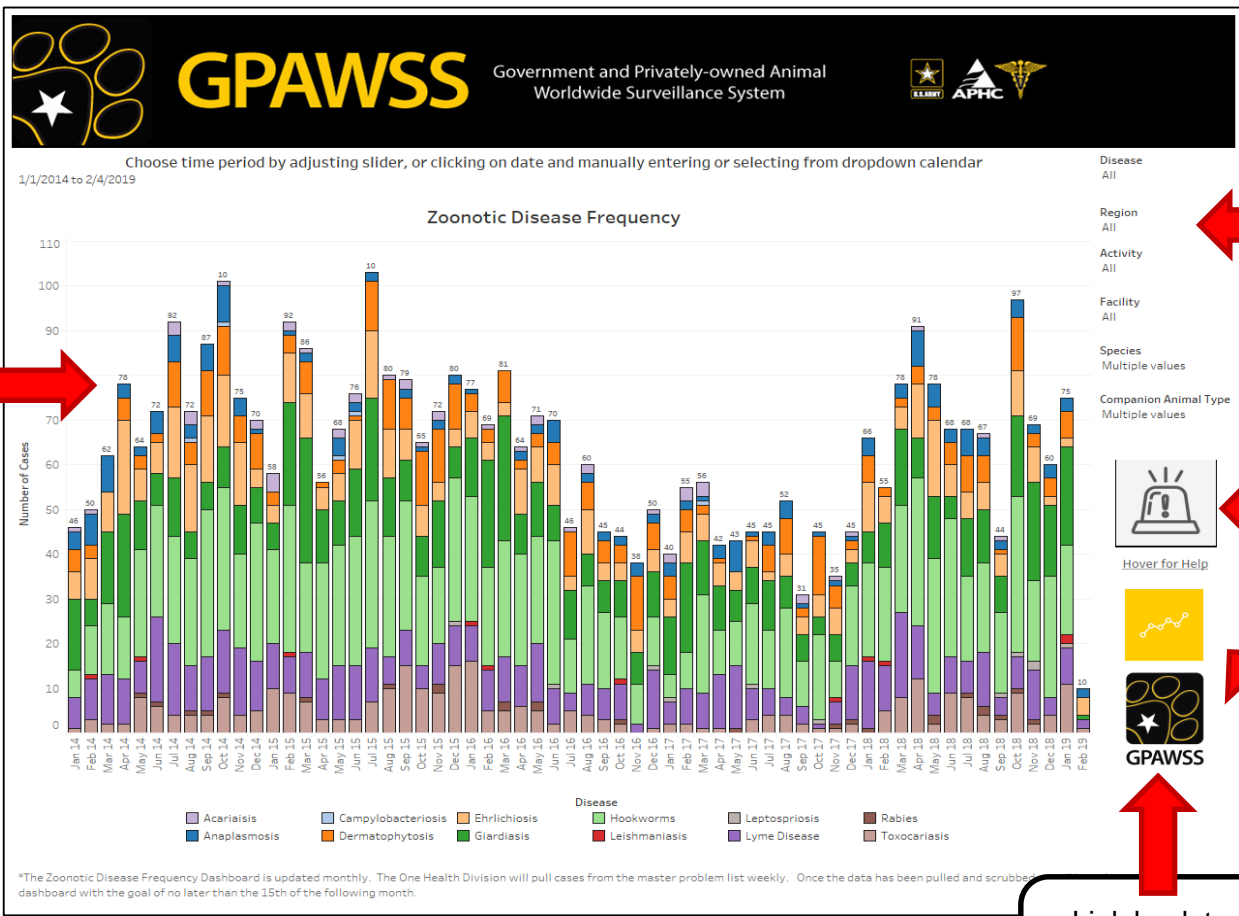



Data capture with no systematic data entry...



What data could start to look like with systematic entry!





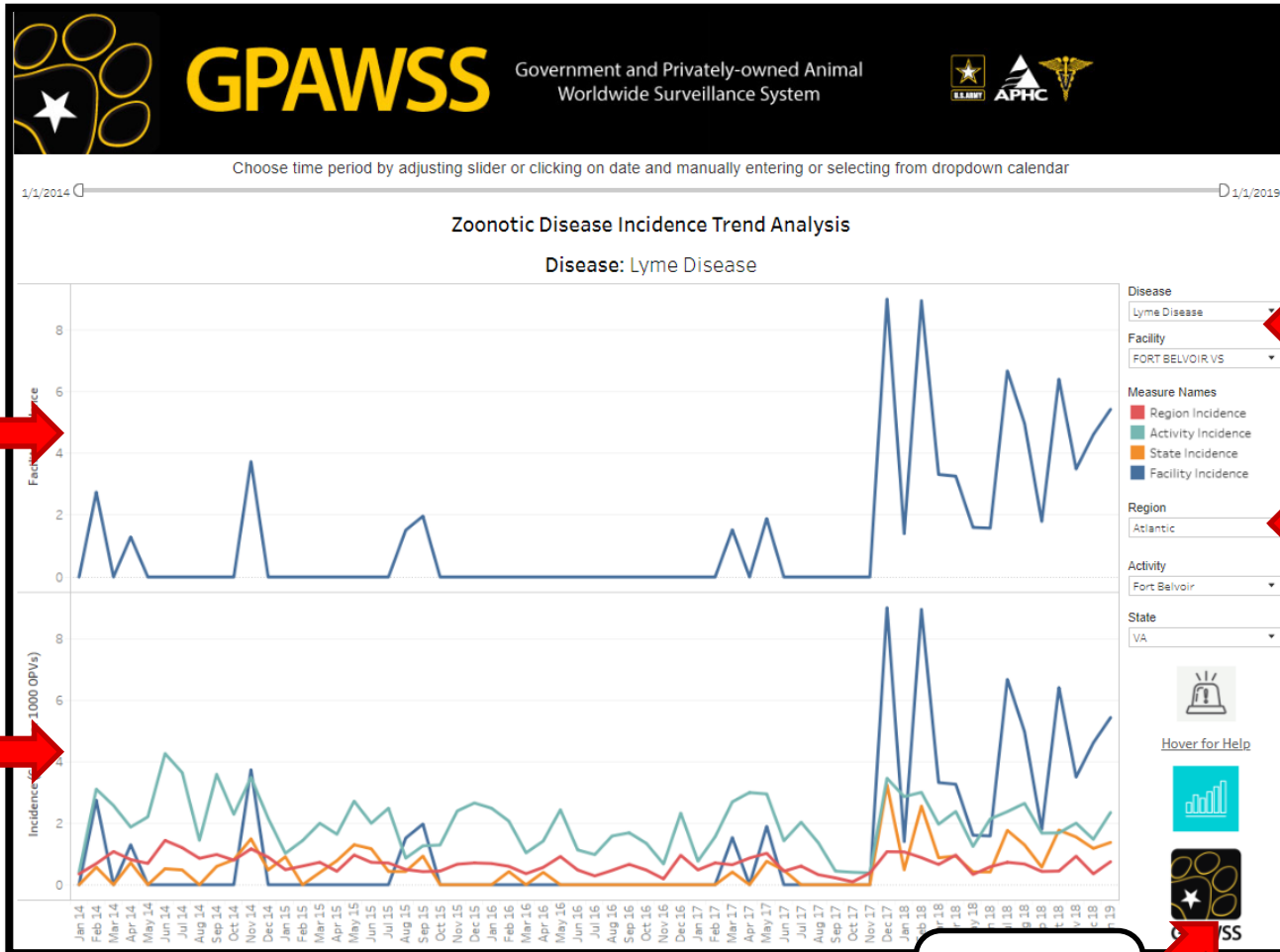
Hover over bars to display additional information

Filters:
Disease,
Region,
Activity, Filter,
Species, &
Companion
Animal Type

Hover pointer
over "alarm"
for help tips

Link back to
Navigation
Page

Link to
Incidence
Trend Analysis
Dashboard



Individual VTF Incidence

VTF, State, Region, & Activity Incidence

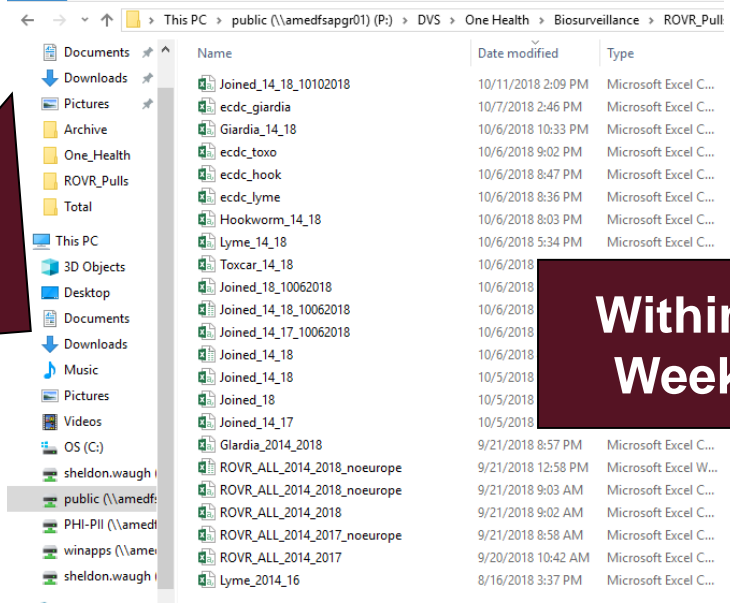
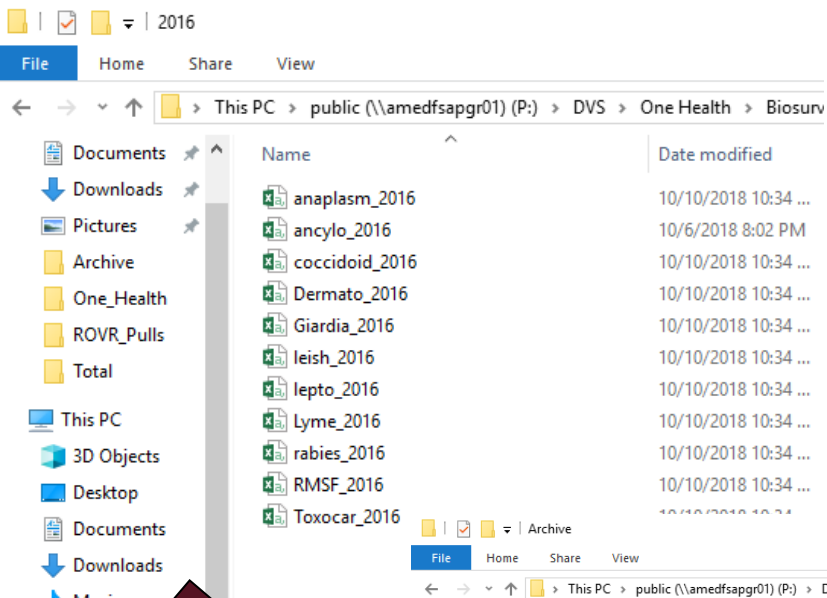
Filters: Disease, Facility

Filters: Region, Activity, State

Hover pointer over "alarm" for help tips

Link back to Navigation Page

Link to Incidence Trend Analysis Dashboard



Within 1 Week

Within 2 Weeks



Systematic entry of diseases on the MPL minimizes under-reporting and enhances the GPAWSS Data Platform



A graphic of a yellow paw print with a white star in the center of the pad, set against a black background.

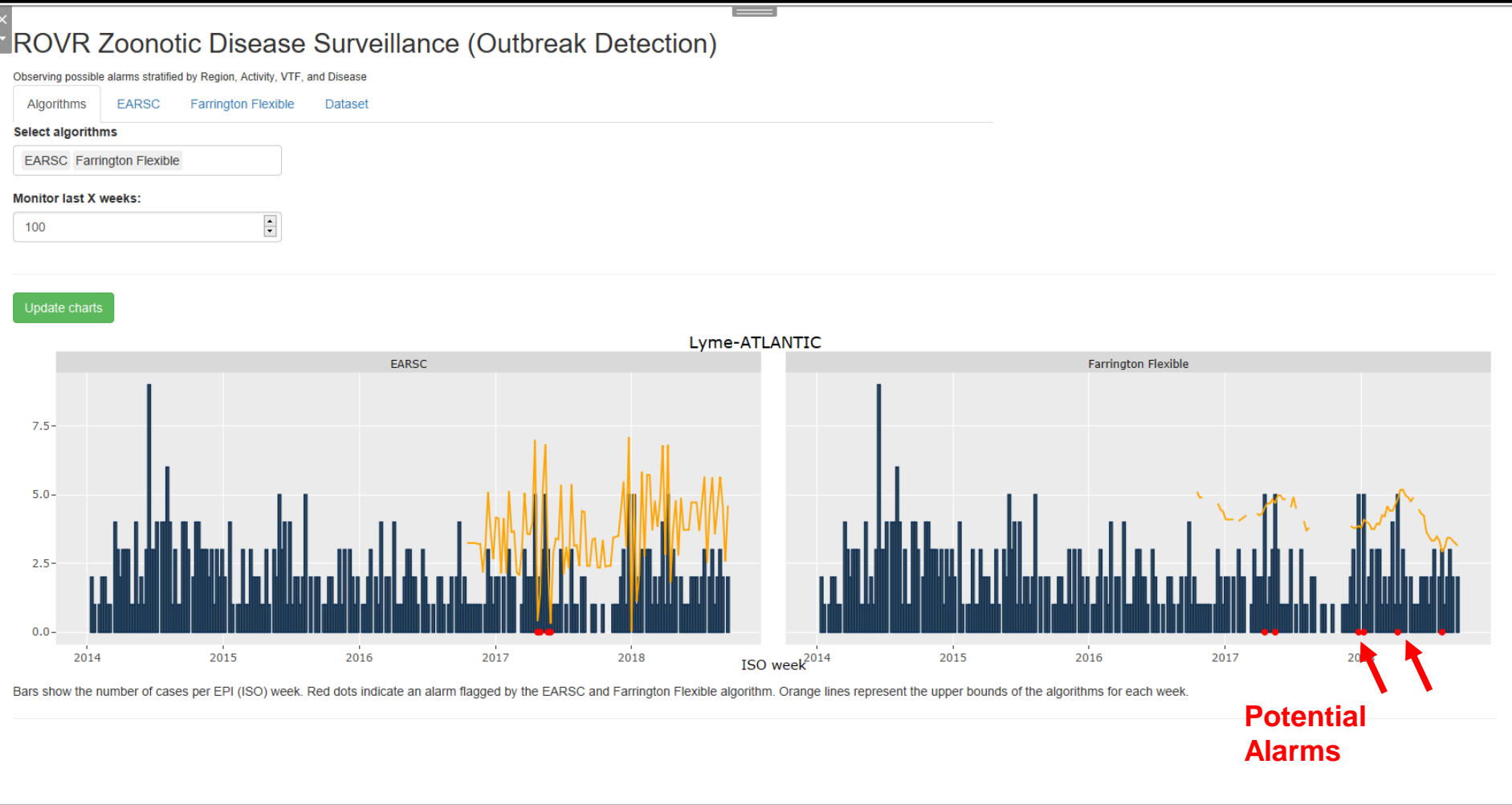
Future Initiatives

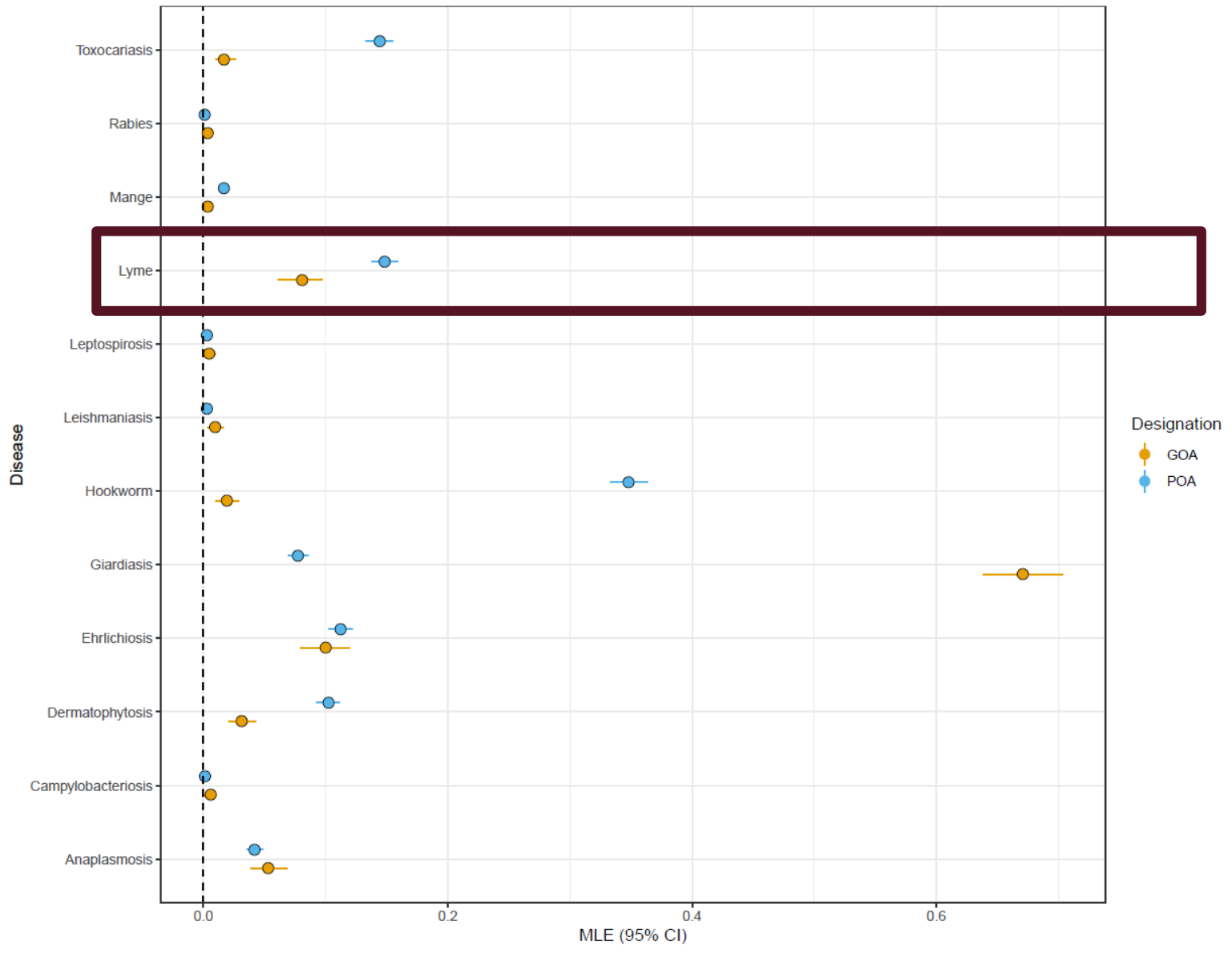
- Implementation of other GPAWSS Programs
- Laboratory surveillance
 - No additional work by VTF personnel
 - Capture laboratory test results automatically
 - Low human error

- Overlay with AFHSB human data
- Overlay with human and animal tick data
- Data integration along with robust data structures could allow for the development of methodologies investigating the potential of companion animals serving as sentinels for disease
- Identify possible emergence of diseases

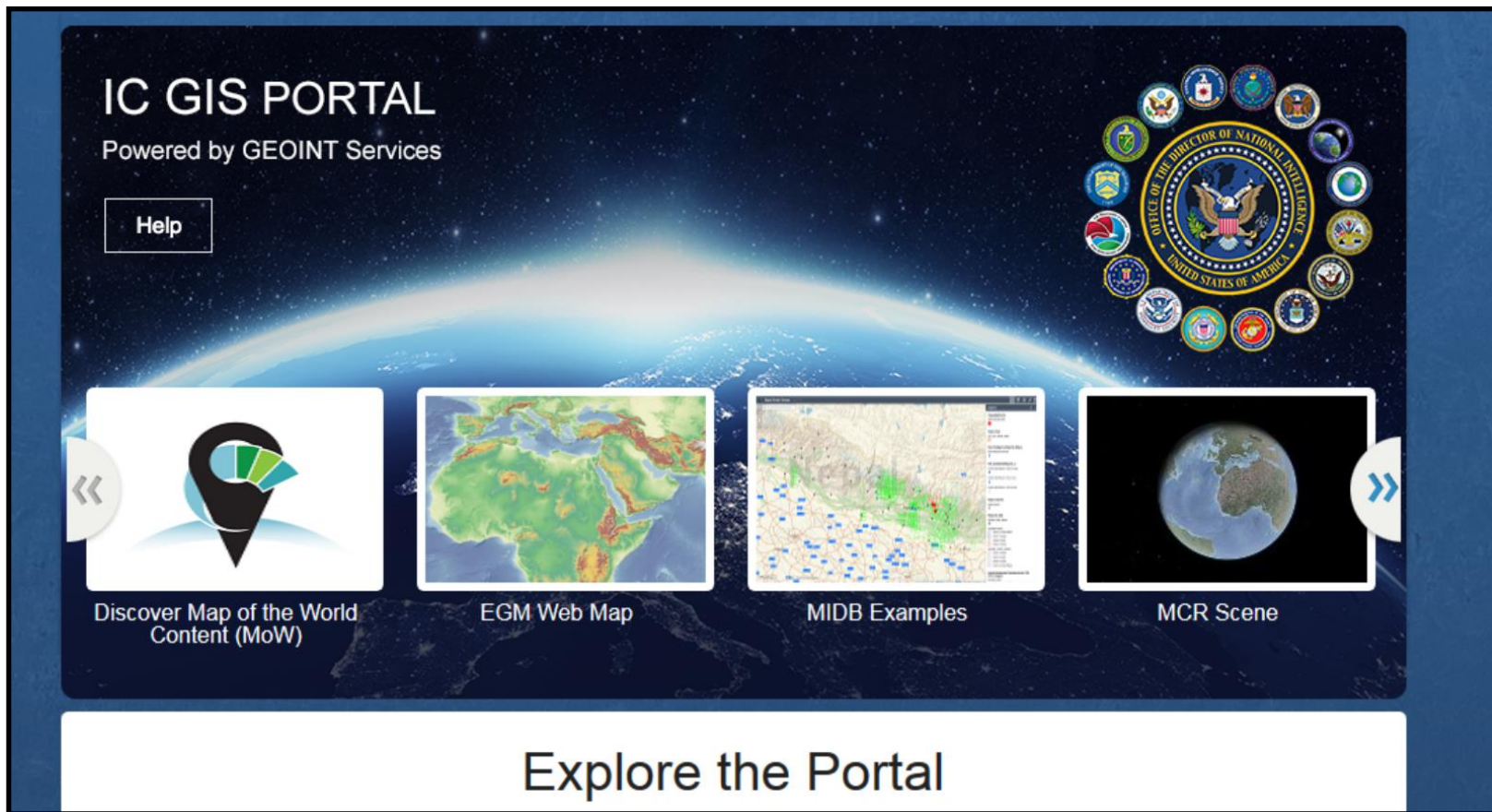


Outbreak detection module (R and R-Shiny)





GIS Mapping through National Geospatial Intelligence Agency



The screenshot displays the 'IC GIS PORTAL' interface, which is powered by GEOINT Services. The background features a view of Earth from space. In the top right corner, there is a circular arrangement of various agency logos, with the central seal of the Office of the Director of National Intelligence, United States of America. The main content area contains four interactive map thumbnails: 'Discover Map of the World Content (MoW)' (a location pin icon), 'EGM Web Map' (a topographic map of Africa), 'MIDB Examples' (a map with blue and green markers), and 'MCR Scene' (a 3D globe). A 'Help' button is located in the top left. Navigation arrows are visible on the left and right sides of the map thumbnails. At the bottom, a large white button reads 'Explore the Portal'.

Questions??