Shipping Scenarios:

1. Field to local lab (human)

A patient recently arrived at a hospital in Alphacity with severe illness. The doctor suspects that the patient may be suffering from cutaneous Anthrax and orders a culture to be taken from the wound site and blood samples collected from the patient. The laboratory at the hospital has cultured bacteria from the wound site and presumptively identified the bacteria as gram positive, spore forming, *Bacillus anthracis*. They will store some blood samples but send portions of the blood together with the agar cultures, in order to get a second opinion, to Alphacity Public Health laboratory by private car. The distance is only a few kilometers so refrigeration during transport is not necessary.

2. Local lab to central lab (human)

Technicians at the Alphacity Public Health laboratory determine that bacterial cultures provided by a local hospital are definitely B. anthracis and recognize the need for confirmation from the National Public Health laboratory (NPHL). They determine to quickly send these samples to the NPHL. Due to the distance between Alphacity and the NPHL and the need for quick confirmation, these samples must be flown on a local commercial airline. The lab will send agar plates with bacteria without refrigeration. However, the NPHL has requested that the original blood samples also be sent frozen with dry ice.

3. Central lab to International collaborator (animal/human)

The Ministry of Agriculture is planning a massive vaccination campaign to reduce the prevalence of Brucella in the country. They have established a partnership with a laboratory in Switzerland to develop new vaccines for Brucella. In order to maximize the vaccination effort, a survey and cataloguing of all the unique strains of Brucella will be undertaken. Vets will travel to areas where Brucella outbreaks are suspected to collect tissue and blood samples. These will be brought back to the central laboratory. When a strain of Brucella is isolated at the central laboratory from the tissue or blood samples, a subculture of this strain will be lyophilized (freeze dried) and sent to collaborators in Europe for genetic analysis, culture typing, and long-term storage. To remain viable, these lyophilized samples must remain at or below 4^{o}C.

3b. Central lab to International collaborator (animal/human)

H5N1 outbreak in the country has left many poultry farms in the country with significant losses (90% die off in some farms). The H5N1 virus has been confirmed at the National Central Public Health Laboratory (NCPHL). Many international collaborators (CDC in the US, several WHO and OIE laboratories, and the Institut Pasteur in Paris, France) from around the world are interested in studying this strain of virus and have requested samples. The NCPHL has grown cultures of this virus in eggs. Samples of this culture are prepared, frozen and will be shipped on dry ice to these various laboratories around the world via international specialized medical courier.

4a. Field to local lab

A dog has bitten a local resident. There is concern about a possible rabies infection. With the help of a local veterinarian, the head of the dog is removed and brought to the laboratory for rabies testing.

4b. Field to local lab

Several local chicken farms are reporting massive die-offs among their poultry. H5N1 is suspected to be the cause. Tissue samples and swabs will be collected from dead and dying birds. These samples will be collected by veterinary staff and brought to the local laboratory for analysis in lab vehicles.

4c. Field to central lab

As part of a national survey, nurses will be collecting blood samples from HIV infected people around the country. These samples will be brought to local public health laboratories where they will be processed and shipped via air carrier from distant locations or lab car for more nearby laboratories to the National Central Public Health laboratory (NCPHL). The NCPHL will be analyzing these samples to determine the titer and prevalence of various HIV strains.

5. Local lab to central lab

There have been a large number of cases of whooping cough (*Bordatella pertussis*) recently in the area. This strain seems to be somewhat resistant to standard antibiotics. The National Central Public Health (NCPHL) lab has requested that several samples be collected and sent for analysis. Throat swabs are collected from numerous patients. The swabs are grown on selective media and samples that are presumptively identified as *B. pertussis* are grown on pure culture and small culture tubes of agar containing the bacteria are sent to the NCPHL by lab courier in a lab owned vehicle. Samples are sent without refrigeration.

6. Central lab to International collaborator

Cases of Rift Valley Fever are suspected in cattle, camel, sheep and goats for the first time in the country with moderate livestock deaths. To date, no human infections have been reported. Samples of blood, serum, and tissue from infected animals will be prepared at the Central Veterinary Lab and sent to the OIE collaborating laboratory at the Institut Pasteur in Paris, France.

7. Field to local lab

Samples of imported milk and eggs will be collected from customs control and transported to the nearest laboratory to test for various parameters, including protein content, presence of adulterating substances, antibiotics and hormones, and various potential pathogens: listeria, salmonella, shigella and fecal coliforms. The dairy products will be collected by laboratory staff and transported in a lab owned car.

8. Local lab to central lab

After a recent vaccination campaign for West Nile virus, serum samples will be collected by local veterinarians from a number of representative sentinel farm animals to determine the effectiveness of the vaccine. The samples will be processed at various regional laboratories and sent to the Central Veterinary Laboratory for analysis.

9. Central lab to International collaborator

The Central Veterinary Laboratory (CVL) has received funding from a research center in America that is interested in studying the genetic diversity of wild foxes in the country. A research team will be collecting feces, tissue and blood samples from foxes caught in the wild and will be brought to the CVL. A team at the CVL will prepare the samples for shipment to the collaborator in America. The samples will be frozen and shipped via international courier (FedEx) with dry ice.