

# STOP GUESSING START DIAGNOSING

Your Guide to Diagnostic Success

Version 2026



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# Challenges of infectious disease diagnostics

## Tired of Inconclusive Results?

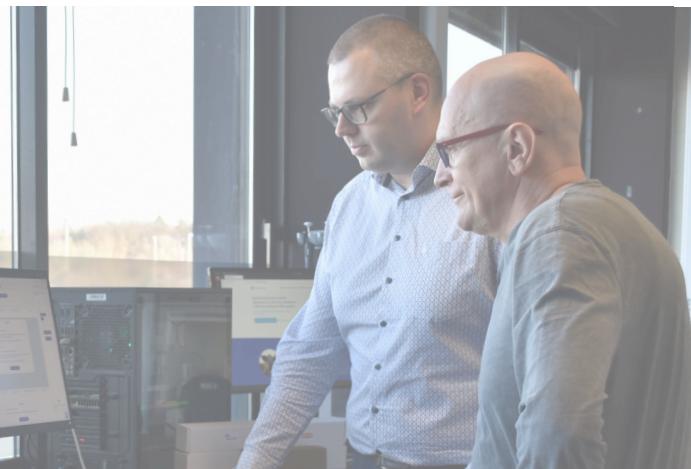
Infectious diseases in companion animals are rarely straightforward. They are often caused by a complex mix of viruses and bacteria co-infecting the animal.

Traditional diagnostic methods like PCR require you to guess which pathogens to test for. If you choose wrong, you get a negative result, even when your patient is clearly sick. This leads to:

- Delayed or incorrect treatments
- Increased costs for the owner
- Frustration for you and your team

[There's a better way to get the full picture >](#)





# One Test to Uncover It All: The PathoSense Solution

**See the Whole Story. With a Single Test.**

PathoSense offers a revolutionary approach to veterinary diagnostics. Born as a spin-off from Ghent University by dr. Sebastiaan Theuns and prof. Hans Nauwelynck. Our platform was designed to **overcome the limitations of traditional methods**.

We use advanced nanopore sequencing to **read and identify all viruses, bacteria and virulence factors in a sample**, without you needing to select them beforehand.

This provides a complete and unbiased overview of the pathogens at play, empowering you to:

- Diagnose with precision
- Treat more effectively
- Improve patient outcomes
- Provide the answers and peace of mind your clients are looking for.



# What to expect from a PathoSense report?

Starting in 2025, PathoSense reports now include comprehensive **Virulence Factor (VF) detection**, allowing for even deeper insights into bacterial pathogenicity.

*“With PathoSense, you are going to explore all the DNAs and RNAs you have in the sample. And you are not going to miss anything. Talking about the virulence factors for me is a wild word... it opens an incredible frame of opportunities to have good decisions or to know exactly what's happening.”*

**Prof. Guillermo Ramis**

## PathoSense

- Suckling piglets
- Age: 2 Days
- Sow parity (litters): 3
- Weaning age (weeks): 4
- Watery diarrhea
- Hypothermia, depression, reduced appetite
- Increased mortality



## VFs detected with new PathoSense:

- Escherichia coli
  - *stB* → heat-stable toxin
- Clostridium perfringens
  - *plc* → alpha toxin
  - *cpb2* → beta 2 toxin

**NEW!**



# Why veterinarians switch to PathoSense

Feature	Traditional Dx	PathoSense
Pathogen Selection	Guesswork	No selection needed
Co-infections	One/few viruses and/or bacteria	Complete disease complex
Virulence factor analysis	Separate specific PCR	Included in assay (update 2025)
Viral strain typing	No or limited insights	Phylogeny available
Sample collection	Poor standardisation	Clear workflows
Detection of novel variants	Failed detection	Easy detection & discovery
Animal species	Depending on primer availability	Suitable for all animal species



# Diagnostic applications

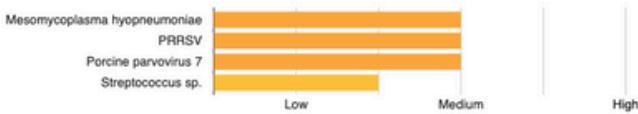


## Porcine respiratory disease complex in swine:

PRDC is a major cause of health problems in swine of different ages. Classical diagnostic tools primarily identify common pathogens such as influenza, PRRSV, PCV2, Mycoplasma spp, APP and a few others. However, incorporating innovative diagnostic methods like PathoSense using nanopore sequencing reveals a broader spectrum of pathogens at play in PRDC. This includes for example novel or overlooked viruses like parainfluenza virus, porcine pneumovirus and much more. Pneumovirus is closely related to respiratory syncytial virus in humans and cattle, where it is known to cause bronchiolitis. Additionally, certain coronaviruses such as PHEV (porcine hemagglutinating encephalomyelitis virus) also come to light (again). Not only do these advanced diagnostics uncover new viruses & complexes, but they also shed light on unique bacterial species, alongside well-known pathogens (eg Mycoplasma hyopneumoniae) and other bacteria. This comprehensive approach to diagnostics opens up great new possibilities for preventive strategies.

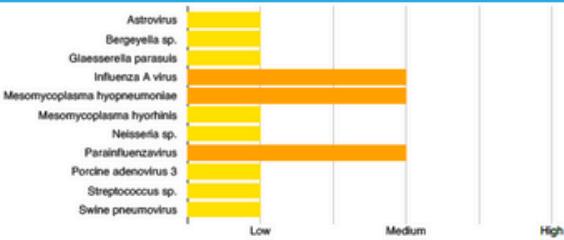


## Example fattening pigs with respiratory disease



- Fattening pigs of 3 months
- Deep respiratory problems: sample of lung tissue was collected
- PRDC consisted of PRRSV, PPV7, Mycoplasma hyopneumoniae and Streptococcus sp.
- PRRSV can pave the way for coinfections with other viruses and bacteria, such as Mycoplasma hyopneumoniae in this case. Parvoviruses are typically secondary and opportunistic. They replicate in actively dividing cells and thus can be potentially considered immunosuppressive.

## Example nursery pigs with respiratory disease



- Nursery pigs of 5 weeks old
- A strong viral respiratory complex was detected. Besides influenza A, the pigs were also affected by other respiratory viruses such as pneumovirus, adenovirus & parainfluenzavirus.
- These viral infections can have paved the way for strong bacterial coinfections of which Mycoplasma hyopneumoniae can be considered very important.



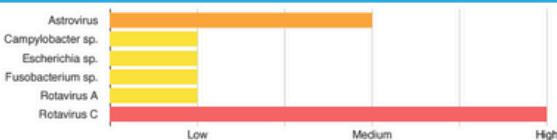


## Enteric disease complexes in swine

Diarrhea is a common problem in early life of piglets and after weaning. We have observed that suckling piglets can be confronted with different types of rotavirus species, including rotavirus A, B and C. Their prevalence is also quite evenly distributed, emphasizing the importance to analyse more broadly for all rotavirus species in a semiquantitative way. When shed at a high load, it can lead to diarrhea in suckling piglets and there is no cross-protection between rotavirus A, B and C. Furthermore, infections can be complicated by other viruses (eg. sapovirus, kobuvirus, astrovirus) and bacteria (*Clostridium perfringens*, *Escherichia coli* etc). Based on longitudinal studies we have observed that several successive replications with multiple viruses and bacteria occur after weaning. The finding of rotaviruses is not abnormal but it can be problematic when multiple rotaviruses and other pathogens are present at the same time (enteric disease complex). The complete analysis of the complex, pre- and post weaning, will allow the veterinarian to come up with more effective and complete preventive strategies



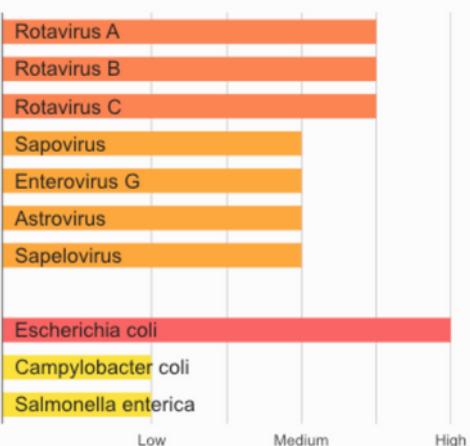
## Example suckling piglets with diarrhea



- Suckling piglets of 4 days old
- Diarrhea
- Rotaviruses can cause diarrhea in suckling piglets and especially rotavirus C has contributed to the disease. Astrovirus can also be found in healthy pigs. However, its early finding together with rotavirus C and A can indicate a high infection pressure in the environment.
- The low bacterial load of Escherichia coli and the other bacteria likely indicate that the viruses are of higher importance in this case.

## Example suckling piglets with diarrhea

- 4 weeks of age, weaning at 4 weeks
- Pasty to watery diarrhea
- Mortality, reduced appetite



### Escherichia coli virulence factors with new PathoSense assay

- fed operon (F18 fimbriae)
- fim operon (type 1 fimbriae, attachment to intestinal epithelium)
- No VFs detected for the other bacteria





## Case Study: Solving a Household Outbreak

### The Challenge

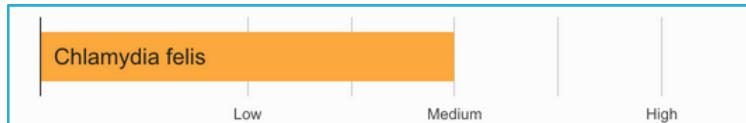
In a multi-cat household, one cat developed chronic purulent conjunctivitis that soon spread to the other cats despite initial treatments.

### The Method

The veterinarian collected conjunctival swabs from the affected cats and analyzed them using the PathoSense platform.

### The PathoSense Finding

The analysis revealed *Chlamydia felis* as the primary cause of the outbreak.



### The Outcome

Armed with a precise diagnosis, the veterinarian was able to implement a targeted treatment plan using both local and systemic therapies, to stop local and fecal shedding. The infection resolved quickly, and the health of all cats improved significantly.



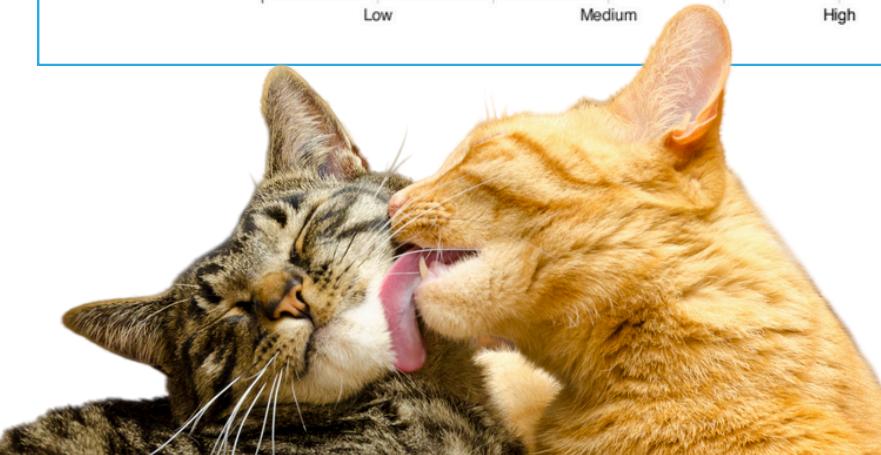
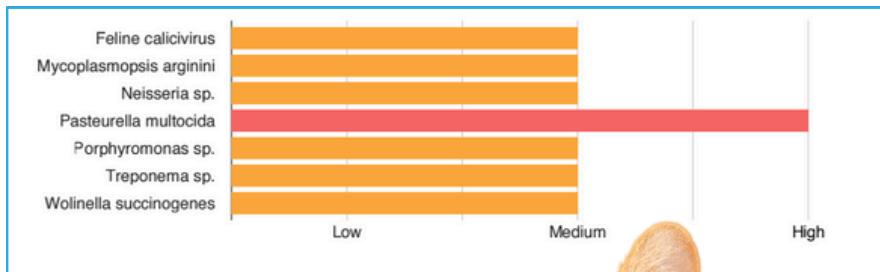
## Cat with tongue ulceration & general weakness

- Anamnesis: General weakness, tongue ulcers, neutropenia, lympho- and monocytosis.
- A viral complex involving feline herpesvirus 1 and calicivirus, complicated by *Pasteurella multocida*. *Treponema* can be found often in the oral cavity of cats.



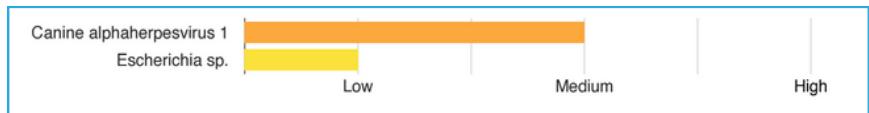
## Cat with stomatitis and vasculitis

- Cat with severe stomatitis and vasculitis of the ears and tail.
- Feline calicivirus can cause stomatitis and vasculitis.
- Bacterial complex involving *Mycoplasma arginini*, a different species than the more classical *Mycoplasma felis*, and *Pasteurella multocida*.
- Bacteria like *Porphyromonas* sp, *Treponema* sp and *Wolinella* are frequently detected in cats with gingivitis and stomatitis.



## Neonatal Mortality in Puppies

- Neonatal death of 2 of 8 pups in 24h.
- Slight dyspnoea, hypothermia, lots of screaming.
- Canine herpes virus detected: this virus can cause health problems and mortality in foeti and young puppies.



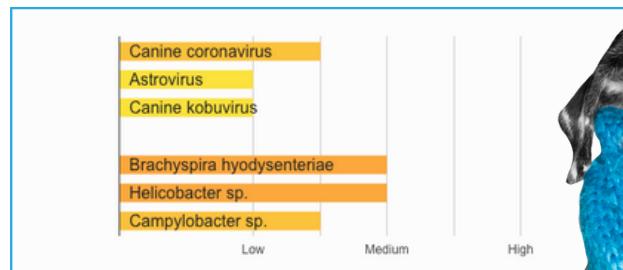
## Pup with Hepatitis

- Anamnesis: necropsy of pup (9 weeks old) with suspicion of Adenovirus Hepatitis.
- Sample type: Tissue.
- The PathoSense analyse confirmed the detection of Canine Adenovirus 1.



## Lethal Outbreak in Canine Breeding Facility

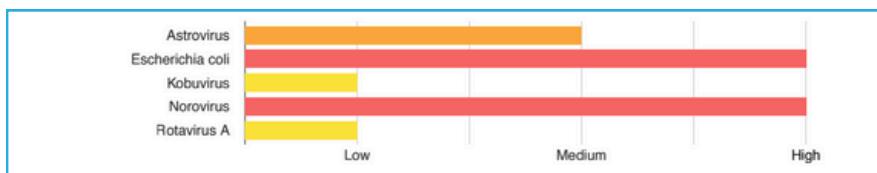
- Anamnesis: Puppies aged 4 to 6 weeks from a breeding facility exhibited lethargy followed by death within a few days. The clinical signs were observed across multiple litters.
- Sample Type: Rectal swab
- Viral enteric disease complex with, among others, canine coronavirus, astrovirus, and kobuvirus detected.
- *Brachyspira hyodysenteriae* is a swine pathogen that causes dysentery. Some *Brachyspira* species are sporadically found in dogs.



## Diarrhea in calves

A group of young calves was experiencing severe diarrhoea, leading to dehydration, poor weight gain, and increased mortality. Initial treatments were ineffective, prompting veterinarians to pursue further diagnostic investigation. To identify the underlying cause of the diarrhoea, veterinarians collected fecal samples from the affected calves.

The analysis revealed a complex mixture of pathogens responsible for the diarrhoea, including norovirus, rotavirus, astrovirus, kobuvirus and *Escherichia coli*.

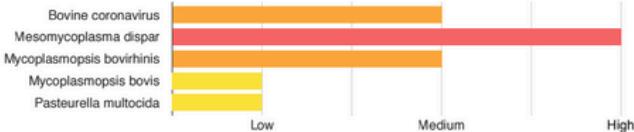


This multifactorial nature of the enteric disease highlighted the need for a comprehensive approach to treatment. While rotavirus & *Escherichia coli* are well-known causes of diarrhea in young calves, the finding of norovirus is very interesting. This is a typical gastroenteric pathogen in multiple animal species and very resistant in the environment. Armed with detailed pathogen profiles, the veterinary team developed a targeted treatment and management strategy. This strategy included supportive care measures such as rehydration therapy, improved sanitation and biosecurity protocols to prevent the spread of resistant viruses, and improved colostrum management to ensure the uptake of passive immunity.

These measures led to a significant reduction in diarrhoea cases and improved the overall health and growth of the calves. By addressing the specific pathogens involved and enhancing preventive measures, the farm was able to effectively manage the outbreak and ensure better long-term health outcomes for the calves.



## Example of calves with respiratory disease



- Young cattle with respiratory disease. A broncho-aveolar lavage was analysed.
- A strong viral & bacterial bovine respiratory disease complex was detected involving bovine coronavirus, multiple Mycoplasma species (including *M. bovis*) and *Pasteurella multocida*.

## Example goat respiratory disease



- Five goats were affected by severe respiratory disease and fever
- A bacterial complex was identified in a broncho-alveolar lavage. *Moraxella* and *Mycoplasma ovipneumoniae* are bacterial pathogens in goats that cause respiratory diseases such as pneumonia and are often detected in nasal or lung samples.

## Example of cows with fever



- Cattle of 2 years, imported from another country
- Animals started showing clinical signs after import: sneezing & fever
- Schmallenberg virus, known to cause congenital disorders in newborn calves, was demonstrated completely unexpected in a serum sample of these disease cows. Bovine parvovirus is likely more of a coincidental finding and can be seen as opportunistic.
- The veterinarian kept a close eye on any malformations in calves born and started an emergency vaccination against Schmallenberg. Luckily no abnormalities were seen later on in the newborn calves.



## Example of neurologic/systemic disease in chicken



- Chicken presented signs of paralysis and stunted growth
- Tremovirus, better known as avian encephalomyelitis virus was detected. A virus known to cause paralysis and neurological clinical signs in poultry.

## Example of enteric disease complex in broilers

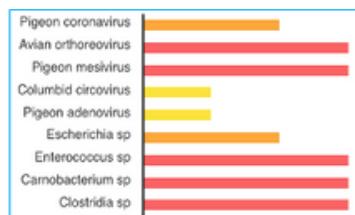
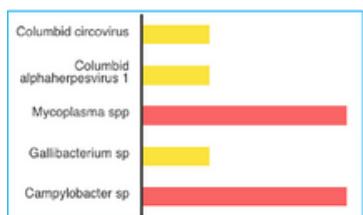


- Poor performance was seen in broiler flocks. Mortality was higher than expected.
- A viral and bacterial complex was identified
  - Infectious bronchitis virus (IBV) is a major coronavirus affecting poultry. It first infects the respiratory tract and then spreads systemically.
  - Reovirus is an important pathogen in poultry and can cause various symptoms including intestinal infections and arthritis and tenosynovitis
  - Astroviruses often affect poultry, usually leading to intestinal inflammation and delayed growth in young birds.
  - Enterococcus cecorum can be found in the gut and after systemic spreading can lead to joint inflammation and paralysis, among others



## Sick pigeons after introduction of new birds in colony

Problems in a pigeon colony began two weeks after the introduction of two new pigeons. The pigeons exhibited accelerated breathing and diarrhea. Some also had swelling of the third eyelid. The veterinarian suspected adenovirus, poxvirus, or circovirus infection. Swabs were taken from three pigeons showing symptoms to collect deep throat samples. These samples were mixed and purified using the PathoSense kit. Cloacal swabs were also collected and processed similarly.



Pigeon circovirus, pigeon herpesvirus, and two *Mycoplasma* species were identified as the main respiratory pathogens. *Mycoplasma* is particularly difficult to grow using traditional methods. Additionally, a complex viral enteric disease was detected in the fecal samples, including pigeon coronavirus, orthoreovirus, mesivirus, circovirus, and adenovirus. The pigeon coronavirus was a gamma coronavirus, distantly related to the infectious bronchitis virus in chickens. *Escherichia coli*, *Carnobacterium* sp, *Clostridium* sp, and *Enterococcus* sp were also found. These findings highlight the complexity of infectious disease outbreaks in pigeons.

## Example of pigeons with acute mortality



- Sudden mortality was observed in a colony of young breeding pigeons. Antibiotic treatment was not responsive.
- A swab from the liver was tested strongly positive for rotavirus A
- The genomic sequences of this rotavirus A strain indicated closely relatedness to a rotavirus A strain that caused an outbreak with mortality in Australia and Germany.



## Snake case report

- Anamnesis: The snake had respiratory symptoms.
- Sample type: The sample was a tracheobronchial swab (TBS) taken from one sick animal.



- Anamnesis: The snake had respiratory symptoms.
- Sample type: The sample was a bronchoalveolar fluid (BALf)
- Nidoviruses can often be missed by PCR due to the viral genomic evolution.



# Reporting & interpretation

## Semi-quantitative reporting of the viruses and bacteria

When you submit a sample, you'll receive a semi-quantitative report of the viruses and bacteria detected, delivered to your app account and email. This report is designed to help you interpret the results. For instance, a low viral load of rotavirus in an animal with diarrhea suggests it may not be the primary issue, while a high bacterial load in a respiratory sample could indicate a shift from a viral to a bacterial phase of infection.

We express pathogen load using a scale that roughly correlates with Ct values:

- Very high load ~ Ct value 10-15
- Medium load ~ Ct value 20-25
- Very low load ~ Ct value 28-30

## PathoSense vs. Traditional PCR

PathoSense focuses specifically on infectious pathogens. Our process includes filtration and enzymatic treatment that removes free-floating genetic material, including viral and bacterial "corpses." This means our results highlight pathogens that are actively replicating at the time of sampling.

In contrast, traditional PCR can pick up all genetic material from pathogens, even at high Ct values (e.g., >30), which are often remnants of a late-stage or chronic infection or even lab contaminants (Ct>35). While a traditional PCR might detect these genetic corpses, PathoSense focuses on identifying the most relevant, actively replicating infections.

## Thinking starts after the diagnosis

*"I find new viruses and bacteria but I cannot do anything about it".*

PathoSense is not just about getting a diagnosis; it's about what you do with it. The real thinking begins after you receive the results.

Instead of being overwhelmed by the new information, use it to explore solutions. Consider how you can improve animal health by analysing management and vaccination practices, biosecurity, or treatments.



# A Simple Path to Diagnosis

## From Sample to Solution in 4 Simple Steps

Our complete platform makes advanced diagnostics easy to integrate into your daily practice.



### Easy Sampling

Collect high-quality, standardized samples with our patented, all-in-one sampling and purification kit.



### Simple Registration

Use our mobile app to easily register samples, track their progress, and add important clinical information that aids in interpretation.



### Comprehensive Analysis

Our lab utilizes nanopore sequencing to identify a wide range of pathogens in your sample.



### Clear, Actionable Reports

Receive a semi-quantitative report directly to your mobile app and email, complete with an interpretation note to get you started.



# High-Quality Samples: The Key to Accurate Results

## Great Diagnostics Start with a Great Sample

A good diagnostic analysis is dependent on the quality of the sample collected. The PathoSense sample kit is designed to ensure high-quality, standardized samples every time.

## The Patented Swab Advantage

Unlike traditional swabs, the PathoSense swab has a unique tip that purifies the sample on-site. It enriches for "infectious pathogens" by removing host cells and other genetic "junk," focusing the analysis on what's actively causing the infection.

## Inside the PathoSense Sampling Kit



- A patented PathoSense swab
- A 50 mL collection tube
- A pre-filled syringe with fluid
- A QR code for easy registration in the app





# Collecting Samples from Your Patients

**Right sample  
from the right place  
at the right time  
= crucial for diagnostic success**



**Not sure which sample to take?  
Use our Sample Selection Guide**

## Upper Respiratory Disease

(e.g., chronic rhinitis, conjunctivitis )

The best samples are from a fine nose swab, an oropharynx swab, and/or a conjunctiva swab.

## Enteric Disease

(e.g., diarrhea)

Collect fresh fecal samples. Avoid samples from the floor as they can be contaminated and not accurately represent the pathogens in the animal.

## Systemic Disease

(e.g., fever, viremia)

Serum is only a good option for detecting pathogens in the blood. For neurological symptoms, consider cerebrospinal fluid.

## Necropsy Samples

Samples from deceased animals can be very valuable. Ensure tissues are fresh and have been stored at 4°C.



# Order your PathoSense sampling kit at a Partner Lab

Pathosense partners with top\_veterinary\_laboratories to introduce this novel diagnostic technology to local veterinarians.

## Ready to start?

### Find a PathoSense partner lab in your country.

[Click here to order your sampling kit.](#)

You don't find your country? Contact us [support@pathosense.com](mailto:support@pathosense.com)



7

Partnerships  
in 2 years

700+

PathoSense  
Clients

50+

Animal Species  
Analyzed



Contact us!

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