FY2007 (abbreviated)

The VDL evaluated 68,839 accessions, an increase of 1% from the previous year. Each accession represents a request for laboratory assistance to address animal or public health concerns. A total of 1,570,029 laboratory tests were conducted, representing an increase of 5.8% from the previous year. The increase was due to expanded influenza surveillance testing at the Minnesota Poultry Testing Laboratory and expanded testing for porcine circovirus type 2. The staff consisted of 16 faculty members (11.7 FTE), 5 pathology residents, 74 support staff and 11 part time employees and 24 part time student employees.

Special funding

In fiscal year 2006-07, the University of Minnesota provided $2.5 million of funding for a Biosafety Level 3 (BSL-3) addition to the necropsy laboratory. Construction began in March, 2007 and is scheduled for completion and commissioning by November 1, 2007. The new BSL-3 necropsy laboratory will provide a safe working environment for VDL employees in the event of an outbreak of highly pathogenic avian influenza virus in the US. It will also be used for containing other high risk zoonotic pathogens associated with diseases such as bovine tuberculosis, chlamydiosis, tularemia, anthrax, West Nile and rabies.

In addition, the Minnesota legislature provided $300,000 for maintenance and renovation of the Minnesota Poultry Testing Laboratory in Willmar, MN. The renovation was completed and the building space dedicated on September 12, 2007. The renovation will expand laboratory testing capacity needed for avian influenza ('bird flu') diagnosis and will correct several deficiencies caused by deferred building maintenance.

Emerging Diseases

New diseases continued to plague Minnesota agriculture and wildlife. Bovine tuberculosis (TB) was eliminated from Minnesota cattle but increased numbers of TB infected wild white-tailed deer were identified through the intensive surveillance conducted in collaboration with the Minnesota Department of Natural Resources. TB-infected deer populations were limited to selected counties in Northwestern Minnesota. In 2007, TB surveillance will again focus on the affected areas in Northwestern Minnesota by testing 1,000 deer samples in an attempt to regain Minnesota’s USDA designation as “TB free”.

A new swine disease, Porcine Circovirus Associated Disease (PCVAD), emerged as a major health threat to the Minnesota swine industry. With the increase in cases, new diagnostic services including immunohistochemistry, serology, polymerase chain reaction, and virus sequencing were rapidly introduced to provide accurate diagnostic information and limit disease transmission. Research on PCVAD was expanded by mobilizing $300,000 of Minnesota Agricultural Experiment Station Rapid Response Funding. Using sample submissions from past and current diagnostic cases, viral genetic sequences were studied to determine the role of novel circoviruses in the clinical syndrome. Introduction and widespread use of USDA licensed PCV2 vaccines was associated with a steep decline in morbidity and mortality caused by PCVAD.
In response to the emerging worldwide threat of avian influenza, the VDL collaborated with the USDA and Department of Interior to expand avian influenza surveillance in wildlife and commercial and noncommercial poultry. Influenza molecular diagnostic testing capabilities were enhanced by implementing new tests that rapidly detect, type and sequence multiple influenza subtypes. Minnesota is now considered one of the most well prepared states for dealing with an avian influenza pandemic.

In April 2007, Dr. Marie Gramer in collaboration with the USDA National Animal Disease Center identified an influenza type A virus subtype H2N3 from Midwestern pigs. This subtype was heretofore not identified in pigs; therefore, susceptible mammalian species do not have immunity against this virus. The VDL in collaboration with private industry is developing vaccines that will help protect animals from this new influenza strain. Also, diagnostic assays that accurately detect and distinguish between the H2N3 influenza strain other influenza A viruses are being developed.

A new and more cost effective diagnostic test was developed for porcine reproductive and respiratory syndrome (PRRS) to deal with the continued mutation of the virus. The new polymerase chain reaction (PCR) test is faster, has lower cost and can detect both North American and European strains of PRRS virus in a single test format.

*Actinobacillus suis* emerged as an important cause of mortality in finishing pigs. Isolation of this pathogen from clinical samples submitted to the VDL increased from 419 cases in FY02 to 959 cases in FY06. In 2005, the VDL developed and validated the first PCR test available for *A. suis* diagnosis in the U.S. and subsequently further refined the test into a multiplex PCR that can detect *A. suis* and *A. pleuropneumoniae*. Field veterinarians are now using these tests to design new control and eradication strategies.

Several cases of human infection by *Streptococcus suis* were recently reported worldwide, especially in China. In the U.S., the first human case of *S. suis* meningitis was reported in 2006 in a New York farmer who had contact with infected pigs. In response to this zoonosis, the VDL standardized several new diagnostic tools for use in outbreak investigations. Currently, the VDL can serotype *S. suis* by PCR and genotype isolates from swine and humans using other molecular techniques. The new methods enable veterinarians and other scientists to perform detailed epidemiological studies involving swine and humans *S. suis* infections. The VDL is the only laboratory in the U.S. currently offering these diagnostics tests on a routine basis.

**Aquaculture**

The VDL established a new program in aquaculture in response to an emerging viral disease, Viral Hemorrhagic Septicemia, affecting the Great Lake states. The new strain of VHSV (VHSV-IVb) first found in the Great Lakes in 2005, has infected more than 25 fish species and caused significant mortalities in hosts such as muskellunge, yellow perch, freshwater drum, and baitfish. Despite its movement through the eastern Great Lakes and spread to inland waters of New York, Michigan, and Wisconsin, the disease has not yet been detected in Lake Superior or any other water body in Minnesota. In response to the spread of VHSV, federal and state regulations limiting the movement of fish have increased the need for diagnostic testing to
protect the aquaculture industry. Nicholas Phelps, with an M.S. degree in fish pathology from the University of Arkansas at Pine Bluff and two years experience conducting USDA-APHIS approved fish health inspections was hired as the first aquaculture specialist for the University of Minnesota’s Veterinary Diagnostic Laboratory. The Executive Director of the Minnesota Board of Animal Health authorized the VDL to do official fish health inspections in the state of Minnesota. All tests performed at the Veterinary Diagnostic Laboratory follow OIE and American Fisheries Society-Fish Health Section procedures for pathogen detection.