

The University of Delaware
Poultry Health System

A Partnership with the Poultry and Allied Industries



Delmarva's Poultry Industry: An Agricultural Cornerstone

The poultry industry is the mainstay of agriculture on the Delmarva Peninsula, accounting for nearly 70% of the agricultural income in this region. Each year about 600 million broiler chickens are produced on Delmarva with a total economic value of nearly \$2 billion. Farmers in the region also benefit economically, producing more than 80 million bushels of corn and soybeans annually as feed for this vitally important, global agribusiness. Others in the community benefit as well, because seven jobs in other employment sectors are created for each of the 16,000 jobs in the poultry industry.

Facts About Delmarva's Broiler Industry

Annual Broiler/Roaster/Cornish Production **571,141,000**

Total Pounds Produced **3,331,005,000**

Poultry Growers and Company Employees **15,932**

Number of Broiler/Roaster/Cornish Houses **5,430**

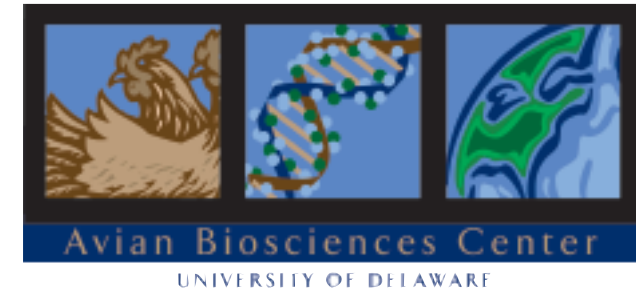
Bushels of Corn used for Feed **76,435,000**

Bushels of Soybean used for Feed **30,309,000**

Wholesale Value of Broilers/Roasters/Cornish **\$1,652,309,000**

Each job in the poultry processing industry creates **7.2** jobs elsewhere.

For the latest statistics on the poultry industry, visit the Delmarva Poultry Industry, Inc. website (<http://www.dpicken.org/>).



The Poultry Health System of the University of Delaware's Avian Biosciences Center

Preventing and controlling poultry diseases is one of the greatest challenges faced by the poultry industry. The Avian Biosciences Center *Poultry Health System* at the University of Delaware provides comprehensive diagnostic services integrated with applied and basic research to identify and control poultry diseases. The Center was established in 2006 to provide national leadership in research, education, and outreach programs that provide solutions to contemporary problems in the avian biosciences (for more information on the Avian Biosciences Center, visit the website:

<http://ag.udel.edu/abc/index.html>). Scientists working in the *Poultry Health System* have addressed and solved many disease problems. With an emphasis on disease prevention, fundamental research has led to the development and implementation of practical measures that have contributed to the profitability of poultry production. Success of the *Poultry Health System* has been significantly enhanced through ongoing collaborations with the poultry and biologicals industries, other universities, regional and state Departments of Agriculture and the United States Department of Agriculture (USDA). Financial support for the *Poultry Health System* comes from the State of Delaware, USDA, the poultry and allied industries, and granting organizations.



The Poultry Health System Infrastructure

Surveillance

Surveillance and early detection of poultry diseases is critical to control. The *Poultry Health System* routinely tests for infectious laryngotracheitis, exotic and endemic (lentogenic) Newcastle disease, infectious bronchitis, and avian influenza. These tests include genomics-based as well as serological assays. Surveillance for avian influenza requires special efforts to meet USDA Animal and Plant Inspection Service (APHIS) programs for commercial and backyard poultry (National Poultry Improvement Plan) and wild birds (Wildlife Services).

Diagnostics

Demand for diagnostic services of the *Poultry Health System* is high. Nearly 10,000 specimens were submitted to the Lasher Laboratory in 2006. The majority of these submissions were from commercial broiler farms located on the Delmarva peninsula. Diagnostic specimens are also received from small flock owners in our region as well as poultry companies in other states.

Research

Surveillance and diagnostic activities are complemented by fundamental research. This ranges from the development of new experimental vaccines to the characterization of avian influenza isolates from poultry and wild birds to the use of genomics for understanding molecular mechanisms by which disease agents cause poultry diseases.

Research on avian influenza outbreak responsiveness, including the development of a safe and effective method for emergency flock depopulation, has been heralded nationwide.

Many vaccines used by the poultry industry today were developed by researchers at the University of Delaware. Vaccines developed for Newcastle disease, infectious bronchitis, avian reovirus infections, Marek's disease, and infectious bursal disease continue to improve poultry health and save the poultry industry millions of dollars annually.

Genomics research and applications constitute a major area of emphasis. Genomics initiatives include the acquisition of expressed sequence tag, transcriptome, and microRNA databases for poultry and for poultry disease agents. Supported by bioinformatics, genomics research will improve our understanding of complex metabolic pathways, immune function, host-pathogen interactions, and disease resistance. Applications in high-throughput diagnostics, poultry breeding, and food safety are anticipated.

The University of Delaware *Poultry Health System* has outstanding, state-of-the-art facilities to support disease surveillance diagnostic services and research. The Charles C. Allen Jr. Biotechnology Laboratory and the Lasher Laboratory are recognized as National Animal Health Laboratory Network (NAHLN) participating laboratories for the detection of avian influenza and exotic Newcastle disease. The NAHLN coordinates USDA's laboratory capacity with the infrastructure of State and University-supported laboratories to enhance early detection of foreign animal disease agents and newly emerging diseases and to better respond to animal health emergencies.

On the UD Newark campus, faculty, professionals, and graduate students work in the *Charles C. Allen Biotechnology Laboratory*, *George M. Worrilow Hall*, and the *Delaware Biotechnology Institute* to improve our understanding of poultry diseases. Research spans a wide continuum from applied disease trials to genomics-based efforts. Research has led to the development of vaccines and applied management practices to control many economically important diseases.

The *Lasher Laboratory*, located in the heart of the poultry industry, is the University's poultry diagnostic facility at the Elbert N. and Ann V. Carvel Research and Education Center in Georgetown. The *Lasher Laboratory* provides time-sensitive diagnostic services to the industry on a daily basis and helps to implement research findings. Veterinary diagnosticians and staff keep poultry health officials apprised of emerging diseases. These include researchers and experts in industry, state and federal agencies.

The *Jones-Hamilton Poultry House* is a fully instrumented production facility used to conduct research on poultry health, nutrition, and management under commercial conditions.



Charles C. Allen Jr. Biotechnology Laboratory



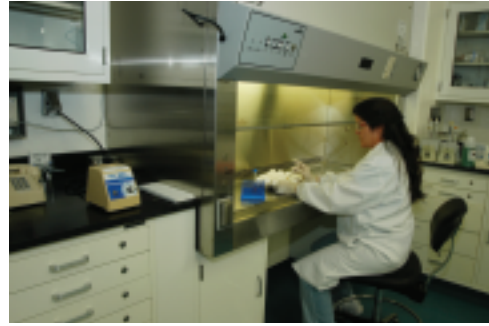
Lasher Laboratory



Jones-Hamilton Poultry House

Charles C. Allen Jr. Biotechnology Laboratory

The *Charles C. Allen Jr. Biotechnology Laboratory* is a world class facility dedicated to poultry disease research and diagnostics. The *Allen Laboratory* is a biosafety level BSL-3, USDA-licensed and NAHLN-approved laboratory, used by scientists to study highly virulent poultry pathogens in a safe and biosecure working environment. The 16,635 square foot facility built in 1997 contains two multi-purpose laboratory suites, a gene-sequencing laboratory and six rooms for housing poultry. The laboratories and animal rooms are equipped with airlocks that prevent the introduction or release of infectious agents. The ventilation system used for the contained areas of the *Allen Laboratory* is a single pass (all fresh air) pressure gradient, HEPA filtration design. The BSL-3 designated laboratories and poultry rooms also have shower change rooms, as required. The BSL-3 animal rooms are equipped with HEPA-filtered stainless steel glove-port isolation cabinets with dip tanks. The *Allen Laboratory* has a computer-controlled liquid waste decontamination system that inactivates microorganisms by steam sterilization, as well as several autoclaves for solid waste inactivation. A BSL-3 necropsy room is available in the event of an emergency disease (avian influenza or exotic Newcastle disease) involving poultry or wild birds.



Lasher Laboratory

Diagnostic efforts in the *UD Poultry Health System's Lasher Laboratory* represent the first line of defense against poultry diseases. The *Lasher Laboratory* enhances the University of Delaware's ability to respond quickly and efficiently to industry needs for poultry disease diagnosis and outreach activities. Diagnostic services available at the *Lasher Laboratory* include poultry necropsy and clinical diagnosis, bacteriology, mycology, molecular diagnostic testing, and serology. Virology and histopathology specimens collected at the laboratory are sent to the Newark campus for evaluation. The *Lasher Laboratory* conducts applied research on poultry diseases, often in collaboration with poultry industry scientists, and provides a broiler progeny challenge service for evaluating infectious bursal disease virus vaccinal immunity. As a NAHLN approved laboratory, the Lasher Laboratory routinely performs surveillance for avian influenza and exotic Newcastle disease. Avian influenza surveillance programs include pre-slaughter testing of commercial broiler chickens, routine surveillance of backyard flocks, and testing of diseased flocks. NAHLN-approved tests used for avian influenza surveillance include antigen detection (real time RT-PCR and antigen capture) and antibody detection (enzyme linked immunosorbant assay and agar gel immunodiffusion) assays.





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