

Research Office and Kentucky Agricultural Experiment Station

Overview

The Research Office and Agricultural Experiment Station have oversight for all research-related academic activities and federal and state mandated programs. Day-to-day duties include:

- Strategic and administrative responsibility for grants and contracts
- Administration of Hatch, Hatch-Multistate, McIntire-Stennis, and Animal Health funds and programs
- Research regulatory compliance, conflict of interest management, and responsible conduct of research
- Intellectual property policy implementation
- Research faculty startups
- Distribution and investment of research support pools (RAA, Royalty, portion of federal formula funds)
- Oversight of Regulatory Services, the Veterinary Diagnostic Laboratory, and Kentucky Tobacco Research and Development Center leadership
- Programmatic oversight for research farm facilities across the state; direct oversight of Princeton and Robinson Center leadership
- Support for research components of college-wide special initiatives
- Completion of reports to numerous university, state and federal entities
- Liaison to agricultural and natural resource organizations and commodity groups including NAREE Board, Kentucky Board of Agriculture and Livestock Care Standards Commission, Nature Conservancy, Kentucky Clean Fuels Coalition, Kentucky Cattleman's Association, Kentucky Soybean Board, and Kentucky Small Grain Growers, among others.

List and provide links to the most recent department level reviews, self-studies, strategic plans or annual reports.

1. Contribution to Battelle report on the value of experiment stations and extension in the Southern Region – *Not yet available online; see appendix for report*
2. 124th KAES Annual Report- <http://www.ca.uky.edu/agc/pubs/ar/ar124/ar124.pdf>
3. 2011 Annual Research Report in Fall 2012 Ag Magazine – http://www.ca.uky.edu/agcomm/Magazine/2012/FALL2012/research_report.html
4. Annual Report of Results and Accomplishments (includes extension, KSU) – <http://www.reeis.usda.gov/web/areera/reports/2011/2011-Kentucky-State-University-and-University-of-Kentucky-Combined-Research-and-Extension-Annual-Report-of-Accomplishments-and-Results.pdf>

Some notes regarding the research components of the College's Strategic Plan:

With the loss of ARRA funding, USDA special grants, and faculty research FTEs (from 125 in 2008 to 113 in 2012) in addition to slow to no growth in competitive federal R&D funding, College extramural funding levels have fluctuated in recent years. However, the percentage of federally competitive funding has increased steadily from 33.64% in 2009

to 39.4% in 2012. Research expenditures have also fluctuated much less than new awards, increasing from just under \$23 million in 2006 to over \$29 million in 2012.

Other strategic research metrics, including refereed journal publication and graduate degrees awarded, have gone down or fluctuated over the last 4 years. The exception to this is the number of patents granted, which has consistently exceeded goals.

Briefly list examples of major projects and initiatives, underway or in planning, for which your department provides leadership or is a primary collaborator.

- UK Equine Programs
- Partnership with ARS Forage Animal Production Research Unit
- Environmental and Natural Resources Initiative
- Statistical Graduate Student Consultant and Applied Statistics Laboratory support
- UT-UK and NCSU-UK Tobacco Partnerships
- UK-Alltech Master Agreement and Research Alliance
- USDA Civil Rights review outcome implementation
- Restructuring of Regulatory Services and KTRDC
- Facility expansion and organizational improvements to UKVDL
- Added Associate Director/Assistant Dean, Director of Environmental & Animal Compliance, and second College Grants Officer
- Development of farm facility enhancement plans and implementation of user committee recommendations
- Farm animal compliance plan development and implementation
- Partnership with Kentucky Cattleman for use of Eden Shale field facility

What are the appropriate measures of excellence and/or progress for your Department?

The measures below relate to the greater Research Office umbrella for the College:

- Total annual grant and contract expenditures (as opposed to awards received)
- Funding per faculty research FTE
- Percent of federal competitive funding
- Total number of peer reviewed journal articles or number per faculty research FTE
- Patents issued (patent applications filed may be more indicative of recent activity, but are more difficult to track)
- Number of graduate degrees granted
- Number of clients served by service units

What are the most critically needed resources (of any kind: human, financial, physical) that limit advancement of your Department?

Summary of existing resources – The Research Office budget includes state support for most, but not all, Research Office and Equine Programs personnel, plus modest operating support for office activities and expenses. The budget also includes federal formula funds that are not part of the departmental distributions. A combination of state funds and income accounts support the service units as well as farm facilities at PREC and RCARS. The primary sources of flexible funding are Research Activity Awards (5% F&A return) and royalties. These funds are used for strategic investments, recurring expenses in support of the college research enterprise (CGO and RA salaries, statistical help), faculty startup/retention and cost share on grants.

Since the last self-study, the Research Office has added the positions of Associate Director/ Assistant Dean for Research, Director of Animal and Environmental Compliance and, in conjunction with OSPA, a second College Grants Officer. A new Academic Coordinator for the Equine Science and Management Program is also being added to the Equine Programs staff to handle advising, recruiting, and placement for this rapidly growing undergraduate program.

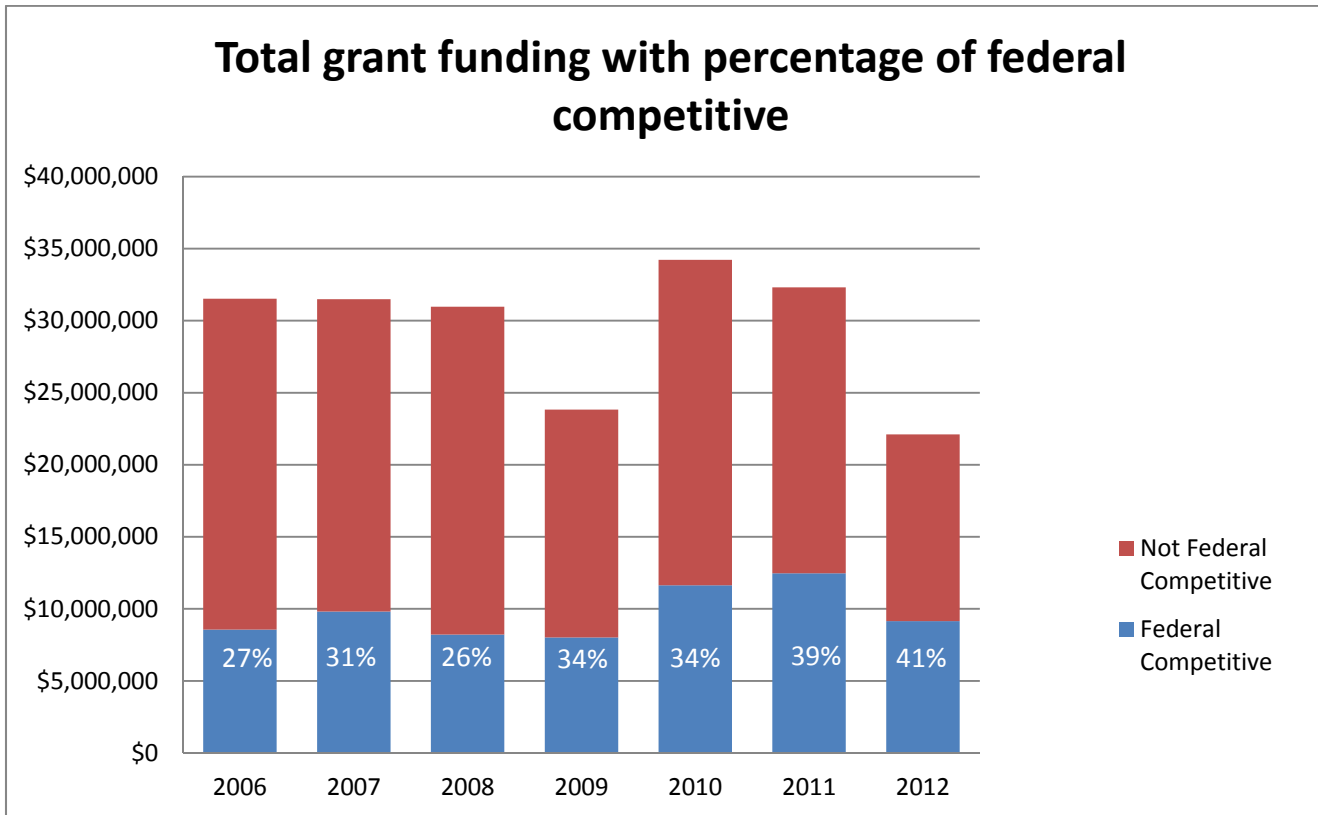
Critically needed resources to advance research in the College:

1. *Stable, recurring source of funds for portion of CGO and RA covered by Research Office* – In 2010 the Research Office took advantage of an offer from OSPA to pay for half of an additional college grants officer to help manage the increasing number of proposals submitted by the College. In 2011, the College agreed to cover half the salary of an experienced and valuable research administrator in order to retain their expertise, with the condition that the arrangement would be re-evaluated after 3 years. Recent organizational changes in OSPA have only further highlighted the value of this administrator and heightened our desire to ensure she continues to be assigned to the College. Currently, the College's share of salaries and fringe benefits for these positions is paid from Research Activity Awards. These commitments significantly reduce the amount of funds available to assist faculty with equipment purchases and repairs, preliminary data generation, and other research enrichment activities. Carving out a recurring, stable source of funds for these critical positions will free up funds that can be used for short-term, strategic investments with potential to return more funds to the College.

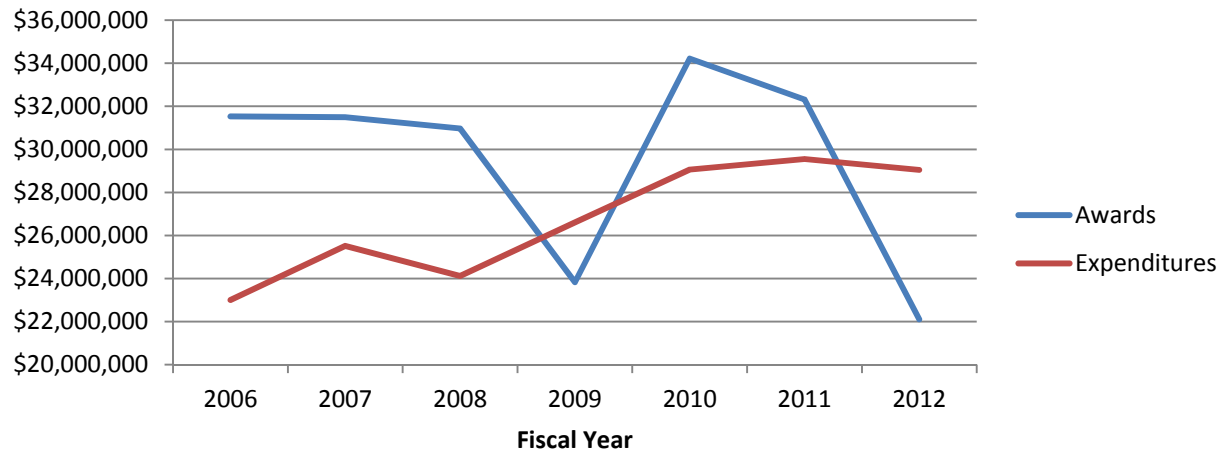
2. *Additional personnel, either at college level or within departments, for grant account management* – Departments have taken on increasing administrative burden, particularly with respect to fiscal and grants management. At the same time, new on-line systems for purchasing and other functions have not reduced the workload at the unit level. Staffs in many departments are not skilled in providing the level of assistance needed to properly manage grants and contracts. Others with skilled staff are overburdened with larger numbers of faculty to serve. As a result, a substantial amount of time is spent by research office administrators and CGOs dealing with post-award management issues that could have been avoided. Additional, skilled staff to better manage grants will reduce paybacks of unallowable expenses or remaining monies and reduce audit risks.

3. *Strategic plan for investing in research instrumentation* – Long-term planning for research instrument acquisition and maintenance is critical to maintaining the competitiveness of our faculty and to recruiting new faculty to UK. With the exception of programs that specifically support research instrumentation, it is increasingly difficult to pay for equipment with grant funding, making it difficult for faculty without startup funds to update or add to their equipment inventories. The College and Departments must develop a pool of equipment funds and prioritize investments to benefit the widest range of students and programs possible.

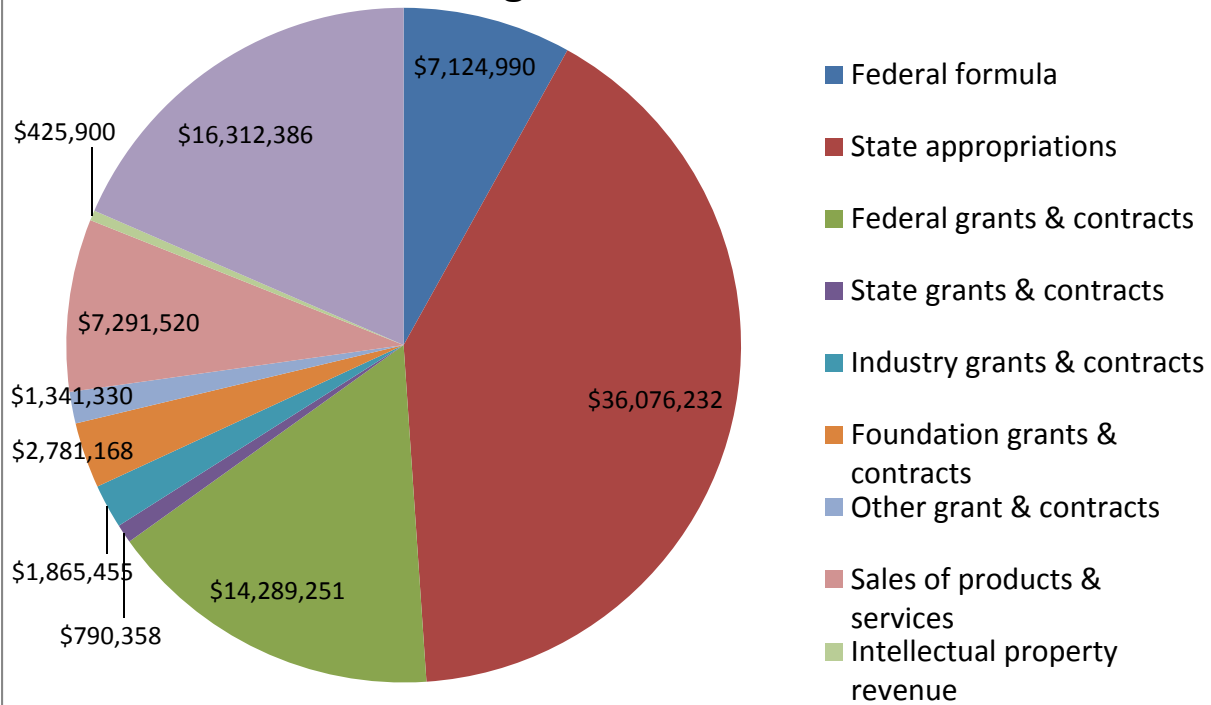
APPENDIX A. Key Data Summaries for Research



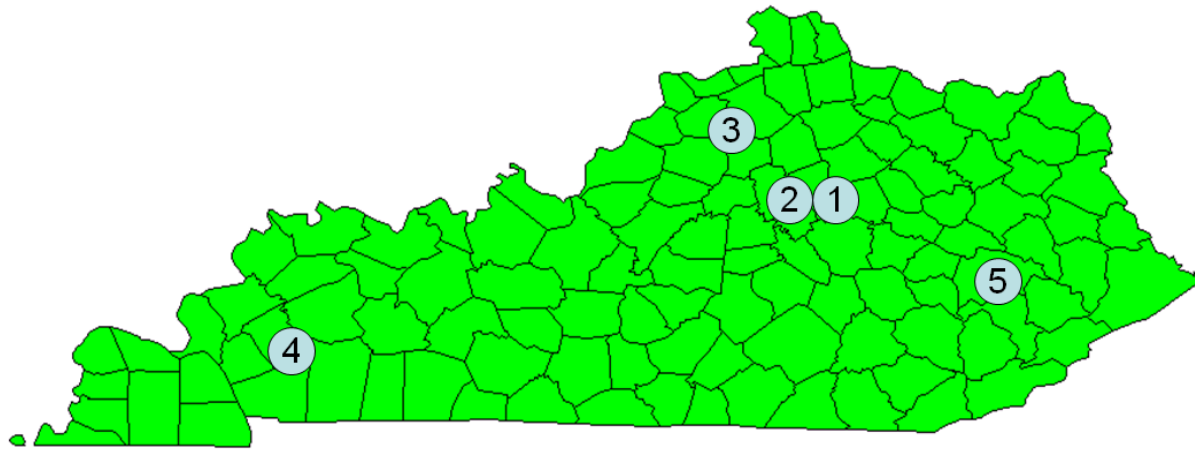
Direct Awards vs. Expenditures



FY 2011 College-Wide Research Income



APPENDIX B. Field Facility Location and Descriptions



Position 1: University of Kentucky (Fayette Co.)

Campus (1890)—Laboratories and specialized equipment for all research program areas

Coldstream (1956)-Maine Chance (1967)-Spindletop Farms (1959)—Beef and dairy cattle, poultry, horses, sheep, and swine; forages and grain crops, tobacco, and turf

South Farm (1956)—Fruits, vegetables, and ornamentals, including organic production

Position 2: UK Animal Research Center (Woodford Co.)

Location for development of state-of-the-art food animal research programs (1991)

Position 3: Eden Shale (Owen Co.)

Experimental and demonstration studies are conducted on forage crops, tobacco, fruits and vegetables, and beef management (1955)

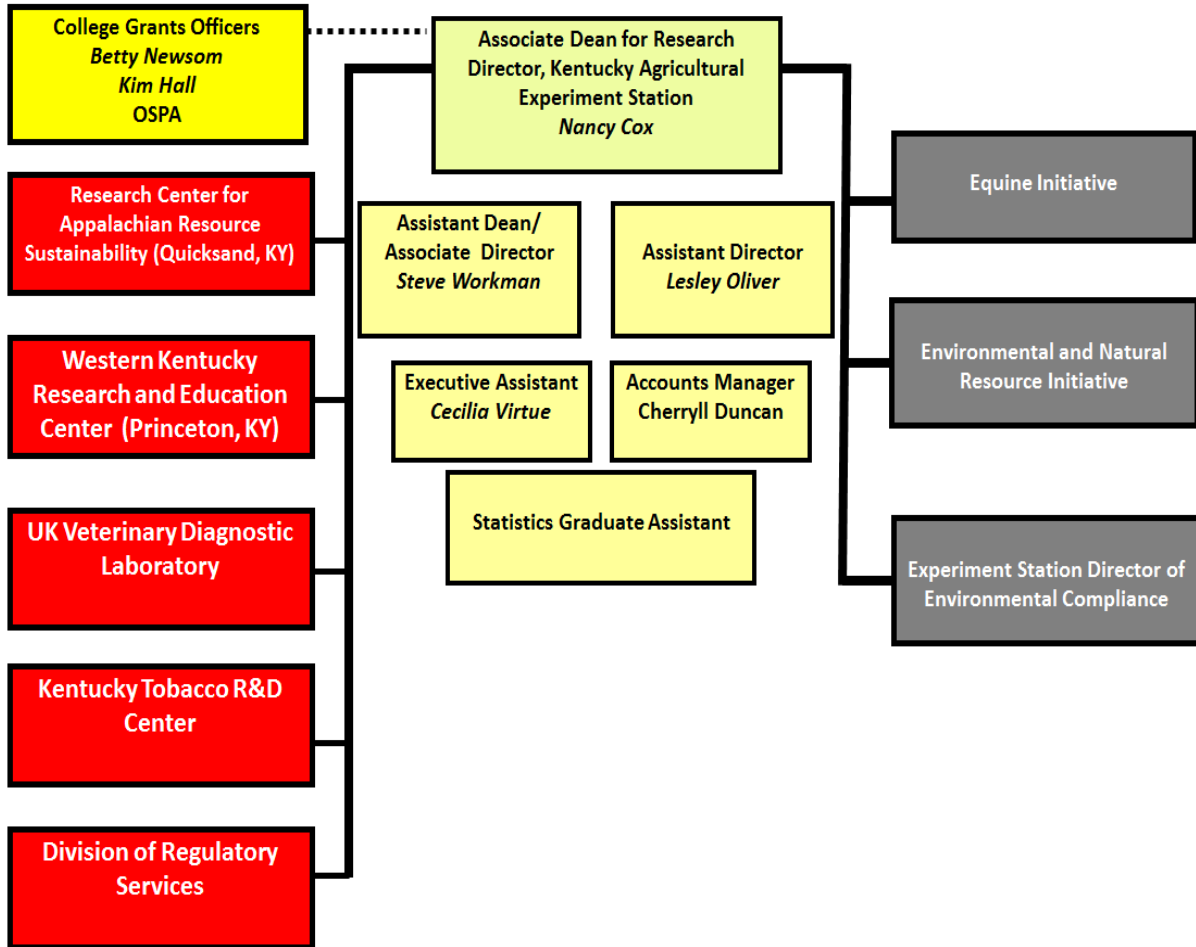
Position 4: Research and Education Center (Caldwell Co.)

At Princeton, the Research and Education Center facilities and the West Kentucky Substation Farm are devoted to research on grain crops, beef cattle, swine, fruits and vegetables, forages, and tobacco (1925)

Position 5: Robinson Station (Breathitt Co.)

At Quicksand, the **Robinson Station** (1924) is the location of research on fruits and vegetables, ornamentals, forages, grain crops, tobacco, and wood utilization. Quicksand is also the headquarters of **Robinson Forest** (1923), which spreads over parts of Breathitt, Perry, and Knott counties and is the site of forestry and watershed management research

APPENDIX C. Research Office Organizational Chart



Section 1: Institutional Profile

University Name	University of Kentucky
Extension Service Director (name, phone, email)	Dr. Jimmy Henning 859-257-4302 jimmy.henning@uky.edu
Experiment Station Director (name, phone, email)	Dr. Nancy Cox 859-257-3333 ncox@uky.edu

Personnel

Number of Personnel in Extension (FTE)	1094
Number of Personnel in Experiment Station (FTE)	947

* Please do not include student employees, graduate assistants or temporary personnel

Section 2: Income/Revenue Sources

Income Source	2011 \$ Income Received by Extension	Funding Trend for Past 3 Years	2011 \$ Income Received by Experiment Stations	Funding Trend for Past 3 Years
Federal Formula Funds	\$11,309,409	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$7,124,990	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
State Appropriations	\$29,689,473	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing	\$36,076,232	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing
Local Government Appropriations (Counties, etc.)	\$45,219,934	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$0	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
Federal Grants and Contracts	\$4,159,461	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$14,289,251	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing
State Grants and Contracts	\$3,420,612	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing	\$790,358	<input type="checkbox"/> Increasing <input type="checkbox"/> Stable <input checked="" type="checkbox"/> Decreasing

<i>Local Grants and Contracts County Income Account plus local capital and program income</i>	\$113,375	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$30,842	<input checked="" type="checkbox"/> Increasing <input type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Industrial Grants and Contracts, including grants and contracts from commodity groups</i>	\$1,333,599	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$1,865,455	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Foundation Grants and Contracts</i>	\$266,961	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$2,781,168	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>All Other Grants and Contracts</i>	\$1,951,422	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$1,310,488	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Sales of Products and Services</i>	\$3,478,945	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$7,291,520	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Intellectual Property Revenues</i>	\$0	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$425,900	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Gifts</i>	\$1,541,270	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$16,312,386	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
<i>Other</i>	\$	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing
TOTAL	\$102,484,461	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing	\$88,299,590	<input type="checkbox"/> Increasing <input checked="" type="checkbox"/> Stable <input type="checkbox"/> Decreasing

Are these income/revenue numbers based on a cash or accrual accounting basis?

Cash

Income Trends:

During the past five years, what trends have been observed in the funding for extension and experiment station activities? What are key funding challenges? Where have the most notable funding declines or increases occurred?

Uncertain and declining Federal Formula Funds; Declines in federal agency funds for research; Decline in state appropriations; More questions and justification for local funds in Extension; Increased competition for federal grants; Loss of ARRA funds

Section 3: Research and Extension Activities

Key Initiatives, Institutes and Programs:

Please provide a description of FIVE key centers, institutes, programs or initiatives that are true signatures of experiment station and extension work at your institution. Here we are looking for descriptions of initiatives, centers, programs, etc. for which your university is internationally or nationally well-recognized as a leader.

<i>1. Fine Arts Extension – Inaugurated in 2005 in one county and now in four, this program is designed to improve lives and communities through full-time county professionals supported by the UK College of Fine Arts and the College of Agriculture.</i>
<i>2. Community and Economic Development Initiative of Kentucky (CEDIK) – A fully integrated (research, extension, teaching) interdisciplinary program to build strong Kentucky communities, especially by training and empowering county extension professionals</i>
<i>3. Beef Integrated Resource Management – A public-private partnership to support the largest cattle state east of the Mississippi led by an interdisciplinary team of extension faculty</i>
<i>4. Equine Initiative – A suite of integrated programs to support the signature industry of Kentucky and take advantage of forage-based enterprises</i>
<i>5. Food Systems Innovation Center and Sustainable Ag Working Group – A partnership with state government through Governor’s Office of Agricultural policy to support >200 Kentucky food processors and entrepreneurs</i>

Special Research and Extension Infrastructure

Please provide a description of FIVE special assets or infrastructure investments that support agbioscience and related development at your institution. Examples might include pilot plant facilities, unique scientific research infrastructure, biosecurity facilities, camps, etc.

<i>1. 4-H Camps – Four overnight camping and educational centers that provide youth development experiences for 24,000 annually, including 8,000 at traditional summer camps; one site includes a hotel-quality leadership center</i>
<i>2. Animal Health Monitoring – Statewide effort with State Veterinarian and Murray State University to create a unique, real-time, syndromic surveillance system for animal health trends; the first of its kind nationally</i>
<i>3. Official reference laboratories for equine health designated by Office Epizootie Internationale (worldwide)</i>
<i>4. Advanced Genetic Technologies Laboratory – A federal investment in gene sciences that leveraged over \$25 million in competitive funding</i>
<i>5. Biogeochemistry Laboratory to study environmental and ecological effects of nanoparticles</i>

Most Notable Assets, Centers, Programs or Initiatives by Category

For each of the areas of focus listed below, please provide what you consider to be the top TWO most notable strengths (programs, assets and infrastructure, centers, etc.) of your institution:

Plant Sciences, Crop Science, Plant Genetics and Agronomy

1. *Grain Crops Academy – Ten 4-hour sessions for grain producers focusing on soils, management, storage, technology, and marketing resulting in increased returns on their crops; as a result of participating in the academy, producers are capable of improving their decision- making*

2. *Pasture Management – Integrated program to serve a forage-heavy state with comprehensive strategies for nutrition, weed management, environmental compliance and variety development; partnership with USDA-ARS Forage-Animal Production Unit*

Animal Sciences, Animal Health, Livestock

1. *Beef Integrated Resource Management /Kentucky Beef Network (KBN) – A public-private partnership that leads the beef industry in the southeast; KBN is a for-profit subsidiary of the Kentucky Cattleman’s Association*

2. *UK-Alltech Poultry Alliance – A public private partnership resulting in industry and academic scientists working seamlessly on research problems; e.g. production systems that do not use antibiotics*

Food Science, Food Product Development, Advanced Nutrition and Health Products

1. *Plate It Up, Kentucky Proud – An educational and marketing collaboration with the Kentucky Department of Agriculture to increase consumer purchase, preparation, and preservation of Kentucky grown and value-added commodities*

2. *Superfund Research Program – University-wide program led by the College of Ag and funded by the National Institute of Environmental Health Sciences; studies mitigation of environmental contaminants through nutrition and nutrigenomics technologies*

Food Safety and Biosecurity

1. *Microprocessor Training – Extension-led training on proper food preparation for producers that satisfies the legal requirements needed to sell home grown and processed foods in farmers markets*

2. *UK Extension Disaster Education Network (EDEN)Team – Tasked to train agents and local emergency management teams on the principles and practices to be followed in developing an emergency management plan for agriculture and how to be prepared for natural disasters*

Industrial Bioeconomy, Biofuels, Biobased Chemicals, Biobased Materials and Fibers

1. *Marginal and coal-mined land reclamation for biomass – Novel programs to reclaim coal-mined land to created forests and biomass production systems*

2. *Bioproducts Pilot Program – A collaboration of plant sciences and engineers to sustainably produce biofuels to support on-site farming operations*

Environmental Sciences, Natural Resources, Sustainability

1. *Environmental and Natural Resources Initiative (ENRI) – An integrated project involving close collaboration with the state Division of Conservation and Division of Water to improve environmental compliance of animal operations and home owners*

2. *Natural disaster response effort – A college-wide team that works to prepare communities to deal with disasters resulting from all hazards and to assist and coordinate in relief efforts after an event, including providing access to resources of the Extension Disaster Education Network*

Agritourism and Recreational Hunting and Fishing

1. *Agritourism – An educational program to encourage, develop and grow tourism opportunities in Kentucky based on agriculture*

2. *4-H Shooting Sports Program – An introduction to the safe and responsible use of firearms and archery equipment that teaches leadership and responsibility in a non-formal environment*

Family Development

1. *Managing in Tough Times Initiative – A college-wide, interdisciplinary effort to provide assistance to farmers, families and communities in the management of resources*

2. *Family Interaction Laboratory – Collects social, neurological and physiological responses from individuals, couples and families as they communicate*

Youth Development

1. *4-H Camps – The signature program of Kentucky 4-H, which provides life experiences for youth ranging from day-long to full week residential camps*

2. *Science, Engineering and Technology/GPS/GIS – Hands-on program designed to improve knowledge and skills of the use of science/engineering/technology, including GIS/GPS and to make youth aware of related career opportunities*

Community and Economic Development

1. *Community Economic Development Initiative of Kentucky(CEDIK) – A research, extension and teaching interdisciplinary effort to build Kentucky Communities*

2. *Fine Arts program – Using full-time county extension professionals to improve lives and communities using the arts*

Other, including multi-focus:

1. *Ken-Tenn Institute: Building Sustainable Communities (Multi-state program) – A community-driven training program using a conference format, designed for extension professionals, discussing principles, practices and successes of extension community development*

2. *Tri-state Diversity Conference – Hosted by four land grant universities from Indiana, Kentucky, and Ohio, the diversity conference is designed for all wanting to empower greater diversity and cultural understanding within their communities and workplaces, including individuals from the extension, academic, research, K through 12 and elected*

officials

Intellectual Property

	2009	2010	2011
# of Invention Disclosures	10	5	2
# of Patents Applied For	5	2	1
# of Patents Awarded	9	5	8
# of Licenses Executed	2	2	0
# of Business Start-Ups	3	1	0
# of Plant Variety Protection Certificates Applied For	0	0	0
# of Plant Variety Protection Certificates Awarded	0	0	0
\$ Value of Income received from Plant Variety/Germplasm Development	\$206,133	\$199,230	\$167,429
\$ Value of Income received from all other Intellectual Property*	\$681,112	\$698,104	\$549,092

*reflects gross licensing fees collected by the University for IP developed by College faculty

Company Spin-Offs and Commercialization

Please provide examples of any start-up companies located in your state or the southern region that resulted from research discoveries, innovations or technologies developed at your institution in the past 10 years:

1. *Allylix – Fragrance and flavor company based on terpene chemistry program of a UK plant scientist; just completed a financing round of > \$18 million and announced its first product, a terpene used in fragrance applications*
2. *Paratechs – Started by UK entomologist to produce novel platforms for biorational control and transgenic bioproducts*
3. *Global Ag Risk – International leader on microinsurance for farmers in developing countries; owned by a UK ag economist*
4. *Naprogenix – Plant production systems for neurochemicals; partnership between pharmacologist and UK's Kentucky Tobacco Research and Development Center*
5. *Reflectronics – In-line process control for food safety concerns; started by a UK agricultural engineer*
6. *Transecurity – A remote sensing application to ensure milk safety during transport from farm to processor; developed by ag engineer and specialist from the Division of Regulatory Services*
7. *Fresh Flavors and Fragrances – Novel chemicals from soybean and chia; owned by a plant scientist*
8. *Mosquito Mate – Controls insects by releasing sterile male mosquitos; started by a*

UK entomologist

9. *Phyllotech – Produces anti-fungal agents for crops based on tobacco surface proteins; started by a UK plant scientist in collaboration with UK's Kentucky Tobacco Research and Development Center*
10. *Entrepreneurial Coaches Institute – Imparts entrepreneurial skills which have developed actual businesses in rural areas; started by a UK social scientist*

High Impact Innovations and Technology Development

Please provide FIVE examples of innovations or technology developments that have had a substantial impact on the field of agbioscience and/or associated agbio industries in the past 10 years. Examples might include crop varieties with enhanced yield characteristics, new processes or technologies introduced that significantly enhance productivity in industry, etc.

1. Genomic manipulations of lignin biosynthesis for ethanol bioprocessing
2. Derivation of terpene compounds through biotechnology as a potential replacement for petroleum based chemicals (flavors, fragrances, home products)
3. Radiofrequency identification tools to remotely detect health problems in cattle
4. Discovery of the sequence of neurological equine herpes virus and production of 6 out of 10 prominent equine vaccines
5. Development and release of improved red clover varieties that have increased pasture value by \$250 per acre

Additional comments or items of note regarding experiment station and extension impacts:

1. *Kentucky 4-H Programming reaches over 200,000 youth annually, representing 25% of youth ages 9 to 19.*
2. *Each of the 120 counties in Kentucky has a UK Cooperative Extension Office with at least 2 professional educators (agents) per office. Most have 3 or more.*
3. *The Kentucky Extension Homemakers Association is the largest in the nation, with more than 12,000 members.*
4. *A partnership with the Kentucky Small Grain Growers Association has created a new method to expedite delivery of improved wheat germplasm to growers compared to traditional methods of plant variety release.*
5. *Kentucky Extension Homemakers, working in conjunction with FCS agents and the UK Medical Center, have raised more than a million dollars for ovarian cancer screening support and actively encourage and facilitate ovarian cancer screenings by providing transportation to the screening clinic. The clinic waiting room and examination rooms have decorations made and provided by Extension Homemakers to make patients feel a connection to home and to improve their clinic experience.*

Section 4: Extension Service Programs

Statistics: please provide basic metrics and statistical information for extension:

Metric	Number
<i>Number of county/parish offices</i>	120
<i>Number of multi-county/multi-parish regional offices</i>	6
<i>Number of major 4H camps</i>	4
<i>Number of 4H participants</i>	204,099
<i>Number of contacts with clients recorded by extension for the most recently completed year (include professional and volunteer contacts)</i>	7,408,327
<i>Number of volunteers for the most recently completed year and number of hours volunteered</i>	33,700

Please provide selected examples of notable/high impact projects or programs of extension that you would like considered for inclusion within the Battelle report. Please give consideration to including both rural and urban programs.

Business Development Programs/ Impacts

Business Retention – A Business Retention & Expansion (BR&E) program helps community leaders and communities work together to identify barriers local businesses face as they try to survive and grow. Provide assistance by helping to form a BR&E Team, create a survey of businesses unique to your local issues, analyze survey results, facilitate meetings to prioritize survey results, and implement a BR&E plan.

Kentucky Entrepreneurial Coaches Institute – A nationally recognized program that builds entrepreneurial leaders, advocates and coaches in Kentucky’s 41 tobacco-dependent counties as a response to declining tobacco income. Recently, the Coaches Institute has expanded to offer programs to elected officials, elementary and high school students and communities.

Community Development Programs/ Impacts

Fine Arts Extension – Full-time county extension educators (agents) using the arts to improve lives and communities

Kentucky/Tennessee (Ken/Tenn) Institute for Sustainable Communities – A multistate collaboration working on building communities through Cooperative Extension leadership

Family and Consumer Science Programs/ Impacts

Operation: Military Kids Family Camp – A three-day overnight camp for injured or wounded military service members and their families, offering opportunities for family team building.

4-H and Other Youth Development Programs/ Impacts

Water Pioneers – A youth education program designed to teach youth the importance of water in Kentucky. Combines a residential camping experience and a related and required community service project back in their home communities.

Science, Engineering and Technology (SET) for Youth: This 4-H program emphasizes science, engineering and technology through its non-formal, hands-on programs and activities. In the past year, 24,141 4-H youth participated in programs in robotics, biotechnology, geospatial relations, electronics and multi-media. These learning experiences in the sciences are a first step in attracting youth to explore the sciences as a future career option.

Other high impact/notable Extension programs

Farm Service Agency (FSA) Borrower Training – A 16-hour training to train Farm Service Agency borrowers in farm business planning, financial management, and crop and livestock production practices

What diagnostic or other service facilities are operated by extension? What is the annual volume of business in number of clients and dollars?

Farm Business Analysis – Kentucky Farm Business Management Program (KFBM) provides a records-based information system to assist Kentucky farmers in best utilizing their resources to accomplish their goals and objectives. This mission is extended to KFBM clientele through direct consultation and to the general population through research, education and extension programs of the University of Kentucky. Income for KFBM was \$255,402 in FY2012.

Section 5: Off-Campus Experiment and Extension Stations, Research and Extension Farms, and Outlying Research and Extension Centers

Please provide a listing of your off-campus agricultural experiment and extension station locations, including those near the main campus but not on campus, and other key research and extension locations across the state where faculty conduct research and/or extension activities, together with key characteristics or focus areas of each. *Note: please cut and paste table as needed to create enough entry places for all of your experiment station sites.*

Station 1

<i>Station name</i>	<i>University of Kentucky North Farm</i>
<i>Location (zip code)</i>	<i>40511</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>2400</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Poultry, Dairy, Plant and Soil Science, Entomology, Equine Programs, Alltech public-private partnership; serves Central Kentucky farming systems with a focus on grazing animals</i>
<i>Notable or unique characteristics or assets</i>	<i>500 acre Main Chance Equine Campus; Temperature and precipitation controlled field plots for researching climate change impacts on forages</i>
<i>Number of personnel (FTEs)</i>	<i>10</i>

Station 2

<i>Station name</i>	<i>C. Oran Little Research Center</i>
<i>Location (zip code)</i>	<i>40383</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>1484</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Beef, swine, and sheep research facilities with some equine research; serves Central Kentucky farming systems with state-of-the-art research facilities for animals</i>
<i>Notable or unique characteristics or assets</i>	<i>Farm is on karst geology and has state of the art research facilities constructed in the last 20 years including an intensive research location at the beef unit including environmentally-controlled housing and facilities for conducting surgery. Serves as a model for environmental compliance in animal agriculture.</i>
<i>Number of personnel (FTEs)</i>	<i>8</i>

Station 3

<i>Station name</i>	<i>University of Kentucky South Farm</i>
<i>Location (zip code)</i>	<i>40515</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>80</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Horticulture and organic agriculture; highly popular with extension clientele and host to a thriving undergraduate program in sustainable agriculture.</i>
<i>Notable or unique characteristics or assets</i>	<i>5000 ft² of greenhouse space on the farm</i>
<i>Number of personnel</i>	<i>5</i>

(FTEs)	
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Station 4

<i>Station name</i>	<i>Princeton Research and Education Center</i>
<i>Location (zip code)</i>	<i>42445</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>1278</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Grain crops research, beef, horticulture, and entomology; serves the western region of Kentucky which is similar to Midwestern grain and animal farming systems</i>
<i>Notable or unique characteristics or assets</i>	<i>35,000 ft² research and education building</i>
<i>Number of personnel (FTEs)</i>	<i>15.85</i>

Station 5

<i>Station name</i>	<i>Robinson Center for Appalachian Resource Sustainability</i>
<i>Location (zip code)</i>	<i>41339</i>
<i>Size (acres), including owned and long-term leased land</i>	<i>15,095</i>
<i>Key focus area(s) (e.g. poultry, crop demonstration, etc.)</i>	<i>Forestry, horticulture, forages; serves the eastern mountain region with tailored programs in value-added wood processing, small ruminant production, and local food systems. Serves as housing for regional extension programs. Is a nexus for educational activity in the mountain region.</i>
<i>Notable or unique characteristics or assets</i>	<i>14,800 acre forest, wood utilization laboratory, forestry field camp with housing for 40.</i>
<i>Number of personnel (FTEs)</i>	<i>5.85</i>

Additional comments or items of note regarding off-campus experiment and extension stations, county offices, etc.:

The UK College of Agriculture is a presence in every county via a physical office, most with excellent educational facilities. One hundred eight of these counties have the support of dedicated levies against personal and real property.

Section 6: Industry Partnerships

Please provide a description of FIVE notable partnerships that your experiment station and/or extension service has with industry. Examples might include a joint engineering center with an agricultural equipment manufacturer, plant breeding or transgenic programs with seed companies, bioprocess development with chemical or biofuels companies, food product development with food manufacturing companies, etc.

Provide details on companies, groups of companies, commodity groups etc. worked with, key results achieved and thoughts on benefits provided.

<i>1. Alltech-UK Poultry Alliance – Shoulder-to-shoulder collaboration in a poultry housing facility</i>
<i>2. Alltech Nutrigenomics Alliance – Promoting discoveries in several farm animal species and humans</i>
<i>3. Kentucky Beef Network – A for-profit company owned by the Kentucky Cattlemen Association, and Southeast Livestock Network, an affiliated company, to promote remote identification and value-added marketing of beef cattle</i>
<i>4. Global Ag Risk – A social science company internationally recognized for farmer-based microinsurance for crop losses</i>
<i>5. Wheat Science Group – A public-private partnership that took wheat from a minor crop in Kentucky to the 14th rank nationally; used new varieties and production systems for double cropping with soybeans</i>

What areas of R&D at your institution do you believe hold the most promise for increasing industry engagement in the next five years?

<i>Advanced phytochemical bioproducts Biosensing in animal production systems Diagnostics and therapeutics in equine Advanced materials for firefighters</i>

What agriculture, forestry, fisheries or wildlife and natural resource-related industries do you expect to see grow in the southern region during the next five years?

<i>Biomass production using a blend of feedstocks typical of Kentucky's geographical location between the South and Midwest</i>

Additional comments or items of note regarding industry partnerships:

<i>With leadership from the College of Agriculture, a comprehensive master agreement was established between the University and Alltech. This serves as a model for enabling industry partnerships at UK and potentially other higher education institutions.</i>

Section 7: Regional Cross-Institutional & Governmental Partnerships

Please provide a description of FIVE projects, initiatives, centers or programs, etc. that your experiment station and/or extension service is engaged in together with other institutions in the southern region. Examples might include joint initiatives in biofuels development, food safety, biosecurity, rural economic development, etc.

1. Ken-Tenn Institute – A multi-state collaboration training extension professionals to build sustainable communities

2. Forestry – Southern Region Extension Forester and associated educational program

3. Tobacco – Shared specialists with U. Tennessee

4. Kentucky Mesonet – Weather data sharing and analysis among KY universities

5. Beginning Farmer Program – Joint with Kentucky State University

What federal agencies do you partner with on major joint projects and programs? Please list the top 3 federal initiatives you are engaged with.

USDA – Supplemental Nutritional Assistance Program

US Department of Energy

USDA-ARS – Forage Animal Production Research Unit

USDA/DOE Biomass Program

US Department of Housing and Urban Development

What state agencies do you partner with on major joint projects and programs? Please list the top 3 state agency initiatives you are engaged with.

Department of Agriculture, State Veterinarian Office (real time animal surveillance), KY Horse Racing Commission (joint employee, Equine Medical Director)

Governor's Office of Ag Policy (Extension agents lead the process of local investment of Tobacco Settlement funds devoted to the diversification of agriculture away from dependence on the tobacco enterprise); over \$20 million has been supplied to UK for projects to enhance Kentucky agriculture

Division of Conservation (joint employee)

What do you believe are some of the unique assets of the southern region that make it particularly well-suited to leadership in the 21st Century agbioscience economy?

Partnerships through the multistate research programs are already established

Human Capital (Research and Extension)

Regional Working Groups

Agrobiodiversity

Section 8: Education and Human Capital Development

Student Population

<i>Number of students graduated in most recent year with Bachelor's degrees in related field of study</i>	537
<i>Number of students graduated in most recent year with Master's degrees in related field of study</i>	59
<i>Number of students graduated in most recent year with Doctorate degrees in related field of study</i>	27
<i>Number of students graduated in most recent year with Associates or other less than baccalaureate qualifications in related field of study</i>	0

Education and Training Programs

In a science and knowledge-driven economy, skilled human capital is a critically important asset for our states. Please provide details pertaining to education and skills development in the sections below:

New or innovative education programs or degree programs developed (for example: bioprocessing or biorefinery operator training, biosecurity training, education programs in new fields such as functional foods, nutraceuticals, etc.)

Equine Science and Management – Interdisciplinary B.S. program that is one of only 3 stand-alone equine degree programs at land-grants ; Sustainable Agriculture – B.S. program educating students in economically viable agricultural production combined with environmental and social responsibility ; Agricultural Biotechnology – Highly competitive interdisciplinary B.S. program educating student in advanced biosciences

Continuing education programs or training for producers or industry

Horse College – Horse College is a series of five educational sessions for horse owners on the topics of nutrition and feeding, breeding, pasture management, health care, hoof care, facilities, and behavior. As a result of the program, owners learn to improve management practices to more effectively and economically care for their animals.

Master Grazer – Kentucky's forage base is underutilized especially as it relates to the 7 million acres of pasture or lands grazed by livestock. The Master Grazer Program is geared toward more efficient utilization of this valuable resource by improving the economics of Kentucky livestock agricultural industries through reduced feeding costs, increasing the amount of available grazing, and increasing stocking rates.

Grain Crops Academy – Ten 4-hour sessions for grain producers focusing on soils, management, storage, technology, and marketing resulting in increased returns on their crops. As a result of participating in the academy, producers are capable of improving their decision-making.

Taking Control of Your Diabetes – The diabetes curriculum, "Taking Ownership of your Diabetes" provides a cost-effective means for individuals to manage their diabetes.

Stand Up for Falling – A program that highlights four preventable risk factors for falling: lack of exercise, unsafe home environments, vision problems, and medication usage for adults 65 and older.

Tax Preparers' Seminars – Agricultural tax training provided to tax preparers, CPAs, farmers and attorneys.

Professional Certification Programs

Master Loggers – The Kentucky Master Logger program provides training for timber harvesting professionals on such topics as environmental protection, safe logging practices, and laws and regulations impacting the timber harvesting industry.

Pesticide Safety Education Program – Educational program to teach safe and effective pesticide use

Leadership training, including civic, commodity, government, youth, etc.

Kentucky Agricultural Leadership Program – Designed to prepare participants to accept leadership responsibility in agriculture, agribusiness and rural communities by improving communication skills and knowledge of major policy issues facing agriculture and rural communities.

Entrepreneur training and other special training or education initiatives

Entrepreneurial Coaches Institute – A nationally award winning program that seeks to build entrepreneurial leaders, advocates and coaches in Kentucky's 41 tobacco-dependent counties as a response to declining tobacco income. Recently expanded to offer programs to elected officials, elementary and high school students and communities.

National defense, including National Guard, training or educational initiatives

Operation Military Kids – A collaborative effort with Kentucky's communities to support military children, youth and families impacted before, during, and after deployment. OMK provides support to military families who are geographically dispersed, recognizing that these families have significantly different needs than those families on active military installations.

Afghanistan training for National Guard – Providing agricultural training and support for National Guard units that will be providing related assistance during their Afghan deployment

Strengthening Military Families Initiative – Educational programs and support for military, National Guard and Reserve families across Kentucky

K-12 specific educational programs and initiatives

Innovative Technology Experiences for Students & Teachers – Teaches Middle and

High School teachers how to incorporate computer models into STEM curriculum

Additional comments or items of note regarding education and training:

Arts in the Community – Fine Arts Extension Program, now present in 4 counties

Section 9: Into the Future

What key challenges does your institution face in the future:

Top 5 key challenges for the Experiment Station in your state

1. Infrastructure support for research farms and facilities

2. Environmental challenges to animal agriculture

3. Pressure from suburban encroachment

4. Meeting needs of local and organic agricultural systems

5. Keeping an effective workforce

Top 5 key challenges for the Extension Service in your state

1. Meeting the needs of urban audiences

2. Interfacing with individuals and families using social media

3. Developing and maintaining good relationships with local leaders, county government officials, state appropriators, and other stakeholder groups as demands for services increase

4. Dealing with the increasing administrative overhead dealing with the use of volunteers, especially with 4-H programs

5. Finding, hiring and retaining quality individuals (county and state level) that have the appropriate background in applied agriculture, family and consumer science, and 4-H youth development

What emerging opportunities or trends do you see impacting your institution:

Top 5 emerging opportunities and trends for the Experiment Station

1. Consumer demand for known-source, local products and humanely produced food creates a new group of clientele that requires a different means of communicating our activities

2. Continuing support for research and demonstration facilities that deliver unbiased results critical to the continued success of our stakeholders

3. Increasing public-private partnerships and the need for unbiased party involvement in addressing grand challenges

4. Increasing need for flexible crop and animal production systems that can adapt to climate change and extreme weather events

5. Continuing to set a national standard for environmentally compliant and humane animal agricultural systems

Top 5 emerging opportunities and trends for the Extension Service

<i>1. Increased ability to conduct educational programs at a distance, including growing clientele acceptance of programs offered in this way</i>
<i>2. Innovative programming opportunities such as Fine Arts Extension that are important to communities and that have the ability to leverage campus expertise from non-traditional areas of the University of Kentucky</i>
<i>3. The new paradigm of community development (CEDIK) at the University of Kentucky has resulted in growing understanding of community development by county educators (agents) and a growing capacity for programming.</i>
<i>4. The interdisciplinary team model (e.g. Beef IRM, Food Systems Innovation Center, CEDIK, Moneywise) is working and is creating very dynamic and productive working groups.</i>
<i>5. Alternative staffing patterns (shared agent, multi-county or area agents) will likely increase as costs (personnel and operating) exceed funding sources.</i>

For the southern region overall, what do you see as the top five challenges/issues moving forward

<i>1. Serving a role in biofuel development and energy security in a region that includes environments spanning from tropical to midwestern</i>
<i>2. Developing more leading agricultural industries</i>
<i>3. Mitigating the “wastelands” of southern rural communities, such as by providing greater economic opportunities to marginalized areas</i>
<i>4. Dealing with chronic health problems of the region, such as diabetes, obesity, and cardiovascular disease and even including abuse of prescription drugs</i>
<i>5. Helping agriculture adapt to the increasing risks and challenges of producing safe, affordable and available food and sustaining farm operations</i>

What are the top five differentiating factors of the southern region in agriculture, agbiosciences, community/family/youth development, etc. What makes the region unique or provides key comparative advantages.

<i>1. Range of climate and diversification of agricultural systems</i>
<i>2. Good water supply that does not typically limit agriculture and other rural enterprises</i>
<i>3. A well-developed system of information discovery and dissemination that is still trusted, valued, and utilized widely by farmers, families and communities</i>
<i>4. Characterized by a large number of small, family farms</i>
<i>5. Large percentage of arable land in close proximity to population centers</i>

Section 10: Interview Suggestions

Battelle would like to interview some key stakeholders (outside of the land-grant institutions) across the southern region to discuss their perspective on the importance of extension and agricultural research. Please provide the names and contact information for three individuals who you would suggest for interviewing in your state:

Name	Title	Organization	Telephone	Email
<i>Don Halcomb</i>	<i>Owner</i>	<i>Walnut Grove farm</i>	<i>270-776-1810</i>	<i>mdhalcomb@aol.com</i>
<i>Dave Maples</i>	<i>Executive Vice President</i>	<i>Kentucky Cattleman's Association</i>	<i>859-278-0899</i>	<i>dmaples@kycattle.org</i>
<i>Mark Haney</i>	<i>President</i>	<i>Kentucky Farm Bureau</i>	<i>502-495-5000</i>	<i>Mark.haney@kyfb.com</i>
<i>Roger Thomas</i>	<i>Executive Director</i>	<i>Governor's Office of Agricultural Policy</i>	<i>502-564-4627</i>	<i>Roger.thomas@ky.gov</i>
<i>Tom McKee</i>	<i>State Representative</i>	<i>Kentucky State Legislature</i>	<i>502-564-8100 ext. 667</i>	<i>Tom.McKee@lrc.ky.gov</i>
<i>David Givens</i>	<i>State Senator</i>	<i>Kentucky State Legislature</i>	<i>502-564-8100 ext. 624</i>	<i>Not available</i>
<i>Laura Knoth</i>	<i>Executive Director</i>	<i>Kentucky Corn Growers Association</i>	<i>502-243-4150</i>	<i>laura@kycorn.org</i>
<i>Ginny Grulke</i>	<i>Executive Director</i>	<i>Kentucky Horse Council</i>	<i>859-367-0509</i>	<i>director@kentuckyhorse.org</i>
<i>David Switzer</i>	<i>Executive Director</i>	<i>Kentucky Thoroughbred Association</i>	<i>859-381-1414</i>	<i>dswitzer@kta-ktob.com</i>

APPENDIX E: 2012 Annual Report for Regulatory Services

The Division of Regulatory Services is committed to consumer protection and service to Kentucky citizens, businesses, and industries. Our regulatory programs monitor and analyze feed, fertilizer, milk and seed products, and our milk, seed and soil service programs are all administered using a cooperative, science-based approach.

The Division administers four state laws pertaining to ingredients, manufacturing, processing, labeling, and marketing of feed, fertilizer, seed and raw milk. Our primary objectives are to protect consumers of these products from poor-quality, mislabeled or misrepresented products, and to protect businesses marketing these products from unfair competition.

Feed, fertilizer, and seed are monitored from ingredients through manufacturing and retail channels for compliance. Label review, and product and facility inspections as well as product sampling by our inspectors and analysis in our laboratories are important steps in this process. Raw milk is monitored during marketing to (1) ensure accurate and equitable exchange between dairy producers and processors; and (2) ensure integrity of milk from farm to processor.

Eight regulatory inspectors and one auditor cover the state collecting samples, inspecting facilities, reviewing labels, and auditing records. Audits of sales and fee payments are conducted on feed, fertilizer, seed, and milk firms in Kentucky to verify reports, records, and fee payments. One inspector is dedicated to the milk program for auditing payment records and monitoring activities of sampler-weighers, handlers, lab personnel, and lab facilities.

The activities in the Division are performed by a dedicated and professional staff that conduct laboratory analyses, provide administrative and computer support, process data, and compile reports in addition to various other duties necessary to carry out and administer effective programs.

Feed Regulatory Program

The feed regulatory program provides consumer protection for livestock feed and pet food according to provisions of the Kentucky Commercial Feed Law. The program ensures safety, suitability and quality of animal feed in producing meat, milk, and eggs for human consumption and products for companion animals. The program provides standards of quality, safety, efficacy, and labeling for feed products. A statewide inspection, sampling, and laboratory analysis program monitors feed ingredients, feed products. Feed labels are evaluated to identify purpose of feed, guaranteed composition, ingredient list, feeding directions, and the need for any warning or caution statements.

The feed program participates in food safety efforts that promote consumer confidence in the nation's food supply. We work cooperatively with the U. S. Food and Drug Administration (FDA) in assessing compliance with the ruminant-to-ruminant feeding

ban to prevent any establishment or amplification of bovine spongiform encephalopathy (BSE, or “mad cow disease”).

2012 Highlights

- Performed official inspections on 1,316 feed manufacturers and dealers.
- Collected 2,582 official samples; inspectors and others provided 70 unofficial samples that resulted in 19,222 lab analyses for more than 2.2 million tons of feed marketed.
- Collected 804 specialty pet food samples for analysis.
- Monitored the 2012 corn crop for mycotoxins including aflatoxin, fumonisin, and vomitoxin. More than 400 mycotoxin analyses were conducted on various feed samples during the year.
- Conducted 75 BSE inspections for compliance with the ruminant to ruminant feed ban and inspected 4 feed mills that mix restricted drugs in feed for compliance with current Good Manufacturing Practices.
- Maintained registration on more than 20,800 feed products from nearly 1,160 companies and conducted new product label reviews on more than 3,260 products.
- Analyzed and reported 36 feed samples from quality control programs.
- Used 47 different approved analytical methods in providing results.
- Income from inspection fees and product registration received during the period of July 1, 2011 to June 30, 2012 was \$1,167,803.79. Inspection fees are assessed at \$0.35/ton, and annual registration of \$50.00 is collected for products sold exclusively in 10-lb or less size packages.

Fertilizer Regulatory Program

The Kentucky Fertilizer Law ensures that fertilizers sold in Kentucky are clearly and accurately labeled so that consumers can make informed purchases of fertilizer with confidence in its quality. The law also protects the legitimate fertilizer industry from unfair competition.

2012 Highlights:

- Conducted 1,337 visits to perform inspections and to sample agricultural, lawn, turf, and garden fertilizer at Kentucky processing, wholesale and retail locations.
- Administered actions on 2,526 official and 78 unofficial samples of fertilizer involving over 6,600 chemical tests.
- The official samples represented about 52,000 tons out of the approximately 972,000 tons of fertilizer distributed in Kentucky during 2012, or about 5.3%.
- Reviewed labels and registered 5,036 products from 703 firms and issued licenses to 216 companies that manufactured custom-blended fertilizers.
- Analyzed laboratory check sample materials from Magruder®, UAN, AFPC phosphate rock, AFPC phosphate, and AFPC specials for the fertilizer regulatory program.

- Provided support for 15 different analytical methods that yield results for 28 analytes and contaminants.
- Substantiated cash receivables from fertilizer reports. The income from registration fees, inspection fees and licenses received from July 1, 2011, to June 30, 2012, was \$595,507. Fertilizer products are assessed an inspection fee of 50 cents/ton.

Milk Regulatory Program

The mission of the milk regulatory program is to ensure raw farm milk produced and marketed in Kentucky is bought and sold using accurate weights and tests. The program's primary function is to monitor milk handling systems from the time a producer's milk is sampled and weighed, through delivery and laboratory testing, until producer payments are calculated. The program provides support to the producers and processors of Kentucky's \$238 million/year dairy industry. Industry participants are trained, licensed and subsequently monitored to maintain compliance with the law.

In addition to regulatory functions, the milk program cooperates with other agencies in educational projects to provide a variety of services to Kentucky dairy producers, processors and allied industries. The milk program also operates a laboratory that is available for Kentucky producer, processor and handler service testing.

2012 Highlights:

- Reviewed applications and issued licenses to 2 transfer stations, 25 milk handlers, 17 laboratories, 75 technicians, and 348 sampler-weighers (milk-haulers, receivers and samplers).
- Analyzed and administered action on 7,402 official samples.
- Administered a monthly milk lab quality control check sample program through the distribution of 2,736 samples to the 17 licensed laboratories and two other labs to ensure accurate component-analysis procedures.
- Conducted 8 pay-record and 13 raw milk receiving audits.
- Conducted 28 milk laboratory inspections.
- Collaborated with Kentucky Cabinet for Health Services Milk Safety Branch to train sampler-weighers and processor receiving personnel.
- Trained and examined 43 new sampler-weighers and 5 new technicians.
- Conducted 4 inspections of raw milk transfer stations.
- Conducted 390 sampler-weigher inspections.
- Provided analyses for research projects pertaining to cow comfort, somatic cell testing, horse milk, and other research in the college.
- Provided analyses for Kentucky small processor cheese makers.
- Completed sample age study to determine if the time allowed for milk sample analysis after collection can be increased from 72 hours to 120 hours.
- Cash receivables were substantiated on 92 milk reports and the income from fees and licenses received from July 1, 2011 to Jun 30, 2012 was \$175,633. Milk handlers and producers are assessed at the rate of one-half cent (\$0.005) per hundredweight of milk.

Seed Regulatory Program

The seed regulatory program ensures Kentucky farmers and urban consumers of quality seed while promoting fair and equitable competition among seed dealers and seedsmen through inspection and analysis of products found in the marketplace. The Division, which administers and implements the Kentucky Seed Law, promotes compliance through facility inspections, sampling and analysis of seed offered for sale. The law requires proper labeling of seed which includes kind, variety and lot designation, seed purity percentages, presence of noxious weeds, seed origin, presence of inert matter, seed analysis date and a seed germination guarantee. The Division is also responsible for maintaining registration of the state's seed labelers, seed conditioners, and seed dealers.

2012 Highlights:

- Conducted 1,322 visits to perform inspections and to sample agricultural, lawn, turf, and garden seeds at Kentucky seed processing, wholesale and retail locations.
- Collected and tested 1,744 official seed samples.
- Issued stop-sale orders on 235 official seed samples and 241 violative seed lots at seed dealer and seed processor locations.
- Cooperated with the USDA-Seed Branch regarding shipments of seed into the state that were in violation of the Federal Seed Act.
- Reviewed and issued 233 permits to label agricultural seed and 53 permits to label vegetable and flower seed.
- Registered 605 seed dealers and 26 non-certified custom seed conditioners.
- Provided training to firms on labeling requirements, retail sales procedures, stop sale release procedures, and record keeping requirements.
- Cash receivables were substantiated on over 800 seed reports and the income from fees, permits and licenses received from July 1, 2011 to Jun 30, 2012 was \$367,694. Seed products are assessed at 4-24 cents per unit.

Seed Testing Laboratory

The Division maintains the only certified seed testing facility in Kentucky. This facility handles all official samples collected by inspectors and provides service testing for seed producers, dealers, retailers, research projects and homeowners for a fee. More than 90% of the service samples accepted into the laboratory were submitted by Kentucky firms or individuals.

The laboratory analyzes seed for purity, identifies weed and crop seed, conducts germination, counts seed, determines test weight, performs accelerated aging, conducts fluorescence testing on ryegrass, determines moisture content, conducts tetrazolium analysis, assesses herbicide tolerance, determines presence of endophyte, and conducts many other analyses. Our analysts keep abreast of changes through participation in regional and national referee testing with the Association of Official Seed Analysts (AOSA) and the USDA Federal Seed Laboratory and by attending special scheduled and regular workshops at the AOSA annual meeting. All analysts are AOSA-certified in areas of purity and germination.

2012 Highlights:

- Analyzed 5,210 service samples.
- Collaborated with researchers to analyze 48 seed samples.
- Supported the equine and livestock pasture management programs in analyzing 372 plant samples for endophytes.
- Analyzed 37 seed samples under the provision that allows one free sample for testing each year from Kentucky residents.
- Income derived from service samples from July 1, 2011 to June 30, 2012 was \$69,438.

Soil Testing Laboratory

Soil testing provides farmers, homeowners, greenhouse operators, and others with scientific information about the fertility status of their soils or greenhouse media. In partnership with the Cooperative Extension Service, it also provides them with lime and fertilizer recommendations based on laboratory results. We also offer analyses of animal wastes, nutrient solutions, and special research solutions. The program received \$240,109 in income for service testing during the period July 1, 2011 and June 30, 2012.

The soil test web site is at soils.rs.uky.edu. The number of samples analyzed in 2012 were:

Type	Number	% change
Agriculture	42,994	28
Home lawn and garden	10,300	6
Commercial horticulture	970	10
Greenhouse media	51	-26
Research	8,291	19
Atrazine residue in soil	28	115
Animal waste	447	22
Nutrient solution	100	-7
Soil nitrate	72	-49
TOTAL	63,253	22

APPENDIX F: 2012 UK Veterinary Diagnostic Laboratory Annual Report

The University of Kentucky Veterinary Diagnostic Laboratory (UKVDL) continues to strive to be one of the premier veterinary diagnostic laboratories in the United States, providing timely and accurate services in support of the practicing veterinary profession, Kentucky animal agriculture, the signature equine industries, companion animals, and public health. As the state's flagship veterinary diagnostic laboratory, the University of Kentucky Veterinary Diagnostic Laboratory's primary goal is to develop, apply, and utilize state-of-the-art veterinary diagnostic testing methods and scientific knowledge to improve animal health and marketability, preserve the human-animal bond, and help protect and improve public health through the early and accurate identification of zoonotic diseases. The UKVDL laboratory is fully accredited by the American Association of Veterinary Laboratory Diagnosticians (AAVLD), and are members of the USDA National Animal Health Laboratory Network (NAHLN) and the FDA Veterinary Laboratory Response Network (Vet-LRN)

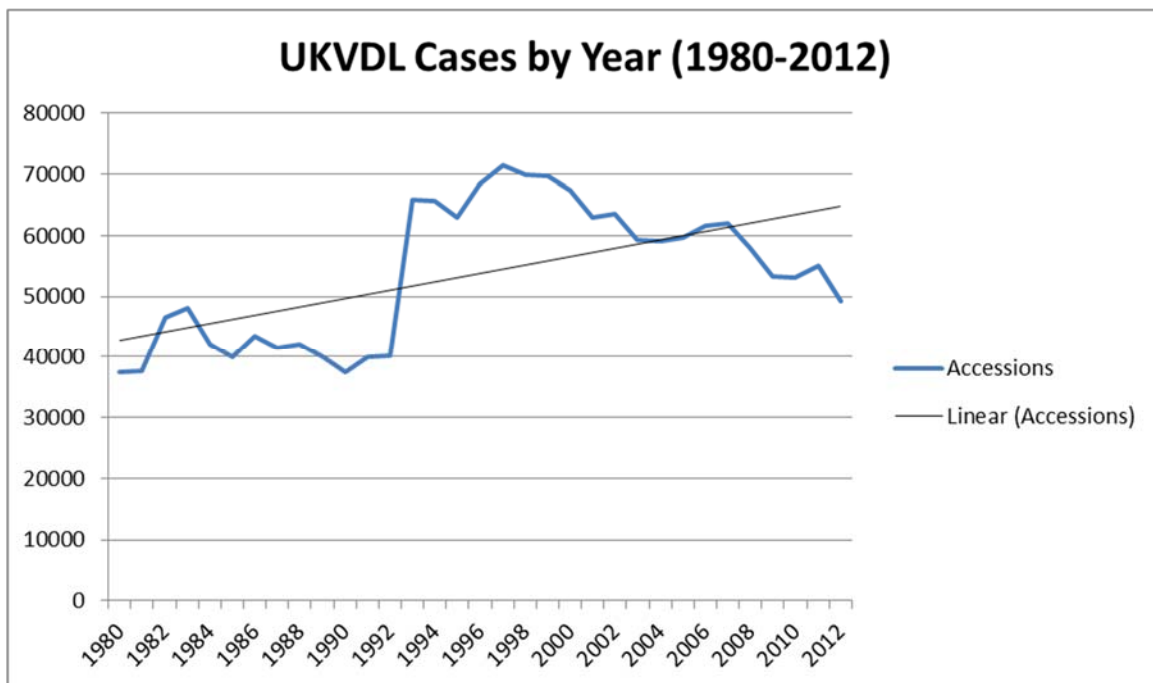
In addition to its clinical diagnostic role, the UKVDL provides surveillance for emerging and endemic diseases such as equine infectious anemia (EIA), equine piroplasmiasis, West Nile virus, chronic wasting disease of deer, contagious equine metritis, bovine spongiform encephalitis (Mad Cow Disease), Johne's disease, bovine leukosis, avian influenza, rabies and many other diseases of agricultural, public health and companion animal importance. Furthermore, the laboratory is always on the watch for the emergence of foreign animal diseases (FADs) such as foot and mouth disease, and classical swine fever. In 2012, UKVDL continued its proficiency testing programs as part of the National Animal Health Laboratory Network.

Farmers and animal owners use the UKVDL's services through their practicing veterinarians. These professionals have expertise in selecting, preparing, shipping, and submitting the proper specimens for testing when needed to assist in making a clinical diagnosis. Laboratory findings are reported back to the submitting veterinarian who then consults with his or her clients to implement a treatment protocol or a preventative solution to disease problems on the farm. A state-of-the-art Laboratory Information Management System (LIMS) is utilized at our laboratory which enables UKVDL to provide the most professional, accurate and timely accessioning, order entry, results capture and clinical case reporting for our clients.

UKVDL faculty, scientists, and technical staff are specialists in several diagnostic medical disciplines directly related to animal health to include bacteriology, clinical pathology, epidemiology, extension, molecular biology, pathology, serology, toxicology, virology and informatics. Disease diagnostic efforts are coordinated and handled by specialists in the appropriate disciplines. Complex clinical cases involving multiple sections are monitored by highly qualified case coordinators. During surge testing

periods and disease outbreaks, trained technicians are redistributed across sections to assure that the increased workload can be managed in a timely and accurate fashion.

The UKVDL received 49,250 cases in calendar year 2012 (a 10% decrease from calendar year 2011, including 4128 necropsies (a 17% decrease from calendar year 2011)). This increase is attributed to the outbreak of Nocardioform Placentitis which occurred that year which significantly added to the necropsy load). The decrease in diagnostic caseload is attributed primarily to the continued depressed state of the Kentucky horse industries. Total tests run in each laboratory section will be listed in the individual section reports.



Outreach:

The UKVDL continues to build and enhance outreach programs around Kentucky. The Kentucky VetLabNet listserv continues to distribute animal health bulletins and has grown to a list to over 600 UKVDL clients, scientists, farmers and stakeholders. The UKVDL Director continues to contribute articles quarterly to the KVMA journal and the Kentucky Cattleman Association *Cow Country News*. The UKVDL Director, faculty and staff continue to deliver lectures at scientific and lay meetings and participate in the monthly Equine Diagnostic-Research Seminar Series at the UKVDL since 2006. These seminars are filmed by The Horse magazine and are edited and made available as Webinars. They have been viewed in over sixty countries across the world.

Other outreach events:

- Food Animal Practitioner Conference, Feb 13, 2013, 40 veterinarians in attendance.
- Poultry Veterinarian Training Symposium, Mar 21, 2013, 40 in attendance.
- Center for Leadership Development – How horses have influenced leadership/career development, held in the UKVDL auditorium, Apr 17.
- Lincoln County High School Beef Production Club tour – 40 students, teacher Mr. Steven Bullock.
- Dr. Carter attended the EAVLD meeting in Kazimierz-Dolny, Poland July 1-5, 2012 as Immediate Past President of the AAVLD and Executive Director of the WAVLD.
- Food Animal Practitioner Conference, Aug 16, 2012, 35 veterinarians in attendance.
- The Director and eight UKVDL employees attended the AAVLD meeting in Greensboro, NC for continuing education and delivering scientific presentations.
- The Director and staff attended the Poultry Health Advisory Committee meeting in Frankfort, Oct 25.
- The Director made a presentation on UKVDL contributions to the Equine Program at the Equine Forum meeting on Oct 26 in the Good Barn, Weldon Suite.
- The Director delivered a lecture on the Livestock Care Standards Commission to an Animal Science class on Oct 30.
- The Director attended the NIAA Symposium on Antimicrobial Resistance in Columbus, OH Nov 13-15.
- UKVDL hosted the *Lawsonia* and Equine Proliferative Enteropathy Symposium on Nov 15th from 7:30. The program was attended by about 80 people.
- The Future of Public Health and One Health. Presented to a forum of the School of Public Health and Medicine, Robert C. Byrd Medical Center, West Virginia University, Dec 3, 2-12.
- Preliminary results of a nocardioform placentitis farm-based risk factor study, presented to the Kentucky Association of Equine Practitioners and Kentucky Thoroughbred Farm Managers Club, Jan 30, 2012.

Personnel actions:

College administration, particularly Deans Smith and Cox, supported the UKVDL in filling vacant positions and other personnel actions in calendar year 2012. The following key positions were filled and/or reclassified:

- Dr. Erdal Erol, Head, Diagnostic Microbiology – position converted from a Scientist III to Associate Professor, Clinical Title Series (non-tenure track).
- Dr. Laura Kennedy, Veterinary Pathologist – position converted from Special Title Series to Clinical Title Series (non-tenure track).
- Dr. Uneeda Bryant – promoted to Associate Professor with full tenure.
- Latissa O’Cull – hired as a histology technician.

- Christina Kane – hired as Accounting Clerk III.
- Amy Barnes – hired as the Histology Section Chief.

Visiting scientists:

- Dr. Oktay Genc – Turkish veterinarian worked in the Bacteriology section on Nocardioform placentitis, May-Oct, 2012.
- Dr. Masood Rabbani – Pakistani veterinarian visited from Aug 8-14 to learn about a modern veterinary diagnostic laboratory and to explore options for Pakistan scientists to train in the US.

Notable achievements or advancements:

- Director served as Immediate Past President of the American Association of Veterinary Laboratory Diagnosticians
- Director continues to serve as Executive Director of the World Association of Veterinary Laboratory Diagnosticians and is planning a meeting to be held in Berlin, Germany, June, 2013.
- Director was appointed to chair a committee to conduct a periodic review of the Department of Animal and Food Science.
- Director chaired the USDA-ARS 5-year research review panel.
- Director and Associate Director served on the committee to plan the International Equine Infectious Disease meeting which was held in Lexington, Oct 21-25, 2012.
- Almost all post-construction issues have been resolved by the end of 2012.
- New web site for UKVDL is nearing completion, should be implemented in early 2013.
- Automated scanning of accession forms and related case documents with automated attachment to the USA LIMS software system.
- New virtual server rack installed and implemented, May.
- 10 GB bandwidth high speed dark fiber hub installed at UKVDL.
- Development of financial workload/fee trend reports almost completed.
- UKVDL staff participated in a Low Path Avian Influenza Exercise, Elizabethtown, KY Mar 7, 2012.
- Director attended the KY State Board of Agriculture to meet the new Commissioner of Agriculture, James Comer.
- Director worked with the Office of the State Veterinarian and the Commissioner of Agriculture to allow charging a fee for Stockyard EIA testing.
- UKVDL video security system implemented for expanded facilities.
- As appointed by the Governor, the Director served on the Livestock Care and Standards Commission in 2012.
- Director Chaired the national search for the Director, Regulatory Services.
- Q-Pulse QA/QC software selected for use at UKVDL in preparation for the upcoming AAVLD accreditation visit in 2014. It will be implemented in the spring of 2013.

- Dr. Carter chaired an OIE Committee on Genomics in Paris, France, Dec 3-7, 2013.

Initiatives and programs:

- The new UKVDL fee schedule went into effect Jul 1. Overall, 134 test fees out of 286 total tests were increased (47%) with the strategy to increase fee income by \$230,851 (17.5%).
- Ms. Valerie Blakemore from the MedTech College in Coldstream toured the UKVDL facilities to see if our laboratory might be able to host interns in their Clinical Laboratory Technician program, Dec, 2012.
- Director discussed a possible genomics laboratory for the UKVDL that would collaborate with the Gluck Equine Research Institute and Texas A&M University (Apr 2-6).
- As part of the UKVDL marketing plan, business office staff compiled a data base of equine practices in an 8-state are and a mail-out was done to encourage the use of the laboratory.
- Director developed one-page summaries of species-oriented diagnostic testing services offered by UKVDL for mailing out and for distribution at scientific and animal agricultural meetings.

Major issues and challenges:

- UKVDL continues to experience budget cuts. A 7.55% additional budget cut was implemented on Jul 1, 2012 (\$247,000). A marketing plan is well underway to assist in increasing income in an attempt these cuts.
 - Enhance and improve test offerings and service for equine & small animal medicine
 - Develop a national reputation as an equine diagnostic testing laboratory
- Incentive-based budgeting model for the University of Kentucky---how will this affect mandated non-teaching programs?
- Investigation and alerting of equine abortion cases, Fall, 2012
- Investigation and alerting of equine lawsonia cases, Fall, 2012
- Investigation and alerting of equine leprospirosis cases, Spring, 2012
- Recurring and non-recurring budget cuts, 2009-present:

Funding Source	Fiscal Year	Recurring/Non-Recurring	Amount Cut
KDA	Fy2009	Recurring	\$78,500
KDA	Fy2011	Recurring	8,000
State	Fy2009	No cut	No cut

State	Fy2011	Recurring	\$33,323
State	Fy2012	Recurring	86,859
State	Fy2013	Recurring	247,000
Total recurring cuts			\$453,718

Section Reports:

Bacteriology/Mycology

Bacteriology/Mycology Section of UKVDL performs several types of culture to isolate and identify pathogenic bacteria or fungi from animals. The Section also determines the antimicrobial susceptibility that might be used for the treatment of specific pathogens. Another important duty of this section is regulatory testing. The section performs culture for *Taylorella equigenitalis* and *T. asinigenitalis* for the federal/state CEM regulatory program in equine. The bacteriology section routinely participates in federal proficiency and ring tests for salmonella, CEM and general bacteriology.

Highlights:

- 9689 aerobic cultures were performed on samples submitted to the UKVDL; significant bacterial pathogens were found in these samples such as Nocardioform bacteria, coliforms, Beta-hemolytic streptococci, Salmonella, Pasteurella, Mannheimia, Arcanabacterium, Mycoplasma and Staphylococci.
- 7288 samples from equines in Kentucky were cultured for the contagious equine metritis organisms. All horses tested were negative. Because of the detection of positive CEM horses by this Section in 2008 and 2011, we continue to receive higher number of samples. Early detection of this infection in the Quarter Horse population by this laboratory prevented this disease from becoming more widespread in the equine population of the USA.
- 2715 microbial isolates were tested to determine the antimicrobials that could be used for their treatment in exposed animals. Antimicrobial susceptibility test was performed broth microdilution method,
- 477 samples from poultry were tested for salmonellosis by using a protocol following National Poultry Improvement Plan (NPIP). Our participation in NPIP helps poultry industry improve infectious disease control and eradication programs.
- Our laboratory has significant collaboration with other institutes such as UK- Gluck Center (Dr. Troedsson, Nocardioform), Pfizer (antimicrobial susceptibility) and University of Copenhagen (Dr. Peterson, beta-hemolytic streptococci).

Virology

This important section performs several virological assays. These assays provide veterinarians and animal owners to diagnose viral infections and treat and protect their animals. Virology

section investigated several disease outbreaks in Kentucky and performed a number of tests submitted by practitioners and owners, not only from Kentucky but also from many other states. Our section also works closely with UKVDL pathology section to examine necropsy specimens for evidence of viral infections. Another important duty of Virology section is to perform tests necessary for export of animals to other states and other countries. The virology section also provides consultancy to the field veterinarians and animal owners concerning sample selection, preservation, shipping procedures and interpretation of results. The section had collaborations with other institutes (such as Pfizer).

Highlights:

In this section, several thousands of Fluorescent antibody tests (FA), Virus Neutralization tests, ELISA tests and virus isolation tests were performed in 2012 to support Kentucky animal industry and beyond.

Number of major tests performed in Virology section were shown in the Table below:

Test	# Performed
Bovine Corona Virus- FA	143
Bovine Respiratory Syncytial Virus- FA	508
Bovine Respiratory Syncytial Virus- VN	57
Bovine Rotavirus- FA	104
Bovine Viral Diarrhea- ELISA	11021
Bovine Viral Diarrhea- FA	810
Bovine Viral Diarrhea 1-VN	171
Bovine Viral Diarrhea 2-VN	171
Canine Adenovirus- FA	33
Canine Corona Virus- FA	33
Canine Distemper Virus- FA	162
Canine Herpesvirus-FA	38
Canine Parvovirus- FA	123
Equine Herpesvirus 1-FA	906

Equine Herpesvirus 1- VN	106
Equine Influenza A1- HI	30
Equine Influenza A2-HI	1931
Equine Rotavirus-FA	23
Equine Viral Arteritis- VN	11577
Feline Herpesvirus- FA	37
Feline Infectious Peritonitis- FA	81
Feline Panleukopenia-FA	70
Infectious Bovine Rhinotracheitis-FA	625
Infectious Bovine Rhinotracheitis-VN	133
Parainfluenza-3 Virus-FA	507
Potomac Horse Fever- IFA	175
Vesicular Stomatitis IN- VN	1233
Vesicular Stomatitis NJ- VN	1233
Virus Isolation	148
West Nile IgM Capture	135

Molecular Diagnostics

Nucleic acid based tests are now used so that unknown organisms can be identified, closely related organisms can be differentiated, and small numbers of pathogens can be detected in complex samples. Several Diagnostic PCR assays are being utilized because of their speed and specificity. This section performs several PCR, real-time PCR and DNA sequencing assays from the specimens submitted by animal owners, veterinarians and pathologists. This section also analyzes specimens received from the Virology and Bacteriology sections to confirm their diagnosis.

Highlights:

- The molecular diagnostics section successfully demonstrated our ability to provide accurate, rapid, high-volume testing. This section also became an accredited member of the USDA's National Animal Laboratory Health Network and passed several federal proficiency testings such as Foot and Mouth disease, Classical swine fever and Avian

influenza. The membership enables this unit to actively participate in national veterinary disease surveillance and provide rapid coordinated diagnostic response in the event of future outbreaks within the veterinary industry.

- We have standardized a new protocol for calf diarrhea panel which is now offered as a service to our large animal practitioners. This panel is able to test fecal specimens from calf with diarrhea and detects bovine corona virus, bovine rotavirus group A, E. coli K99, Salmonella and Cryptosporidium.
- The section tested several thousands of molecular tests in 2012 and the major ones are provided in the below table.

Test	# Performed
Amycolatopsis	199
Bovine Viral Diarrhea	31
Crossiella equi	217
EHV-1	746
EHV-1 TYPING	30
Ehv-4	177
Equine influenza	302
Lawsonia intracellularis	114
leptospira	666
Johnes	87
Potomac horse fever	230
Rhodococcus equi	82
salmonella	624
Streptococcus equi	413
West Nile	65

Pathology, general

The UK Veterinary Diagnostic Laboratory pathology section is composed of 7 faculty pathologists, a staff laboratory animal pathologist, 4 post-doctoral scholars (pathology residents), 4 histology technicians, 4 full time necropsy technicians, and 2 part time necropsy student workers. The pathologists perform complete necropsy examinations on submitted animals, histopathology on necropsy cases and surgical biopsies, and cytological examinations, and are supported by the other section personnel. As part of the comprehensive necropsy

examination, additional laboratory tests are ordered by the pathologist to aid in confirming a diagnosis. The abnormal findings on necropsy are correlated with other laboratory tests, including microscopic examination of the tissues, and a comprehensive report is prepared for every pathology case. Utilizing the abundant cases submitted to the VDL and the faculty expertise, post-doctoral scholars (DVM) are trained in veterinary anatomic pathology in a 3-year program, visiting senior veterinary students have extern rotations, and surgical residents visit to fulfill the pathology requirement for the American College of Veterinary Surgeons.

Necropsy: A postmortem examination (necropsy) is conducted on animals submitted to the VDL in order to identify any pathologic changes in the tissues that would indicate disease, injury, toxicosis, or any other abnormal process resulting in illness.

Total Necropsy Cases	3,391
Avian	20
Bovine	813
Caprine	108
Equine	1583
Ovine	135
Porcine	16
Small Animal	350
Miscellaneous	33
Laboratory Animal	213

Histopathology: Tissues are prepared and processed to produce glass slides for microscopic examination conducted by the pathologists. Tissues from the necropsy and surgical biopsy cases were processed and 34,190 microscopic slides produced. In addition to the routine hematoxylin and eosin stained tissue sections, special and immunohistochemical stains were done resulting in 2,075 slides produced for the purpose of identifying microscopic organisms/agents that may cause disease or tissue antigens that define or identify cell structures.

Biopsy: Abnormal areas or lesions are often removed surgically or a portion biopsied from live animals and sent to the laboratory for determination of the type of process, recommended treatment, and potential prognosis. These tissue specimens are processed and microscopic slides prepared for the pathologists to examine by microscopy. Tissue specimens representing 3,507 cases were processed and examined. A report with diagnosis was produced for each case. Typical turn-around on these cases is 24 to 48 hours.

Cytology: Preparations of cells harvested from abnormal lesions or abnormal fluids are placed on microscopic slides and stained for examination under the microscope by the pathologists. Cytopathological examinations were performed, a diagnosis made, and a report generated for 479 cases.

Pathology, research animal

The research animal pathology service sees mostly small rodents with occasional dogs, rabbits, nonhuman primates, and pigs. There were over 249 submissions from research animals during 2012 including clinical pathology samples, biopsies and necropsies. In addition to research animal work, Dr. Coyle is handling the diagnostic pathology case load for the agricultural research animals housed at the various UK farms.

Quality Control/Quality Assurance

The goal of the UKVDL Quality Assurance Program is continuous quality improvement of service. An additional goal of this program is to ensure the quality, accuracy and timeliness of all test results to veterinarians, animal owners, UK researchers and other clients in the animal industry. The Quality Team monitors test results, quality control results and Proficiency Testing.

The Quality Assurance Program is based on Quality System concepts of the American Association of Veterinary Diagnostic Laboratory (AAVLD) Requirements, International Standards Organization (ISO 17025) guidelines and Organization of International Epizootics (OIE).

The QA section has assisted in preparing reports and submitting data to the National Animal Health Laboratory Network (NAHLN) and the Veterinary Laboratory Network (Vet-LRN). The section continues implementing all policies and procedures required by NAHLN and Vet-LRN and assisted the director and laboratory sections in securing grant funds for salaries, equipment and supplies.

The requirements for maintaining the Quality System and Management are continuously being updated. To maintain conformance to all requirements, the QA Manager attended Quality Assurance and Quality Management Training sponsored by NAHLN at the AAVLD Annual meeting. Internal section audits are conducted throughout the year in preparation for the next AAVLD accreditation visit.

The Quality Assurance Program helps fulfill the university's mission of improving service delivery while achieving excellent human relations (internally and externally), sound leadership, and effective communications.

Ruminant Extension

The Ruminant Extension Veterinarian is charged with improving the status of ruminant health by establishing and maintaining information flow among all the stakeholders in the livestock industry. This is accomplished through open communication with food animal veterinarians,

county extension personnel, producers, state and federal authorities and University faculty and staff in a progressive and responsive manor. Current health topics including disease risk and occurrence, diagnosis, treatment, prevention and control form the core of the information disseminated. New knowledge generated at the University level, governmental directives, and other stakeholder contributions are also gathered centrally then communicated openly for discussion and action to ultimately benefit producers throughout Kentucky.

Highlights:

- Presented the herd health portion of the new Master Stocker Program in 6 regions of the state. Updated and presented the herd health portion of Master Cattlemen in 7 regions and 3 Master Grazer sessions. These programs directly affected approximately 300 farming enterprises.
- Hosted two well-attended food animal veterinary continuing education meetings at the diagnostic laboratory (UKVDL) and one at the Breathitt Veterinary Center (BVC). A total of 22 hours of continuing education was made available to food animal veterinarians at no cost to them. Outside sponsors covered the costs of the events. The Winter CE meeting at the UKVDL was sponsored by Pfizer and featured Dr. Vic Cortese as guest speaker. Forty food animal veterinarians attended the winter meeting. A summer meeting was held at the Breathitt Veterinary Center in June. Boehringer Ingelheim Vetmedica Inc. (BIVI) sponsored the event that was attended by 25 food animal veterinarians from the western portion of the state. The final CE meeting was held in August at the UKVDL sponsored by BIVI and Elanco Animal Health. Thirty five veterinarians were in attendance.
- Co-sponsored the Small Ruminant Grazing Conference in Bowling Green that drew 75 participants in 2012. This conference changes to a different location in Kentucky each year in order to reach sheep and goat producers in all areas of the state.
- Worked with Dr. Erol to develop a neonatal calf diarrhea panel which is a PCR test for 5 of the major pathogens that cause diarrhea in the first 21 days of life. Plans for abortion panels and respiratory pathogens are in the works.
- Launched the new extension program: Improving Reproductive Efficiency in Beef Cattle in Northern KY with Drs. Les Anderson, Jeff Lehmkuhler, and Darrh Bullock.
- Published two fact sheets with Dr. Jeffrey Bewley (Animal Science): Recommended Milking Procedures for Maximum Milk Quality (ID-208) by Bewley and Arnold; Management of the Dry Cow to Prevent Mastitis (ID-209) by Arnold and Bewley. Published fact sheet on Infectious Bovine Keratoconjunctivitis ("Pinkeye") in Cattle (ID-135) by Arnold and Dr. Jeff Lehmkuhler.
- Participated in an Extension agent informational meeting about nitrates in forages after the drought via internet (Microsoft Lync) with Dr. Cindy Gaskill and many extension specialists in the areas of dairy, beef, forages, and crops.
- Co-authored three animal health bulletins with Dr. Cynthia Gaskill on nitrates, cyanide, and mycotoxins in formats for veterinarians and alternate versions for extension and producers.
- Participated in numerous field days, producer meetings and farm visits throughout the state to educate producers as well as to identify the scope of existing problems and find ways to promote positive change.
- Worked closely with the State Veterinarian's office to inform producers of the new animal disease traceability regulations.
- Continued to work collaboratively with state officials, industry representatives, and producers to draft the Livestock Standards Care document. I contributed the university position on tail docking in dairy cattle.

- Continue to expand the database of food animal veterinarians that will allow rapid communication in the event of an animal emergency situation or disease outbreak. This database is continually updated with email addresses and cell phone numbers to enhance the speed of communication.
- Regularly contributed health related articles for the Ag Extension newsletters “Off the Hoof” (10 articles) and “KY Dairy Notes” (7 articles). I also contributed 7 articles to “Cow Country News”, the official publication of the KY Cattlemen’s Association.
- Submitted material for the KY Veterinary News from the KVMA and the veterinary listserv distributed from the diagnostic laboratory.
- Played a major role in writing the budget justification on the Southeast Quality Milk Initiative (SQMI) grant submitted to AFRI which is now officially funded. This is a multi-state effort including 6 southeastern states for 3 million dollars over a 5 year funding period to begin February 2013.

Kentucky veterinarians, extension agents, producers, government entities and the University benefit from a strong livestock sector of which health is a major consideration. In 2012, this position served to reach each of these stakeholders for the overall improvement of livestock health and sustainability of the food animal veterinary profession.

Serology

The mission of the Serology Section is to provide accurate and timely results for both diagnostic and regulatory testing. The results generated provide veterinarians and regulatory personnel with data upon which to base their decisions. This section also performs testing for movement of animals within the United States and for international export purposes. We were able to send personnel from this section to training for poultry testing and to the National Veterinary Services Laboratory for training in running the MAT *Leptospira* testing. This section offers a wide variety of tests by various types of methodologies; the tests and numbers listed below are just a sampling of what is available. Please check the website for additional test offerings.

Equines: This section successfully passed the annual USDA-APHIS inspection to continue to offer Equine Infectious Anemia (EIA) antibody testing and piroplasmiasis testing. In 2012, we ran 21,960 EIA tests. The serology section continues to monitor equines moving through the state stockyards for EIA antibody, testing 11,533 specimens. All employees of this section passed the required NVSL proficiency testing for piroplasmiasis testing (*Babesia caballi* and *Theileria equi*), and tested 4,137 specimens for antibodies to *Babesia caballi* and 4,146 specimens for *Theileria equi*. We tested 917 serum samples for antibody to Contagious Equine Metritis (CEM-CF). Serology performs antibody screening tests for *Leptospira* in equines for diagnostic and regulatory purposes. In 2012, we tested approximately 7,000 serums.

Poultry: In 2012 the section chief of serology, Meg Steinman, worked with the Kentucky Poultry Federation to host a day of poultry training for veterinarians. The training targeted “backyard producers” and included didactic lectures on respiratory disease, enteric diseases, leukosis diseases, Avian Influenza, concluding with a discussion of internal/external parasites. The laboratory continues to pass annual inspections and maintain status as an NPIP approved laboratory. Personnel from this section attended National Poultry Improvement Plan (NPIP)

approved training course for Mycoplasma testing and Avian Influenza testing. In 2012 the serology laboratory tested 5,170 samples for antibody to Avian Influenza, 17,981 samples for antibody to *Salmonella pullorum*, 22,005 samples for antibody to both *Mycoplasma gallisepticum*, and *Mycoplasma synoviae*.

Bovines: This section offers a variety of antibody tests performed on serum from bovines and other ruminant species. In 2012 we tested 228 specimens for antibodies to *Anaplasma marginale*, 95 specimens for antibody to Bluetongue virus, 250 specimens for antibodies to the Bovine Leukemia Virus, 1,111 serums for Johne's (*Mycobacterium paratuberculosis*) antibodies, 400 samples for Leptospira antibodies, and 437 specimens for antibody to *Neospora canicum*. This lab is also active in regulatory screening for antibodies to *Brucella abortus*, testing 1,382 serums.

Small ruminants: The serology section runs testing on small ruminants, including *Brucella melitensis* (46) and small lentivirus Caprine Arthritis/Encephalitis Virus antibody (137).

Canine and feline: This section offers a variety of tests that can be run on dogs and cats. We added an antibody test for Feline Infectious Peritonitis (Feline Coronavirus). We offer an antibody test for Histoplasma and Blastomyces. A few examples of the testing done in 2012 include 140 for antibodies to histoplasmosis, and 166 samples for antibodies to blastomyces. Serology also offers *Brucella canis testing*, an important test for breeding, and tested 99 samples.

Porcine: This section also offers testing for swine. In 2012 we tested 117 samples for Pseudorabies and Brucella antibodies.

Toxicology

The primary mission of the Toxicology Section at the UKVDL is to provide toxicological diagnostic testing capabilities and consultations to Kentucky veterinarians, UKVDL pathologists and residents, county extension agents, livestock producers, pet owners, state officials and others. A large variety of toxicological tests are available through the Toxicology section, including assays for metals and minerals; organic compounds including a multitude of pesticides, drugs and other chemicals; biological toxins such as plant, insect, bacterial and fungal toxins; and numerous other toxicants. Tests are performed in tissues, gastrointestinal contents, biological fluids, baits, feed, forages, water, soil and many other substances.

Consultation services include assistance with therapeutic advice; differential diagnoses; residue considerations; toxicological risk assessments; determination of appropriate tests; appropriate sample collection and submission recommendations; interpretation of analytical results; and other general toxicological information. Many consultation cases require many hours to days or longer to complete. In 2012, Dr. Gaskill provided over 2,000 toxicological consultations. Dr. Gaskill also provides the State Veterinarian's office with alerts and updates on all cases of poisoning or contaminated animal feeds diagnosed at the UKVDL. The section personnel consist of Dr. Cynthia Gaskill, DVM PhD, Clinical Veterinary Toxicologist and section head; DR. Lori Smith, PhD, Senior Analytical Chemist; Michelle Helm, BSc, chemist/technician; and several student interns.

Highlights:

- In 2012, many feed related problems occurred due to severe environmental heat and drought conditions. These issues included nitrate accumulation in forages, increased cyanogenic risks, and increased mycotoxin production in grain crops. As a result, the Toxicology section performed a large number of forage and feed tests for these toxins. Dr. Gaskill worked with other UK specialists to initiate the UK Mycotoxin Working Group and create a centralized UK website for information on mycotoxin. This group includes specialists in grain crops, plant pathology, beef and dairy nutrition, veterinary medicine, poultry production, swine production, veterinary toxicology, regulatory services, agricultural engineering, and other areas.
- The Toxicology section initiated and coordinated an inter-laboratory proficiency program for nitrate testing for the AAVLD/AAVCT Toxicology working group, in cooperation with the FDA Vet-LRN agency. This proficiency involved the majority of veterinary diagnostic laboratories in North America and improved nitrate test consistency and reporting across veterinary diagnostic laboratories.
- The Toxicology section collaborated with other UK specialists to develop and distribute safe, new rapid field test kits for nitrate and cyanide testing of forages.
- Dr. Gaskill collaborated with other UK specialists to write and distribute information updates and publications on nitrate, cyanide, mycotoxin, and other issues, and participated in several UK Extension Lync sessions focused on these topics.
- Acquired a large FDA Vet-LRN grant shared with microbiology that will help fund instrumentation maintenance costs, student labor and supplies associated with increased analyses in large-scale events of contaminated animal feeds and drugs.
- Initiated fee changes for toxicology tests to make the lab more competitive. This resulted in increased submissions from county extension agents and veterinary diagnostic laboratories from other states.
- Hosted 4 student interns for the Forensic Science internship program at Eastern Kentucky University, a graduate student from North Dakota State University, and a graduate student from UK.
- Continued to provide forage ergovaline analyses for the University of Kentucky Horse Pasture Evaluation program
- Developed and validated several new diagnostic toxicology tests, including aflatoxins in feeds and milk, and zearalenone and ochratoxin A in feeds.
- Participated in a number of proficiency testing programs to ensure accuracy and quality control for analytical methods
- Completed the conversion of the Toxicology section to a predominantly paper-free laboratory, with electronic documentation system to reduce paper costs, increase efficiency, and improve data storage and retrieval capabilities
- Worked closely with UK Regulatory Services on a number of cases involving feed contaminations requiring feed recalls

The UK Toxicology section participated in several research projects directly applicable to improvements in diagnostic offerings. The funding for these projects help support instrumentation and labor used also for diagnostic purposes. A few 2012 projects are:

- Development of a novel quantitative method for cyanide analysis of forage and plant materials and development of a rapid semi-quantitative field test for cyanide in plants
- Investigation of the effects of harvest, transport, storage and processing conditions on ergovaline analyses of tall fescue

- Analysis of trace elements in liver tissue from aborted, stillborn and neonatal foals to develop normal reference ranges for this group
- Liver elemental concentrations in Alabama cattle exposed to water with algal blooms
- Completed a study of ocular fluid nitrate and nitrite concentrations in aborted, stillborn, and neonatal foals to establish a normal reference range for this group

Research findings, methodology, continuing education programs and seminars were presented at numerous meetings and conferences including:

- American Association of Veterinary Clinical Toxicologists conference
- American Association of Veterinary Laboratory Diagnosticians conference
- Kentucky Veterinary Medical Association annual conference
- University of Kentucky Veterinary Sciences seminar series
- University of Kentucky cooperative extension summer food animal conference
- University of Kentucky cooperative extension Eastern Region Cattlemen's short course
- Eastern Kentucky University Department of Chemistry Seminar series
- University of Kentucky Agricultural Biotechnology Program seminar series
- FBI multi Sector Infrastructure Protection and Threat Workshop, Frankfort KY
- North American Mounted Unit Commanders Association conference

In 2012, the Toxicology section received samples from more than 1,500 diagnostic cases, with most cases involving multiple samples such as various forage and feed samples, tissues, body fluids, baits and other samples, and often involving multiple animals and multiple test requests per case. The most common tests requested in 2012 were forage nitrate analyses, mycotoxin analyses, metal and mineral quantifications in tissues such as liver and kidney, screening of rumen and stomach contents for organic compounds, and analysis of environmental samples for pesticides and metals.

Epidemiology

The UKVDL Epidemiology section plans and conducts veterinary epidemiological research experiments that lead to the earliest detection of animal disease outbreaks, with our primary mission being to provide animal disease surveillance, and assist veterinarians in the investigation of serious and unusual disease problems. Daily monitoring of finalized necropsy and lab testing data streams provide near real-time disease cluster analysis.

The section also conducts data acquisition and statistical analysis in support of the Office of the State Veterinarian, USDA, and to provide animal health situational awareness for industry stakeholders. Many of these studies lead to publication in peer-reviewed journals and lay publications. Disease reporting to the state veterinarian (reportable infectious diseases, disease of interest, emergency disease notification) is performed weekly for the typical endemic diseases, while unusual or emergency disease situations are reported immediately. In-depth field investigations to better characterize disease outbreaks for identifying causative etiology through the collection of diagnostic specimens and recommending diagnostic testing are provided free of charge to any farm/producer in the state of Kentucky at the request of a local client with the approval of the UKVDL administration.

Highlights:

- Research farm visits (UK Beef unit) for NIHS Project – 7 visits
- Conducted 372 telephone consults asking for suggestions, recommendations and questions related to animal health issues.
- Statistical requests (from UKVDL faculty, state and federal officials, local veterinarians, and other UK faculty) – 121 (1-10 hours each)
- Graphics requests – 93 (2-10 hours each)
- Reportable disease reports sent: 52 weekly reports (approx. 1 hour each week)

Educational Achievement:

- Epidemiology section chief successfully defended and received her PhD in Animal Science.

Research Projects in Progress

- Continuous health monitoring of cattle: Dr. Craig Carter, Ms. Jackie Smith
- Animal disease cluster detection: Dr. Craig Carter, Ms. Jackie Smith
- Mobile Wireless & Remote Diagnostic Computer Applications, Dr. Craig N. Carter, Dr. Wade Northington, Dr. Michelle Bilderback, Ms. Jackie Smith, Dr. Cindy Gaskill and Ms. Jacki Cassady
- US Leptospirosis Sero-epidemiological Survey, Dr. Craig Carter, Dr. Noah Cohen, Ms. Jackie Smith, Ms. Meg Steinman, Dr. Erdal Erol

APPENDIX C. Research Office Organizational Chart

