

Targeted Enhancement Funding Update: Fiscal Year 2020

Kansas State University, College of Veterinary Medicine

Targeted Enhancement funding from the State of Kansas has supported the College of Veterinary Medicine (CVM) to develop faculty, students and facilities to pursue research initiatives that align with K-State's 2025 and the Kansas Board of Regents strategic goals.

Research Faculty Support

Targeted Enhancement (TE) funding provided faculty expertise and infrastructure for the CVM to respond to the COVID-19 crisis on a local and global level. In March, CVM faculty redirected research efforts towards investigating SARS-CoV-2. Nine CVM faculty funded through TE received 12 grants totaling \$6.98M. The grants address vaccine development, antiviral compounds, diagnostics, animal models of disease, mechanisms of transmission, and reducing risk in meat processing plants. These studies have informed disease transmission and identified candidate species for testing mitigation strategies. Three faculty members have signed licensing agreements for vaccine technology and antiviral compounds.

Researchers in the CVM Veterinary Diagnostic Laboratory (VDL) developed the COVID-19 diagnostic PCR in March and provided testing for campus. The VDL COVID laboratory completes 350 to 800 cases/day for the Manhattan campus and community including private physicians, the surgical center, Via Christi hospital, and area nursing homes. The VDL is the overflow COVID laboratory for the KS Department of Health and Environment and is gene sequencing 200 samples/wk for the Riley County Health Department to monitor for unusual strains of COVID-19.

The long-term research goal of the CVM continues to be positioning the college to collaborate with the National Bio and Agro-Defense Facility (NBAF) when the USDA transitions transboundary disease programs from Plum Island in December, 2021. To ensure relevance to NBAF, faculty hires have been prioritized in the disciplines of virology, toxicology, pathology, immunology, epidemiology, and molecular diagnostics. We are positioned to serve the needs of workforce development and non-containment research for NBAF scientists.

African Swine Fever (ASF) remains an infectious disease threat to US livestock. The Biosecurity Research Institute (BRI) is the only non-federal containment research facility with select-agent approval to study ASF. Five CVM faculty members have ASF research programs investigating vaccine development and prevention of disease transmission. Two licensing agreements for ASF mitigation strategies have been signed by CVM faculty and one potential license agreement for a candidate vaccine is under discussion.

Graduate Education

Targeted Enhancement funds supported tuition for dual-degree DVM/PhD students in disciplines relevant to transboundary and domestic infectious diseases of livestock. Dual-degree graduates have taken positions in Kansas in pharmaceutical, livestock contract, and academic research. In addition, eight CVM graduate students are enrolled in the NBAF Scientist Training Program funded by USDA-APHIS. Participants receive specialty training in high-containment facilities and transboundary disease. Graduates of the program are committed to USDA employment in NBAF. CVM faculty have developed and implemented a graduate certificate in foreign animal disease with intensive training in infectious disease and containment research. They have also developed a summer program for undergraduate students to gain experience working in containment and a summer fellowship for transboundary disease training for graduate students.

Research laboratory space

Targeted Enhancement funding supported renovation of research space to contemporary facilities promoting collaboration through core facilities for molecular techniques, chemistry analysis, toxicology, and infectious disease. Laboratory renovation, equipment purchases, and tuition support have strengthened our ability to attract high-quality research faculty who now collaborate with federal agencies and corporate researchers. FY20 funds committed to facility renovation were used to enhance capacity and laboratory safety.

Interdisciplinary Research Centers

Center of Excellence designation provides a strategic advantage to secure extramural research support, attract corporate support, and facilitate collaboration. In 2020, a CVM team of researchers secured a five-year, \$11.3 million NIH grant under the Centers of Biomedical Research Excellence (COBRE) program to establish a Center on Emerging and Zoonotic Infectious Diseases (CEZID). Our existing Center of Excellence in Emerging and Zoonotic Animal Diseases (CEEZAD) served as the foundation for this grant. CEZID will bridge infectious diseases programs at K-State involving the CVM and College of Arts and Sciences. Projects will examine virulence factors and host-pathogen interactions of emerging pathogens, utilizing both basic and translational approaches to *in vitro* systems and animal models.

Centers of Excellence for Vector-Borne Diseases, Emerging and Zoonotic Animal Diseases, Outcomes Research and Epidemiology, and the Beef Cattle Institute have been instrumental in developing relevance for NBAF and the State of Kansas. The Beef Cattle Institute's CattleTrace project is a collaborative effort with the USDA, Kansas Department of Agriculture, College of Agriculture, and private industry beef producers to implement a large-scale cattle traceability initiative for the State of Kansas. The Center for Outcomes Research and Epidemiology has developed strong relationships with USDA-APHIS, and will be a key collaborator for NBAF in the future. The Center of Excellence for Emerging and Zoonotic Animal Diseases is a leader in vaccine development and graduate education for transboundary infectious diseases. Annual funding has provided support for these Centers to become relevant resources to meet regional, national, and international needs in livestock production.

Distribution of Targeted Excellence Funds

Targeted Enhancement Funds	FY16	FY17	FY18	FY19	FY20	Projected FY21
Research Faculty	1,991,665	1,848,491	1,981,360	3,504,677	3,874,354	3,675,000
Research Support	2,156,298	2,254,690	2,566,450	951,135	749,246	950,000
Facilities Renovation	417,463	428,107	0	302,116	362,335	242,267
Graduate Program Support	275,000	301,400	284,878	191,134	14,065	100,000
Total Expenditures	4,840,426	4,832,688	4,832,688	4,949,062	5,000,000	4,967,267

Outcomes

Targeted Enhancement funding has strengthened the CVM through improved faculty retention and contemporary equipment and space for research. The support has been critical to strengthen grant success, corporate funding, and national credibility. A CVM faculty member has been awarded the national 2021 AAVMC Research Excellence award for the first time in history. This same faculty member received a 2021 Higuchi Research Excellence Award from the University of Kansas – the 3rd recipient in the history of the college.

	2016	2017	2018	2019	2020
Extramural Research	\$12,137,652	\$13,829,113	\$16,143,879	\$14,522,368	\$17,837,791
Recovered F&A	\$853,479	\$1,061,594	\$1,489,233	\$1,512,998	\$912,419
Manuscripts published	371	363	385	388	356 (11 mo)
MS Enrollment	62	82	67	70	101
MPH Enrollment	60	58	68	75	77
PhD Enrollment	44	48	55	48	48

Recovered Facilities and Administration (F&A) costs are derived from extramural awards and recovered by the institution when research dollars are spent by the investigator. Therefore, recovered F&A was lower in 2020 due to the emergency shutdown for COVID-19 from March through June. Nonetheless, grant success is the second best in the history of the college. Refereed publications have remained stable and graduate programs are strengthening. Targeted enhancement funding allows the CVM to protect and maintain a critical mass of research faculty to remain relevant to NBAF and respond to emerging infectious diseases. FY 2020 on the COVID crisis highlights the importance of the research talent of the CVM with rapid ability to respond to a critical infectious disease outbreak.