

Building public-private partnerships to advance global veterinary medical education: the US-China Joint DVM Program

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The world has experienced multiple devastating infectious disease outbreaks in the past few decades. Most recently, the current COVID-19 pandemic has had catastrophic impacts on human health and economies around the world, and the 2018 outbreak of African swine fever (ASF) in China caused the world's largest pork-producing country to lose almost half of its pigs in 1 year.¹ Now, ASF has crossed international borders and is causing substantial damage to swine industries elsewhere in Asia and around the world. The global nature of these emerging infectious diseases requires strong and early international cooperation in public and animal health management. It also emphasizes the critical role contemporary veterinary services have in providing effective control of infectious diseases and preventing worldwide spread.

In the past 3 decades, as a result of its fast-growing economy and the increased living standards of its citizens, China has experienced rapid growth in its livestock and companion animal populations. Today, China is the largest producer of poultry and pork,² the second-largest country in ownership of pet cats, and the third-largest country in ownership of pet dogs.³ This rapid increase in animal populations has placed great pressure on veterinary services in China and challenges the Chinese veterinary education system to meet the demand for qualified veterinarians to protect animal health and welfare, ensure food safety, prevent and control zoonoses, and improve public health.

In 2012, through a partnership with the China Scholarship Council, Zoetis/International Veterinary Collaboration for China, Chinese Veterinary Medical Association, and China Agricultural University, the US-China Center for Animal Health at Kansas State University (KSU) established the US-China Joint DVM Program. The objectives of this program are to provide a comprehensive veterinary medical education to Chinese citizens who will then return home to train others (ie, a “train the trainers” approach) and to build a platform that will allow future leaders of animal health in China and the United States to become colleagues. Over the past 8 years, we have ex-

panded our partnership with additional organizations and animal health companies in the United States and China to secure additional resources and provide enhanced learning opportunities for program students. This program is a true example of US and China cooperation in veterinary medicine under the mission of “one world, one health.”

US-China Center for Animal Health

The US-China Center for Animal Health was established in 2010 at KSU College of Veterinary Medicine. Its mission is to improve the veterinary training system in China to the level of the AVMA Council on Education's accreditation standards and to promote US-China research collaborations focused on combating emerging and major infectious animal diseases.⁴

The center was a product of the increase in business and cultural exchanges between the United States and China occurring at that time. Specifically, the concept for the center started when Dr. Jishu Shi, a faculty member at KSU College of Veterinary Medicine, attended a December 2009 Midwest China Hub Commission meeting in St Louis as the university's representative. The commission was exploring ways to export Midwest goods and services to China,⁵ which gave Dr. Shi the idea to establish a center for exporting US veterinary educational methods to China. Dr. Shi's proposal to develop a US-China Center for Animal Health gained strong support from Dr. Frank Blecha, head of the KSU College of Veterinary Medicine Department of Anatomy and Physiology; Dr. Ralph Richardson, dean of the KSU College of Veterinary Medicine; and Dr. Daniel Richardson, chief executive officer of the K-State Olathe Innovation Campus, as well as university leadership, and it quickly became a reality in May 2010.^{6,7}

US-China Joint DVM Program

One important goal of the US-China Center for Animal Health was to bring top Chinese students to the United States to study veterinary medicine, with

the goal of having them return to China once they received their veterinary degree to teach the next generation of veterinarians at universities in China. To achieve this goal, the center worked closely with the China Scholarship Council, Pfizer Animal Health (now Zoetis), the Chinese Veterinary Medical Association, and the China Agricultural University to obtain conceptual support and resources for this initiative. In 2012, the US-China Joint DVM Program was established, with the first group of Chinese students entering the program in the fall of 2012. Dr. Lei Wang, then a faculty member in the Department of Anatomy and Physiology, was appointed by Dean Richardson to join the center and manage this educational program.

The US-China Joint DVM Program consists of 1 year of preveterinary studies at KSU and 4 years of veterinary studies at KSU or a partner university in the United States. The US-China Center for Animal Health, through funding from program partners, provides a scholarship that covers tuition for the 1 year of preveterinary studies and pays program activity fees for all 5 years of the program; the China Scholarship Council provides a scholarship that covers tuition for the 4 years of veterinary studies and a stipend that covers living expenses for the 5-year program. The US-China Center for Animal Health administers the program, which includes program promotion in China, student selection, assisting students with their veterinary college applications, identifying summer internship programs for students, and paying tuition expenses. In addition, the center secures funding support for the program and organizes an annual homecoming event⁸ (**Figure 1**). The homecoming event includes reports from program alumni, new graduates, and students who just finished their year of preveterinary studies at KSU or are currently

pursuing a veterinary degree at a partner US university. The homecoming is also an opportunity to invite senior leaders from all program partners, students attending at partnering universities, and alumni to visit KSU and exchange experiences, share ideas to better the program, and celebrate each year's graduating class.

Since 2012, the number of partners in the program has been expanding, and partners now include Zoetis, Banfield Pet Hospital, Qingdao Yebio Bioengineering, RedDog Pet Nutrition, the AVMA, the USDA APHIS, and the Chinese Veterinary Drug Association, as well as 18 US and Chinese universities. Partner universities in the United States include the University of Minnesota, Iowa State University, the University of Missouri, the University of California-Davis, and the University of Georgia. Partner universities in China include Jilin University, Southwest University, Zhejiang University, Huazhong Agricultural University, Sichuan Agricultural University, Yangzhou University, South China Agricultural University, Northwest A&F University, Beijing University of Agriculture, Nanjing Agricultural University, Inner Mongolia Agricultural University, Zhejiang A&F University, and China Agricultural University.

The unique partnerships with universities, governmental bodies, and animal health companies in the United States and China are essential for the center to support the program. Importantly, they also provide unprecedented learning opportunities for Chinese students enrolled in the program. For the first time, students can fully understand and compare veterinary education and service, veterinary professional association governance, and the important roles of veterinarians in animal health, public health, food safety, and other social and economic areas in



Figure 1—Photograph of attendees at the 2019 homecoming event for the US-China Joint DVM Program.

these 2 countries. These experiences and knowledge prepare them to be leaders in promoting standardized veterinary services in China and strengthening US-China collaborations related to public and animal health.

Program Impacts

In 2017, the first 4 students enrolled in the US-China Joint DVM Program graduated from veterinary colleges in the United States. To our knowledge, these were the first Chinese citizens to graduate from a US college of veterinary medicine since 1949. According to Chinese history, the first Chinese citizen to graduate from a US college of veterinary medicine was Luo Qingsheng, who graduated from KSU College of Veterinary Medicine in 1923. From 1924 to 1949, seven more Chinese students earned veterinary degrees in the United States and Europe and subsequently returned to China. These Chinese veterinarians later became the driving force behind China's animal husbandry and veterinary education systems. Luo Qingsheng was the founding member of the veterinary school at Nanjing Agricultural University in China. Unfortunately, US-China exchanges in veterinary education were suspended after 1949.

To date, the US-China Joint DVM Program has graduated 15 veterinarians. All graduates were recruited as associate professors in top universities in China immediately after graduation, which is unprecedented in China. As expected, these Chinese veterinarians have started to have a substantial impact on veterinary education and service in China. For example, they have established new veterinary courses, such as equine medicine basics, an equine clinical training lab, and animal neuroanatomy at China Agricultural University; wildlife and exotic animal medicine, equine general medicine, small animal diseases, and advanced veterinary surgery at Huazhong Agricultural University; and small animal diagnostic imaging at South China Agricultural University. They have also created more hands-on clinical opportunities for students.

To facilitate access to advanced veterinary knowledge for Chinese students, these Chinese veterinarians have also started to translate Western veterinary textbooks into Chinese or write new textbooks. The contemporary veterinary knowledge and teaching methods they learned in the United States have helped them earn awards in teaching excellence at their universities. In addition, they have been appointed by their universities to lead projects such as designing new veterinary teaching hospitals or modifying existing ones to enhance their use for veterinary service and education.

In addition to teaching, these Chinese veterinarians have provided critical veterinary services to dairy cattle, beef cattle, swine, donkey, and equine farms in China. They have also actively participated in animal infectious disease control and prevention

in China. For example, Dr. Zezhong Zheng, who received his veterinary degree in 2019, has investigated ASF at swine farms and slaughter plants and provided valuable recommendations for effective control of the epidemic to Chinese policymakers and swine companies. Dr. Jing Li, who received his veterinary degree in 2017, led a medical team in the treatment of a horse that was ill after saving a child in the ocean. The horse recovered after 10 days of care.

In addition to its impact on China, the US-China Joint DVM Program has benefited US veterinary education as well. The presence of Chinese veterinary students on campus increases the social and cultural diversity of the US veterinary community. These students bring international perspectives and stories of personal experiences to US classrooms, which helps US students develop well-informed opinions and become better equipped for a career in global veterinary medicine. Furthermore, the center has actively helped US veterinary students at KSU intern at the Chinese Center for Disease Control and Prevention and China Agricultural University in the past few years,⁹ providing them with more global learning opportunities.

In summary, the US-China Joint DVM Program recruits the best and brightest Chinese students to come to the United States for veterinary training. It provides an opportunity for partner universities in the United States to build connections with China and increase their global impact on veterinary education and the veterinary profession. After they return to China, these Chinese veterinarians become ambassadors for the United States and our partner universities, strengthening trade, research, and education exchanges between the United States and China. Program alumni have facilitated collaborations between their US alma maters and Chinese universities and hosted visiting US students and faculty in China. They have even established scholarship funds at the University of Minnesota College of Veterinary Medicine and KSU College of Veterinary Medicine specifically for US veterinary students, encouraging them to share their experiences with Chinese students or travel to China to gain international experiences and perspectives.

Future Perspective

The American Association of Veterinary Medical Colleges (AAVMC) recently released a statement on global veterinary medical education stating that the AAVMC supports policies that foster and protect international collaborations in veterinary education and movements of veterinary professionals and students.¹⁰ In light of the recent challenges faced by many countries in dealing with outbreaks of ASF and the COVID-19 pandemic, the AAVMC statement is quite timely and should be seriously considered and implemented by all stakeholders involved in animal and public health. To this end, with the strong sup-

port of our domestic and international partners, the US-China Joint DVM Program will continue to “train the trainers” of veterinary medicine in China for the foreseeable future. We believe the US-China Joint DVM Program will strengthen cooperation between the United States and China and contribute to the goal of “one world, one health.” The world will become a better and healthier place because of the lasting friendships between our Chinese veterinary students and their American classmates, which would be the best appreciation and reward for all partners of this program.

Currently < 1% of veterinary students in the United States are foreign nationals.¹¹ In addition to encouraging more international students to apply to veterinary programs in the United States, we should also help more American veterinary students seek job opportunities globally. Our Chinese veterinary graduates and their American classmates should work together to train more qualified field veterinarians and small animal clinicians around the world. The transboundary nature of emerging and reemerging high-consequence infectious animal diseases requires global cooperation not only in outbreak management, but also in research and education for a broader biomedical, social, and ecological understanding of disease systems. The one-health concept will become a successful approach only when the world has sufficient competent veterinarians.

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