

Curriculum Vitae

Name	Position Title	
Kenneth L. Gage, Ph.D.	Chief, Flea-Borne Diseases Activity	
Educational Institution/Location	Degree/Year	Fields of Study
Wichita State University, Wichita, KS	B.S. 1980	Biology
University of Oklahoma, Norman, OK	M.S. 1984	Zoology/Ecology
University of Oklahoma, Norman, OK	Ph.D. 1987	Medical Entomology/ Medical Microbiology/ Population Ecology

Positions and Employment:

- 1992-present Bacterial Diseases Branch (BDB; former the Bacterial Zoonoses Branch), Division of Vector-Borne Infectious Diseases, Fort Collins, CO (Served as Plague Section Chief from 1994-2003; Name of Section changed to Vector Ecology and Control Laboratory (VECL) in 2003 – Served as VECL Chief from 2003-2006; Name of Laboratory changed to Flea-Borne Diseases Activity (FBDA) in 2006 – served as FBDA Chief from 2006-2014; Chief of Entomology and Ecology Activity (EEA) from 2014-present, This activity was formed in 2014 by merging the Flea-Borne Diseases Activity and the Tick-Borne Diseases Activity).
- 1990-1992 NIH-IRTA Postdoctoral Fellow, Laboratory of Vectors and Pathogens, Rocky Mountain Laboratories, National Institute of Allergy and Infectious Disease, National Institutes of Health, Hamilton, MT
- 1989-1990 McLaughlin Fellow, Department of Pathology, University of Texas Medical Branch, Galveston, Texas
- 1987-1989 Postdoctoral Fellow, Department of Pathology, University of Texas Medical Branch, Galveston, Texas

Professional Duties/Research Interests: Vector-borne and zoonotic disease research. Supervise surveillance, prevention, and control activities for plague and other vector-borne infectious diseases. Conduct research on the biology, epidemiology, ecology, and control of plague and other vector-borne diseases and their vectors. Plan for and maintain bioterrorism response capabilities for environmental investigations of possible intentional releases of plague or tularemia bacteria (Tier 1 select agents).

International Activities:

WHO activities, including those with regional WHO affiliates (Note: World Health Organization (WHO) Advisor positions and working group assignments include those done for the for the following regional offices of WHO: Pan American Health Organization (PAHO), which serves as the Western Regional Office of WHO in the western hemisphere; South-East Asia Regional Office (SEARO); and Western Pacific Regional Office (WPRO). Each advisory activity discussed below involved onsite work in the countries listed. These activities occurred from 1993-Present.)

- 2003 – 2010 Principal Investigator for CDC's World Health Organization Collaborating Center for Reference and Research on Plague Control
- 2007-Present Invited to serve as plague expert on World Health Organization Secretary's Advisory Panel for International Health Regulations

International Activities (cont.)

- 1993 WHO Short-term Advisor to Ministry of Health, People's Republic of China for World Health Organization (WHO) (Western Pacific Regional Office (WPRO) of WHO). (Participated in workshop on plague surveillance and control and reviewed Chinese and CDC plague programs with Chinese plague experts.)
- 1994 WHO Short-term Advisor to Peruvian Ministry of Health, Peru for Pan American Health Organization (PAHO)(Western Hemisphere Regional Office of WHO). (Evaluated Peruvian plague epidemic in Cajamarca and Lambayeque provinces, Peru. Also conducted training on plague surveillance and control.)
- 1994 Member of six-person international team organized by WHO and WHO's South-East Asia Regional Office (SEARO) to investigate Indian plague epidemic of 1994. (Advised environmental and epidemiological investigation of rural village thought to be the index site for the bubonic plague outbreak that preceded the pneumonic plague outbreak in the city of Surat. CDC Team received HHS Secretary's Award in 1995 for response to this outbreak.)
- 1995 WHO Short-term Advisor to Peruvian Ministry of Health, Peru for Pan American Health Organization (PAHO)(Western Hemisphere Regional Office of WHO). (Evaluated insecticidal control measures for reducing risks of flea-borne transmission of plague in homes and peridomestic environments. Assisted in assessing plague risks for urban residents in northern Peru.)(Spring 1995 – First of two WHO advisory appointments in Peru in 1995)
- 1995 WHO Short-term Advisor to Peruvian Ministry of Health, Peru for Pan American Health Organization (PAHO)(Western Hemisphere Regional Office of WHO). (Evaluated insecticidal control measures for reducing risks of flea-borne transmission of plague in peridomestic environments. Assisted in assessing plague risks for urban residents in northern Peru.)(Fall 1995 – Second of two 1995 WHO advisory appointments in Peru in 1995)
- 1996 WHO Short-term Advisor to Indonesian Ministry of Health, Indonesia for WHO's South-East Asian Regional Office (SEARO). (Evaluated surveillance and control measures in plague-endemic region of central Java and conducted training on surveillance and control techniques.)
- 1997 WHO Short-term Advisor to Indonesian Ministry of Health, Indonesia for WHO's South-East Asian Regional Office (SEARO). (Evaluated surveillance, control, and laboratory diagnostic activities in plague-endemic areas of central and eastern Java.)
- 1998 WHO Short-term Advisor to Ecuadoran Ministry of Health, Ecuador for Pan American Health Organization (PAHO) (Western Hemisphere Regional Office of WHO) (PAHO). (Participated in investigation of pneumonic plague outbreak in southern Ecuador.)
- 2001 WHO Short-term Advisor to Mongolian Ministry of Health, Mongolia for WHO's Western Pacific Regional Office (WPRO) (Evaluated Mongolia's national plague program, including protocols and activities related to surveillance, control, diagnosis, and prevention.)
- 2006 Invited participant at WHO-sponsored meeting on plague in Antananarivo, Madagascar (see invited presentations below). Participants included plague specialists from many plague-endemic countries around the world.

International Activities (cont.)

- 2006-2008 Invited member of WHO panel on urban pests that met in Bonn, Germany and London, England (see WHO publications below). Panel included numerous pest control and vector-borne/zoonotic disease experts from Europe and North America.
- 2007 WHO Short-term Advisor to Indonesian Ministry of Health, Indonesia for WHO's South East Asian Regional Office (SEARO). (Performed 10-year review of Indonesian plague prevention and surveillance program)
- 2013 Invited participant at WHO/PAHO meeting in Lima, Peru on plague management, surveillance, diagnosis and control in South America. Meeting including plague specialists the plague-endemic countries of South America and plague specialists from the Pasteur Institutes in Paris, France and Antananarivo, Madagascar.

Other International Activities:

Japan

- 1989 Invited Researcher at Tokushima Medical School, Tokushima Prefecture, Shikoku Island, Japan (Conducted research on tick-borne rickettsiae.)

Kazakhstan

- 1999 Invited to participate in site visit to Kazakh Institute for Research in Plague Control. The objective of this visit was to initiate a collaborative plague research program that later would be supported by ISTC (K-147) and U.S. State Department's Biotechnology Engagement Program (BTEP) funds (BTEP-1 project later awarded to Dr. Gage's CDC activity.). Trip funding provided by Center for Threat Reduction (CTR), Defense Threat Reduction Agency (DTRA), Department of Defense (DoD)
- 2001-2004 Developed and conducted plague project in collaboration with the Kazakh Scientific Center for Quarantinable and Zoonotic Diseases (KSCQZD). This work was funded by the International Science and Technology Center and the Biotechnology Engagement Program (BTEP). ISTC/BTEP projects provide support to former USSR bioweapons scientists as they transition their careers from projects with biowarfare applications to disease control and public health activities. During this project, the Flea-Borne Diseases Activity provided training for Kazakh scientists and conducted analyses of *Yersinia pestis* strains from the KSCQZD reference collection.
- 2010-Present Received DTRA funding for GIS-based modeling project to identify areas at risk for human plague and other vector-borne diseases in Kazakhstan and other central Asian republics

Russia

- 2004 Visited Russia to do progress review for BTEP project on rodent-associated *Bartonella*. The principal investigator for this project was Dr. Michael Kosoy, a scientist who was a member of the Flea-Borne Diseases Activity and under the supervision of Dr. Kenneth Gage. The project was done collaboratively with staff from the Gamaleya Institute, Moscow Medical Academy, and the Obolensk Laboratory in Russia.

Other International Activities (cont.):

Tanzania

2006 Visited plague-endemic sites in Lushoto District and elsewhere to review activities of Tanzania's plague prevention programs and discuss potential collaborations with members of the Tanzanian Ministry of Health.

Uganda

2006 Visited field study sites for Flea-Borne Disease Activity projects in Arua and Nebbi Districts of the West Nile region in northwestern Uganda. Some of these projects will identify environmental risks for human plague in this region. Others will develop new or evaluate existing methodologies for controlling rat-associated plague.

2007 Follow-up visit to evaluate the progress of the above-mentioned projects in the West Nile region. We also evaluated the potential for expanding our current scope of work to include GIS studies, expanded ecological studies, and attempts to better identify the ability of local rodent fleas to spread *Yersinia pestis* (plague bacteria) among local human and rodent populations.

2009 Received funding for project intended to identify how climatic variability and climate change will affect the spread and occurrence of plague in Uganda and other plague-endemic regions of Africa

2010-2013 Received funding from U.S. State Department's Biosecurity Engagement Program (BEP) to enhance biosecurity and biosafety at Ugandan Viral Research Institute Laboratories

2011-2013 Received funding for project intended to investigate food storage practices and develop means to protect foods from rat damage in a plague-endemic area of Uganda. If successful, these methods will restrict rat access to foods and reduce rat numbers, which will, in turn, reduce human plague risk

2011 Visited field study sites for Flea-Borne Disease Activity projects in Arua, Zombo and Nebbi Districts of the West Nile region in northwestern Uganda. These projects involved those related to identifying local environmental risks for human plague, understanding the local ecology of plague, managing rat populations in plague-endemic areas, and controlling flea vectors in plague-endemic areas.

2006-Present Maintained and supervised active research program in plague-endemic West Nile region of Uganda. Projects done in collaboration with the Uganda Virus Research Institute (UVRI) include those related to insecticidal control of fleas, efforts to reduce rat populations in village huts, ecological investigations of potential hosts and vectors of plague in the West Nile region, spatial modeling to identify areas most at risk for plague within this region, accompanying temporal modeling to identify climatic and seasonable variables associated with increased plague risk, and increasing biosafety and biosecurity at the CDC/UVRI laboratories in Arua and Entebbe, Uganda. Funding for these projects has been provided by CDC intramural research funding, State Department Biosecurity Engagement Program (BEP), U.S. Agency for International Development (USAID), and the U.S. Department of Defense's Defense Threat Reduction Agency (DTRA).

Journal Reviewer:

1992-present *Ad hoc* reviewer for Nature, Proceedings of the National Academy of Science, Journal of Medical Entomology, Emerging Infectious Diseases, Journal of Infectious Diseases, Vaccine, Journal of Wildlife Diseases, Journal of Vector Ecology, Biotechniques, Acta Tropica, Vector-Borne and Zoonotic Diseases, Journal of Parasitology, American Naturalist, Microbiology, Journal of Applied Microbiology, International Journal of Health Geographics, PLoS Neglected Tropical Diseases; ISME Journal (International Society of Microbial Ecology Journal), PLoS One

Offices Held and Committee Assignments:

1998 President, 53rd International Northwestern Conference on Diseases of Nature Communicable to Man (Edmonton, Alberta, Canada Aug. 9-12, 1998).

1998-Present Co-Secretary, National Association of Vector Borne Disease Control Officials (NAVCO) (formerly the State Public Health Vector Control Conference or SPHVCC). (CDC sponsors this conference, which is held every two years to discuss current vector-borne disease issues. According to the conference's charter, two CDC employees must be chosen at the end of each conference to provide advice and help organize the next meeting of this group.)

2000 Secretary-Treasurer, 55th International Northwestern Conference on Diseases of Nature Communicable to Man (Fort Collins, Colorado July 31- August 2, 2000)(Coordinator for conference's scientific program)

2005 Served as member of SMART Team with NBACC to advise Department of Homeland Security on plague-associated bioterrorism threats

2007 CDC Climate Change Working Group (Designated by NCZVED as working group's representative on vector-borne diseases)

2007-Present World Health Organization Secretary's Advisory Panel for International Health Regulations (selected to serve as plague expert on this panel)

Honors, Awards and Fellowships:

Fellowships: 1989-1990 McLaughlin Fellowship, Department of Pathology, University of Texas Medical Branch

1990-1992 Intramural Research Training Award (IRTA), Rocky Mountain Laboratories, National Institute of Allergy and Infectious Diseases, National Institutes of Health

Awards: 1993 Special Service Award - Hantavirus Investigation U.S. Department of Health and Human Services

1995 James H. Nakano Citation for outstanding paper published within the National Center for Infectious Diseases in 1994. (Childs et al. 1994. J. Infect. Dis. 169:1271-80.). Centers for Disease Control and Prevention, National Center for Infectious Diseases

1995 Lyme Disease Foundation Prize for an outstanding contribution to the Journal of Spirochetal and Tick-Borne Diseases (1994-1995 publishing year)(Schwan, Gage, and Hinnebusch. J. Spiroch. Tick-Borne Dis. 2:3-8, 1995.) Lyme Disease Foundation

Honors, Awards and Fellowships (cont.):

- 1995 Nomination for Charles C. Shepard Award (Childs et al. 1994. J Infect Dis 169:1271-80.). Centers for Disease Control and Prevention, National Center for Infectious Diseases
- 1995 Department of Health and Human Services Secretary's Award for Distinguished Service - Plague in India. CDC Plague Emergency Response Team. Department of Health and Human Services
- 2002 Honorary Professorship conferred by the Scientific Council of M. Aikimbaev's Kazakh Scientific Center for Quarantinable and Zoonotic Diseases, Bakyt Atshabar, M.D., Director, Almaty, Kazakhstan, Oct. 8, 2002.
- 2003 Department of Health and Human Services Secretary's Award for Distinguished Service - Tularemia outbreak in prairie dogs at an exotic pet distributorship. Department of Health and Human Services
- 2007 James H. Nakano Citation for outstanding paper published within the Coordinating Center for Infectious Diseases in 2006. (Eisen et al. PNAS 103:15380-15385, 2006). Centers for Disease Control and Prevention
- 2007 Nomination for Charles C. Shepard Award (Eisen et al. PNAS 103:15380-15385, 2006). Centers for Disease Control and Prevention
- 2007 Uganda Plague Outbreak Response and Longitudinal Study Team. National Center for Zoonotic, Vector-Borne and Enteric Diseases, Centers for Disease Control and Prevention
- 2013 Distinguished Alumnus Award, University of Oklahoma, College of Arts and Sciences (On average, almost 9000 undergraduate and graduate students are enrolled annually in OU's College of Arts and Sciences. Each year, four previous graduates of this college are recognized as distinguished alumni.)

Peer-reviewed Publications:

(Note: Asterisks (*) on last authorships denote Dr. Gage's role as Section/Laboratory/Activity Chief and principal investigator for the projects described in the given publication.)

1. Burgdorfer W and **Gage KL**. The susceptibility of the black-legged tick to the Lyme disease spirochete (*Borrelia burgdorferi*). Zbl. Bakt. Hyg. A. 263:15-20, 1986.
2. Burgdorfer W and **Gage KL** Susceptibility of the hispid cotton rat (*Sigmodon hispidus*) to the Lyme disease spirochete (*Borrelia burgdorferi*). Am. J. Trop. Med. Hyg. 37:624-628, 1987.
3. Hoover J.J., **Gage KL**, and Paulissen MS. Helgrammite respiration - Temperature's role in ectotherm physiology. Am. Biol. Teacher. 50:39-42, 1988.
4. **Gage KL**, Burgdorfer W and Hopla CE. Hispid cotton rats (*Sigmodon hispidus*) as a source for infecting immature *Dermacentor variabilis* (Acari:Ixodidae) with *Rickettsia rickettsii*. J. Med. Entomol. 27:615-619, 1990.

Peer-reviewed Publications (cont.):

5. Schwan TG, Schrumpf ME, **Gage KL**, and Gilmore RD, Jr. Analysis of *Leptospira*, *Leptonema illini*, and *Rickettsia rickettsii* for the 39 kilodalton antigen (P39) of *Borrelia burgdorferi*. J. Clin. Microbiol. 30:735-738, 1992.
6. Schwan TG, **Gage KL**, Karstens RH, Schrumpf ME, Hayes SF, and Barbour AG. Identification of the tick-borne relapsing fever spirochete *Borrelia hermsii* by using a species-specific monoclonal antibody. J. Clin. Microbiol. 30:790-795, 1992.
7. **Gage KL**, Gilmore RD, Karstens RH, and Schwan TG. Detection of *Rickettsia rickettsii* in saliva, hemolymph and triturated tissues of infected *Dermacentor andersoni* ticks by polymerase chain reaction. Mol. and Cell. Probes. 6:333-341, 1992.
8. **Gage KL**, Hopla CE, and Schwan TG. Cotton rats and other small mammals as hosts for immature *Dermacentor variabilis* (Acari:Ixodidae) in central Oklahoma. J. Med. Entomol. 29:832-842, 1992.
9. **Gage KL**, and Jerrells TJ. Demonstration and partial characterization of antigens of *Rickettsia rhipicephali* that induce cross-reactive cellular and humoral immune responses to *Rickettsia rickettsii*. Infect. and Immun. 60:5099-5106, 1992.
10. **Gage KL**, Schrumpf ME, Karstens RH, Burgdorfer W, and Schwan TG. DNA typing of rickettsiae in naturally infected ticks using a PCR-RFLP typing system. Am. J. Trop. Med. Hyg. 50:247-260, 1994.
11. Childs JE, Ksiazek TG, Spiropoulou CF, Krebs JW, Morzunov S, Maupin GO, **Gage KL**, Rollin PE, Sarisky J, Ensore RE, Frey JK, Peters CJ, and Nichol ST. Serologic and genetic identification of *Peromyscus maniculatus* as the primary rodent reservoir for a new hantavirus in the Southwestern United States. J. Infect. Dis. 169:1271-1280, 1994.
12. Doll JM, Zeitz PS, Ettestad P, Bucholtz AL, Davis T, and **Gage K**. Cat-transmitted fatal pneumonic plague in a person who traveled from Colorado to Arizona. Am. J. Trop. Med. Hyg. 51:109-114, 1994.
13. Elliott LH, Ksiazek TG, Rollin PE, Spiropoulou CF, Morzunov S, Monroe M, Goldsmith CS, Humphrey CD, Zaki SR, Krebs JW, Maupin G, **Gage K**, Childs JE, Nichol ST and Peters CJ. Isolation of Muerto Canyon Virus, Causative Agent of Hantavirus Pulmonary Syndrome. Am. J. Trop. Med. Hyg. 51:102-108, 1994.
14. Maupin GO, **Gage KL**, Piesman J, Monteneri J, Sviat SL, VanderZanden L, Happ CL, Dolan M, and Johnson BJB. Discovery of an enzootic cycle of *Borrelia burgdorferi* in *Neotoma mexicana* and *Ixodes spinipalpis* from northern Colorado, an area where Lyme disease is nonendemic. J. Infect. Dis. 170:636-643, 1994.
15. Schwan TG, **Gage KL**, and Hinnebusch J. Analysis of relapsing fever spirochetes from the western United States. J. Spirochetal and Tick-Borne Diseases. 2:3-8, 1995.
16. Zeitz PS, Butler JC, Cheek JE, Samuel MC, Childs JE, Sands LA, Turner RE, Vorhees RE, Sarinsky J, Rollin PA, Ksiazek TG, Chapman L, Reef SE, Komatsu KK, Dalton C, Krebs JW, Maupin GO, **Gage K**, Sewell CM, Breiman RF, and Peters CJ. A case-control study of hantavirus pulmonary syndrome during an outbreak in the southwestern United States. J. Infect. Dis. 171:864-870, 1995.

Peer-reviewed Publications (cont.):

17. Childs J.E., Krebs JW, Ksiazek TG, Maupin GO, **Gage KL**, Rollin PE, Zeitz PS, Sarisky J, Ensore RE, Butler JC, Cheek JE, Glass GE, and Peters CJ. A household-based, case-control study of environmental factors associated with hantavirus pulmonary syndrome in the United States. *Am. J. Trop. Med. Hyg.* 52:393-397, 1995.
18. **Gage KL**, Maupin GO, Monteneri J, Piesman J, Dolan M, and Panella NA. Flea (Siphonaptera: Ceratophyllidae, Hystrichopsyllidae) and tick (Acarina: Ixodidae) control on woodrats using host-targeted liquid permethrin in bait tubes. *J. Med. Entomol.* 34:46-51. 1997.
19. Niebylski ML, Schrupf ME, Burgdorfer W, Fischer ER, **Gage KL**, Schwan TG. *Rickettsia peacocki* sp. nov., a new species infecting wood ticks, *Dermacentor andersoni*, in western Montana. *Int. J. Systematic Bacteriol.* 47:446-452. 1997.
20. Hinnebusch BJ, **Gage KL**, and Schwan TG. Estimation of vector infectivity rates for plague by means of a standard curve-based competitive PCR method to quantify *Yersinia pestis* in fleas. *Amer. J. Trop. Med. Hyg.* 58:562-569. 1998.
21. Trevejo RT, Schriefer ME, **Gage KL**, Safranek TJ, Orloski KA, Pape WJ, Monteneri JA, and Campbell GL. An interstate outbreak of tick-borne relapsing fever among vacationers at a Rocky Mountain cabin. *Amer. J. Trop. Med. Hyg.* 58:743-747. 1998.
22. Engelthaler DM, **Gage KL**, Monteneri JM, Chu MC, and Carter LG. PCR detection of *Yersinia pestis* in fleas: Comparison with mouse inoculation. *J. Clin. Microbiol.* 37:1980-1984. 1999.
23. Parmenter RR, Yadav EP, Parmenter CA, Ettestad P, and **Gage KL**. Incidence of plague associated with increased winter-spring precipitation in New Mexico, USA. *Am. J. Trop. Med. Hyg.* 61:814-821, 1999.
24. Cully JF, Carter LG, **Gage KL**. New records of sylvatic plague in Kansas. *J. Wildlife Dis.* 36:389-392, 2000.
25. Engelthaler DM and **Gage KL***. Quantities of *Yersinia pestis* in fleas (Siphonaptera: Pulicidae, Ceratophyllidae, and Hystrichopsyllidae) collected from areas of known or suspected plague activity. *J. Med. Entomol.* 37:422-426. 2000.
26. Glass GE, Cheek JE, Patz JA, Shields TM, Doyle TJ, Thoroughman DA, Hunt DK, Ensore RE, **Gage KL**, Irland C, and Bryan R. Anticipating risk areas for hantavirus pulmonary syndrome with remotely sensed data: re-examination of the 1993 outbreak. *Emerging Infectious Diseases.* 6:238-247. 2000.
27. **Gage KL**, Dennis DT, Orloski KA, Ettestad P, Brown TL, Reynolds PJ, Pape WJ, Fritz CL, Carter LG., and Stein JD. Cases of human plague associated with exposure to infected domestic cats. *Clin. Infect. Dis.* 30:893-900. 2000.
28. Gabastou J-M, Proano J, Vimos A, Jaramillo G, Hayes E, **Gage K**, Chu M, Guarner J, Zaki S, Bowers J, Guillemard C, Tamayo H, and Ruiz A. An outbreak of plague including cases with pneumonic infection, Ecuador, 1998. *Transactions of the Royal Society of Tropical Medicine and Hygiene.* 94:387-391, 2000.
29. Engelthaler DM, Hinnebusch BJ, Rittner CM, and **Gage KL***. Quantitative Competitive PCR as a method for exploring flea-*Yersinia pestis* dynamics. *Am. J. Trop. Med. Hyg.* 62:552-560, 2000.

Peer-reviewed Publications (cont.):

30. **Gage, KL**, Eggleston ME, Gilmore RD, Dolan MC, Monteneri JA, Tanda DT, and Piesman J. Isolation and characterization of *Borrelia parkeri* Davis in *Ornithodoros parkeri* Cooley (Ixodida:Argasidae) collected in Colorado. J. Med. Entomol. 38:665-674, 2001.
31. Enscoe, RE, Biggerstaff BJ, Brown TL, Fulgham RF, Reynolds PJ, Engelthaler DM, Levy CE, Parmenter RR, Monteneri JA, Cheek JE, Grinnell RK, Ettestad PJ, and **Gage KL***. Modeling relationships between climate and the frequency of human plague cases in the southwestern United States, 1960-1997. Am. J. Trop. Med. Hyg. 66:186-196, 2002.
32. Bai Y, Kosoy MY, Maupin GO, Kiyotaka RT, and **Gage KL***. Genetic and ecological characteristics of *Bartonella* communities in rodents in southern China. Amer J Trop Med Hyg 66(5):622-7, 2002.
33. Kosoy MY, Murray M, Gilmore RD, Bai Y, and **Gage KL***. *Bartonella* strains obtained from ground squirrels in Nevada are identical by sequencing of three genes to *Bartonella washoensis* isolated from a patient with cardiac disease. J Clin Microbiol 41:645-650, 2003.
34. Stevenson HL, Bai Y, Kosoy MY, Monteneri JA, Lowell JL, Chu MC, and **Gage KL***. Detection of novel *Bartonella* strains and *Yersinia pestis* in prairie dogs and their fleas (Siphonaptera: Ceratophyllidae and Pulicidae) using multiplex PCR. J Med Entomol 40:329-337, 2003.
35. Gilmore RD, Jr., Carpio AM, Kosoy MY, and **Gage KL***. Molecular characterization of the *sucB* gene encoding the immunogenic dihydrolipoamide succinyltransferase (SucB) protein of *Bartonella vinsonii* subsp. *berkhoffii* and *Bartonella quintana*. Infection and Immunity. 71:4818-4822, 2003.
36. Seery DB, Biggins DE, Monteneri JA, Enscoe RE, Tanda DT, and **Gage KL***. Treatment of black-tailed prairie dog burrows with deltamethrin to control fleas (Insecta:Siphonaptera) and plague. J. Med Entomol. 40:718-722, 2003.
37. Petersen JM, Schriefer ME, Carter LG, Zhou Y, Sealy T, Bawiec D, Yockey B, Urich S, Buck J, Lindley C, Zeidner N, Monteneri JA, **Gage KL**, Celeda L, and Chu MC. Laboratory Analysis of a Tularemia Outbreak in Wild Trapped, Commercially Traded Prairie Dogs: Evidence for Seropositive, Culture-positive Animals. Emerging Infect Dis, 10:419-425, 2004.
38. Avashia SB, Petersen JM, Lindley C, Schriefer ME, **Gage KL**, Cetron M, Demarcus TA, Kim DK, Buck J, Monteneri JA, Lowell JL, Antolin MF, Kosoy MY, Carter LG, Chu MC, Hendricks K, Dennis DT, and Kool JL. Outbreak of Tularemia in Prairie Dogs at an Exotic Animal Facility, Texas 2002: First evidence for prairie-dog-to-human transmission. Emerging Infect Dis, 10:483-486, 2004.
39. Zeidner NS, Carter LG, Monteneri JA, Petersen JM, Schriefer M, **Gage KL**, Hall G, Chu MC. An outbreak of *Francisella tularensis* in captive prairie dogs: an immunohistochemical analysis. J Vet Diagn Invest. 16:150-152, 2004.
40. Castle KT, Kosoy M, Lerdthusnee K, Phelan L, Bai Y, **Gage KL**, Leepitakrat W, Monkanna T, Khlaimanee N, Chandranoi K, Jones JW, and Coleman RE. Prevalence and diversity of *Bartonella* in rodents of northern Thailand. Amer. J. Trop. Med. Hyg. 70:429-433, 2004.
41. Petersen JM, Schriefer ME, **Gage KL**, Monteneri JA, Carter LG, Stanley M and Chu MC. Methods for enhanced culture recovery of *Francisella tularensis*. Applied and Environmental Microbiol. 70:3733-3735, 2004.
42. Lowell JL, Wagner DM, Atshabar B, Antolin M, Vogler AJ, Keim P, Chu MC, and **Gage KL***. Identifying sources of human plague exposure. J Clin Microbiol. 43:650-656, 2005.

Peer-reviewed Publications (cont.):

43. Stevenson HL, Labruna MB, Monteneri JA, Kosoy MY, **Gage KL**, and Walker DH. Detection of *Rickettsia felis* in a New World flea species, *Anomopsyllus nudata* (Siphonaptera:Ctenophthalmidae). J Med Entomol. 42:163-167, 2005.
44. Collinge SK, Johnson WC, Ray C, Matchett R, Grensten J, Cully JF, Jr., **Gage KL**, Kosoy MY, Loye JE and Martin AP. Testing the generality of a trophic-cascade model for plague. Ecohealth 2:1-11, 2005.
45. Guarner J, Shieh W-J, Chu M, Perlman DC, Kool J, **Gage KL**, Ettestad P, Zaki SR. 2005. Persistent *Yersinia pestis* antigens in ischemic tissues of a patient with septicemic plague. Human Pathology. 36:850-853, 2005.
46. Collinge SK, Johnson WC, Ray C, Matchett R, Grensten J, Cully, Jr JF, **Gage KL**, Kosoy MY, Loye JE, and Martin AP. Landscape structure and plague occurrence in black-tailed prairie dogs. Landscape Ecology. 20:941-955, 2005.
47. Webb CT, Brooks CP, **Gage KL**, Antolin MF. Classic fleaborne transmission does not drive plague epizootics in prairie dogs. Proc Natl Acad Sci USA 103(16):6236-41, 2006
48. Eisen RJ, Bearden SW, Wilder AP, Monteneri JA, Antolin MF, **Gage KL*** Early-Phase transmission of *Yersinia pestis* by unblocked fleas as a mechanism explaining rapidly spreading plague epizootics. Proc Natl Acad Sci.USA 103:42:15380-15385, 2006.
49. Brinkerhoff RJ, Markeson AB, Knouft JH, **Gage KL**, Monteneri JA. Abundance patterns of two *Oropsylla* (Ceratophyllidae:Siphonaptera) species on black-tailed prairie dog (*Cynomys ludovicianus*) hosts. J Vector Ecology 31:355-363, 2006.
50. Steenhof K, Yensen R, Kochert MN, **Gage KL**. Populations and habitat relationships in Piute ground squirrels in southwestern Idaho. Western North American Naturalist. 66:482-491, 2006.
51. Lowell JL, Zhansarina A, Yockey B, Meka-Mechenko T, Stybayeva GS, Atshabar B, Nekrassova L, Tashmetov R, Kenghebaeva K, Chu MC, Kosoy M, Antolin MF, **Gage KL***. Phenotypic and molecular characterizations of *Yersinia pestis* isolates from Kazakhstan and adjacent regions. Microbiology. 153(Pt.1):169-177, 2007.
52. Adjemian JC, Foley P, **Gage KL**, Foley JE. Initiation and spread of traveling waves of plague, *Yersinia pestis*, in the western United States. Am J Trop Med Hyg. 76:365-375, 2007.
53. Eisen RJ, Lowell JL, Monteneri JA, Bearden SW, and **Gage KL***. 2007. Temporal dynamics of early-phase transmission of *Yersinia pestis* by unblocked fleas: secondary infectious feeds prolong efficient transmission by *Oropsylla montana* (Siphonaptera: Ceratophyllidae). J Med Entomol, 44:672-677, 2007.
54. Eisen RJ, Wilder AP, Bearden SW, Monteneri JA, and **Gage KL***. 2007. Early-phase transmission of *Yersinia pestis* by unblocked *Xenopsylla cheopis* (Siphonaptera:Pulicidae) is as efficient as transmission by blocked fleas. J Med Entomol, 44:678-682, 2007.
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3. Prevention of plague. Recommendations of the Advisory Committee on Immunization Practices (ACIP). Prepared by **Gage KL**, Dennis DT, Tsai TF. Morbidity and Mortality Weekly Report - Recommendations and Reports. 45:RR-14:i-iv and 1-15, 1996.
4. Outbreak of tularemia among commercially distributed prairie dogs, 2002. Reported by Lindley C, Avashia S, Hendricks K, Rawlings J, Buck J, Kool J, **Gage KL**, Schriefer M, Dennis D, Chu M, Petersen J, Monteneri J, Kim D, Demarcus T, and Cetron M. Morbidity and Mortality Weekly Report 51:688-689, 2002.
5. Imported Plague ---New York City, 2002. Reported by Perlman DC, Primas R, Raucher B, Lis R, Weinberg B, Davilman A, Yampierre C, Protic J, Weiss D, Ackelsberg J, Lee L, Layton M, Beatrice ST, Smith PF, Ettestad PJ, Reynolds PJ, Sewell CM, Ensore RE, Kosoy MY, Kubota K, Lowell JL, Chu M, Kool J, and **Gage KL***. Morbidity and Mortality Weekly Report. 52(31):725-728, 2003 (**Note:** Editorial section of article written by KL Gage).
6. **Gage KL**. Plague. Health Information for International Travel, 2003-2004. Arguin PM, Navin AW, Steele S, Fisk T, Kozarsky PE, Cetron M eds.. Centers for Disease Control and Prevention, Atlanta: US Dept. Health Human Services, Public Health Services, pp. 125-126, 2003
7. **Gage KL**. Plague. Health Information for International Travel, 2005-2006. Arguin PM, Kozarsky PE, Navin AW, eds.. Centers for Disease Control and Prevention, Atlanta: US Dept. Health and Human Services, Public Health Services, pp. 233-235, 2005.
8. Human Plague – Four States, 2006. Reported by Bertram-Sosa L, Jaso C, Valadez A, Nix B, Jones R, Sidwa T, Walker J, Anglim A, Reporter R, Mascola L, Van Gordon G, Ramirez J, Fritz C, Davis R, Ross J, Chongsiriwatana K, DiMenna M, Sheyka J, Ettestad P, Smelser C, Powers N, Reynolds P, Fowler J, Pape J, Tanda D, Mead P, Griffith K, **Gage KL**, Monteneri J, Dietrich G, Kubota K, Young J, Gould LH. Morbidity Mortality Weekly Report. 55:34:940-943, 2006.
9. Notes from the Field: Two cases of Human Plague --- Oregon, 2010. Reported by Wilkie M, McGivern T, Skeels M, DeBess E, Propulske BA, Cieslak PR, Brouillard K, **Gage KL**, Griffith K, Petersen JM, Tourdjman M. Morbidity Mortality Weekly Report 60:07:214, 2011.

World Health Organization (WHO) Publications:

1. Dennis, DT, **Gage KL**, Gratz N, Poland JD, and Tikhomirov E. (Principal authors). **Plague Manual**. World Health Organization. Geneva, Switzerland. 172 pp., 1999. Sole author of two chapters in this manual (see below):
 - **Gage KL**. Plague Surveillance (Chapter 6). In: **Plague Manual**. Dennis, DT, **Gage KL**, Gratz N, Poland JD, and Tikhomirov E. (Principal authors). World Health Organization. Geneva, Switzerland. pp. 135-165, 1999a.
 - **Gage KL**. National Health Services in Prevention and Control (Chapter 7). In: **Plague Manual**. Dennis, DT, **Gage KL**, Gratz N, Poland JD, and Tikhomirov E. (Principal authors). World Health Organization. Geneva, Switzerland. World Health Organization. pp. 167-171, 1999b.
2. **Gage KL**, Kosoy MY. Non-Commensal Rodents and Lagomorphs (Chapter 13). In: Public Health Significance of Urban Pests. Eds. Bonnefoy X., Kampen H, Sweeney K. World Health Organization. pp. 421-476, 2008.

Other Publications (Non-Peer Reviewed), including Symposium Proceedings:

1. **Gage KL**, Lance SE, Dennis DT, and Monteneri JA. Human plague in the United States: A review of cases from 1988-1992. *Border Epidemiol. Bull.* 6:1-10, 1992.
2. **Gage KL**, Thomas RE, and Monteneri JA. The role of predators in the ecology, epidemiology, and surveillance of plague in the United States. *Proc. 16th Vert. Pest Conf. Univ. California, Davis.* pp. 200-206, 1994.
3. Niebyski ML, Peacock MG, Schrupf ME, Burgdorfer W, Fisher ER, **Gage KL**, and Schwan TG. Characterization of the East Side Agent, a spotted fever group rickettsia infecting wood ticks, *Dermacentor andersoni*, in western Montana. In: Kazar, J. and R. Toman, eds. *Rickettsiae and Rickettsial Diseases*. *Proc. Vth International Symposium. Slovak Academy of Sciences.* pp. 227-232. 1996.
4. Reisen WK, **Gage KL**. Cluff E. Hopla (1917-2008). *J Med Entomol* 46:173-174, 2009.
5. Reisen WK, **Gage KL**. In Memoriam, Cluff E. Hopla, 1917-2008. *J Vector Ecology.* 34:1, 2009.

Invited Presentations at National and International Meetings (Note: List does not include numerous invitations for presentations at various universities.):

1. Society of Vector Ecology, San Francisco, California, 1992 – Title: Landscape Ecology of Plague.
2. Society of Vector Ecology, International Congress of Vector Ecology, San Diego, California, 1993 – Title: Emerging Plague Risks in the United States.
3. American Veterinary Medical Association, San Francisco, California, 1993 – Title: Plague in the United States.
4. Forty-eighth International Northwestern Conference on Diseases of Nature Communicable to Man, 1993 – Title: Plague in the United States: Recent Observations and Prospects for the Future. **(Invited organizer of plague symposium)**.
5. Sixteenth Vertebrate Pest Conference, San Francisco, California, 1994 – Title: The Role of Predators in the Ecology, Epidemiology and Surveillance of Plague.
6. State Public Health Vector Control Conference, Fort Collins, Colorado, 1994 – Title: Plague Update - 1993-1994.
7. Entomological Society of America, Dallas, Texas, 1994 – Title: Emerging Global Plague Risks.
8. Society of Vector Ecology, Fort Collins, Colorado, 1995 – Title: A Comparison of Plague Surveillance and Control in India, Peru, and the United States. **(Invited organizer of symposium on flea-borne diseases and flea control)**.
9. American Society of Tropical Medicine and Hygiene, San Antonio, Texas, 1995 – Title: The Influence of Climate on Plague Transmission.
10. State Public Health Vector Control Conference, Fort Collins, Colorado, 1996 – Title: Plague Update - 1995-1996.
11. Society of Vector Ecology, Berkeley, California, 1996 – Title: GIS Analysis of Plague in Colorado, 1990-1995.
12. State and Public Health Vector Control Conference, Fort Collins, Colorado, 1998 – Title: Plague Update - 1996-1997.
13. Entomological Society of America, Las Vegas, 1998. – Title: The Reemergence of Plague.
14. State and Public Health Vector Control Conference, Fort Collins, Colorado, 2000 – Title: Plague Update - 1998-1999.
15. Society of Vector Ecology, Berkeley, California, 2000 – Title: Fleas as Vectors of Human Pathogens: Recent Advances **(Keynote Address)**
16. State and Public Health Vector Control Conference, Fort Collins, Colorado, February 2002 – Title: Plague Update - 2000-2001
17. Entomological Society of America, Fort Lauderdale, Florida, 2002. Symposium: Bioterrorism and Vector-Borne Pathogens Affecting Human and Animal Health **(Invited Symposium Organizer)**. Title: Animal-based Surveillance and Vector Control Activities Following a Bioterrorism Incident Involving Plague or Tularemia

Invited Presentations (cont.):

18. International Symposium on Emerging Infectious Diseases and Bioterrorism: Regional Threats, Global Impact. University of California, Davis. Davis, California, 2002 - The Threat of Plague.
19. Ecology of Plague, Tularemia and Q Fever Workshop – Fogarty Center, NIH, Bethesda, MD, February 2003 (**Invited Chair and Session Organizer – Plague Ecology Session**). Title: Ecology of Plague.
20. The Ecology of Plague in Prairie Dog Communities. Society for Vector Ecology, Coeur d'Alene, ID. October 2003. (**Invited Symposium Organizer**).
21. Symposium on the Status of the Black-footed Ferret and its Habitat. Sponsored by the U.S. Geological Survey. Fort Collins, CO, January, 2004 – Title: Plague Ecology and Research: An Update.
22. State and Public Health Vector Control Conference, Denver, Colorado, February, 2004 – Title: Plague Update, 2003-2004.
23. Second National Invasive Rodent Summit. National Wildlife Research Center, Fort Collins, CO, Sponsored by USDA Wildlife Services: US Fish and Wildlife Service, The Wildlife Society, and the Wildlife Damage Management Working Group. October, 2004 – Title: An Overview of Rodent-Borne Diseases.
24. Urban Pests and Health, Bonn, Germany. Sponsored by the World Health Organization – Regional Bureau for Europe. May 2005 – Title: Non-commensal Rodent Biology, Disease Vectors/Reservoir and Emerging Threats to Urban Settings.
25. Urban Pests and Health, Bonn, Germany. Sponsored by the World Health Organization – Regional Bureau for Europe. May 2005 – Title: Non-commensal Rodent Management and Exclusion in Urban Settings.
26. Plague: Bacteriology, Evolution, Ecology, Epidemiology and its Impact on Human History, Oslo, Norway, November 2005.- Title: Plague Systems in North America – Climate and Plague.
27. State and Public Health Vector Control Conference, San Francisco, California, February, 2006 – Title: The Ecoepidemiology of Plague in the United States and the World.
28. World Health Organization Meeting on Plague in Antananarivo, Madagascar, April, 2006 – Title: Epidemiological Situation in the Americas.
29. World Health Organization Meeting on Plague in Antananarivo, Madagascar, April, 2006. – Title: Animal Surveillance for Plague in the United States.
30. National Environmental Health Association, San Antonio, June, 2006 Title – Vector-Borne Disease Organisms as Agents of Bioterrorism.
31. International Conference of Diseases of Nature Communicable to Man, San Antonio, August, 2006. - Title: An Ancient Scourge in the 21st Century: Plague as a Reemerging Disease and Bioterrorist Threat (**R.R. Parker Lecture – Keynote Address**).
32. Ninth International Symposium on *Yersinia*, Lexington, Kentucky, October, 2006 - Title: Observations on the current and possible future distribution of human plague in the United States.
33. Nation Pest Management Association Meeting (PestWorld 2006). Grapevine, Texas, October 2006 – Title: Plague and other Flea-Borne Diseases.

Invited Presentations (cont.):

34. Society for Vector Ecology, Anchorage, Alaska, October 2006 – **Invited organizer and co-chair of symposium** entitled, “Vector Biology Research with Plague and Tularemia in an Age of Bioterrorism Preparedness”.
35. National Environmental Health Association, Tuscon, Arizona, June, 2008 Title – Vector-Borne Disease Organisms as Agents of Bioterrorism.
36. Society for Vector Ecology, Fort Collins, Colorado, October 2008. Title - Plague and Climate. (**Invited organizer and chair of symposium** in which this paper was presented. Symposium title: “Climate and Vector-Borne Diseases”.)
37. One Medicine Conference, Durham, North Carolina, November 2008. Title- Climate and Vector-Borne Diseases.
38. American Society for Tropical Medicine and Hygiene, New Orleans, Louisiana, November 2008. Title – The Epidemiological Implications of Recent Advances in Plague Ecology.
39. American Association for the Advancement of Science, Chicago, Illinois, February 2009. Title – The Impact of Climate on Plague. (Symposium sponsored by National Resources Defense Council).
40. Yale Zoonoses Meeting, New Haven, Connecticut. April, 2009. Title - Plague Surveillance Strategies In the U.S. and other Countries.
41. Infectious Disease Modeling Meeting, Advanced Physics Laboratory, Johns Hopkins University, Baltimore, Maryland. January, 2010. Title – Benefits and Drawbacks of Models as Public Health Tools.
42. ASM Biodefense Meeting, Baltimore, Maryland, February 2010. Title – Plague as an Emerging or Re-Emerging Threat in the 21st Century. (Plenary Talk).
43. International *Yersinia* Meeting. Recife Brazil. October 2010. Title – Factors influencing the spread and maintenance of plague.
44. Fourth Annual Biannual Colloquium on Climate and Health, National Center for Atmospheric Research, Boulder Colorado, July, 2011. Title - Influence of Climate on Plague and Hantavirus-caused Illnesses.
45. Vector-Borne Disease Symposium. Parkhill, Missouri, September, 2011. Title - Climate and Vector-Borne Diseases.
46. Banbury Conference on Scientific and Technological Barriers to Global Real Time Risk Assessment of Vector Borne Infections, Banbury Conference Center, Cold Harbor, New York. September 2011. Title – Selection of sites to evaluate newly developed techniques for assessing global risks of vector-borne diseases.
47. Fifth National Biothreat Conference, Denver, Colorado, March 2012. Title - Vector-Based Surveillance for Diseases Transmitted by Ticks, Mites and Fleas.
48. World Health Organization/Pan-American Health Organization Meeting of International Experts on Plague in South America, January, 2013. Title – Mapping Plague Foci and Risk.

Fellowship Training, Teaching and Graduate Education Activities:

- 1998-Present Primary mentor for three ASM Postdoctoral Fellows, an Emerging Infectious Diseases (APHL) Postdoctoral Fellow, an Emerging Infectious Diseases (APHL) Training Fellow, and 6 CDC Regular or ORISE pre-doctoral fellows and 2 postdoctoral fellows.
- 1980-1987 University of Oklahoma, Department of Zoology, Graduate Teaching Assistant. Laboratory courses taught: Introductory Zoology, Invertebrate Zoology, Parasitology, and Human Physiology
- 1996-present Colorado State University, Affiliate Faculty in the Department of Biology and the Department of Microbiology, Immunology, and Pathology
- Lectured in the following courses: Biology of Disease Vectors, Epidemiology of Infectious Diseases, and Mechanisms of Bacterial Pathogenesis
- Graduate Education activities at Colorado State University: Served as committee member on eight graduate thesis/dissertation committees (Note: Each of these students performed portions of their research in my laboratory. Also served as co-major professor for two of these students.)
- 2004-2006 Kansas State University, Adjunct Faculty, Department of Biology: Committee member for doctoral student (Note: This student performed part of their dissertation work in my activity's laboratory)
- Texas A & M Univeristy, Adjunct Faculty, Department of Entomology: Committee member for doctoral student (Note: This student performed part of their dissertation work in my activity's laboratory)
- 2005 University of Saskatchewan: Served as outside examiner on doctoral student's Ph.D. Defense (Note: This person also performed part of her Ph.D. work with in my activity's laboratory.)
- 2011-Present Universidad Nacional Autónoma de México, Departamento de Etología y Fauna Silvestre. Serve as outside committee member on two masters student theses and one doctoral student's dissertation. (Note: Each of these three students performed a portion of their graduate work in the my activity's laboratory.)

Documentary Film Appearances:

1. Ancient Mysteries – the Black Death. Arts and Entertainment Network. DVD released in 2005. A&E Home Video.
2. In Search of History – Scourge of the Black Death. History Channel. DVD released in 2005. A&E Home Video.
3. The Plague. History Channel. DVD released in 2005. A&E Home Video.