

Case Investigations of Infectious Diseases Occurring in Workplaces, United States, 2006–2015

Appendix

Methods

We conducted a literature review by referring to the methods of Haagsma et al. (6).

In March 2016, with the assistance of a CDC librarian, we searched articles published since 2006 in the PubMed database (<http://www.ncbi.nlm.nih.gov/PubMed>). Our search strategy was to combine 3 groups of relevant keywords, including case investigation, workers/workplace, and infectious diseases. Below is the detailed search strategy:

(“outbreak” OR “cluster” OR “investigation” OR “epidemiology” OR “cases” OR “case report” OR “Notes”) AND (“Occupational diseases” OR “Environmental Exposure” OR “laborers” OR “occupational exposure” OR “workers” OR “employees” OR “workplace” OR “industry”) AND (“infectious diseases” OR “infection” OR “communicable disease” OR “Bacterial Infections” OR “viral infection” OR “pathogen” OR “zoonoses” OR “animals” OR Parasitic Diseases(Mesh)) AND eng(LA) AND United states(PL) NOT review(PT)

OR

(“occupational diseases”(mesh) and “infectious”(title) AND (“2006/01/01”(PDat): “2016/12/31”(PDat)) AND Humans(Mesh) AND English(lang))) OR ((((((“Occupational Exposure”(Mesh) AND Humans(Mesh) AND English(lang))) AND (((((infectious or infection* or fungal or mycotic or mycoses or mycosis or viral or virus*)) OR (((“Bacterial Infections and Mycoses”(Mesh)) OR “Viruses”(Mesh)) OR “Bacteria”(Mesh)) OR “Fungi”(Mesh) OR pathogen*))) AND (“occupational disease” OR “occupational diseases” OR laborer* OR “occupational exposure” OR “occupational exposures” OR worker* OR employee* OR workplace* OR industry OR industries) or (pathogen* and occupation*))) AND Humans(Mesh)

AND English(lang))) AND Humans(Mesh) AND English(lang))) AND ((((((“Disease Outbreaks”(Mesh)) OR “Case Reports” (Publication Type)) OR (“Epidemiologic Studies”(Mesh) OR “Epidemiologic Study Characteristics as Topic”(Mesh))) OR (“Epidemiology”(Mesh) OR “epidemiology” (Subheading) OR “Molecular Epidemiology”(Mesh) OR “Bias (Epidemiology)”(Mesh) OR “Confounding Factors (Epidemiology)”(Mesh))) AND Humans(Mesh) AND English(lang))) AND (“2006/01/01”(PDat): “2016/12/31”(PDat)) AND Humans(Mesh) AND English(lang)) Filters: Publication date from 2006/01/01 to 2016/12/31; Humans; English

In addition, we searched NIOSH Health Hazard Evaluation (HHE) reports in the database (<https://www2a.cdc.gov/hhe/search.asp>) by using 2 filters:

1. Health effect: Viral, bacterial, parasitic, and fungal diseases.
2. Year published: 2006 to 2015.

We identified 2,402 articles that met the search criteria. After scanning the titles and/or abstracts, we excluded 2,045 for the following reasons:

1. Did not occur in the United States.
2. Not relevant to work-related infectious disease.

We also identified 40 HHE reports in the database and reviewed these along with the remaining articles. A total of 67 articles and 7 HHE reports from 66 infectious disease case investigations among workers were determined to be relevant to our topic, because each publication satisfied the following criteria:

1. It described a work-related infectious disease case investigation.
2. It mentioned one specific pathogen or disease.
3. It mentioned at least one specific occupational group or workplace.
4. It reported at least one symptomatic patient or seroconversion among workers.
5. The event occurred in the United States from 2006 to 2015.

The pathogens/diseases, industries (types of activity at the places of work), occupations (kinds of work), numbers of ill workers, transmission routes, and sources of exposure identified in this literature review are listed in Appendix Table 1.

Appendix Table 1. Data from reported case investigations of infectious diseases occurring in workplaces, United States, 2006–2015*

Year	State	Pathogen or disease	Industry (work setting)	Occupation	No. ill workers	Transmission mode†	Source of exposure‡	References
2006	MI	Norovirus	Food services	Server, cook	15	Direct contact	Co-workers and/or patrons	(20)
2006	ME	Salmonellosis	Manufacturing (poultry vaccine production)	Unspecified employees in the same room	5 confirmed	Vehicles	Environment (lab)	(29)
2006	IL	Mumps	Healthcare (hospital)	Employees, not specified	7	Airborne	Patient	(51)
2006	RI	Methicillin-resistant Staphylococcus aureus (MRSA) soft-tissue infections	Healthcare (hospital)	Protective service (security guards)	5	Direct contact	Patient	(52)
2006	Unk	Tuberculosis	Public administration (Navy)	Sailors	139 latent TB	Airborne	Co-worker	(53)
2006	Mult	Tuberculosis (TB)	Manufacturing (furniture installation company)	Unspecified employees in the same building	42 latent TB	Airborne	Co-worker	(54)
2006	NM	Tularemia	Landscaping services	Landscaper	1	Aerosol or vectors	Animal (rabbits?) or environment	(21)
2007	NY	Tuberculosis	Funeral service	Embalmer	1	Airborne	Human corpse	(16)
2007	MN	Salmonellosis	Food services (grocery store delicatessen)	Food preparation	2	Vehicles	Animal (chicken)	(19)
2007	CA	Coccidioidomycosis	Construction (pipeline installation contractor)	Construction laborers	12	Airborne	Environment	(23, 55)
2007	MI	Measles	U.S. Customs	Federal airport officer	2	Airborne	International traveler	(9)
2007	OR	Norovirus	Healthcare (long-term residential treatment facility)	Healthcare (nurse, doctor, nursing aid, others)	242	Vehicles	Co-workers, patients, or visitors	(56)
2007	TX	Adenovirus 14	Healthcare (hospital)	Not specified healthcare workers	6	Droplet	Patient	(57)
2007	CT	Anthrax	Manufacturing	Drum maker	1	Direct contact	Animal (goat hide)	(2, 58)
2007	AZ	Plague	National Park Service	Wildlife biologist	1	Droplet	Animal (mountain lion carcass)	(59)
2005–2007	Mult	Vaccinia virus	Academic institution/government facility	Laboratory workers	5	Direct contact	Environment (lab)	(30)
2008	MI	Norovirus	Food services	Dining service staff	3	Vehicles	Contaminated food?	(60)
2008	VA	Vaccinia virus	Academic institution	Laboratory worker	1	Direct contact	Environment (lab)	(31)
2008	Unk	Human immunodeficiency virus (HIV)	Laboratory	Technician	1	Needle puncture	Environment (lab)	(13)

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2007 – 2008	Mult	Brucellosis	Agriculture	Hunters	3	Direct contact	Animal (feral swine)	(61)
2007 – 2008	WA	Respiratory syncytial virus (RSV)	Healthcare (inpatient and outpatient cancer care)	Not specified healthcare workers	4	Droplet	Patients	(62)
2008	CA	MRSA skin infection	Zoo	Animal caretaker	20	Direct contact	Animal (elephant)	(63)
2009	IL	Plague	University	Laboratory worker	1	Direct contact	Environment (lab)	(32)
2009	NY	H1N1 influenza	High school	School employees	4	Droplet	Human	(7)
2009	MO	<i>Trichophyton tonsurans</i>	Healthcare	Staff, volunteer	21	Direct contact	Human	(64)
2009	Unk	Q fever	Manufacturing (slaughterhouse)	Inspector	1	Unknown	Animal (sheep and goat)	(65)
2009	CA	Meningococcal disease	Emergency response and healthcare	Police officer and respiratory therapist	2	Droplet	Patient	(66)
2009	HI	H1N1 influenza	School	Teacher	1	Droplet	Patient	(8)
2009	IL	H1N1 influenza	Hospital	Healthcare personnel (physician, nurse, other)	20	Droplet	Patient	(11)
2009	UT	H1N1 influenza	Hospital	Physicians	5	Droplet	Patient	(67, 68)
2009	TN	Tuberculosis	Elephant refuge	Employees (caregiver and administrative)	9 latent TB	Airborne	Animal (elephant)	(28, 69)
2009	NM	<i>Mycobacterium avium</i> complex	Spa	Maintenance worker	2	Airborne	Environment	(22)
2007 – 2009	Unk	Sealpox virus	Marine mammal rehabilitation facility	Marine mammal workers	2	Direct contact	Animal (seals or sea lions)	(18)
2010	Unk	Cowpox	Research lab	Lab worker	1	Direct contact	Environment (lab)	(33)
2010	FL, PA	Malaria	Commercial airline	Flight attendants and pilots	4	Vectors	?	(37)
2010	GA, NE	Dengue	Religious organizations	Missionary workers	7	Vectors	?	(70)
2010	CO	Shiga toxin-producing <i>E. coli</i>	Dairy farm	Employees at the dairy	10	Vehicles	Animal (cows)	(71)
2010	CO	Shiga toxin-producing <i>E. coli</i>	Child care center	Not specified staff	1 confirmed	Vehicles	Human	(72)
2010	Unk	Legionnaires' disease	Military base	Not specified base workers	11 suspect 7 confirmed 22 probable	Droplet	Environment	(73)
2010	Mult	Salmonellosis	Pet store	Employee	3	Vehicles	Animal (guinea pig)	(74)
2010	TX	Tuberculosis	Jail, hospital	Hospital and correctional staff	6 active TB	Airborne	Patient	(12)
2010	Unk	Melioidosis	Reptile importation and distribution center	Not specified	1	Direct contact	Animal (reptile)	(75)
2011	AZ	Tuberculosis	Hospital	Nursing assistant, nurse, medical support assistant, physician, Officer	1 active TB 18 latent TB	Airborne	Patient	(76, 77)
2011	CA	Measles	U.S. Customs and Border Protection	Officer	1	Airborne	Patient (arriving refugee)	(10)
2011	IN, MI	Cryptosporidiosis	Fire department	Firefighter (response to a fire in a barn)	3	Vehicles	Animal (cattle)	(78)

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2011	MN	<i>Streptococcus suis</i>	Trucking company	Driver	1	Vehicles	Animal (swine)	(79)
2011	TX	Tuberculosis	Meat-packing plant	Not specified workers	20 latent TB	Airborne	Co-workers	(40)
2008 – 2011	VA	Campylobacteriosis	Poultry-processing plant	Poultry workers	29	Vehicles	Animal (chicken)	(17, 80)
2008 – 2011	Mult	Brucellosis	University, public health lab	Laboratory workers	5	Direct contact	Environment (lab)	(34)
2009 – 2011	NY	Legionnaires' disease	Automobile and scrap metal shredding facility	Employees	4	Droplet	Environment	(81)
2012	CA	Coccidioidomycosis	Outdoor television-filming event	Cast or crew members	5 confirmed 5 probable	Airborne	Environment	(24)
2012	NE	Histoplasmosis	Day camp	Counselors	32	Airborne	Environment	(26)
2012	CA	Meningococcal disease	Research laboratory	Microbiologist	1	Direct contact	Environment (lab)	(35)
2012	IN, KY	Lymphocytic choriomeningitis virus (LCMV)	Rodent-breeding facilities	Employees	31	Direct contact	Animal	(82)
2012	OH	Variant influenza A(H3N2)	State fair	Swine exhibitor	20	Droplet	Animal (swine)	(83)
2012	AK	Tuberculosis	Long-term-care facility	Nursing assistant, environmental services	16 latent TB	Airborne	Resident/patient	(84, 85)
2013	MA	Vaccinia virus	Research laboratory	Laboratory worker	1	Direct contact	Environment (lab)	(86)
2013	MN	Salmonellosis	Hospital	Phlebotomist	1	Vehicle	Patient	(87)
2013	KS	Cryptosporidiosis	Emergency responders	Law enforcement officers, tow truck employees	15	Vehicle	Animal (calves)	(88)
2013	PA	<i>E. coli</i> O157:H7	Restaurant	Food handlers: beef grinding	9	Vehicle	Animal (beef)	(89)
2009 – 2013	CA	Coccidioidomycosis	Prison	Employees	103	Airborne	Environment	(90, 91)
2014	TX	Ebola	Hospital	Nurses	2	Direct contact	Patient	(14)
2014	NY	Ebola	International medical humanitarian organization	Humanitarian aid worker	1	Direct contact	Patient	(15)
2014	CA	HIV	Adult-film production	Performers	2	Sexual contact	Co-worker	(36)
2011 – 2014	CA	Coccidioidomycosis	Construction (solar power farms)	Construction labors	44	Airborne	Environment	(25)
2015	AZ	Measles	Outpatient healthcare facility	Nurse	1	Airborne	Patient	(92)

*Unk, unknown; Mult, multiple.

†Suspected or confirmed.

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