

Examples of case definitions for FWD outbreaks

Pathogen	Countries	Source	Year of Outbreak	Case definition	Context	Reference
<i>Salmonella</i> Newport	Finland, UK	Funeral meals	1997-1998	<p>Ylikiimink: Patients that attended the funeral reception on 14 December 1997 and subsequently had diarrhoea</p> <p>Hausjarvi: Person that attended the funeral reception 20 December 1997 and subsequently had a stool culture positive for <i>S. Newport</i></p>	Event/Mass Gathering	Lyytikainen et al. <i>Epidemiol Infect</i> 2000; 124(2): 185-192
<i>Salmonella</i>	Canada, UK, USA	(Mexico)	1996	A diarrheal illness in a conference attendee or accompanying family member, with illness lasting 2 or more days and onset occurring from 6 November 1996 to 9 November 1996	Event/mass gathering	Shane et al. <i>Int J Infect Dis</i> 2002; 6: 98-102
<i>Salmonella</i> Typhimurium DT104	The Netherlands, Denmark	Beef	2005	<p>Residents of The Netherlands who had sought medical care for gastrointestinal symptoms, had not travelled abroad 3 days before onset of symptoms and whose DT104 isolates were included in the Dutch surveillance system between 19 September and 28 November 2005. Gastrointestinal symptoms were defined as diarrhoea (3 or more loose stools in 24h) or 2 or more other symptoms of vomiting, nausea, blood in stool or abdominal pain.</p> <p>In case-control study, alternative case definitions excluded cases with early onset of symptoms, respectively, to identify potential changes in risk factors over time.</p>	International distributed product	Kivi et al. <i>Epidemiol Infect</i> 2007; 135(6): 890-899
<i>Shigella sonnei</i>	International flight (USA, Japan, Australia, American Samoa)	Raw carrot	2004	<p>Confirmed case: illness in a passenger who departed Honolulu by air on 22-24 August 2004, and who had <i>S. sonnei</i> stool culture-positive diarrhoea within 7 days afterwards.</p> <p>Probable case: diarrhoea during the 7 days after departure from Honolulu in a passenger who was on a flight on which at least one confirmed case had been identified.</p>	International travel	Gaynor et al. <i>Epidemiol. Infect</i> 2009; 137:335-341

Shigellosis	International flight	Sandwiches	1988	<p>Initial investigation:</p> <p>Confirmed case: A player of staff member who had diarrheal illness with subjective fever or chills that occurred within 4 days after returning to the Twin Cities from Miami and who had <i>S sonnei</i> organisms from a stool sample.</p> <p>Probable case: A player or staff member with a similar illness who did not have <i>S sonnei</i> isolated.</p> <p>Subsequent investigation:</p> <p>Confirmed case: a person who had diarrheal illness with onset of symptoms 12 to 96 hours after taking a flight serving food prepared in the Twin Cities flight kitchen used by the airline and who had the outbreak-associated strain of <i>S sonnei</i> isolated from a stool sample.</p> <p>Probably case: a person with a diarrheal illness with subjective fever or chills lasting at least 3 days, onset of symptoms 12 to 96 hours after the respective flight, and who did not have <i>S sonnei</i> isolated from a stool sample.</p>	International travel	Hedberg et al. JAMA 1992 ; 268 :22 3208-3212
Shigellosis	Cruise Ship (518 crew members from 38 countries and 818 passengers)	German potato salad	1989	<p>A case of gastroenteritis in passengers was defined as diarrhoea (three or more stools in a 24-hour period) or abdominal pain and other symptom (nausea, vomiting, headache, blood in the stool or muscle aches) during the cruise. For the crew, because of language differences, the case definition was simply self-reported diarrhoea or abdominal pain.</p> <p>Case-control: Self-reported diarrhoea or abdominal pain with fever, sweating or chills, or blood in the stool.</p>	International travel (Passengers 95% USA, 4 % Canada,	Lew et al. American Journal of Epidemiology 1991 134:4
Cholera	International flight (Peru to USA)	Cold seafood salad	1992	<p>USA: Having both diarrhoea and laboratory evidence of infection with toxigenic <i>Vibrio cholerae</i> O1, in accordance with criteria of the Centers for Disease Control and Prevention. Diarrhoea was defined as any loose stool during the week after the flight. Laboratory evidence of infection was either a stool culture that grew toxigenic <i>V. cholerae</i> O1 or a vibriocidal antibody titre > 640.</p> <p>Case-control study: Passengers whose stool grew toxigenic <i>V. cholerae</i> O1, regardless of symptoms</p>	International travel (Commercial airline flight)	Eberhart-Phillips et al. Epidemiol. Infect. 1996 ; 116 :9-13

Botulism	USA (Georgia & Florida), Canada (Ontario)	Carrot juice (USA)	2006	Illness in a patient with signs and symptoms of botulism, with onset between 1 August 2006 and 1 November 2006, who had consumed carrot juice during the 10 days before illness onset. Cases also had to meet 1 of 3 criteria for laboratory confirmation of botulism, as follows: 1) botulinum toxin identified in a clinical specimen obtained from the patient, 2) <i>C. botulinum</i> identified in a clinical specimen obtained from the patient, or 3) botulinum toxin identified in the same container of orange juice that the patient had consumed during the 10 days before onset of illness.	Internationally distributed product	Sheth et al. CID 2008 ; 47 :1245-51
<i>E. coli</i> VTEC O157	Netherlands, Iceland	Lettuce (Netherlands)	2007	Netherlands: An isolate matching the outbreak fingerprint for at least 95% and the date of onset of symptoms later than 1 September 2007. Iceland: all domestically acquired STEC O157 (same as VTEC O157) infections with onset of symptoms after 1 September 2007, pending PFGE and testing for stx1 and stx2 genes.	Internationally distributed product	Friesema et al. Eurosurveillance 2008, 13:50
Norovirus	UK, Norway, France, Sweden and Denmark	Oysters	2010	A verified cluster as one where (i) evidence was available that cases had consumed oysters within the incubation period and (ii) norovirus was identified with reverse transcription RT-PCR (RT-PCR) in oysters from the same batch or from the same harvesting area as the oysters which were consumed by the cases.	Internationally distributed product	Westrell et al. Eurosurveillance 2010 15:12
Salmonella	Denmark, Norway, Sweden	Meat	2008	A person with a laboratory –confirmed <i>Salmonella</i> Typhimurium infection with the distinct MLVA-outbreak profile, and with illness onset after 1 September 2008. A common case definition was used in all three countries.	Internationally distributed product	Bruun et al. Eurosurveillance 2009, 14;10
<i>Salmonella</i>	UK, USA	Savoury snack	1994-1995	A case was defined as <i>Salmonella</i> Agona of the outbreak strain isolated from a faecal specimen in a child under the age of 10 with an associated diarrhoeal illness.	Internationally distributed product	Killalea et al. BMJ 1996; 313:1105 Shohat et al. BMJ 1996, 313:1107

<i>Salmonella</i>	USA, Finland	Seeds	1995	<p>Arizona: An illness in a person who was in Arizona during the 3 days before onset of illness in which a clinical specimen yielded <i>Salmonella</i> Stanley.</p> <p>Michigan: the first illness in a household in which an isolate submitted to the MDPH laboratory after 1 May was identified as <i>S. Stanley</i>.</p> <p>Finland: A person whose address was in Helsinki or Espoo, who had domestically acquired illness and from whom a <i>Salmonella</i> isolate submitted to the National Public Health Institute in 1995 was identified as <i>S. Stanley</i>.</p>	Internationally distributed product	Mahon et al. Journal of Infectious Diseases 1997 ; 175 :876-82
<i>Salmonella</i> Thompson	Norway, Sweden, UK	Rucola lettuce (Italy)	2004	<p>Norway: a person with a laboratory confirmed <i>Salmonella</i> Thompson infection, between October 1 and December 31, 2004, in Norway. Five definitive PFGE profiles were recognized among the isolates of</p> <p>Other countries: <i>S. Thompson</i> submitted to Salm-Gene database (STMPXB.0001, STMPXB.0002, STMPXB.0003, STMPXB.0004 and STMPXB.0005). The profiles were all very similar (95% similarity, UPGMA), but with significant band differences occurring within specific regions of the gel. Other isolates (mainly related to travel to Asia and Africa) were markedly different.</p>	Internationally distributed product	Nygård et al. Foodborne Pathogens and Disease 2008, 5;2: 165-173
<i>Salmonella</i> Senftenberg	UK, Denmark, Netherlands, Israel	Basil (Israel)	2007	A resident of England and Wales infected with a drug-sensitive isolate of <i>Salmonella</i> Senftenberg, belonging to the same strain identified with PCGE and plasmid profiling, and received by LEP on or after the 8 April 2007.	Internationally distributed product	Pezzoli et al. Foodborne pathogens and disease 2008; 5:4 661-668
<i>Salmonella</i>	New Zealand, Australia, Canada, UK	Sesame seeds (tahini)	2002-2003	<p>Outbreak 1: Any person reported to the health authorities with <i>Salmonella</i> Montevideo detected in their faecal sample, who had acquired their infection in Australia between 1 November 2002 and 31 March 2003.</p> <p>Outbreak 2: Any person notified to the Department of Human Services, Victoria, Australia as infected with <i>S. Montevideo</i> with symptom onset between 25 June and 29 July 2003.</p> <p>Outbreak 3: Any person reported to public health authorities in Auckland, New Zealand as infected with <i>S. Montevideo</i> with symptom onset between 8 August and 8 September 2003.</p>	Internationally distributed product	Unicomb et al. Epidemiol. Infect. 2005, 133, 1065-1072

<i>Salmonella</i> Oranienburg	Germany, Austria, Belgium, Canada, Denmark, The Netherlands, Sweden and the Czech Republic	Chocolate (Germany)	2001-2002	Germany: A person with gastroenteritis starting after 1 October 2001 who had been reported with a <i>Salmonella</i> Oranienburg infection to a public health department before December 6.	Internationally distributed product	Werber et al- BMC Infectious Diseases 2005, 5:7
<i>Salmonella</i> Newport	USA, Canada (Denmark)	Alfalfa Sprouts	1995-1996	Canada: a resident of Oregon or British Columbia with onset of diarrhoea between December 1, 1995 and February 29, 1996, from whom SN was cultured.	Internationally distributed product	Van Beneden et al. JAMA 1999, 281;2:158-162
<i>Salmonella</i> Stanley and Newport	Australia, Canada, England & Wales, Scotland	Peanuts (Asia)	2001	Australia: any person reported to health authorities infected with <i>Salmonella</i> Stanley or <i>Salmonella</i> Newport who had acquired their infection in Australia after May 2001, and the isolate was sensitive to all antibiotics tested. Canada: cases with symptoms of vomiting, abdominal cramps, fever or diarrhoea and a stool culture positive for <i>S. Stanley</i> with the SSTAXB.0002 PFGE profile. England, Wales and Scotland: someone who had acquired <i>S. Stanley</i> or <i>S. Newport</i> with the characteristic SSTAAXB.0002 or SNWPXB.0030 profiles in England, Wales or Scotland after July 2001. Investigators in each country reviewed national <i>Salmonella</i> surveillance data-sets for cases infected with other serotypes isolated from peanut products that were potentially related to this outbreak.	Internationally distributed product	Kirk et al. Epi Inf 2004; 571-7

<i>Salmonella</i> Typhimurium	Iceland, UK, Netherlands, Germany	Lettuce (?)	2000	<p>Descriptive epidemiology:</p> <p>England and Wales, Scotland, Germany and The Netherlands: Any person from whom <i>Salmonella</i> Typhimurium DT204b R-type ACGNeKSSuTTmNxCP1 was isolated from a fecal sample received in the respective national laboratory between 16 August 2000 and 31 October 2000.</p> <p>Iceland: Any person from whom <i>S. Typhimurium</i> with the above R-type was isolated in the same time period.</p> <p>Analytic epidemiology:</p> <p>Iceland: A person who had eaten at an implicated restaurant on 2 September and had developed acute gastrointestinal symptoms two to six days later.</p> <p>England: A person from whom the outbreak strain had been cultured.</p>	Internationally distributed product	Crook et al. Clin Microbiol Infect. 2003 ; 9 :839-845
<i>Shigella dysenteriae</i>	Sweden, Norway, Denmark	Sugar snaps	2009	A case was Defined as having a domestic laboratory-confirmed <i>Shigella dysenteriae</i> .	Internationally distributed product	Lofdahl et al. Eurosurveillance 2009 14(28)
<i>E. coli</i> O111 and <i>Campylobacter</i>	UK, France	Unknown	1995	People suffering diarrhoea, vomiting or 'flu-like symptoms within 4 days of the trip'.	Tourist location	Wight et al. Epidemiol Infect 1997 119:9-14
<i>E. coli</i> VTEC O157	UK, France, Belgium	Cucumbers	2002	Cohort was defined as staff or pupils who participated in the school trip to France. Cases were defined as confirmed if they had any symptoms and had VTEC O157 isolated from their faeces, as probable if they had diarrhoea, but no laboratory confirmation of VTEC O157, and as possible if they had other symptoms without laboratory confirmation.	Tourist location	Duffell et al. Eurosurveillance 2003. 8:4
<i>E. coli</i> VTEC O157	Spain, England, Finland, Wales, Sweden, Denamrk	Raw vegetables, well water ?	1997	<p>A confirmed case was defined as an individual who had stayed in Fuerteventura during March 1997 and had any one of the following: VTEC O157 isolated in stool, clinical HUS or serological evidence of recent VTEC O157 infection.</p> <p>A probable case was defined as an individual who had stayed in Fuerteventura during March 1997 who presented with bloody diarrhoea with no laboratory confirmation of VTEC O157 infection</p>	Tourist location (Fuerteventura, Spain)	Pebody et al. Epidemiol. Infect. 1999 123: 217-223

Norovirus	Spain, Sweden, Norway, Finland	Dried fruit, strawberry jam?	2002	A person who 1) attended dermatological care or worked at the Health Centre in Gran Canaria, 2) took meals at the Centre and 3) fell ill between the 2 and 10 November 2002, with symptoms of diarrhoea (3 or more loose stools in 24 hours), vomiting or both.	Tourist location (Health centre)	Eriksen et al. BMC Infectious Diseases 2004 4 :45
<i>Salmonella</i> Enteritidis	Norway, Sweden, Finland, Greece	Chicken	2001	Analytical study: A human infection notified in Norway, Sweden or Finland with a microbiologically confirmed finding of <i>Salmonella</i> Enteritidis after travel to Greece within the incubation period for salmonellosis, with symptom date between 1 January 1997 and 21 December 2002. 2001 study: An outbreak-associated confirmed case: a person notified in Norway, Sweden or Finland with a microbiologically confirmed finding of <i>S. Enteritidis</i> phage type 14b after travel to Greece within the incubation period for salmonellosis, occurring between 1 May and 31 December 2001. Norway: An outbreak-associated probable case was defined as an infection notified in Norway with a positive finding of anaerogenic <i>S. Enteritidis</i> , after travel to Greece within the incubation period for salmonellosis, occurring between 1 May and 31 December 2001.	Tourist location	Guerin et al. Eurosurveillance 2006 11:2
<i>Salmonella</i>	Spain, France	Spaghetti	2007	A person presenting gastrointestinal illness within 96 hours of having eaten from the open buffet served for lunch on 14 August at the hotel.	Tourist location	El Omeiri et al. Eurosurveillance 2007 ; 12 :42
<i>Salmonella</i> Goldcoast	UK, Germany, Sweden, Norway, Ireland, Denmark, Finland, Spain	Unknown	2005	A case of gastroenteritis caused by <i>Salmonella</i> Goldcoast in a patient who had visited Mallorca one week before the onset of symptoms, onset being between 20 September and 19 October.	Tourist location	Lewis et al. Eurosurveillance 2005 ; 10 :49
Unknown waterborne	Spain, Dominican Republic	Waterborne	2002	A person who had visited the hotel during the epidemic period and developed diarrhoea (three or more loose stools per day) and abdominal pain plus one of the following symptoms: vomiting, fever and chills.	Tourist location	Jimenez et al. Eurosurveillance 2004 9:3

Salmonella	UK, Republic of Ireland	Lasagne	1996	Anyone staying at the hotel on the 25 and 26 August 1996 with either a faeces specimen positive for <i>Salmonella</i> or diarrhoea (more than three loose stools in 24h) and one of the following symptoms; fever, vomiting, abdominal pain after 25 August.	Tourist location (country not specified)	Nylen et al. Epidemiol Infect. 1999; 123:31-35
Hepatitis A	Netherlands	Semi-dried tomatoes	2010	All reported hepatitis A infections in the Netherlands with date of onset of disease from 15 December 2009 until present, with viruses with an identical sequence in a fragment of the VP1-2A region. Case control study: all reported hepatitis A infections in the Netherlands with date of onset of disease from 15 December until present. Exclusion criteria were: <ul style="list-style-type: none"> - most probably source of infection outside the Netherlands or outside any western European country, - most probable route of transmission sexual contact between men - detection of a non-related HAV strain - secondary cases. 		Petrignani et al. Eurosurveillance 2010; 15 (11)