

# Outbreaks of Foodborne Illness Associated with Melons<sup>1</sup>

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This document is intended to serve as a reference for everyone interested in the safety of melons by providing a comprehensive list of melon-related outbreaks in the United States.

In recent years, foodborne illness outbreaks have become increasingly associated with produce (Walsh et al. 2014). One such commodity linked to foodborne illness are melons (specifically cantaloupe, honeydew, and watermelon), which are consumed around the world. Melons can be eaten alone or combined with other fruit and vegetables to make salads. Regardless of the way they are prepared, melons are typically consumed raw. This lack of a processing step increases the risk a foodborne pathogen making it to the consumer (Carstens et al. 2019).

While in the field, melons may be in direct contact with the soil, irrigation water, and insects, all of which are a potential source of contamination (Carstens et al. 2019; Walsh et al. 2014). Melons may also become contaminated with foodborne pathogens during harvesting, packing, shipping, or preparation for consumption. During harvesting, mechanical damage resulting in wounds (e.g., punctures, cracks, bruising) may allow pathogen entry into the melon mesocarp tissue (i.e., edible flesh of the fruit) (US Food

and Drug Administration 2013). Pathogen infiltration and adherence at the stem scar tissue (the end of the melon where the vine was removed), especially in cantaloupe, also can be problematic for food safety (US Food and Drug Administration 2013).

The characteristics and maturity of the melons can also influence the susceptibility to foodborne pathogen contamination. The characteristics of the melon rind, specifically the netted surfaces (cantaloupes), create a favorable environment for bacteria to grow and make it difficult to remove pathogens (Fu et al. 2020; Walsh et al. 2014). The maturity of the melon also can play a role in susceptibility because ripe melons may allow for better growth and survival of pathogens on their surfaces (Suslow 1997). Contamination on the surface of a melon may then be able to spread to the inside of the fruit once the melon is cut (Walsh et al. 2014).

This document serves as a reference for those concerned about the safety of melons, including cantaloupe, honeydew, and watermelon in the fresh and fresh-cut market. Outbreaks associated with melons in the United States, Canada, and Europe are highlighted with information regarding the location, pathogen, and incidence of illness.

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Six tables are presented, representing different melon types (Table 1, cantaloupe; Table 2, honeydew; and Table 3, watermelon), unspecified melon and mixed fruits including melon (Table 4), outbreaks suspected to be associated with different melon types, unspecified melon, and mixed fruits including melon (Table 5), and outbreaks associated with multiple foods including melons (Table 6).

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Table 1. Outbreaks of foodborne disease associated with cantaloupe, 1997–2016\*

Year	Month	Location	Pathogen <sup>a</sup>	Location of Consumption <sup>b</sup>	Cases (Deaths) <sup>b</sup>	Food Vehicle	References
1997	Feb–May	US (CA)	<i>Salmonella</i> Saphra	Private home, grocery store, restaurant	24 (0)	Cantaloupe	Mohle-Boetani et al. 1999
2000	April–June	US (multistate)	<i>Salmonella</i> Poona	Restaurant—other or unknown	47 (0)	Cantaloupe	CDC 2018
2001	April	US (OR)	<i>Salmonella</i>	Restaurant—other or unknown	2 (0)	Cantaloupe	CDC 2018
2001	April–May	US (multistate)	<i>Salmonella</i> Poona	Grocery store; other	50 (2)	Cantaloupe	CDC 2018
2002	April	US (multistate)	<i>Salmonella</i> Poona	Private home/residence; grocery store; long-term care/nursing home/assisted-living facility	48 (NR)	Cantaloupe	CDC 2018
2007	December	US (multistate)	<i>Salmonella</i> Litchfield	Restaurant—other or unknown	53 (0)	Cantaloupe	CDC 2018
2008	November	US (multistate)	<i>Salmonella</i> Javiana	NR	10 (NR)	Cantaloupe	CDC 2018
2008	December	US (CA)	Norovirus	Restaurant	23 (0)	Cantaloupe	CDC 2018
2011	February	US (multistate)	<i>Salmonella</i> Panama	Private home	20 (0)	Cantaloupe	CDC 2018
2011	June	US (multistate)	<i>Salmonella</i> Uganda	NR	25 (0)	Cantaloupe	CDC 2018
2011	July	US (multistate)	<i>L. monocytogenes</i>	Private home	147 (33)	Cantaloupe	CDC 2018
2011	August–October	US (multistate)	<i>L. monocytogenes</i>	Grocery retailer	147 (33)	Cantaloupe	McCollum et al. 2013
2012	July	US (multistate)	<i>Salmonella</i> Newport	Private home/residence	24 (0)	Cantaloupe	CDC 2018
2012	July	US (multistate)	<i>Salmonella</i> Newport	Private home/residence	33 (1)	Cantaloupe	CDC 2018
2012	July	US (multistate)	<i>Salmonella</i> Typhimurium	NR	14 (0)	Cantaloupe	CDC 2018
2012	July–September	US (multistate)	<i>Salmonella</i> Typhimurium and <i>Salmonella</i> Newport	Private home/residence; all sourced from same farm	261 (3)	Cantaloupe	CDC 2018
2013	April	US (IN)	<i>Salmonella</i> Typhimurium and <i>Salmonella</i> Typhimurium	NR	14 (0)	Cantaloupe	CDC 2018
2014	April	US (multistate)	<i>Salmonella</i> Baildon	Private home/residence	20 (0)	Cantaloupe	CDC 2018
2016	June	US (multistate)	<i>Salmonella</i> Minnesota	Restaurant—Sit-down dining; private home/residence; grocery store	10 (0)	Cantaloupe	CDC 2018

<sup>a</sup> Pathogens abbreviated and associated with outbreaks include *E. (Escherichia)*, *L. (Listeria)*

<sup>b</sup> NR: Not Reported

Table 2. Outbreaks of foodborne disease associated with honeydew, 2003\*

Year	Month	Location	Pathogen	Location of Consumption	Cases (Deaths)	Food Vehicle	References
2003	January	US (multistate)	<i>Salmonella</i> Newport	Restaurant—other or unknown type; private home/residence; caterer (food prepared off-site from where served); grocery store; long-term care/nursing home/assisted living facility; hospital	68 (2)	Honeydew	CDC 2018
2003	September	US (CO)	<i>Shigella sonnei</i>	Restaurant—other or unknown	56 (0)	Honeydew	CDC 2018

\*Table was last updated on 5-3-2021. The most recent data published by the CDC indicates that there have been no outbreaks since 2003.

Table 3. Outbreaks of foodborne disease associated with watermelon, 1950–2017\*

Year	Month	Location	Pathogen <sup>a</sup>	Location of Consumption	Cases (Deaths)	Food Vehicle	References
1950	NR <sup>c</sup>	US (MN)	<i>Salmonella</i> Bareilly	Roadside stand	6 (0)	Watermelon, cut	Gayler et al. 1955
1954	June	US (MA)	<i>Salmonella</i> Miami	Supermarket	17 (1)	Watermelon, cut	Gayler et al. 1955
1979	NR	US (IL)	<i>Salmonella</i> Oranienburg	Supermarket	6 (0)	Watermelon	CDC 1979
1987	NR	Sweden	<i>Shigella sonnei</i>	Dinner party	15 (0)	Watermelon	FAO 2011
1991	June	US (MI)	<i>Salmonella</i> Javiana	Indoor picnic/school party; grocery retailer	39 (0)	Watermelon	Bolstein 1993
1993	NR	US	<i>Salmonella</i> Javiana	Private home, church	27 (0)	Watermelon	Del Rosario and Beuchat 1995
2000	July	US (WI)	<i>E. coli</i> O157:H7	Restaurant	736 (1)	Watermelon	CDC 2018
2005	July	US (ID)	Norovirus	Camp	18 (0)	Watermelon	CDC 2018
2006	July	US (CA)	Norovirus	Grocery store	14 (0)	Watermelon	CDC 2018
2006	July	US (VA)	<i>Campylobacter jejuni</i>	Other	15 (0)	Watermelon	CDC 2018
2006	August	US (NY)	<i>Salmonella</i> Newport	Restaurant	20 (0)	Watermelon	CDC 2018
2008	October	US (CA)	<i>Salmonella</i> Javiana	Other	594 (0)	Watermelon	CDC 2018
2010	July	US (MI)	<i>Salmonella</i> Saintpaul	Private home/residence; grocery store	17 (0)	Watermelon	CDC2018
2011	August	US (MN)	<i>Salmonella</i> Typhimurium	Private home/residence	15 (0)	Watermelon	CDC 2018
2017	June	US (Multistate)	<i>Salmonella</i> Newport	Unknown	20 (0)	Watermelon	CDC 2018
2017	July	US (PA)	<i>Salmonella</i> Newport	Private home/residence	13 (0)	Watermelon	CDC 2018

<sup>a</sup> Pathogens abbreviated and associated with outbreaks include *E. (Escherichia)*

\*Table was last updated on 5-3-2021. The most recent data published by the CDC indicates that there have been no outbreaks since 2017.

Table 4. Foodborne Illness Outbreaks Associated with Unspecified Melons and Mixed Fruit (including melon), 1998–2019\*

Year	Month	Location	Pathogen	Location of Consumption	Cases (Deaths)	Food Vehicle	References
1998	August	US (IA)	Norovirus	Restaurant—other or unknown type	41 (0)	Strawberries; honeydew	CDC 2018
1999	May	US (WI)	Norovirus	Restaurant	23 (0)	Melon (unspecified), pineapple, watermelon	CDC 2018
1999	July	US (CA)	<i>Salmonella</i> Enteritidis	School	82 (0)	Honeydew, watermelon	CDC 2018
1999	June	US (IA)	Norovirus	Restaurant	61 (0)	Cantaloupe, honeydew, watermelon	CDC 2018
2000	June	US (CO)	<i>Salmonella</i> Heidelberg	Restaurant	4 (0)	Melon (unspecified)	CDC 2018
2001	January	US (KS)	Norovirus	Restaurant	36 (0)	Cantaloupe, honeydew, pineapple	CDC 2018
2001	March	US (MN)	Norovirus	Office/indoor workplace	42 (0)	Cantaloupe, pineapple, unspecified	CDC 2018
2001	June	US (CA)	<i>Salmonella</i> Poona	Daycare, picnic, private home, restaurant	23 (0)	Honeydew, musk melon, watermelon	CDC 2018
2002	January	US (MN)	Norovirus	Restaurant	15 (0)	Strawberries; melon, unspecified; pineapple, unspecified	CDC 2018
2002	September	US (WA)	<i>Salmonella</i> Berta	Caterer (food prepared off-site from where served)	29 (0)	Cantaloupe, grapes, watermelon	CDC 2018
2003	May	US (multistate)	<i>Salmonella</i> Muenchen	Daycare, private home, grocery store	58 (0)	Cantaloupe, honeydew	CDC 2018
2003	August	US (FL)	Norovirus	Nursing home	16(0)	Cantaloupe, banana, pineapple	CDC 2018
2004	June	US (WI)	Norovirus	Church	34 (0)	Honeydew, musk melon, watermelon	CDC 2018
2004	March	US (KS)	Norovirus	School/college/university	100 (0)	Cantaloupe, honeydew, watermelon	CDC 2018
2008	August	US (CO)	<i>Salmonella</i> Newport	Private home	3 (0)	Cantaloupe, watermelon	CDC 2018
2011	April	US (GA)	Norovirus	Banquet Facility (food prepared and served on-site)	22 (0)	pineapple, unspecified; cantaloupe	CDC 2018
2011	June	US (OR)	<i>Salmonella</i> Typhimurium	Private home/residence; Child day care	6 (0)	Cantaloupe & strawberry mix	CDC 2018
2015	February	US (OH)	<i>Norovirus</i> GII.4 Sydney	Restaurant—sit-down dining; private home/residence	35 (0)	Cantaloupe, pineapple, unspecified; grapes	CDC 2018
2016	September	US (OR)	<i>Norovirus</i> GII.4 untypeable	Banquet facility (food prepared and served on-site)	26 (0)	Strawberries; cantaloupe; honeydew	CDC 2018
2017	October	US (multistate)	<i>Salmonella</i> Newport	Unknown	24 (1)	Melon, unspecified	CDC 2018
2018	April	US (multistate)	<i>Salmonella</i> Adelaide	Other	77 (1)	Melon, unspecified	CDC 2018
2019	March–May	US (multistate)	<i>Salmonella</i> Carrau	Grocery store	137 (0)	Watermelon, honeydew, cantaloupe, fruit medley (containing one of these melons)	CDC 2019
2019	November–January	US (multistate)	<i>Salmonella</i> Javiana	Long-term care facilities, hospitals, hotels, schools, and grocery stores	165 (0)	Honeydew, cantaloupe, pineapple, and grapes	CDC 2020

\*Table was last updated on 5-3-2021. The most recent data published by the CDC indicates that there have been no outbreaks since 2019.



Table 5. Foodborne illness outbreaks suspected to be associated with cantaloupe, honeydew, or watermelon or with unspecified melons, or mixed fruit (including melon), 1987–2017\*

Year	Month	Location	Pathogen <sup>a</sup>	Location of Consumption <sup>b</sup>	Cases (deaths)	Suspected Food Vehicle	References
1987	NR <sup>b</sup>	UK	Norovirus	NR	206 (0)	Melon (unspecified)	FDA 2009
1990	January	US (multistate)	<i>Salmonella</i> Chester	Restaurant salad bars	245 (2)	Cantaloupe	Ries, Zaza, and Langkop 1990
1991	June	US (IL, MI) and Canada	<i>Salmonella</i> Poona	Grocery stores, restaurants	400 (0)	Cantaloupe	CDC 1991
1993	NR	US	<i>Campylobacter jejuni</i>	Food service	48 (0)	Melon (unspecified), strawberries	FAO 2011
1997	NR	US (OR)	<i>E. coli</i> O157:H7	Restaurant	9 (0)	Cantaloupe	FDA 2009
1998	May–June	Canada (ON)	<i>Salmonella</i> Oranienburg	Supermarket	22 (0)	Cantaloupe	Deeks et al. 1998
1998	August	US (IA)	Norovirus	Restaurant	14 (0)	Honeydew, strawberries	CDC n.d.
1999	September	US (MN)	Norovirus	Restaurant	5 (0)	Cantaloupe	CDC 2018
2000	May	US (IL)	<i>Bacillus cereus</i> , <i>Staphylococcus aureus</i>	Church, temple	55 (0)	Melon (unspecified)	CDC 2018
2001	January	US (CO)	Norovirus	Restaurant	100 (1)	Honeydew, pineapple	CDC 2018
2001	March	US (MN)	Norovirus	Workplace	42 (0)	Cantaloupe, pineapple	CDC n.d.
2001	March	US (FL)	NR	NR	33 (0)	Melon (unspecified)	CDC n.d.
2001	June	US (WA)	NR	Restaurant	4 (0)	Cantaloupe, pineapple	CDC n.d.
2001	December	US (OR)	<i>Salmonella</i> spp.	Nursing home, home care, restaurant	2 (0)	Cantaloupe	CDC n.d.
2002	March–May	US (multistate), Canada	<i>Salmonella</i> Poona	Nursing home, home care, private home	58 (0)	Cantaloupe	CDC 2002
2002	June	US (DC)	NR	NR	11 (0)	Watermelon, strawberries	CDC n.d.
2004	NR	US (NR)	<i>E. coli</i> O157:H7	NR	6 (0)	Cantaloupe	FAO 2011
2004	April	US (CO)	Norovirus	Nursing home, home care	62 (0)	Melon (unspecified), house salad, strawberries	CDC n.d.
2004	November	US (CA)	Norovirus	Other	30 (0)	Cantaloupe, honeydew, watermelon	CDC 2018
2006	April	US (CA)	Norovirus	Other	108 (0)	Mixed fruit; sandwich, beef	CDC 2018
2006	June–July	US (multistate), Canada (ON)	<i>Salmonella</i> Oranienburg	Grocery store, health care facility, nursing home	41 (0)	Cantaloupe, honeydew, fruit salad	CDC 2007
2007	NR	US	<i>Salmonella</i> Litchfield	Private home, restaurant	11 (0)	Honeydew	FAO 2011
2007	February	US (MI)	NR	Banquet facility	8 (0)	Cantaloupe, watermelon	CDC n.d.
2007	May–June	US (NJ)	<i>Salmonella</i> Litchfield	Hotel restaurant	30 (0)	Fruit salad, honeydew	CDC 2008b
2007	September	US (MN)	Norovirus	Private home	12 (0)	Grapes, unspecified; pineapple, unspecified; watermelon; cake, unspecified	CDC 2018
2008	January–March	US (multistate), Canada	<i>Salmonella</i> Litchfield	Hospital, private home	51 (0)	Cantaloupe	CDC 2008a
2008	June	US (MN)	Norovirus	Private home, grocery store	3 (0)	Brie, unspecified; sauces, unspecified; pineapple, unspecified; cantaloupe	CDC 2018

Year	Month	Location	Pathogena	Location of Consumption <sup>b</sup>	Cases (deaths)	Suspected Food Vehicle	References
2009	February	US (multistate)	<i>Salmonella</i> Carrau	Private home	53 (1)	Cantaloupe, honeydew, watermelon	PHAC 2009; Nielsen et al. 2010
2013	May	US (MN)	<i>Salmonella</i>	Private home	7 (0)	Watermelon	CDC 2018
2013	May	US (MN)	Norovirus	Restaurant—sit-down dining	59 (0)	Cantaloupe	CDC 2018
2017	January	US (MN)	Norovirus	Long-term care/ nursing home/ assisted-living facility	9 (0)	Mixed cut fruit	CDC 2018

<sup>a</sup> Pathogens abbreviated and associated with outbreaks include *E. (Escherichia)*

<sup>b</sup> NR: Not Reported

\*Table was last updated on 5-3-2021. The most recent data published by the CDC indicates that there have been no outbreaks since 2017.



Table 6. Foodborne illness outbreaks associated with multiple foods (including melons), 2000–2016\*

Year	Month	Location	Pathogen <sup>a</sup>	Location of Consumption	Cases (deaths)	Food Vehicle	Reference
2000	June	US (MN)	Norovirus	Caterer (food prepared off-site from where served)	33 (0)	Sandwich, turkey; cantaloupe	CDC 2018
2002	April	US (DC)	<i>Staphylococcus aureus</i>	Other	8 (0)	Other cheese, pasteurized; honeydew melon; potato, fried	CDC 2018
2002	August	US (SC)	<i>Salmonella</i> Heidelberg	Prison/jail	26 (0)	Watermelon; ground beef, hamburger; biscuit, unspecified	CDC 2018
2004	April	US (CO)	Norovirus	Long-term care/nursing home/assisted-living facility	62 (0)	Strawberries; melon, unspecified; house salad	CDC 2018
2005	March	US (WA)	Norovirus	Private home/residence; caterer (food prepared off-site from where served); other	20 (0)	Dips, unspecified; strawberries; melon, unspecified	CDC 2018
2005	May	US (UT)	<i>Salmonella</i> Enteritidis	Private home/residence	126 (0)	Cantaloupe; chicken, bbq; corned beef, unspecified	CDC 2018
2005	July	US (CO)	<i>Salmonella</i> Newport	Unknown	24 (1)	Cantaloupe; ground beef, unspecified	CDC 2018
2006	May	US (CO)	<i>Salmonella</i> Typhimurium var Cope	Restaurant—other or unknown type	7 (0)	Chicken; watermelon	CDC 2018
2006	August	US (NY)	<i>Salmonella</i> Newport	Other	12 (0)	Honeydew melon; plum, unspecified; pizza, unspecified; cheese, unspecified	CDC 2018
2007	January	US (CO)	Norovirus	Banquet facility (food prepared and served on-site); grocery store	19 (0)	Honeydew, caramel rolls	CDC 2018
2007	May	US (NJ)	<i>Salmonella</i> Litchfield	Restaurant—other or unknown type	30 (0)	Fruit salad; green salad; cantaloupe; honeydew melon; grapes, unspecified	CDC 2018
2007	November	US (IA)	Norovirus	Restaurant—other or unknown type; other	44 (0)	Mixed fruit	CDC 2018
2008	July	US (GA)	Norovirus	Private home/residence; Caterer (food prepared off-site from where served)	27 (0)	Other cheese, pasteurized; watermelon; grapes, unspecified	CDC 2018
2008	August	US (CO)	<i>E. coli</i> O157:H7	Grocery store; other	5 (0)	Cantaloupe; ground beef, hamburger	CDC 2018
2009	February	US (multistate)	<i>Salmonella</i> Carrau	Grocery store	53 (1)	Melon	CDC 2018
2009	July	US (OR)	Norovirus	Caterer (food prepared off-site from where served)	18 (0)	Rolls; watermelon; cheese/roll	CDC 2018
2010	February	US (MO)	Norovirus	Banquet facility (food prepared and served on-site)	139 (0)	Fruit salad	CDC 2018
2010	April	US (WY)	Norovirus	Banquet facility (food prepared and served on-site); other	33 (0)	Multiple salads; unspecified fish; couscous; zucchini; mousse; water; ice; soup, other vegetable-based; soup, specialty, other; enchiladas; red salsa; chips, tortilla; ranch dressing; refried beans, unspecified; melon, unspecified; cake; salad dressings; pork, sweet and sour; mixed vegetables; egg rolls; banana, unspecified; cookies	CDC 2018

Year	Month	Location	Pathogen <sup>a</sup>	Location of Consumption	Cases (deaths)	Food Vehicle	Reference
2011	July	US (MN)	<i>E. coli</i> O157:H7	Private home/residence	6 (0)	Fruit	CDC 2018
2014	June	US (WI)	Norovirus	Caterer (food prepared off-site from where served)	21 (0)	Fruit platter	CDC 2018
2016	May	US (NY)	Norovirus	Banquet facility (food prepared and served on-site)	136 (0)	Mixed cut fruit; crudites	CDC 2018
2016	July	US (WV)	<i>Salmonella</i> Heidelberg	Private home/residence	4 (0)	Chicken; cantaloupe; eggs	CDC 2018

<sup>a</sup> Pathogens abbreviated and associated with outbreaks include *E. (Escherichia)*

\*Table was last updated on 5-3-2021. The most recent data published by the CDC indicates that there have been no outbreaks since 2016.