

Cronobacter Infection

Disease Category: Foodborne

Timeframe to follow-up: 1 day

See the link to the Disease Investigation Process document

Signs and Symptoms	- Fever, poor feeding, excessive crying, very low energy, seizures¹ - Bloodstream infections (sepsis), swelling of the lining surrounding the brain and spine (meningitis), urinary tract infections, infection in wounds like cuts, scrapes, or places where people have had surgeries¹
Incubation	The incubation period is relatively unknown; it could be as short as a few hours or up to 14 days (typically 7 days prior to symptom onset). ²
Case Classification	Clinical criteria: In the absence of a more likely alternative diagnosis, illness in an infant is characterized by an invasive infection, including but not limited to meningitis, cerebral abscess, sepsis, necrotizing enterocolitis, or urinary tract infection.³ Confirmed: Meets clinical criteria and confirmatory laboratory evidence (isolation by culture of Cronobacter in a clinical specimen from a normally sterile site).³ Probable: Meets clinical criteria and epidemiologic linkage criteria [consumption of powdered infant formula (PIF) implicated as the source of infection OR exposure to a non-PIF product, such as breast milk, implicated as the source of infection OR residing in a congregate setting (a NICU with an active Cronobacter outbreak)] and supportive laboratory evidence (isolation of Cronobacter spp. in a clinical specimen from a non-sterile site).³
Differential Diagnosis	Meningitis, cerebral abscess, sepsis, necrotizing enterocolitis, or urinary tract infection ³
Treatment	Antibiotics can treat Cronobacter infections. Infants with sepsis or meningitis should be hospitalized. ¹
Duration	Symptom duration can vary depending on the severity of the illness.
Exposure	- Cronobacter bacteria are found naturally in the environment, and the bacteria can contaminate dry foods like powdered infant formula, powdered milk, herbal teas, starches, and feeding items like breast pump equipment.¹ - Cronobacter can live on surfaces in a home, such as kitchen counters, sinks or in water, and can get into powdered formula if one places formula lids or scoops on contaminated surfaces and later touches the formula or if one mixes the formula with contaminated water or in a contaminated bottle.¹
Laboratory Testing	Local Health Authority can arrange testing if an outbreak is suspected OR for contacts:

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	• Clinical Testing and Diagnosis for Cronobacter Infection
Control of Contacts	• Disease does not have person-to-person contact and does not require any control measures of contacts
Key areas of focus during investigation	Infant food history (powdered infant formula, breast milk), water exposure (bacteria on feeding equipment, water mixed with formula).
Public Health Actions	Reports of Cronobacter cases must be made to the Local Health Authority during the regular business hours of the health authority on the first working day following the identification of the case.⁴ Local Health Authority to notify Office of State Epidemiology (dpbhepi@health.nv.gov) or call 775-684-5911/775-400-0333 (after hours) if outbreak suspected. For individual confirmed or probable cases: • Confirm diagnosis, if possible • Identify potential exposures • Prepare a case report and submit to the Chief Medical Officer (through OSE) within 7 days after completing the case investigation⁵ • Identify potential outbreaks from common sources • Provide education about how to prevent transmission To the best of the local health authority's ability, each step of the investigation should be completed within one working day or in alignment with NAC 441A.
Key Partner Agencies	• CDC⁶ • U.S. Food and Drug Administration⁶ • Association of Public Health Laboratories⁶ • Council of State and Territorial Epidemiologists⁶

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I. DISEASE REPORTING

A. Legal Reporting Requirements

A report to the health authority may be made by telephone; telecopy (in the form prescribed by the health authority); or any form of electronic communication identified by the health authority, following the specified format and procedure.⁴

1. *Health Care Providers and Health Care Facilities*

Health providers and facilities must notify the health authority where provider is located within the first working day after identifying the case.^{4,7,8}

2. *Laboratories*

Laboratories must notify the health authority within the first working day after identifying the case.⁹ If the lab is located outside of Nevada, notify the Nevada Chief Medical Officer through the Office of State Epidemiology (OSE) within the same timeframe.^{4,10}

3. *Local Health Authority (LHA)*

LHAs must notify the Office of State Epidemiology (OSE) within 7 days after completing the case investigation.⁵

II. THE DISEASE AND ITS EPIDEMIOLOGY

A. Background

Cronobacter is a bacterium found naturally in the environment, and can live in dry foods, such as powdered infant formula, or on contaminated feeding items, like breast pump equipment. To date, most clinically relevant species are *C. sakazakii* and *C. malonaticus*. Getting sick from Cronobacter is rare, but infections in infants less than 2 months old can lead to meningitis and death.¹ Cronobacter only became a Nationally Notifiable Condition in 2024, so it is globally underreported and little is known about its true incidence, but it is estimated that there are about 18 Infant Cronobacter Infections each year in the United States.⁶ Infants are at a higher risk if they are younger than 2 months old, born prematurely, or have a weakened immune system. Cronobacter spreads through dry foods like powdered infant formula, powdered milk, herbal teas, starches, and feeding items like breast pump equipment. Cronobacter infection can lead to bloodstream infections and meningitis, which can result in serious, long-lasting brain problems with a global mortality rate of about 40%.¹

B. Etiologic Agent

Cronobacter spp. are Gram-negative bacteria (order Enterobacterales) and are opportunistic pathogens linked to life-threatening necrotizing enterocolitis, meningitis, and Cronobacter Infection

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sepsis in neonates, infants, and other susceptible populations. In 2008, the bacteria were reclassified under the genus *Cronobacter*, which replaced *Enterobacter sakazakii*. Currently, the most clinically relevant species are *C. sakazakii* and *C. malonaticus*.³ *Cronobacter* are known for their ability to live in dry foods.¹

C. Description of Illness

In infants under 1 year old, *Cronobacter* infection typically starts with a fever, poor feeding, excessive crying, very low energy, and the chance of seizures. Infants with these symptoms should be taken to a medical provider as soon as possible. Infections typically begin within the first few days or weeks of life. *Cronobacter* infection can lead to bloodstream infections (sepsis), swelling of the lining surrounding the brain and spine (meningitis), urinary tract infections, and infection in wounds like cuts, scrapes, or places where people have had surgeries. Infants with meningitis can develop serious, long-lasting brain problems, which can lead to death.¹

D. Disease Burden in Nevada

Prior to 2024, *Cronobacter* infection was not a nationally notifiable condition, so Nevada, along with many other states, did not mandate reporting of the infection. Therefore, there is little available information on *Cronobacter* infections, and Nevada does not have a disease dashboard for it. *Cronobacter* infections are sporadic and rare, not following any epidemic wave patterns, and no recent cases have been reported in Nevada.¹

E. Reservoirs

Cronobacter bacteria can survive in dry environments, including food and on surfaces. Their reservoirs include environmental, foodborne, domestic, and clinical settings.¹

F. Modes of Transmission

The primary mode of transmission is foodborne, particularly through dry foods, as well as inadequately cleaned feeding supplies, like breast milk equipment. The bacteria have also been found on surfaces, like counters, sinks, and in water. *Cronobacter* is not known to spread from person to person.¹

G. Incubation Period

Very little is known about the *Cronobacter* infection incubation period; it could be as short as a few hours or up to 14 days (typically 7 days prior to symptom onset).²

H. Period of Communicability

Cronobacter infection is not known to spread from person to person, so there is not an established period of communicability.

I. Testing

Cronobacter infection is diagnosed by a laboratory culture. It can be detected in the blood or cerebrospinal fluid of patients with meningitis or sepsis caused by *Cronobacter* bacteria.

Cronobacter bacteria grow on routine culture media. CDC does not recommend testing stool for Cronobacter, as it does not typically cause diarrhea in infants. CDC does not recommend testing formula for Cronobacter contamination unless an infant has a diagnosed Cronobacter infection. In each case, clinicians should communicate with the Nevada State Public Health Laboratory to arrange testing.⁹

J. Treatment

Cronobacter infections are treated with antibiotics. Infants suspected of having sepsis or meningitis should be hospitalized and undergo a full clinical evaluation. Antimicrobial susceptibility testing should be performed because multidrug-resistant strains have been reported. If a patient is colonized (organism is found in or on the body but is not causing symptoms or disease), treatment is not necessary.¹¹

Provide most current treatment guidelines from Red Book to the healthcare provider or refer case to physician for proper treatment for Cronobacter.

III. EPIDEMIOLOGIC CASE INVESTIGATION

The public health authority should begin investigating the case of Cronobacter infection, step by step, within one working day of notification or in alignment with [NAC 441A](#).

A. Step 1: Review relevant information about the disease.

1. *Review scientific information in [Control of Communicable Diseases Manual](#), most recent edition.*
2. *Review Cronobacter infection most recent case definition ([\[2024\] CDC](#)).*

B. Step 2: Begin investigating the case.

1. Contact Reporting Source and/or Reported Case

Upon receiving an initial case report, review lab test results and available clinical details and epidemiologic factors. Please make three attempts to contact the case (text and phone calls) on separate days, at different times of the day (morning, afternoon, late afternoon). Document all attempts to contact a reporting source and/or reported case, preferably in the “Encounters” tab of EpiTrax. Please use case report forms (CRF) to gather accurate information about the case. Focus on the key data elements listed above. Filling out an electronic version of the CRF in EpiTrax (called a Confidential Morbidity Report (CMR) in EpiTrax) is preferred. If used, the completed PDF version should be attached to the CMR in EpiTrax. The CRF should be completed within 7 days of completing the investigation of the case.⁵

C. Step 3: Identify potential sources of infection

The investigation focuses on exposures in the 7 days before onset,³ paying particular attention to the infant’s feeding history, including whether the infant was fed powered instant formula, breast milk, or something else. Investigators should ask about the formula

brand, how the formula was stored, how the feeding equipment was cleaned, and environmental information, including home and clinical settings. Since Cronobacter infection is not known to spread person-to-person, investigators should not be concerned with asking about recent contacts.

D. Step 4: Initiate control measures for case and/or for contacts (see Section IV – Section VI below).

E. Step 5: Provide Education and Prevention messaging to the case and/or contacts (see Section IX below).

IV. CONTROL OF CASE

Disease does not require any control measures of cases. Please provide education and prevention measures.

V. CONTROL OF CONTACTS (IF APPLICABLE)

Although direct community person-to-person transmission is not documented, strict hand hygiene, aseptic equipment handling, and contact precautions/surveillance are required in healthcare settings (e.g., NICU) to prevent hospital-acquired cross-contamination. Please provide education and prevention measures.

VI. CONTROL OF CARRIERS (IF APPLICABLE)

A carrier state has not been documented for Cronobacter infection and thus no carrier-specific control measures are needed.

VII. MANAGEMENT OF SPECIAL SITUATIONS/OUTBREAK CONTROL

Coordinate with senior epidemiology staff to determine if an outbreak is occurring. If so, notify DPBH Environmental Health, local health authorities, or infection control, as appropriate.

VIII. PREVENTION

The investigator should reference the most recent disease specific public educational materials from the CDC. To prevent babies from getting Cronobacter infection:

- Breastfeed, if possible¹²
- Clean, sanitize, and store infant feeding items safely¹²
- Keep hands and surfaces clean¹²

- Prepare and store formula safely¹²

IX. REFERENCES

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X. ACKNOWLEDGEMENTS

This document was developed based on the content and format of the disease investigation guidelines of several state and local health jurisdictions:

- Oregon Health Authority Investigative Guidelines
- Washington State Department of Health Reporting and Surveillance Guidelines
- Washoe County Health District Epidemiology and Communicable Disease Program Investigation of Communicable Disease Manual
- Colorado Department of Public Health and Environment

The Nevada Office of State Epidemiology would like to acknowledge the work of these great partners.

XI. UPDATE LOG



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Chief Medical Officer Approval Date