

# Salmonella Napoli

**Background:** *Salmonella enterica* subsp. *enterica* serovar Napoli (antigenic formula 1,9,12:l,z<sub>13</sub>:e,n,x) is a serovar of the O:9 (D<sub>1</sub>) serogroup. This is a rare serovar, in the US only 19 cases were reported from 1999-2009. In other regions of the world *S. Napoli* is also rare, except for France, Italy, and Switzerland where it appears to have increased considerably. It was isolated from rucola and wild bird samples collected in Italy between 2004 and 2014 (Fisher et al., 2009; Mancini et al., 2014; Gori et al., 2018).

**Animal reservoir:** poultry and wild birds have been reported as animal sources of this serovar.

**Geographical distribution:** Serovar Napoli appears to be distributed in Europe, specifically in France, Italy, and Switzerland.

**Phylogenetic Information:** Serovar Napoli has the typhoid-associated genes *hlyE* and *taiA* (SPI-18), *cdtB*, *pltA*, and *pltB* (CdtB-Islet), as well as the GICT18/1 islet.

**Symptoms:** Although it is a nontyphoidal *Salmonella* strain some of its symptoms, including a prolonged incubation period (7–14 days), high fever, bacteremia, and elevated rates of hospitalizations, are similar to those caused by typhoidal *Salmonella*.

## Human Outbreaks:

Year	Location	Associated source	Number of cases
1982	England	Chocolate bars	245
2014	Milan, Italy	Ham	47

## Border Rejections:

Year	Location	Associated Source	Number of Cases
2004	Slovenia	Rucola (arugula) from Italy	NA
2006	Denmark	Bulls blood beet from Italy	NA
2014	Italy	Rucola salad	NA
2022	Finland	Fresh thyme from Italy, packaged in the Netherlands	NA

## Relevant links and references:

1. <http://www.ncbi.nlm.nih.gov/pubmed/19534593>
2. <http://www.ncbi.nlm.nih.gov/pubmed/6131266>
3. [http://www.iss.it/binary/publ/cont/ANN\\_14\\_01\\_14.pdf](http://www.iss.it/binary/publ/cont/ANN_14_01_14.pdf)
4. <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=20519>
5. <http://online.liebertpub.com/doi/full/10.1089/fpd.2015.2091>
6. <http://online.liebertpub.com/doi/full/10.1089/fpd.2016.2206>
7. <https://webgate.ec.europa.eu/rasff-window/screen/notification/556383>
8. Fisher I, Jourdan-da S, Nathalie H, Herbert W, François-Xavier SH, Danan C, Kérouanton A, Lane C, Dionisi AM, Luzzi I. 2009. Human Infections Due to *Salmonella* Napoli: A Multicountry, Emerging Enigma Recognized by the Enter-net International Surveillance Network. Foodborne pathogens and disease. 6. 613-9. 10.1089/fpd.2008.0206.
9. Mancini L, Marcheggiani S, D'Angelo A, Puccinelli, Camilla C, Filippo R, Flavia D, Elisabetta DM, Dario D, Anna M, Owczarek S, Luzzi Ida. 2014. First isolation of *Salmonella enterica* serovar *Napoli* from wild birds in Italy. Annali dell'Istituto superiore di sanità. 50. 96-8. 10.4415 /ANN\_14\_01\_14.
10. Gori M, Ebranati E, Scaltriti E, Huedo P, Ciceri G, Elisabetta T, Mirella P, Gianguglielmo Z, Stefano P, Luca B. 2018. High-resolution diffusion pattern of human infections by *Salmonella enterica* serovar *Napoli* in Northern Italy explained through phylogeography. PLOS ONE 13(8): e0202573. <https://doi.org/10.1371/journal.pone.0202573>