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Outbreak of Listeriosis Associated with Consumption of Vegan Cheese

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1 **Outbreak of Listeriosis Associated with Consumption of Vegan Cheese**

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27 **To the Editor:** Vegan cheese substitutes have been suggested as an alternative to raw-milk dairy
28 cheeses for persons at risk for listeriosis, including pregnant persons. We report an outbreak of
29 listeriosis in France between April and December 2022 that involved four pregnant women who
30 delivered preterm (median gestation, 32 weeks) and one case of meningoen­cephalitis in a 38-yearold
31 person with compromised immune function. An alert in Europe led to the identification of three
32 additional cases of listeriosis, which occurred in Belgium (in a 3-year-old child), in Germany (in a
33 person with pregnancy-associated sepsis), and in the Netherlands (a maternal–neonatal case of
34 neonatal meningitis). The *Listeria monocytogenes* clinical isolates were genetically closely related (≤ 1
35 allelic difference; type L2-SL475-ST504CT11461 on core genome multilocus sequence typing)¹ to
36 those from vegan cheeses and their production environment. The exposure of all these affected
37 persons to incriminated products was epidemiologically proved, which led to a product recall and an
38 urgent request from the French national public health authority to inform consumers, especially
39 pregnant persons, about the risk of listeriosis from the consumption of vegan cheese substitutes.

40 Made from raw almond, cashew, or coconut milk, these alternative semisoft cheese substitutes mimic
41 dairy cheeses (e.g., Camembert, goat cheese, and blue cheese). The vegan cheeses that were
42 associated with these maternal–neonatal cases were exported to Europe, sold in retail stores, and
43 available on the Internet. Such products are promoted as being healthier to consume than dairy
44 cheeses and free of zoonotic foodborne pathogens because they are plant-based. However, these
45 products did not undergo a hygiene step such as pasteurization that could control contamination at
46 the level of raw materials or from a contaminated production or postproduction environment.

47 *L. monocytogenes* is a ubiquitous bacterium that can contaminate raw dairy products, meat, fish,
48 seafood, vegetables, and fruits, including nuts, and its prevalence is predicted to increase with
49 climate change.² In a study in which *L. monocytogenes* was inoculated in beverages derived from nut
50 milks and in bovine milk, the proliferation of bacteria was greater in the plant-based milks.³ The
51 physicochemical properties of these products (e.g., pH and water activity) allow the growth of *L.*
52 *monocytogenes*. Although previous outbreaks due to salmonella contamination have been associated
53 with vegan cheese substitutes in the United States,^{4,5} vegan cheese substitutes continue to be
54 inappropriately marketed as a safe alternative to raw-milk dairy cheese to populations at increased
55 risk for foodborne infection, such as pregnant persons. This outbreak highlights both the lack of data
56 on the contamination of these products by foodborne pathogens, including *L. monocytogenes*, and
57 the need for manufacturers of vegan cheese substitutes to consider this risk in their production
58 processes, as with any other ready-to-eat product.

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63 Disclosure forms provided by the authors are available with the full text of this letter at NEJM.org

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66 **References**

67 1. Moura A, Criscuolo A, Pouseele H, et al. Whole genome-based population biology and
68 epidemiological surveillance of *Listeria monocytogenes*. *Nat Microbiol* 2016;2:16185

69 2. Summary and conclusions of the Joint FAO/WHO Expert Meeting on Microbiological Risk
70 Assessment of *Listeria monocytogenes* in Foods. 2. Risk assessment models. Geneva, May 29–June,
71 2023, Geneva: World Health Organization, July 2023 ([https://cdn.who.int/media/docs/default-](https://cdn.who.int/media/docs/default-source/food-safety/jemra/jemra-listeria-part2-meeting-summary-and-conclusion.pdf)
72 [source/food-safety/jemra/jemra-listeria-part2-meeting-summary-and-conclusion.pdf](https://cdn.who.int/media/docs/default-source/food-safety/jemra/jemra-listeria-part2-meeting-summary-and-conclusion.pdf))

73 3. Bartula K, Begley M, Latour N, Callanan M. Growth of food-borne pathogens *Listeria* and
74 *Salmonella* and spore-forming *Paenibacillus* and *Bacillus* in commercial plant-based milk alternatives.
75 *Food Microbiol* 2023;109:104143

76 4. Food and Drug Administration. Jule's Foods issues voluntary recall of Jule's Foods products because
77 of possible health risk. April 22, 2021 ([https://www.fda.gov/safety/recalls-market-withdrawals-safety-](https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts/jules-foods-issues-voluntary-recall-jules-foods-products-because-possible-health-risk)
78 [alerts/jules-foods-issues-voluntary-recall-jules-foods-products-because-possible-health-risk](https://www.fda.gov/safety/recalls-market-withdrawals-safety-alerts/jules-foods-issues-voluntary-recall-jules-foods-products-because-possible-health-risk)).

79 5. Centers for Disease Control and Prevention. Multistate outbreak of *Salmonella* Stanley infections
80 linked to raw cashew cheese (final update). January 31, 2014
81 (<https://www.cdc.gov/salmonella/stanley-01-14/>)