

Listeriosis in the City of Johannesburg, South Africa

P Manganye, Nat Dip Public Health (SA); **B Desai**, MB BCH, MMed; **M Daka**, PhD; **R Bismilla**, LLM, RCP Irel, LLM, RCS Irel

City of Johannesburg Health Department, South Africa

Corresponding author: P Manganye (PeterMan@joburg.org.za)

Listeriosis is a food-borne disease caused by food contaminated with the *Listeria monocytogenes* (*L. monocytogenes*) bacterium. *L. monocytogenes* is found in soil, vegetation and water. There are six species of *Listeria*, but only *L. Monocytogenes* causes disease in humans. It is a relatively rare disease, with 0.1 - 10 cases per million people per year, depending on the country or region of the world. The World Health Organization believes that South Africa's (SA's) current listeria outbreak is the largest ever in the world. The National Institute of Communicable Diseases reported that as of 28 February 2018, there had been 943 laboratory-confirmed cases of listeriosis in SA, and 176 deaths from the disease. As of March 2018, the City of Johannesburg (CoJ) has had a total of 251 cases (26% of total cases), with an incidence of 51 cases per 1 million, and a case fatality rate of 15%. The age group 15 - 49 is the most badly affected, followed by neonates >28 days old. A detailed outbreak preparedness and response plan to prevent listeriosis and promote good hygiene was developed which emphasised the fact that the main preventive measure is to always ensure that good basic hygiene is followed. The CoJ is committed to continuing the management and control of listeriosis according to the National Department of Health communicable disease guidelines and surveillance policy, which includes the provision and management of primary healthcare to all patients presenting with suspected listeriosis at facilities, and conducting regular preventive and promotive activities/measures to create community awareness.

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Listeriosis is a food-borne disease caused by food contaminated with the *Listeria monocytogenes* (*L. monocytogenes*) bacterium. *L. monocytogenes* is found in soil, vegetation and water. Vegetables can become contaminated by way of the soil or from manure used as fertiliser. Some animals carry the bacteria and might contaminate their meat and dairy products. Processed foods, such as soft cheeses and cold cuts, can become contaminated during processing. Unpasteurised milk could be unsafe to consume.^[1] *L. monocytogenes* has been recognised as an animal pathogen since the early part of the 20th century. It is widespread in nature, in soil, decaying vegetation and the bowels of many mammals. The first human outbreak was reported in Canada in 1983, proving that indirect transmission from animals to humans was possible. In that outbreak, cabbages, stored in the cold over the winter, were contaminated with *L. Monocytogenes* through exposure to infected sheep manure. There are six species of *Listeria*, but only *L. monocytogenes* causes disease in humans.^[2]

It is a relatively rare disease, with 0.1 - 10 cases per million people per year, depending on the country or region of the world. Although the number of cases of listeriosis is small, the high death rate associated with infection makes it a significant public health concern.^[1] The World Health Organization believes that South Africa's (SA's) current listeria outbreak is the largest ever in the world. The second largest outbreak occurred in 2011, with a total of 147 cases reported in the USA. Italy also had a large outbreak in 1997.^[1]

SA situation

The first documented outbreak in SA occurred between August 1977 and April 1978 (14 cases reported in Johannesburg). Since then, there have been sporadic cases. Listeriosis was not then recognised as a notifiable disease, and therefore it could not be picked up by the routine surveillance system. After the recent outbreak, the National Department of Health has made it a notifiable medical condition.^[3]

The National Institute of Communicable Diseases (NICD) reported that as of 28 February 2018, there had been 943 laboratory-confirmed cases of listeriosis in SA, and 176 deaths from the disease. The distribution of cases per province was: Eastern Cape, 48; Free State, 33; Gauteng, 555; KwaZulu-Natal, 65; Limpopo, 47; Mpumalanga, 46; Northern Cape, 5; North West, 27; and Western Cape, 116.

On 4 December 2017, the NICD reported that whole genome sequencing had been performed on 189 clinical *L. monocytogenes* isolates, and 15 sequence types (STs) identified; 71% (134/189) of the isolates were of a single ST (ST6). It was reported that the isolates in the ST6 cluster were very closely related, which suggests that most cases in this outbreak have had exposure to a widely available, common food type/source.^[4]

A media statement on 4 March 2018 by the Minister of Health confirmed that the source of the recent outbreak has been confirmed to be the Enterprise food-production facility in Polokwane.^[5]



City of Johannesburg situation

The City of Johannesburg (CoJ) is the capital of Gauteng Province, the economic hub of SA. The city has a population of 4.9 million people spread across seven geographical regions (Fig. 1).

Fig. 2 shows the number of laboratory-confirmed listeriosis cases per year from January 2013 to December 2017. As can be seen, there were very few cases of listeriosis in SA before 2017.

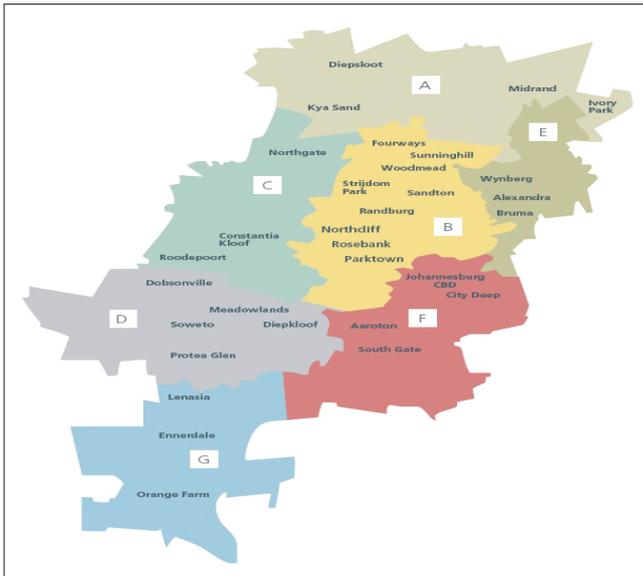


Fig. 1. The seven regions of the City of Johannesburg.

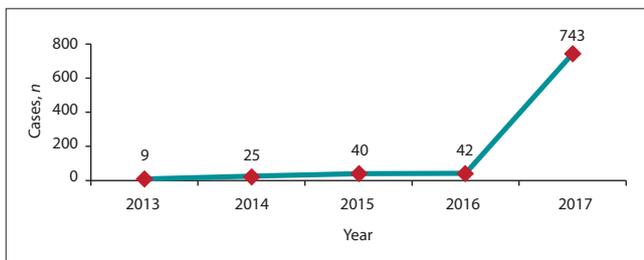


Fig. 2. Laboratory-confirmed listeriosis cases in South Africa, 1 January 2013 - 31 December 2017.

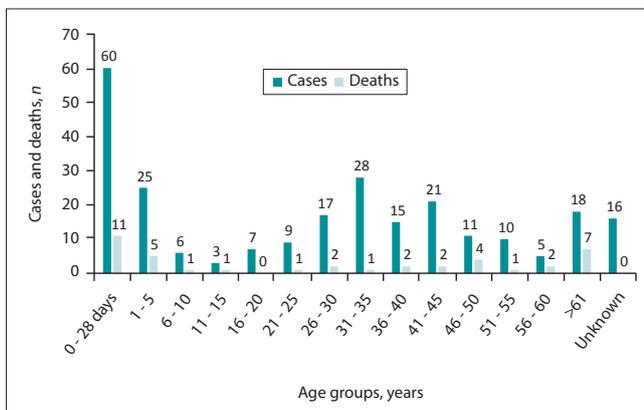


Fig. 3. Age breakdown of laboratory-confirmed listeriosis cases and deaths in the City of Johannesburg, 1 January 2017 - 28 February 2018.

To date, the CoJ has had a total of 251 cases (26% of total cases), an incidence of 51 cases per 1 million, and a case fatality rate of 15%. The age breakdown of listeriosis cases in the CoJ is described in Fig. 3. The figure shows that taken together, the age group 15 - 49 is the most badly affected, followed by neonates >28 days old.

These cases were spread across the seven regions as shown in Table 1, and hospitals as shown in Table 2.

An outbreak response team was activated in the CoJ. A detailed outbreak preparedness and response plan to prevent listeriosis and promote good hygiene was developed (Table 3), which included the following:

- prevention and health promotion activities, focusing on the following target groups: community; food premises/food handlers; and health workers
- development of pamphlets and posters, and distribution of frequently asked question (FAQ) documents
- briefing sessions for environmental health practitioners and professional nurses, conducted on 12 December 2017
- training of environmental health practitioners on 1 February 2018
- food samples taken from different food stores and outlets in the city by environmental health practitioners.

The prevention and health promotion activities emphasised the fact that the main preventive measure is to always ensure that good basic hygiene is followed. This includes:

Table 1. Listeriosis cases and deaths per CoJ region, 1 January 2017 to 28 March 2018

Region	Cases, n	Deaths, n
A	14	1
B	17	4
C	10	1
D	60	12
E	8	1
F	29	9
G	16	4
Unknown	97	8
Total	251	40

CoJ = City of Johannesburg

Table 2. Listeriosis deaths per hospital

Hospital	Deaths, n
Life Carstenhof Clinic	1
Charlotte Maxeke Johannesburg Academic Hospital	5
Chris Hani Baragwanath Hospital	17
Helen Joseph Hospital/Coronation Hospital/Rahima	9
Moosa Mother And Child Hospital	
Life Healthcare Brenthurst Clinic	1
Life Healthcare Flora	2
Netcare Milpark Hospital	2
Netcare Olivedale Hospital	1
Zola Jabulani District Hospital	2
Total	40



Table 3. Listeria outbreak response plan for prevention and hygiene promotion, December 2017 - ongoing

Area/ward	Activity	Target group	Responsible party	Required resources	Outcomes
All regions	Give briefing on listeriosis; provide FAQ document; distribute listeriosis guidelines and information material; give presentations on listeriosis; email information to GPs	All CoJ healthcare facility staff members; NGOs/CBOs/FBOs; traditional/faith healers	EHPs; surveillance officers; CoJ outbreak response team; health promoters; epidemic preparedness operations managers	Updated guidelines; FAQ document; pamphlets	Stakeholder alert; informed stakeholders; well-managed suspected listeriosis cases; referrals done in time
Formal and informal settlements (including suburbs) taxi ranks; bus stations; Park Station	Social mobilisation; health education to informal and formal food handlers; door-to-door household visits giving information to communities; distribution of information material; communication (media, radio and newspapers)	Community in informal settlements; community at large	CoJ and Gauteng Province; Departments of Environmental Health and Health Promotion; WBOTs	Pamphlets; posters; loudhailers; health promotion vehicle; press releases	Creating awareness; well-informed community; reduced number of listeriosis cases; healthy community
Farms	Education to farm owners and workers on listeriosis	Farm owners and workers	EHPs	Information material	Informed farm owners and workers; reduced food contamination at farm level
Health facilities, regional and central offices	Line listing of any suspected cases; follow-up on old and new cases reported; health talks on listeriosis; distribution of health information material	Community at large	Clinic nurses; CoJ outbreak team; health promoters	Case investigation form; information material	Well-investigated cases; well-informed community; reduced number of listeriosis cases
Communication	Conduct radio talks; draft newspaper statements; Jozinet stories; CoJ messages	Various media platforms	Communications officer	Information, facts and figures on listeriosis	Well-informed audience

FAQ = frequently asked question; GP = general practitioner; NGO = non-governmental organisation; CBO = community-based organisation; FBO = faith-based organisation; EHP = environmental health practitioner; CoJ = City of Johannesburg; WBOT = ward-based outreach team; Jozinet = CoJ website.

- using only pasteurised dairy products
- separating raw and cooked food, and thoroughly cooking raw foods from animal sources, such as beef, pork or poultry
- keeping food at safe temperatures
- using safe water and raw materials
- washing hands before preparing food, before eating and after going to the toilet
- washing and decontaminating kitchen surfaces and utensils regularly, particularly after preparing raw meat, poultry and eggs, including in industrial kitchens
- washing raw vegetables and fruit thoroughly before eating.

Those at high risk of listeriosis were advised to avoid the following foods:

- raw or unpasteurised milk, or dairy products that contain unpasteurised milk
- soft cheeses (e.g. feta, goat's milk, brie)
- foods from delicatessen counters (e.g. prepared salads, cold meats) that have not been heated/reheated adequately
- refrigerated pâtés.

Conclusion

The CoJ is committed to continue the management and control of listeriosis according to the National Department of Health communicable disease guidelines and surveillance policy, which includes the provision and management of primary healthcare to all patients presenting with suspected listeriosis at facilities, and conducting regular preventive and promotive activities/measures to create community awareness.

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