



Australian Government
Department of Health

COMMUNICABLE DISEASES INTELLIGENCE

2019 Volume 43
<https://doi.org/10.33321/cdi.2019.43.38>

Experimenting at Uni: *Salmonella* in laboratory students

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Communicable Diseases Intelligence

ISSN: 2209-6051 Online

This journal is indexed by Index Medicus and Medline.

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Communicable Diseases Intelligence (CDI) is a peer-reviewed scientific journal published by the Office of Health Protection, Department of Health. The journal aims to disseminate information on the epidemiology, surveillance, prevention and control of communicable diseases of relevance to Australia.

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Short report

Experimenting at Uni: *Salmonella* in laboratory students

Timothy S. Sloan-Gardner

Case Report

Laboratory-acquired infections are generally considered a potential hazard for those employed in microbiology and pathology laboratories.¹⁻³ However, outbreaks associated with teaching laboratories overseas highlight the risks for students working with bacterial pathogens.⁴⁻⁶

This article describes the first two known cases of non-typhoidal salmonellosis acquired from a university teaching laboratory in Canberra, Australian Capital Territory (ACT), Australia. Ethics approval was not sought for this investigation as the data were collected for the purpose of public health surveillance.⁷

Keywords: salmonellosis, laboratory-acquired, case study, public health.

Case 1

A 20-year-old female presented to the emergency department with a three-day history of vomiting, abdominal cramps and watery diarrhoea. She was admitted to hospital and treated with intravenous fluids and oral antibiotics. The patient's symptoms improved and she was discharged after two days.

A faecal sample collected on the day of admission was examined for a range of pathogens by ACT Pathology at the Canberra Hospital, Garran, Australian Capital Territory. Standard bacterial cultures were set up to test for the presence of *Salmonella*, *Campylobacter* and *Shigella*; antigen tests were conducted for rotavirus and norovirus, and direct microscopy was performed for parasites.

The stool sample was culture positive for *Salmonella enterica*. The sample was sent for further typing to the Microbiological Diagnostic Unit Public Health Laboratory (MDU) in Melbourne, Victoria. The isolate was typed as serovar Typhimurium, with a multiple-locus

variable-number tandem repeat analysis (MLVA) pattern of 04-16-07-00-517. This pattern had not been seen before in the ACT.

The case reported consumption of chicken and eggs in the week before the onset of symptoms, as well as contact with animals (cat and turtle). None of the case's friends or family members had been ill recently nor had the case travelled outside of Canberra. The case did participate in an undergraduate microbiological course at a university in Canberra in the two weeks prior to symptom onset. The case's stool was still positive for *S. Typhimurium* MLVA pattern 04-16-07-00-517 two months after initial symptom onset.

Case 2

A 20-year-old male presented to the emergency department almost two months after the first case, with a five-day history of abdominal pain, bloody diarrhoea and nausea. The case was admitted to hospital and treated with intravenous fluids and oral antibiotics. The patient's symptoms improved and he was discharged after five days.

A stool sample collected on the day of admission for the second case was also positive for *S. Typhimurium* MLVA pattern 04-16-07-00-517.

The second case reported consumption of chicken and eggs in the week before the onset of symptoms, though no contact with animals. None of the case's friends or family members had been ill recently nor had the case travelled outside of Canberra. The second case was in a later cohort of the same undergraduate microbiological course as Case 1.

Investigation

Whilst both cases attended the same course, they were in separate classes which used the same teaching laboratory. Additionally the cases were not known to each other; consequently, person-to-person transmission between the cases was thought unlikely.

In the course, students undertook routine bacterial culture and biochemical identification of *Salmonella*, *Shigella*, *Escherichia coli* and *Staphylococcus aureus* cultures. The seed stocks for these organisms had been in the university for a number of years and their exact type/sub-type was unknown.

The university provided a sample of the *Salmonella* used in the course for typing, which matched the two cases; *S. Typhimurium* MLVA pattern 04-16-07-00-517.

Whilst the convenors had undertaken a risk assessment for the course, a review identified some deficiencies which were later addressed. These included:

- As part of the course, the students received laboratory safety information and a presentation. Whilst students were only required to wear gloves if they had unhealed cuts or abrasions on their hands and were instructed to practise appropriate microbial techniques, there was no direct observation of appropriate hand washing during or upon leaving the laboratory.

- Students were not restricted, merely discouraged, from bringing any personal equipment (e.g. mobile phones, books, pens) into the laboratory.
- There was a need for a new non-pathogenic strain of *Salmonella* for use in future classes.

Discussion

Whilst both cases had reported consumption of chicken and eggs prior to their illness, there was no link in location nor brands.

This case report highlights the need to take into account non-traditional exposures when investigating novel *Salmonella* Typhimurium subtypes. It also adds to the evidence of the risk of laboratory-acquired infections in teaching laboratories. Whilst the university had undertaken a risk assessment for the course and students were provided with safety instructions, the lack of restrictions on students bringing their personal belongings into the laboratory likely facilitated exposure to the pathogens being tested. Universities should review current risk assessments to mitigate the chances of laboratory-acquired infections occurring in teaching laboratories.

Acknowledgements

The authors acknowledge the following persons and organisations for their assistance with the investigation: Deborah Denehy and staff at the ACT Government Analytical Laboratory; staff at ACT Pathology, The Canberra Hospital; Mary Valcanis and staff at the Microbiological Diagnostic Unit, Melbourne, Victoria; and staff at the unnamed university

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