

# CAMPYLOBACTER OUTBREAKS ASSOCIATED WITH POULTRY LIVER DISHES

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## Introduction

*Campylobacter* is a frequent contaminant of poultry liver. The bacteria can often be found throughout liver tissues and may survive brief frying. Two recent microbiological surveys of raw poultry liver in New Zealand identified *Campylobacter* on the surface of 98% and 100% of livers sampled, and isolated *Campylobacter* from within liver tissues in 76% and 90% of samples.<sup>1,2</sup> Cooking liver to achieve an internal temperature of between 70 and 80 degrees Celsius for at least 2 minutes was required to inactivate *Campylobacter*.<sup>2</sup>

The Health Protection Agency in the United Kingdom recently reported a significant increase in *Campylobacter* outbreaks associated with poultry liver dishes in the United Kingdom and attributed this to deliberate undercooking.<sup>3,4</sup> The United Kingdom Food Standards Agency issued advice to caterers on the safe handling and cooking of livers in 2010, recommending that livers be cooked thoroughly until steaming hot all the way through, to reach a core temperature of 70 degrees Celsius for 2 minutes or equivalent.<sup>5,6</sup> An update in December 2011 recommended that 'chefs thoroughly cook chicken livers fully to kill any bacteria, until there is no pinkness left in the centre'.<sup>7</sup>

## Australian outbreaks

*Campylobacter* outbreaks associated with poultry liver dishes have not been commonly recognised in Australia but have increased in frequency in recent years.

A review of the OzFoodNet outbreak register identified seven such outbreaks in Australia since 2000, with six of these occurring since 2008 (Table).

Only outbreaks in which a poultry liver food item could be clearly identified are included in this report and it is possible that there were additional associated outbreaks. For example, poultry liver pate may be an ingredient in dishes such as Asian-style pork and chicken rolls. These items have been implicated in *Campylobacter* outbreaks during this period, but poultry liver pate was not specifically identified as the food vehicle for any of these.

The identification of *Campylobacter* outbreaks in general is also constrained by the lack of an effective typing system for this pathogen. In addition, *Campylobacter* is not notifiable in New South Wales.

*Campylobacter* outbreaks associated with poultry liver dishes have occurred in five Australian states since 2000. All outbreaks implicated commercial food venues with either chicken (5) or duck (2) liver dishes prepared on site. The 2 outbreaks reported in Tasmania involved functions at the same venue serving the same menu 2 days apart. A relative risk for the combined cohort is provided in the Table.

A poultry liver dish was implicated by an analytic epidemiological investigation for 5 outbreaks and the descriptive epidemiology was supportive for the other two. The liver dishes were often consumed or discarded prior to an investigation and *Campylobacter* was not identified in samples of the implicated food item for any outbreak. In the 2011 outbreak in Western Australia, *Campylobacter* was isolated from a subsequent batch of raw duck liver from the same supplier.

Inadequate cooking of poultry liver dishes was likely a significant contributing factor to these outbreaks. Temperature monitoring was only described for one venue (Western Australia 2011) and the cooking times and temperatures were inadequate to achieve a core temperature sufficient to inactivate *Campylobacter* reliably. Inadequate cooking was suspected by investigators for a further 4 outbreaks and cooking details were not available for the remaining two.

## Conclusion

A recent increase in *Campylobacter* outbreaks associated with poultry liver dishes in Australia and the United Kingdom has highlighted potential food-borne illness risks if these dishes are undercooked.

There is a need to develop and promote Australian guidelines for the safe preparation of poultry liver dishes.

## Acknowledgement

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**Table: *Campylobacter* outbreaks associated with poultry liver dishes, Australia, 2000 to 2011**

Year	State	Cases		Setting	Suspected food vehicle	Epidemiological investigation RR/OR (95% CI) <sup>†</sup>	Environmental investigation
		Total	Confirmed*				
2001	Qld	2	2	Restaurant	Pan-fried duck liver		Under-cooked duck liver reported
2008	Qld	4	2	Restaurant	Chicken liver pâté	4/6 diners ate pâté, all 4 developed gastroenteritis	No food samples collected
2009	Tas	35	7	Restaurant	Chicken liver parfait	Combined cohort RR 5.2 (2.4–11.3)	Inadequate cooking of livers suspected. Livers lightly pan-fried, leaving pink centres. Parfait samples negative for <i>Campylobacter</i> .
2009	Tas	9	0	Restaurant			
2010	SA	9	1	Restaurant	Chicken liver pâté/steak	RR 6.7 (1.7–26.3)	Cooking procedure not described in detail. Food samples negative, pâté not sampled.
2011	NSW	11	2	Restaurant	Chicken liver pâté	RR 6.9 (1.0–45.4)	Cooked whole until liver surface was brown, liver temperature not monitored. Pâté from a subsequent batch negative for <i>Campylobacter</i> and <i>Salmonella</i> .
2011	WA	67	6	Function centre	Duck liver parfait	OR 13.0 (1.9–91.5)	Parfait made from duck liver. Oven baked to core temperature of 60°C. Raw duck liver from a subsequent batch positive for <i>Campylobacter</i> .

\* Confirmed *Campylobacter* infection.

† RR: Relative risk, OR: Odds ratio, 95% CI: 95% confidence interval.

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