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Two Outbreaks Caused by *Salmonella* Derby and *S. Anatum* at Grilled-Meat Restaurants in Fukuoka City

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Salmonella spp. are often found in the intestinal tracts of domestic animals. During slaughtering and meat processing, *Salmonella* may contaminate carcasses and meats. In Japan, raw and inadequately cooked animal meat, especially sashimi of raw meat, lightly roasted meat, and raw liver, is the source of *Salmonella* food poisoning. Here we describe two *Salmonella* outbreaks that occurred at grilled-meat restaurants in Fukuoka City, Japan.

On 9 August 2005, a local health and welfare center in Fukuoka City received a report that many students of a junior high school exhibited food poisoning symptoms. An investigation by the health and welfare center revealed that a total of 44 persons (39 students of the school tennis club, 4 parents and 1 school personnel) ate grilled meat at a grilled-meat restaurant on 3 August. Among them, 16 students

developed symptoms, 7 students consulted physicians and *Salmonella* strains were isolated from 2 of these 7 students by stool examination at a clinical laboratory.

The median incubation period was 28 h (range, 3-86 h) and the predominant symptoms were diarrhea, stomachache and fever. Stool samples collected from 7 students and 3 employees of the restaurant, 5 swab samples of the restaurant and 2 *Salmonella* strains from the clinical laboratory were examined by our Institute. Seven isolates from all 7 students and the 2 strains above were identified as *Salmonella* Derby.

The restaurant served an all-you-can-eat smorgasbord consisting of raw meat (beef, pork, seasoned pork, seasoned chicken), intestines, wieners, squid, fried chicken, fried potato, Korean pizza ("Tijimi"), boiled green soybeans, cabbage, tomatoes and rice. From the testimony of the students, it turned out that they grilled the raw meat without using tongs or long chopsticks for cooking, instead using their own chopsticks, and then ate the meat, which was inadequately cooked. It is thought that insufficient heating of the meat or

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oral infection through chopsticks for eating was a cause in this food poisoning.

On 5 October 2005, a local health and welfare center in Fukuoka City received another report that 2 patients exhibited food poisoning symptoms, and *Salmonella* strains were isolated by stool examination of a clinical laboratory. An investigation by the health and welfare center revealed that of 7 employees of a company who ate grilled meat at a grilled-meat restaurant on 30 September, all exhibited food poisoning symptoms and 5 consulted physicians. The common food of the patients was the meal at the grilled-meat restaurant; the menus were grilled meat (beef, intestines, chicken and gristle), grilled sea food (prawn, squid and scallop), sashimi of raw horse liver, sashimi of lightly roasted chicken, boiled chicken intestines seasoned with vinegar, stew of intestines, salad, pickles, rice and sherbet.

The median incubation period was 18 h (range, 13-27 h) and the predominant symptoms were the same as in the above-mentioned outbreak. Stool samples collected from 5 patients and 11 employees of the restaurant, 7 swab samples of the restaurant and 2 *Salmonella* strains from the clinical laboratory were examined. Isolates from 4 patients and 1 employee, and the 2 strains above were identified as *Salmonella* Anatum. The employees who were carriers of *S. Anatum* ate the same meal that the patients ate. *S. Anatum* is sometimes isolated from chicken in our food inspection. Therefore, the sashimi of lightly roasted chicken was suspected of being the causal food.

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