

Laboratory and Epidemiology Communications

Universal Questionnaire Needed for Investigations of Diffuse Outbreaks of Enterohemorrhagic *Escherichia coli* in Japan

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Communicated by Haruo Watanabe

(Accepted December 5, 2001)

Recent progress in molecular epidemiology has enhanced the efficiency of public health measures. The pulsed-field gel electrophoresis (PFGE) technique, for example, has played a crucial role in epidemiological investigation of infectious diseases (1). Based upon the unique characteristics of *Escherichia coli*, whose DNA profile changes within a short period of time, applying PFGE to a cross sectional study is a powerful tool for etiological investigation of outbreaks of disease induced by this pathogen (2). A PFGE database for enterohemorrhagic *Escherichia coli* (EHEC) was thus established in Japan in 1999. This database is maintained by the Department of Bacteriology, National Institute of Infectious Diseases (NIID), and data results are routinely shared using the computer network, called "Pulse-net", among prefectural public health laboratories in the country (3).

From March to April 2001, several clusters of diarrhea patients infected with EHEC O157:H7 were reported from Chiba, Saitama, Tokyo, and Kanagawa Prefectures. Although these cases appeared to be epidemiologically unlinked, Pulse-net data indicated that they were identical in PFGE pattern. The collaboration of public health physicians from the Prefectures, with the assistance of field epidemiologists in NIID, lead to the conclusion that the outbreak was caused by contaminated roast beef manufactured in Tochigi Prefecture where no case was reported (4). Meanwhile, in another diffuse outbreak in June 2001 caused by EHEC probably of common origin (suggested by the same PFGE pattern), no implicated food was identified by active field investigation (5). This failure was caused mainly by the difficulties in obtaining accurate and precise information regarding the food items consumed and the possible neglect of human-to-human transmission.

In the United States (U.S.), Centers for Disease Control and Prevention (CDC) has developed a universal questionnaire for multi-State field epidemiological investigations, in order to standardize interviews regarding diffuse EHEC outbreaks. The questionnaire focuses on a variety of foods which are commonly consumed in the country, and/or have often been

implicated in past EHEC outbreaks. Interviews using universal questionnaires is found to be highly effective when PFGE results are matched but the source of infection otherwise remains unknown (personal communication with Rob Tauxe, CDC). The universal questionnaire has been developed and revised for other infectious pathogens including *Bacillus cereus*, *Campylobacter*, *Salmonella* and so on (it is available with the full text of this article at http://www.cdc.gov/ncidod/dbmd/outbreak/stand_qu.htm)(6).

Introducing the U.S. questionnaire without revision to Japanese settings will be of limited value since the queried food items are occasionally inappropriate. We recognize the necessity of making two major modifications to the list of food items in the present questionnaire. First, we have to replace the uncommon food items with those common to Japanese cuisine. Next, we have to add food items which have been implicated in past EHEC outbreaks in Japan.

The list of identified foods implicated in EHEC outbreaks in the past 10 years in Japan (Fig. 1; published in Infectious Agents Surveillance Report (IASR) and Japan Centra Revuo Medicina) indicates that the EHEC outbreaks are induced by variety of non-beef items including fruits, vegetables, and even sea foods. The brevity of the list indicates that identifying the items implicated in EHEC outbreaks was highly difficult. Field investigation enhanced by using the integrated universal questionnaire and PFGE DNA typing will make the investigation of diffuse EHEC outbreaks more efficient and more thorough.

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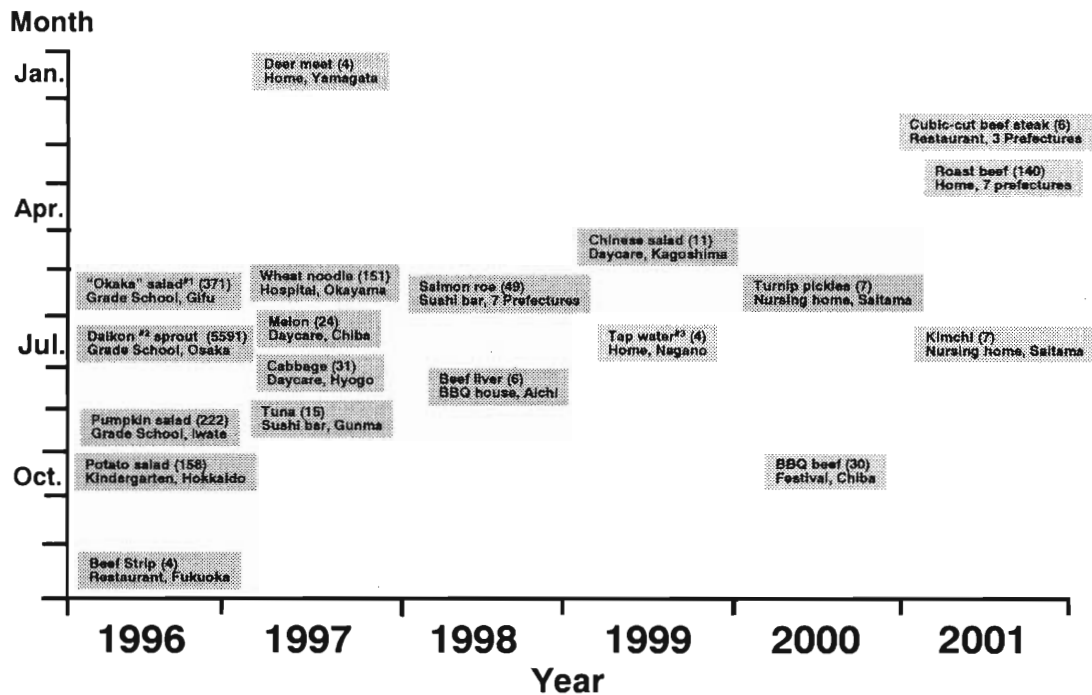


Fig. 1. Food items implicated in EHEC outbreaks in Japan, 1996-2001

Each rectangle indicates the implicated food, (number of cases), setting, and Prefecture where each incidence was recognized. Position of the rectangle shows the month and year of the incidence.

^{#1} Salad flavored with dried bonito flake.

^{#2} Japanese radish.

^{#3} Water supplied by a private water system for a limited neighborhood.

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