

Cabinet Office Food Safety Commission
General Food Safety Report for Fiscal Year ending March 31, 2004

**Report on the gathering and dissemination of
information relating to food safety incidents
occurring within Japan
(Report on diarrhea outbreak among school children
in Sakai City)**

March 2004

Gyosei Corporation

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Notes on how to read this report

Regarding terminology for enterohemorrhagic *Escherichia coli* O157

The Ministry of Health and Welfare's 85th *Eishoku* food hygiene advisory issued on March, 24, 1997, entitled "Measures for responding to large-scale food poisoning" stated that enterohemorrhagic *Escherichia coli* bacillus would henceforward be referred to as entero-hemorrhagic *E. coli* bacillus. Quotes and references in this report follow the terminology used at the time of writing, and as such both appellations are used herein. Note also, that some references and quotations may use the older terminology even if they were published after March 24, 1997.

Names of cities, towns and villages reflect the names in use at the time the reference concerned was written.

Names of government ministries which have changed as a result of reorganizations reflect the names in use at the time the reference concerned was written. (Ministry of Health and Welfare - Ministry of Health, Labor and Welfare)

The various figures in this report are based of those published by public organizations including the central government, prefectural governments, and local municipal authorities.

**Diarrhea outbreak among school
children in Sakai City**

Chapter 1 Enterohemorrhagic Escherichia coli O157 and past food poisoning outbreaks

1. About enterohemorrhagic Escherichia coli O157

(1) What is enterohemorrhagic Escherichia coli O157?

Food poisoning caused by enterohemorrhagic Escherichia coli O157 leads to bloody stools and severe diarrhea, and is therefore officially referred to as enterohemorrhagic Escherichia coli O157. Enterohemorrhagic Escherichia coli O157 is extremely dangerous, producing verotoxins and sometimes causing hemolytic-uremic syndrome (HUS). There are over hundreds of varieties of the bacillus caused by variations in the O-antigens from the cell wall and the H-antigens from the flagella. The bacillus found in the Sakai City case was enterohemorrhagic Escherichia coli O157:H7, meaning that it contains the 157th O-antigen discovered and the 7th H antigen. The bacillus is stick-shaped, around 0.002 millimeters in length, and around 0.001 millimeters in width.

(2) The characteristics of enterohemorrhagic Escherichia coli O157

Enterohemorrhagic Escherichia coli O157 is one of the most contagious food poisoning agents. For example, in the case of vibrio parahaemolyticus and salmonella, one has to ingest from over 100,000 to over 1 million cells for illness to develop. However, with enterohemorrhagic Escherichia coli O157, symptoms can develop having ingested as few as 100 cells. Secondly, because of its extremely contagious nature, secondary person to person infection is also thought to occur. Infection is possible through contact with infected feces or urine.

Furthermore, while most food poisoning agents such as vibrio parahaemolyticus, salmonella and staphylococcus aureus have incubation periods which, at most, do not exceed two days. enterohemorrhagic Escherichia coli O157 has, by comparison, an extremely long incubation period of four to eight days. Therefore, it is extremely difficult to identify the contaminated food or other source in the case of illnesses caused by enterohemorrhagic Escherichia coli O157.

As with other food poisoning agents, the majority of outbreaks tend to be concentrated in the June to October period when the temperature is high. However, enterohemorrhagic Escherichia coli O157 cases can also occur at any other time of year, and have been confirmed during winter. Therefore constant vigilance is necessary.

However, as with other food poisoning agents, enterohemorrhagic Escherichia coli O157 is heat intolerant, and can be destroyed through normal disinfecting procedures

such as heating, cationic soap and alcohol. Therefore, it can be dealt with through standard prevention procedures.

2. Past food poisoning outbreaks involving enterohemorrhagic Escherichia coli O157

(1) Enterohemorrhagic Escherichia coli O157 incidents occurring overseas.

As examples of enterohemorrhagic Escherichia coli O157 food poisoning outbreaks overseas, we can examine the food poisonings that occurred in Oregon, U.S., from February through March 1982, and in Michigan from May to June of the same year.

In the prior case, there were 26 patients, including 19 who were hospitalized. The source of contamination was identified as a particular hamburger restaurant chain, and enterohemorrhagic Escherichia coli O157 was found in that restaurant's food products. In the latter case, there were 21 patients, including 14 who were hospitalized. E. coli O157 was detected from the stools of 6 of the 14 hospitalized patients. enterohemorrhagic Escherichia coli O157 was detected in hamburger mince, and this second incident was also classified as a case of enterohemorrhagic Escherichia coli O157 poisoning.

(2) E. coli O157 outbreaks occurring in Japan

In January 1985, following the occurrence in the United States of the above food poisoning cases, stools from Japanese diarrhea patients which had been kept in storage were tested for E. coli O157. The first confirmed case is believed to be the enterohemorrhagic Escherichia coli O157:H7 found in the stools of brothers who fell ill in August 1984.

Since 1984, various unconnected outbreaks of enterohemorrhagic Escherichia coli O157 have been reported. However, in October 1990, several children from the Shirasagi Kindergarten in Urawa City began to complain of stomach pains, diarrhea, and fever. Subsequently, a four-year old and a six-year old died as a result of acute encephalitis brought on by HUS. This incident was the first large-scale enterohemorrhagic Escherichia coli O157 outbreak in Japan.

At first, the cause of the outbreak was thought to be food poisoning. However, an investigation by the Saitama Prefectural Department of Public Health found enterohemorrhagic Escherichia coli O157 in a well for drinking water. Further investigation found cracks in the kindergarten's septic tank. It was concluded that contaminated water from the tank had leaked into the well, and then been ingested.

The outbreak affected not just the children, but also their families and faculty

members at the kindergarten. The final number of patients rose to 319. This was because on October 10th, the kindergarten had held its sports festival, and large numbers of people, including the children’s parents and other persons concerned visited and drank from the contaminated well.

(3) Subsequent incidents of enterohemorrhagic Escherichia coli O157 food poisoning in Japan

After this first large-scale outbreak described above, other diarrhea outbreaks caused by enterohemorrhagic Escherichia coli O157 began to occur. The following year (1991), in April, 161 people fell ill at a child care center in Osaka City. In April 1992, 11 people fell ill after an outbreak at a child care center in Karatsu City, Saga Prefecture. Up to and including a September 1994 food poisoning outbreak at an elementary school in Miyake Town, Nara Prefecture, in which 250 people fell ill, a series of incidents resulted in a total of 1,275 patients, and three deaths, as shown in the chart below.

Chart 1: Outbreaks of diarrhea caused by enterohemorrhagic Escherichia coli O157 between 1990 and 1994

	Date	Location	Number of patients
1	October 1990	Saitama Pref.	319 (2 deaths)
2	April 1991	Osaka	161
3	April 1991	Niigata Pref.	234
4	June 1991	Tokyo	89
5	April 1992	Saga Pref.	11
6	June 1993	Tokyo	165
7	August 1993	Tokyo	40
8	June 1994	Tokyo	3
9	June 1994	Hiroshima Pref.	3 (1 death)
10	September 1994	Nara Pref.	250
	Total		1,275 (3 deaths)

(4) Enterohemorrhagic Escherichia coli O157 incidents in 1996

In 1996, outbreaks of diarrhea caused by enterohemorrhagic Escherichia coli O157, which had previously been only sporadic, began to occur across the whole of Japan. The first food poisoning outbreak in this year was at a kindergarten and an elementary school in Oku Town, Okayama Prefecture. Seven children complaining of diarrhea and stomach pains were hospitalized. Tests revealed the presence of enterohemorrhagic Escherichia coli O157. Including cases of secondary transmission, a total of 416 people fell ill and two young girls died, one on June 1st and one on June 5th. Investigations found that the joint facility for preparing meals, which were supplied to the schools,

cooked meals in six batches. Students who fell ill were concentrated among those who ate the third and fourth batches. The ingredients and cooking methods used for these batches were identified as the cause of the poisoning.

Chart 2 : Outbreaks of diarrhea caused by enterohemorrhagic Escherichia coli O157 in 1996

Prefecture	No. of persons with symptoms	Prefecture	No. of persons with symptoms
Hokkaido	136	Shiga	22
Aomori	6	Kyoto	94 (1)
Iwate	138	Osaka	6,218 (4)
Miyagi	9	Hyogo	139
Akita	4	Nara	68 (1)
Yamagata	10 (1)	Wakayama	41
Fukushima	11	Tottori	6
Ibaraki	7	Shimane	7
Tochigi	2	Okayama	871 (2)
Gunma	142	Hiroshima	206
Saitama	40	Yamaguchi	18
Chiba	41 (1)	Tokushima	6
Tokyo	283	Kagawa	28
Kanagawa	72 (1)	Ehime	4
Niigata	2	Kochi	8
Toyama	19	Fukuoka	124
Ishikawa	17	Saga	22
Fukui	9	Nagasaki	21
Yamanashi	2	Kumamoto	15
Nagano	17	Oita	8
Gifu	403	Miyazaki	10
Shizuoka	19	Kagoshima	11
Aichi	80 (1)	Okinawa	6
Mie	29	Total	9,451(12)

*Figures in brackets indicate the number of fatalities

*Figures indicate the number of person suffering from symptoms as a result of enterohemorrhagic Escherichia coli O157, or found to be carrying enterohemorrhagic Escherichia coli O157

As shown in the chart above, other incidents involving enterohemorrhagic Escherichia coli O157 in 1996 resulted in the deaths of an 80-year old woman in Obanzawa City in Yamagata Prefecture, a second-year elementary school student in Nagoya City, Aichi Prefecture, a 59-year old woman in Yamatotakada City in Nara

Prefecture, and a 56-year old man in Kyoto City, Kyoto. Further fatalities occurred in Chiba City, Chiba Prefecture, and Ashigarakami County in Kanagawa Prefecture. Including the fatalities from the diarrhea outbreak among elementary school students in Sakai City, a total of 12 lives were lost during the year.

Chapter 2 Summary of diarrhea outbreak among school children in Sakai City

From June 1996 onwards, starting with an incident in Oku Town, Okayama Prefecture, frequent outbreaks of enterohemorrhagic *Escherichia coli* O157 poisoning occurred including incidents in Setagaya Ward, Meguro Ward and Itabashi Ward in Tokyo, Nagoya City in Aichi Prefecture, Fukuoka City in Fukuoka Prefecture, and Gifu City in Gifu Prefecture. It was at this time that the outbreak of diarrhea among elementary school children in Sakai City occurred. This was a rare example of a very large-scale outbreak, which resulted in 9,523 patients, of whom 3 lost their lives.

1. Incident summary

(1) Background

At 10:00 am on July 13th (Saturday), the Sanitation Department of Sakai City's Environmental Health Bureau received notification from Sakai Municipal Hospital that the past night they had treated 10 elementary school students for symptoms including diarrhea and bloody stools. As the day progressed, the Health Center began to receive similar reports from other medical institutions, prompting the Center to start an immediate enquiry.

On the following day (14th), enterohemorrhagic *Escherichia coli* O157 was found in the stools of 26 of those exhibiting symptoms. After conducting various tests, the cause of the problem was found to be enterohemorrhagic *Escherichia coli* O157 bacillus infection from elementary school meals.

(2) Number of patients

There were 12,680 patients treated at medical institutions, 14,153 patients exhibited symptoms, and 2,764 people were found to have bacteria in their stools for a cumulative total of 29,597 people.

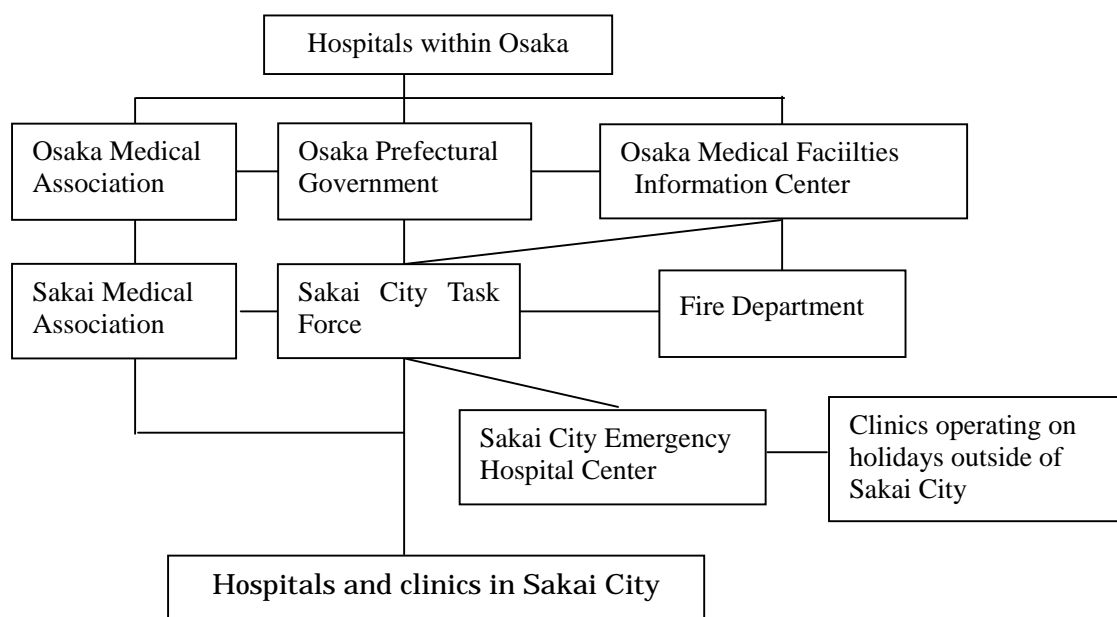
Among residents of Sakai City, 7,936 elementary school students and staff, 1,180 members of students' and staffs' families, and 376 other residents were confirmed as having been infected by the enterohemorrhagic *Escherichia coli* O157 originating from the school meals. Among non-residents of Sakai City, there were 31 confirmed cases, comprised of 3 elementary school students, 27 teaching staff, and one other person. As such the total number of infected persons among residents and non-residents of Sakai City was 9,523.

(3) Organizational framework

After the outbreak, Sakai City immediately set up a special task force led by the Director of the Environmental Health Bureau. However, as the number of patients continued to rise in the days following, and the situation became more serious, the mayor became director of the task force. The Director of the Environmental Health Bureau became one of five Deputy Directors of the Task Force, together with the Deputy Mayor, the Education Superintendent and the Deputy Education Superintendent, the Director general of the Environmental Health Bureau and the Director of Sakai Hospital. Sixteen General Managers in the relevant fields were placed under the supervision of the five Deputy Directors, thus establishing a system that encompassed all related organizations.

Furthermore, as the situation became increasingly more serious and it became difficult to find hospital beds for all the patients, the task force worked to coordinate various organizations, and asked the Osaka Prefectural Government, the Osaka Medical Association, the Osaka Medical Facilities Information Center, the Sakai Medical Association and hospitals within Sakai City for their full cooperation in dealing with the outbreak. A coordinated network, as shown in Fig. 1 below, was established, allowing patients to be treated 24 hours a day, including on holidays.

Fig. 1: Cooperation between medical institutions



(4) Investigation into the cause of the poisoning

Through cooperation between the Ministry of Health and Welfare, Osaka Prefectural Government and Sakai City, investigations were carried out from a number of standpoints, including: an analysis of food poisonings by district and by school; an analysis of those affected by food poisonings, principally elementary school students and staff; an analysis of hospitalized patients centering on their date of admission and what food they had and had not ingested; interviews concerning menus, systems, transportation, and cooking methods for school meals; analyses of the onset of symptoms for those who sampled the food, and other information related to eating behavior.

Attempts to find the source of the enterohemorrhagic *Escherichia coli* O157 were made by examining the results of the various investigations.

1) Presumed cause of the outbreak

From the circumstances surrounding the outbreak, at first the cause was thought likely to be contaminated tap water or school meals. However, the possibility of the former was deemed to be low because the Prefectural Water Board supplies water to all areas of the city with no major works carried out on the water system at the beginning of July, and because tests for residual chloride concentrations did not show any abnormalities.

On the other hand, an analysis of people showing symptoms, patients examined by doctors, and patients admitted to hospital, showed that those from areas which shared the same school meal menu showed similarities in the degree and timing of their illness. Furthermore, an examination of the DNA of the enterohemorrhagic *Escherichia coli* O157 found in the stools of those showing symptoms in the Central and South District, and North and East District, showed that there was a high possibility that the infections were due to a common source. This led investigators to consider that school meals might be the source of the problem.

Based on this supposition, examinations of the school meal menu began.

2) Examination of school meal menu

Investigations into what meals hospitalized patients had eaten, and into the school attendance records of those showing symptoms, showed that it was very likely that the contaminated meal was served on July 9th in the Central and South District, and on July 8th in the North and East District. These results, combined with the results of investigations into the food served in each district, suggested that the most likely source

of the contamination was cooled noodles and milk served on July 9th in the Central and South District, and chicken and lettuce marinated in sweet vinegar and milk served on July 8th in the North and East District. (Refer to Chart 2).

3) Possibility of contaminated food ingredients

The possibility that the school meal ingredients on both these days were contaminated was investigated from three angles. The first of these was production, processing and distribution processes. However, enterohemorrhagic Escherichia coli O157 was not found in any of the meat and vegetable ingredients. The second possibility was contamination during the transportation of the ingredients. However, enterohemorrhagic Escherichia coli O157 was not found in examinations of the vehicles used to transport the ingredients. The third major possibility was that contamination had occurred during the preparation of the food. However, there appeared to be no serious problems in the way the food was handled. Furthermore, each school cooked the food according to their own methods, and as 47 schools were simultaneously affected by the outbreak, it was difficult to believe that the cause lay in the cooking facilities at individual schools.

4) Identifying ingredients

Therefore suspicion grew that there was a problem with the actual ingredients, and further tests were carried out on the cooled noodles served on July 9th in the Central and South District, and chicken and lettuce marinated in sweet vinegar served on July 8th in the North and East District.

Chart 2 : Break down of ingredients for cooled noodles (Central and South District, July 9th) and chicken and lettuce marinated in sweet vinegar (North and East District, July 8th)

Menu item	Cooled Noodles	Chicken and lettuce marinated in sweet vinegar
Ingredients	Dried noodles, chicken eggs, salt, cooking oil, fish paste, carrots, cucumber, radish sprouts , sugar, sweet rice wine, soy sauce, fish flakes, kelp, seaweed	Cold, skinned chicken, soy sauce, cooking wine, flour, starch, cooking oil, onion, ginger, vinegar, sugar, sesame oil, lettuce, radish sprouts

*Excludes milk

As a result of the investigation, it was found that milk was thought unlikely to be the cause. It was confirmed that all milk had been sterilized, and furthermore, milk had been supplied from a number of locations and the distribution of affected schools and non-affected schools did not match the distribution of milk suppliers.

Unheated ingredients in the cooled noodles were the fish paste, cucumbers, and radish sprouts. Unheated ingredients in the chicken and lettuce marinated in sweet vinegar were the lettuce and radish sprouts. Radish sprouts were found to be the only ingredient common to both menu items. In addition, it was found that radish sprouts from the same supplier had been delivered on the 8th, 9th and 10th, increasing the possibility that the radish sprouts were the source of the contamination. Osaka Prefectural Government moved to examine possible sources of contamination within the facility that shipped the above sprouts. However, tests of well water within the facility and of effluent water, seeds, seed cultures, and sprouts failed to reveal any enterohemorrhagic *Escherichia coli* O157. Therefore, at that point in the investigation, it was not possible to speculate on the existence of contamination at the facility, or possible contamination of the facility by outside agents.

5) Conclusion

Although the investigation could not determine the source and transmission route of the contamination, it was shown that all hospitalized patients had attended school in the Central and South District on July 9th, or in the North and East District on July 8th. Investigations of the food eaten by patients caused suspicion to fall on the school meals on those days, and the only unheated item common to both menus was the radish sprouts which could be traced to a specific supplier. Furthermore, experiments showed such sprouts could be subject to enterohemorrhagic *Escherichia coli* O157 contamination through production processes such as hydroponic cultivation in water. It was also established that food hygiene problems could be caused by inadequate storage and temperature control during storage. In addition, the DNA pattern of the enterohemorrhagic *Escherichia coli* O157 extracted from those showing symptoms in the Central and South District and the North and East District was found to be the same. In light of the above, a comprehensive judgment which also took account of more detailed test results, concluded that there was a very high probability that the radish sprouts shipped from a supplier on July 7th, 8th and 9th were the source of the contamination that led to the outbreak of diarrhea among elementary school students in Sakai City.

It also emerged that radish sprouts shipped from the same supplier on July 7th and July 9th were also on the menu in other cases of food poisoning which occurred around the same time as the outbreak among elementary school children, and that persons showing symptoms as a result of those incidents were found to be carrying enterohemorrhagic Escherichia coli O157 whose DNA matched that of those found in Sakai City patients.

Thus, on September 26th, the Ministry of Health and Welfare's Enterohemorrhagic Escherichia coli O157 Countermeasures Department, released a statement saying, "There is a high possibility that the contaminated ingredients which led to the outbreak of diarrhea among elementary school students in Sakai City were radish sprouts shipped from a specific production facility on July 7th, 8th and 9th."

2. The impact of enterohemorrhagic Escherichia coli O157 poisoning as a social phenomenon

The incidents of enterohemorrhagic Escherichia coli O157 poisoning, which occurred in various locations around Japan in 1996, had a diverse effect on society.

(1) Regarding radish sprouts

On August 7th, the Ministry of Health and Welfare published an interim report into the diarrhea outbreak in Sakai City, which stated the following conclusion: "A single strain of bacillus has been found, but we are unable to immediately identify the contaminated ingredients, or confirm that the radish sprouts are the source. However, careful and comprehensive consideration of the epidemiologic survey results leads to the conclusion that this possibility cannot be discounted." The suggestion that radish sprouts were the source of the contamination was a heavy blow to the industry. The final report, issued on September 26th, reached the same conclusion as the interim report, stating "There is a high possibility that the source of contamination was radish sprouts shipped from a specific producer."

The announcement by the Ministry of Health and Welfare that "radish sprouts may be responsible" had a significant influence on producers and distributors of the product, prompting aggrieved comments such as "The market which we have developed over long years has disappeared overnight," and "Shipments have dropped by 75% and the price has fallen by more than half." Many large supermarket and other vendors removed the sprouts from their shelves, and the Ota Market, Tokyo's central wholesale market, reported a rush of cancelled orders.

Furthermore, an executive of the Japan Radish Sprouts Association said in a press conference at the Ministry of Agriculture and Fisheries that, “The Ministry of Health and Welfare announcement has affected not only radish sprouts, but also sales on all other products grown through hydroponic methods.” The Association requested an apology from the Health and Welfare Minister. Then on August 14th, the Association submitted a letter of protest, which demanded retraction of the Ministry of Health and Welfare’s previous comments and an apology, claiming that the Ministry’s indication of radish sprouts as a possible source of contamination had no factual basis.

After the Ministry released its final report which repeated the same conclusion, the association revealed its intention to sue the Ministry for damages (at the same time, the producer of the radish sprouts identified as the likely source of contamination also announced plans to file a suit against the Ministry, including a damages suit.)

At an extraordinary general meeting on October 15th, the Association decided to sue both the government and the Health and Welfare Minister for damages, and on December 2nd, the Association launched a suit for damages of over 440 million yen, claiming they “suffered due to the government’s announcement of radish sprouts as the culprit.”

(2) Bullying and harassment problems

On August 6th, enterohemorrhagic *Escherichia coli* infection was designated as an infectious disease, based on the Contagious Diseases Prevention Law. The measures prescribed were limited including requirements for doctors who had treated patients to file a notification with the Public Health Center, and restrictions placed on patients and those carrying the infection from going to work. However, the designation of patients as carriers of “infectious disease” led to bullying problems. For example, investigations carried out through interview by the labor union at a company where one male employee had died from the enterohemorrhagic *Escherichia coli* O157 infection revealed that other employees at the same company and their children had been victims of bullying and harassment.

Some children were not allowed to participate in summer holiday camps simply because they were from Sakai City. Some patients lost their jobs because of their infection, or were harassed at work, while others were victims of unjust and provoked treatment such as being refused lodging at traditional inns in resort areas.

The medical help line set up by the Sakai City task force began to receive calls from people saying they had been harassed because they had been infected by enterohemorrhagic *Escherichia coli* O157. The city sent teachers on home visits to stem

anxiety and misunderstandings, even though the autumn term had yet to start.

(3) Other incidents

A man was arrested after trying to blackmail 7-Eleven, Inc. out of 120 million yen by threatening to place bread infected with enterohemorrhagic *Escherichia coli* O157 in one of their stores.

Violent incidents also occurred. On August 10th, a man burst into the offices of the Director of the Mayor's Public Room in Sakai City hall, punching and kicking the director while shouting that he was responsible for the food poisoning outbreak.

In the afternoon of October 2nd, the director of the Sakai City School Meal Association was found drowned in what was presumed to be a suicide over the incident.

(4) Distribution

The furor caused by the food poisoning outbreak caused consumers to shy away from purchasing perishable goods in supermarkets and grocery stores. Consumption of fresh vegetables such as lettuce and cabbage fell drastically, and prices crumbled.

Sales orders for giblets also declined drastically, with the wholesale price of items such as cow liver falling in Osaka markets for the first time in two years. Restaurant sales also fell as some consumers stopped eating out for fear of food poisoning.

According to sales figures released by the Japan Department Store Association in July, declines in food sales due to the enterohemorrhagic *Escherichia coli* O157 outbreak, and poor sales of mid-year gifts caused a 2.7% fall in sales over the same month of the previous year, the first fall in seven months. July sales figures for supermarkets nationwide announced by the Japan Chain Store Association also showed a year on year drop of 2.5%, the first such decline for two months, due to the effect of decreased purchases of perishable products, caused chiefly by the impact of the enterohemorrhagic *Escherichia coli* O157 incident.

Kanto Bureau of Trade and Industry announced that in the 11 prefectures under its jurisdiction, sales figures for large-scale retail stores for July were down 4.7% compared to the same month of the previous year, the first time in two months that year on year figures had decreased.

On the other hand, many pharmacies and supermarkets began to post up information on how to counteract food poisoning, to respond to customer's questions, and to set up displays selling anti-bacterial products. This contributed to an increase in general awareness and perceptions of the danger of food poisoning in ordinary households. Antibacterial products such as disinfectant spray, medicinal soap and alcohol

disinfectants all sold rapidly, with some shops selling out as sales reached 10 times their normal levels. Sales of bleach and tiles processed to prevent the spread of bacteria were also high. Large soap makers were forced to review their production plans to cater for the increased demand.

(5) Corporate measures

As incidents of enterohemorrhagic *Escherichia coli* O157 poisoning occurred frequently at schools across the country, companies producing school meals were particularly forced to take rapid countermeasures.

The Japan Industrial Food Service Association, the industry organization for school meals providers, instructed its members to ensure that employees washed their hands and that food was sterilized through heat treatment. The school meal supplier Green House gathered all of its general managers and managers together for a meeting, at which the enterohemorrhagic *Escherichia coli* O157 situation was explained, and instructions for countermeasures were given. The Japan Food Service Association took a series of measures, demanding that its 420 member companies introduce thorough hygiene management procedures and take appropriate measures and also calling on suppliers of food ingredients to carry out thorough hygiene management. In addition, the Japan Medical Food Service Association, after demands from the Ministry of Health and Welfare to instill thorough hygiene management procedures, carried out various measures to tackle the problem, including giving direct instruction to its members.

Companies in other industries also took countermeasures. The Mitsubishi Motor Company created a pamphlet drawing attention to enterohemorrhagic *Escherichia coli* O157 food poisoning, and distributed it to its employees. Other companies producing such pamphlets through their health unions included Yamato Transport Co. Ltd., Tanabe Seiyaku Co. Ltd., the Victor Company of Japan, and McDonald's Japan.

In order to gather information about enterohemorrhagic *Escherichia coli* O157 and consider measures to combat the infection, the Ajinomoto Co., Inc created an in-house specialist project team which began a complete inspection of their operations.

Some large supermarkets strengthened their hygiene management by adding enterohemorrhagic *Escherichia coli* O157 to the list of items checked during employees' fecal examinations.

Some companies used the Internet to encourage their employees to prevent infection, while some companies attempted to protect themselves by removing raw items from their canteen menu.

(6) Active measure taken by corporations

The Takara Shuzo Co. Ltd. began an emergency increase in the production of a reagent designed to identify enterohemorrhagic *Escherichia coli* O157, which it had developed in tandem with Shimadzu Corporation, and also planned the release of two other types of reagents for identifying enterohemorrhagic *Escherichia coli* O157. The Miura Fisherman's union in Miura City, Kangawa Prefecture began shipping fish products using "Natural Mineral Sea Water for Bacteria Reduction," a new technique which allowed the elimination of enterohemorrhagic *Escherichia coli* O157 without using chlorine or other chemicals.

Some development occurred overseas, including Raymond Stevens, an assistant professor at UCLA, Berkley, announcing the development of a sensor which allowed instant detection of enterohemorrhagic *Escherichia coli* O157.

On July 26th, the Ministry of Education officially notified prefectural boards of education to instruct schools to freeze and store school meal samples (of both ingredients and cooked meals) for examination, for periods over two weeks. Up until then, samples had been stored for periods of three to four days; therefore, schools were forced to purchase new refrigerators. In response to this situation, Sanyo Electric Co., Ltd., a maker of industrial freezers, increased their production output for August and September to a level 20% higher than the previous year.

(7) Other items

As the impact of the enterohemorrhagic *Escherichia coli* O157 poisoning continued to expand, many non-life insurance companies received a sudden increase in enquiries about and applications for product liability insurance, principally from companies in industries related to food production. Furthermore, the Food Safety Division of the Tokyo Metropolitan Government's Public Health Bureau printed 10,000 copies of each of two pamphlets, for infants and elderly people respectively on measures against food poisoning. However, soon there were only a few hundred leaflets left, and it was decided to print extra copies.

On the other hand, scams started to emerge whereby fraudsters took advantage of the public concern over enterohemorrhagic *Escherichia coli* O157 by tricking people into having their houses disinfected at illegal rates.

Another development was the start of loans by the Yokohama Bank to those small-and mid- sized enterprises which were having financial difficulties due to the food poisoning problem.

In Sakai City, Osaka, where the large-scale outbreak took place, consumer anxiety towards food remained, and the Sakai Resident's Olympics which had been held every year on October 10th was cancelled. Also in Hiroshima Prefecture, a peace march was cancelled through fears that hygiene management of boxed lunches and water could not be guaranteed. Throughout the country, various events, including festivals and summer dances, were cancelled.

In order to remove the perception that radish sprouts were dangerous, the Minister of Health and Welfare at the time ate three packs of Saitama radish sprouts, made into a salad with Japanese dressing. He had purchased the sprouts at the kiosk in the Agriculture, Forestry and Fisheries Ministry.

Chapter 3 Problems arising as a result of the incident, issues and effective responses

(1) Problems

As stated in the prior chapter, several problems arose in the course of investigations to find the cause of the problem.

Firstly, it became clear that vehicles used to distribute food ingredients from carriers to cooking facilities lacked appropriate refrigeration and freezing facilities, and that foods were being left at room temperature after being delivered, at some time between 5.00 am and 7.45 am, until the arrival of the cooking staff.

Furthermore, when ingredients were collected, there were no checks to record whether or not the ingredients were damaged or whether they were properly labeled. In addition, it became clear that the Sakai City School Meal Association had been failing to require suppliers to submit the results of self-administered checks on their produce.

On the subject of food preparation, the Nutritional Sub-Committee of the Sakai City Elementary Education Research Committee had created “Cooking Guidelines.” The guidelines contained detailed procedures on the handling of ingredients; however, regarding hand-washing, instructions were only printed on the containers in which meals were delivered to each class, and there were no separate instructions on hand-washing during cooking procedures.

Regarding response measures at the time of the incident, the peak of the outbreak was on the weekend of July 13th and 14th, and clinics open for the weekend were unable to cope with the volume of patients and therefore requested help from other hospitals in the city. Even then, the number of hospital beds was not sufficient, and cooperation was sought from neighboring authorities starting with Osaka City.

In hospitals in Sakai City, doctors were forced to examine patients in waiting rooms and corridors, which then overflowed with patients receiving drips. The mother of a classmate of one of the girls who died from the outbreak stated that, “It seems that the first hospital they took her to was full, and she was not hospitalized until the following day. If they had been able to respond properly in the first place, perhaps she never would have died.” Indeed, immediately after the start of the outbreak, as more and more patients were brought to hospitals, the length of the treatment time for individual patients grew longer, and some patients were forced to wait for between three and five hours before being examined. Despite the emergency nature of the situation, the capacity to meet the demand was not adequate, and there was a great deal of confusion. It is clear that emergency contact procedures designed to cope with such an incident

occurring on a weekend or holiday were not already in place.

(2) Issues

The incident revealed a large number of issues which must be addressed.

Firstly, there is a need to further strengthen crisis management systems designed to cope with large-scale outbreaks such as this one.

Secondly, as a large number of patients with serious symptoms presented simultaneously, hospitals were unable to respond rapidly to patients coming to hospital at any time of the day or night. Therefore, systems to ensure a smooth response in times of emergency, and a strengthening of collaboration between organizations concerned are required.

Thirdly, immediately after the outbreak began, the Osaka Prefectural Government, Public Health Centers, and various medical organizations continually rang the City Hall to ask about where to transport seriously ill patients. However, within the City Hall, preparations were inadequate, and they were having enough problems just trying to grasp the extent of the situation. They could not make appropriate decisions as to what was necessary, and as to how they should respond. Time passed, and despite the fact that other local authorities and related organizations were waiting to be asked for their cooperation, actual requests for cooperation from Sakai City were not made until later on.

The problem of related organizations waiting to be asked to cooperate was also raised after the Great Hanshin Awaji Earthquake on January 17th, 1995.

Central government and local authorities were criticized for waiting for cooperation requests from the authorities affected by the earthquake, when such areas were in a state of confusion. The poisoning in Sakai City, which occurred one year and a half after the Hanshin earthquake, showed that the appropriate lessons had not been learned, and the same situation had occurred once again.

Fourthly, in order to ascertain the number of patients affected by the outbreak, investigations by the Food Sanitation Inspectors, Public Health Nurses and staff at the Board of Education were combined, while trying to ensure mutual consistency. Therefore, a great deal of time and labor was required. The need to develop methods of investigating large-scale infections, to produce a manual of response procedures, to make efficient use of computer resources, and to train staff became apparent.

Fifthly, as all human resources were tied up in dealing with the incident, responses to press enquiries and other public relations activities were inadequate.

Sixthly, anxiety among residents spread due to the danger of secondary infection.

Children that had become ill were bullied for having an infectious disease, and some people were refused lodging simply because they were from Sakai City. Others lost their jobs or were suspended from work. In the future, methods must be found of preventing the human rights infringements that result from such overreaction.

(3) Effective responses

As stated above in (1) and (2), many problems and issues were raised as a result of the incident. However, there were also some areas where responses were extremely effective.

The WHO referred to the food poisoning incident in Sakai City to draw the attention of countries around the world to the issue of enterohemorrhagic *Escherichia coli* O157. The WHO stated that “such poisoning can occur even in developed countries with fully developed sanitation facilities,” and added, “The outbreak of food poisoning in Sakai City, Osaka caused by enterohemorrhagic *Escherichia coli* O157 reached unprecedented record levels, with the number of patients exceeding 6,500.” Thus, this was a very rare large-scale incident. At the early stages of the outbreak, some sources thought they should be prepared for as many as 20 deaths, as worries grew about the spread of the infection.

In past food poisoning incidents in the United States, and in the 1990 food poisoning incident at the Shirasagi Kindergarten in Urawa City, Saitama Prefecture (which resulted in the deaths of two girls), 5% - 10% of patients went on to develop hemolytic-uremic syndrome (HUS), which can lead to acute renal failure, and anywhere up to 10% of those patients lost their lives. A simple application of the above formula to the number of patients in the Sakai City food poisoning incident suggests there was the possibility of deaths ranging between ten to just short of 100.

Why was the final death toll just three persons?

One reason that the number of victims was not as high as first feared was the effective use of information networks.

The Director of Sakai Municipal Hospital, which became one of the main treatment centers, stated that “Particularly in the treatment of patients with HUS, the network of information shared between doctors on the Internet was very useful.” At hospitals that were inundated with patients, information placed on the Internet by Osaka University and Osaka City University played an important role. The information included data from specialist doctors in Saitama Prefecture and Chiba Prefecture who had experience in treating enterohemorrhagic *Escherichia coli* O157 patients. It also included specific treatment methods, and diagnostic information about the actual development of patient

symptoms.

The responses above were successful. Going forward, we must make effective use of information networks, and clarify exactly where particular kinds of useful information, for all possible situations and incidents, are located.

Chapter 4 Central government and local government response to the incident

The Ministry of Health and Welfare, Osaka Prefectural Government and Sakai City took various measures in response to the outbreak of diarrhea among elementary school students in Sakai City.

1. Response of the Ministry of Health, Labor and Welfare, Osaka Prefectural Government and Sakai City authorities

(1) Response of the Ministry of Health and Welfare

On July 15th, the Ministry dispatched five experts from the National Institute of Health of Japan to Sakai City, in order to collect information and investigate the cause of the outbreak.

Furthermore, on July 16th, the Ministry set-up the Enterohemorrhagic Escherichia coli O157 Countermeasures Department, to establish a response mechanism that cut across all related departments. The next day (July 17th), together with the Osaka Prefectural Government and Sakai City, a three-way liaison committee was established, to promote mutual cooperation, to investigate the cause of the outbreak, to prevent secondary infection, and to secure adequate medical facilities.

(2) Response of the Osaka Prefectural Government

On July 15th, the Prefectural Government instructed all administrative districts to stop serving school meals as of July 16th. Furthermore, on August 7th, after radish sprouts had been identified as the likely cause of the contamination, the Prefectural Government called on the supplier in Habikino City, which cultivated and shipped the radish sprouts, to stop any further product shipments, on a voluntary compliance basis. Then, on August 12th, an investigation, under the authority of the Contagious Diseases Prevention Law, began. On August 21st, while condition of conducting inspection and sterilizing of facilities, the supplier was allowed to continue its production.

The Prefectural Government thoroughly researched and analyzed symptoms which arose from the enterohemorrhagic Escherichia coli O157 food poisoning incident, and got involved in publishing a manual detailing diagnostic criteria and treatment methods. A final report on the incident was due to be completed in March of the following year.

(3) Response of Sakai City

1) Immediate measures

All 90 elementary schools in Sakai City and two schools for the disabled, 92 schools in total, were temporarily closed during the three days from July 15th to July 17th. Classrooms and toilets in all schools were disinfected to prevent secondary infection.

On August 12th, Sakai City established the Enterohemorrhagic Escherichia coli O157 Countermeasures Committee.

On August 22nd, the Board of Education held a training workshop for staff at kindergartens, elementary schools, middle schools, and schools for the disabled, regarding appropriate health instruction for students at the start of the second term.

The special task force that had been set up opened a 24-hour medical advice hotline with 20 phones. Interpreters in five languages, including English and Chinese were also provided to assist foreign residents.

Educational activities were carried out using loudspeaker vehicles, banners trailed behind light aircraft, and television advertisements, while leaflets concerning the correct methods of preventing secondary infection were inserted into newspapers over a four-day period to disseminate such information among the population. A total of 1,884,000 leaflets were delivered. Other measures to provide information to further correct understanding of enterohemorrhagic Escherichia coli O157 were carried out including the printing of a pamphlet entitled, "How to protect yourself and your family from enterohemorrhagic Escherichia coli O157." The pamphlet was delivered to all houses in the city. Public health nurses were also sent out to visit the homes of those elementary school students showing symptoms.

A total of 1,047 public facilities including schools, old people's homes, local authority assembly halls, welfare centers and facilities, and child care centers were disinfected. Disinfectant was also distributed to all households who requested it. Some 262,314 bottles were distributed in total. On July 21st, free fecal examinations were also carried out.

Those who were carrying the bacteria but showed no symptoms were divided into three groups: an "Anti-bacterial medicine group," an "Intestinal medication group," and a "No medication group." Due to the possible side effects of the anti-bacterial medicine, it was only given to those who requested it, excluding pregnant women, young infants, and senior citizens.

On August 3rd, an extraordinary meeting of school and kindergarten principals was held to discuss strengthening measures to prevent the bullying of infected persons. As a further measure, a "Project Team for Dealing with Human Rights Problems" was

established.

The compensation and consolation payments for those affected students, and those affected by secondary transmission were authorized based on certain regulations. Those who received compensation were also checked through follow-up urine tests, renal function tests, and other precision examinations, starting from February of 1997.

School meals should be the safest of all meals, but in this incident, they became the source of contamination. Therefore, tighter regulations over school meals were introduced.

Firstly, the three blocks of Central and South, North and East, and Sakai and West were re-divided into six blocks: Central, South, North, East, Sakai and West. A School Meals Menu Committee, in which parents and guardians participated, was established in each block. Under the guidance of the Board of Education's Student Health Division, the Committee examined and decided whether to adopt the menus proposed by the school nutritionists. Furthermore, if emergency safety measures became necessary, measures would be taken including changing the menu.

Furthermore, regarding the purchase of ingredients, all suppliers would be required to comply with strict hygiene management standards. Approved ingredients would be designated by a newly established Procurement Committee, which included parents and guardians and school health staff. Before starting to supply goods, suppliers were required to undergo scientific tests including tests for bacteria by a public body. It was also decided that the Board of Education would carry out random tests on ingredients at the time of delivery.

Regarding the transport, inspection and storage of ingredients, it was decided to require vehicles for transporting ingredients to be fitted with freezing, refrigeration or cooling facilities which would allow food to be kept at an appropriate temperature. As a general rule, ingredients were required to be shipped on the afternoon of the day before use, to allow time for thorough inspection. It was also decided that storage of the food would be carried out using appropriate refrigeration, freezing and cooling facilities.

Regarding cooking facilities and equipment, it was decided to equip each school with freezers and refrigerators, freezers for storage, thermometers for measuring internal food temperature, containers and chemicals for disinfecting, and cooking utensils. Inspections of facilities and equipment were to be carried out by Board of Education staff. The Public Health Center was also to give instructions on maintaining hygiene, and enact appropriate improvements.

Regarding hygiene management and cooking operations, staff involved in the

preparing of food were required to undergo skill training sessions concerning disinfecting, inspection and cooking procedures.

Regarding monitoring systems, the supervisory responsibility of the Board of Education and of the schools was clarified, and it was decided to establish systems for ensuring smooth communication.

2) Future measures

The Sakai City food poisoning incident revealed the lax attitude of public administration with regard to crisis management. It was necessary to imagine a similar event occurring once again, and to use reflections on the current incident to develop various measures.

Firstly, from the standpoint of organizational structures, sanitation inspectors from the various Public Health Centers will be brought together at the Sakai Public Health Center, to work on finalizing a hierarchy of authority and to ensure that necessary resources can be mobilized over a wide area. In addition, an officer will be assigned responsibility for hygiene measures at joint school meal facilities, and efforts will be made to rationalize and raise the efficiency of monitoring and instruction systems for facilities such as joint school meal facilities through the overhaul of such systems and other measures.

Following on from the above, from the standpoint of information provision, measures will be taken to establish a fax network, encompassing organizations in the food industry, joint facilities for producing school meals, and companies producing boxed lunches as a catering service, in order to facilitate rapid information exchange regarding outbreaks of infectious diseases, especially food poisoning, infection prevention methods, and ban on substandard use of food products.

In addition, a Committee for the Prevention of Food Poisoning and Contagious Diseases will be established, and various publicity methods will be used to convey information rapidly to related organizations and residents. Standards will also be set and the division of responsibility will be clarified for methods of notification, reporting and investigation concerning the establishment of special task forces, systems for carrying out inspections and for dealing with isolated incidents of infection. Finally, “Basic Policies for Dealing with Food Poisoning and Infectious Diseases” will be published. This document will clearly detail the role of the Task Force, the division of responsibilities within the task force, personnel in charge and the contents of the Task Forces’ work.

2. Response of Central government and local government to other E. coli 0157 food poisoning incidents around Japan

In 1996, starting with the above mentioned incidents in Oku Town, Okayama Prefecture, and Sakai City, Osaka Prefecture, several incidents of enterohemorrhagic *Escherichia coli* O157 food poisoning occurred throughout the country. Counting only those incidents that were reported to the Ministry of Health and Welfare, 9,451 people fell ill (6,218 in Osaka, 871 in Okayama, 403 in Gifu, 283 in Tokyo, and 206 in Hiroshima), resulting in 12 deaths, (four in Osaka, two in Okayama and one each in Yamagata, Chiba, Kanagawa, Aichi, Kyoto, and Nara). (Refer to Chart 2.)

As the incidents spread throughout the country, the central government, prefectural governments, and local authorities took various measures to combat infection.

(1) Principal measures taken by central government

1) Ministry of Health and Welfare

In June and July, various sections of the Ministry including the Food Sanitation Division, the Environmental Health Bureau, and the Health Instruction Division spent each day issuing notifications concerning the thorough implementation, instructions regarding and future policies concerning the prevention of food poisoning. The Ministry also established a task force and a sub-committee to debate concrete measures for the future.

June 12th	A notification was issued to all prefectures calling for thorough instruction and monitoring of school meal facilities.
June 14th	The Food Sanitation Investigation Council's Subcommittee on Large-scale Food Poisoning Outbreaks held an emergency meeting to discuss response measures.
July 23rd	An emergency meeting of the above subcommittee on food poisoning was called, to debate the measures that all elementary and junior high schools should take during the summer vacation.
August 1st	An enterohemorrhagic <i>Escherichia coli</i> O157 hotline was established, to deal with enquiries from residents and medical institutions.
August 2nd	A manual for the treatment of enterohemorrhagic <i>Escherichia coli</i> O157 aimed at ordinary medical institutions was published.
August 6th	Because of the great need to prevent secondary enterohemorrhagic <i>Escherichia coli</i> O157 infection, but the difficulty in determining

	transmission routes, the Ministry followed the advice of the Council of Public Health, and designated enterohemorrhagic <i>Escherichia coli</i> O157 as an infectious disease under the Contagious Disease Prevention Law.
August 12th	400 staff from Boards of Education responsible for school meals were called together for an emergency meeting. Instructions were given to carry out thorough hygiene management inspections based on check lists, to cook all vegetables in school meals for an indefinite period, and to deal flexibly with students who bought boxed lunches to school even after the provision of school meals had restarted.
August 16th	The Ministry decided to draw up a standardized manual for researching the cause of food poisoning, to replace manuals which had been developed by individual local authorities.
August 25th	Because there is no effective medicine for the treatment of enterohemorrhagic <i>Escherichia coli</i> O157 infection, the Ministry set up two research groups in August with the aim of developing a workable medicinal treatment before the summer of 1997.

2) Ministry of Education

Because the outbreak of food poisoning originated in a school, the Ministry of Education concentrated its response measures on promoting the thorough safety management and hygiene management of school meals, giving instructions to related parties at schools, and holding workshops.

June 19th	70 officials responsible for school meals from the Boards of Education in the 47 prefectures and 12 major cities attended an emergency meeting in Tokyo, where they were instructed on thorough food poisoning prevention methods.
July 17th	The Ministry decided to extend the required period of frozen storage for school meals for the purpose of examination from over 72 hours to over one week, and notified boards of education on the change.
July 24th	The Ministry started a Meeting Group for those involved in food sanitation, for the purpose of debating safety strategies for school meals. The group decided to review environmental health for

	schools, and also to create a hygiene management check list of standards for use by nutritionists.
July 26th	Prefectures were officially notified of the requirement to keep all school meal ingredients and completed meals in frozen storage for over two weeks.
August 5th	The Ministry's Panel of Experts, during comprehensive checks of school meals carried out during the summer vacation, required certain local authorities around the country to submit food ingredients for inspection, to ensure that food kept in storage by suppliers or at cooking facilities was not infected with enterohemorrhagic <i>Escherichia coli</i> O157. The decision aimed to secure food safety for the second school term.
August 12th	A special meeting to discuss measures against food poisoning was held in Tokyo, and attended by representatives of all prefectures. At the meeting, as well as being instructed to remove raw vegetables from the menu for the second school term, representatives were also instructed to cook all raw ingredients for an indefinite period.
August 22nd	The Ministry's Panel of Experts which had been working on a revision of measures for the hygiene management of school meals in the wake of the enterohemorrhagic <i>Escherichia coli</i> O157 poisonings, released its second report which contained recommendations for regular safety checks of ingredients, education for suppliers, and measures to ensure the safety of food products. The report also recommended that staff from cooking facilities should always be present when food supplies were delivered in order to check product quality. The report also called on prefectures to designate at least 12 cooking facilities annually, which would be subject to regular tests for micro-organism and pesticide contamination twice a year.
December 26th	The Meeting Group (set up on July 24th) which had been investigating ways of preventing enterohemorrhagic <i>Escherichia coli</i> O157 poisoning, released its final report which in particular called for better sanitation procedures during the cooking process.

3) Ministry of Agriculture and Fisheries

Due to the announcement that radish sprouts were the likely cause of contamination,

and other factors, the Ministry gave guidance regarding the treatment and self-conducted tests of raw vegetables, including radish sprouts, and also for the thorough introduction of hygiene procedures.

July 26th Special consulting services for enquiries regarding enterohemorrhagic Escherichia coli O157 poisoning were set up at locations including the Ministry's consumer centers, the seven Agricultural Administration Offices, and the eight Centers for Food Quality, Labeling and Consumer Services.

August 3rd A briefing session regarding enterohemorrhagic Escherichia coli O157 was held for members of food industry related organizations.

August 7th Notice was sent to all prefectures, the Radish Sprouts Association, and to the Japan Agricultural Federation, calling for the introduction of strict hygiene management procedures for radish sprouts.

August 16th The Ministry announced a policy to establish new hygiene management standards concerning checks for microbes and water quality checks for radish sprouts and other hydroponic cultivation facilities by August 16th, and to implement the standards starting in September.

August 21st The introduction of a new quality control system based on a U.S. system of hygiene management into production facilities including food production facilities, hydroponic production facilities and livestock farming was announced.

Other Ministries also enacted various measures appropriate to their role.

4) Environment Agency

July 24th The Agency instructed all prefectures to carry out emergency checks for the presence of enterohemorrhagic Escherichia coli O157 at sea bathing sites.

5) Defense Agency

July 31st The agency prepared the Ground Self-Defense Forces for dispatch in the event of a request for cooperation from local authorities affected by enterohemorrhagic Escherichia coli O157.

6) Ministry of Foreign Affairs

August 16th The Ministry briefed representatives of embassies and international organizations based in Tokyo on methods of preventing enterohemorrhagic *Escherichia coli* O157 food poisoning.

7) Management and Coordination Agency

November 18th As the safety of school meals had once again become an issue due to the enterohemorrhagic *Escherichia coli* O157 food poisoning, the Agency decided to introduce administrative supervision and conduct research, starting in December 1996, to determine whether hygiene management of school meals in public elementary schools and junior high schools was being correctly conducted.

(2) Principal measures taken at the prefectural level

1) Tokyo Metropolitan Area

After receiving notification from the Ministry of Education dated July 17th, the Metropolitan Board of Education called an emergency meeting of those responsible for school meals, with the aim of preventing enterohemorrhagic *Escherichia coli* O157 food poisoning. Attendees were instructed to extend the period of frozen storage of school meals from over 72 hours to over one week. Furthermore, an extraordinary meeting of Public Health Center directors and directors of the nutrition departments at hospitals and other medical institutions was held, and measures for preventing enterohemorrhagic *Escherichia coli* O157 infection and appropriate cooking measures were discussed. Furthermore, the Tokyo Metropolitan Liaison Committee of Related Organizations for the Prevention of Food Poisoning was established, in order to strengthen communication and information exchange between related governmental agencies and industries.

The Metropolitan Bureau of Public Health held an extraordinary meeting regarding methods of identifying enterohemorrhagic *Escherichia coli* O157 for representatives of 58 inspection stations around Tokyo.

Following the announcement that the outbreak of food poisoning in Sakai City, Osaka, was likely caused by radish sprouts, sample inspections, underpinned by the Food Sanitation Law, were carried out at the Ota market, one of the country's largest fruit and vegetable markets.

Furthermore, at the end of August, just before the start of the second school term,

around 350 staff responsible for school meals attended a Hygiene Management Promotion Meeting, to prepare for the re-start of school meals provision in the metropolitan area. At the meeting, implementation of thorough measures against food poisoning was called for.

2) Other areas

As of August 7th, 44 of the 47 prefectures had established Task Forces for dealing with enterohemorrhagic *Escherichia coli* O157, and the three prefectures without task forces, namely Tochigi, Tottori and Okinawa have plans to establish a task force in the near future.

In Oita Prefecture, teacher's unions called for the suspension of school meal services, from the start of the second term, until the source and transmission route of the enterohemorrhagic *Escherichia coli* O157 infection had been gathered.

In Gunma Prefecture, on August 7th, the Japan Agriculture Economic Federation held a training workshop on enterohemorrhagic *Escherichia coli* O157 prevention techniques for around 350 people from related companies and business partners.

In Nagano Prefecture, on August 16th, various agricultural cooperatives proclaimed the safety of their produce by distributing a total of 2,400 lettuces to people returning to their hometown for the holidays, both in Saku City, and in front of JR Nobeyama Station.

3) Principal measures taken at the local authority level.

In Arakawa Ward, on July 31st, a task force for the prevention of enterohemorrhagic *Escherichia coli* O157 infection was established. In addition, pamphlets detailing prevention methods in three languages (English, Chinese and Korean) were printed, in order to inform foreign residents of enterohemorrhagic *Escherichia coli* O157 related problems.

In Toshima Ward, a liaison meeting to discuss the prevention of enterohemorrhagic *Escherichia coli* O157 was held, and it was decided to ban the use of paddling pools at kindergartens and children's facilities and to carry out surveys of children's health by telephone interview during the summer vacation.

Furthermore, Minato Ward, Suginami Ward, and Nerima Ward all provided telephone counseling regarding enterohemorrhagic *Escherichia coli* O157 infection.

In Bunkyo Ward, on August 12th, following the Ministry of Health and Welfare's instruction to keep frozen meals for over one week for the purpose of examination, one new freezer was supplied to elementary schools, junior high schools, kindergartens, and

welfare facilities (63 facilities in total) within the ward.

On August 16th, the Yokohama City Board of Education decided to start the provision of school meals at the 355 elementary schools and schools for the disabled under its jurisdiction four days later than usual, on September 9th. The Board of Education also called on all elementary schools not to improvise their own school meal menus during September and October.

The Sapporo City Board of Education also decided on a policy to take measures, before August 17th, to prevent children who were infected, or suspected of being infected with enterohemorrhagic *Escherichia coli* O157, from attending school.

Chapter 5 Concrete response measures

The occurrence of the outbreak of diarrhea in elementary school children in Sakai-city and other incidents caused by enterohemorrhagic *Escherichia coli* O157 has led to increased debate over hygiene management. As the debate continues, the HACCP System method of improving hygiene management is now being introduced with increasing frequency.

1. About the HACCP system

HACCP (Hazard Analysis Critical Control Point) is a hygiene management and monitoring system which places emphasis on the importance of food product safety. In the 1960's, HACCP was devised as the method of food management hygiene for the United States' space program, before being published and recommended for adoption around the world by the Codex Alimentarius Committee (Codex), which is under the joint auspices of the Food and Agriculture Organization of the United Nations (FAO) and the World Health Organization (WHO).

Previous conceptions of food hygiene centered on the premise that food would be safe if produced in a clean hygienic environment, and therefore placed emphasis on maintaining sanitary production conditions. Confirmation of product safety was usually carried out by testing the samples of the finished product for bacteria and other indicators.

The HACCP system augments the approach above by the advance analysis of possible hazard sources in all production processes, from procurement of raw materials through production, to the shipping of the finished product. Important monitoring points for the purpose of preventing, eliminating or reducing the hazard to an acceptable level can then be identified. Conditions at the monitoring points are monitored and recorded continuously and abnormalities are dealt with immediately at the point of discovery. Thus, the system prevents in advance the shipping of defective food produce.

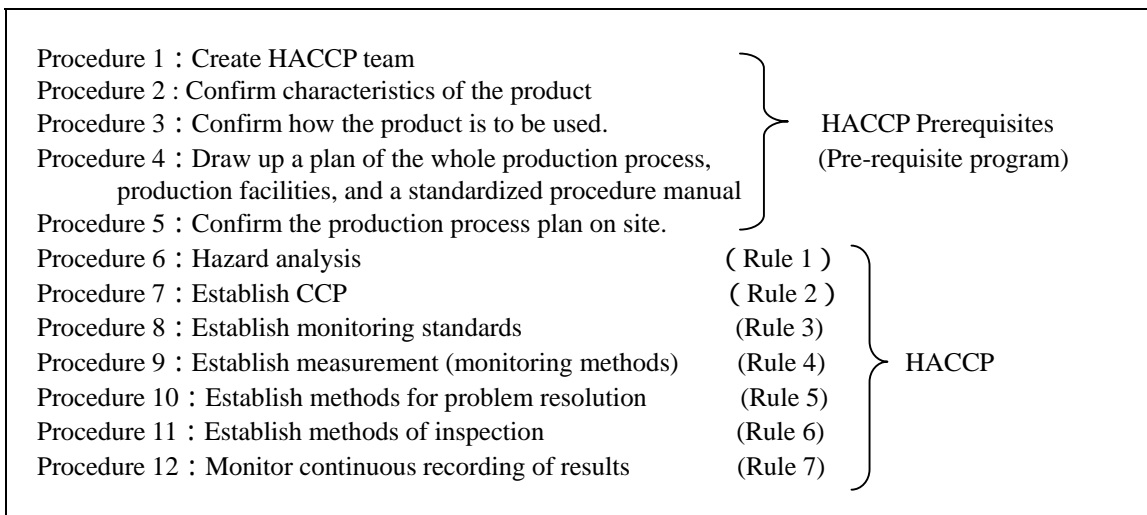
The "HA" in "HACCP" refers to hazard analysis, and the scope of the analysis encompasses not only those microorganisms that can cause food poisoning, but also includes analyses of all processes involved in food production and preparation to find the cause of, and establish possible methods of preventing contamination by the following during the production process: poisonous moulds; chemicals (including naturally occurring substances such as histamine, additives which are designed to be part of the product, and insecticides and herbicides which were unintentionally added to

the product); and foreign bodies such as glass or metal.

After the above analyses have been completed, Critical Control Points (CCP) are established. The CCP refer to important processes and procedures that must be monitored to prevent the occurrence of the hazards identified through the prior analysis.

The analysis consists of 7 rules and 12 procedures.

- Rule 1 : Carry out hazard analysis (HA), and identify prevention methods.
- Rule 2 : Decide Critical Control Points (CCP).
- Rule 3 : Decide appropriate monitoring standards for each CCP.
- Rule 4 : Decide appropriate management, monitoring and measuring methods for each CCP.
- Rule 5 : Decide how modifications and problem resolutions will be put into effect for each CCP.
- Rule 6 : Decide how monitored results will be recorded.
- Rule 7 : Decide methods of inspection. Inspection methods include biological, chemical, physical and sensory inspection. Appropriate standards should be set for each method.



Procedures 6-12 constitute HACCP, while procedures 1-5 are referred to as the pre-requisite program. The pre-requisite program consists of general hygiene management procedures such as whether or not production facilities are hygienic, whether facilities are being appropriately cleaned, disinfected and maintained, and whether those preparing the food are maintaining appropriate hygiene levels and being continuously trained. As a general rule, if the prerequisite program is being properly implemented, the number of CCP necessary to monitor the system can be reduced. Conversely, however the HACCP system is implemented, if the prerequisite program is not in place, the system will not function effectively.

Furthermore, introducing HACCP to the food production process means that product safety will be higher than under the previous production procedure, but more

importantly, the introduction of HACCP will lead employees who have undergone training and education at a facility operating HACCP to contribute to increased product safety through the upholding of designated procedures and methods in their daily production activities,

2. Hygiene management concerning meat for consumption

(1) The introduction of a general hygiene management production process for meat for consumption.

In 1995, following an amendment to the Food Sanitation Law, general hygiene management production processes were introduced for foods including milk products, sausages and ham. This was the first time that a hygiene management system based on HACCP had been included in the Japanese legal framework.

On the other hand, a research unit of the Ministry of Health and Welfare had planned to spend a year, from June 1996, finalizing policy for the hygiene management of meat. However, once 1996 began, incidents of enterohemorrhagic *Escherichia coli* O157 poisoning became widespread, and the importance of thorough hygiene management at meat production facilities once again became a focus of attention. Therefore, the planned policymaking schedule concerning meat hygiene was brought forward, and new hygiene management guidelines for beef and pork, which included HACCP concepts, were introduced in October 1998 as a comprehensive overhaul of policy. Then, on December 25th 1996, some of the procedural regulations regarding abattoir procedure were amended. The amended regulation centered on designating persons responsible for hygiene management, recording and filing records of operations, sealing the esophagus and rectum of cows, sterilizing knives at temperatures of over 83°C, washing hands at each stage of the production process, not wearing gloves and appropriate refrigeration of the dressed carcass.

(2) Meat processing procedures at the time of the incident.

Enterohemorrhagic *Escherichia coli* O157 is found in the intestines of cattle. In a previous survey of meat shipped from abattoirs, Ministry of Health and Welfare surveys have found the bacteria in 0.2% of samples taken from dressed carcasses and in 0.2% of feces and urine samples.

Therefore, the Ministry of Health and Welfare advised abattoirs to seal the esophagus and rectum at the time of dismemberment to prevent the contents of the intestine

contaminating the meat, and also to disinfect the blade used to cut the meat. These precautions were adopted on a voluntary basis.

Staff at abattoir meat hygiene inspection stations check each individual animal to see whether it is diseased. Three stages of checks are carried out: once before slaughter, and then after slaughter on the internal organs and dressed carcass. However, there are no regulations for tests regarding *E. coli* and other microorganisms, and at that time, such tests were left up to the discretion of the abattoirs. Therefore, thorough hygiene management procedures were not in place at the 333 abattoirs in operation around Japan at that time.

At that time, three abattoirs were licensed by the government to prepare meat for export to the United States. The licensed facilities were monitored by government officials and inspected regularly by U.S. officials.

Meat for export to the United States had to be processed at facilities which met U.S. government requirements, and hygiene management through the HACCP system is a necessary requirement. The three designated facilities have the same level of equipment as U.S. facilities, and carry out operations according to a detailed manual which contains instructions including “seal the rectum before dismemberment,” “knives which have been used once must be sterilized for over 8 seconds in water over 83° Celsius,” and “gloves should not be worn during work.”

In addition to the regulations which apply to the export-orientated facilities, the new regulations stipulate requirements for microbe examination and storage procedures during the dismemberment process, and for the maintaining of records. The regulations aim to ensure safety through the systematized hygiene management of the whole process.

(3) Approval system for general hygiene management in production processes.

This system grants the approval of the Minister of Health, Labor and Welfare to individual facilities and products where hygiene management is carried out effectively through HACCP, based on a prerequisite program (appropriate facility standards and management standards.) Specifically, the approval is granted after reviewing documents including Sanitation Standard Operating Procedures (SSOP), and carrying out on-site investigations to confirm that the HACCP program is being appropriately applied.

Through approval by the above system, operators may be allowed to produce food products through methods which do not follow the previous standardized procedures, thus allowing the regulations to be applied flexibly.

The above system applies to milk, milk products, meat products, packaged food

products which have been sterilized through heat or pressure treatment (retort-packed food), fish cakes and soft drinks, as prescribed by government ordinance.

Since the first approvals under the system of 177 milk and milk products in January 1998, 340 production facilities and 520 products in the milk and milk products category, 84 facilities and 154 products in the meat category, 24 facilities and 32 products in the fish cakes category, 63 facilities and 103 products in the soft drinks category and 41 facilities and 48 products in the retort-packed food category have been granted approval as of the end of April 2004.

The Ministry of Health, Welfare and Labor, intends, with the co-operation of local authorities, to expand and strengthen this approval system.

(4) Enactment of the Extraordinary measures law concerning the improvement of management of food manufacturing processes

After the Ministry of Health and Welfare decided to introduce the new hygiene standards regarding beef and pork processing, many operators raised queries suggesting that they would have trouble implementing the legislation. Representative opinions included “(the actions required by the legislation) are all new to us,” “Compliance is not possible with our current facilities,” and “We will have to completely overhaul our facilities, but we are already losing money. Will there be any government compensation?”

As the HACCP system has spread, it has become clear that it is difficult to introduce the system efficiently and effectively into small- and mid- scale operations, such as processing factories, which lack sufficient capital and human resources. These difficulties encompass both “soft” aspects, such as technical skill, and “hard” aspects such as the provision of actual facilities.

Therefore, in May 1998, the Ministry of Health, Labor and Welfare, together with the Ministry of Agriculture, Forestry and Fisheries enacted the “Extraordinary measures law concerning the improvement of management of food manufacturing processes.” The law made it possible to implement beneficial fiscal and tax measures which would assist businesses in providing the facilities and equipment necessary for the introduction of the HACCP system

The system prescribed by the above law works as described below. Firstly, industry associations are designated as approved bodies under the law. These approved bodies then grant approval to plans for facilities and equipment upgrades at individual factories under their jurisdiction. As of the end of the fiscal year 2004, 18 industry associations had been designated as approved bodies. These associations had drawn up standards for

the improvement of hygiene, and were working to assist in the introduction of the HACCP system into the food industry. As of the end of January 2004, 168 hygiene improvement plans had been approved by the designated approved bodies.

However, approval by the designated industry associations centers on the “hard” aspects of HACCP, i.e., plans for the provision of facilities and equipment. It does not encompass the “soft,” technical aspects of the system. Therefore, each food industry business and facility that has received approval for their hygiene improvement plans is required to implement a further stage, the actual application of HACCP procedures following their hygiene improvement plans.

To assist in the application of HACCP procedures, the food industry business, which will invest in the upgrade of facilities in accordance with an officially approved hygiene improvement plan, will be eligible for a loan from the Ministry of Agriculture, Forestry and Fisheries. As of February 19, 2004, the terms of the loan were 1.35% interest with a repayment period of 15 years, with interest set to vary according to fiscal conditions. Among other measures of assistance extended to such businesses would be a special depreciation allowance (12% of the cost of machinery, and 6% of the cost of buildings) which would allow for tax savings.

In response to the rising demand for the maintenance of food safety and the thorough implementation of quality control, one may consider that the introduction of HACCP procedures into manufacturing processes at food producers should be further encouraged. To this end, the period of application of the above law has been extended for 5 years, up until the end of June 2008. The amendment granting the extension was issued on June 11, 2003, and went into effect on July 1, 2003.

3. Hygiene management at facilities providing meals for school children

(1) Hygiene management problems at school meal facilities.

The outbreak of diarrhea among elementary school pupils in Sakai City, Osaka, was caused by the contamination of school meals. After the incident, the Ministry of Education designated an emergency list of items requiring inspection in an effort to encourage thorough hygiene management at all schools across Japan. However, although various points for improvement were identified and countermeasures were enacted, eight more incidents of food poisoning in meals at kindergartens and schools occurred in 1996.

The Commission for Research Improvements in School Meal Hygiene Management, a body within the Ministry of Education at that time, observed and inspected cooking facilities for school meals at those schools where the food poisoning incidents had occurred. The commission found numerous problems which indicated low awareness of the problem of food poisoning.

Problems included the following: unsatisfactory methods of hand-washing, which resulted in insufficient cleansing and sterilization of the hands and fingers; straining of vegetables being carried out on the floor; failure to clearly distinguish knives and utensils for use with meat and those for use with vegetables; failure to adequately regulate temperature through refrigerating food after preparation which led to failure to prevent bacteria multiplication; long intervals between preparation and consumption during which the food was left at room temperature; repeated unnecessary floor washing during food preparation, causing a perpetually wet floor which became an environment for bacteria multiplication.

Furthermore, after the incident in Sakai City, as a result of emergency inspections of around 26,800 school meal preparation facilities around Japan, it was found that around 10% of facilities had not taken any steps to improve their hygiene management despite being given guidance on hygiene management procedures.

Independently of the Ministry of Education survey mentioned above, the then Ministry of Health and Welfare conducted two comprehensive surveys of school meals, once from September 1996 to October 1996, and once from April to May 1997.

These surveys found that, as well as the problems found by the Ministry of Education survey of food preparation facilities above, there were also other more serious lapses in hygiene management procedures.

The survey conducted from September to October of 1996 found the following problems: Failure to distinguish between contaminated work areas and non-contaminated work areas; workers involved in transporting food produce from preliminary preparation facilities to actual cooking facilities failed to take appropriate measures such as washing their hands; utensils were not sterilized and stored hygienically after use; no school personnel were present at the site of procurement of raw materials.

In addition, the survey conducted from April to May of 1997 found that although hand-washing practices had improved after being indicated in the prior survey, little progress was being made on implementing the prior survey's other recommendations.

The second survey also found the following new problems: Few facilities kept records of test results concerning the presence of microbes in raw ingredients; few

facilities clearly divided sinks according to usage, failing to separate sinks for cooked ingredients, uncooked ingredients, and sinks for washing utensils; few facilities maintained proper temperature control or kept the necessary temperature and time records, particularly when food was being delivered.

As outlined above, hygiene management at facilities for preparing school meals is found wanting in many areas. The need for those responsible to take immediate remedial measures became clear.

Therefore, the Ministry of Health and Welfare instructed local authorities to issue written guidance, based on the results of the above survey, calling for improvement in hygiene management procedures. Persons responsible for facilities preparing school meals were required to implement the steps detailed in the guidance. In cases where immediate remedy was not possible due to the need to upgrade facilities or other reasons, the Ministry instructed local authorities to demand submission of a yearly plan, in writing, outlining the steps to be taken to improve hygiene management. The plan was to be submitted to the public health center.

Furthermore, in March 1997, the Food Poisoning Sub-Committee of the Ministry of Health and Welfare's Food Hygiene Investigation Committee issued their Results of Investigations into Measure to Counteract Large-Scale Food Poisoning, and published a hygiene management manual for large-scale food preparation facilities. The manual is designed to apply to facilities preparing school meals, defined as facilities preparing over 300 portions of the same meal simultaneously, or over 750 portions of the same meal during the course of a single day.

(2) Hygiene management manual for large-scale food preparation facilities.

The main theme of the manual is that in order to prevent food poisoning in facilities producing school meals, the following Critical Control Points (CCP) should be identified, based on the HACCP methodology:

- 1) Ensure thorough control of hygiene management during the procurement of raw materials and preliminary food processing.
- 2) When preparing cooked food, ensure the food is cooked right through to the center in order to kill bacteria which may cause food poisoning.
- 3) Take thorough measures to prevent the secondary contamination of food after it has been cooked, and of food which is eaten raw.
- 4) To prevent any bacteria which may lead to food poisoning from multiplying, carefully control the temperature of raw ingredients and the cooked product.

At facilities producing school meals, it is essential that hygiene management procedures be established, and CCP be monitored and data recorded. Where necessary, remedial measures should be considered and strictly implemented. Work must also be made towards encouraging the further spread of knowledge of hygiene management.

(3) Standards for hygiene management at facilities producing school meals.

The Ministry of Education revised those items related to school meals contained within the “Environmental Hygiene Standards for Schools,” which was published in April 1997. Items necessary from the perspective of improving and strengthening hygiene management were added, and “Hygiene Management Standards for School Meals” were thus established. The standards are designed to enhance the hygiene management of school meals, and are also designed to be consistent with the Hygiene Management Manual for large-scale food preparation facilities noted above. The Ministry intended that measures to improve and strengthen hygiene management, and also to prevent food poisoning would be enacted based on the standards.

The “Hygiene Management Standards for School Meals” are comprised of the following sections: “School meal facilities and equipment,” “Person responsible for providing school meals,” “Menu,” “Inspection of ingredients for use in school meals,” “Purchase of ingredients,” “Confirmatory checks and storage of ingredients,” “Preparation procedures,” “Delivery and distribution,” “Inspecting and storing food,” “Hygiene management procedures” and “Regular, irregular and daily hygiene inspections.” The Ministry gave instruction to ensure that all food preparation facilities throughout the country followed the manual.

Later, in June 1997, the standing committee of the Food Hygiene Inspection Committee produced a report on the subject of future administrative measures regarding food health. The report contains the following passage:

“The cause of many large-scale food poisoning outbreaks has been found to lie with facilities for the preparation of school meals. As such, strengthening of hygiene management practices at these facilities is indispensable. To achieve this, we believe that it is necessary to investigate ways of introducing hygiene management procedures based on the HACCP system into the food preparation process, and develop feasible, effective measures based on the results of trials. We consider that these measures should include proactive efforts to introduce new methods such as the dry-floor system in food preparation areas, and the cook-chill system (in which foods are cooked thoroughly before rapid chilling, refrigerator storage and subsequent reheating.) In addition, besides the development of such hygiene management procedures, it is necessary to consider

comprehensive regulatory measures including the introduction of regulations under food hygiene laws for facilities serving meals en masse, such as schools and hospitals.”

As a concrete measure, from September 1997, seven facilities for the production of school meals including the school meal center at Shinshinotsu village in Hokkaido, and the Kizaki Elementary School in Akishi City, Hyogo Prefecture have begun trials, which will last over a three-year period, proposing, operating and evaluating HACCP planning.

(4) Issues surrounding the introduction of hygiene management measures into facilities for preparing school meals.

There are many issues which must be considered surrounding the introduction of HACCP methods of hygiene management techniques into facilities for the preparation of school meals.

Many such facilities are not very advanced, with contaminated areas and non-contaminated areas for the purpose of hygiene management being simply delineated only with a red or a yellow line on the floor. Questions therefore remain about the effectiveness of hygiene control procedures. Inappropriate instruction regarding hygiene management also occurs.

There are further problems from the point of view of general hygiene management. These include local authorities, who are responsible for the provision of school meals, tending to postpone comprehensive upgrades of facilities due to fiscal difficulties, and also tending to attempt to reduce personnel expenses by employing part-time workers at directly managed facilities, or by outsourcing food preparation. As a result, there are few directly employed full-time workers other than a limited number of chefs, working hours are decreasing, and it is difficult to carry out thorough training of those involved in food preparation. For both general hygiene management, and for HACCP hygiene management, it is essential to acquire the appropriate knowledge and skills, not only for the actual cooking process but through continued and repeated training.

In addition, cases could occur where partly processed foods, cooked under the HACCP system replace local vegetables and eggs, which are dismissed as unhygienic. Were such a movement to occur, the quality of the school meal from an educational perspective would be significantly impaired.

Methods for disinfecting vegetables outlined in the Hygiene Management Manual for large-scale food preparation facilities above also contain regulation concerning washing with mild detergent and the use of sodium chlorite and sodium hypochlorite, raising concerns about residual chemicals and problems other than food poisoning..

In addition, facilities for producing school meals differ from other large-scale cooking facilities in that every day they produce a different meal in bulk. Therefore some of the CCP change with each item being prepared.

When introducing the HACCP system into facilities for preparing school meals, it is essential that appropriate advanced facilities are in place, and that employees preparing the food understand the system.

Subsequently, in March 2003, the Ministry of Education, Culture, Sports, Science and Technology issued amendments to some parts of the Hygiene Management Standards for School Meals. However, many of those involved in school meal preparation on a daily basis raised the opinion that, while they were aware hygiene management should be a top priority in the preparation of school meals, the standards clashed with the reality of the workplace and led to several problems, including the need for comprehensive improvements to facilities, extensive restrictions on the menu items that could actually be prepared, and a significant increase in the workload connected with recording and documentation.

Going forward, it will be necessary to discuss hygiene management while considering the perspective of school meals as an educational tool.

However, despite the various issues that the introduction of HACCP presents, there are some local authorities who have overcome these problems and are succeeding in their attempts to introduce HACCP methods into school meal preparation.

(5) An example of the successful introduction of HACCP procedures into a center for producing school meals.

Following on from the enterohemorrhagic *Escherichia coli* O157 food poisoning outbreak at the elementary school in Sakai City, Usuki City in Oita Prefecture, which had been investigating methods of providing school meals safely to children, set up a directly managed HACCP school meal center in December 2000.

The center is responsible for producing school meals for 13 schools within the city, and has achieved a high level of safety, together with significant rationalizations and cost savings. These benefits are being realized in an increase in the quality of raw ingredients, and an increase in manual preparation procedures.

Usuki City built the HACCP through research into designated workflow processes, potential hazards, and critical control points at each of the following stages: local production of ingredients, methods of procurement, control of volume of ingredients, menu items, cooking methods, and distribution methods. The research involved many

parties including the staff preparing the food, builders and nutritionists.

Specifically, the system is operated taking the following factors into consideration: “Prevention of contamination of water, ingredients and air,” “Creation of a dry environment which excludes bacteria,” “Creation of structures which do not permit the entry of small animals from the outside,” “Preserving the safety of the cooking environment,” “Stewing, roasting and frying to be carried out at a temperature of over 75°C,” “Control the temperature of marinated food and other refrigerated products,” “Prevent contamination before delivery, prevent contamination during delivery,” and “Ensure hygienic management of containers, cans and other vessels.”

4. Hygiene management at home

In 1997, while incidents of enterohemorrhagic *Escherichia coli* O157 poisoning were down compared to the previous years, there were still some occurrences. Considering only those incidents which were reported to the Ministry of Health and Welfare, food poisoning in the home was the cause of around 20% of incidents.

In order for individual consumers to become conscious of the fact that they are responsible for their food hygiene, maintain a constant interest in food, and enjoy a safe diet, it is essential that people endeavor to do what they can to prevent food poisoning.

For this reason, the “Guide to preventing food poisoning in the home” was published by nine authors who are experts in various fields related to food hygiene. The guide defines the three basic rules of food poisoning prevention in the home - “Prevent bacteria entry, prevent bacteria multiplying, kill any bacteria present.” The guide then identifies six areas requiring specific attention, based on these three rules. These areas are “Purchase of ingredients,” “Food storage in the home,” “Food preparation,” “Cooking,” “Eating” and “Dealing with leftovers.”

Furthermore, the guide emphasizes that the fundamental points of HACCP for food prepared in the home are the same as those for HACCP in factory settings: work to analyze possible hazards, designate the CCP, and then ensure safety through thorough monitoring of the CCP.

It then goes on to explain that the concepts of “cleanliness and “hygiene” are different from what we often imagine them to be, and that HA refers to the analysis of possible causes of food poisoning related to food products and preparation methods, and the development of preventative methods. The guide promotes the use of HACCP concepts in the home, stating that in order to effectuate domestic hygiene management, it is of utmost importance that questions are asked daily concerning possible points of bacteria contamination and multiplication in food products and in the cooking process, and how

such contamination can be prevented. Such preventative measures must then be put into practice.

5 . Promoting the HACCP system

Following the partial amendment of the Food Sanitation Law in July 1995, the HACCP system, which did not previously have a role in Japan's health administration system, has increasingly begun to take root. In 1996, the Ministry of Health and Welfare carried out education and training for prefectural food sanitation inspectors employed to monitor food hygiene, with the aim of drawing up plans for the outline of a HACCP system and actual HACCP facilities. This decision was influenced by events including the multiple outbreaks of enterohemorrhagic *Escherichia coli* O157 which occurred throughout the country. Since 1997, the Ministry has also run an education and training program to develop personnel with a fundamental knowledge of HACCP in each relevant industry.

From 1998, following on from this, regarding the further training and education of prefectural food sanitation inspectors, the Ministry began to encourage local authorities to hold lecture meetings, either alone or jointly with neighboring local authorities, with the aim of imparting fundamental knowledge of HACCP. Furthermore, from 1999, the Ministry of Health, Labor and Welfare aimed to promote the diffusion of HACCP methods by dividing the country into seven blocks and holding training workshops in each of those blocks on how local authorities should give appropriate advice and carry out external verification procedures regarding HACCP systems.

However, while the movement to encourage the introduction of HACCP systems was underway, an outbreak of food poisoning occurred at the Osaka factory of Snow Brand Milk Products Co. Ltd. in June 2000. The factory had received HACCP approval. The incident led to an increase in doubts over the effectiveness of HACCP in maintaining food safety.

However, this incident was not caused by problems intrinsic to the HACCP methods, but rather by problems concerning the attitude of the parties responsible for building and operating the system.

The incident was caused by human error. The company did not correctly follow its own procedural manual, failing to wash valves for periods of two or three weeks, and allowing the company to which it had outsourced product delivery to open returned products in the open-air, before reusing these products.

The incident shows that the final aim of the HACCP system is to provide the consumer with safe products, and that if operators do not have a clear conception of these aims,

then the appropriate operation of the system becomes impossible.

From the standpoint of promoting industry self-regulation, governmental authorities must clarify again the importance of self-responsibility, and endeavor to steer operators in the correct direction regarding the introduction of HACCP. To this end, as we moved into the year 2000, local authorities began to roll-out various measures.

6. Examples of local authority measures regarding food hygiene management

(1) Hokkaido - Independent system for approval of food products produced in Hokkaido

1) Establishing the system

The central government HACCP system is limited to six types of food products including meat and milk products. Furthermore, the standards required are extremely high, and only 40 facilities within Hokkaido were granted approval. Therefore Hokkaido established a system which would be easier for small- and mid-sized operations to tackle, and could apply to all food producers and processors in the region.

The system requires the inspection of 141 items concerning the handling of facilities and machinery, and the attitude of the employees towards sanitation issues. Operations are then graded on an 8 rank scale, according to their score. Excellent performers are rewarded with a “star,” and have their name published through websites and other means.

2) Policy to promote a safe food system for Hokkaido products

This policy was developed jointly by related parties within Hokkaido to promote the adoption of concrete measures to encourage the maintenance of safety and security regarding Hokkaido-produced food, and was finalized in September 2002.

3) Action plan for a safe food system for Hokkaido products

In March 2003, this plan was finalized to move forward with the measures outlined in 2) above in a comprehensive and systematic manner. The plan defines the content and procedures for the above measures, and the roles of those involved.

(2) Kesen-numa City Council for the Promotion of Processed Marine Products “Kesen-numa brand”

This council, made up of those working in the processed marine products industry, established their own standards based on an HACCP methodology, and created a system

which carefully monitored product origin and hygiene management. Processed products from factories which met the standards are approved to be marked with the “Kensen-numa brand.”

(3) Ibaraki Prefecture - Basic action plan to ensure product safety

To ensure the safety of food produce at all stages from production, through distribution to consumption, Ibaraki Prefecture developed an action plan which covers the period from the fiscal year 2003 to the fiscal year 2007.

The prefectural authorities’ action plan involved monitoring, guidance, structures for investigations, research and inspections, support and alliances and the sharing of information necessary to ensure a safe, reliable diet. Producers, vendors, and consumers all develop their own action plans.

(4) Tokyo Metropolitan Government - Autonomous products hygiene management approval system

To improve hygiene standards at vendors of food throughout the metropolitan area, and provide residents with a higher level of food safety, the metropolitan government built a system to actively evaluate and grant approval to voluntary hygiene management efforts.

(5) Saitama Prefecture - Guidelines for producing safe agricultural products

To promote a voluntary production management system based on HACCP, and aim for higher safety standards in agricultural produce, the above guidelines were finalized in August 2003. The guidelines express procedures for producing the prefectures principal agricultural products according to HACCP procedures.

(6) Ishikawa prefecture - Policies for eliminating infection in child care centers using HACCP

In 2002, after a series of outbreaks of enterohemorrhagic Escherichia coli O157 at child care centers within the prefecture, the need for a workable hygiene manual for child care centers increased. In order to carry out hygiene management which can definitely lead to the prevention of group poisoning outbreaks, the prefectures adopted HACCP methods for comprehensive hygiene management at food factories, and created hygiene management procedures suitable for child care centers. These procedures were then introduced.

Going forward, the Ministry of Health, Labour, and Welfare intends to use the seven regional Bureaus of Health and Welfare established around the country to strengthen the system of examination for approval under the “Approval System for General Hygiene Management of Production Process,” which is based on HACCP, and also strengthen guidance for monitoring such approved facilities. The Ministry also wishes to encourage the appropriate operation of HACCP systems and raise awareness of hygiene management issues through educational activities aimed at those working in the food produce industry.

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(Report on diarrhea outbreak among school children in Sakai City)

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