食品のリスク評価－食中毒原因微生物、放射性物質－

Food Risk Assessment - Food Poisoning Causative Organisms, Radioactive Nuclides in Foods

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Hello everybody. I am Eiji Shinmoto from the Cabinet Office Food Safety Commission of Japan.

Today's workshop is on the theme of food safety. Of the three factors mentioned by the chair earlier, I am going to talk about food safety and in particular about risk assessment. The FSCJ conducts risk assessments based on scientific knowledge. As examples of our recent assessments, I will talk about a risk assessment for the microorganisms that cause food poisoning, which were the subject of a previous talk. I will also talk about a risk assessment of radioactive materials which have been the focus of much debate regarding their control ever since the 2011 Fukushima Daiichi Nuclear Power Plant disaster.

When we speak of food risks, we could be referring to a variety of dangers that can affect food. For example, there are biological factors such as food poisoning causative microorganisms, prions, and various chemical substances. There are also physical risk factors, such as the risk of choking when eating certain foods such as devil's tongue. Radioactivity represents another physical risk factor. Dangers such as these exist within the food itself and our task is to assess how great the risk to health might be when people eat various foods. In this context, the scale of the risk is calculated by multiplying the probability of food poisoning occurring (when ingesting a causative agent) by the size of the agent's effect. So even if the pathogen can produce major symptoms, if the probability of food poisoning incidents is very small, the risk may be ignored or else accepted. To clarify risk size scientifically is one of the FSCJ's major roles.

The FSCJ was established inside the Cabinet Office in 2003 to carry out risk assessment and control as part of an overall framework for food safety in Japan. Until that time, the Ministry of Health, Labour and Welfare (MHLW) and the Ministry of Agriculture, Fisheries and Food (MAFF) had conducted risk assessment and risk control separately. But due to the occurrence of various problems relating to food safety a major readjustment to food safety administration was implemented. These problems included the identification, for the first time in Japan, of BSE-infected animals and the distribution of unregistered agricultural chemicals. The FSCJ is an organization established to carry out risk assessment separately from risk control but from a neutral, fair and scientifically reliable standpoint.

As I say, risk control conducted for the regulation and supervision of individual foods is handled by the MHLW and the MAFF while the FSCJ conducts the risk assessment. For instance, in the case of setting a regulatory value for a specific food, the FSCJ scientifically assesses the risk in advance for the specific hazard to be regulated. Based on the assessment results and in addition to any scientific basis, the technological possibilities, cost-effectiveness and other factors are also considered as an integrated whole and the conclusions implemented using concrete control measures. That is risk control.

Under the present system for maintaining safety and reassurance, which is termed risk assurance, risk communication is very important. Risk communication is carried out by the assessment organization and the control organization respectively. However, food safety cannot be realized by the administration alone.

It can only be realized if all the various stakeholders - the businesses, consumers and others – perform their own respective roles properly. Accordingly, all these related parties need to share the relevant information on food safety requirements and communicate it so that everybody understands what needs to be done. This is why an emphasis needs to be placed on risk communication.

About eight years have passed since the FSCJ was established. Over that time we have received requests to conduct well over 1,000 assessments, mainly from control organizations, and we have actually completed more than 1,000 of them. In the livestock-raising field, we have conducted assessments of veterinary-use medical products and feed additives. We are also making a risk assessment of BSE prions in relation to transmissions of variant Creutzfeldt-Jakob disease to humans via BSE.

Today, I am mainly intending to talk about food poisoning and radiation but I will also talk more generally about the BSE situation. The chair of today's workshop, Prof. Yoshikawa, has also chaired the FSCJ's Prion Expert Panel. The FSCJ has carried out a variety of BSE-related assessments. Based on their results, Japan is now implementing control measures on US and Canadian beef imports. We received a new inquiry from the MHLW about BSE in December 2011. In Japan BSE testing is currently required on all cattle more than 21 months old. As for beef from the US and Canada, only beef from animals below 20 months, for which import program guidelines have been followed, is eligible for import into Japan. The MHLW's present request to us is as follows. If the test month for these cattle were to change from 20 months old to 30 months old, how would this change the infection risk?

The MHLW also asked us to conduct a risk change assessment when reviewing SRM in relation to OIE. In concrete terms, the Ministry asked us to carry out the same kind of assessment on Japanese beef, US and Canadian beef, and beef imported from France and the Netherlands, although beef imports from the latter two countries are currently prohibited.

On receiving this inquiry, our Prion Expert Panel began its current deliberations. The initial panel session was held in January and it was recently announced that the second session would take place on February 27. Although I can't say when the deliberations will be completed, I want to assure you that fair and scientifically based deliberations about prions are happening.

I will now introduce several risk assessment examples related to food poisoning causative microorganisms. As Mr. Sakai and Prof. Morita introduced earlier, for the risk assessment of food poisoning, the increase or decrease of each kind of bacteria at the farm stage, distribution stage and consumption stage are all major factors. Also, as Mr. Sakai stated, the farm stage, slaughterhouse stage and distribution stage are controlled by HACCP and the number of bacteria present in food can be heavily influenced by the quality of temperature control in the processing and preparation stages. For risk management we take a scientific approach by analyzing the various contributing factors at each stage.

As one example, I would like to introduce a 2009 case in which the FSCJ produced a summarized risk assessment for Campylobacter bacteria within chicken meat. As Prof. Morita explained in his talk, Campylobacter live in the intestinal tract of livestock including poultry. There is a considerable incidence of food poisoning caused by Campylobacter infected chicken meat. As a countermeasure, the simple sufficient heating of the chicken meat prior to serving can eliminate the problem so there is little reason to worry about cross-contamination if such attention is paid. The FSCJ made a risk assessment on the combination of chicken meat and Campylobacter. The data on which the assessment was based came from actual contamination data in the chicken production and distribution fields. The positive ratio of Campylobacter-infected chickens was quite high at the farm stage, for example, and the contamination persisted throughout the distribution and slaughtering stages. Due to cross contamination, the test-positive ratio increases during the slaughtering process. In addition, an important characteristic of Campylobacter-caused food poisoning is that it can occur if even a small number of these bacteria contaminate food during the cooking or consuming stages. The recent popularity of eating chicken raw is considered a major factor in the spread of this food poisoning.

In risk assessment, it is necessary to consider the possibility of infection at each stage and also the possibility of cross contamination. Firstly, we check the situation at the farm stage, then at the poultry slaughtering stage including the possibility of cross contamination when slaughtering. During the slaughtering process, chlorine concentration control at the water processing stage is used as a means of minimizing infection. Many factors such as these are involved at each processing stage. In this risk assessment, we proceeded with the aim of clarifying the following points scientifically, based on the data collected. These points concern what is the actual degree of risk in the current situation and how concretely will the risk of infection be changed when measures are taken at each stage? As an example of the results of the process, this is an estimate of the probability of infection. This risk assessment was conducted based on a model. The probabilities of infection in the case of eating raw meat and in the case of not eating raw meat are generated. People who eat raw meat become infected approximately 3.4 times per year. But even those who don't eat raw meat have a higher than zero risk — actually, it's 0.36 times per year — due to the possibility of cross contamination. There is nothing particularly surprising about this. It demonstrates the risk of eating raw meat. The risk of infection is high for people who eat raw chicken, although becoming infected is not necessarily the same thing as exhibiting symptoms.

In addition, we made assessments of how the risk of infection changes when specific measures are taken at each stage. For example, we assessed how effective it was at the poultry slaughtering stage when slaughtering facilities made a distinction between chicken from contaminated farms and those from uncontaminated farms, or when people stopped eating chicken raw. And we estimated how far the number of affected individuals could be reduced through a combination of measures such as maintaining thorough control over the chlorine concentration in poultry slaughtering facilities. According to our assessment, if Japanese people would reduce the number of occasions on which they ate raw chicken by 80%, then the number of people infected with food poisoning from raw chicken would decline by 70% compared with the present situation. This assessment includes another estimate of how far the number of infected people would decline if poultry slaughtering facilities engaged in sectioned processing and implemented thorough chlorine concentration control in addition to consumers reducing the number of occasions on which they ate raw chicken.

The results of such risk assessments are reported to the MHLW and the MAFF, which are the supervising authorities. Regarding the present situation, since receiving this particular risk assessment result, the MHLW and MAFF have been conducting their own research and surveys with a view to drawing up specific control measures. Also, they are issuing more strongly-worded cautions to the general public to stop eating raw chicken.

Last year, we also carried out a risk assessment concerning enterohemorrhagic Escherichia coli or EHEC, which was mentioned earlier by Prof. Morita. One of the characteristics of this bacterium is that an infection can lead to food poisoning symptoms even if the number of bacteria present is relatively small. As a result of such contamination, cases in which EHEC contamination of beef and beef liver causes food poisoning are seen. In the same way as with Campylobacter, there is no need for concern about EHEC food poisoning when meat, including chicken, is sufficiently heated prior to serving.

As for the current situation in Japan, at the farm stage, as was mentioned earlier, in some of the facilities monitored, more than 10% of the livestock are infected. Although the rate of infection varies according to the season, a certain amount of contamination is always present. Next, we come to the bacteria detection ratio from carcasses after slaughtering treatment. This varies from year to year within the level shown here. In recent years, the detection ratio has declined significantly, but still a certain amount of EHEC contamination is detected. At the consumption stage, if food is tested, a certain amount of contamination can be detected too.

In this type of risk assessment, the amount of bacteria present is a factor. There is a report of an incident where - to give an example of the minimum number of bacteria that can produce symptoms - food poisoning developed from just two colony-forming units (CFUs). Similarly, there are other cases in which people have developed food poisoning from ingesting very few pathogenic bacteria.

In April and May of last year (2011), there was a succession of deadly food poisoning incidents in Japan involving "yukhoe" (a Korean dish of spiced ground beef served raw). In response to these incidents, the MHLW decided to establish a new standard for foods intended for raw consumption based on the Food Sanitation Act. Accordingly, in April of last year, the FSCJ received a request to conduct a risk assessment, and this is that risk assessment. Before that time, the MHLW set out guidelines, issued notices concerning these guidelines and provided related guidance to business operators, in addition to taking measures to boost public awareness among consumers. However, after it became clear that eating yukhoe was causing food poisoning fatalities, the Ministry decided to set out a standard based on the Foot Sanitation Act backed up by force of law and with penalties for infringement. Prior to establishing this regulation, the Ministry requested the FSCJ to conduct a health impact assessment to serve as the basis for formulating the standard.

This assessment was compiled and summarized by last August and the results reported to the MHLW, after which the new regulation came into force in October of last year. Regarding the outline of the standard set by the Ministry for beef intended for raw consumption, the main points are that the meat must be heat treated by heating it to more than 60 ℃ for more than two minutes at a depth of more than one centimeter from the surface. The standard also specifies other things including temperature control. The reason for specifying heating to more than 60 ℃ for more than two minutes is that, in the course of various research conducted by the MHLW, it was found that when E. coli O157 becomes attached to the surface of whole cuts of meat, depending on the number of days passed since the animal was slaughtered, the bacteria on the surface will move to locations inside the meat. For this reason, it is necessary to heat the meat not only on the surface but also to a certain depth (in order to eliminate the bacteria).

The MHLW's idea is that its ultimate target is to hold down the number of deaths caused by E. Coli O157 annually to less than one person. Based on the number of past deaths and the E. Coli O157 contamination ratio of meat up until now, the Ministry decided to target the amount of microorganism contamination of meat at the time of consumption. Specifically, the Ministry set out a target limit of 0.014cfu/g (colony-forming units per gram). Moreover, because microorganisms propagate during both the processing and consuming stages, in the interest of safety, the Ministry set a target limit for contamination by microorganisms at the processing stage of 10% of the consumption time limit, or 0.0014cfu/g. Also, the Ministry's standard specifies the necessary measures for achieving this target including how to heat the meat and how to conduct inspections to verify whether or not the target has been reached.

The outline of the standard is as written here. In addition, meat intended for raw consumption should test negative for contamination by members of the Enterobacteriaceae family. Specifically, the main hazards are EHEC and Salmonella bacteria. But in the case of meat for raw consumption the index for the test is that the meat should be free from all Enterobacteriaceae bacteria contamination. Of course, various hygiene requirements during the preparation stage are also specified.

This is an outline of the assessment results summarized by the FSCJ in August of last year. To be on the safe side, the MHLW's indicated target limit for microorganism contamination at the time of consumption is set low.

Furthermore, the Ministry has set the target limit for microorganism contamination at the processing stage to make a considerable allowance for safety under conditions of hygienic management. One of the conditions is that no parts of the meat that have not been heat treated should be eaten raw, and because there is no guarantee that the target level of contamination can be achieved by complying with the heating-up process standard alone, it is also necessary to conduct bacteriological testing with the necessary number of samples. This is a point concerning the FSCJ's assessments that was not contained in the MHLW's request. Specifically, it is necessary to test 25 specimens weighing 25g each. The FSCJ also added the caveat to its assessment that validation of the system is an indispensible element of the heating method.

As a result, we can say that meat satisfying the above standard is assured quite a high level of safety. But, even so, the MHLW does not guarantee a zero risk or 100% safety. At the Ministry's council, deliberations proceeded from the standpoint that, basically, people should avoid eating raw meat. The FSCJ also takes the stance that, particularly in the case of children, the elderly, and those with lower levels of natural immunity to the microorganisms that cause food poisoning, attention should be paid to avoid eating raw or undercooked meat.

In addition, the MHLW's council is continuously discussing the handling of raw liver. Administratively, it is known that in December of last year, as a result of research by the Ministry, E. coli and EHEC were detected in liver. If it becomes necessary, the Ministry will issue an assessment request concerning this issue to the FSCJ.

Next, I would like to talk about the risk assessment situation related to radioactive contamination.

When the nuclear accident occurred in March of last year, the MHLW set a provisional regulation value for radioactivity, and this is now used to regulate food distribution. In addition, when there is a possibility of radioactive contaminated food in excess of the regulation value being distributed across a region, instructions are issued about shipment restrictions and intake restrictions within that region. These instructions are not issued by the MHLW but by the Prime Minister or the Government's Nuclear Emergency Response Headquarters to the prefectural governors concerned. In either case, regulation based on the provisional regulation value remains in force at present. Since the nuclear accident created an emergency situation, the provisional regulation value was set in March of last year without any prior assessment from the FSCJ. After the accident, the FSCJ received a request to conduct an assessment from the MHLW. The FSCJ sent back a summary of its results in October. Armed with these results, the MHLW has been conducting concrete studies since April of this year in preparation for setting a new regulation value.

Moving on to the health effects of radioactive contamination, these can be divided roughly into "deterministic" effects and "probabilistic" effects. The deterministic effects, which occur at comparatively high doses, include hair loss and infertility. In the present situation, doses are not at a level that should cause worry about deterministic effects. Regarding the probabilistic effects of low doses, it is necessary to consider the risk of cancer including leukemia. As for the relationship between cancer risk and radiation, radioactive material can emit three types of radiation, known respectively as alpha particles, beta particles and gamma rays, when unstable isotopes change into stable isotopes. Beta particles are fast moving electrons, while gamma rays are high-energy electromagnetic waves, or photons. High-energy radiation of this kind can damage the DNA in the cells of living things including human beings. Basically, our bodies are equipped with functions that can repair this damage, but occasionally, probabilistic damage can remain without being repaired in the form of a mutation that causes a cell to become cancerous. Despite the body's natural defense mechanisms, if such a cell can survive in the immune system, it may propagate and grow into a cancer. Such developments are probabilistic effects that depend in part on the amount of radioactive material present in the body.

Radioactivity is said to have caused genetic effects in animal experiments, but in research on humans, such effects have not been detected. In the ongoing research on the atomic bomb victims of Hiroshima and Nagasaki, no clear genetic effects have been shown statistically up to the present time.

At this point, let me talk a little bit about becquerels and sieverts. The becquerel is the unit employed to quantify radioactive contamination in food, etc., Essentially, it measures the strength of the radioactive emissivity of the substance being measured. However, when radiation enters the body in food, which results in internal exposure, the unit used to quantify the severity of the effect on health is the sievert. Radioactive emissivity differs according to the type of radioactive material and the type of radiation emitted, such as beta particles or gamma rays, but conversion factors based on scientific knowledge have been established for each of these types. There is also a conversion factor from becquerels to sieverts, and this can be used to put a numerical value on the scale of the effect of internal exposure.

In the food health effect assessment we conducted this time, we studied approximately 3,300 domestic and international documents beginning with publications by UNSCEAR (the United Nations Scientific Committee on the Effects of Atomic Radiation), the ICRP (International Commission on Radiological Protection, and the WHO (World Health Organization). In order to clarify the relationship between doses and health effects, we closely examined documents with a focus on whether such radiation dose estimates are reliable or not, and on whether research methods for epidemiological studies are appropriate or not.

Regarding the health effects of radioactive contamination ingested via food, since epidemiological data on internal exposure has been very limited, we studied this subject using epidemiological data that included external exposure as well. Both internal and external exposures are quantified using a common unit, namely, the sievert. Accordingly, if there happens to be some data in which individual doses are given in sieverts, this data can be used for food health effect assessment, so we studied this data as well.

Internationally, in this kind of assessment, the linear non-threshold model is used, particularly for high doses. For example, there is a finding that the mortality risk from cancer increases by 5% at a dose of 1,000 milisieverts. Under the present situation, hypothetically, a risk exists in proportion to the radiation dose even if the dose is small, and risk management is carried out accordingly. Actually, whether or not there is a real health risk at low doses has not been proven, but risk management is conducted based on the hypothesis that the risk is real.

On the other hand, the FSCJ's role is to clarify this risk based on scientific knowledge, so we have studied this risk based on epidemiological data on people who have been exposed to radiation. This is the epidemiological data we used. The first is from the State of Kerala in southern India, a region where natural background radiation is relatively high due to there being comparatively large amounts of radioactive thorium in natural sand deposits. The results of this survey, which followed 70,000 residents in Kerala over a ten-year period, showed no increase in the risk of developing cancer. According to the report, despite some very high doses (including cumulative doses as high as 500 milisieverts) the researchers found no link to carcinogenesis. However, in the case of atomic bomb victim data from Hiroshima and Nagasaki, the mortality risk from leukemia was found to rise statistically at above a borderline level of 200 milisieverts. The results of an epidemiological survey that had followed almost 100,000 people for 47 years, in the case of a group that had experienced radiation exposure of between zero and 125 milisieverts, showed a statistical rise in mortality risk due to carcinoma. But this rise couldn't be confirmed in a group that experienced radiation exposure of between zero and 100 milisieverts. So the risk only becomes visible statistically when radiation exposure levels rise above 100 milisieverts.

This is a document concerning the effects of radiation on children. According to the text, available data indicates that children are generally more sensitive to the effects of high radiation doses. However, the epidemiological data is extremely limited concerning children exposed to low radiation doses, as in the case of the Fukushima Daiichi nuclear accident. We also studied two documents concerning Chernobyl. One of them reports that the risk of leukemia was higher among children aged less than five years. There was also a document stating that the younger the age when radiation victims were exposed, the higher their risk of developing thyroid cancer. However, when we looked at this document from an epidemiological and statistical perspective, we found that the dose estimates were imprecise in certain respects. Accordingly, the FSCJ judged that uncertainties remain concerning the risk from exposure to a given dose of radiation.

The next piece of data I want to show you concerns the effects of exposure to radiation on fetuses. This is the outline of an assessment we carried out in October of last year based on other documents and the results of an epidemiological survey. The effects of radiation exposure can be seen when the lifetime additional cumulative effective dose climbs to approximately 100 milisieverts. The significance of the term "additional" here is that, even before the Fukushima Daiichi nuclear accident, people were exposed to natural radiation in the course of their everyday lives. For Japan, the natural background radiation level is in the order of 1.5 milisieverts annually. Also, we are occasionally exposed to radiation in the course of medical examinations. When there is additional food-mediated radiation, beyond such natural background and medical examination-related radiation, and reaching 100 milisieverts, the effects of radiation exposure begin to be seen. Specifically, we evaluated that a risk of cancer occurred at this level.

The words here state, "during life". But in the summary it specifies that during the period of childhood, sensitivity is higher than in the period of adulthood. This is what was stated in a document dealing with the Chernobyl accident. But we could not share this conclusion because on close examination the data was uncertain with respect to dose estimation. However, the possibility of this conclusion being correct is high, so the FSCJ has included it within the summary. Regarding the health effects of doses below 100 milisieverts, we were unable to refer to this data. Although there is a document stating adverse health effects even at doses below 100 milisieverts, we were unable to employ it because the theoretical estimates used were incorrect. More than anything, the risk of developing cancer is affected by a long list of things ranging from consuming alcohol or tobacco to lack of vegetables, lack of exercise, etc., and there is a possibility that the effects of these various risk factors and the effects due to exposure to low doses of radiation are not clearly distinguished. As FSCJ assessments should be made statistically and epidemiologically, and given the small size of the epidemiological data, such small risk differences could not be detected, although there is a possibility that such differences are real. From this, the FSCJ decided that it was difficult to make a judgment regarding the sensitivity of children to low doses of radiation.

This is the result of the FSCJ assessment in which we considered that approximately 100 milisieverts is the borderline between safety and danger. This is not a scientifically determined border because it has not yet been made clear scientifically that a person who receives a radiation dose higher than 100 milisieverts always develops cancer, or that a person who receives a dose lower than 100 milisieverts has no risk of developing cancer at all. But it does represent a value that risk management organizations can consider when conducting risk management.

Cancer has a variety of causative factors, and to prevent cancer there are also many factors that can play a role such as eating lots of vegetables and exercising, etc. Individuals themselves need to consider which preventative measures they should take for preventing the likelihood of cancer.

In this slide, you can see the radiation dose that Japanese people were receiving from the natural world before the nuclear accident. The Japanese receive about 1.5 milisieverts per year from such natural sources. So in the course of his or her life so far, a 70-year-old Japanese would have cumulatively received approximately 100 milisieverts. This breaks down into radiation received from cosmic rays and from the ground or soil. There is also some radioactive radon and thoron within the atmosphere so there is some internal exposure when we inhale. On top of that, we take in the equivalent of 0.4 milisieverts of radiation per year from food.

The radioactive substances in food include potassium 40. Potassium is a naturally occurring element and a necessary component within living things. Approximately 0.012% of naturally occurring potassium is the radioactive isotope potassium 40. Since the half-life of this isotope is very long (at 1.2 or 1.3 billion years) it continuously remains present in food. So there is always a certain amount of radioactive potassium 40 present in all foods containing potassium. Also, if we check dried food, we always detect a certain level of radioactivity. In this assessment, the FSCJ addressed the issue of how things stand when radioactivity from food is added to the radioactivity exposure from other areas of our lives in order to provide a guide to cancer risks when food-mediated radioactive exposure increases above 100 milisieverts.

Since receiving this assessment in October of last year, the MHLW has been reviewing its specific standard 'values'. This is the provisional regulation value set in March of this year. For example, in the case of meat, an upper limit of 500 becquerels has been established, although this will be reviewed in April. Under the new regulation value plan, the classification is also being reviewed. According to the new regulation value idea, the regulation values are 10 for drinking water, 50 for milk, 100 for general food and 50 for baby and infant food.

The provisional regulation values were decided with the idea of keeping exposure to radiation from cesium below 5 milisieverts per year, with the dosage divided between specific foods. But the new regulation values are based on the FSCJ's assessment results, etc., and designed to keep exposure below 1 milisieverts per year.

The dividing method employed is as follows. In addition to cesium, food contamination with strontium or plutonium is considered a possibility. The MHLW explained the thinking behind the new regulation values as follows. By setting this low limit for radioactive cesium, any hidden radioactive effects from strontium or plutonium will also be controlled.

The method used for dividing the regulation value among specific types of food in order to set the new regulation values was to first remove the portion for drinking water and then to divide the remainder among the various general foods. Naturally, the amount of food people consume varies according to age, so sensitivity to radioactivity likewise differs according to age. Accordingly, the maximum values are calculated by paying consideration to these aged-related variations in consumption volume and sensitivity to radiation.

In terms of age categories, to take babies aged less than one year old for example, since the volume of food they consume is small, if a limit value of 460 becquerels is set, their radiation intake will not be in excess of 1 milisievert per year. By contrast, to take the example of adolescent boys aged 13 to 18, since they tend to have large appetites, a radiation intake of no more than 1 milisievert per year cannot be guaranteed unless a limit value of 120 becquerels is set for food. The MHLW's thinking was to make this calculation for each generation or age group, and then, based on the most severe case (which was 120 becquerels) to set the regulation value even lower at 100 becquerels. Also, in this calculation, the value was set based on the idea that half of the food people eat is contaminated by radioactive material.

Concerning this point, some people have voiced the opinion that, in practice, it could never happen that 50% of the food people eat was contaminated, but the

MHLW made this calculation expressly to ensure a considerable margin of safety.

The Ministry makes estimates of how much radioactive material people are ingesting from food. Currently, each municipality is testing food. Based on the results of these tests, using laboratory data covering the period from August to November of last year, and also on the assumption that no contaminated food (contaminated with radioactive material in excess of the new regulation limit) is distributed, in the case that food contaminated at levels below the regulation value is distributed, the Ministry estimates how many sieverts per year of radioactivity people who eat this food will be exposed to.

According to a calculation made using the median value of the test results, the radioactivity intake is 0.043 milisieverts per year. Likewise, when a calculation is made on the assumption that people eat food with levels of radioactivity comparatively higher than those of 90% of the samples recorded in the laboratory result data, the intake rises to 0.074 milisieverts. So, on the basis of these calculations, we can expect levels of actual exposure to be quite low.

Actually, this laboratory testing was mainly carried out on food produced in eastern Japan, which means the food had comparatively high levels of contamination (from a national average standpoint). Even so, the estimate shows this rather low result.

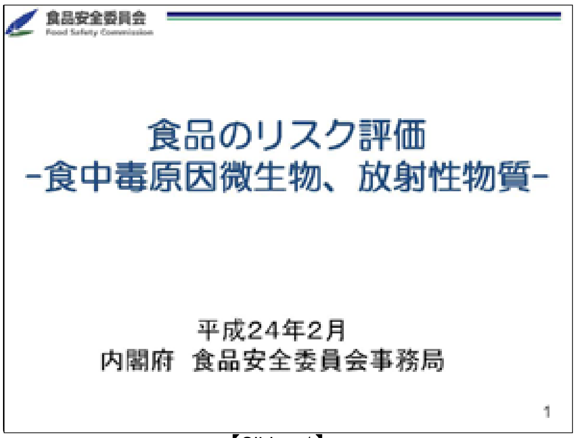
To carry out its tests, the MHLW bought food that was on sale locally in Tokyo, Miyagi and Fukushima, and checked how much radioactive material the foodstuff contained. This slide shows the results in various regions. Earlier, I said that food contains potassium and that a certain amount of it occurs in the form of the radioactive isotope potassium 40. What this means is that food contains the equivalent of an annual dose of 0.2 milisieverts of potassium. The Ministry also checked how much radioactive cesium 134 and 137 are contained in this food. In the case of various regions of Tokyo, the levels were extremely low. In the case of Miyagi and Fukushima, despite the fact that the most of food bought was produced locally, the level of radioactive cesium detected was at a very low level - equivalent to an annual dose of just 0.02 milisieverts. So, when actually distributed foods were examined, they were found to contain only tiny amounts of radioactive cesium even when compared to the levels of naturally occurring radioactive potassium.

Although this is the actual situation, the MHLW has set out regulation values with the aim of guaranteeing a considerable margin of safety.

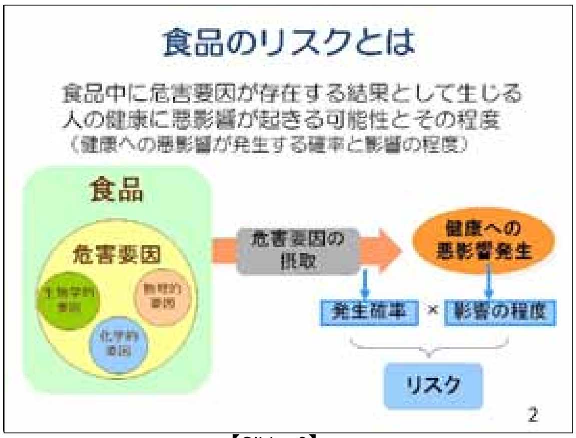
From this January, the MHLW and the FSCJ began jointly holding a series of explanatory meetings in various regions concerning the presence of radioactive material in food. In Kansai, a meeting is scheduled to take place in Osaka on February 28.

Lastly, we are undertaking the various efforts I have introduced here as part of the FSCJ's approach to risk communication. On the FSCJ's website, you'll find the answers to a wide range of FAQs concerning the radioactive contamination and food poisoning issues, so I hope you will make good use of this information.

Thank you very much for your attention.



【Slide　1】



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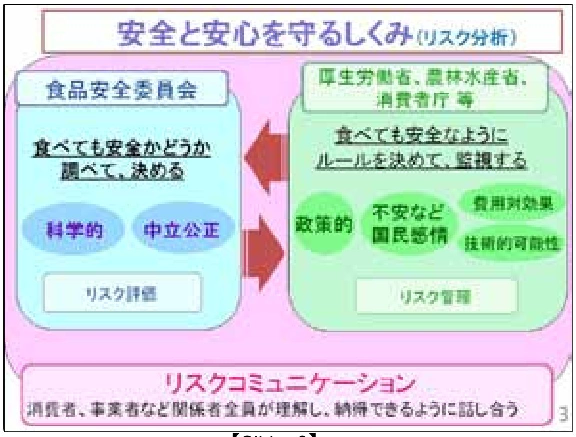

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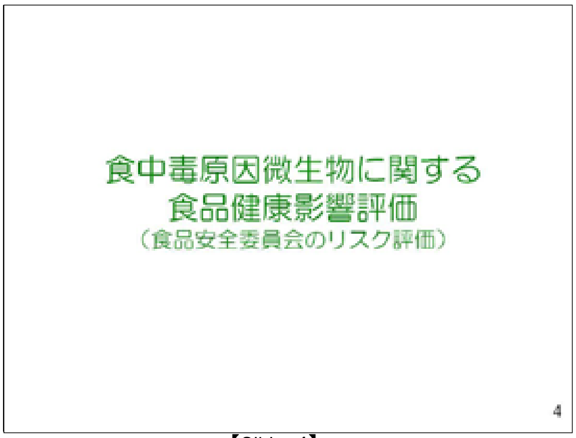

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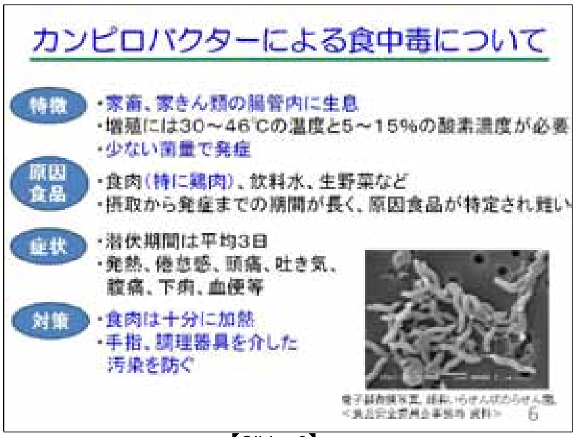

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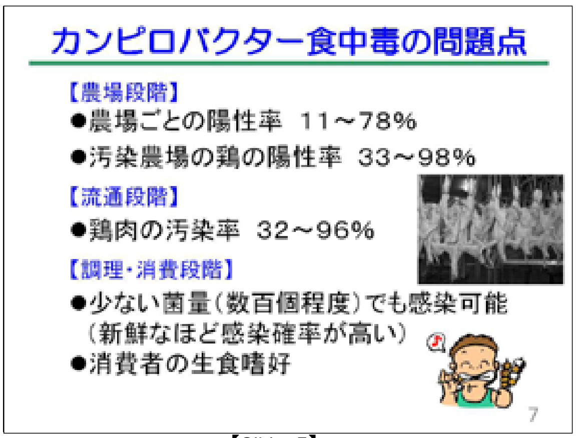
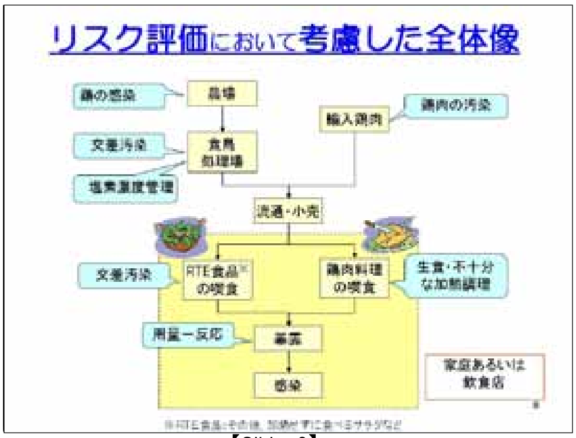


【Slide　7】



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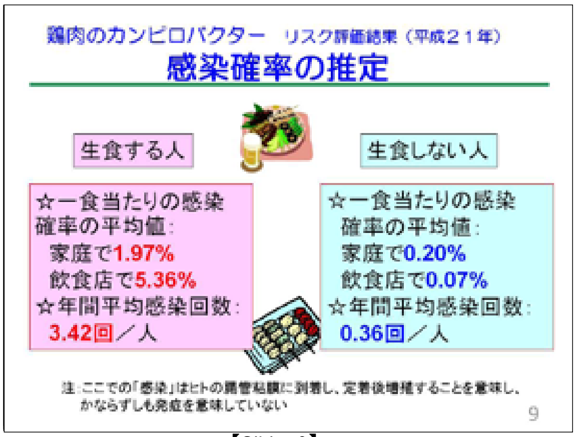
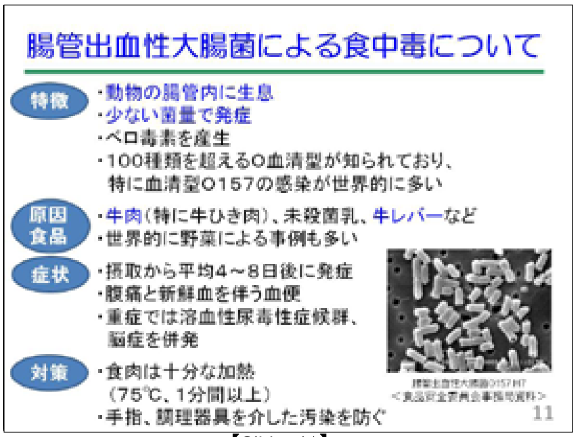


【Slide 9】

【Slide 10】



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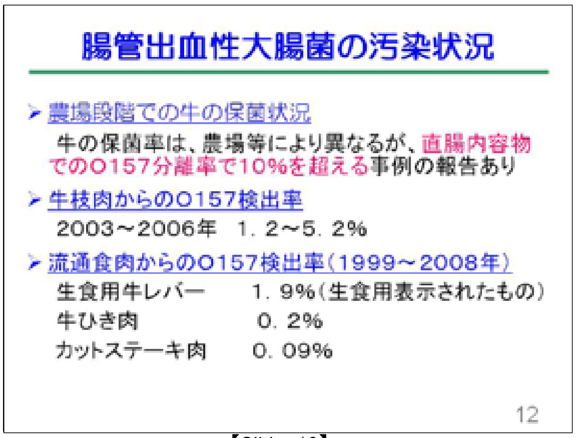

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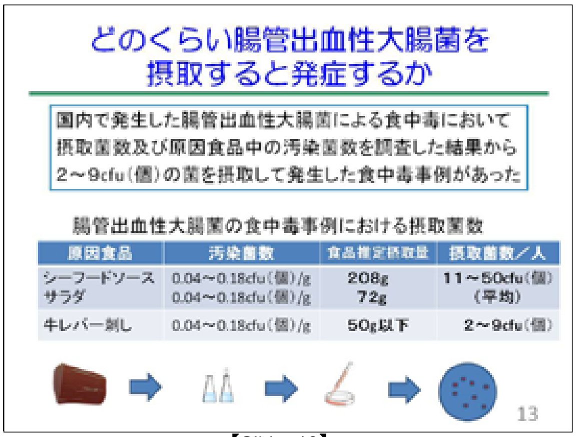

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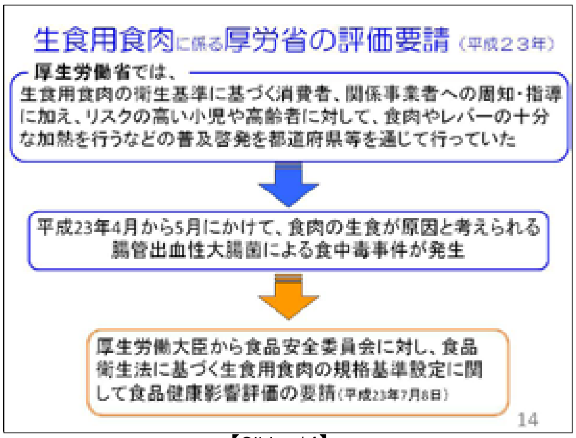

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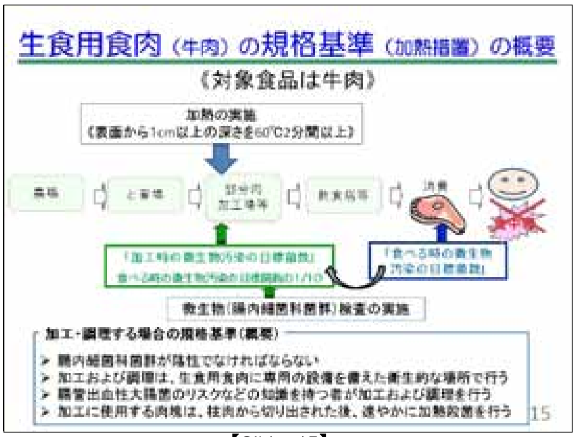

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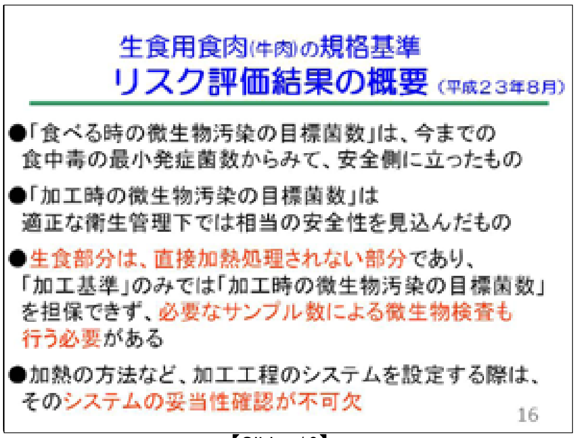

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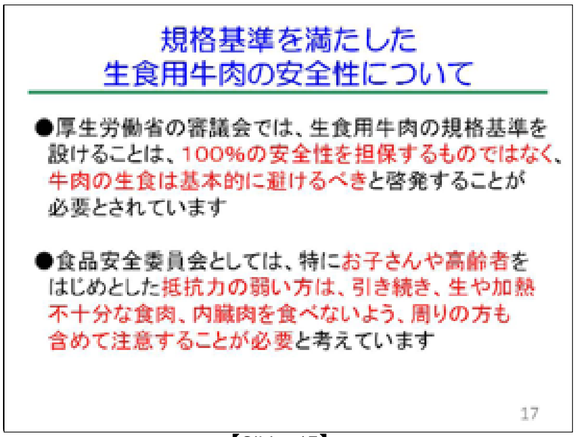

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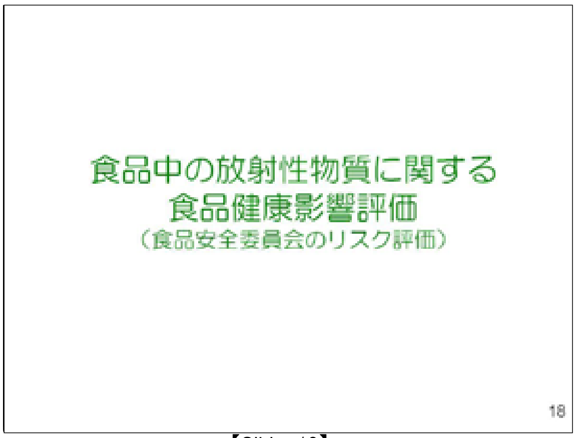

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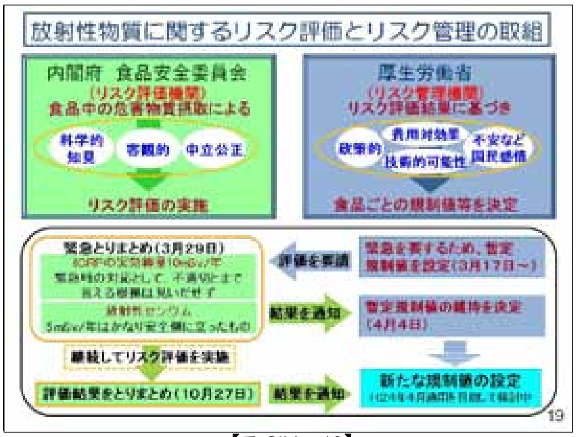

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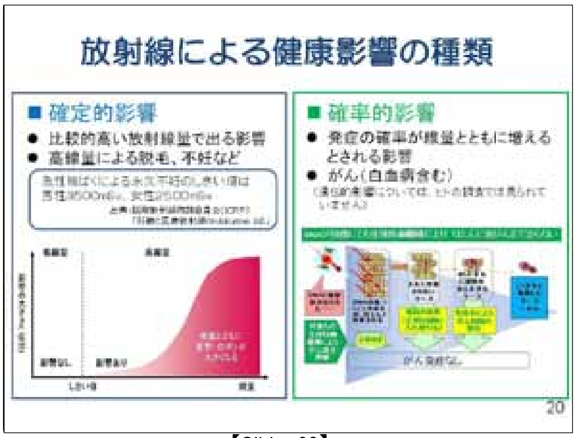

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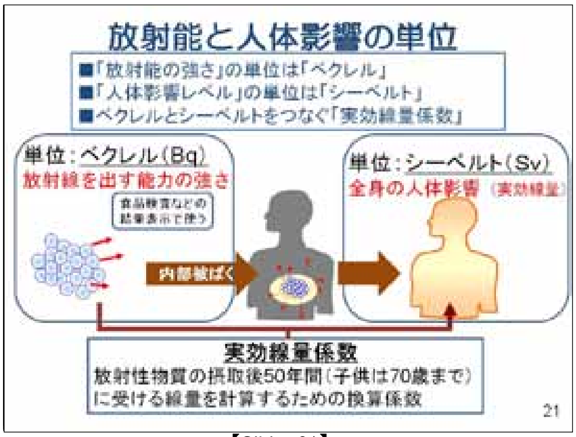

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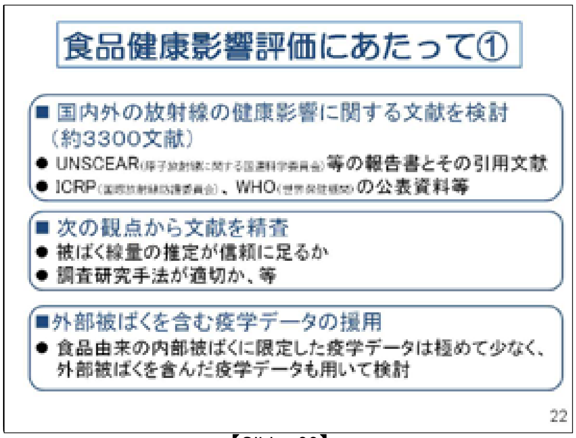

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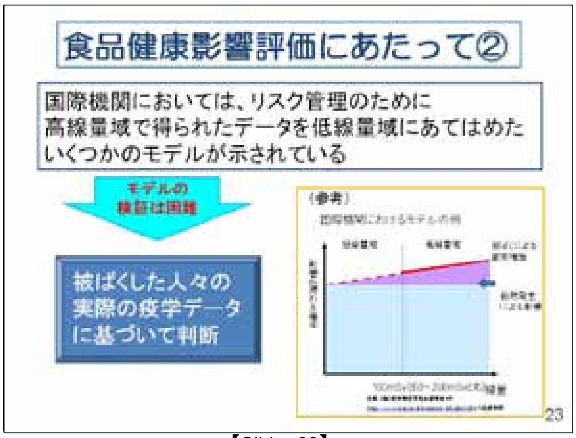

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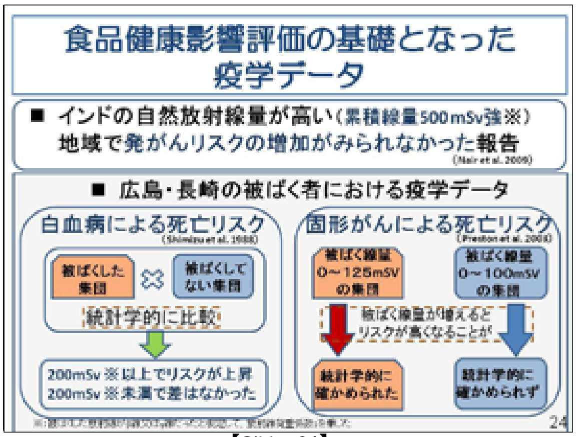

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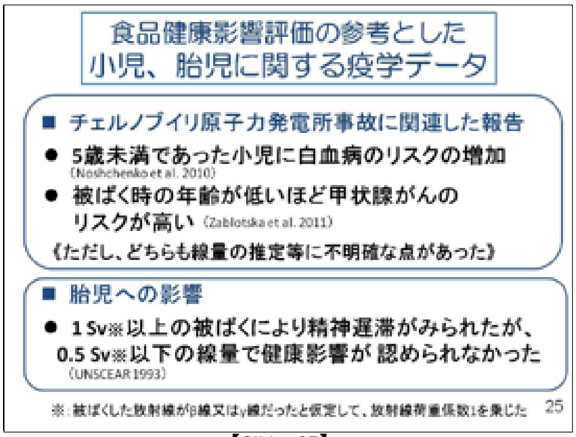

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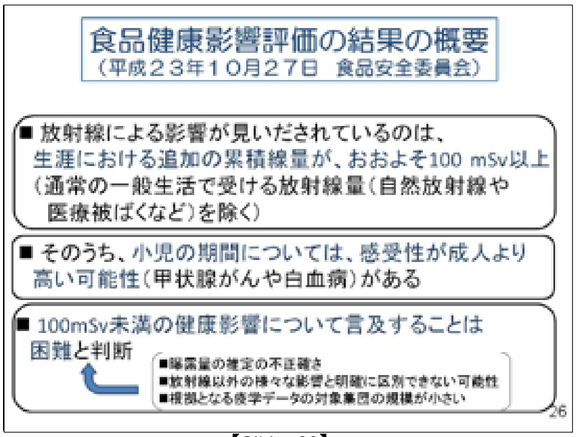

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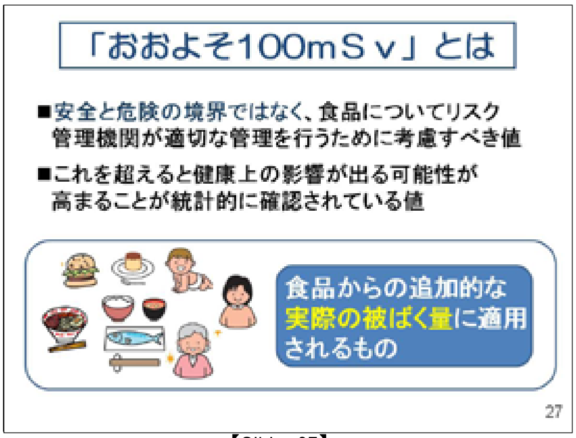

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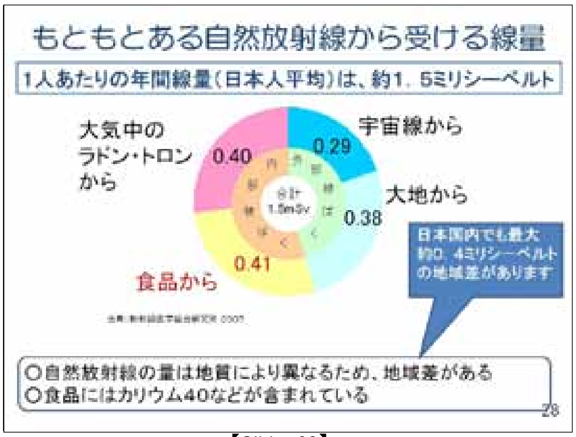
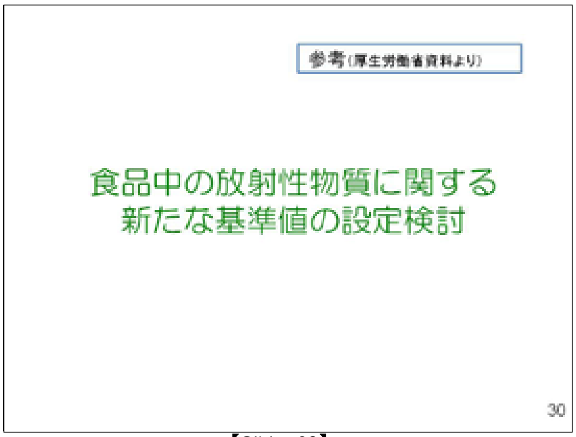


【Slide 28】

食品名	放射能	食品名	放射能
干し昆布	2,000Bq/kg	魚	100Bq/kg
干し椎茸	700Bq/kg	牛乳	50Bq/kg
お茶	600Bq/kg	米	30Bq/kg
ドライミルク	200Bq/kg	食パン	30Bq/kg
生わかめ	200Bq/kg	ワイン	30Bq/kg
ほうれん草	200Bq/kg	ビール	10Bq/kg
牛肉	100Bq/kg	清酒	1Bq/kg

【Slide 29】



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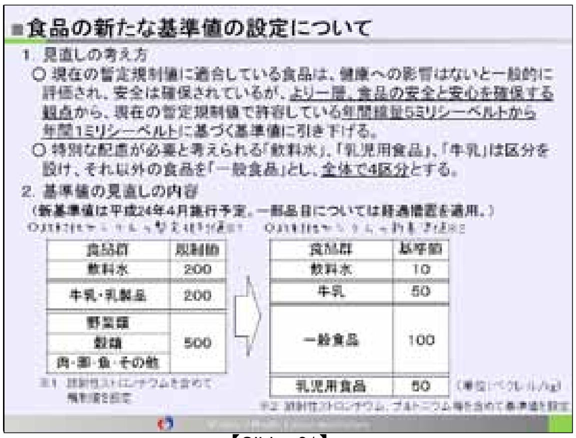
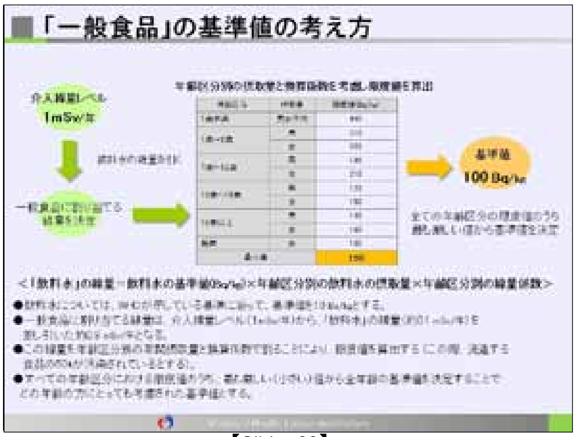


【Slide 31】

【Slide 32】



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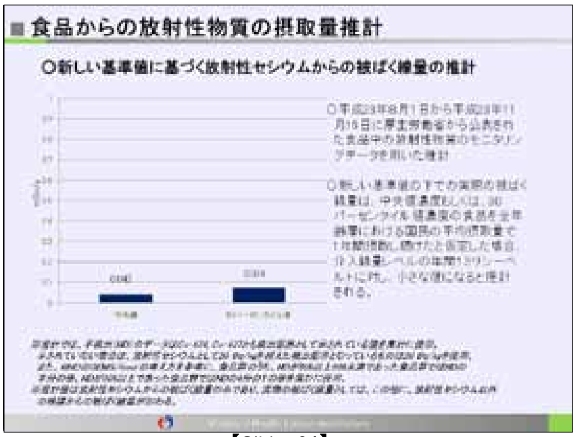

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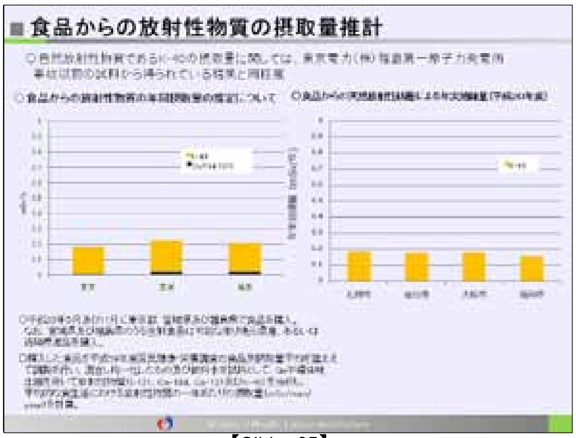

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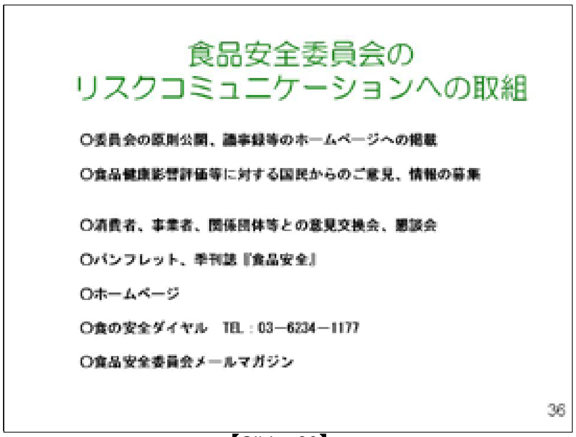

【Slide 36】

【Slide 37】