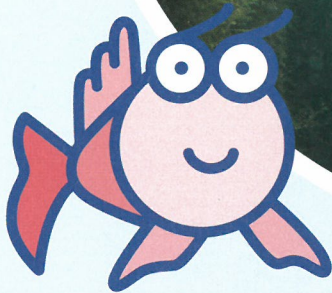


Minamata Disease for Beginners

Let's learn about Minamata disease.



Revived Minamata Bay
Photo by Tamaki Ozaki

Let's reflect on the following questions before going to the next page.

- Q1** How did Minamata disease occur?
- Q2** What kind of disease is it?
- Q3** What damage was caused by Minamata disease?
- Q4** What measures were taken against Minamata disease?
- Q5** What is the current situation of mercury in fish in Minamata Bay?
- Q6** What can be learned from Minamata disease?

Q1 How did Minamata disease occur?

A1 Minamata disease was officially recognized for the first time in Minamata, Kumamoto Prefecture, Japan in 1956. The Minamata factory owned by Chisso Corporation was a major chemical factory in Japan, producing various chemical products. While producing acetaldehyde, a highly toxic chemical called **methylmercury** was generated as a by-product, which the factory drained into Minamata Bay with effluent. As a result, this methylmercury from the factory was taken in by fish and shellfish and the people who consumed such fish for a long time were stricken with Minamata disease.

The same disease later occurred in the Agano Basin in Niigata Prefecture in 1965. It was caused by methylmercury in the drainage from the Showa Denko Kanose Plant, and it is called Niigata Minamata disease (the second Minamata disease).

Fig.1 Food chain

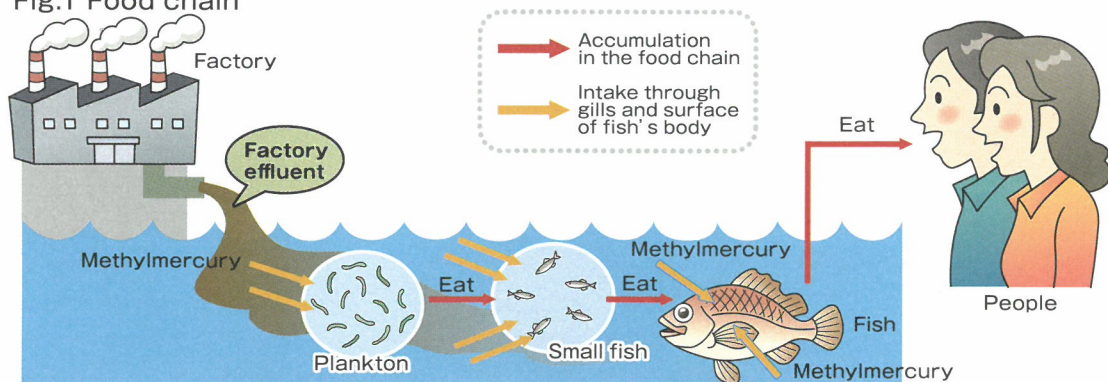
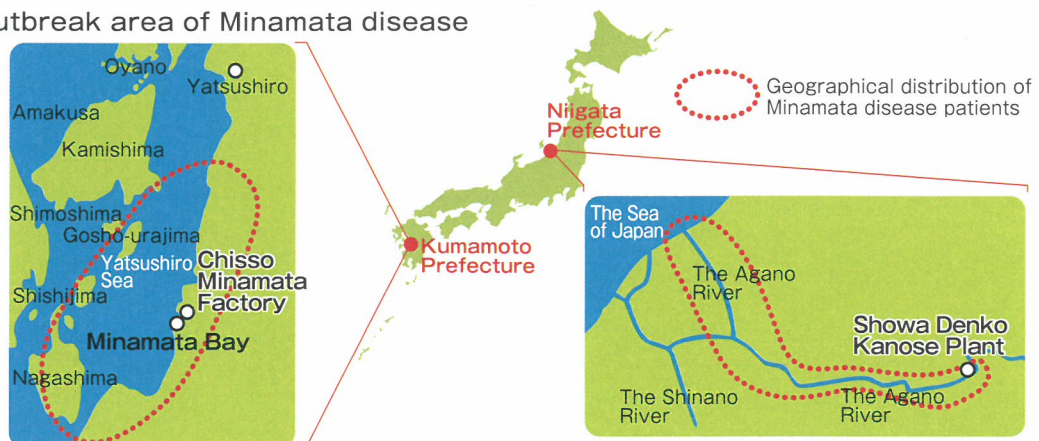


Fig.2 Outbreak area of Minamata disease



Partly revised version from "Minamata Disease: Its History and the Measures from 2002", by the Environmental Health Department of the Ministry of Environment

?

What is methylmercury?

Mercury is categorized into three forms; metal mercury, inorganic mercury and organic mercury. Methylmercury, which caused Minamata disease, is one type of organic mercury and it is extremely poisonous. It was used as an agricultural chemical in the past. Metal mercury has been used in thermometers and fluorescent lights and is ubiquitous. Inorganic mercury is used in lacquer work or in shrine buildings as a raw material for red paint.

Q2 What kind of disease is it?

A2

Some of the main symptoms of Minamata disease are loss of sensation in the hands and feet, awkward movements, narrowing of visual field, difficulty in hearing, and slurred or unclear speech. The symptoms and its severity vary depending on the individual.

Among sufferers with severe symptoms in the initial period of the outbreak, some went into convulsions, lost consciousness, and died. These symptoms were caused by methylmercury, which was taken in the body and damaged the brain and nervous system.

Some babies were born with the symptoms of Minamata disease (fetal Minamata disease patients), whose methylmercury was taken in their bodies through the umbilical cord while they were in the womb of their pregnant mothers.

Minamata disease is intoxication of methylmercury and is not passed from person to person through air or food. It is not inherited, either. Of course, it is not a disease endemic to Minamata.

It is impossible to restore brain cells once they are damaged by methylmercury. It is said that there is no proper treatment to cure Minamata disease. The main treatment is only to mitigate the symptoms temporarily.

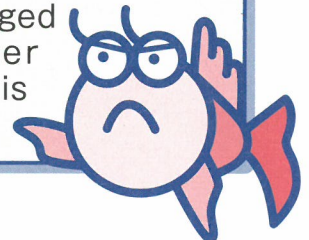


Fig.3 Main Symptoms of Minamata Disease

Falling over quite often
Difficulty in walking straight

Difficulties in daily life such as buttoning, putting on and removing clothing, and performing other simple activities

Unable to speak clearly

Reduced peripheral vision

Difficulty in distinguishing sounds

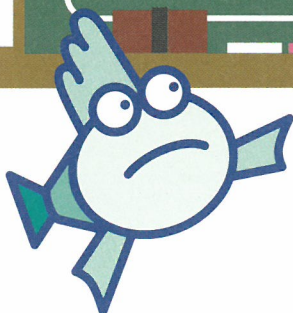
Difficulty in hearing what others are saying

Continuous numbness

Difficulty in feeling pain and being touched

Difficulty in feeling temperature extremes

The symptoms of Minamata disease vary from person to person.



Q3 What damage was caused by Minamata disease?

A3 ① Damage to health

Minamata disease sufferers are concentrated along the coastal area of the Yatsushiro Sea, mainly around Minamata Bay, and along the Agano Basin in Niigata Prefecture. Many people suffered from health damage caused by Minamata disease. The number of sufferers who have been certified is 1,789 in Kumamoto Prefecture, 493 in Kagoshima Prefecture, and 714 in Niigata Prefecture, as of late December 2018, and even today the pain of sufferers has never been cured.

② Environmental Pollution

Due to the drainage from the Chisso Minamata Factory, a huge amount of sludge contaminated with mercury accumulated at the bottom of Minamata Bay, and the environment was polluted. The thickness of sludge at the bottom at times reached 4 m.

Because fish and shellfish in Minamata Bay were polluted with mercury, people could neither catch nor eat fish.

③ Discrimination / Prejudice

When the cause of Minamata disease had not yet been identified, people thought it was contagious and passed from person to person through the air. Therefore, people never approached houses of sufferers, and showed discrimination against them by rejecting their opportunities of employment and marriage. Such unreasonable discrimination and prejudice tortured sufferers and their families.

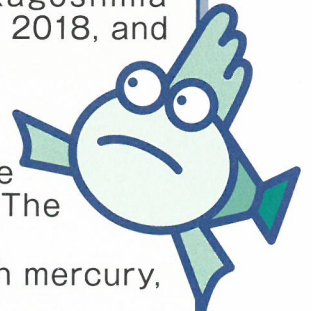
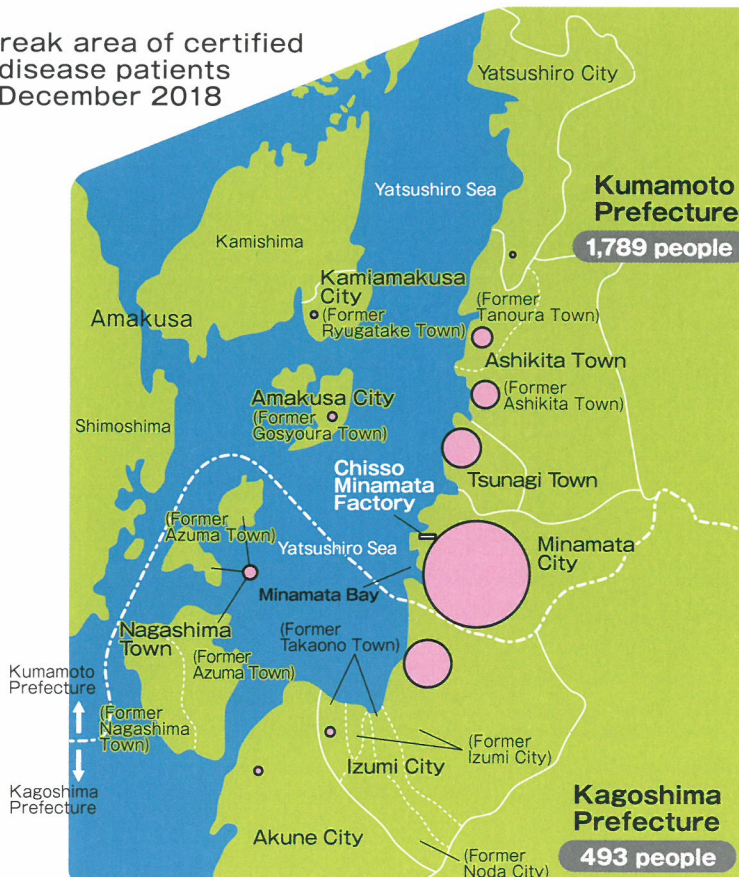


Fig.4 Outbreak area of certified Minamata disease patients As of late December 2018



The size of the pink dot (●) represents the number of patients

Q4

What measures were taken against Minamata disease?

A4

① Against Damage to Human Health

1. Certification of Minamata Disease

New laws were enforced to bring relief to Minamata disease patients in 1969. Those patients who were certified as suffering from Minamata disease by the national and prefectural governments after undergoing the examination of the Minamata Disease Certification Council (a council formed by university professors and specialized doctors) receive compensation for medical expenses, medical care allowance and lump sum payment.

2. Implementation of Medical Care Program of the Comprehensive Measures on Minamata Disease

Those who are not certified as suffering from Minamata disease by law, but lived in the surrounding areas of Minamata Bay, eating a large amount of fish at the time of the initial outbreak, and those who show similar symptoms to Minamata disease (sensory disorder of hands and feet, and other neurological symptoms) receive medical expenses and other support from Kumamoto and Kagoshima prefectures. During the period between May 1, 2010 and July 31, 2012, applications for relief were accepted based on "Act on Special Measures Concerning Relief for Victims of Minamata Disease and Solution to the Problem of Minamata Disease", and about 65,000 people nationwide applied for this. In Kumamoto Prefecture, 43,000 people applied for it, and over 37,000 people received the relief.

② Against Environmental Pollution

1. Installation of Dividing Net

After the outbreak of Minamata disease, residents were instructed not to catch and eat fish from Minamata Bay. In 1974, Kumamoto Prefecture installed the dividing net to shut polluted fish in Minamata Bay. All polluted fish shut up inside the dividing net were caught and disposed of.

2. Environmental Restoration of Minamata Bay Reclamation Works

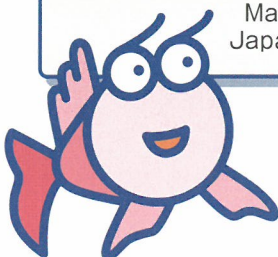
In 1977, Kumamoto Prefecture started dredging the huge amount of mercury sludge which had accumulated on the bottom of Minamata Bay and sealed it inside an embankment of reclaimed land. The construction was completed in 1990, taking 14 years and 48.5 billion yen, and a huge area of reclaimed land of 58.2 ha (equivalent to the approximate size of 82 soccer pitches) was created. As a result of the reclamation project, Minamata Bay returned to its original state (cover photo), and people now can swim here and enjoy recreation.

③ Against Discrimination and Prejudice

Moyai-naoshi Centers were constructed in order to regenerate the Minamata and Ashikita areas and restore ties among local residents. Now they are used as places for residents to enjoy interactions and are hubs to provide healthcare service and welfare.

The Minamata Disease Municipal Museum, the Minamata Disease Archives, and the Environmental Education and Intelligence Center were established next to the reclaimed land in order to provide visitors with opportunities to study the issues of Minamata disease and the environment. Presently 10 sufferers work here as storytellers, introducing the history of Minamata disease and disseminate the lessons they learned from the experiences of Minamata disease. Their photographs and their messages are shown on the homepage of the Minamata Disease Municipal Museum. Some other sufferers also tell their stories about Minamata disease at various places and schools. Activities of the Minamata Disease Archives include collecting information regarding Minamata disease and research. In addition, the Environmental Education and Intelligence Center provides educational guidance on various environmental issues.

Many students from primary and junior high schools visit these facilities from all over Japan to learn about the environment.



What is Moyai-naoshi?

Moyai is a Japanese word meaning "to moor boats" or "to do something together by mutual cooperation". In Minamata, the term "Moyai-naoshi" is used to restore relationships between people which had been torn down and to restore the relationship between the environment and the area's people.

Q5

What is the current situation of mercury in fish in Minamata Bay?

A5 The concentration level of mercury in fish and shellfish in Minamata Bay gradually decreased due to the discontinuation of acetaldehyde production at the Chisso Minamata Factory, the dredge and reclamation of sludge in Minamata Bay, and the capture and disposal of fish contaminated by mercury.

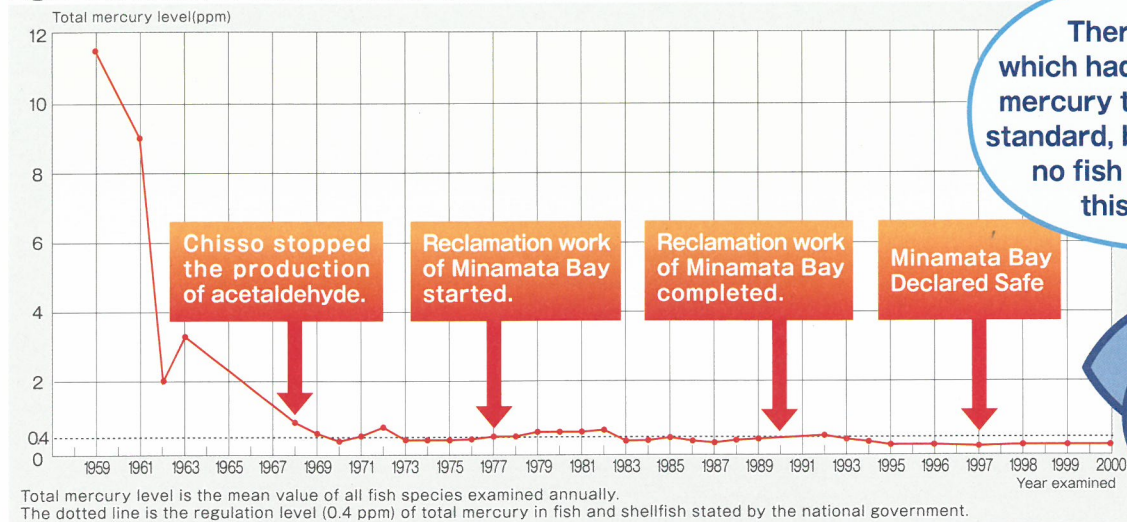
As the concentration level of mercury in fish and shellfish in Minamata Bay had been lower than national standard for three consecutive years up to 1997, the Kumamoto prefectural government declared that all fish and shellfish in Minamata Bay were safe, and removed all dividing nets which had been set up at the entrance of Minamata Bay. As a result, people were once again able to catch and eat fish in Minamata Bay.

Now Minamata Bay is considered clean and its fish are safe to eat.

The prefectural government is regularly checking the concentration level of mercury contained in fish and sea water in Minamata Bay. The level has been lower than the national standard.



Fig.5 Transition of total mercury level of fish and shellfish in Minamata Bay



There were fish which had higher levels of mercury than the national standard, but now there are no fish which exceed this standard.

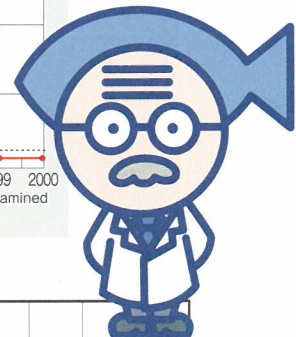


Fig.6 Transition of total mercury level of Minamata Bay after FY2001

	2001	2002	2003	2004		2005		2006		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
				Addition	First half	Later half	First half	Later half													
Scorpion fish	0.36	0.33	0.34	0.40	0.36	0.38	0.37	0.26	0.30	0.31	0.31	0.39	0.38	0.30	0.28	0.33	0.29	0.32	0.29	0.27	0.26
Bambooleaf wrasse	0.22	0.22	0.20	0.19	0.17	0.18	0.18	0.17	0.15	0.13	0.19	0.23	0.20	0.19	0.18	0.17	0.20	0.15	0.12	—	0.15

unit : ppm



What is ppm?

One ppm is a concentration level of one millionth of one percent (0.0001%). For example, if a tank with a depth, width, and height of 1m respectively is filled with water, 1g of red ink (1ml) added the water would be equivalent to 1ppm.

Q6

What can be learned from Minamata disease?

A6

① We should cherish the life, health of people, and the environment.

When Minamata disease occurred, increasing profit had priority in many factories and protecting health, life, and environment were easily set aside. As a result, various types of pollution (including that which caused Minamata disease) occurred all over Japan. We have to treasure life, health, and environment the most.



② Pollution must be prevented before it occurs.



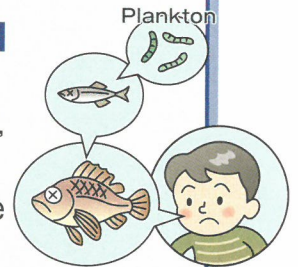
Once pollution occurs, the life and health of people once lost will never be recovered again. It is very difficult to restore the environment once destroyed.

We should never cause pollution. In order to do that, we need to take care in our daily life not to cause pollution.

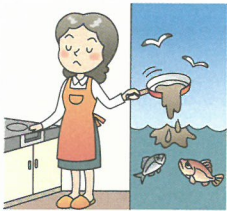
③ Once pollution has occurred, we should try our best to limit its harmful effects.

Because Minamata disease was not immediately identified, many people were unknowingly contaminated.

In such cases, we need to find the cause as soon as possible in order to minimize suffering.



④ Everyone should make efforts to protect the environment.



Minamata disease was caused because methylmercury was drained into Minamata Bay with factory effluent. We might be polluting our environment and causing destruction of the environment without noticing it in our daily life.

Each one of us can protect our environment by not disposing of garbage or polluted water into the seas or rivers.

⑤ We should strive to acquire correct knowledge and abandon discrimination and prejudice.

Because people had an incorrect understanding of Minamata disease, sufferers and families had a hard time and faced discrimination and prejudice.

For Minamata disease and all tragedies which befall us, it is important to base our opinions and policies not on ignorance or on fear, but on a correct understanding of the facts. Furthermore, our actions must be guided by sympathy and compassion for the sufferers.



Chronology of Minamata Disease

1956	A hospital attached to Chisso Co. reported the outbreak of a strange disease to the Minamata Public Health Center.(May 1, the official recognition of Minamata disease)	2004	The Supreme Court decided that the national and prefectural governments were responsible for failing to prevent the spread of Minamata disease.
1959	A research group of Kumamoto University announced that organic mercury might be the cause of Minamata disease.	2005	<ul style="list-style-type: none"> •The Minister of the Environment announced “On Future Minamata Disease Countermeasures” , whose contents include the expansion of the Medical Care Program of Comprehensive Measures on Minamata disease. •Residents filed a claim for state compensation against Chisso and the national and prefectural governments (No-more Minamata State Compensation Suit)
1965	Minamata disease occurred in the Agano Basin in Niigata Prefecture.	2009	Act on Special Measures Concerning Relief for Victims of Minamata Disease and Solution to the Problem of Minamata Disease promulgated and enacted (July 8)
1968	<ul style="list-style-type: none"> •Chisso stopped production of acetaldehyde. •The national government stated that the cause of Minamata disease was methylmercury contained in factory effluent from Chisso. 	2010	<ul style="list-style-type: none"> •Basic agreement for settlement in No-more Minamata State Compensation Suit at Kumamoto District Court (March) •The policy of Special Measures for Compensation for Minamata Disease was approved by the cabinet council (April 16). •Kumamoto Prefecture and others started to accept applications for compensation of Minamata disease sufferers (May 1).
1969	<ul style="list-style-type: none"> •Patients and their families instituted a damage suit against Chisso. •Act on Special Measures Concerning Relief for Health Damage by Pollution proclaimed. 	2011	<ul style="list-style-type: none"> •Settlements were reached with No-more Minamata State Compensation Suit and two others (March). •Three patients groups concluded the agreement on ending the conflicts with Chisso
1973	<ul style="list-style-type: none"> •Compensation agreement between patients group and Chisso concluded. •Act Concerning Compensation and Prevention of Pollution-Related Health Damage proclaimed. 	2012	About 43,000 people (Kumamoto Prefecture) applied for relief for Minamata disease sufferers by the deadline for application (July 31)
1974	Dividing nets were set up in Minamata Bay.	2013	<ul style="list-style-type: none"> •The Supreme Court made the decision that comprehensive investigation is important for certification (April). •Residents filed a state compensation suit against Chisso, as well as the national and prefectural governments (No-more Minamata Second State Compensation Suit) (June, September, and December). •Conference of Plenipotentiaries on the “Minamata Convention on Mercury” was held, and the Minamata Convention on Mercury was adopted. The Mercury-Free Kumamoto Declaration (October)
1977	Reclamation construction on Minamata Bay started (completed in 1990).	2014	About 19,000 people received lump-sum payments and are receiving ongoing free medical care, while an additional 18,000 are receiving ongoing free medical care based on the Act on special Measures Concerning Relief for Victims of Minamata Disease and Solution to the Problem of Minamata Disease (Kumamoto Prefecture)
1992	<ul style="list-style-type: none"> •Medical Care Program of the Comprehensive Measures on Minamata Disease started in Kumamoto and Kagoshima prefectures. •City of Minamata held the first Minamata Disease Sufferers’ Memorial Service (it has been held every year since then). 	2017	“The Minamata Convention on Mercury” came into effect (August).
1993	Minamata Disease Municipal Museum and Environmental Education and Intelligence Center, Kumamoto Prefecture opened.		
1995	Five patients groups accepted the Final Solution Scheme proposed by the national government.		
1997	Kumamoto Prefecture declared “Minamata Bay Safety Declaration” and removed the dividing nets.		
1998	Minamata City “Sogo Moyai-naoshi Center” opened.		
2002	Fifth graders in Kumamoto started visiting Minamata to study about Eco and Minamata Disease		

Our Future Efforts

A conference was held in Kumamoto Prefecture with the participation of about 140 countries and regions worldwide in 2013, and the Minamata Convention on Mercury was adopted, which prohibits the mining, usage, import and export of mercury. (which came into effect in August 2017) At this conference, the governor of Kumamoto Prefecture made the Mercury-Free Kumamoto Declaration, in which Kumamoto takes the initiative to establish a mercury-free society, and the efforts have been ongoing since 2014.



Conference

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