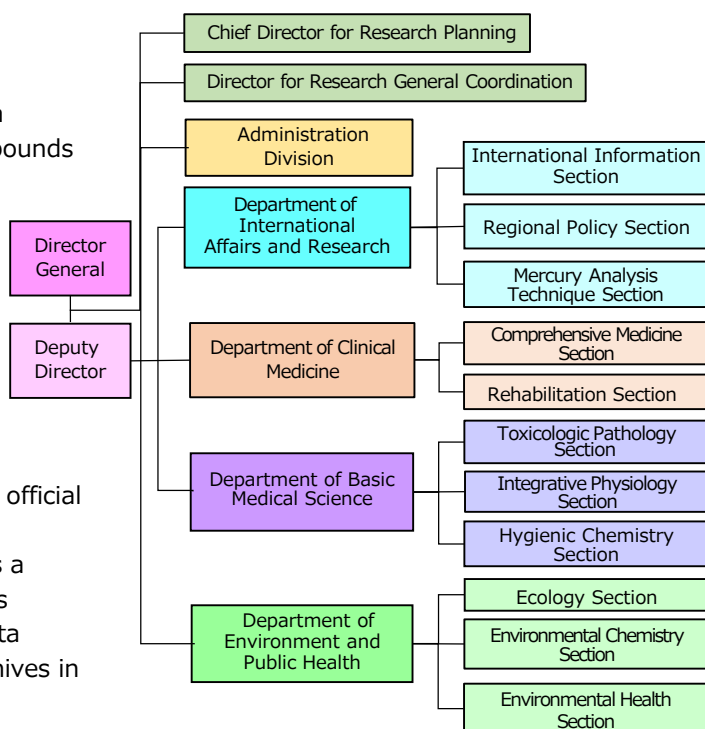




(National Institute for Minamata Disease and Yatsushiro Sea)

## History and Organization

- 1956 Official recognition of Minamata disease
- 1965 Official recognition of Minamata disease in Niigata
- 1968 Official government announcement that Minamata disease is caused by methylmercury (MeHg) compounds in factory effluents
- 1971 Establishment of Environmental Agency
- 1978 Establishment of National Institute for Minamata Disease (NIMD)
- 1986 Designation of NIMD as a WHO Collaborating Centre
- 2001 Renaming of Environmental Agency as Ministry of the Environment  
Opening of Minamata Disease Archives
- 2006 Participation in the 50th anniversary project of the official recognition of Minamata disease
- 2010 Legal designation of Minamata Disease Archives as a research institute for managing academic materials
- 2013 The Conference of Plenipotentiaries on the Minamata Convention was held at the Minamata Disease Archives in Minamata City, Kumamoto Prefecture.



# Long-Terms Aims and Mid-Term Plan

## Long-term aims

Preventing pollution in Japan and worldwide and promoting the welfare of the affected area by researching methylmercury (MeHg), the cause of Minamata disease. Collecting and organizing information and disseminating research results and information.

## Mid-term plan 2020

### Planning Period

Five years (2020–2024)

The research plan will be reviewed as needed

### Priority Research and Activities

- Evaluation of health effects of MeHg exposure and its application to treatment
- Environmental dynamics of MeHg
- Contribution to the improvement of community welfare
- Contribution to the international community

### Basic Guidelines for Research and Activities

#### ■ Promotion of Project Research

To promote research in important fields by a cross-sectional team of NIMD personnel and external investigators

#### ■ Promotion of Fundamental Research

To improve research capacity and train researchers, promoting fundamental research and producing a mercury knowledge base at NIMD from Long-term perspective

#### ■ Activities

To participate in regional and international contributions via our whole activity



### System for Research and Activities

To classify project and fundamental research and related activities into five groups by purpose and promote cross-sectional research activities

## Previous Achievements

### Key study results (cited by researchers worldwide)

- Impact of MeHg on developing fetuses
- Involvement of oxidative stress in MeHg toxicity
- Mechanism of MeHg toxicity in the central nervous system

### International contributions

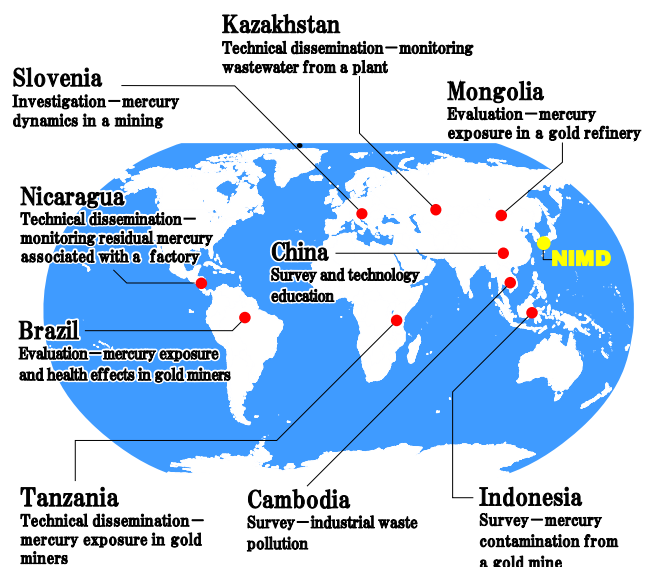
- Field study on mercury contamination and educational and technical dissemination of mercury monitoring techniques
- Training overseas researchers  
Mercury analysis techniques, MeHg toxicity, and Minamata disease
- Monitoring airborne mercury concentrations  
Collaboration with an EU-led global monitoring project
- Holding the NIMD Forum on mercury

### Community contributions

- Periodic environmental monitoring of mercury in Minamata Bay
- Community development project for home-care support

### Partnerships with external entities

- Collaborative research with universities and other institutions in Japan and overseas
- Academic agreements on graduate education



Major NIMD collaborative efforts on global mercury concerns

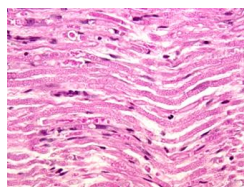
# Research Overview

## Project Research

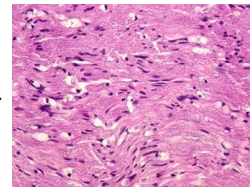
### Fundamental research on neurotoxic mechanism by methylmercury and its related prevention and treatment

To prevent and treat nerve dysfunction caused by MeHg, we study its mechanism of toxicity and the effects of therapeutic drugs in experimental animals. (Pathomechanism Group)

Nerve axons destroyed by MeHg



Nerve axons repaired by ROCK inhibitor



### Study on the health effects of methylmercury exposure and therapy for Minamata disease

Objective diagnostic methods of MeHg poisoning include magnetoencephalography (MEG) and magnetic resonance imaging. Developing an effective therapy that is based on the pathogenetic mechanism of symptoms. (Clinical/Welfare/Social Group)



Examination of brain function using MEG

### Study on factors influencing the vertical distribution of speciated mercury in the ocean

Elucidate factors that affect MeHg concentrations in the ocean such as mercury exchange between air and seawater, chemical reactions of Hg species, intake of MeHg by phytoplankton, and mercury elution from marine snows in the deep ocean. (Nature Environment Group)



Seawater sampling in the ocean

### Simplification and optimization of mercury analysis techniques and development of reference materials

To evaluate exposure and strengthen mercury monitoring in underdeveloped countries, preparation of reference materials to guarantee accurate analysis, and simplify mercury analysis techniques. (International Contribution/Information Group)



Gold extraction in a small gold-mining area using elemental mercury



Reference materials to assess the efficacy of the Minamata Convention

## Fundamental Research

### 1 Pathomechanism Group

Elucidate the causal factors in MeHg-induced neural dysfunction using a comprehensive approach on the molecular (gene and protein), cellular (cultured cell), individual (laboratory animal), and human (pathology tissue) levels, and apply the findings in diagnosis, prevention, and treatment.

### 2 Clinical/Welfare/Social Group

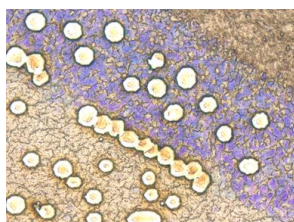
Improve the welfare of areas affected by Minamata disease through care and prevention, societal implement of research outcome on regional reconciliation and development, and disseminate information for historical verification of Minamata disease.

### 3 Risk Assessment Group

Study the health effects of MeHg in individuals exposed to high concentrations of mercury and susceptible populations such as fetuses and children through both epidemiological and experimental studies, taking into account effect modifiers such as selenium intake.

### 4 Nature Environment Group

Obtain detailed information on emission sources and chemical reactions of mercury in air, water, sediments, and organisms at a local, regional, and global scale. Implement integrated studies of environmental mercury that include field surveys, monitoring, and laboratory experiments by collaborating with domestic and foreign research entities.



Separation of neurons by laser microdissection



Collaboration workshop with overseas researchers and fetal Minamata disease patients



Interviews on diet and lifestyle



Instrument for measuring mercury isotope ratios with high precision

# Overview of Activities

## 1 Clinical/Welfare/Social Group

- Welfare support service in collaboration with the Council on Social Welfare of Minamata and Izumi City
- Daycare and outpatient rehabilitation services for Minamata disease patients and conducting rehabilitation seminars
- Digitization for permanent preservation of pathological tissue specimens from Minamata disease patients
- Maintenance and dissemination of information on Minamata disease and mercury



Community living (welfare support service for the elderly)



Outpatient rehabilitation

## 2 Risk Assessment Group

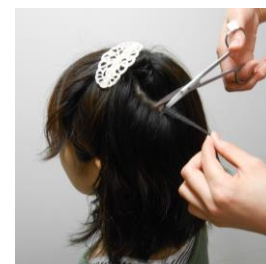
- Measurement of mercury levels in hair and provision of information on mercury

## 3 Nature Environment Group

- Continuous monitoring of mercury and related chemicals in Minamata Bay
- Speaking on scientific topics including mercury for students in elementary and junior high schools



Seawater sampling in Minamata Bay



Hair sampling to assess MeHg exposure

## 4 International Contribution/Information Group

- Conducting training and technology transfer in developing countries on mercury analysis technologies
- Hosting an international conference (NIMD Forum) annually to disseminate the results of mercury research and exchange research insights
- Support the International Conference on Mercury as a Global Pollutant (ICMGP) and a satellite workshop organized by NIMD
- Hair mercury examination of areas concerning for mercury pollution around the world
- Collaborate with major international organizations such as WHO and UNEP



NIMD Forum



Overseas training in mercury analysis

## Minamata Disease Archives

Minamata Disease Archives was established as an attached facility of NIMD in 2001. It serves a number of functions such as promoting a better understanding of Minamata disease, communicating the lessons learned from Minamata disease and mercury, and contributing to the development of research on these fields.

- Organization and provision of documents and materials on Minamata disease and mercury
- To provide information through exhibitions and lectures
- To organize meetings for an academic and scientific exchange on issues related to Minamata disease



Minamata Disease Archives



### NIMD Logo

The river and sea of Minamata are depicted in the form of the Japanese character “水” (water). The victims of Minamata disease are symbolized as an adult on the left side and as a fetus on the right. We created this logo in blue and green, beautiful natural colors whose use also warns of the adverse effects of environmental pollution.

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