

# Postmortem Examination and Personal Identification of Victims of the Great East Japan Earthquake

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Feb 20, 2012

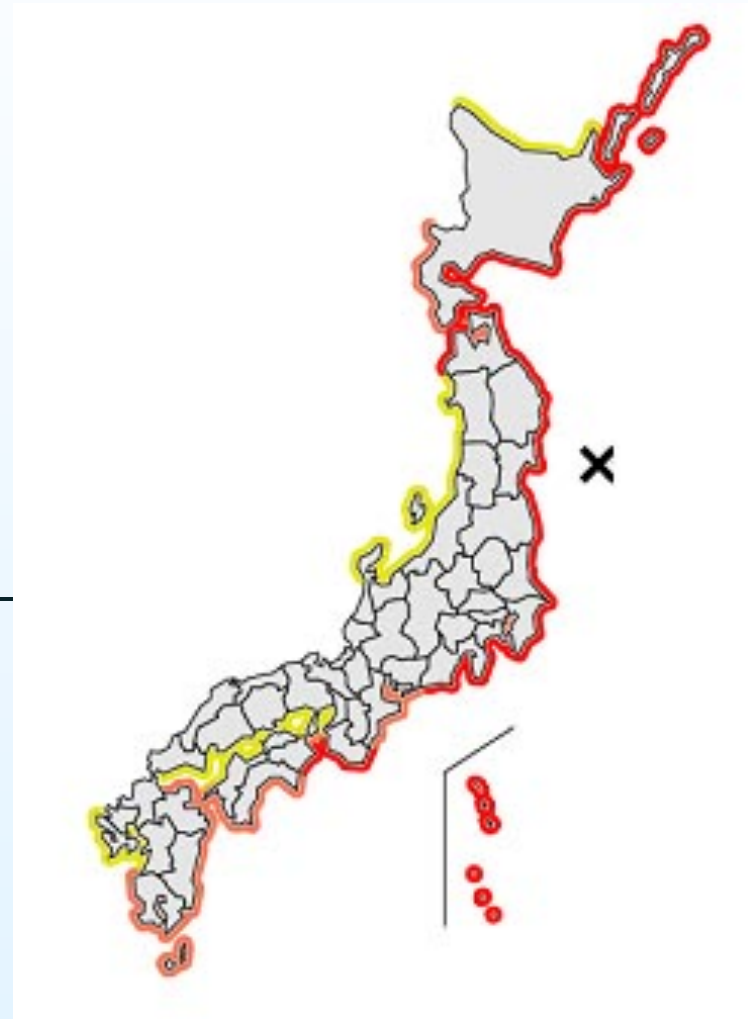
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Epicenter	38°6'12"N 142°51'36"E 80 miles off the Pacific coast of Ojika Peninsula
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Depth	15 miles

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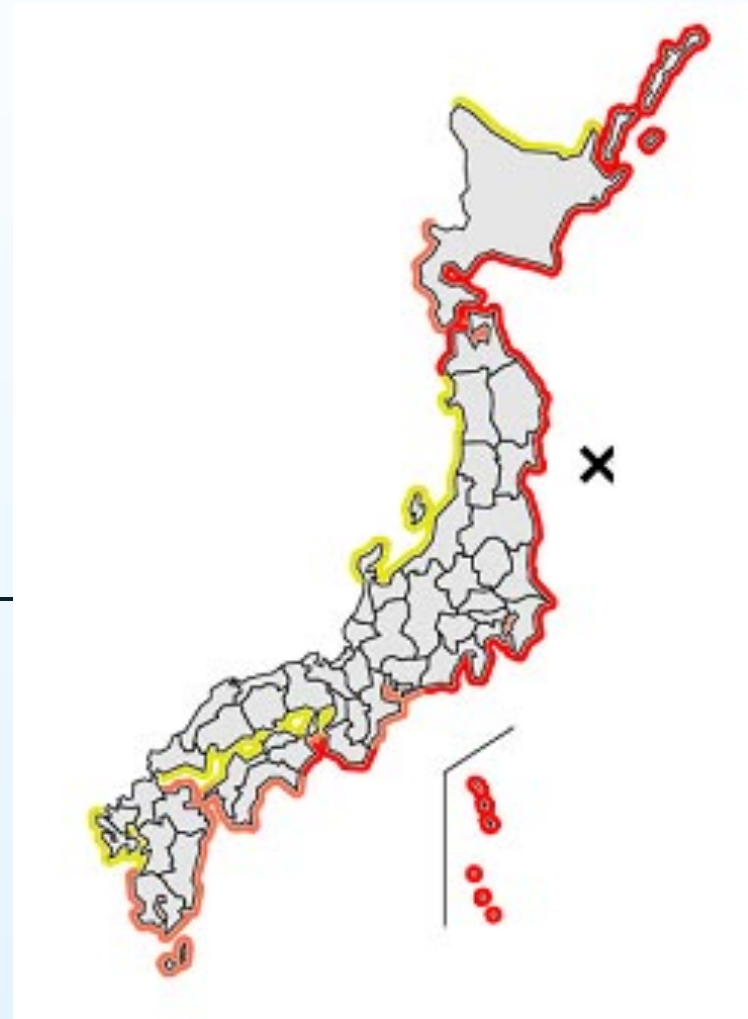
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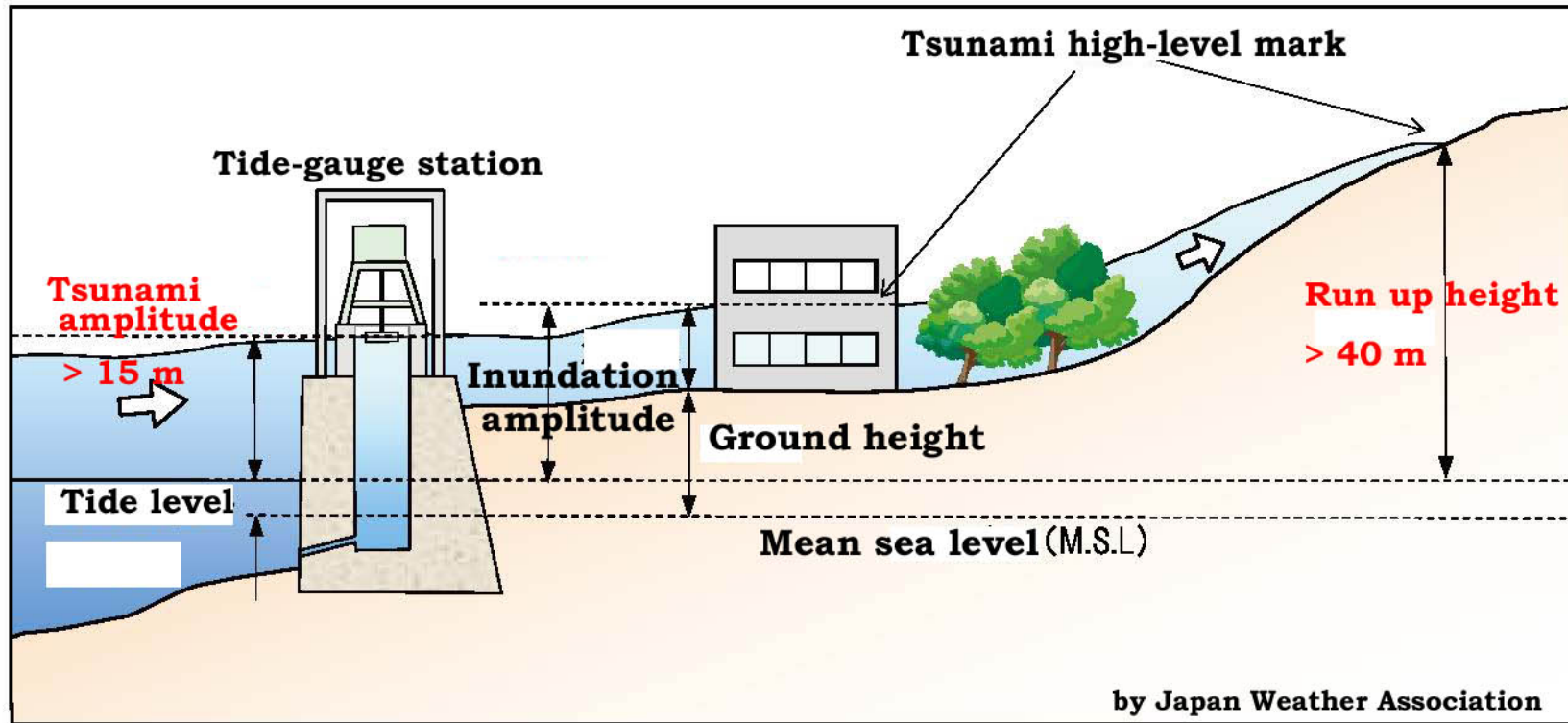
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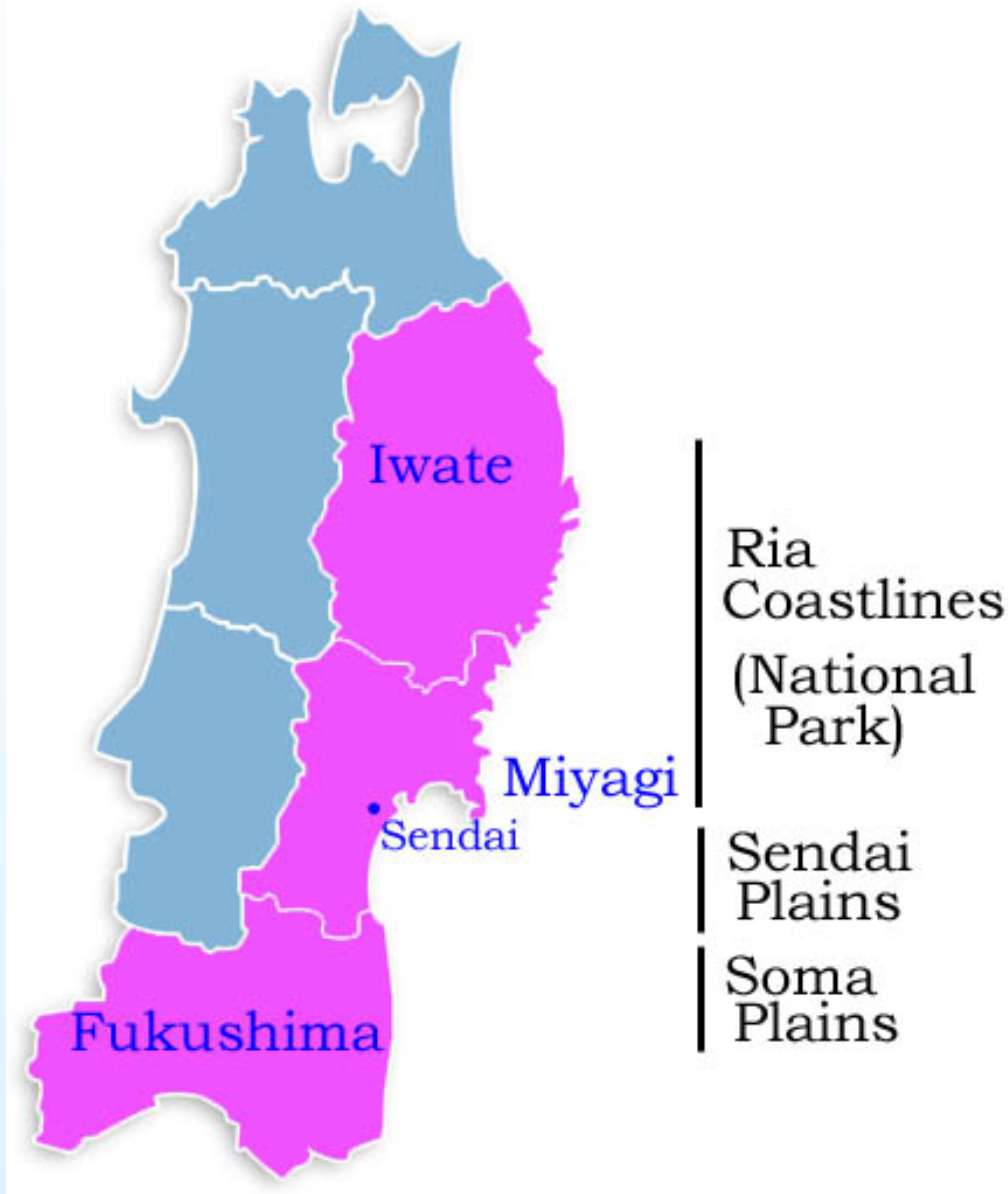
# The Great East Japan Earthquake: Tsunami

Property damages by the earthquake were mild....



Both human casualties and property damage, mostly due to the huge tsunami triggered by the earthquake were concentrated in the 3 prefectures.

# The Great East Japan Earthquake



- Population is relatively sparse

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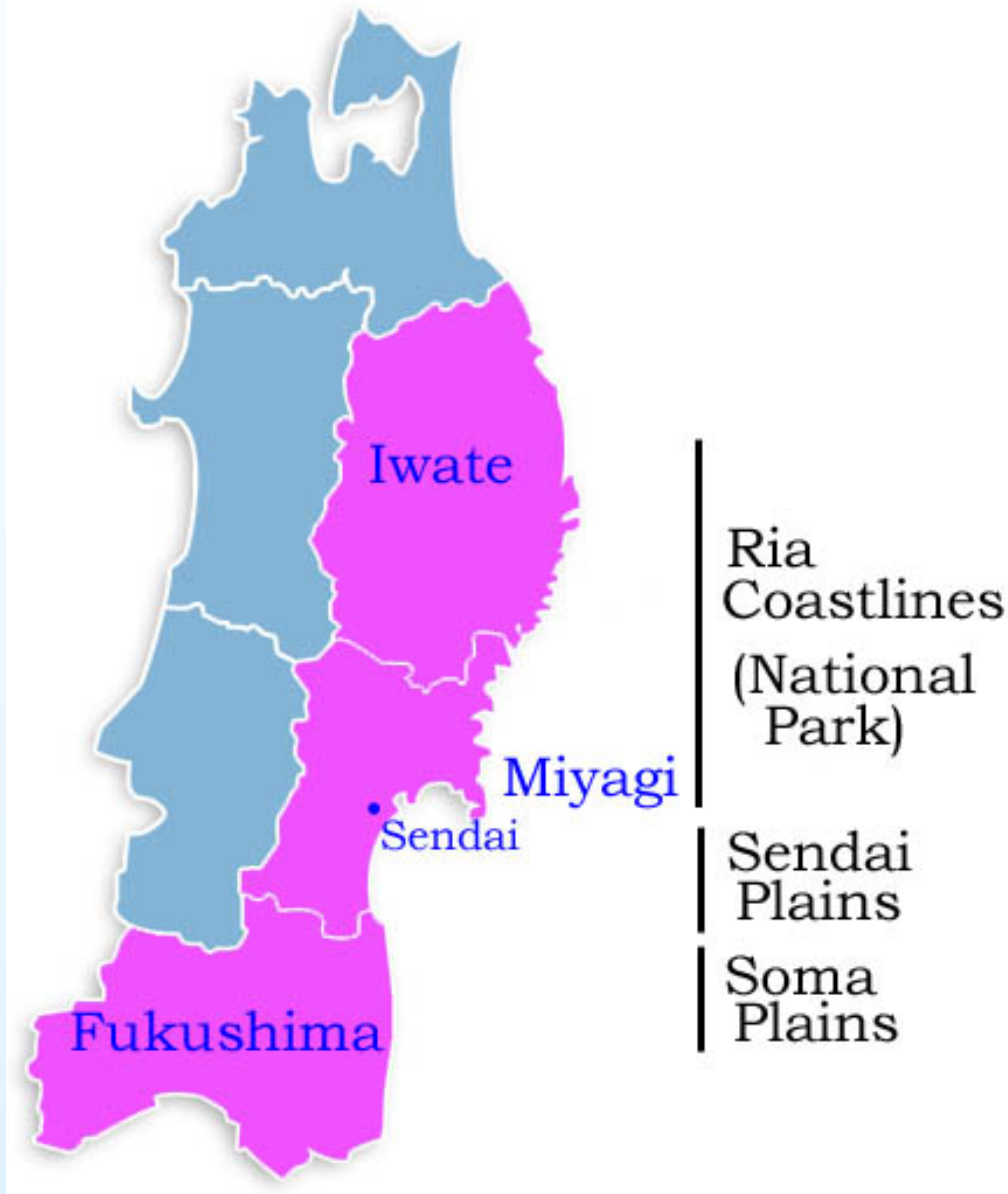
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Miyagi	2,348,000
Sendai	1,046,000
Fukushima	2,029,000

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2010 Census

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- Historically, both areas suffered from tsunami damages recurrently.

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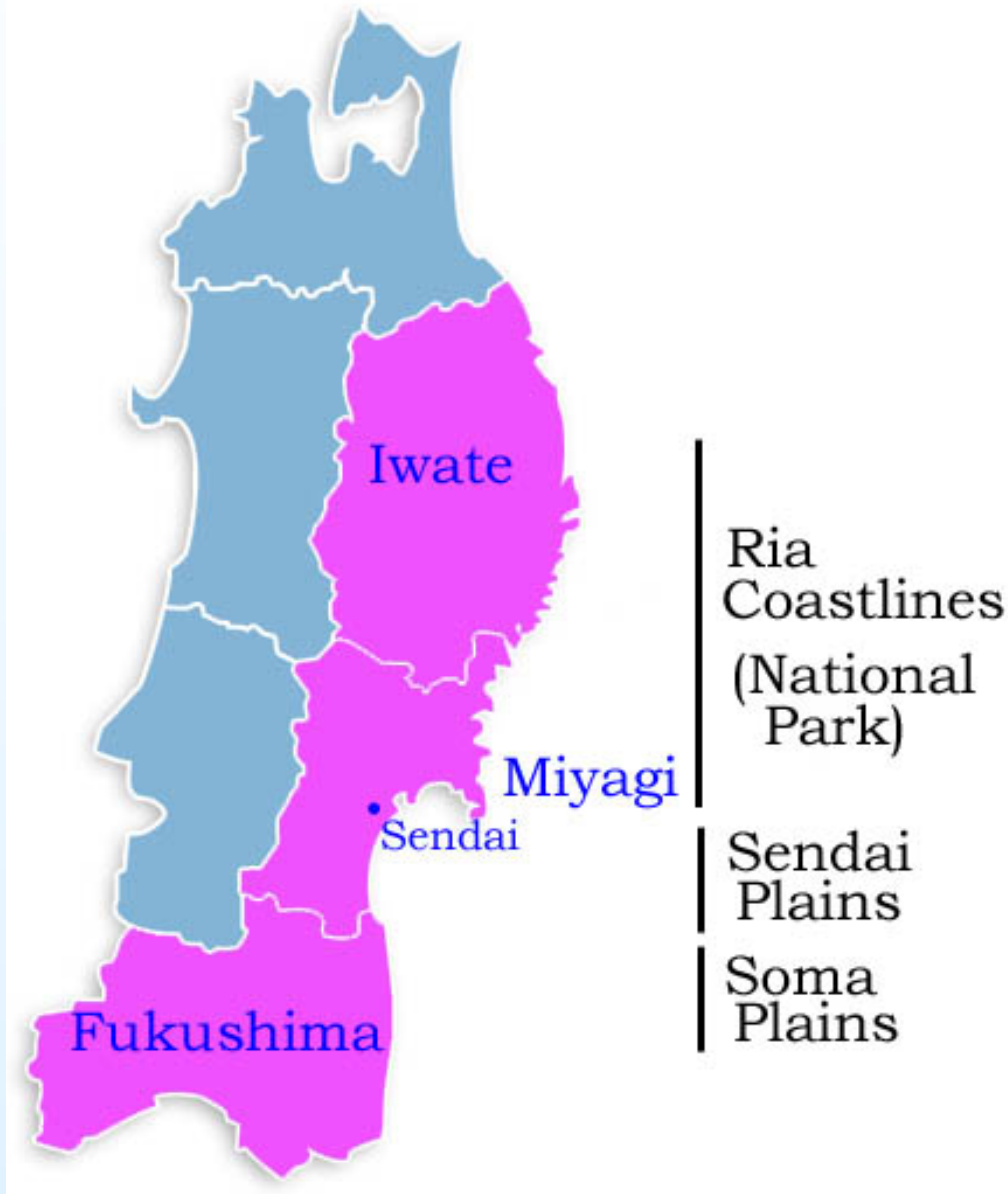
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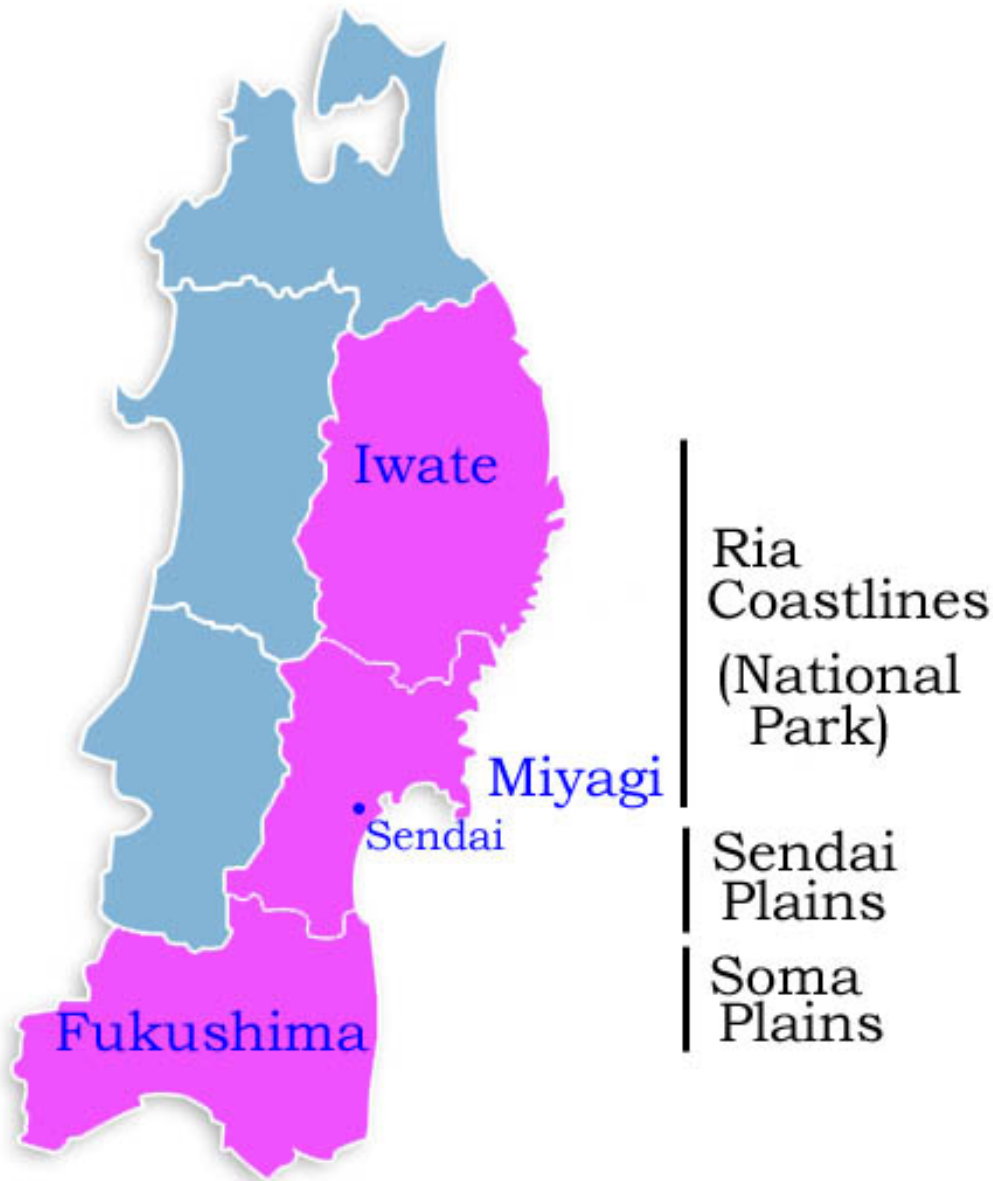
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# Japanese Society of Legal Medicine (JSLM)

- Founded: 1914
- Members: 1,330
  - Pathologist: <200
  - Physician: 300
  - Dentist: 130



(endangered  
population: 3,000)

Issued a guideline in 1997 for an integrated support system of mass disaster management based on the experience of the 1995 great Hanshin-Awaji earthquake (fatality: 6434).

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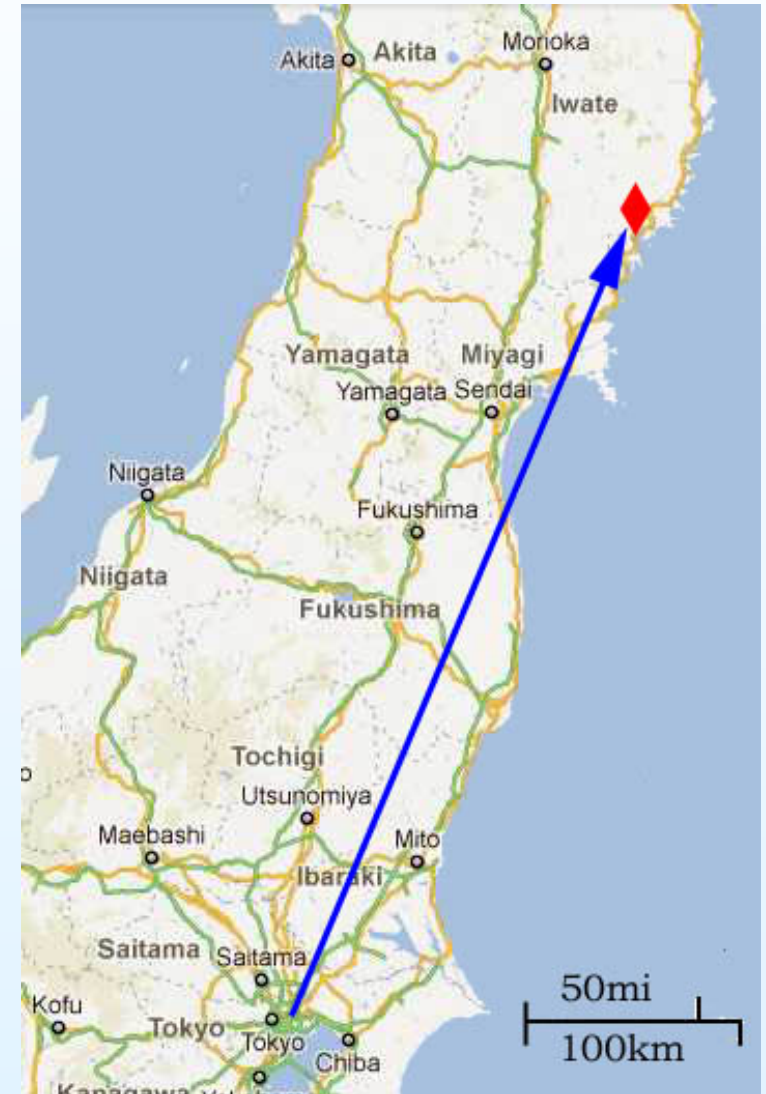


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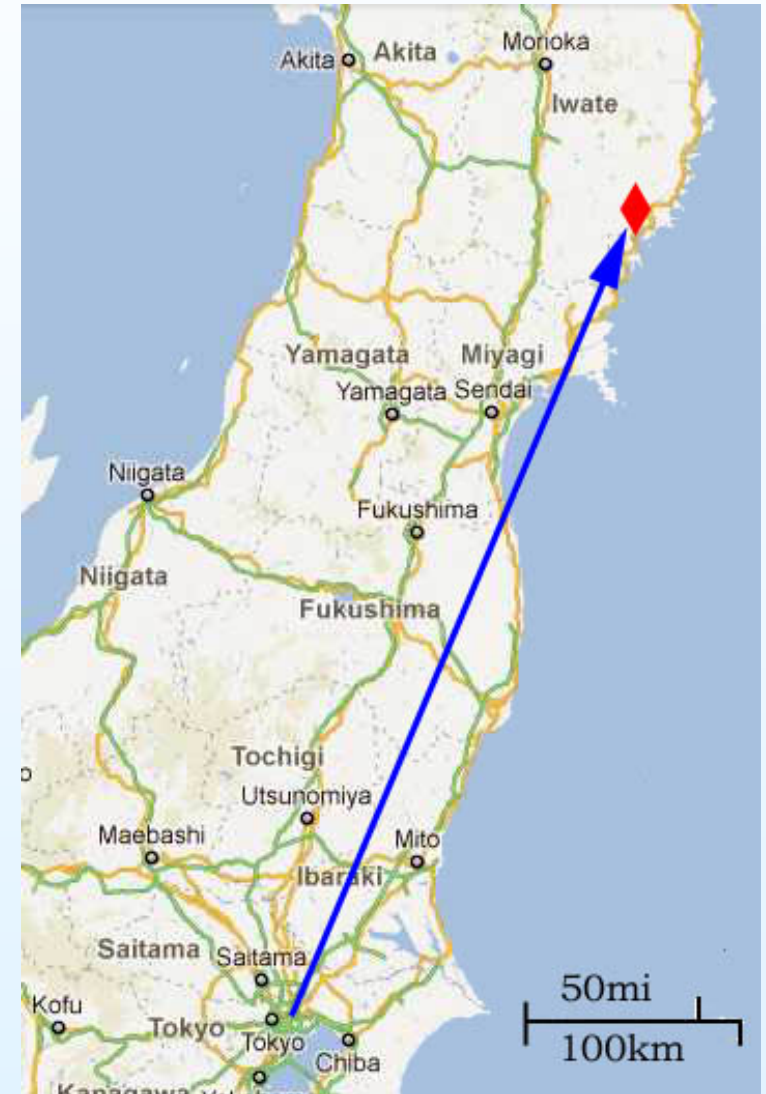
# Disaster Response Headquarters of JSLM

- JSLM established the *ad hoc* Disaster Response Headquarters on March 12.
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- Examination began on Mar. 13.
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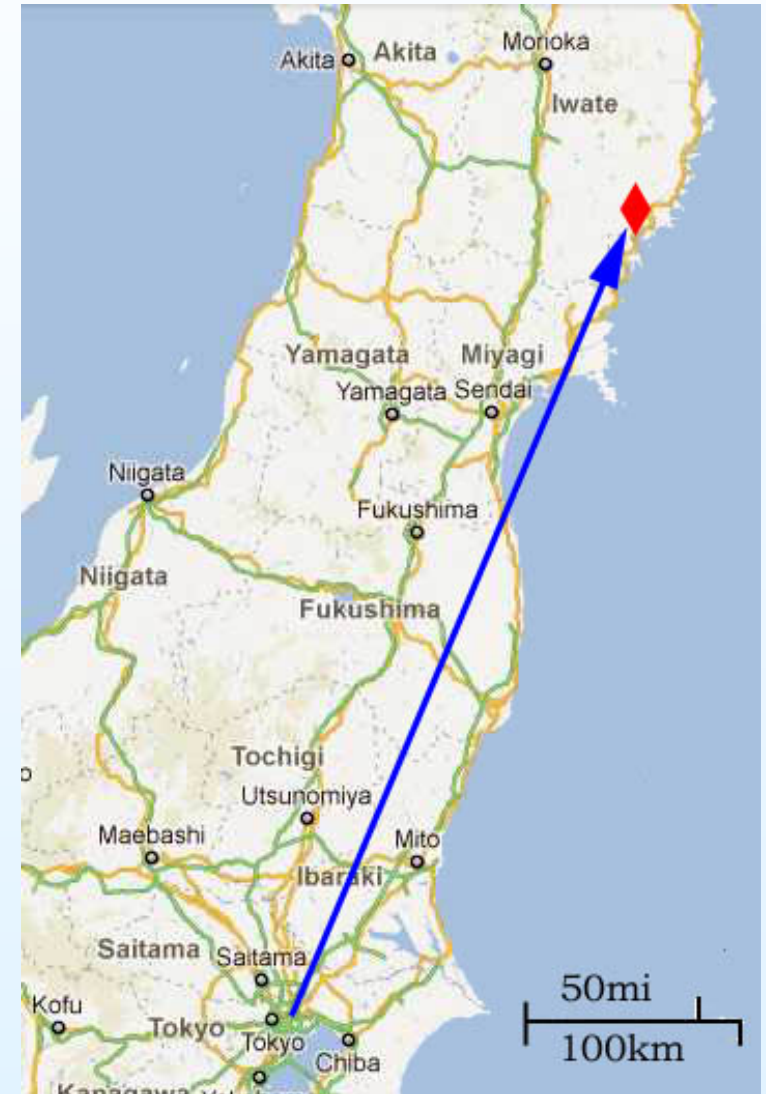
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# Temporary Morgue/Examination Center in Rikuzentakata



Gymnasium of a junior high school

## Body Recovery & Transfer Teams

- Police, Self Defense Force, fire rescue units and local government personnel organized to recover the bodies of victims.
- As many as 25 countries, regions, and international organizations have sent rescue teams and other specialists to the disaster areas.

## Victims of tsunami

More than 90% of victims  
were signed out as  
“Drowning.”



## Identification: Personal effects

Many of the victims carried personal effects.

Photographs of clothes and personal belongings of the victims were presented at the temporary morgue (Soma, Fukushima).

# Dental Examination

- Examination was performed by 2 dentists.
- X-rays were unavailable during early phase due to electric power black out.
  - Handheld, digital, battery powered X-ray devices would have been useful.
- Many antemortem dental records were missing.
  - Nationwide compilation of database of dental records are being discussed.
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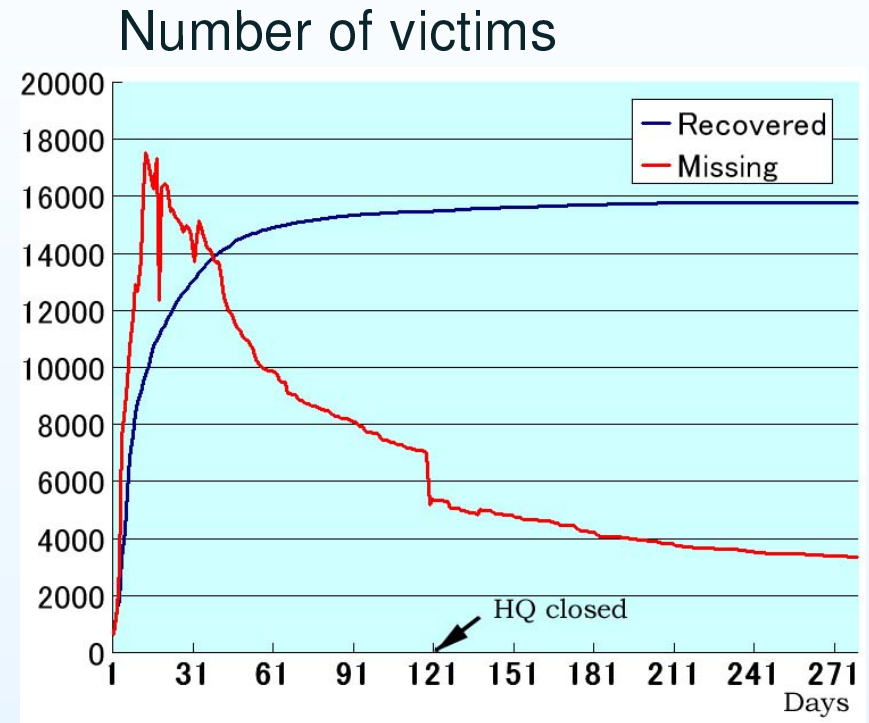
# Morgue in Soma City: A Closed Down Factory





# Successive Supports for 4 Months

- An average of 1,000 remains/day were inspected during the next week of the disaster.
- Less than 10 remains/day were recovered after mid June.
- JSLM successively organized and dispatched JSLM members through July 6.
- The Headquarters was closed on July 11.



## JSLM members dispatched

Pathologist/Physician		Dentist		Total	
Number	Person-days	Number	Person-days	Number	Person-days
118	1,090	31	298	149	1,388

## Identification by DNA Evidence

- The policy or plan of sampling DNA source from remains was not established or announced initially.
- It was believed that extraction of human tissue from un-autopsied bodies might be violation of the law (approved later).
- Not all remains were subjected to sample the DNA source.
- Fingernails and blood were the first choice DNA source.
- Autosomal STR and Y-STR of the remains were tested at the forensic investigation laboratories of prefectural police headquarters of all over Japan.
- Mitochondrial DNA was examined in some cases by National Research Institute of Police Sciences of NPA.
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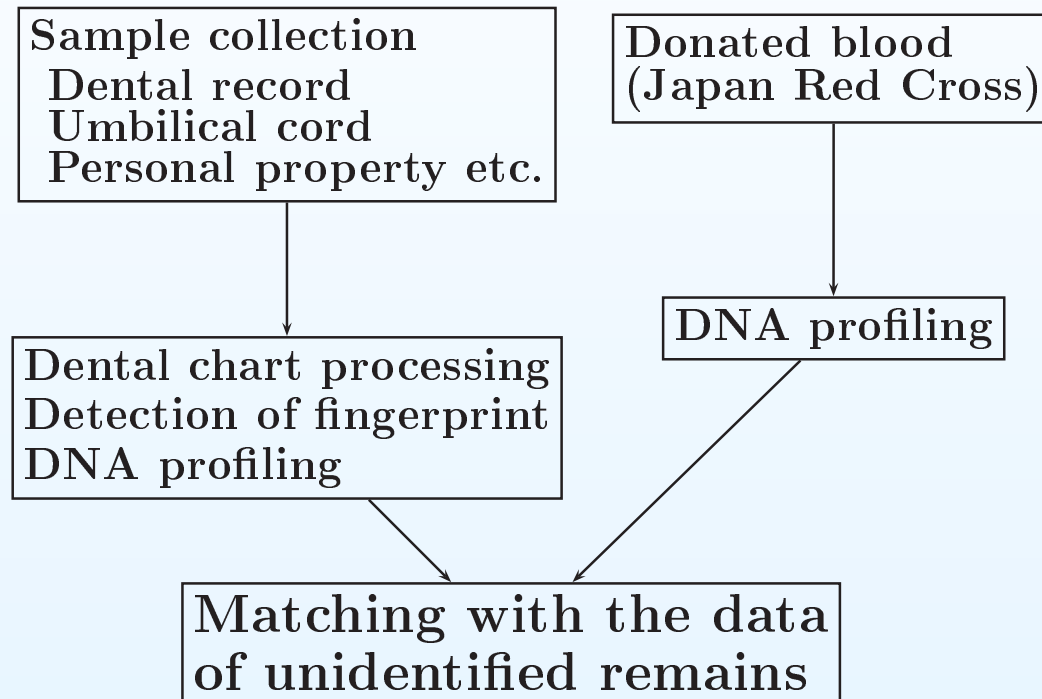
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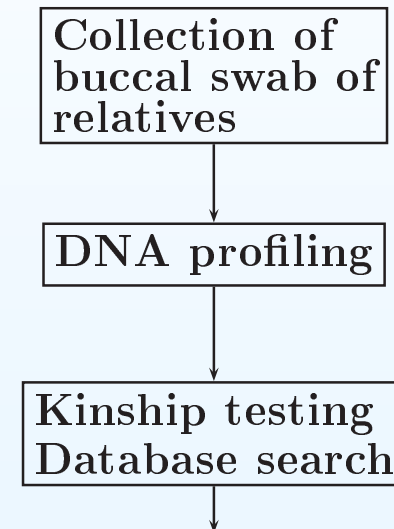
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# Policy of Personal Identification by NPA

## Direct references



## Kinship analyses



Comparison with other evidence

Positive identification

## 96.4% of the Remains were so far Positively Identified.

	Remains recovered	Identified	Not identified	Missing
Iwate	4,667	4,497	170	1,322
Miyagi	9,508	9,109	399	1,778
Fukushima	1,605	1,599	6	216
Other	66	63	3	4
Total	15,846	15,268 (96.4%)	578 (3.6%)	3,320

As of Feb. 3, 2012

— in Iwate prefecture:

- DNA was tested in 3,197 remains (68.5%).
- Identity was established mainly by:
  - Personal effects and body features in 4,323 cases (96.1%),
  - Dental evidence in 109 cases (2.4%),
  - Fingerprint in 45 cases (1.0%),
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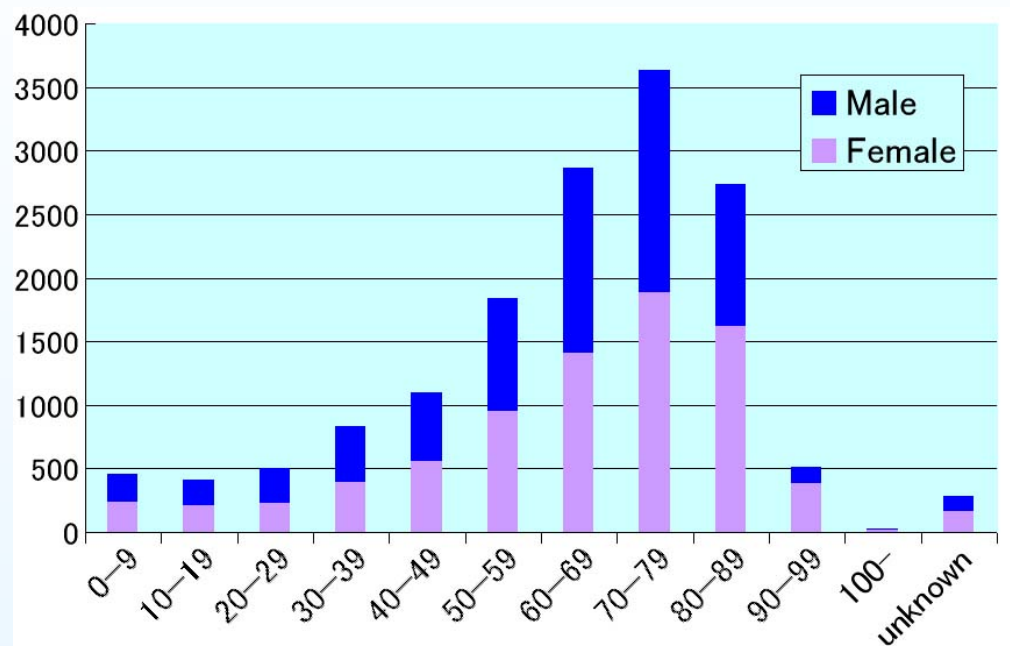
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- More than half the fatalities were people over 65.

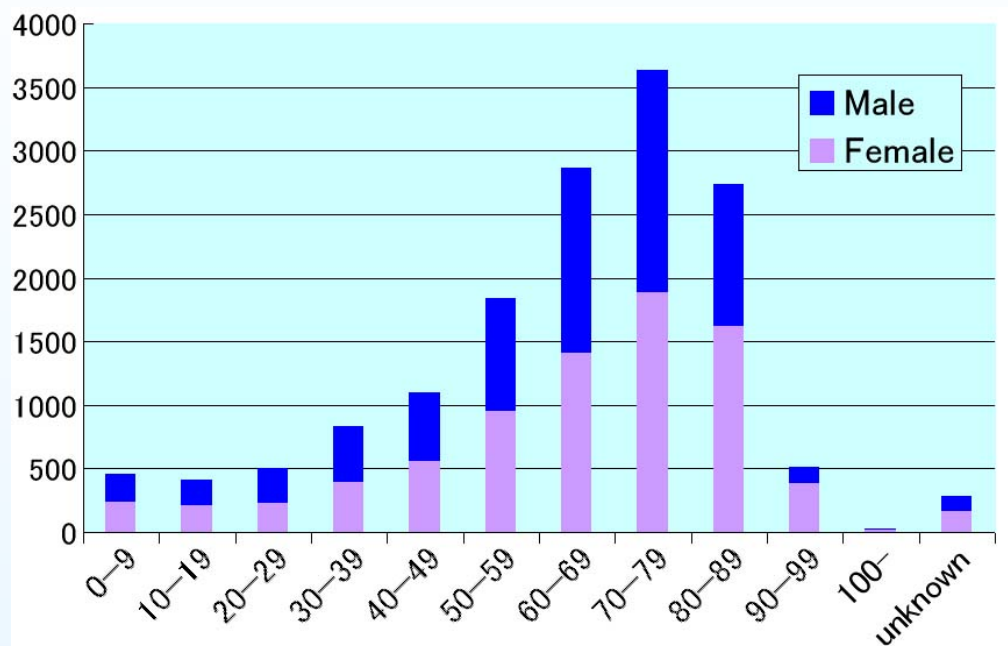


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  - Inspectors: 264 (2005)  $\implies$  579 (2010)
- The medico-legal investigation system in Japan including the medical examiner system is not well established.

Medical examiner systems are operating only in a few cities (Metropolitan Tokyo, City of Osaka, Kobe etc.)



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3. The DVI team examined about 16,000 bodies and identified over 96%.
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Mt. Iwate 岩手山