

Counter-disaster Measures for People with Functional Needs Following the Great East Japan Earthquake: Basic Facts, Challenges and Their Solution

Presentation for 2012 EERI Annual Meeting Concurrent
Session 5. Preparedness and Response Lessons,
Peabody Hotel, Memphis, Tennessee

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Presentation Outline

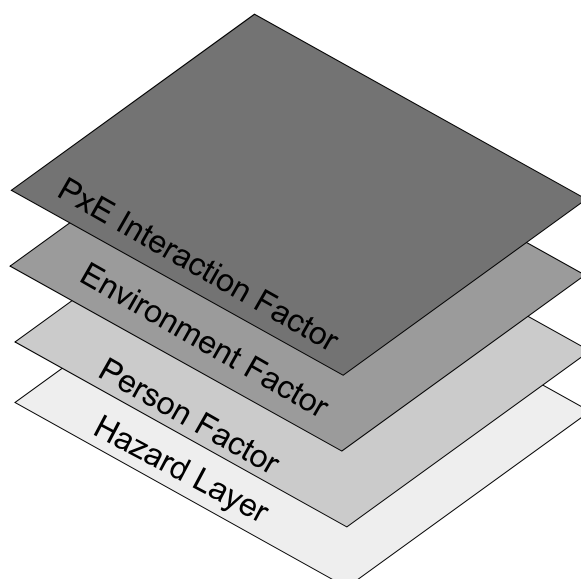
1. Counter-disaster measures for people with functional needs in times of disaster: March 2005 to March 2011
2. Casualty Gaps: Basic Facts of the 2011 Eastern Japan Earthquake
3. Observations and Implications
 - Challenge on Identifying People at Risk: Re-think “Correct” Hazard Estimates
 - Challenge on Pre-planning Specially Designated Shelters for People with Special Needs
 - Challenge on Utilizing Personal Information on People with Special Needs in Times of Disasters

1. Counter-disaster measures for people with
functional needs in times of disaster:

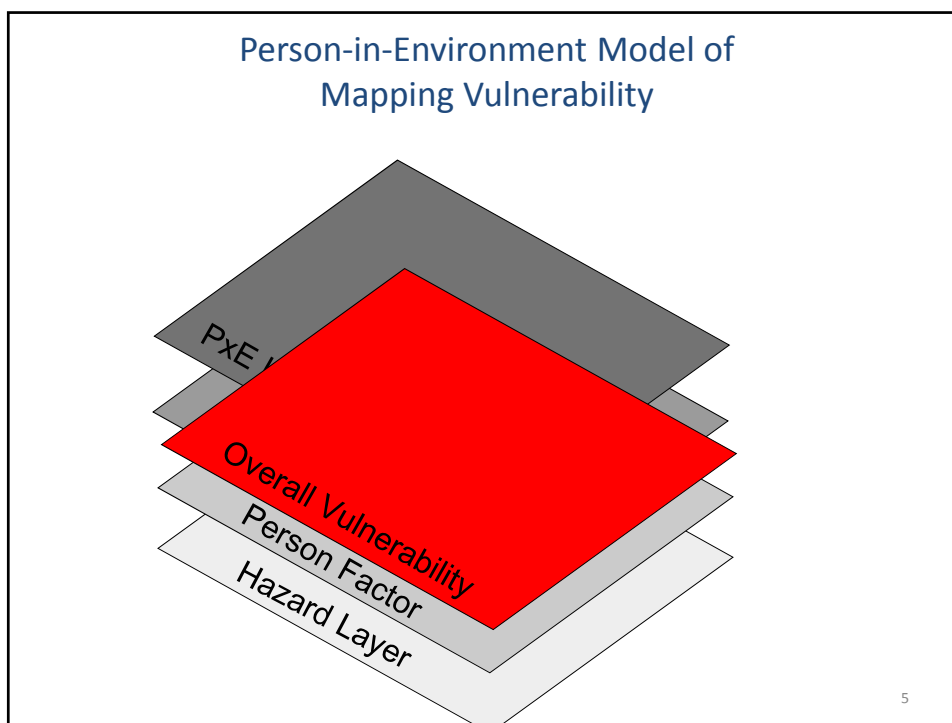
March 2005 to March 2011

Vulnerability as a Function of
Hazards, Person &
Environment

Person-in-Environment Model of
Mapping Vulnerability



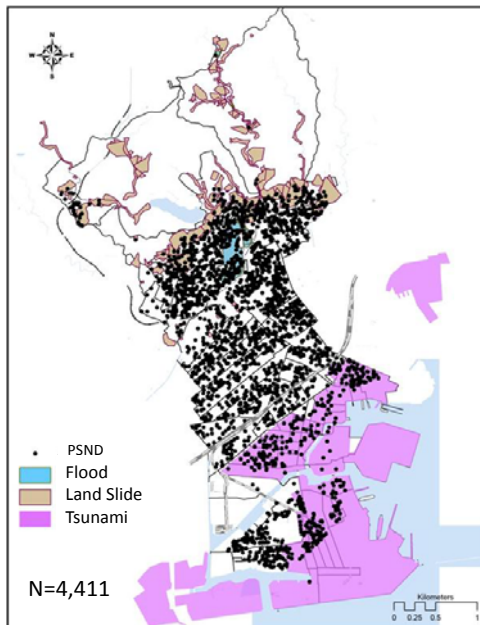
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Kobe PSND (People with Special Needs in Times of Disasters) Mapping Project

Fy2007 to Present

4,411 Persons with Physical, Mental & Developmental Impairments Residing in Hyogo Ward, Kobe City

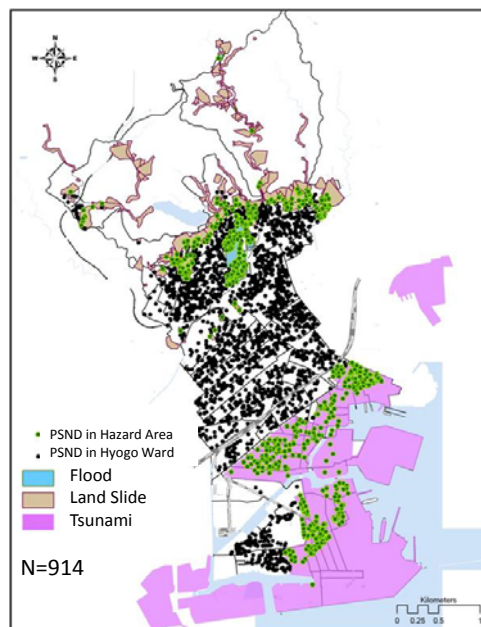


Kobe city (1.5 million population) administration collated separate social service recipient databases, resulting in an integrated database involving one hundred and twenty thousand individuals who were considered being potentially vulnerable in time of disaster.

The database identified **4,411** people with physical impairments in Hyogo Ward (about **108,000** population).

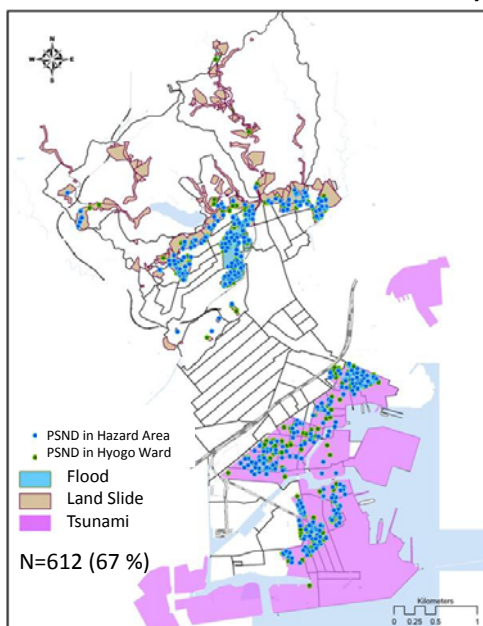
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914 Persons with Disabilities were Residing in Hazardous Areas



8

612 (67%) out of 914 PWD in Hazardous Areas Responded to Structured Interview Survey



9

Variables Measured/Obtained in the Study

Age
Gender
Job

Demographics

Level of Physical Impairments
Types of Impairments
Utilized Home Care Service
Utilized Community Care Services
Utilized Institutional Care Services
ADL Level

Physical Impairment

Movement Assistance
of Assistants Required
Equipment for Movement
Walking up & down Stairs
Medical Equipments in Use
Toilet Use Capability

Physical Immobility

ZIP Averages of Neighbors
Greeting & Chatting
Engaging in Rec. Activities
Going Out Together
Exchanging Gifts
Visiting Each Other
Taking Care of Each Other
Helping Each Other
Becoming Friends

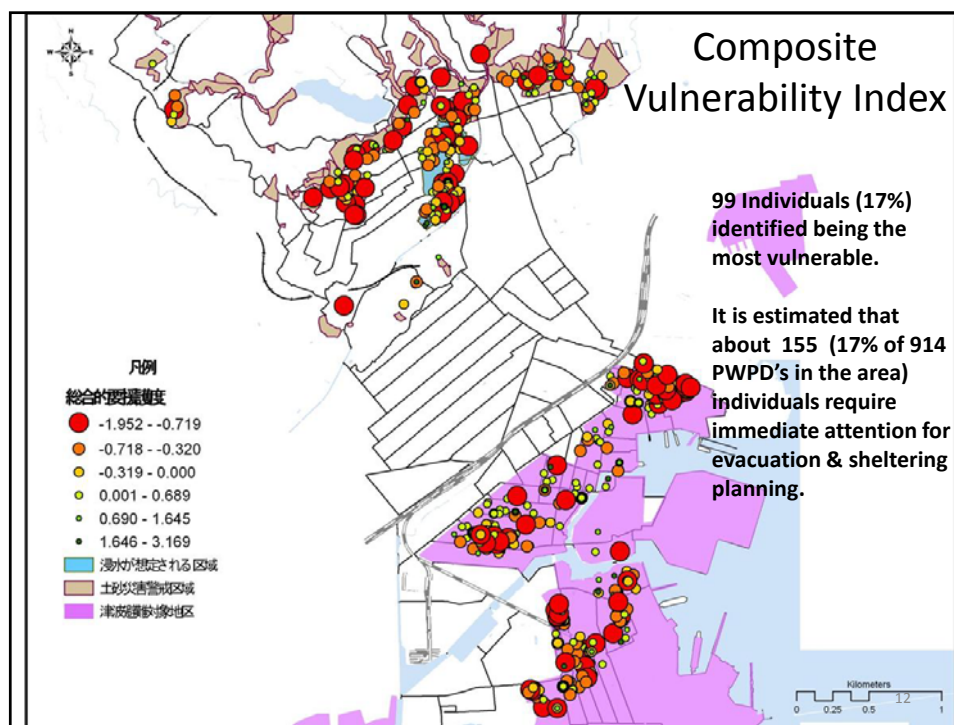
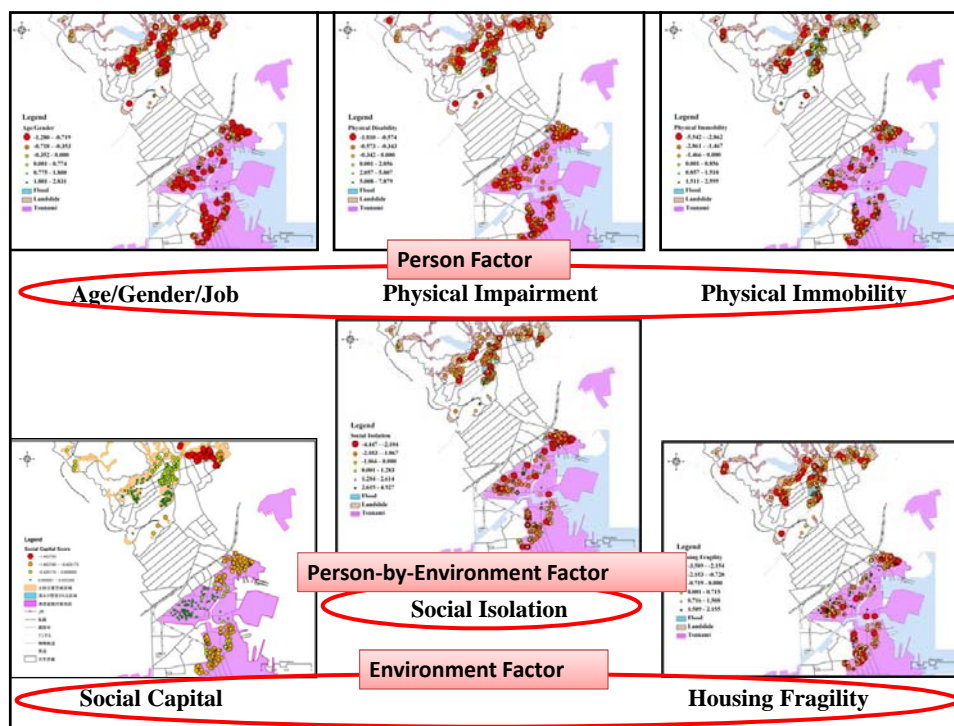
Social Capital

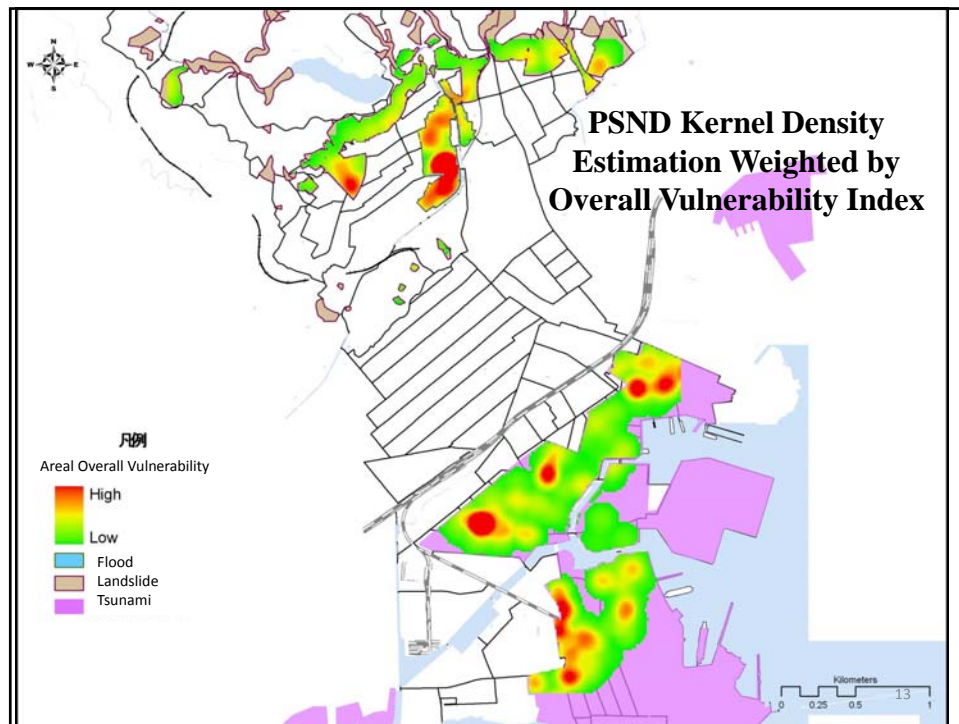
Household Size
Household Type
Key Person Category
Location of Key Person

Social Isolation

Type of Structure
Age of Building
Building Type
Number of Floors
Bedroom Floor

Housing Fragility





Kernel Density Map as a Tool to Sensitize Awareness of and to Induce Responsiveness to PSNDs in Communities



2. Basic Facts of the 2011 Eastern Japan Earthquake:

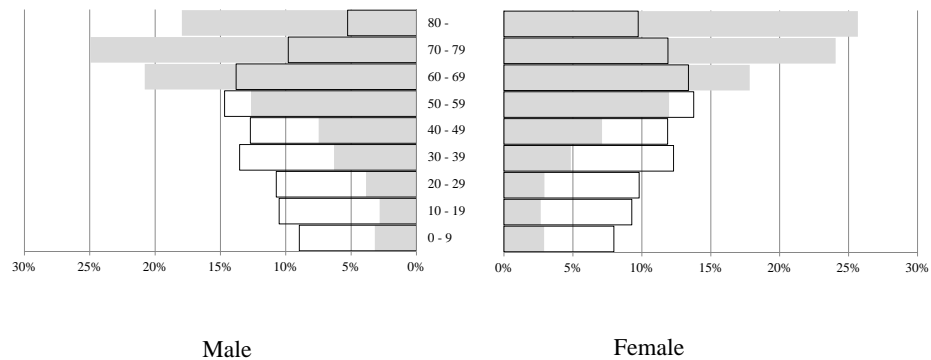
A) Casualty Gaps between the Total Population and People with Disabilities

Table 1: Death Toll, Total Population and Number of Deaths per 100,000 by Gender, Age Group and Prefecture										
Prefecture	Age	Death Toll			Total Population			Number of Deaths per 100,000		
		Male	Female	Total	Male	Female	Total	Male	Female	Total
Iwate	0 - 9	30	54	84	54,287	51,930	106,217	55	104	79
	10 - 19	41	41	82	65,306	61,918	127,224	63	66	64
	20 - 29	75	59	134	59,637	58,980	118,617	126	100	113
	30 - 39	134	108	242	80,390	77,575	157,965	167	139	153
	40 - 49	165	180	345	79,900	80,170	160,070	207	225	216
	50 - 59	297	308	605	95,059	95,486	190,545	312	323	318
	60 - 69	426	466	892	90,142	98,326	188,468	473	474	473
	70 - 79	550	606	1,156	70,130	93,844	163,974	784	646	705
	80 -	400	616	1,016	36,961	75,041	112,002	1,082	821	907
Miyagi	0 - 9	170	165	335	101,846	97,068	198,914	167	170	168
	10 - 19	137	147	284	117,822	111,475	229,297	116	132	124
	20 - 29	177	155	332	135,185	134,457	269,642	131	115	123
	30 - 39	275	253	528	162,597	161,165	323,762	169	157	163
	40 - 49	321	348	669	145,852	146,619	292,471	220	237	229
	50 - 59	509	573	1,082	158,825	162,591	321,416	320	352	337
	60 - 69	900	854	1,754	151,083	157,214	308,297	596	543	569
	70 - 79	1,070	1,116	2,186	102,335	130,242	232,577	1,046	857	940
	80 -	733	1,248	1,981	52,571	101,686	154,257	1,394	1,227	1,284
Fukushima	0 - 9	29	18	47	89,226	85,146	174,372	33	21	27
	10 - 19	24	29	53	104,283	98,804	203,087	23	29	26
	20 - 29	25	24	49	98,828	94,349	193,177	25	25	25
	30 - 39	44	33	77	127,461	122,496	249,957	35	27	31
	40 - 49	51	50	101	122,131	121,730	243,861	42	41	41
	50 - 59	103	92	195	148,080	145,806	293,886	70	63	66
	60 - 69	167	129	296	136,356	137,326	273,682	122	94	108
	70 - 79	172	233	405	96,086	125,140	221,226	179	186	183
	80 -	156	222	378	54,725	109,005	163,730	285	204	231
Total		7,181	8,127	15,308	2,737,104	2,935,589	5,672,693	8,241	7,379	7,704

Note: The above table does not include 414 (Age unknown) or 64 (Age and Gender unknown).

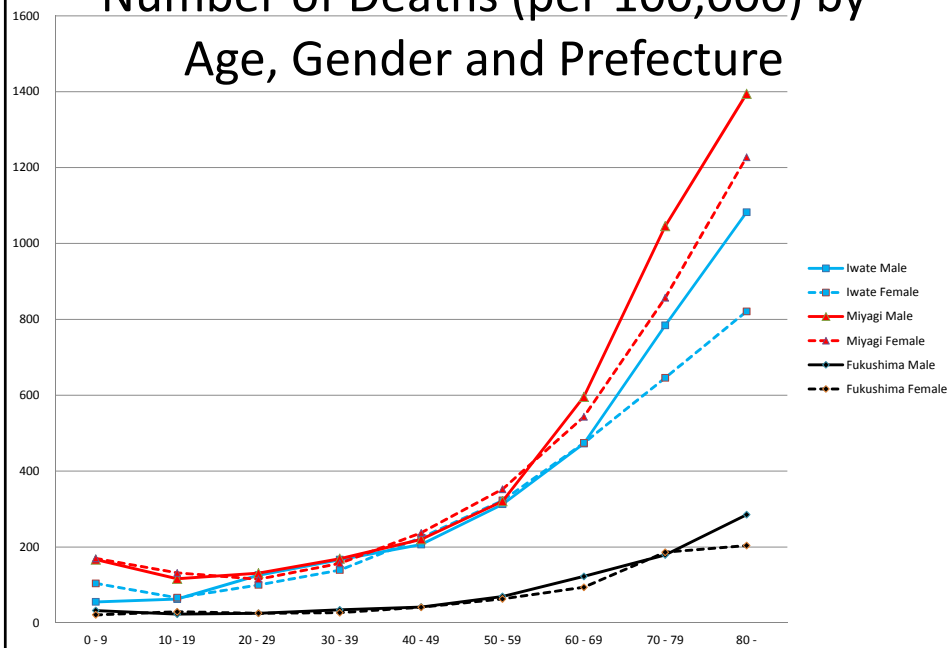
Source: Asahi Shinbun, March 11, 2012; The Statistics Bureau and the Director-General for Policy Planning of Japan, 2011. 2010 Population Census.

Population Pyramid and the East Japan Earthquake Casualties by Gender and Age Group



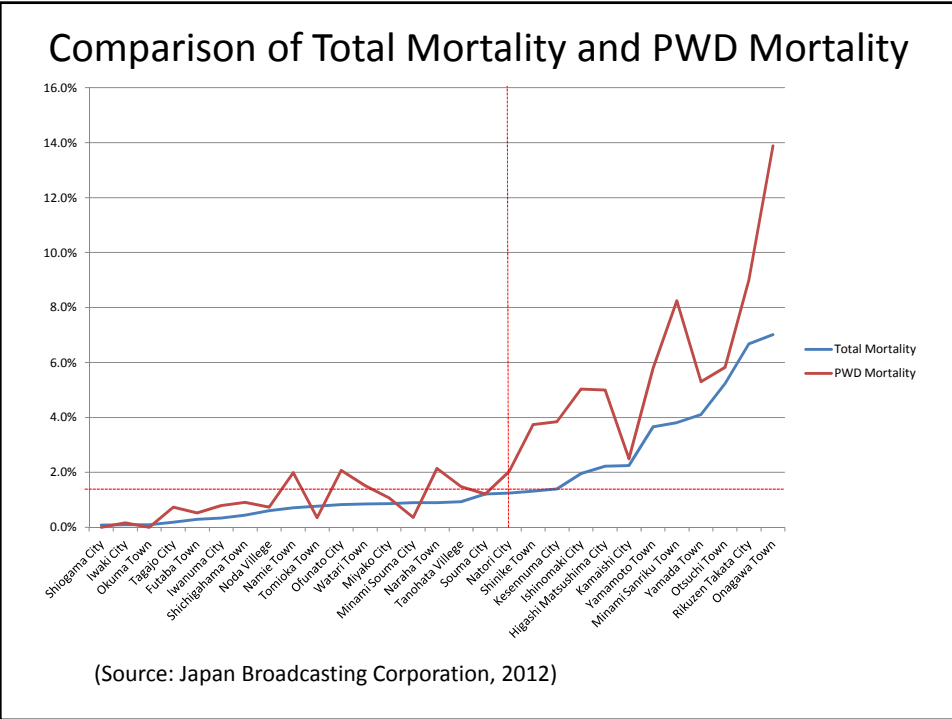
Source: Asahi Shimbun, March 11, 2012; The Statistics Bureau and the Director-General for Policy Planning of Japan, 2011. 2010 Population Census

Number of Deaths (per 100,000) by Age, Gender and Prefecture



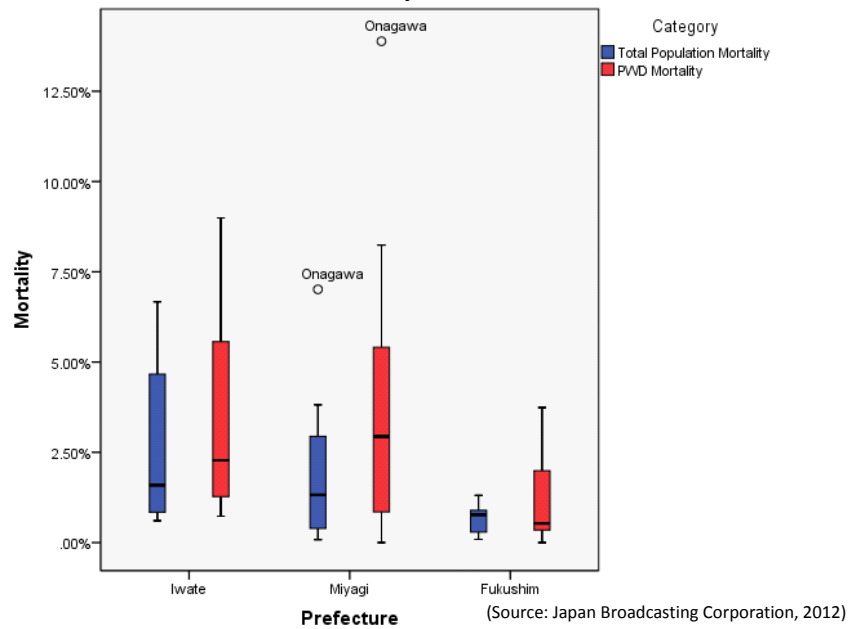
Two Independent Survey on PWD Mortality Rates among 29 Municipalities

Table 1 Comparison of Mortality Rates among People with Developmental, Physical, and Mental Disabilities in East Japan Earthquake Disaster																
Prefecture	Municipality	Total			PWD			PWD(Developmental)			PWD(Physical)			PWD(Auditory)		
		Population	Dead	Mortality	Population	Dead (NHK)	Mortality (NHK)	Population	Dead	Mortality	Population	Dead	Mortality	Population	Dead	Mortality
Iwate	Miyako City	59442	514	0.86%	3371	36	1.1%	479	2	0.4%	2465	28	1.1%	176	2	1.1%
	Ofunato City	40738	336	0.82%	2288	47	2.1%	359	2	0.6%	1742	42	2.4%	190	4	2.1%
	Rikuzen Takata City	23302	1554	6.67%	1368	123	9.0%	221	5	2.3%	1019	106	10.4%	NA		
	Kamashiro City	39578	888	2.24%	2589	64	2.5%	346	2	0.6%	2032	59	2.9%	183	4	2.2%
	Otsuchi Town	15777	799	5.07%	1012	59	5.8%	311	5	1.6%	807	53	6.6%	NA		
	Yamada Town	18825	763	4.05%	1114	59	5.3%	172	0	0.0%	858	58	6.8%	NA		
	Tanohata Village	3843	36	0.94%	203	3	1.5%	411	1	0.2%	142	2	1.4%	5	0	0.0%
Miyagi	Noda Village	4532	28	0.62%	273	2	0.7%	411	0	0.0%	199	2	1.0%	19	0	0.0%
	Sanda City	1045903			Not Recorded											
	Ishinomaki City	160704	3151	1.96%	7893	397	5.0%	1100	28	2.5%	6364	351	5.5%	Not Recorded		
	Shiogama City	56490	46	0.08%	2997	0	0.0%	3551	0	0.0%	2459	0	0.0%	165	0	0.0%
	Kesennuma City	74494	1021	1.40%	3608	135	3.7%	Not Recorded								
	Natori City	73140	911	1.25%	3749	76	2.0%	375	4	1.1%	3069	68	2.2%	NA		
	Taizono City	62979	121	0.19%	2318	17	0.7%	337	1	0.3%	1790	16	0.9%	123	1	0.8%
	Iwajuma City	44198	150	0.34%	1770	14	0.8%	265	3	1.1%	1356	10	0.7%	86	1	1.2%
	Higashi Matsushima City	42908	956	2.23%	1920	96	5.0%	294	7	2.4%	1440	85	5.9%	104	4	3.8%
	Watari Town	34846	296	0.85%	1384	21	1.5%	230	0	0.0%	1004	21	2.1%	70	0	0.0%
Fukushima	Yamanote Town	16711	611	3.66%	933	54	5.8%	129	3	2.3%	693	45	6.5%	43	4	9.3%
	Shichigahama Town	26419	91	0.35%	882	9	0.9%	121	0	0.0%	723	9	1.1%	40	1	2.5%
	Onasawa Town	10051	705	7.01%	605	84	13.9%	52	4	7.5%	458	69	15.1%	23	1	4.3%
	Minami Sanriku Town	17431	665	3.82%	995	82	8.2%	150	3	2.0%	764	78	10.2%	42	6	14.3%
	Iwaki City	342198	310	0.09%	21004	35	0.2%	2185	3	0.1%	17384	30	0.2%	1350	6	0.4%
	Soma City	37796	459	1.21%	1863	23	1.2%	245	3	1.2%	1480	17	1.1%	Not Recorded		
	Minami Soma City	70895	633	0.89%	4398	16	0.4%	519	0	0.0%	3581	16	0.4%	276	0	0.0%
	Naraha Town	7701	69	0.90%	512	11	2.1%	85	0	0.0%	426	10	2.3%	32	1	3.1%
	Tomonaka Town	13998	123	0.77%	861	3	0.3%	122	0	0.0%	560	3	0.5%	26	0	0.0%
	Osama Town	11511	11	0.10%	565	0	0.0%	67	0	0.0%	468	0	0.0%	27	0	0.0%
Chiba	Futaba Town	6932	20	0.29%	377	2	0.5%	18	0	0.0%	343	2	0.6%	76	2	2.6%
	Namie Town	20908	149	0.71%	1155	23	2.0%	146	1	0.7%	925	21	2.3%	63	0	0.0%
	Shiraka Town	8218	108	1.31%	455	17	3.7%	51	2	3.9%	382	14	3.7%	30	1	3.3%
	Total	1340963	15534	1.16%	72382	1507	2.0%	8579	76	0.9%	54852	1214	2.2%	3099	38	1.2%
Source: Japan Broadcasting Corporation(NHK) Fukushima Network "One Year after the East Japan Earthquake: 1) Disasters Experienced by People with Disabilities. Broadcasted on March 6, 2012.																
Mainichi Shinbun December 24, 2011																

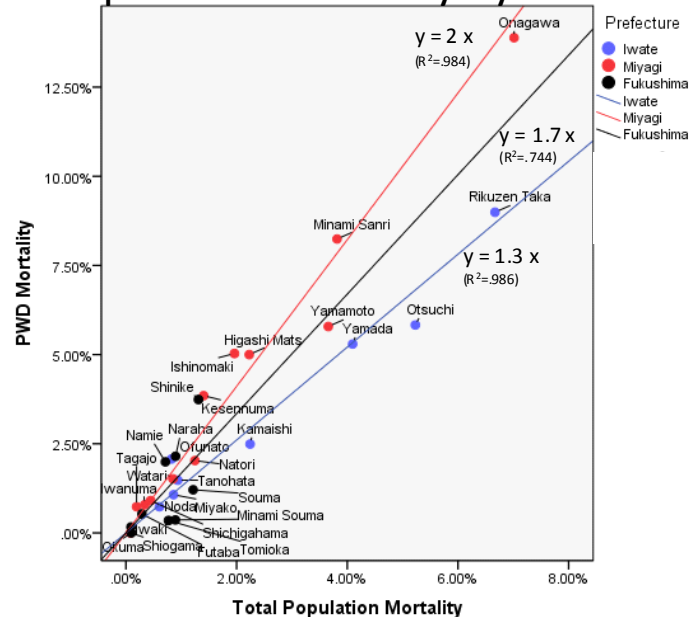


(Source: Japan Broadcasting Corporation, 2012)

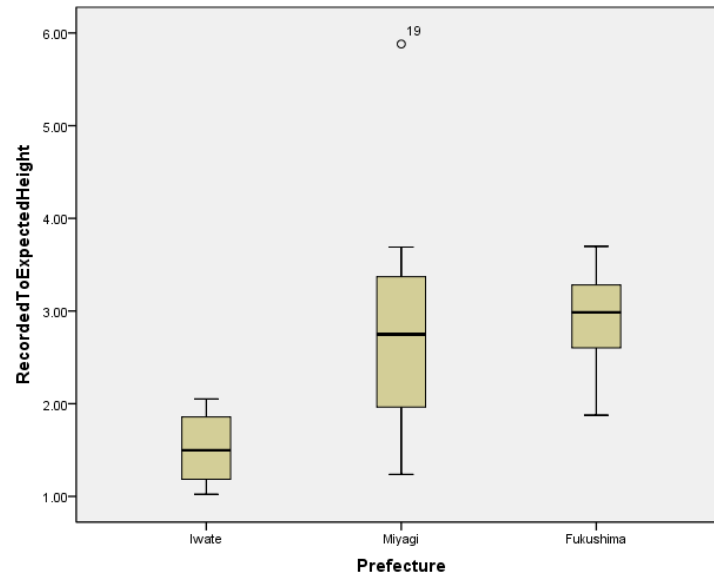
Comparisons of the Total and PWD Mortality Rate Distributions by Prefecture



Regression of PWD Mortality on the Total Population Mortality by Prefecture

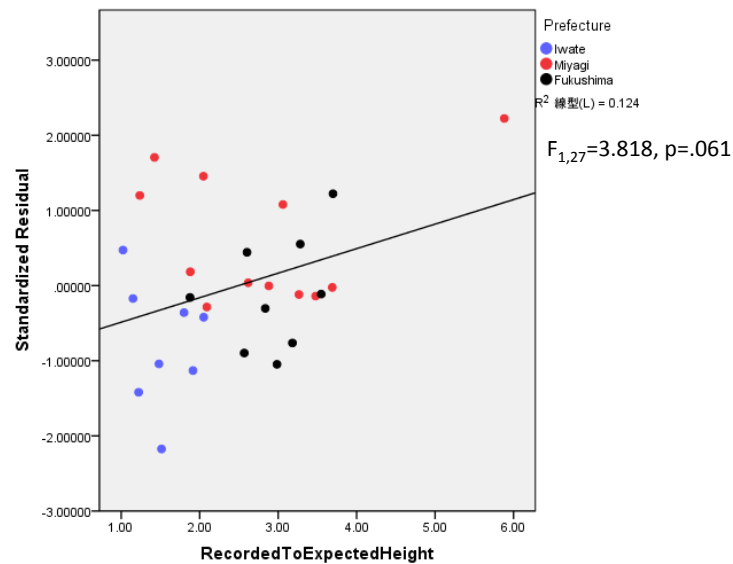


Recorded Maximum Tsunami Height / Expected Tsunami Height by Prefecture



Source: Suzuki and Hayashi (2011)

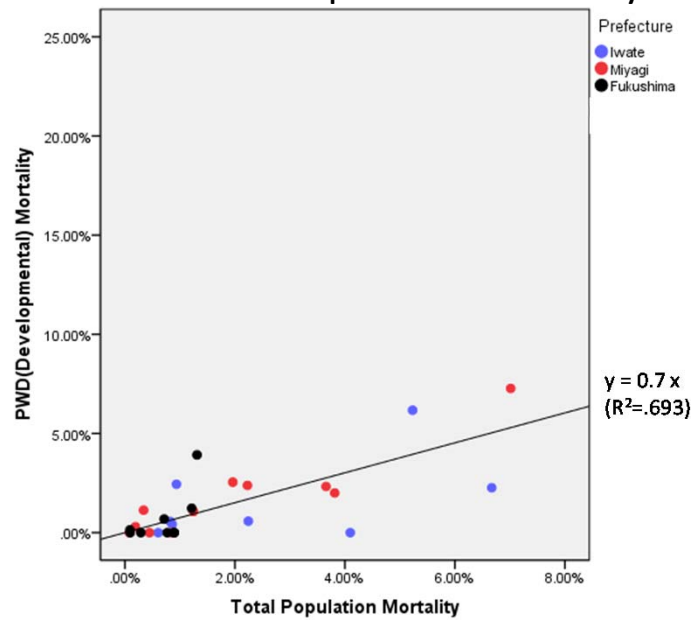
Regression of Residual (PWD Mortality <- Total Mortality) on Recorded-to-Expected Tsunami Height



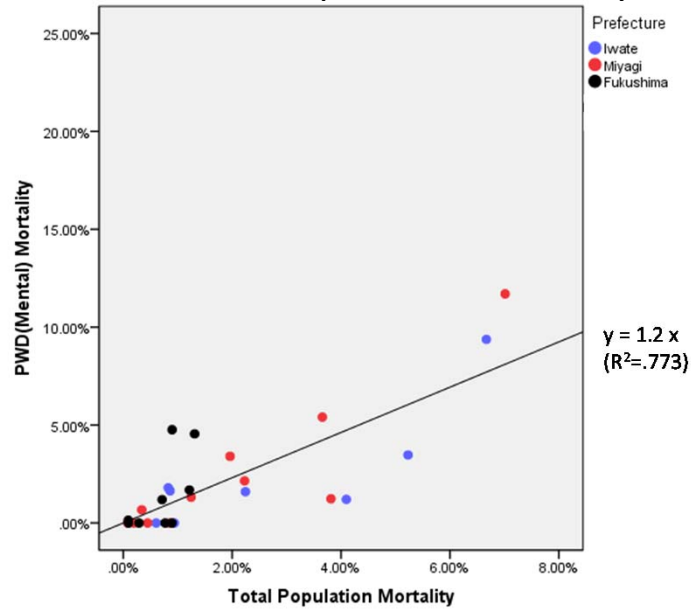
2. Basic Facts of the 2011 Eastern Japan Earthquake (2):

B) Casualty Gaps among Different Categories of PWDs

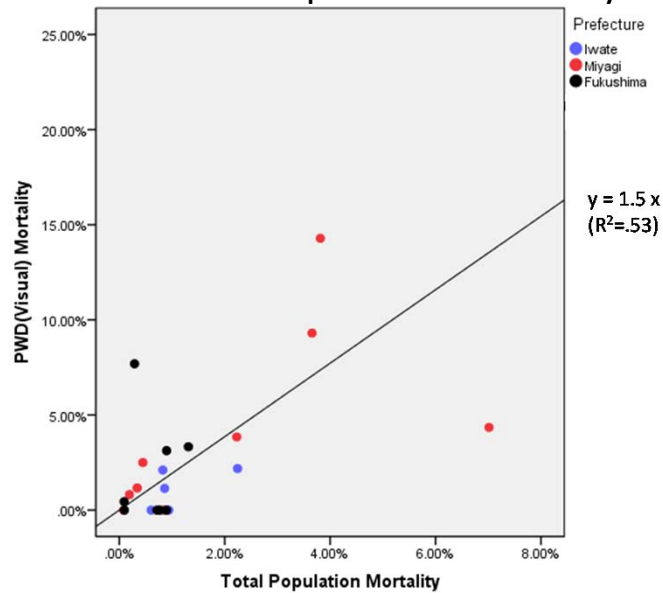
Regression of PWD(Developmental) Mortality on the Total Population Mortality



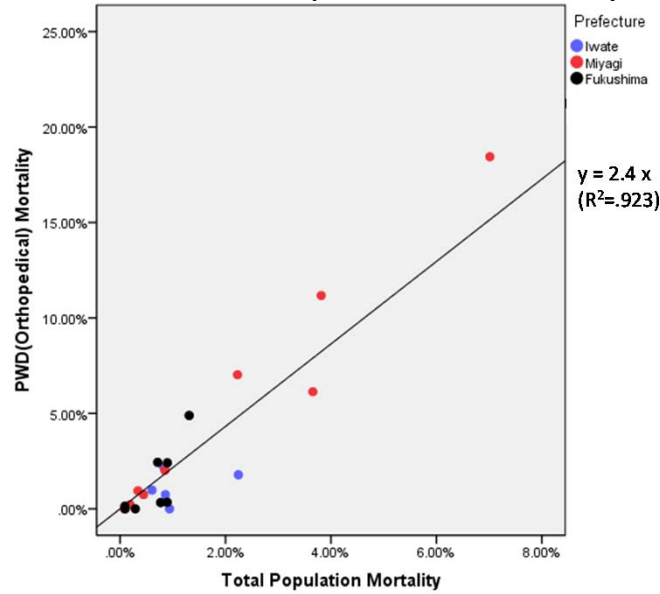
Regression of PWD(Mental) Mortality on the Total Population Mortality



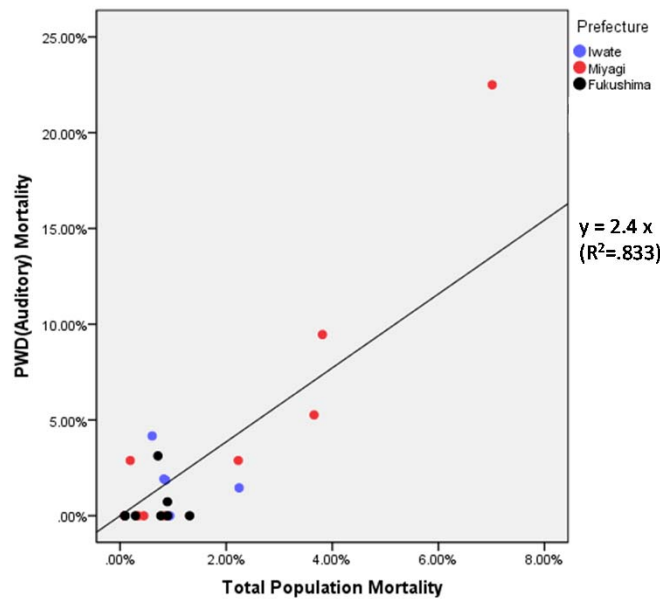
Regression of PWD(Visual) Mortality on the Total Population Mortality



Regression of PWD(Orthopedic) Mortality on the Total Population Mortality



Regression of PWD(Auditory) Mortality on the Total Population Mortality

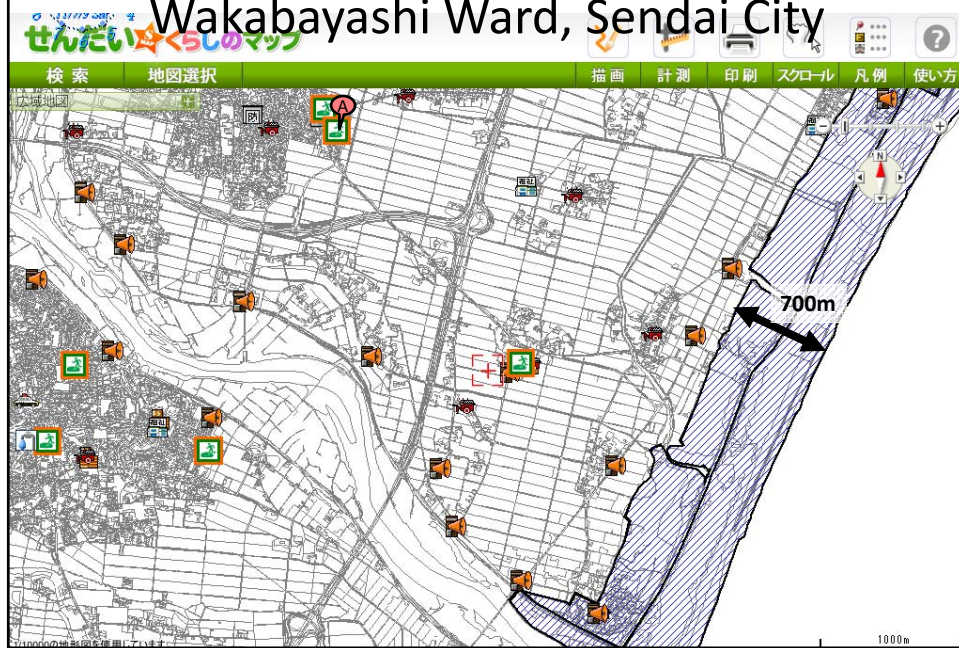


3. Observations and Implications

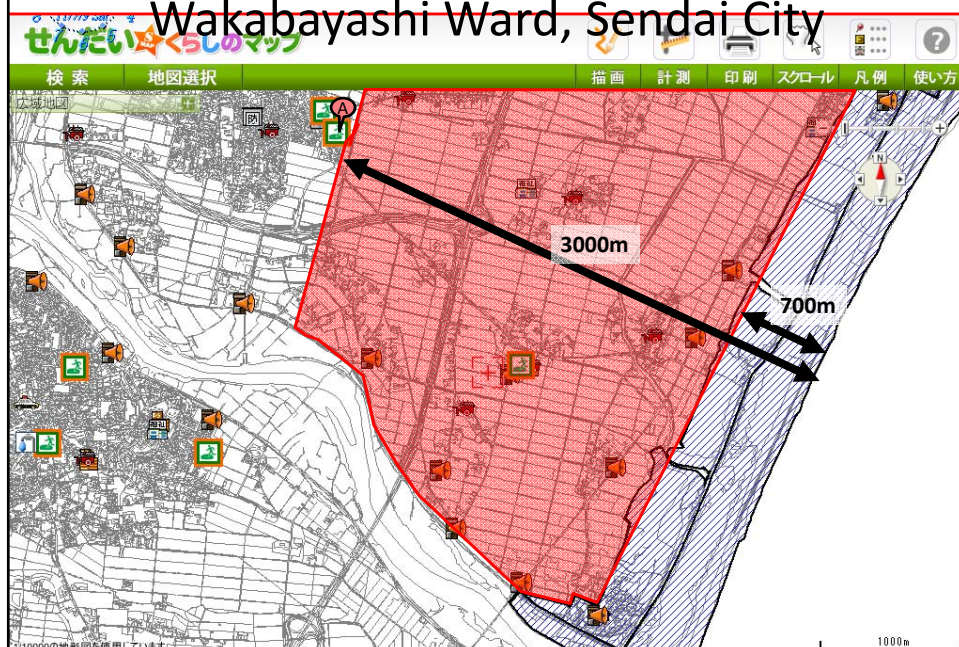
A) Challenge on Identifying People at Risk

Re-think “Correct” Hazard Estimates

Tsunami Hazard Map East of Rokugo JHS, Wakabayashi Ward, Sendai City



Tsunami Inundation East of Rokugo JHS, Wakabayashi Ward, Sendai City



Vulnerability as a Function of Hazards, Person & Environment

$$f(\text{Hazard}, f(\text{Person}, \text{Environment}))$$

Person-Environment Profiles

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Vulnerability as a Function of Hazards, Person & Environment

$$f(\text{MP}_r\text{E}, f(\text{Person}, \text{Environment}))$$

Person-Environment Profiles

= Maximum Probable Event

≠ Maximum Possible Event

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Vulnerability as a Function of Hazards, Person & Environment

$f(\text{MP}_o\text{E}, f(\text{Person, Environment}))$

Person-Environment Profiles

≠ Maximum Probable Event

= Maximum Possible Event

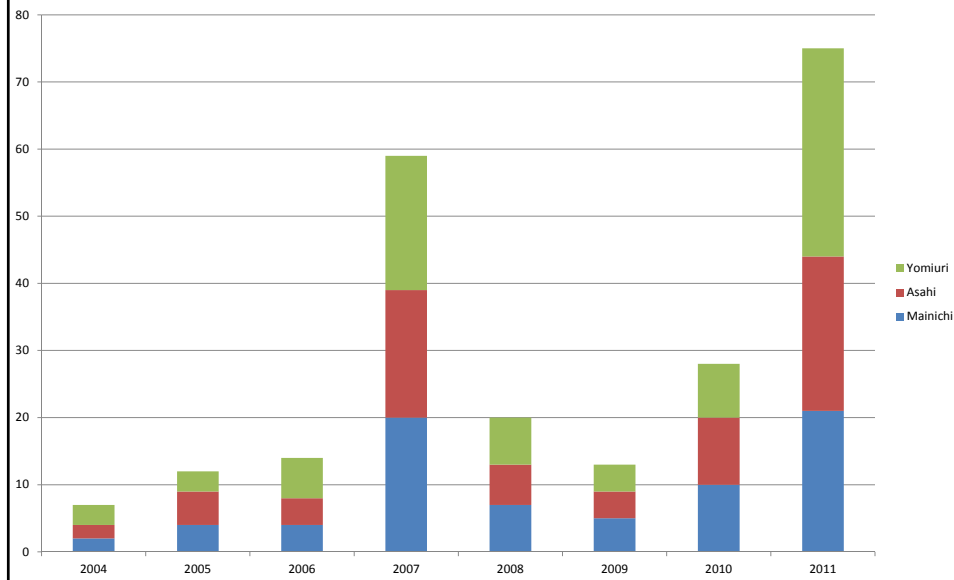
“What-if” type of Hazard Magnitude Estimation

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B) Challenge on Pre-planning Specially Designated Shelters for People with Special Needs

Need to Expand Disaster Process Time
Span in the Disaster Countermeasure
Guideline for People with Special Needs
in Times of Disaster

“Specially Designated Shelter” Appeared in 3 Major Newspapers



School Gym Shelter at Rokugo JHS, Sendai City



April 6, 2011

Classroom Shelters at Hakken JHS, Sendai City



Nakano (Gamo) Residents on the 2nd Floor Classroom April 6, 2011



Arahama Residents on the 1st Floor Classroom April 6, 2011

Specially Designated Shelter at Miyagino Day Service Center for PWD, Sendai City



April 5, 2011

Specially Designated Shelter at Yugakukan Sport Center Gym, Ishinomaki City



April 24, 2011

<http://road.nippon-foundation.or.jp/2011/04/007-fcd1.html>

Specially Designated Shelters at Shunpoen Special Nursing Home in Kesennuma City



Shunpoen Nursing Home Shelter (April 7, 2011)



Ochiai Nursery School Shelter

Differences in Response

- Sendai City
 - Pre-planned arrangement/compact with social service providers
 - Improvisations in referring elderly depending on physical and cognitive functioning levels
- Ishinomaki City
 - Improvisations initiated by City Hospital doctors/nurses, supported by city officials.
 - Lacked formal logistic support. City officials not aware of specially designated shelter provision from Disaster Relief Act
- Kesennuma City
 - Local service provider initiative/improvisations
 - No logistic support or acknowledgement from the city administration
 - Special nursing home director was afraid of financial burden to run specially designated shelter for an extended period of time.

Observations and Implications

- Municipalities other than Sendai city did not have compacts on specially designated shelter operations with social service providers.
- It took nearly three weeks for Ishinomaki and Kesennuma to formally designate such shelters after the earthquake.
- many local officials were unaware of the special service provision clause of the Disaster Relief Act covering shelters for people with special needs.
- More detailed guidelines for specially designated shelters and temporary housing operation for PSNDs need to be developed in order to address this issue.

C) Challenge on Utilizing Personal Information on People with Special Needs in Times of Disasters

School Gym Shelter at Rokugo JHS, Sendai City



April 6, 2011

Classroom Shelters at Hakken JHS, Sendai City



Nakano (Gamo) Residents on the 2nd Floor Classroom April 6, 2011



Arahama Residents on the 1st Floor Classroom April 6, 2011

Registry of People with Special Needs in Times of Disasters

- Disaster Countermeasure Guideline outlined procedures to collate local government data bases to create registry of PSND.
- After the event, many local government officials felt hesitant to release PSND information to NGOs and self-help organizations due to their fear of breaking Personal Information Protection Bylaw.
- This is despite the fact that the Bylaw provides exceptional conditions. The onset of disaster is clearly one of these exceptional conditions.

Observations and Implications: Seven Months After the Event

- Japan Disability Forum outreached 1,386 individuals with disability after the onset of the earthquake and tsunami disasters as of June 17.
- This number (1,386) accounts for only 2.6 % of 53,511 people who are registered to be PWD in the affected areas in Miyagi prefecture.
- We still do not know the conditions of a large majority of People with Disabilities even one year after the event.