Great East Japan Earthquake and the Sendai Framework for Disaster Risk Reduction

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Sendai Framework for Disaster Risk Reduction 2015 - 2030
Sendai Framework for Disaster Risk Reduction 2015-2030

• Health resilience is strongly promoted throughout
Sendai Framework for Disaster Risk Reduction 2015-2030

• Health resilience is strongly promoted throughout

• The substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries
Sendai Framework for Disaster Risk Reduction 2015-2030

**Reduce**
- Mortality/
  - global population
  - 2020-2030 Average << 2005-2015 Average

- Affected people/
  - global population
  - 2020-2030 Average << 2005-2015 Average

- Economic loss/
  - global GDP
  - 2030 Ratio << 2015 Ratio

- Damage to critical infrastructure & disruption of basic services
  - 2030 Values << 2015 Values

**Increase**
- Countries with national & local DRR strategies
  - 2020 Value >> 2015 Value

- International cooperation
to developing countries
  - 2030 Value >> 2015 Value

- Availability and access
to multi-hazard early warning systems 
  and disaster risk information and assessments
  - 2030 Values >> 2015 Values
Work in Fukushima so far:
A partnership of many
Overview of the triple disaster in Fukushima

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25 April, 2017
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The 2011 Great East Japan Earthquake Disaster: A mixture of 3 events

1. Earthquake
   Magnitude 9.0
   Seismic Intensity 7
   Duration >200sec
2. Tsunamis

Height ① 10m
Rose up to ② 41m
Flooded 561km$^2$
Death toll >16,000
Missing >2,500
120,000 houses were washed away
Another 10,000 totally collapsed
3. Nuclear power plant accident
Secondary events: Unplanned mass-evacuation

Causes of health problems:
- Staying indoors from fear of radiation exposure
- Loss of jobs
- Social isolation
  → Increased car-dependency
- Increasing mental health problems
Secondary events: \(\text{number of residents}\) ageing population due to fear of radiation

Population of Minamisoma City, Fukushima

Age distribution of Minamisoma in 2011 and 2016
Secondary events:
Influx of workers with low socio-economic status

At least 20,000 decontamination workers needed
People with low SES tend to be recruited
• At high risk of chronic disease
• Working & living conditions are often poor
• Social security issues

REUTERS Dec 30, 2013
Special Report: Japan’s homeless recruited for murky Fukushima clean-up
6 years on, my summary

• Secondary health impacts caused by the nuclear power plant accident have been much larger than direct health impacts by radiation.

• However, by focusing too much on radiation and cancer,
  • Massive preventable health deterioration is overlooked
  • Stigmatisation about radiation & cancer is not dispelled
  • Practical disaster mitigation plans have not been established

• To reduce preventable health deterioration in future disasters, it is essential to understand disaster health risks.
Understanding health risks of the Fukushima Disaster

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How do we know the health risks of the Fukushima disaster?
UN statement on Fukushima radiation

“No radiation-related deaths or acute diseases have been observed among the workers and general public exposed to radiation from the accident. The doses to the general public, both those incurred during the first year and estimated for their lifetimes, are generally low or very low. No discernible increased incidence of radiation-related health effects are expected among exposed members of the public or their descendants.” (UNSCEAR, 2013:10)

Problematic dissemination of information

• October 2015: the results of two studies concerning the children of Fukushima were reported within two days of each other

→ One finds no detectable internal radiation contamination\(^1\)
→ The other finds an increased incidence of thyroid cancer\(^2\)

• Both are reported widely in international and domestic (Japanese) media

• Confusion ensues

How might confusion influence practice?

• Short-term
  • Nursing home evacuations
  • Hospital evacuations

• Long-term
  • Health practitioner advice to patients on lifestyle choices
  • How long should external and internal radiation contamination screenings continue for?
In the five years since Japan’s triple disaster there has been a growth in media coverage and public interest in disaster recovery. An earthquake in March 2011 triggered a tsunami that hit the Fukushima Daiichi nuclear power plant, leading to loss of the plant’s core cooling capacities, followed by hydrogen explosions and subsequent radiation leakage. The nuclear accident is often discussed, both within Japan and abroad, from a perspective of radiation leakage – as would be expected in the aftermath of such an accident. Yet this has led to confusion about the importance of radiation risks, due to conflicting reports and a lack of awareness of ongoing problems that are unrelated to radiation. These misunderstandings deserve attention.

many members of the public, and even health professionals, continue to be confused by inconsistent results. This is unfortunate, in more ways than one. Controversy over radiation risk not only increases the difficulty in creating an appropriate public health response, but also diverts attention away from other post-disaster health problems that are unrelated to radiation, resulting in issues that are neglected in disaster awareness and response.

Over 80 000 people in Fukushima prefecture were forced to evacuate their homes following the nuclear accident. The event brought many changes to the affected region, including widespread social disruption through the breakdown of communities (due to the evacuation of among children and adults, it appears that the increasing burden of noncommunicable diseases and mental health problems may outweigh the burden of disease caused directly by radiation.

The multifaceted nature of the impact of nuclear disasters is exemplified in the issues faced by elderly residents of Fukushima. A study of 1215 elderly residents of care facilities followed up until 2013 found that those evacuated at the time of the disaster had a 3.37 times higher risk of mortality (95% confidence interval: 1.66–6.81) compared with those not evacuated; this suggests that the evacuation may have been more dangerous than the disaster itself for this population. This unexpected result illustrates the complexity of disaster recovery.
Take home messages

• There have been problems with understanding risk (Sendai Framework Priority 1) after the Fukushima Disaster.

• There is a need for a review of the impacts of both evidence for both radiological and non-radiological health effects of the Fukushima disaster.

• In my view, evidence-based practice and policy is impossible if we do not understand the evidence. Evidence must be useful, useable and used!
A case series of health impacts after the disaster

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Outline of cases

1. Abandonment in the evacuation zone
2. Impact of evacuation on nursing homes
3. Collapse of the healthcare system
4. Non-communicable disease changes
Case 1: Abandonment in the evacuation zone

<20km: Mandatory evacuation zone (no-entry zone)
20-30km: Voluntary evacuation zone (Indoor evacuation)

Indoor evacuation: scientifically ‘reasonable’, but culturally difficult

→ All who could evacuate left
→ No food supplies within 50km
→ Medical supplies (e.g. oxygen) in shortage
→ The most vulnerable were left without food (e.g. hospital patients, seniors living alone)

A medical doctor said:

“I did death investigation for a month after the disaster…several elderly people apparently died from starvation or dehydration at home.”
Case 2: Impact of evacuation on nursing homes
Estimated pre and post-earthquake survival.

Case 3: Collapse of the healthcare system

The majority of hospital staff are women, who are more likely to evacuate
Concern for their children’s health and/or education
Unemployment of husbands
Licensed nurses could easily find jobs outside of Fukushima

Number of hospital staff in a disaster area of Fukushima

Ochi S, et al. PLOS ONE 11(10): e0164952
Case 4: Increase in hypertension in Soma city

Prevalence of hypertension increased after the disaster, but the Proportion of treated patients also increased, and the Prevalence of uncontrolled patients has decreased → Health check-ups might contribute to increased intervention?
Process of health impacts by a nuclear accident

Event
- Explosion
- Contamination
- Evacuation
- Bad rumor
- Closure

Intermediate factors
- Radiation
- Mental stress
- Unemployment
- Decontamination
- Lifestyle change

Health deterioration

Evidence-based data
- Size
- Cost
- Timing
- Duration
- Risk factor

Prioritisation

Intervention & Prevention
Evidence-informed disaster risk governance & management for health

Sendai Framework for Disaster Risk Reduction 2015 - 2030

Public Health

Social Stabilisation

Defense-in-Depth

Local/National Government

Evidence

Evidence

Evidence

Evidence

NPP

Hospital
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Questions
Discussion