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UNISDR  
The United Nations Office for Disaster Risk Reduction



World Health  
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WS06 Public Health  
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# 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

## 7 GLOBAL TARGETS

### 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 & 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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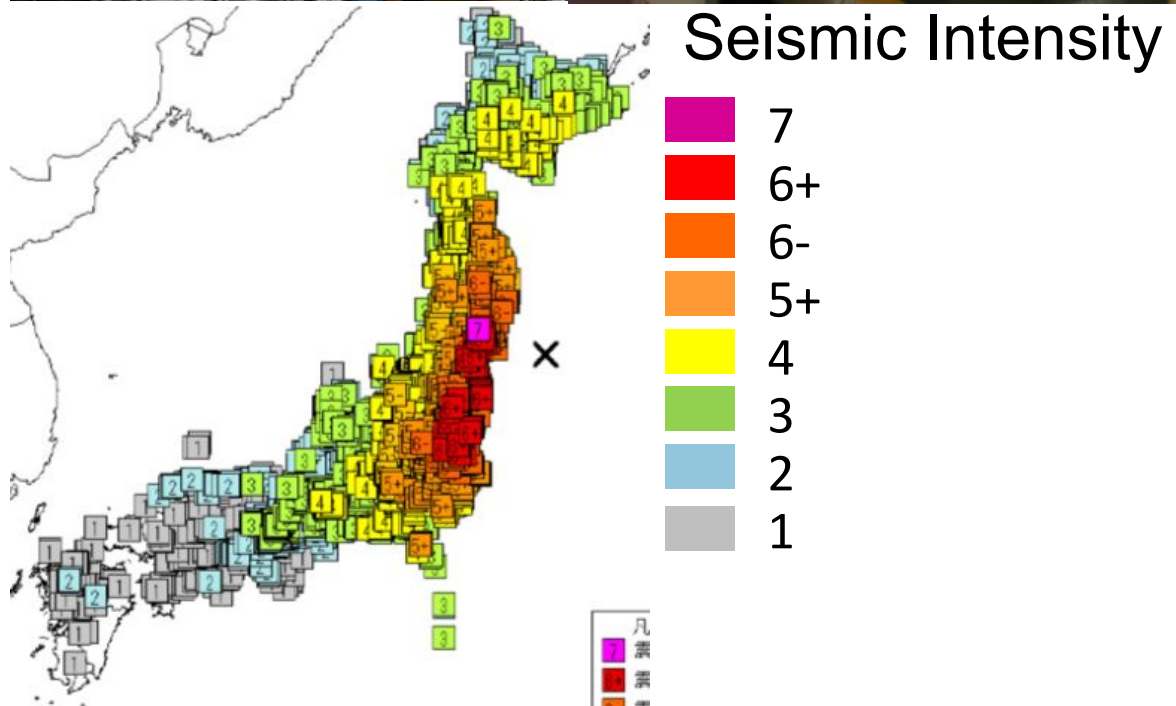
# The 2011 Great East Japan Earthquake Disaster: A mixture of 3 events

## 1. Earthquake

Magnitude 9.0

Seismic Intensity 7

Duration >200sec





## 2. Tsunamis

Height ① 10m

Rose up to ② 41m

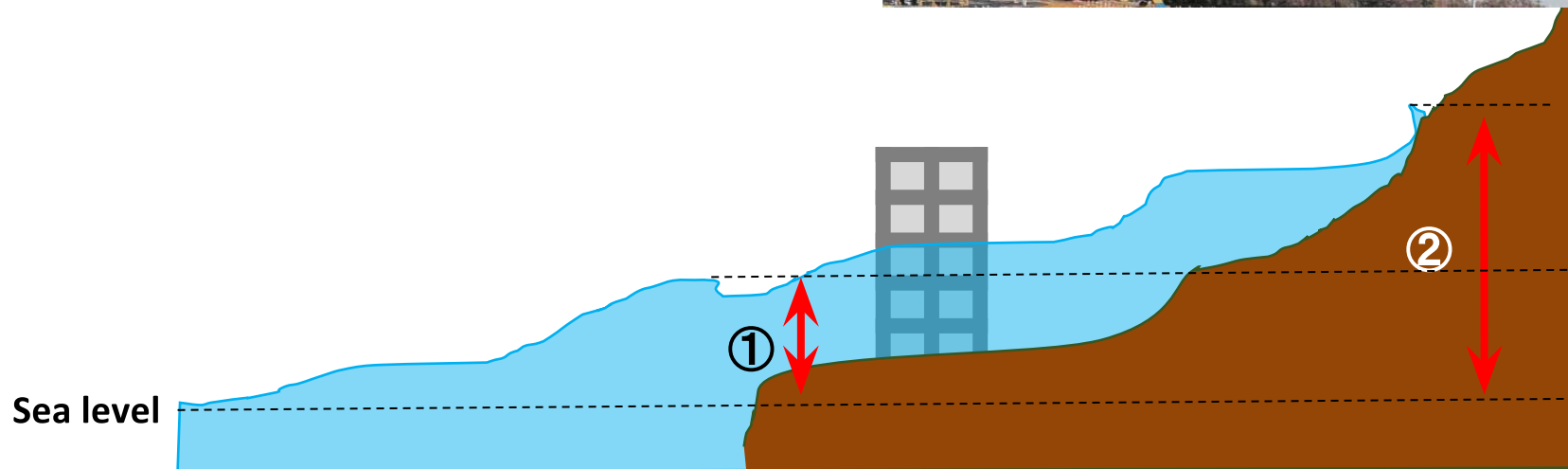
Flooded 561km<sup>2</sup>

Death toll >16,000

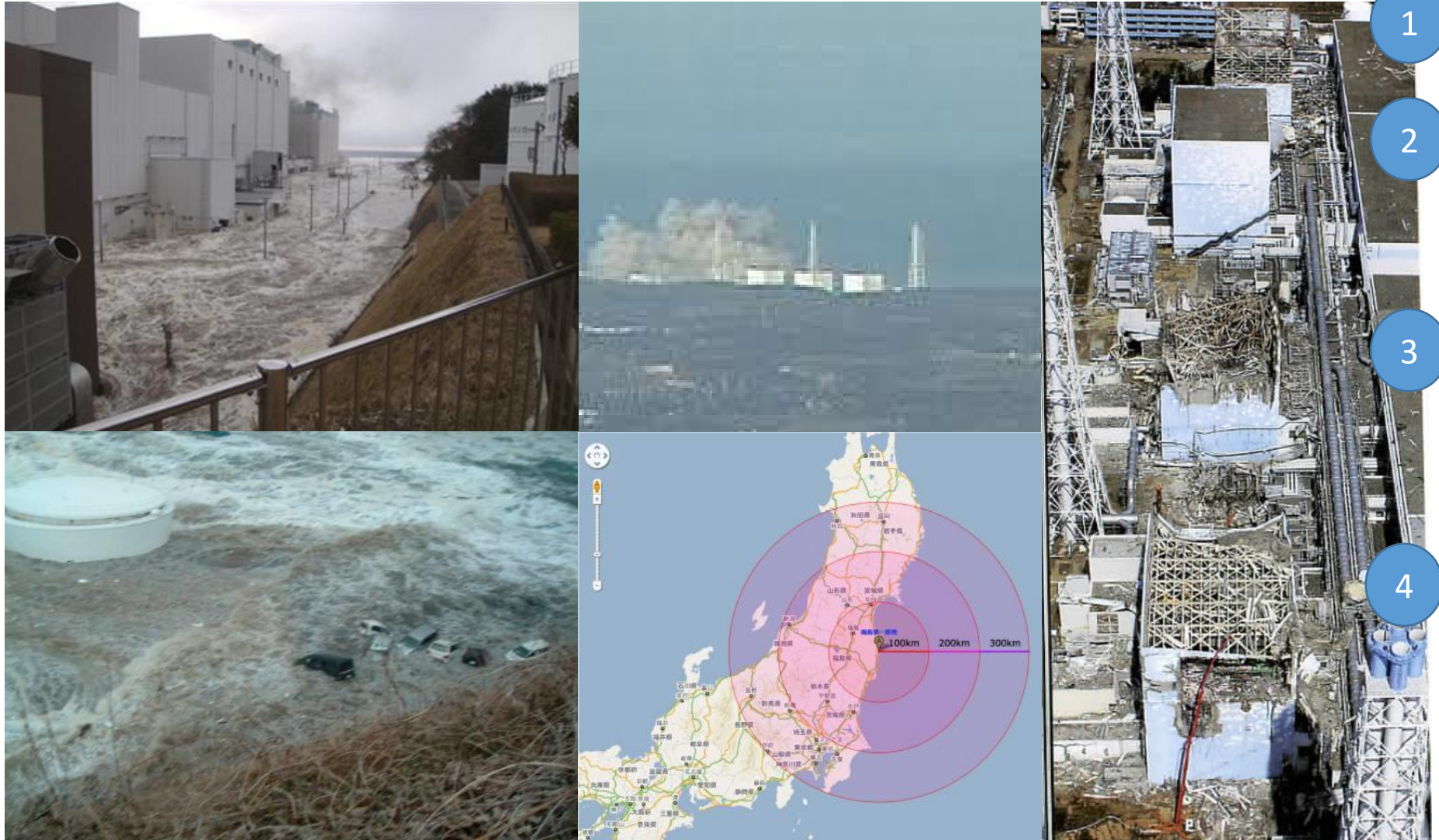
Missing >2,500

120,000 houses were washed away

Another 10,000 totally collapsed



### 3. Nuclear power plant accident



24<sup>th</sup> March, 2011



# Secondary events: Unplanned mass-evacuation



Weeks - months



For years (ongoing)



Immediately after

## 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:

number of  
residents

## ing population due to fear of radiation

Population of Minamisoma City, Fukushima

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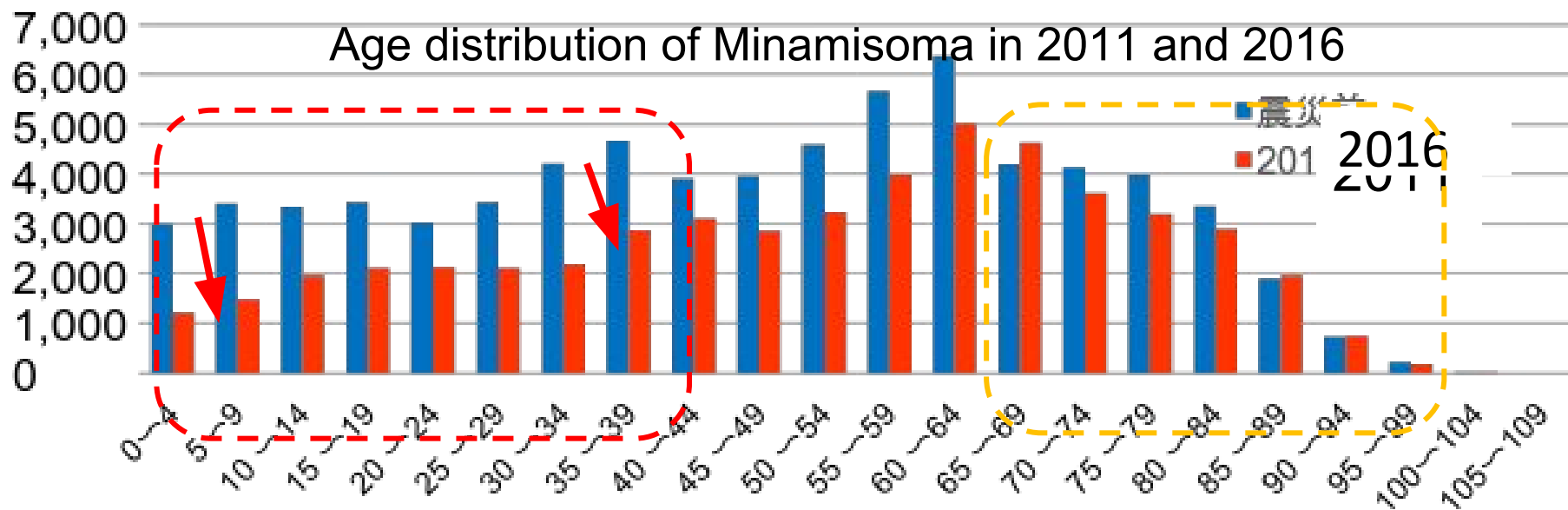
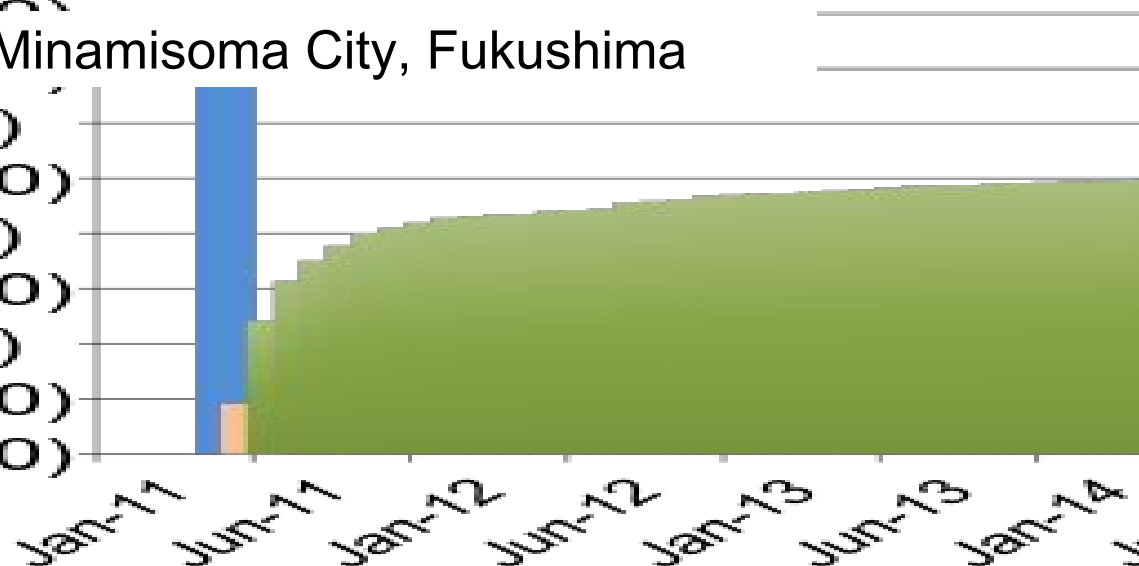
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##0\_);[Re18](#,#0)

##0\_);[Re3](#,#0)

##0\_);[Re18](#,#0)

##0\_);[Re30](#,#0)





# 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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27 April, 2017  
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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)

<http://www.unscear.org/unscear/en/fukushima.html>



# 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<sup>1</sup>
  - The other finds an increased incidence of thyroid cancer<sup>2</sup>
- Both are reported widely in international and domestic (Japanese) media
- Confusion ensues
  1. Hayano RS et al, *Proc Jpn Acad Ser B Phys Biol Sci.* 2015;91(8):440-6.
  2. Tsuda T et al. *Epidemiology* 2016;27(3):316-22.

# 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?



## Public health after a nuclear disaster: beyond radiation risks

Claire Leppold,<sup>a</sup> Tetsuya Tanimoto<sup>b</sup> & Masaharu Tsubokura<sup>c</sup>

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.<sup>5</sup> The event brought many changes to the affected region, including widespread social disruption through the breakdown of communities (due to the evacu-

among children and adults,<sup>2,9</sup> 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.<sup>10</sup> This unexpected result illustrates the complexity



# 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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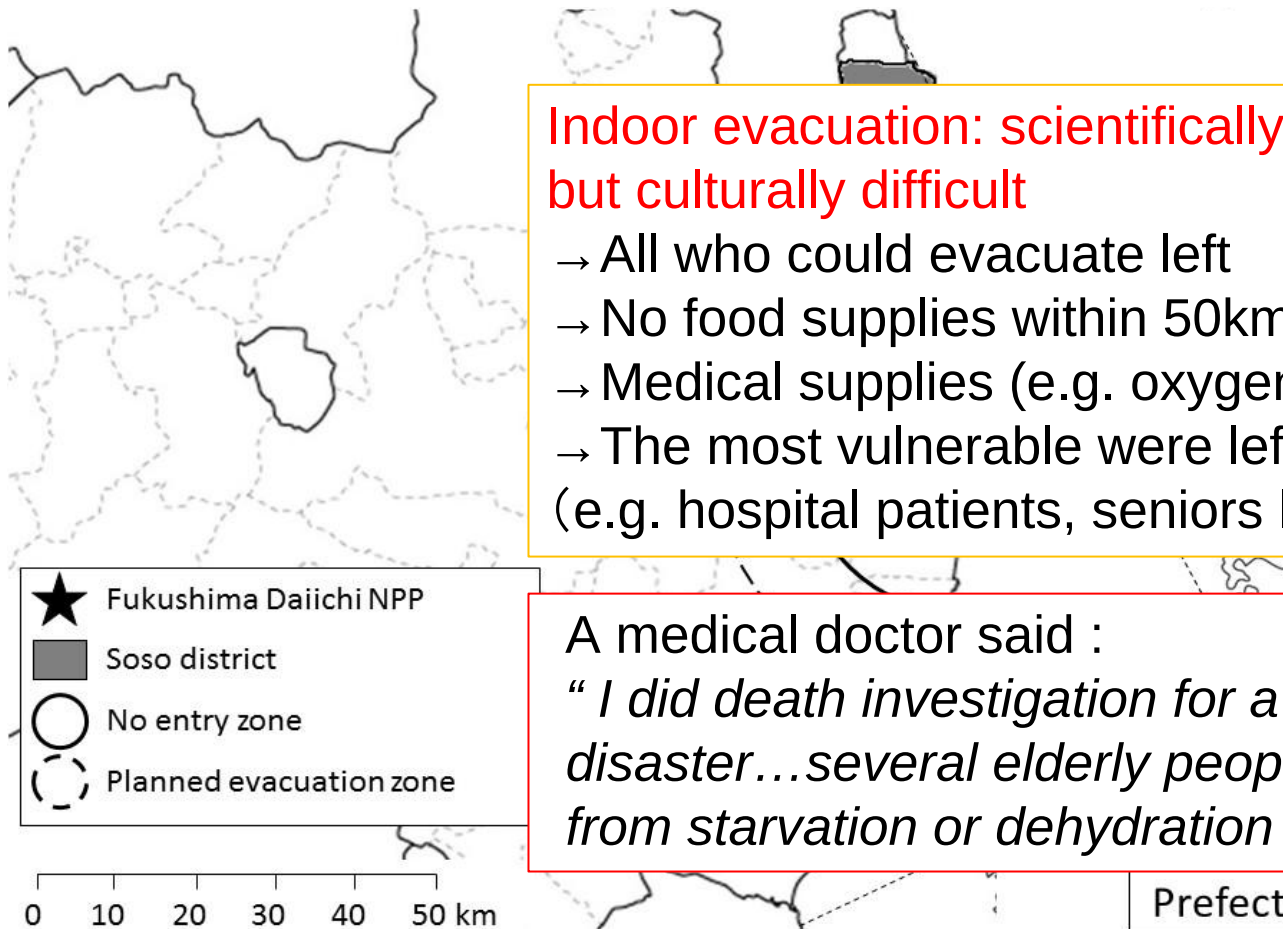
# Outline of cases

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)

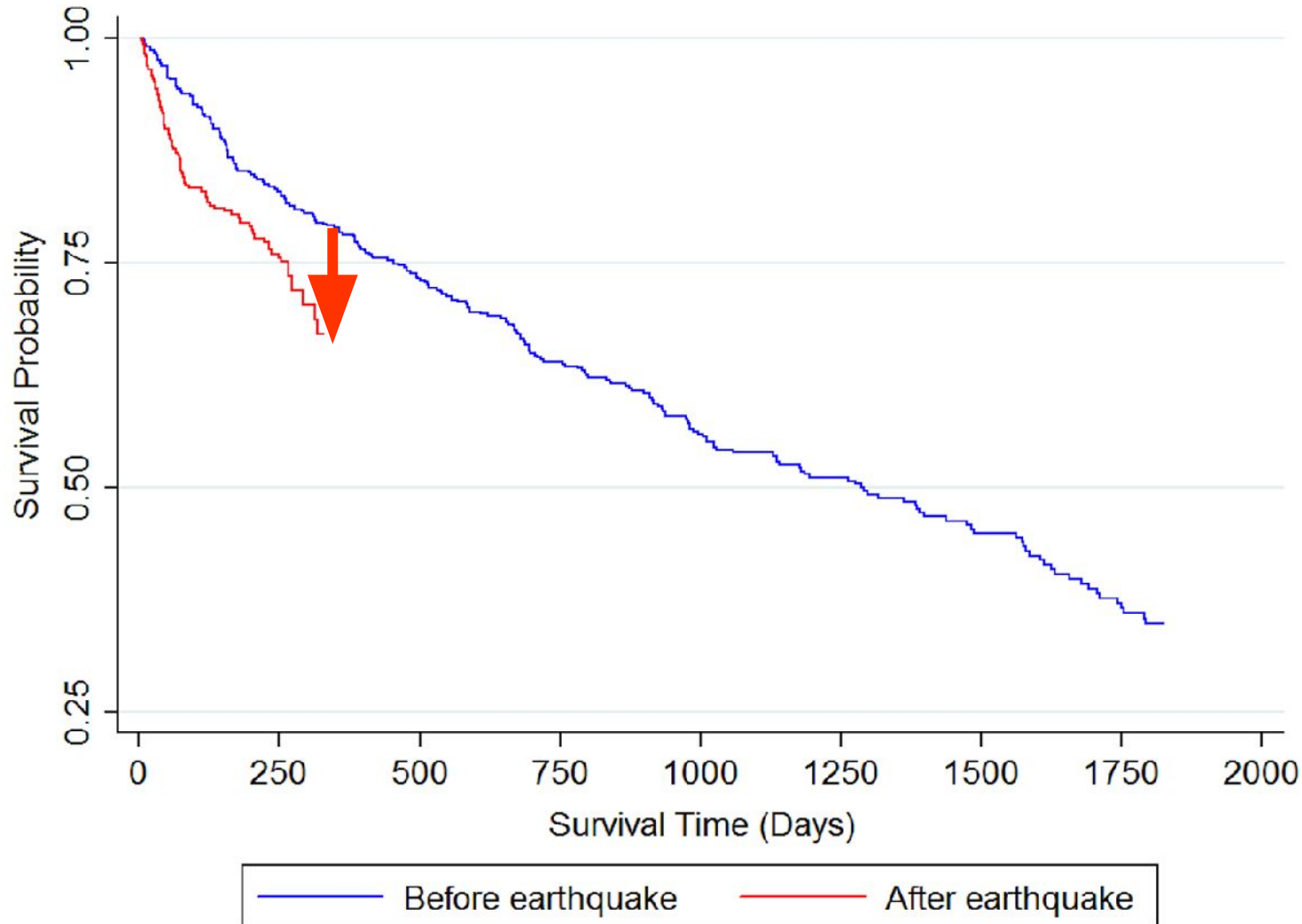
A medical doctor said :

*" 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.

s.

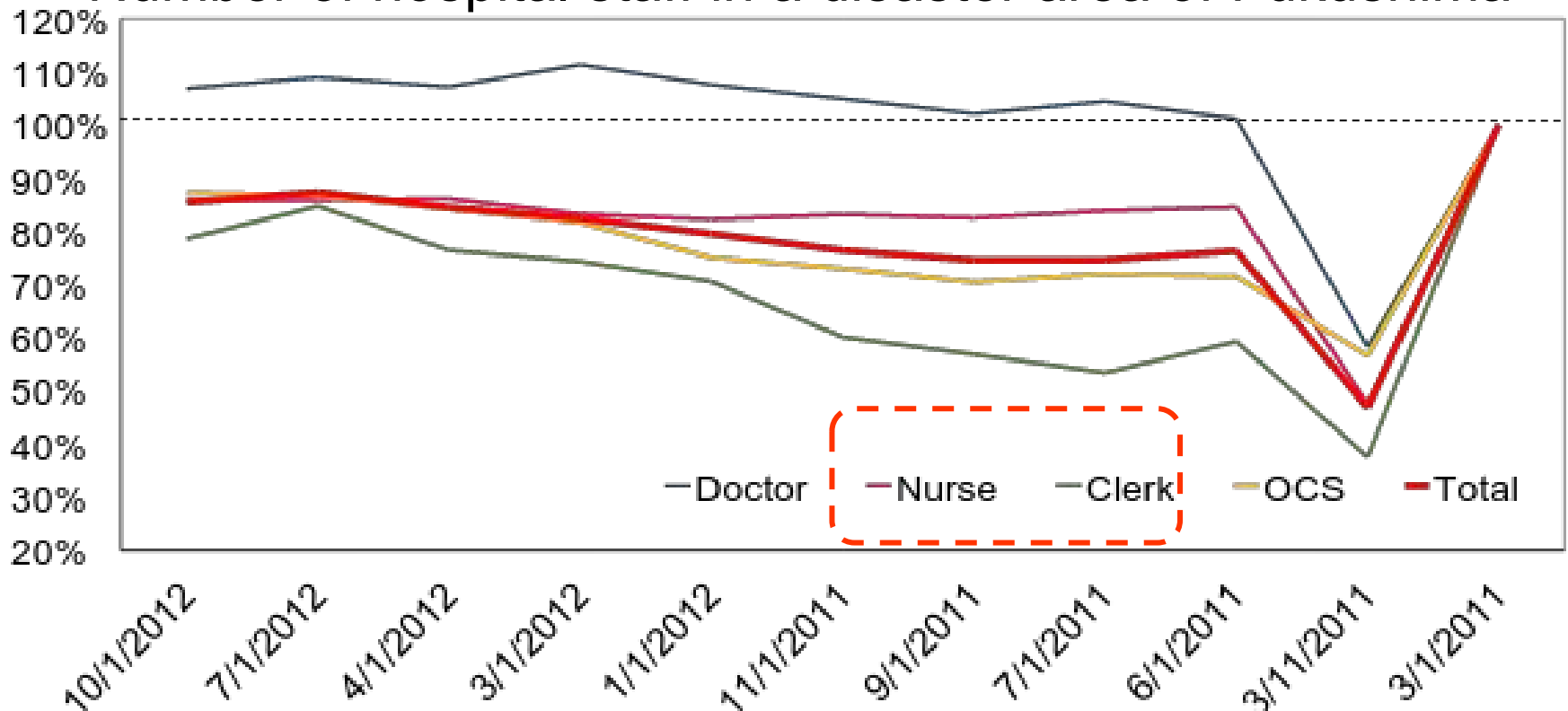




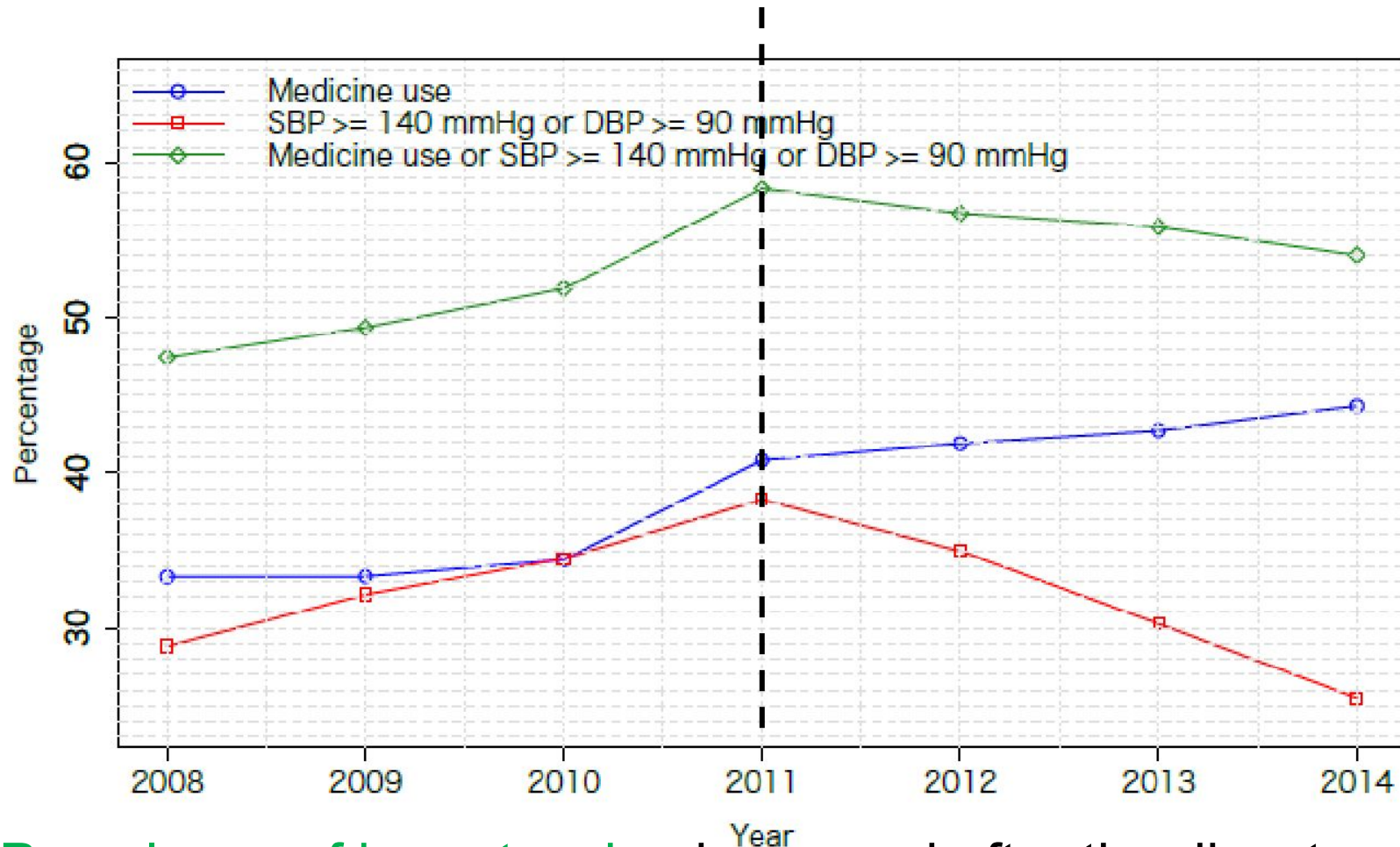
# Case 3: Collapse of the healthcare system

- 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

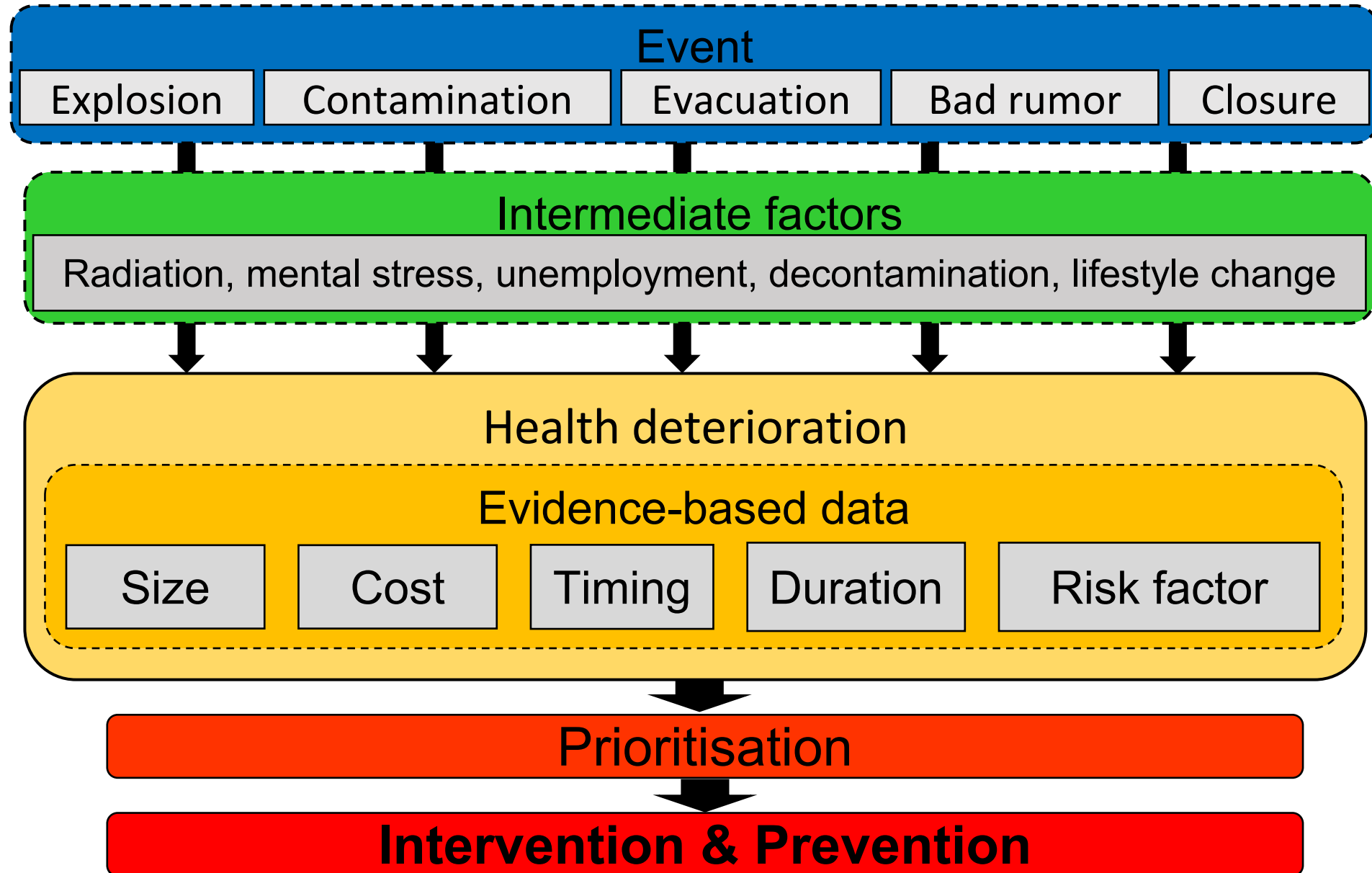


## Case 4: Increase in hypertension in Soma city



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

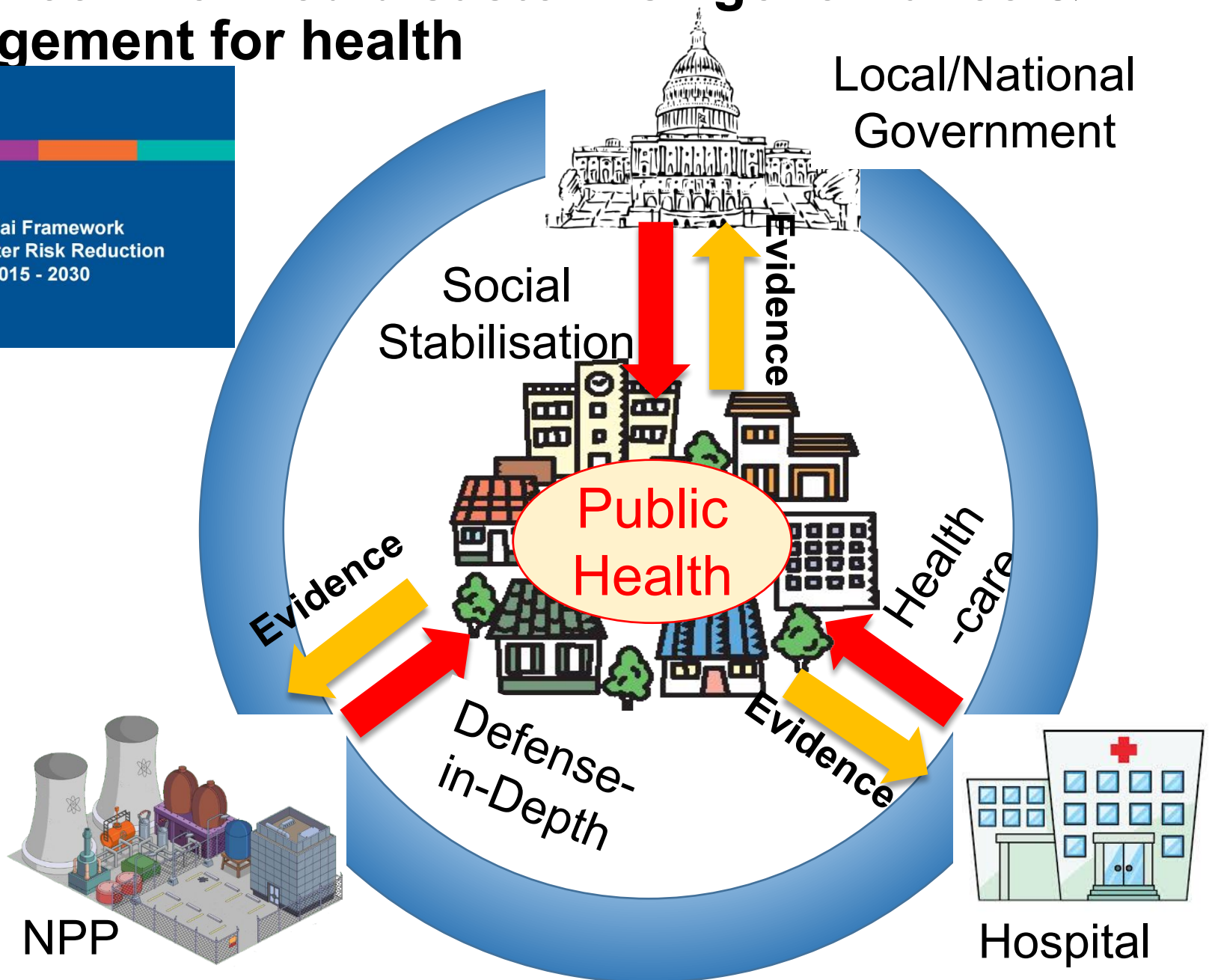






# Evidence-informed disaster risk governance & management for health

Sendai Framework  
for Disaster Risk Reduction  
2015 - 2030





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

Questions  
Discussion