3 How to determine the morbidity status in a disaster area

Use of surveillance

Surveillance is …

… the ongoing systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know. The final link in the surveillance chain is the application of these data to prevention and control. (CDC 1986)

With the conventional surveillance system collapsed, what should we do to determine the morbidity of infectious diseases?

- Focus on high-risk diseases (expected ones)!
  - Diseases surveillance (confirmed by testing) or Syndromic surveillance (no tests required)
- What should we consider for unexpected infections?
  - Infections brought in from outside
  - Secondary disasters (e.g., floods after an earthquake)

Use of surveillance for outbreak detection

Indicator-based surveillance (IBS)

- **Indicators** of health conditions that have been considered of higher priority based on risk assessment are compared with the baseline data to detect abnormal events (outbreaks).
  - Disease surveillance (cases are reported after confirmed by testing)
  - Syndromic surveillance (no need to wait for test results)

Will be reported as "### (number) patients with XXX (disease) emerged."

Event-based surveillance (EBS)

- A wide variety of information are organized and confirmed in a systematic manner to assess the **event.**
  - Alternatively called "rumor surveillance" (as the information gathered can be rumors and informal)
  - Applicable to unexpected events.

Will be reported as "Something strange seems to be happening."

Information → Confirmation (Outbreak verification) → Rapid risk assessment → Required action (Countermeasure)

Actually, the concept of event-based surveillance is **not** new to us.

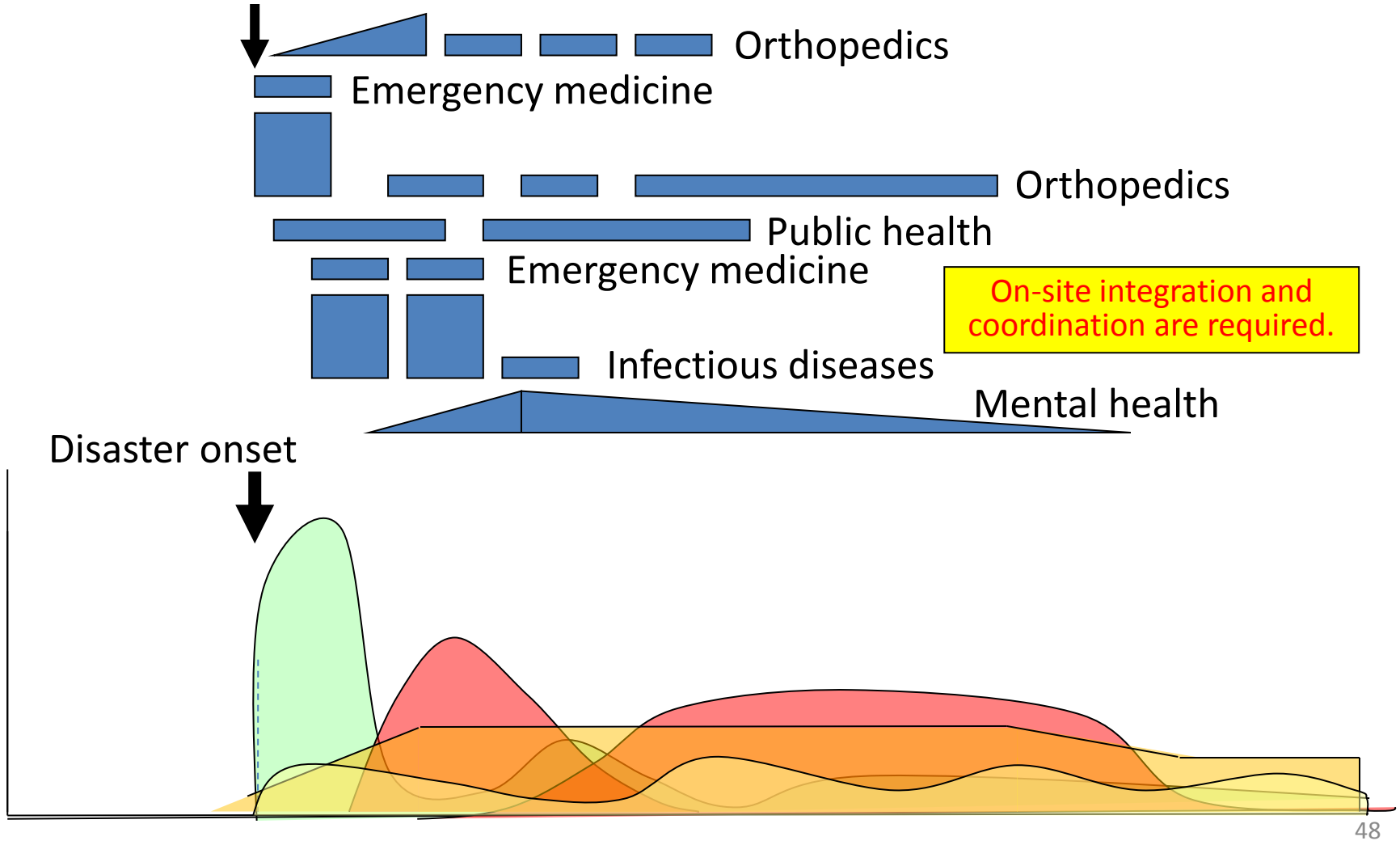
Information →	Confirmation (Outbreak verification) →	Rapid risk assessment →	Required action (Countermeasure)
Report to the police	Ascertain a **crime**	Investigate the crime	Arrest of the criminal
Report to the health center	Confirm **food poisoning**	Inspect the restaurant	Suspend the business
Report to school	Confirm **bullying**	Administer an interview, etc.	Reconciliate and prevent recurrence
Report to ICT	Confirm a **hospital-acquired infection**	Conduct an epidemiological investigation	Implement effective infection control measures

Further application is expected in:

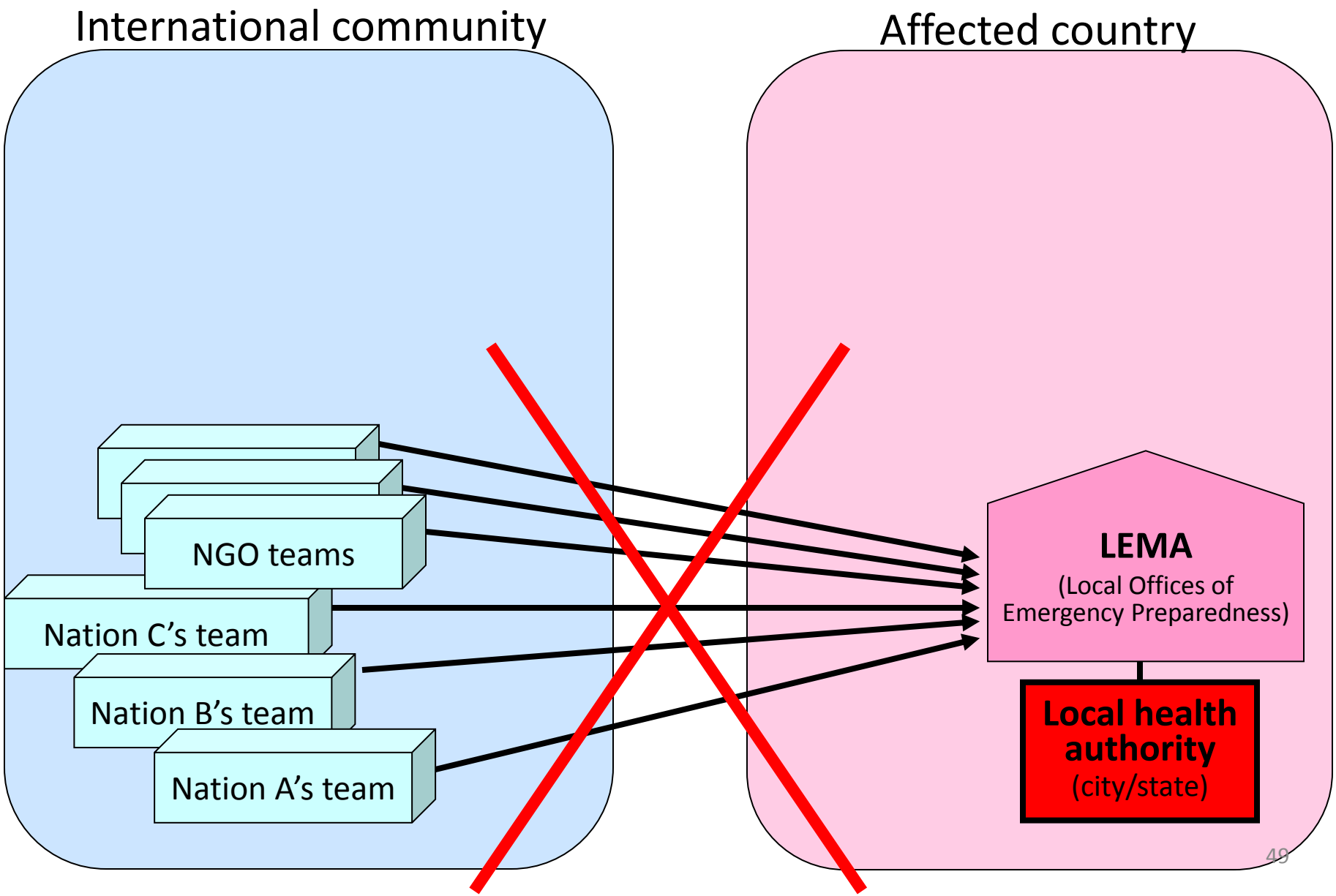
- response to various situations emerging in shelters after a major disaster,
- response to situations emerging during mass gathering,
- measures against bioterrorism, etc.

Roles of international organizations after a major natural disaster

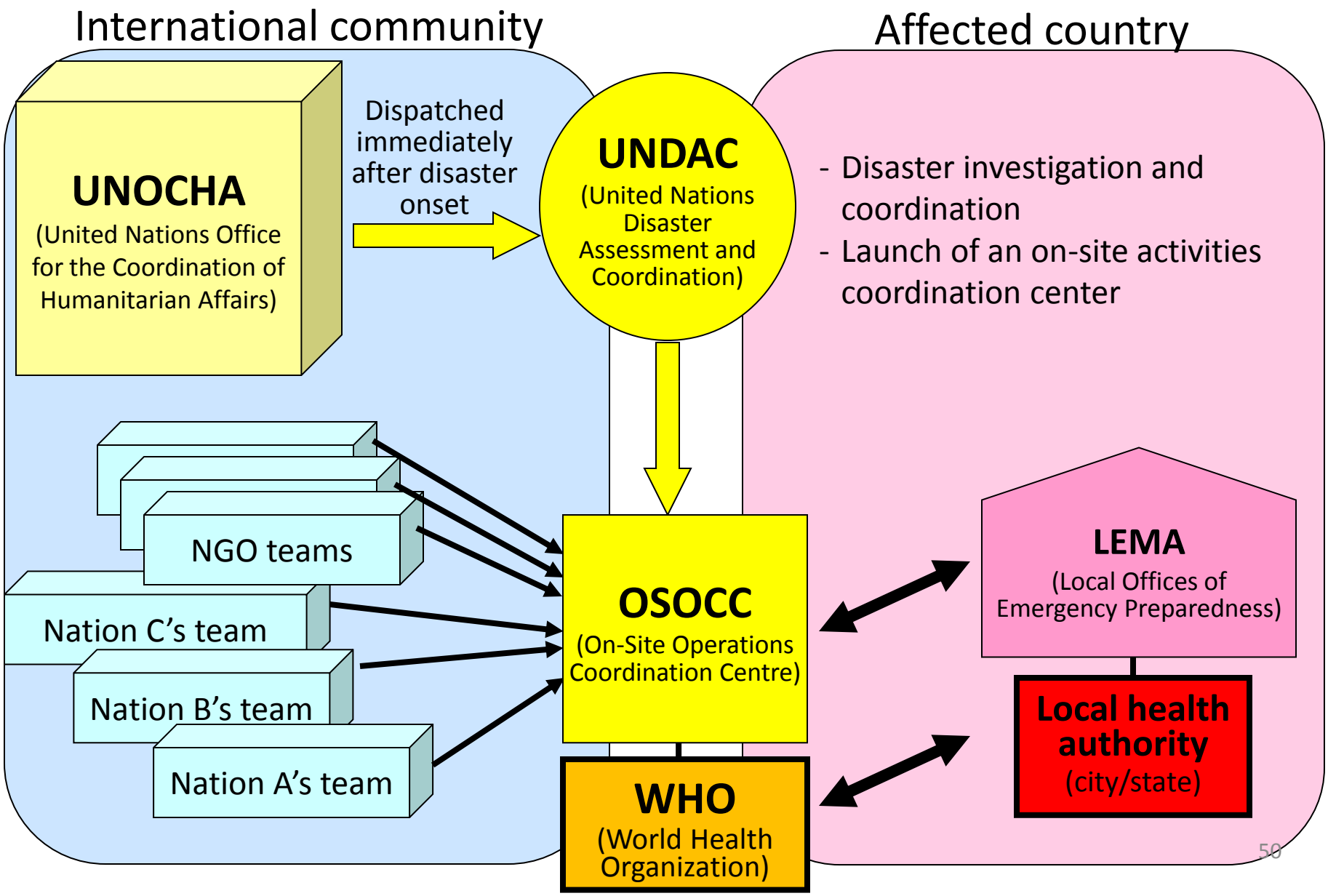
Start of assistance from international organizations etc.



Conceptual flow of international emergency assistance after a major disaster



Conceptual flow of international emergency assistance after a major disaster



WHO's responses to the tsunami disaster in Banda Aceh, Indonesia

A total of 221,000 people died or went missing.

Assess the risk of infectious diseases.

- What is the original prevalence of infectious diseases?
- What characterize the disaster and when (season) did it occur?
- How hygienic is the shelter?
- What is the immunization coverage in the region?

Where and how many are the victims?

- How large the affected population?
- Where are shelters located?

System of testing

- Test items
- Where are they available?

Surveillance operating procedure

- Who will report what and when?
- How the results will be published?
- Required measures should be ・・・

Outpatient Mortality and Morbidity Weekly Surveillance (**OMMWS**)

- Objective

  Analyze the morbidity and mortality in 14 districts of Aceh and apply the results to benefit early detection of outbreaks and the assessment of various operations that require response in the context of public health.

- Conditions subject to infection surveillance

  Syndrome surveillance
  Disease surveillance

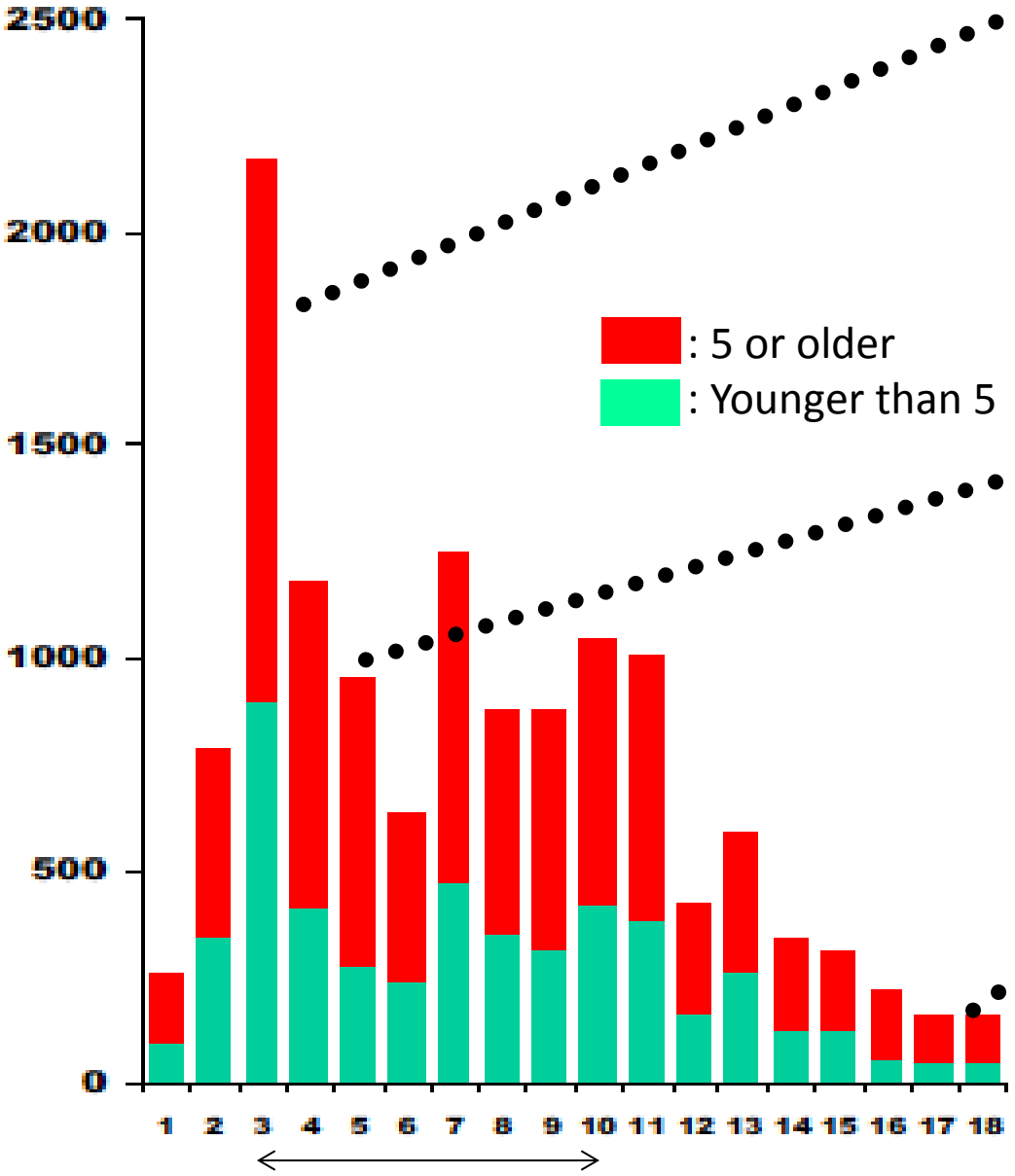
- Acute watery diarrhea	- Measles (including suspected cases)
- Bloody diarrhea	- Acute respiratory infection
- Malaria (confirmed cases)	- Acute jaundice syndrome
- Other fever above 38^{o}C	- Meningitis

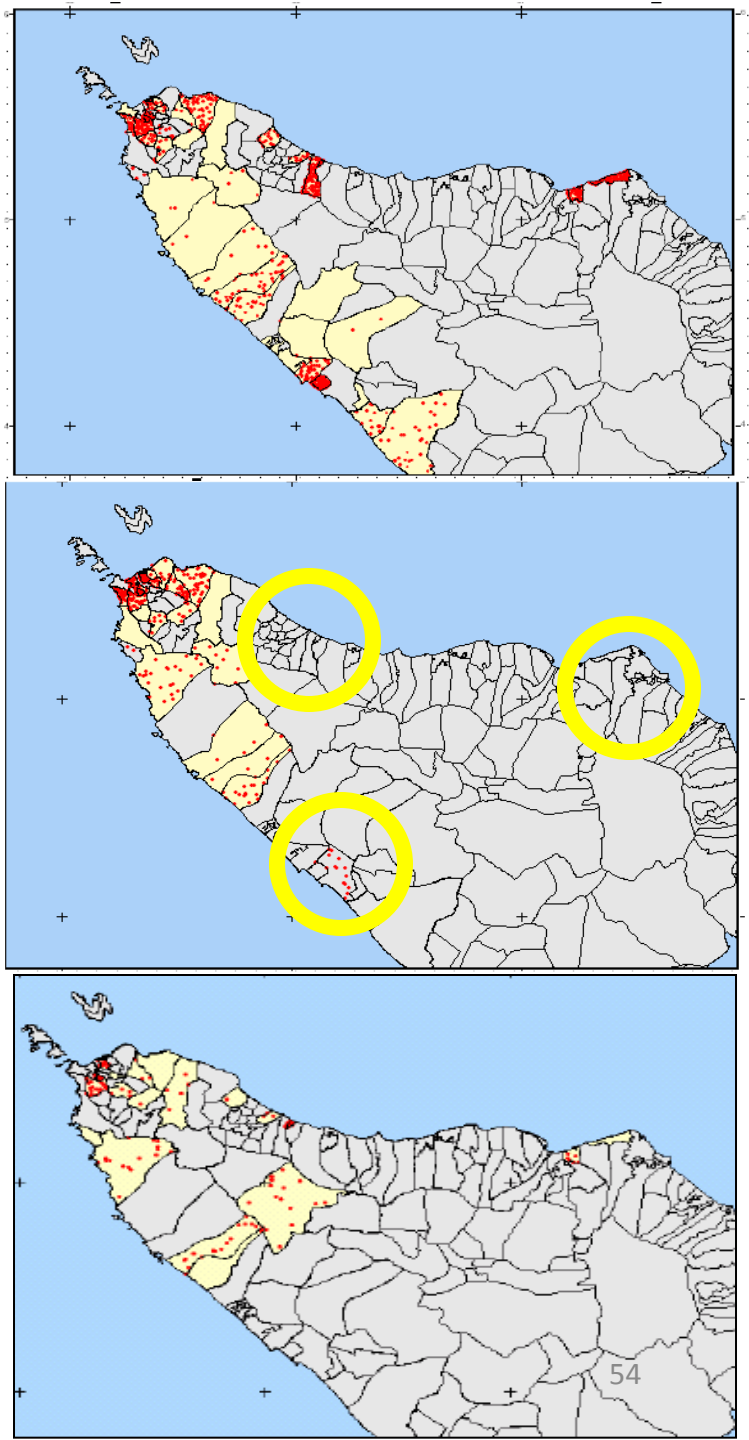
- Mode of reporting
  - In paper or by e-mail
  - Data from Monday through Sunday are reported every next Monday.
  - To registered medical institutions (national and international NGOs, international organizations, etc.)

Disease specific morbidity and mortality indicators (weekly surveillance reports)

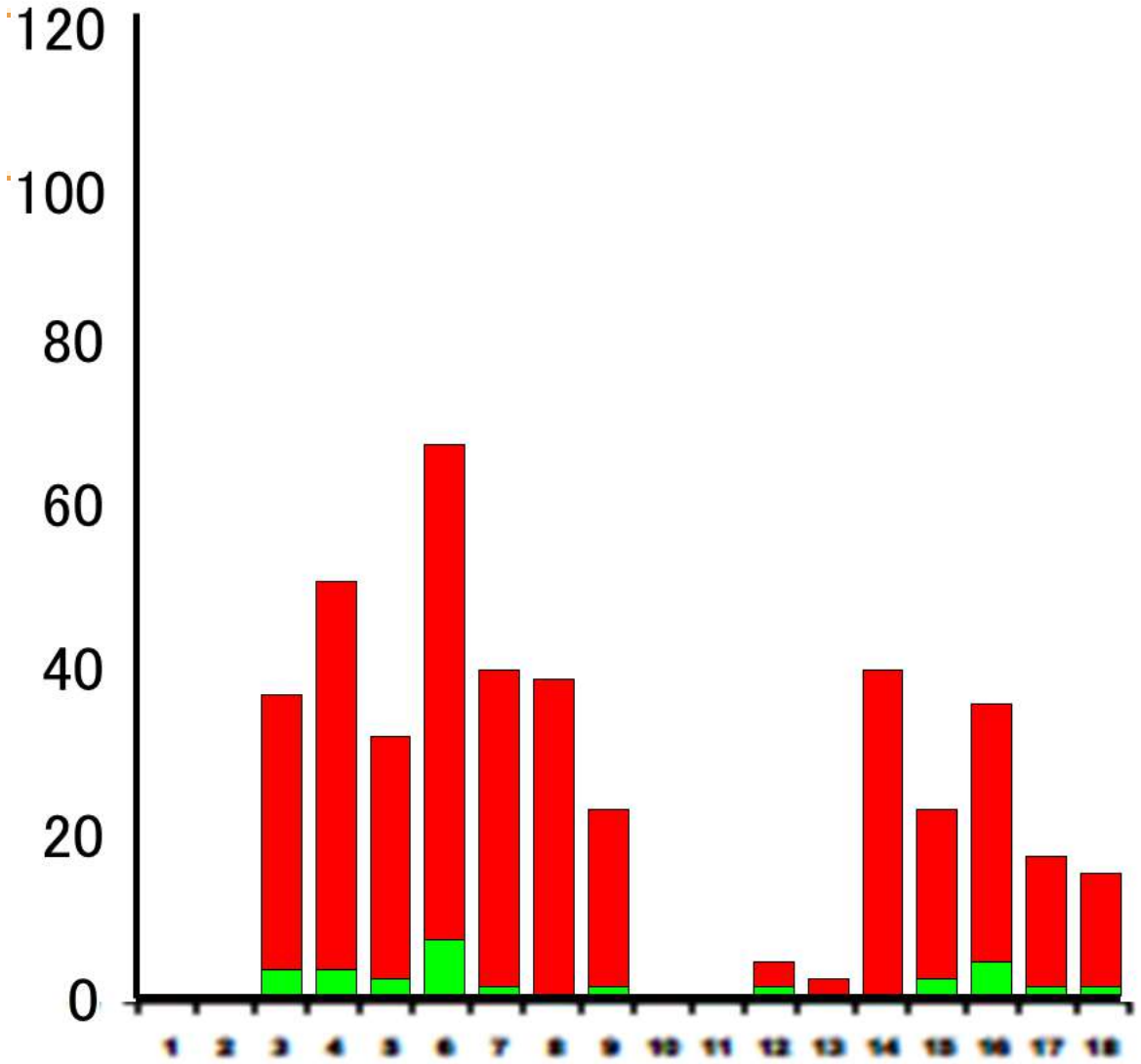
	Diseases	0-4 years		5 years and +		Total	
		Cases	Deaths	Cases	Deaths	Cases	Deaths
Week 14	Acute watery diarrhoea	86	0	148	0	234	0
	Bloody diarrhoea	1	0	7	0	8	0
	Confirmed malaria	0	0	40	0	40	0
	Other fever above 38°	64	0	133	0	197	0
	Measles	2	0	3	0	5	0
	Acute respiratory infection	161	0	535	0	696	0
	Acute jaundice syndrome	0	0	2	0	2	0
	Meningitis	0	0	0	0	0	0
Week 15	Acute watery diarrhoea	61	0	112	0	173	0
	Bloody diarrhoea	0	0	4	0	4	0
	Confirmed malaria	2	0	21	0	23	0
	Other fever above 38°	28	0	61	0	89	0
	Measles	4	0	5	0	9	0
	Acute respiratory infection	88	0	237	0	325	0
	Acute jaundice syndrome	0	0	1	0	1	0
	Meningitis	0	0	0	0	0	0
Week 16	Acute watery diarrhoea	55	0	136	0	191	0
	Bloody diarrhoea	4	0	9	0	13	0
	Confirmed malaria	4	0	32	0	36	0
	Other fever above 38°	41	0	55	0	96	0
	Measles	5	0	7	0	12	0
	Acute respiratory infection	87	0	235	0	322	0
	Acute jaundice syndrome	0	0	1	0	1	0
	Meningitis	0	0	0	0	0	0

Morbidity of watery diarrhea

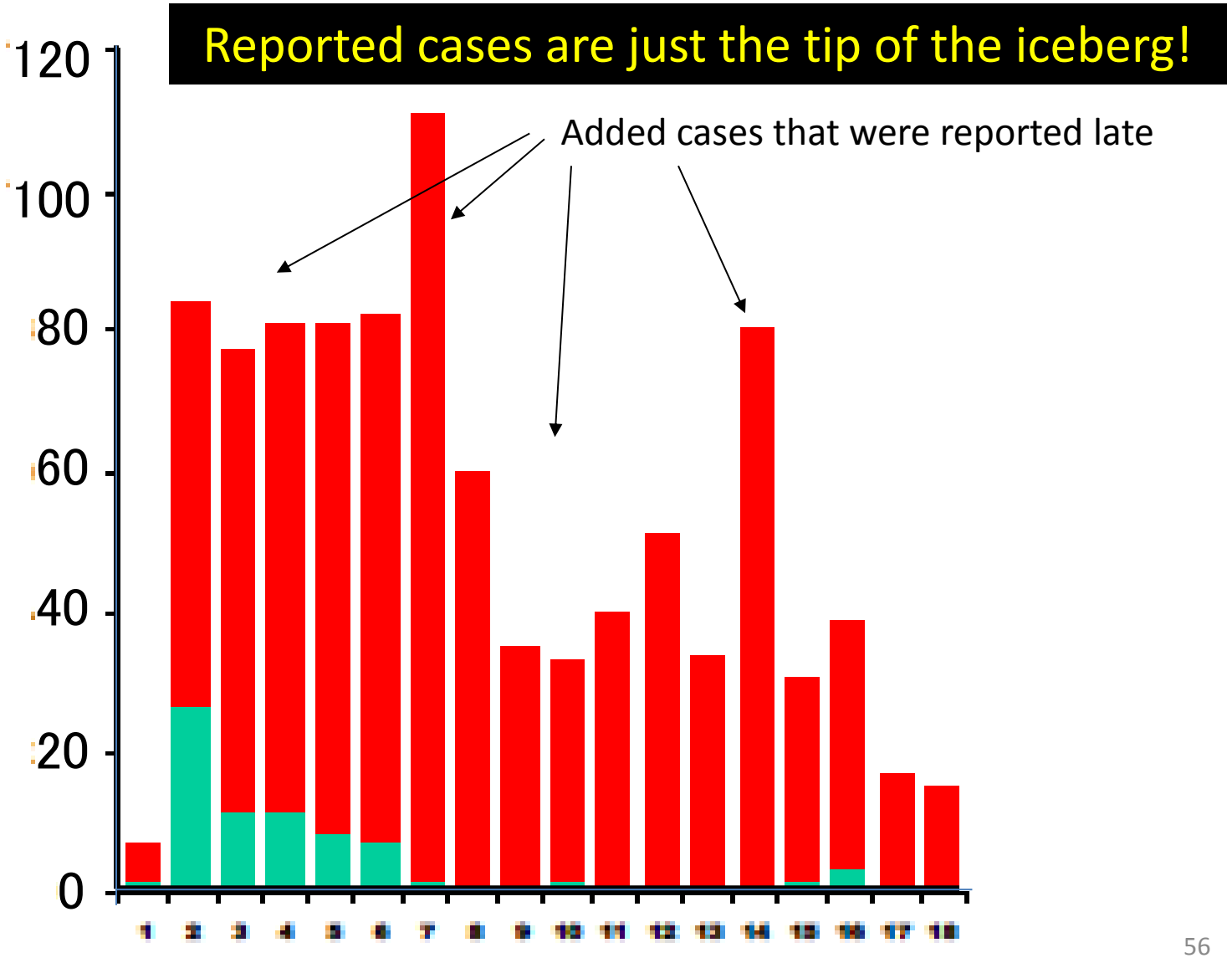




Morbidity of malaria



Morbidity of malaria

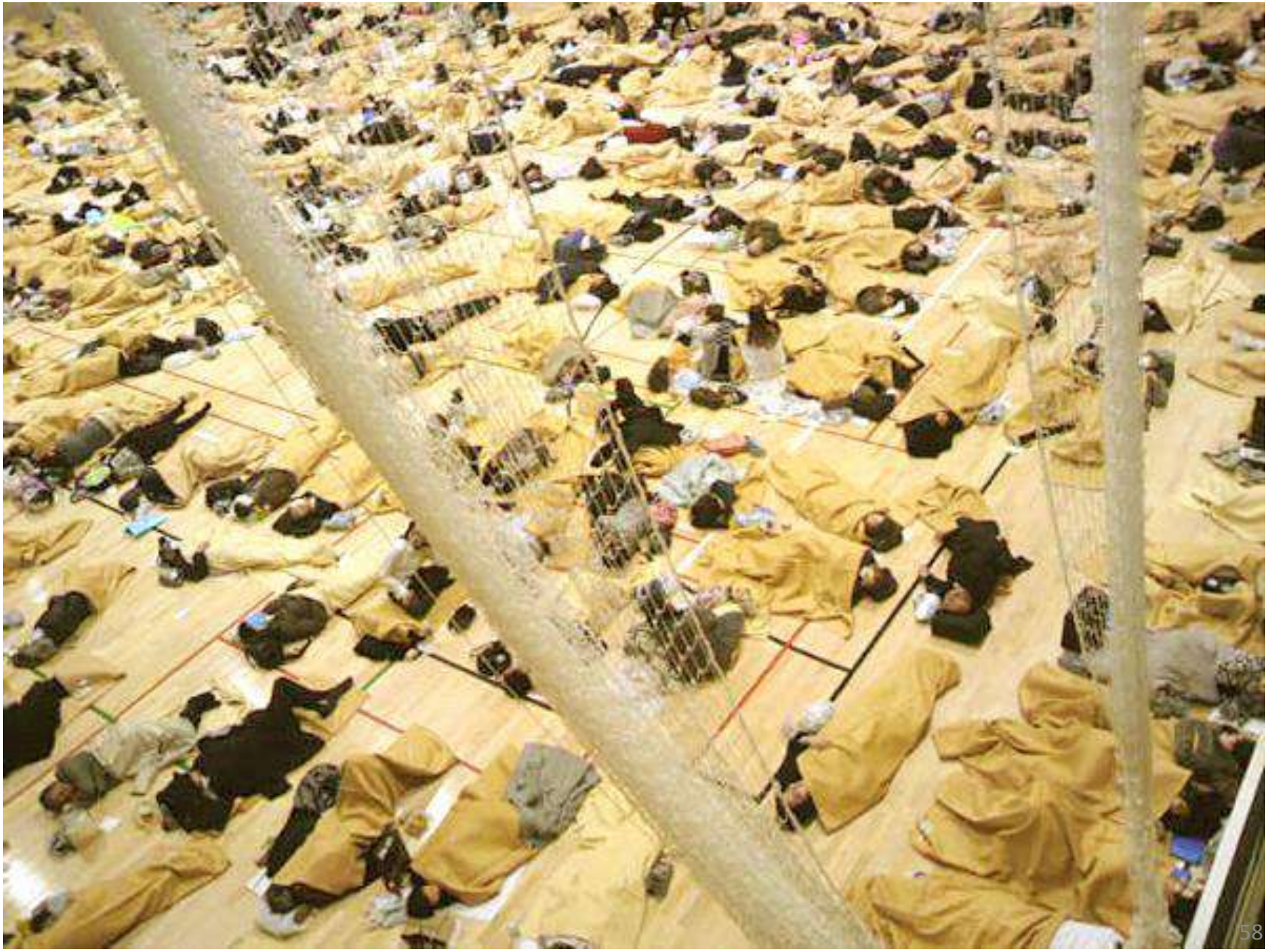


Considerations for **OMMWS** data analysis

- Medical support team
  - The number of medical teams, the scale and contents of their operation may change.
  - The mode of operation (mobile or stationary) varies from team to team.
  - Affected by VIP visits and media interviews.
  - Reports often come late.
- Affected population
  - Regional morbidity may change with movement of evacuees.
  - “Doctor shopping” by relatively mild person causes double or triple counts of cases.
  - Some people are reluctant to see doctors until symptoms reach a certain level.

It is difficult to recognize the sign of outbreak.

The Great East Japan Earthquake caused 300,000-400,000 evacuees and 19,000 deaths or missing.



3 How to determine the morbidity status in a disaster area

- Use of surveillance
- Use of Sumatra Tsunami Disaster experience into the Great East Japan Earthquake.

Taking advantage of lessons learned from Sumatra Tsunami Disaster

- For early detection of outbreaks,
  - Directly capture the ongoing morbidity status in shelters is more important than analyzing medical practice data;
  - reporting daily is more effective than reporting weekly; and
  - it is necessary to seek reliable informants.
- To keep and encourage people's motivation to participate in a surveillance program, there should be
  - immediate feedback of data and
  - timely support for infection control measures.

DSOD: Daily surveillance for outbreak detecting

DSOD is a system for conducting an infection surveillance to identify signs of infectious disease outbreak in shelters after the Great East Japan Earthquake and to support the initial response for infection control measures.

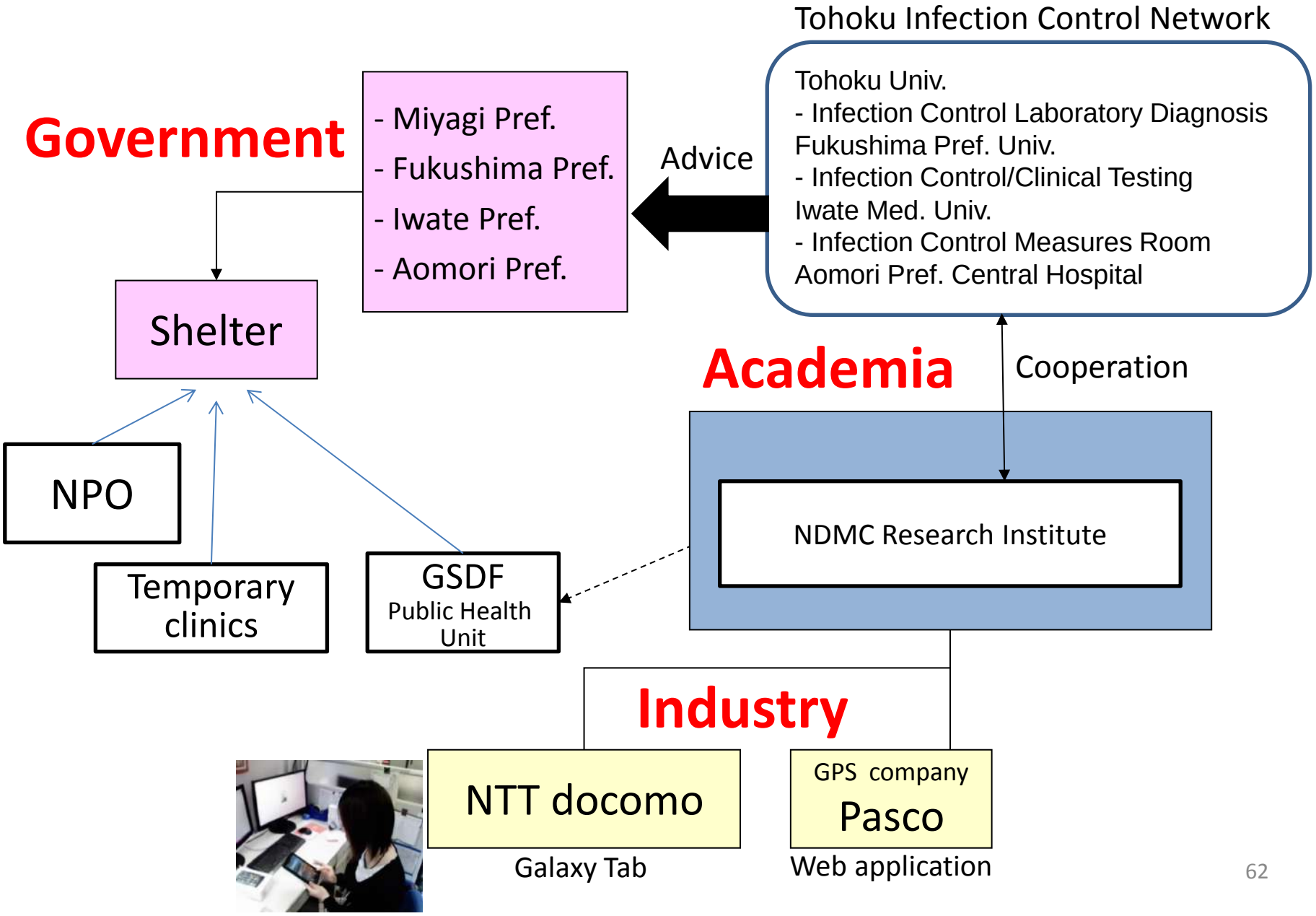
Infection Control Assistance Team of Iwate (ICAT)

ICAT is an infection control team of Iwate Prefecture.

It is a volunteer team organized under the leadership of Dr. Shigeru Sakurai of Iwate Medical University, involving ICD, ICN, ICMT, and BCICPS of prefectural hospitals.

ICAT was later commissioned with an infection control measures business by Iwate Prefecture.

DSOD Overview



Syndrome categories

1 Acute gastrointestinal syndrome ・・・ Norovirus infection, infectious gastroenteritis, Staphylococcus aureus food poisoning, campylobacter enteritis, vibrio enteritis, EHECO157, dysentery and cholera

2 Acute respiratory syndrome ・・・ Common cold, influenza, and legionellosis

3 Acute rash/mucous/hemorrhagic syndrome ・・・ Measles, rubella, scrub typhus, pharyngoconjunctival fever, A streptococcal infection, hand-foot-and-mouth disease and epidemic keratoconjunctivitis

4 Acute neurological/muscular syndrome ・・・ Tetanus, meningitis, etc.

5 Skin/soft tissue infection ・・・ Gas gangrene, Vibrio. vulnificus infection and scabies

6 Acute jaundice syndrome ・・・ Hepatitis and leptospirosis

7 Non-specific syndrome ・・・ Influenza and scrub typhus

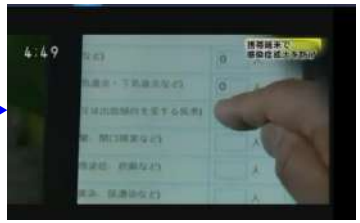
8 Death

Season (Time) + Tohoku (Place) + Tsunami-affected population (Person)

Infection surveillance and control activities using a smartphone

Shelter

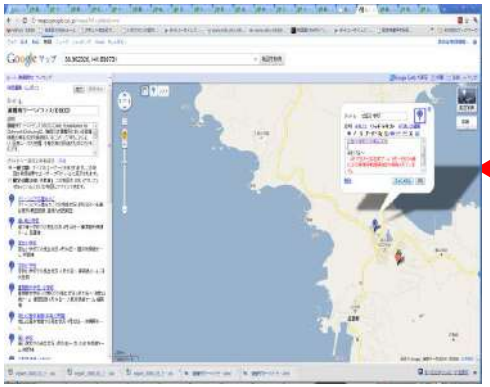
Use a smartphone to input the number of syndromes (younger than 5 and 5 and older).



PASCO server

Data are updated daily per shelter

Similar to school surveillance for flu. Epidemic.



Check on the google map

Share info

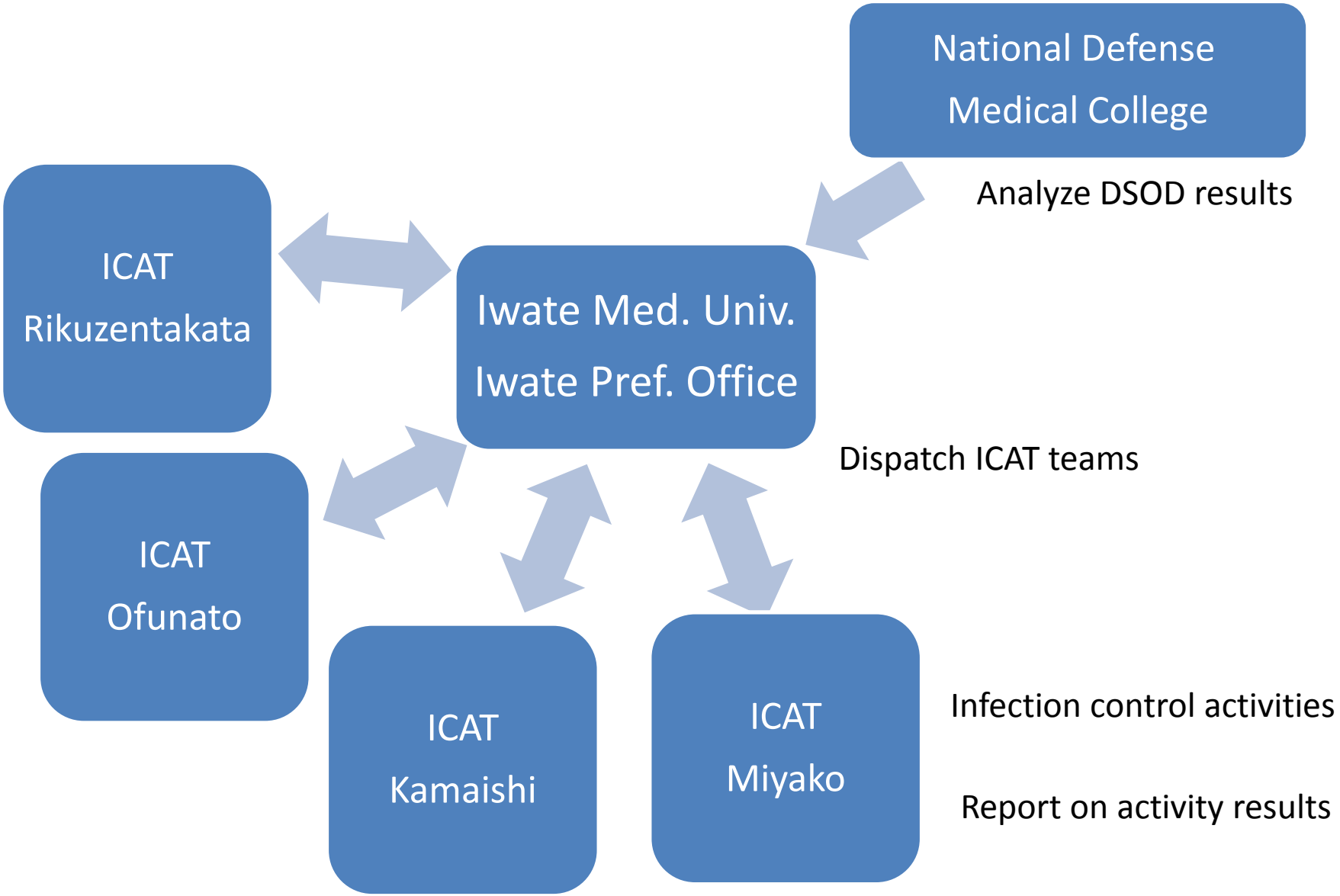
Send info

NDMC Research Center

Information is collected/analyzed. Data are updated 3 times and released on the Google Map.

ICAT members' intervention

Infection control activities at shelters by ICAT based on DSOD



Kamaishi-Otsuchi ICAT Activity Report (June 23, 2011)

岩手県立胆沢病院 中島佳子
岩手県立中央病院 外部善裕（2 名で出動）

活動内容

1. 釜石保健所：朝の派遣保健師合同ミーティング参加
   ICAT サーベイランスの報告を行う
   感染症予防情報（第5号）の紹介
2. 避難所等ラウンド
   釜石：市民体育館、旧釜石一中
   大槌：吉里吉里体育館、赤浜小学校、安渡小学校、寺野弓道場、城山体育館、
   寺野弓道場、大槌高校、
3. 大槌町合同ミーティング
   大槌町役場健康推進班 藤原さん・大槌町包括支援センター保健師3 名
   各保健師チーム、心のケアチーム、釜石保健所保健師2名・関課長、ICAT2 名

報告事項

【[redacted]】

1. 先日まで、県立釜石病院の巡回診療が6 月中にて終了予定であったが、7月も継続することとなり、市民体育館のサーベイランスも現在の秋田保健師チームから県立釜石病院へ引き継いでいただくこととした。（担当の秋田保健師チームは6 月30 日終了→7月以降、千葉保健師チームへ移行で要請中）
2. 今後の保健師班の活動予定を確認したが、後日、検討会を開催予定で、それ以降でないと正式な一覧を出せないとの事
3. ハエ・蚊対策について、避難所への実態状況の把握

【[redacted]】

釜石の避難所は市民体育館に集約する方向であるが、近く20名ほど増える予定。

写真では、分かりづらいが入り口付近、ごみ付近にはハエがいる

[redacted]

手前敷地に仮設住宅も立ち、入居しているとの事だが、現在、76名の避難者が未だ生活しており、他の避難所から20～30名ほど増えそうとの話しもあった。

ハエが多く、ポット等の熱源には特にも多くたかっている状態。網戸等の害虫対策がなく、全て窓は暑さ対策として全開となっている状況。

トイレは高齢者・身障者用は内トイレ（便器にパッドを敷いてその都度替える）、その他は外の仮設トイレ 4 台（回収は 2 回/週）で分別していたが、不衛生な環境となっている。

北九州市の保健師より、ウジ駆除用の薬剤を一般者用トイレに入れたいが、駄目と言う話もあり、投入可能なのか知りたい。湿気、暑さ対策に扇風機が 7 台ある。しかし電源確保不十分のため全機稼働が難しい。昨日もブレーカーが 3 回落ちた。ベストコントロールがいつどのように入ってくれるのか分からない。誰がどのように要望をきいてやってくれるのか？保健所ではなく市だと思うが…。しかし常駐の釜石市職員もわからないとのこと。
→我々の方でも保健所へ今一度、現状報告をさせていただく。

Infectious diseases important in shelters after the Great East Japan Earthquake

1 Norovirus infection
2 Influenza
3 Acute respiratory syndrome (including dryness, coldness, asthma, and allergies)

- Hand-foot-and-mouth disease
- Tetanus (which took a toll of 9/19,000 lives) = 0.047 points
  In Indonesia it took a toll of 106/221,000 lives = 0.048 points

- Legionellosis
- No cases have been reported of acute jaundice syndrome (as of August 16)

Preparations made by local governments after the Great East Japan Earthquake

- Iwate Prefecture
  - October 2012, Iwate Infection Control Assistance Team (ICAT) was made permanent.
- Tokushima Prefecture
  - February 2014, “Tokushima disaster infectious disease special team” was organized.
- Hiroshima Prefecture
  - March 2018, “Hiroshima infectious disease medicine assistance team” was set up.

3 How to determine the morbidity status in a disaster area

Use of surveillance

Use of Sumatra Tsunami Disaster experience in the Great East Japan Earthquake

Event-based approach

Concepts of infection risk assessment

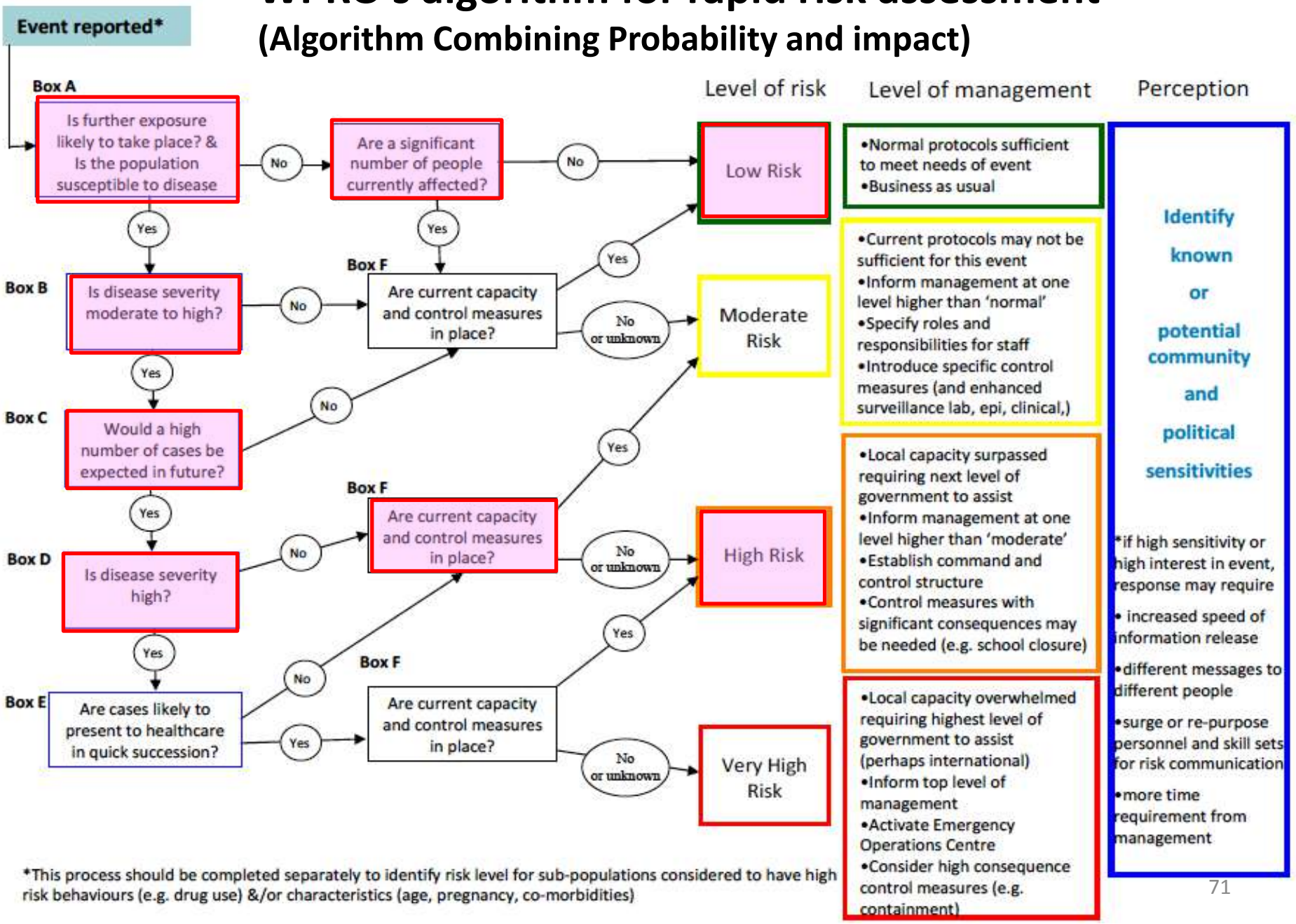
1. Current number of patients
   Are there a significant number of patients?
2. Severity at the time of injury/ illness
   Is the disease severe?

Impact on public health

3. Availability of countermeasures
   Are effective control measures available?
4. Availability of response capacity
   Is the response capacity sufficient?
5. Exposure to the source of infection
   Is the population still exposed to the infectious agent?
6. Presence of susceptible individuals
   Is the susceptible population large?

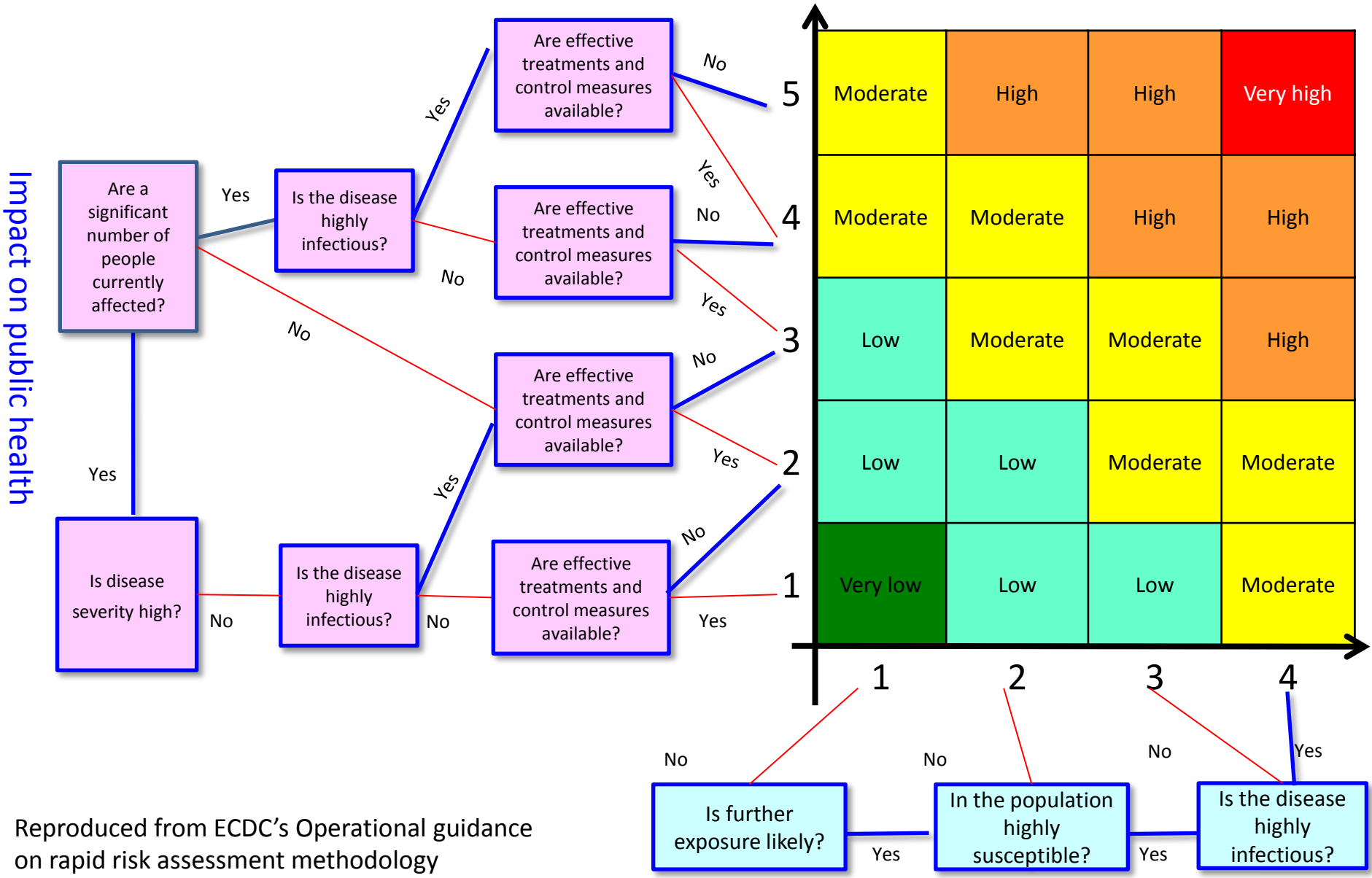
Probability of an epidemic

WPRO's algorithm for rapid risk assessment
(Algorithm Combining Probability and impact)



*This process should be completed separately to identify risk level for sub-populations considered to have high risk behaviours (e.g. drug use) &/or characteristics (age, pregnancy, co-morbidities)

Significance on public health assessed by risk matrix (5 levels)



Reproduced from ECDC's Operational guidance on rapid risk assessment methodology

http://ecdc.europa.eu/en/publications/Publications/1108_TED_Risk_Assessment_Methodology_Guidance.pdf

NIID 国立感染症研究所
NATIONAL INSTITUTE OF INFECTIOUS DISEASES

文字の大きさ 標準 大きく

検索...

ホーム | 研究所の概要 | 所長挨拶 | アクセス | 関連リンク | お問い合わせ | メンテナンス | 記事一覧

日本語 ENGLISH

お知らせ

- 採用情報
- 調達情報
- 情報公開
- 公開講座・研修
- その他

感染症情報

- 疾患名で探す
- 感染源や特徴で探す
- 予防接種情報
- 災害と感染症
  - 熊本地震(2016年)
  - 台風第18号による大雨等被害（2015年）
  - 九州北部豪雨(2012年)
  - 東日本大震災(2011年)

研究・検査・病原体管理

Infectious diseases requiring attention based on risk assessment (2016 Kumamoto Earthquake-related

- April 28, 1016 Risk assessment table (as of April 28)

  Risk score 3 infectious diseases/symptoms

  - Acute respiratory infectious diseases
  - Influenza/flu-like diseases
  - Infectious gastroenteritis
  - Wound-related skin/soft tissue infections
  - Tetanus

- April 19, 1016 Risk assessment table (as of April 29)

  Risk score 3 infectious disease/symptoms

http://www.nih.go.jp/niid/ja/disaster/earthquake201604.html

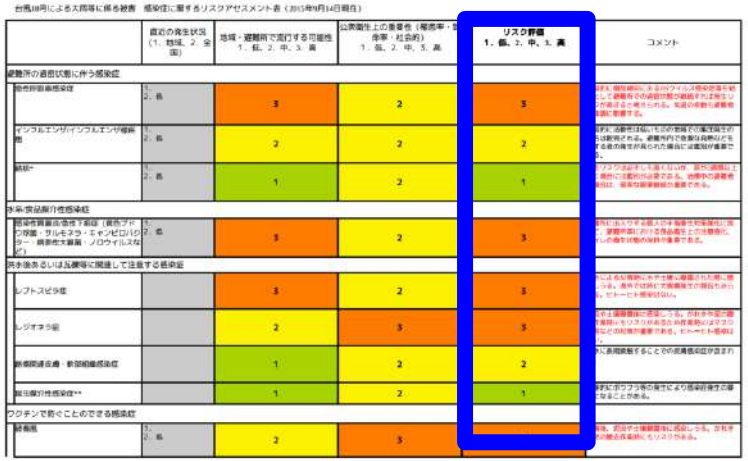
Risk assessment using NIID's risk assessment table

平成28年熊本地震における被害・感染症に関するリスクアセスメント表（2016年4月19日現在）

Categories by source and route of infection	Possibility of regional epidemic	Impact on public health infrastructure	Comprehensive risk assessment	コメント
避難所の過密状態に伴う感染症				
急性呼吸器感染症	3	2	3	RSウイルス感染症の活動性は低下傾向であるが、避難所での過密状態が継続すれば発生リスクが高まる。気温・湿度の変動も病原体伝播・避難者の体調に影響する。レジオネラ感染症はヒトーヒト感染の可能性は極めて低いが、がれき撤去等の作業に伴い発生するリスクがあり鑑別を考慮する必要がある。
インフルエンザ/インフルエンザ様疾患	3	2	3	全国的にも当該地域でも活動性は低下傾向であるが、14週現在でも県内で警報が出ている地域があるので避難所内でインフルエンザ様症状の発生には注意が必要である。
結核*	1	2	1	発生リスクは必ずしも高くないが、咳が2週間以上続く場合には鑑別が必要である。治療中の避難者の場合は、確実な服薬継続が重要である。
水系/食品媒介性感染症				
感染性胃腸炎/急性下痢症（黄色ブドウ球菌・サルモネラ・キャンピロバクター・病原性大腸菌・ノロウイルス・ロタウイルスなど）	3	2	3	避難所でノロウイルス感染者の発生が報告されており、感染症発生動向調査によると地域におけるロタウイルスの活動性は全国より高く、避難所における感染性胃腸炎の発生および感染拡大のリスクは高い。嘔吐・下痢の症状が出現した際は速やかに申告するよう避難者、支援者含めすべての避難所関係者に周知する。避難所に出入りする個人の手指衛生対策強化に加えて、避難所等における食品衛生管理の強化、トイレの衛生状態の保持が重要である。
野外活動等で注意する感染症				
創傷関連皮膚・軟部組織感染症	2	3	3	がれき撤去等の活動に伴う受傷による破傷風や皮膚感染症発生の可能性がある。発症のおそれがある患者の予防処置としては、必要に応じて破傷風トキソイドの接種が行われる。
節足動物等の媒介による感染症	1	2	1	ツツガムシ、日本紅斑熱、SFTS（重症熱性血小板減少症候群）などのダニ媒介性感染症の発生の可能性があり、発熱患者には屋外での行動歴や刺し口の有無を確認する。
ワクチンで防ぐことのできる感染症				
破傷風	2	3	3	外傷後、泥流や土壌曝露後に感染しうる。がれきや泥の撤去作業時にもリスクがあるため、発症のおそれがある患者の予防処置としては、必要に応じて破傷風トキソイドの接種が行われる。
麻疹 （はしか）	1	3	2	輸入例等により持ち込まれ、また避難所に感受性者（乳幼児等やワクチン未接種者等）が居住する場合、重症かつ空気感染により伝播する麻疹は常に最大級の警戒をする必要性がある。麻疹様症状を呈する者が認められた場合には速やかな隔離が必要である。
風疹	2	2	2	避難所での発生があると、ワクチン未接種の成人を中心に感染伝播する可能性がある。妊娠初期の感染は先天性風しん症候群のリスクがある。（妊娠中の風しんワクチン接種は禁忌）
ムンプス（おたふくかぜ）	2	2	2	全国平均より発生の高い地域もあり、集団の感受性によっては注意を要する。
水痘 （みずぼうそう）	2	2	2	水痘の発生は低いレベルに維持されているが、空気感染により伝播することから避難所において症例が探知された場合には速やかに適切な対応をとる。
百日咳	2	2	2	県内の定点サーベイランスにおいて大きな流行は見られていないが、百日咳様症状（持続的な乾性咳嗽や笛声咳嗽等）を認めた際には医療機関への相談等が必要である。
肺炎球菌	1	2	1	東日本大震災において発災直後から3週間程度の間に肺炎球菌性肺炎が多発している。
その他				
体液を介して感染する疾患（B型肝炎/C型肝炎/HIV）	1	2	1	
細菌性髄膜炎、ウイルス性髄膜炎	1	2	1	

*被災直後よりも避難所での滞在が長期になった場合に問題となる

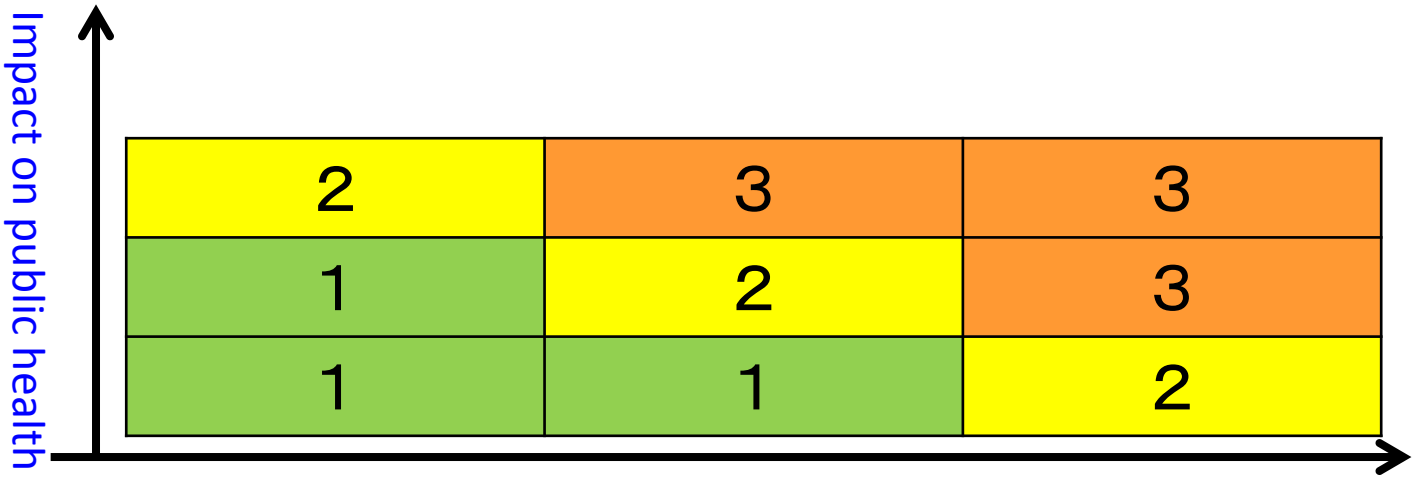
Risk assessment using NIID's risk assessment table



Comprehensive risk assessment

1	Low risk
2	Medium risk
3	High risk

The risk is comprehensively assessed based on the following criteria:



Baseline assessment results compared between two shelters

MM/DD as of 17:00	Shelter A (capacity: 300 people)	Shelter B (capacity: 100 people)
Number of victims	400	90

Baseline assessment results compared between two shelters

MM/DD as of 17:00	Shelter A (capacity: 300 people)	Shelter B (capacity: 100 people)
Number of victims	400	90
Children under 5/pregnant women /65 and older	80/10/100	10/0/40
Water supply	Water supply not available; drinking water available in PET bottles.	Water supply available; drinking water available in PET bottles.
Sewage	No facility toilets available; latrines installed but not sufficient.	No facility toilets available; latrines available.
Hand wash station	Unavailable. Alcohol disinfectants available but not widely used; wet wipes used instead.	Unavailable. Alcohol disinfectants available and widely used (encouraged with posters) .
Waste disposal	The dumping area unclean, overflowing with garbage.	Garbage sorted relatively well.
Food provision	Rice balls distributed; meals prepared elsewhere, and heated and provided with disposable dishes; no self-catering practiced.	Sweet buns and biscuits distributed; self-catering to be practiced; handwashing well practiced.
Ventilation/isolation facilities	Ventilation not available due to power outage; doors always closed to keep out rain; no isolation facilities available; tents available.	Ventilation and isolation space available; corrugated boards available for partitioning.
Bathroom facilities	Unavailable	Unavailable
First-aid center	Unavailable, but to be opened by medical volunteers.	Unavailable. A traveling clinic is to be opened.
Diaper users	20 infants and 10 elderly. Diapers in short supply for both infants and the elderly.	3 infants and 3 elderly; each has their own diapers with them.
Emergence of diarrhea	At least 3 watery diarrhea patients identified; sanitation not hygienic.	Some have soft stool but without overt diarrhea.
Patients with respiratory symptoms	4 with cough symptoms; no thermometer available.	None. New residents individually checked for the presence or absence of fever.
Volunteer groups	Support from multiple organizations scheduled and starting tomorrow.	When to start support unknown.

Points to consider for infection risk assessment (proposal)

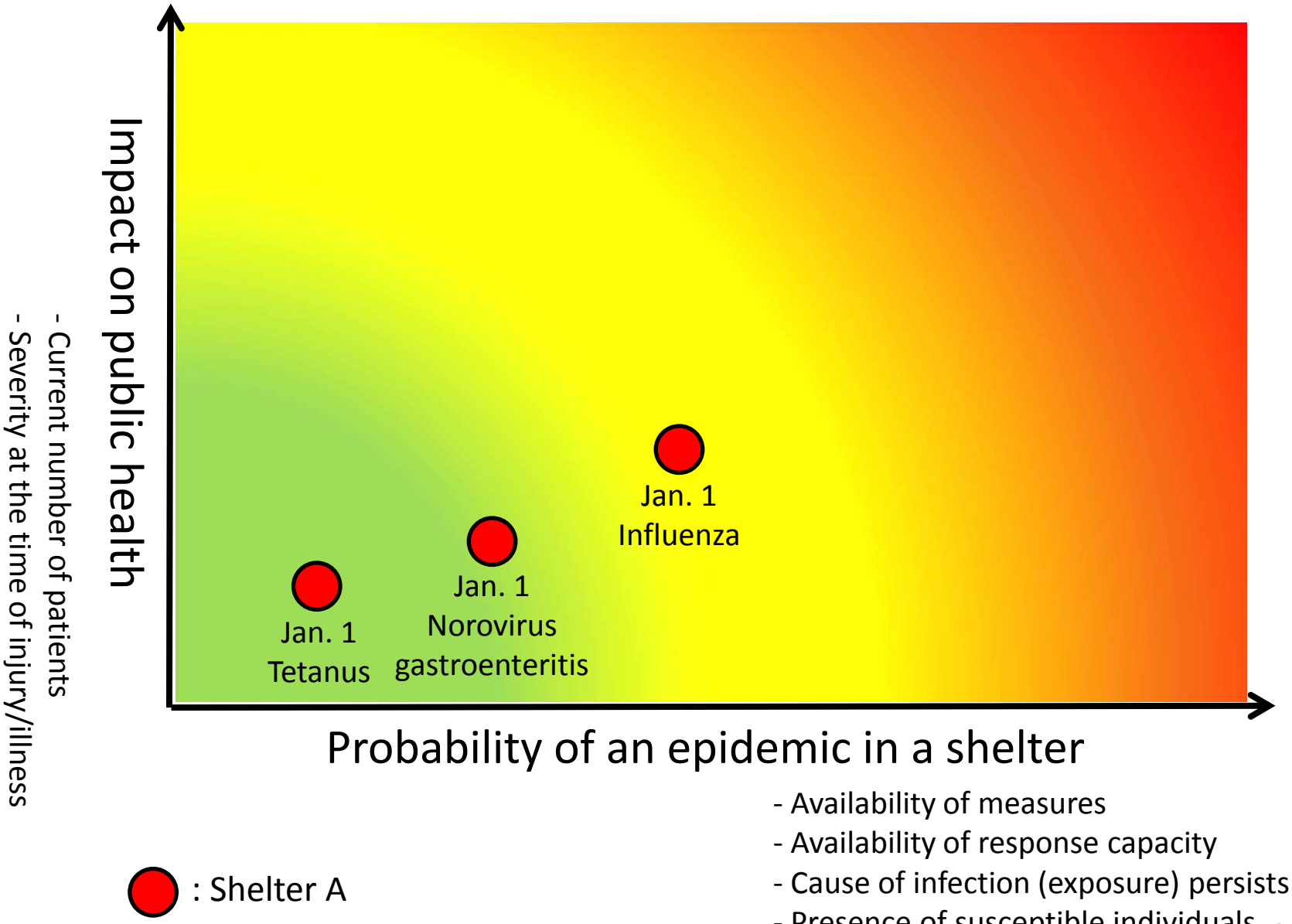
1. Current number of patients
   None to a few : 0 Several : +1 Many : +2 Very many : +3
   Explosive : +4
2. Severity at the time of injury/illness
   Manageable as outpatients : +1 Requiring admission : +2
   Requiring intensive care : +3 Fatal : +4

Impact on public health

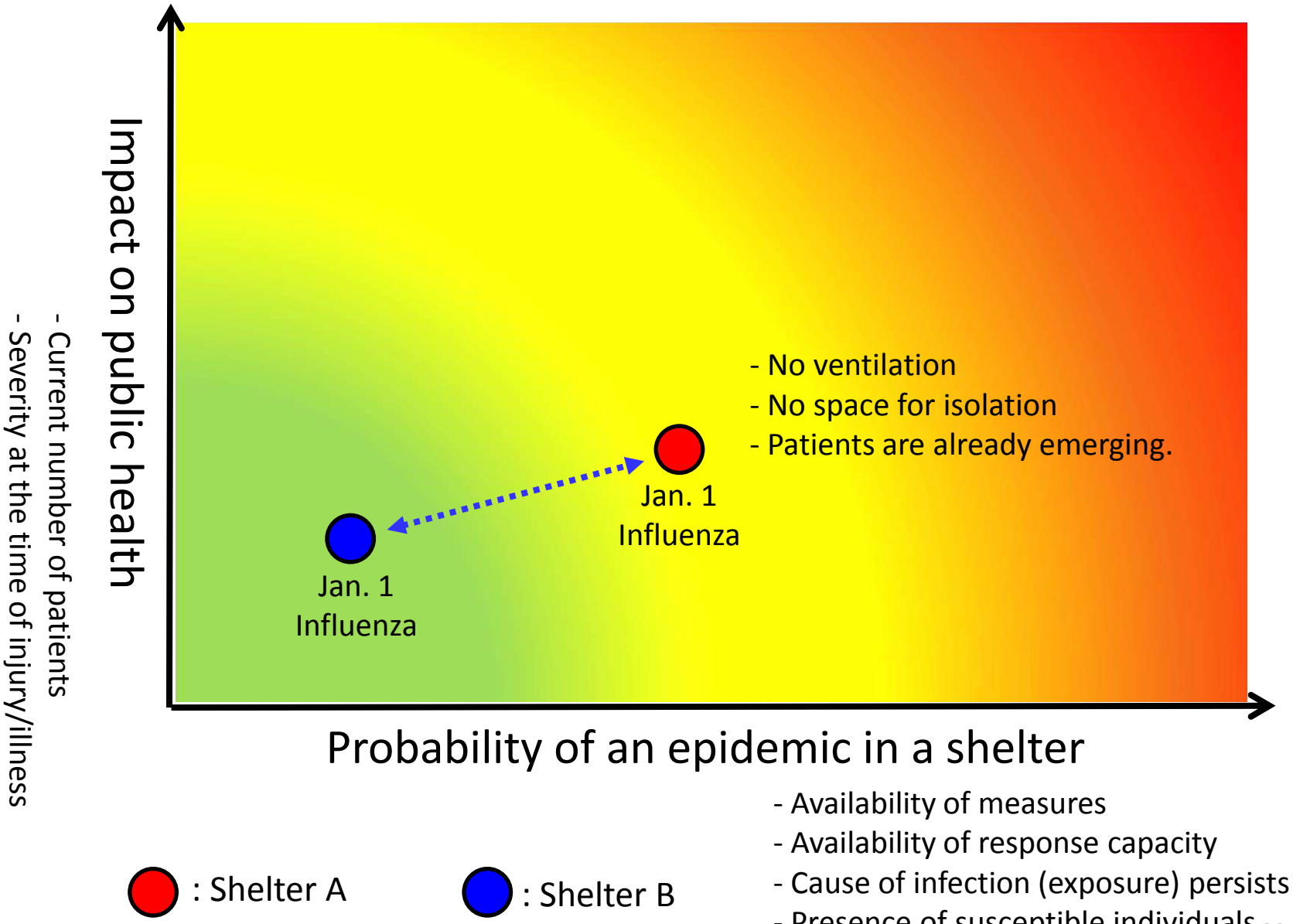
3. Availability of countermeasures
   Multiple effective measures available : 0
   Some available but limited+1 None : +2
4. Availability of response capacity
   Very sufficient : -1 Sufficient : 0
   Not sufficient : +1 Far from sufficient : +2
5. Exposure to the source of infection
   Ended : 0 Partially remains : +1 Persists : +2
   Keeps expanding : +3
6. Presence of susceptible individuals
   A few : +1 Many : +2 Very many : +3

Probability of an epidemic

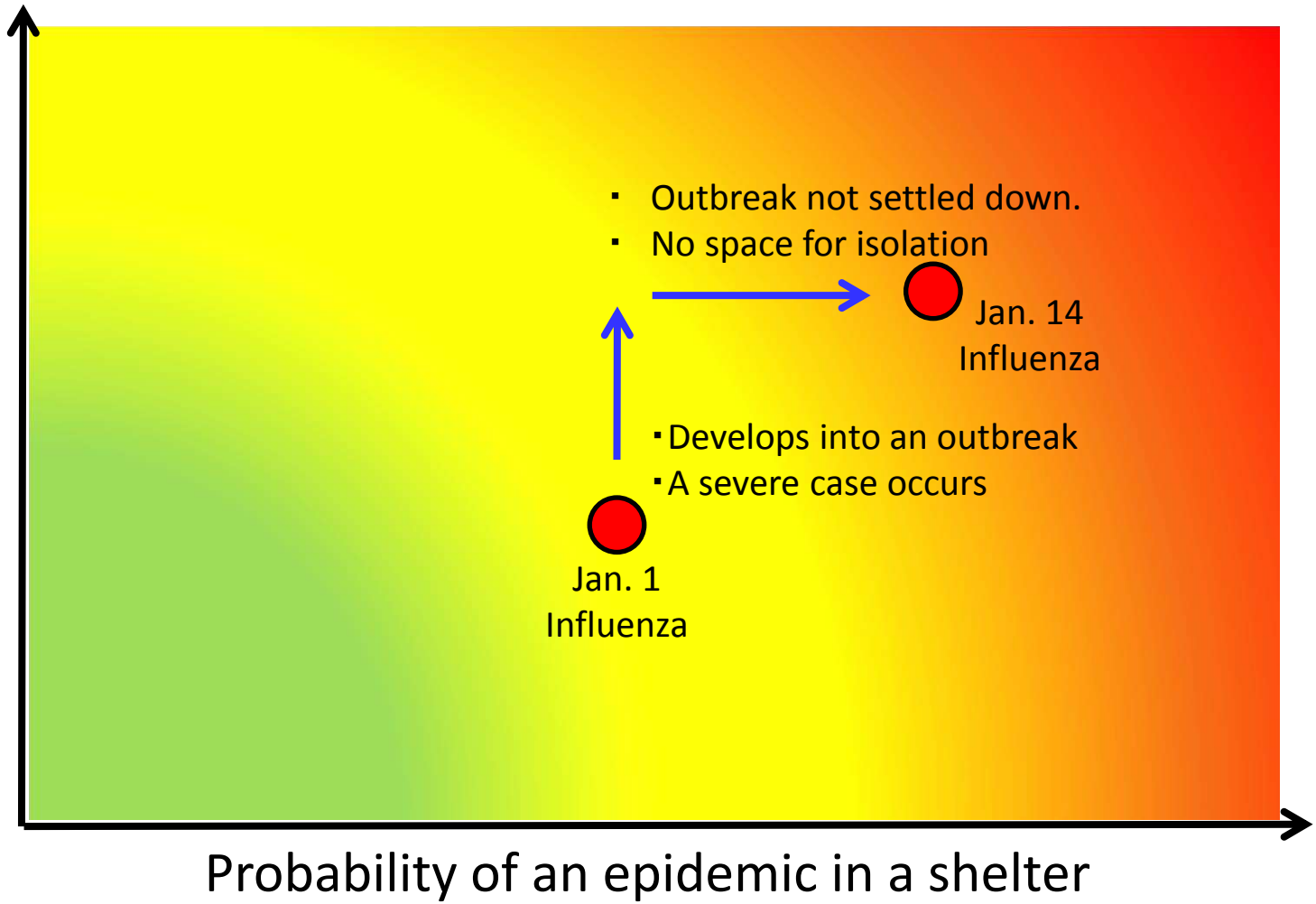
Consideration to the priority of disease control measures in a facility



Risk of infection compared between two facilities



Consideration to changes over time



Infection control measures in time of disaster (summary)

- Preparations in time of peace
  - Identification, inspection/maintenance and training of emergency facilities/personnel
    - location, capacity, etc.
    - Safe water, plain meals, clean blankets, etc.
    - Confirmation of responsibilities
  - Assistance for those in special needs
    - Infants, pregnant women, the elderly, etc.
    - Foreign tourists, etc.
  - Understand conditions that can develop in shelters
    - Exacerbation of chronic illness
    - Illness due to mental stress
    - Infectious diseases associated with wounds and burns
    - Infectious diseases associated with environmental deterioration
    - Epidemics
    - Food poisoning
  - Others
    - Support for people unable to get home

Infection control measures in time of disaster (summary)

- When a disaster strikes,
  - implement the following infection control measures in shelters to reduce their prehospital burden:
    - assessing the risk of infection
    - joining forces for early detection of, and response to, infectious diseases
    - seeking ICT support from neighboring prefectures until one's own ICT operation kicks in, and
  - for patients in medical facilities:
    - implementing standard preventive measures + syndrome-specific empirical infection control measures.

Infection Control Team rounds, surveillance

Activities against infection through regional cooperation

Bring out ICT's full potential to face the challenge of risk management!

A quick review

1 Risk of infection in time of disaster

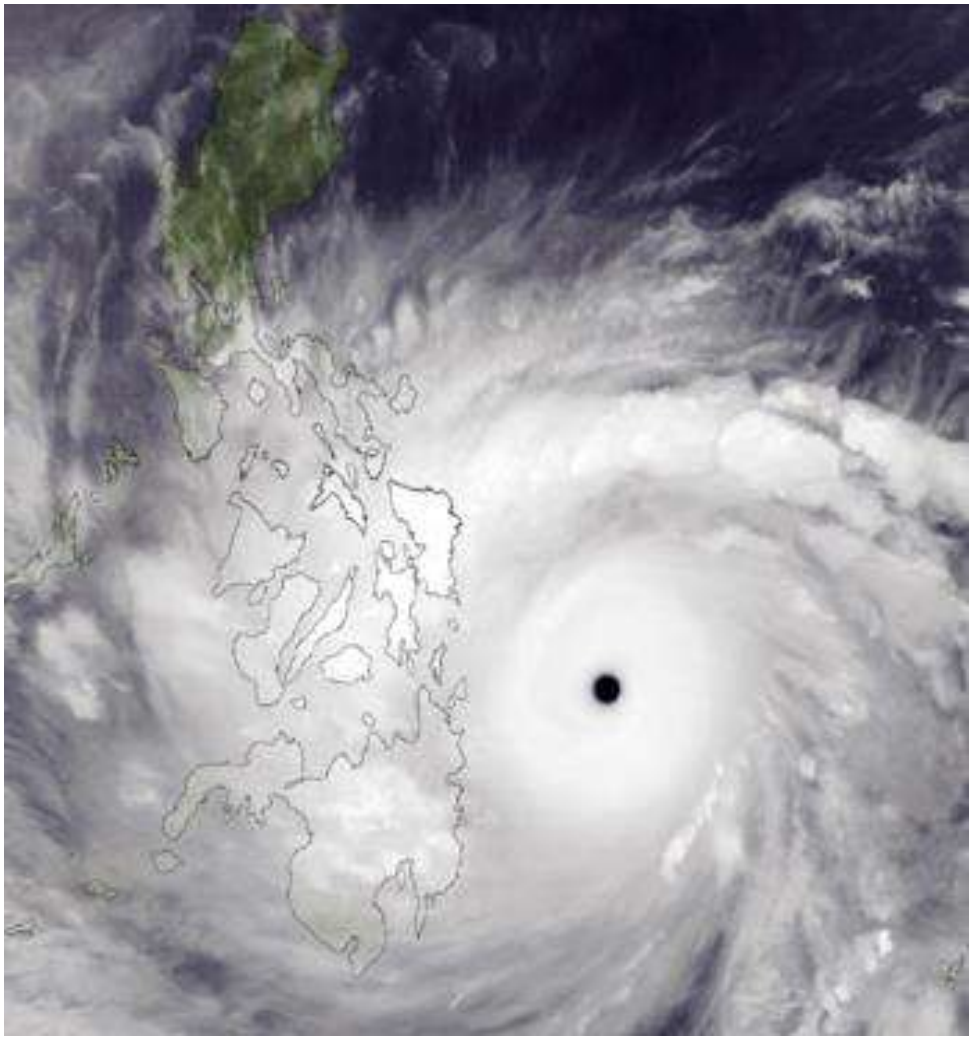
2 Identify patients according to syndromes

3 How to determine the morbidity status in a disaster area

4 Control of infection outbreak in a shelter

Thank you for your attention.

Risk Assessment Case study



Typhoon "Yolanda" hit the Philippines early in November 2013

Nov.8th 2013, A storm surge occurred on Leyte island in the Philippines

Nov. 10th 2013

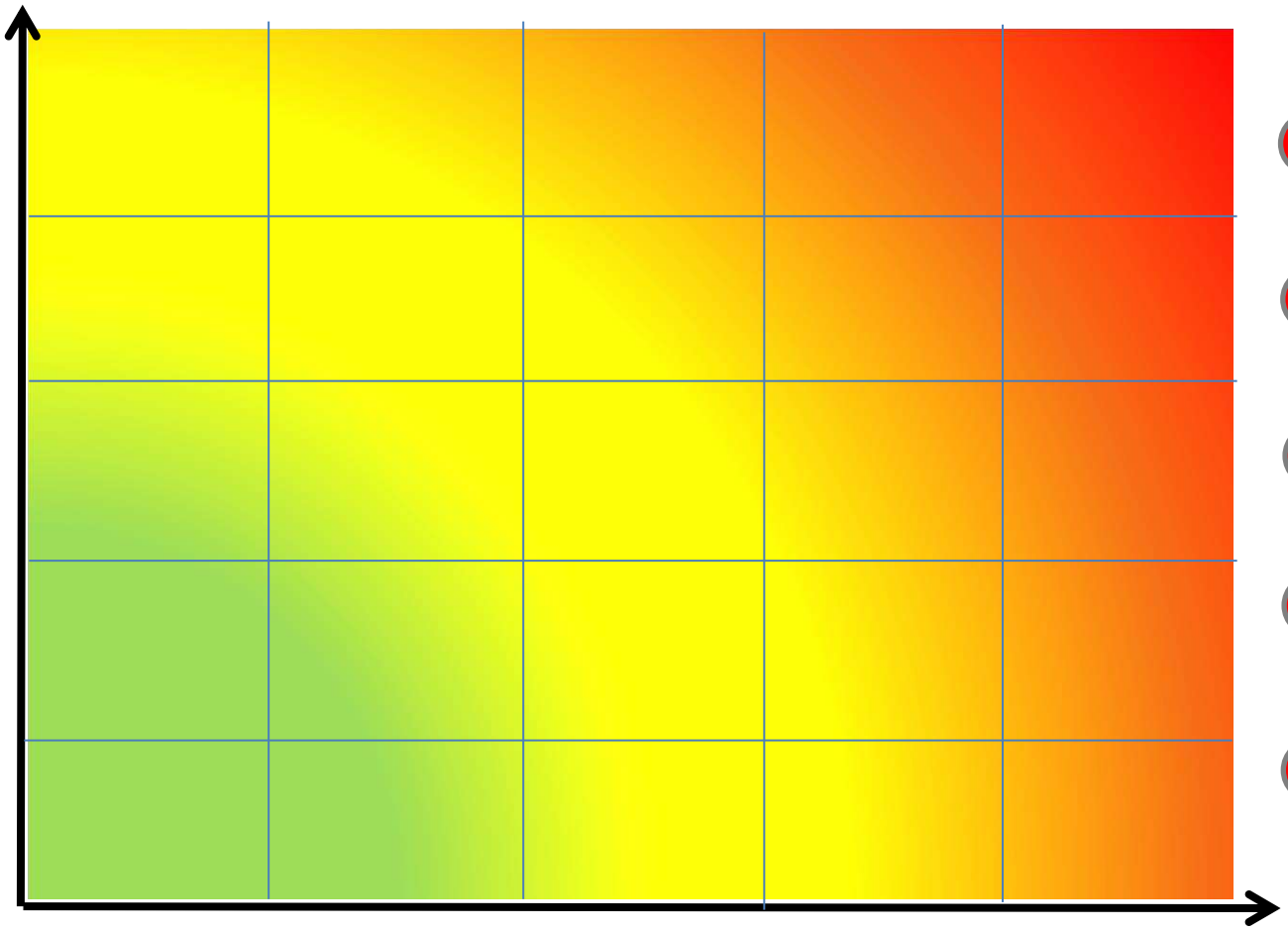
- Leyte police announced estimates that about 70 to 80% of houses and structures in the course of the typhoon were destroyed and the dead will reach 10,000 people
- Even at Ormoc in the western part of Leyte Island, 90% of buildings suffered damage such as full destruction

Nov.10th 2013
UN officials who visited the disaster area said they had been damaging since the 2004 Sumatra earthquake

Nov.11th 2013

- The Philippine government announced that about 10 6% of the total population was affected by about 9.67 million people.
- In Tacloban, looting of food and money occurred, President Aquino issued an emergency declaration.

Consideration to the priority of disease control measures at Flood in Philippines



Impact on public health

- Current number of patients
- Severity at the time of injury/illness

Probability of an epidemic in a shelter

- Availability of measures
- Availability of response capacity
- Cause of infection (exposure) persists
- Presence of susceptible individuals

1. Malaria
2. Dengue fever
3. Leptospirosis
4. Schistosomiasis
5. Rabies