

DISASTER MEDICAL SYSTEM IN JAPAN



Department of Acute Critical Care and
Disaster Medicine,
Tokyo Medical and Dental University
Graduate School of Medicine
Yasuhiro Otomo, MD. PhD.

2:46 p.m. March 11

HUGE TRAGEDY



HUGE TRAGEDY

DMAT

Japan Disaster Medical Assistance Team



HUGE TRAGEDY

DMAT

Japan Disaster Medical Assistance Team



HUGE TRAGEDY



市・岩手県
市の被災地。一時は
16日に避難所を
設け、17日に





- 12,431 death
- 15,153 missing
- 2,869 injured

April 6

The National Police Agency



OVERVIEW

- What were lessons learned from great Hanshin Earthquake.
- Development of the system of Japan DMAT.
- Activities of Japan DMAT on the Tsunami disaster
- Distinctive aspect of Medical Burden in this Tsunami Disaster



THE GREAT HANSHIN-AWAJI EARTHQUAKE

1995.1.17



(From the Cabinet Office PR video)

THE GREAT HANSHIN-AWAJI EARTHQUAKE

1995.1.17

- 6473 death toll
- The number of "preventable death" casualties, which could have been saved if standard emergency care was provided, has been estimated as **more than 500.**



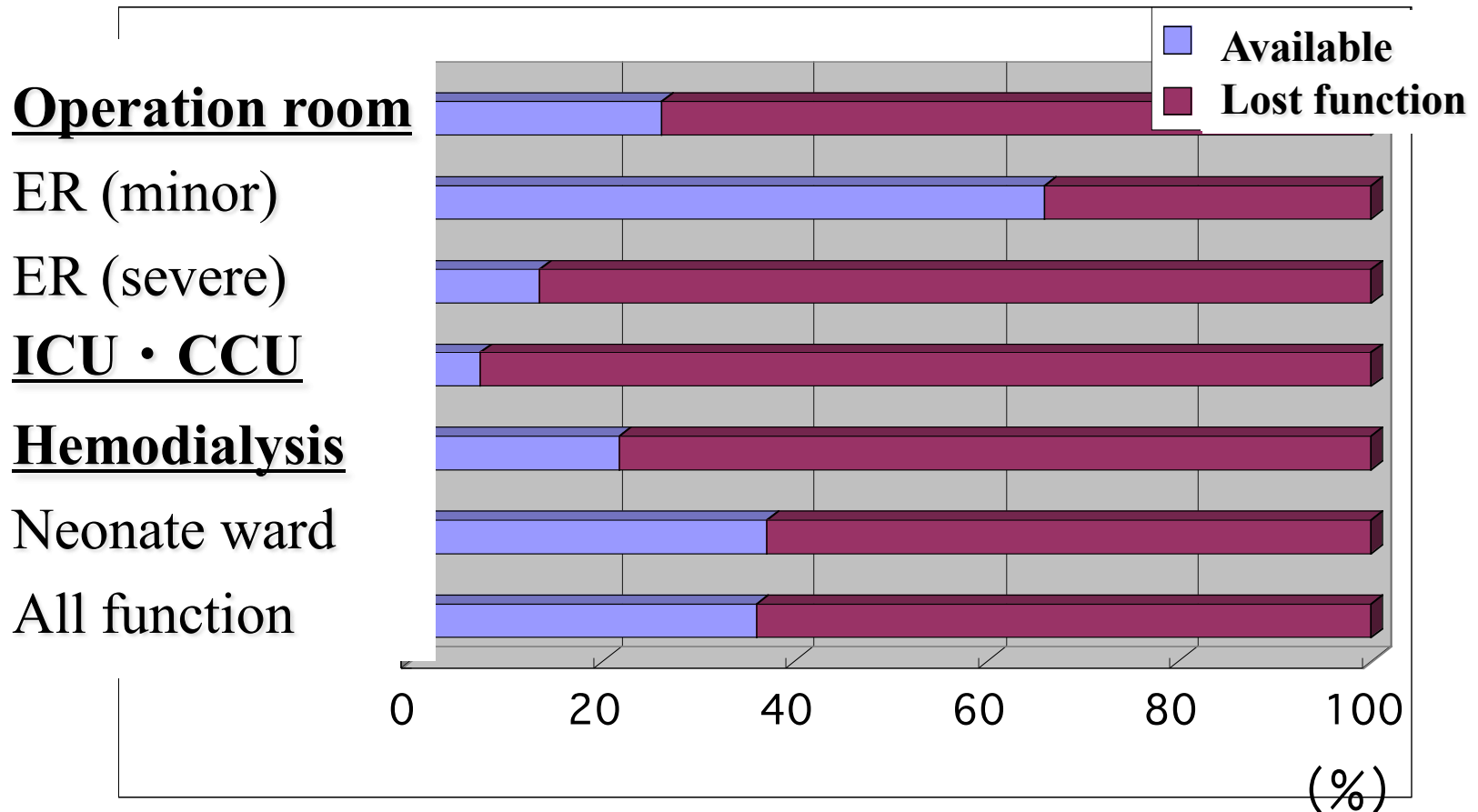
THE GREAT HANSHIN-AWAJI EARTHQUAKE

1995.1.17



- Hospitals were overwhelmed
- No power, No water, No line
- Lack of staffs, medical supplies, beds
- Insufficient surge assistance teams
- No medical evacuations by air





Availability of the hospital function among 224 facilities within affected area on the disaster date





No of Patients (death) treated at each hospital in Nishinomiya City on the disaster date





LESSONS LEARNED FROM THE GREAT HANSHIN-AWAJI EARTHQUAKE "THE COMMITTEE ON DISASTAR MEDICINE TO LEARN FROM EXPERIENCES OF THE GREAT HANSHIN-AWAJI EARTHQUAKE"

- The facilities of the local governmental administrations were damaged, and the overloaded telecommunication system severely restricted the availability of information.
- Over the devastating necessity of medical transportation, the co-existing demand of fire fighting, relief and rescue activities disturbed the smooth operations of medical services.
- Many hospitals were functionally restricted due to the damages to utilities (water, electricity and gas) and/or equipment and pipings.
- Due to the absence of adequate triage function, their medical resources were not optimally utilized in some hospitals.
- Due to a belief among people that no major earthquake could hit the Hanshin area, unfortunately disaster preparedness measures were not adequately provided.
- The coordination function of the health centers were appreciated as being very helpful.



THE GOVERNMENT HAS BEEN INTRODUCED

- Disaster Base Hospitals (DBHs)
(1996–)
- Disaster/Emergency Information system
(1996 –)
- Medical Helicopter (Heli)
(2001 –)
- Wide-area Medical Air Evacuation Plan
(2004 –)
- Japan DMAT (Disaster Medical Assistance Team) (2005–)



DISASTER BASE HOSPITALS (DBHS)

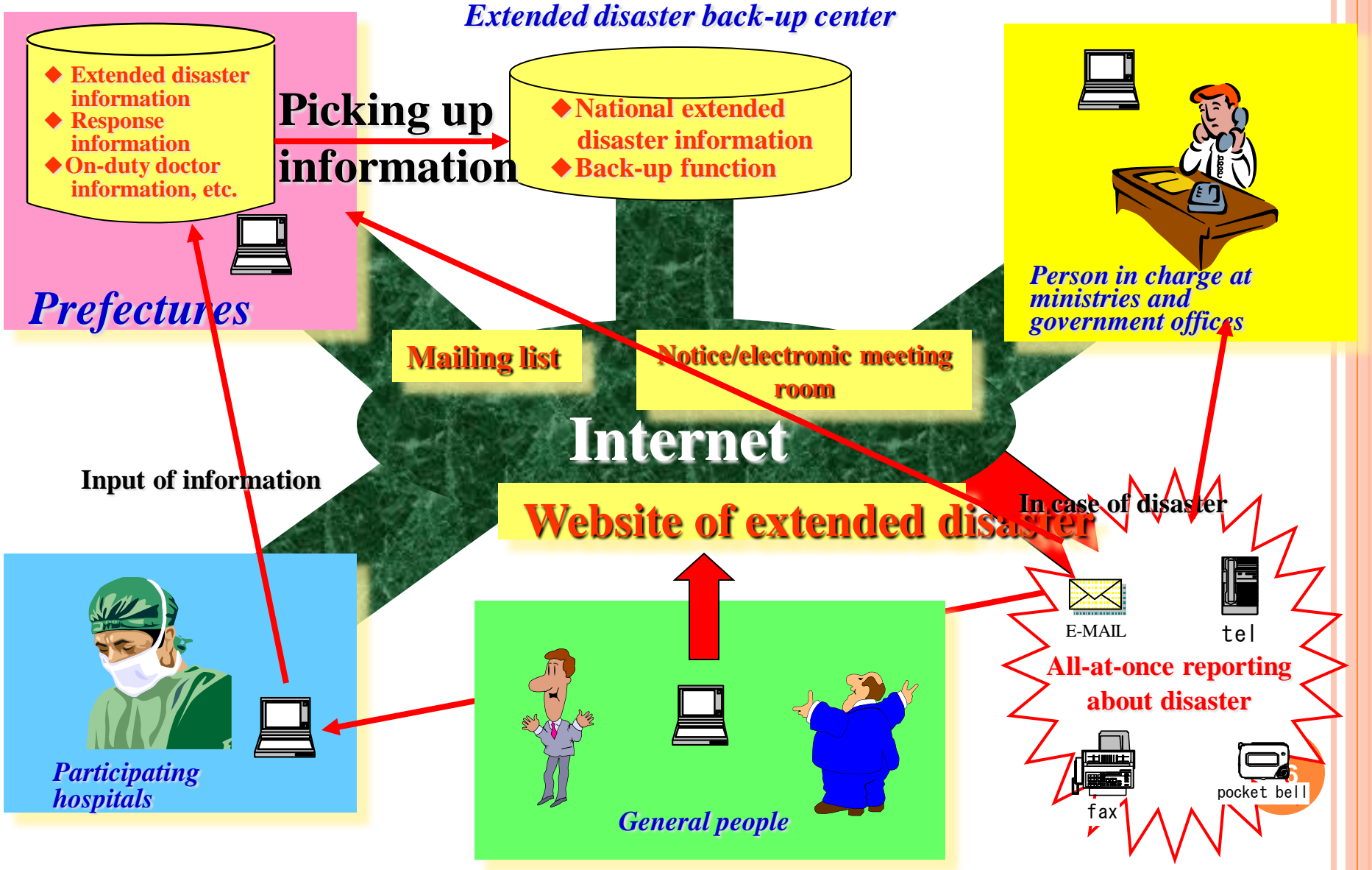
- responsible for disaster management in the territory in charge

- Earthquake-resistant construction
- Heli-pad
- Private electric generators
- Earthquake-resistant water tanks
- Supplementary beds and enough space for surge capacity

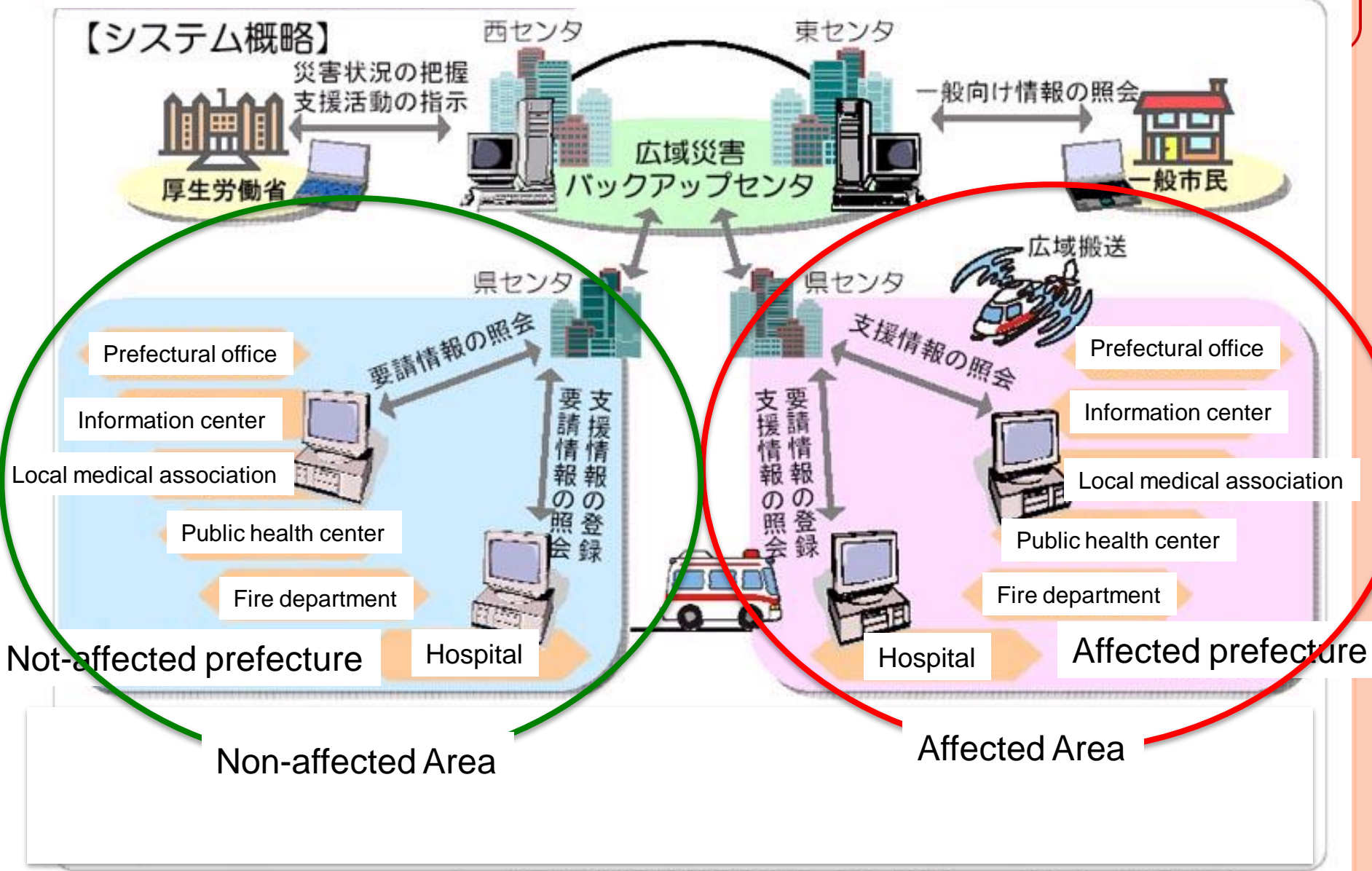
640 hospitals have been designated



Disaster/Emergency Medical Information System



Disaster/Emergency Medical Information System

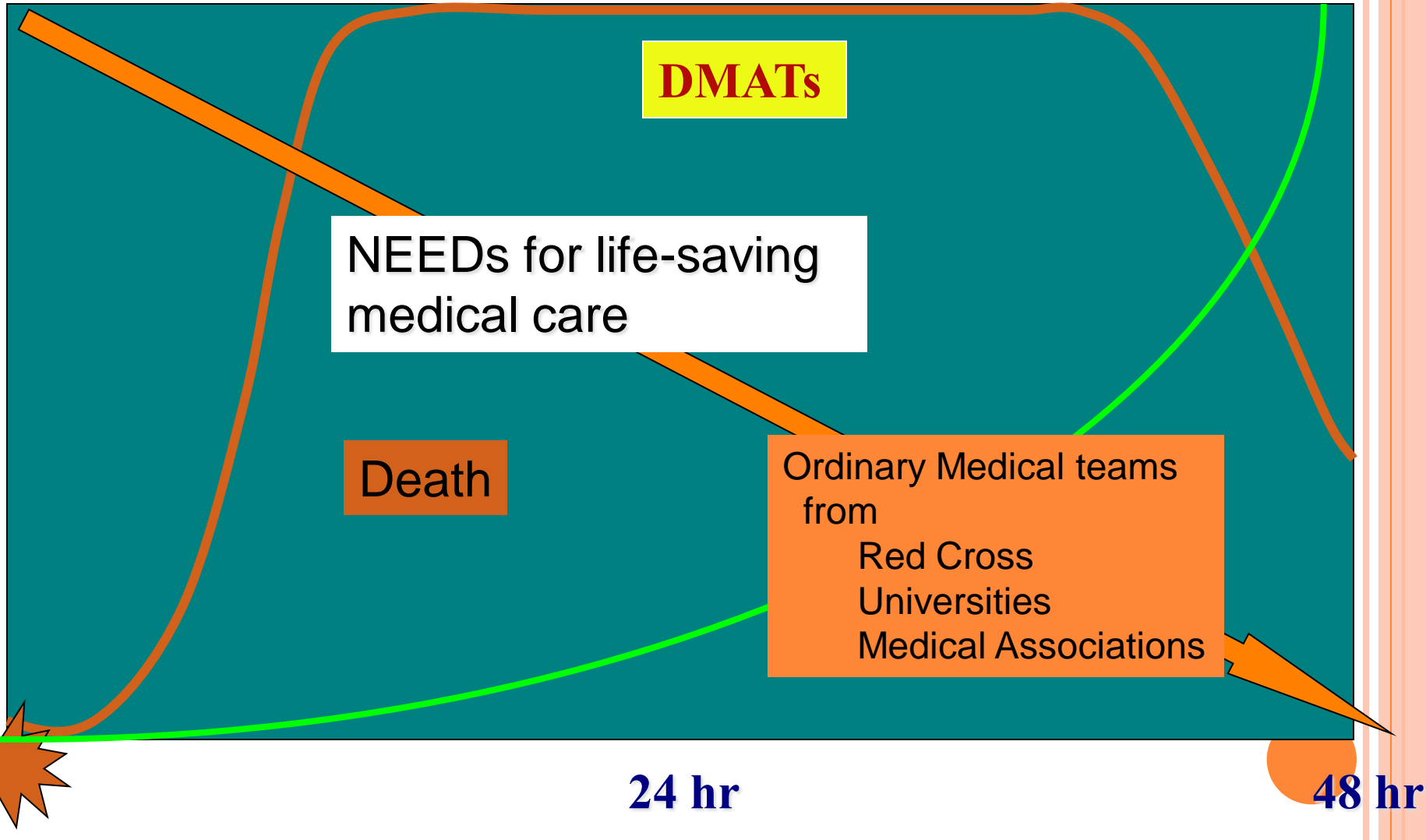


JAPAN DMAT

- Hospital Based Team
- National Standard Training Course (4 days)
- Members Certified by Ministry of Health and Labor



BASIC CONCEPT OF DMAT



BASIC CONCEPT OF DMAT

- Focus on medical care for saving lives of severely injured during ultra-acute phase (<72 hr)
 - Assist disaster base hospitals (triage, emergency treatment, transport by land and air)
 - Engaged in wide-area medical air evacuation
 - Support US&R on site



ASSISTING DISASTER BASE HOSPITALS



SUPPORTING RESCUE TEAM ON SITE



(Drill)

WIDE-AREA MEDICAL AIR EVACUATION



Assembly



Stabilizing



Transporting into the aircraft



Care in the aircraft

(Real)

WIDE-AREA MEDICAL AIR EVACUATION in Hanamaki Airport



Assembly



Stabilizing



Transporting into the aircraft



Care in the aircraft

JAPAN DMAT REGISTERED PERSONNEL

As of March 31st, 2012

- 496 Medical facilities
- 1002 teams
- 6245 persons

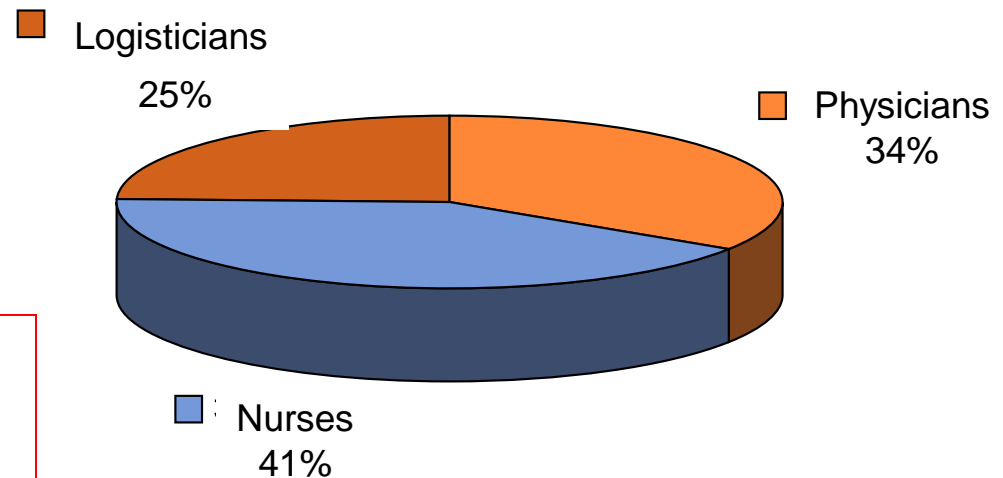
4-5 persons per team

Physician 1-2

Nurse 2-3

Logistician 1-2

Breakdown



DMA T headquarter


United states : 



Large team (>40 members), long mission (2 weeks)
Self-sufficient
Slow response

To make up sufficiently enough power,
large number of teams have to assemble very quickly.

© Michael Borjesson

JAPAN : 

640 Disaster Base Hospitals (DBHs)

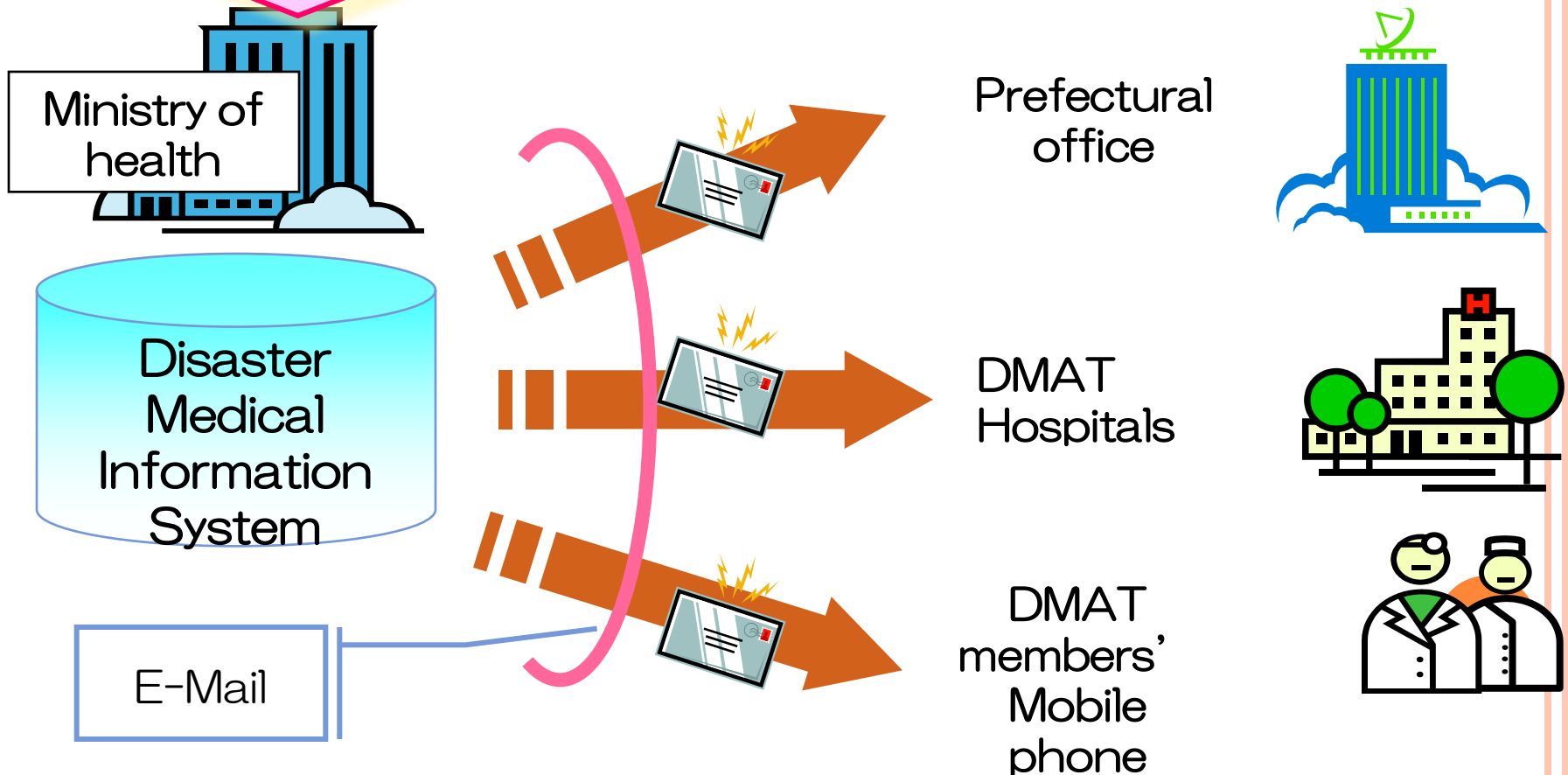
Small team (5 members), short mission (<72 hrs)
DBH dependent and mobile
Rapid response



Disaster Notification: Alert for Stand-by

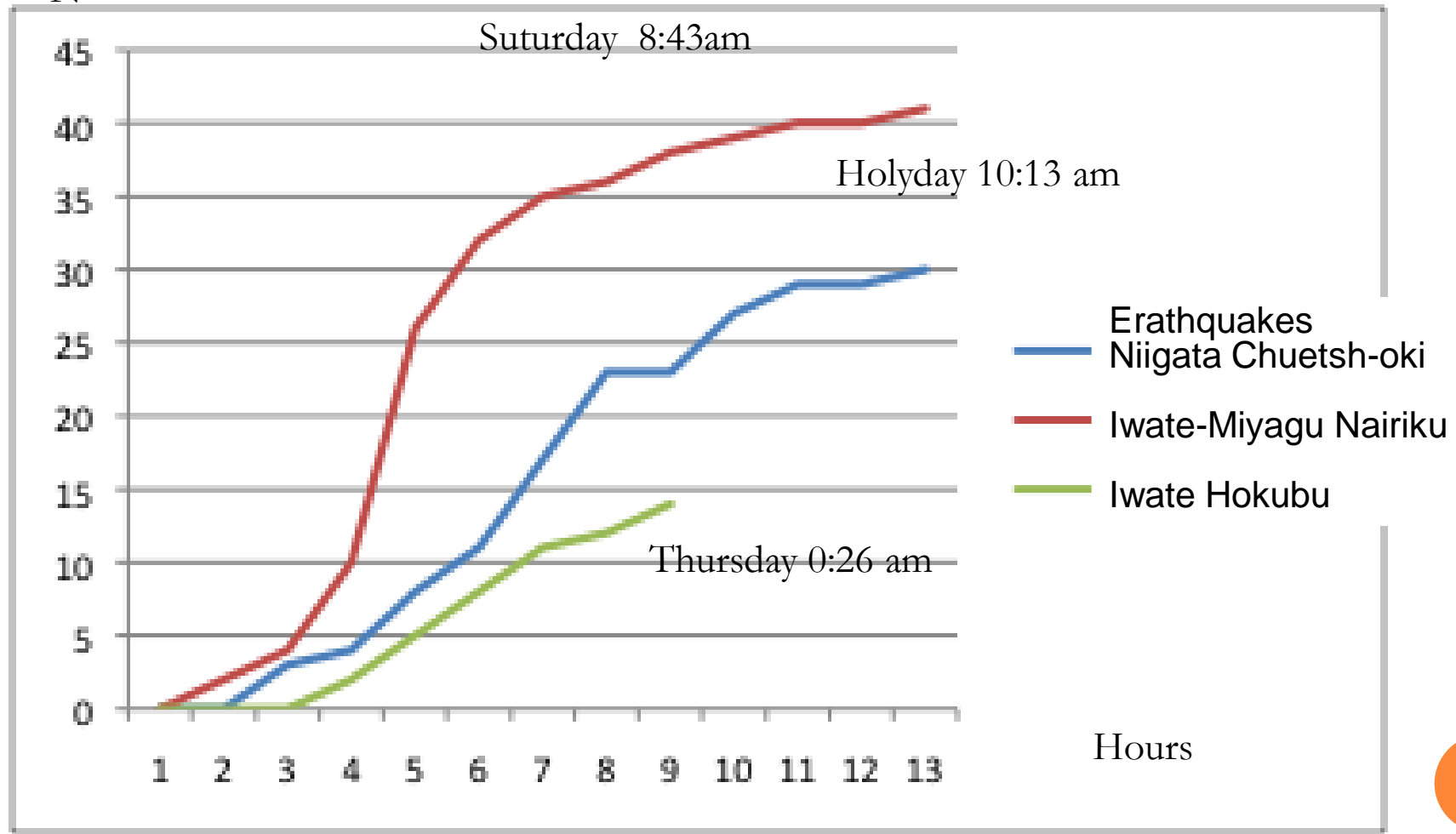


Disaster Affected Prefectural Office
Turn on "DISASTER MODE"

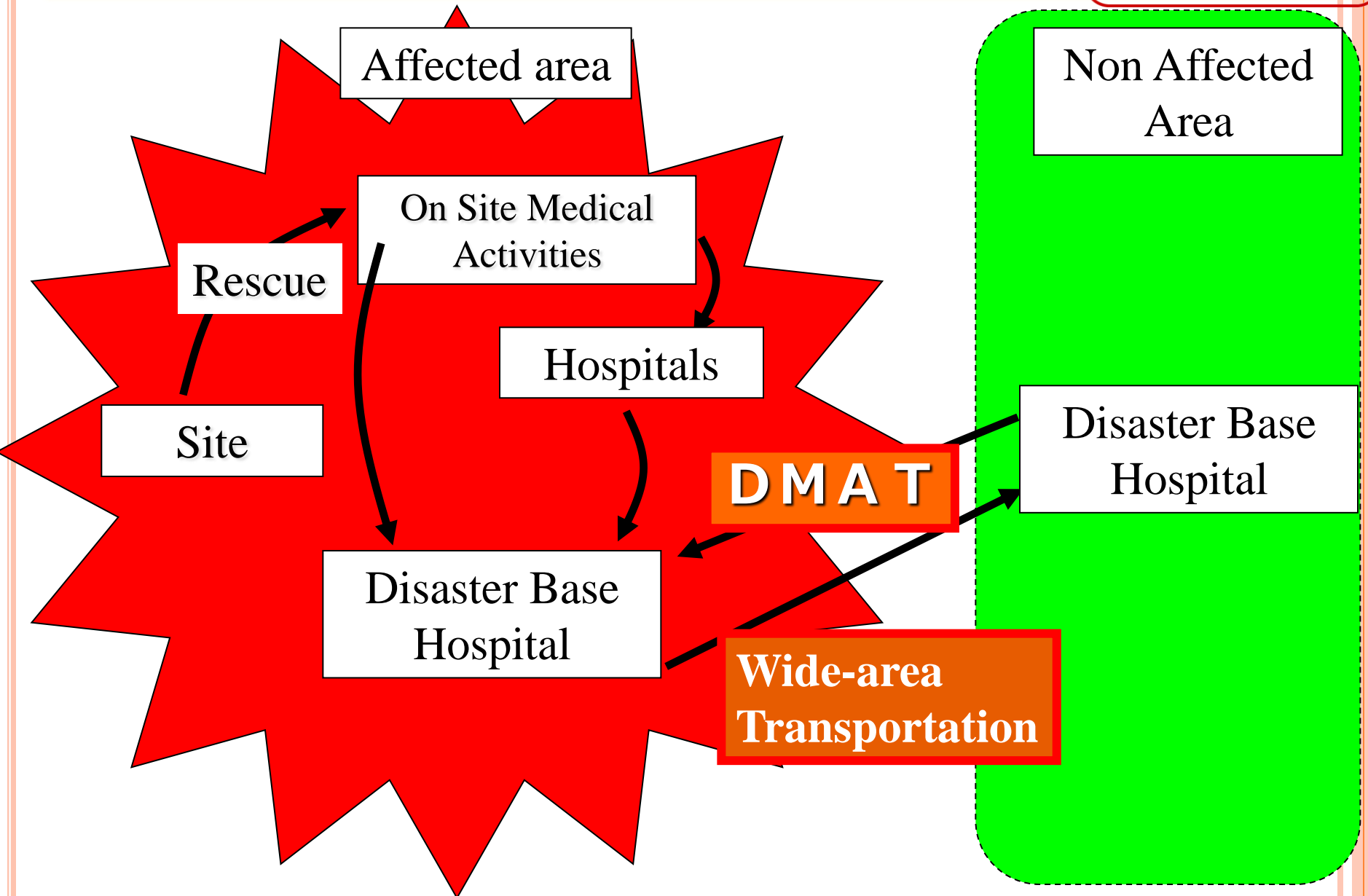


When and How many DMATs Showed up at Disaster base hospitals in the affected area ?

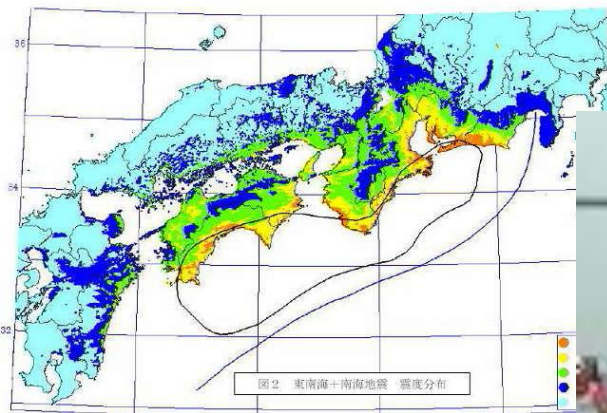
N



Disaster Medical System



Wide-area Medical Air Evacuation Plan





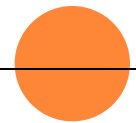
	No. of Patients	No. of Intensive Care Patients	No. of Nonsurvivors
Crush syndrome	372	262 (70.4%)	50 (13.4%)
Injuries to vital organs	177	122 (68.9%)	36 (20.3%)
Intracranial injuries	37	22 (59.5%)	11 (29.7%)
Spinal cord injuries	29	20 (69.0%)	1 (3.4%)
Intrathoracic injuries	63	51 (81.0%)	5 (7.9%)
Visceral injuries of the	48	29 (60.4%)	19 (39.6%)
Peripheral nerve injuries	42	2 (4.8%)	1 (2.4%)
Fractures of skull or face	30	4 (13.3%)	0 (0.0%)
Others	57	8 (14.0%)	7 (12.3%) ^a
Unknown	113	2 (1.8%)	67 (59.3%)
Total	2,702	513 (19.0%)	178 (6.6%)

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Kuwagata Y, et al

Journal of Trauma. 43:427-432, 1997.

^a Includes six cases with asphyxia resuscitated after the extrication.



THE TARGET MALADIES OF WIDE-AREA MEDICAL AIR TRANSPORTATION

- Crush syndrome
- Extensive burn injury $20 \leq \text{BI} \leq 50$
- Injury to the trunk and limbs
- Head injury.



TRIAGE CRITERIA FOR PATIENTS WITH INJURY TO THE TRUNK, LIMBS OR HEAD

A

Tracheal intubation
Artificial respiration

Intratracheal bleeding

Peritoneal irritation symptom

B

Thoracic drainage

Massive air leakage
Massive hemothorax (≥500 ml)

Aortic injury
Tracheal/bronchial injury
Diaphragmatic injury

C

FAST

Pericardial fluid accumulation
Fluid accumulation in abdominal cavity

Multiple shaft bone fracture
Severe soft tissue injury

Pelvic X-ray

Unstable pelvic fracture
Stable pelvic fracture (shock +)

Stable pelvic fracture (hemostatic treatment required)

D

GCS ≤13 indicates:
Decrease in consciousness level
Pupillary inequality
Hemiplegia
Open skull fracture

Acute epidural hematoma
Acute epidural hematoma with primary causes other than cerebral contusion
Fracture extending across the middle meningeal artery and venous sinus

Brain injury detected by head CT
GCS ≤13
Head injury in patients predisposed to bleeding
Head injury requiring tracheal intubation
Skull base fracture

Other: Degree of urgency

Within 8 hours

Within 24 hours

Triage criteria for Crush Syndrome

クラッシュ症候群

病院へ搬入されるのは発災後3時間以降

診断のポイント

- 長時間、四肢臀部を重量物で挟圧されたエピソード
- 患肢の知覚運動麻痺
- 黒褐色尿

注意！（クラッシュ症候群の早期では、多くの場合）

バイタルサイン安定
患部皮膚は肉眼的には正常
患部の腫脹を認めない
疼痛を訴えない

初期治療のポイント

急速輸液が最も重要な初期救命治療！

- 生理食塩水または乳酸リンゲル1000mlを全開輸液
- 膀胱カテーテル留置

利尿なし



緊急度A

輸液をさらに継続しつつ
直ちに広域搬送

利尿あり



緊急度B

輸液速度をゆるめ、広域
搬送の待機



PREDICTED NUMBER AND PRIORITY OF TARGET PATIENTS OF WIDE-AREA MEDICAL TRANSPORTATION (TOKAI EARTHQUAKE MODEL)

Target transportation time (time from onset of disaster to reception to the hospital outside the affected area)	Number of patients			
	injury to the trunk and limbs	head injury	crush syndrome	extensive burn injury
3 hours	3 - 10	3 - 10		
8 hours (priority A)	30 - 50	10 - 15	50 - 80	
24 hours (priority B)	50 - 80	20 - 30	220 - 300	20 - 35
72 hours			130 - 180	
	Predicted number of patients qualified the criteria for air transporta			
	Within 8 hours	100 - 150		
	Within 24 hours	400 - 600		
	After 24 hours	130 - 180		

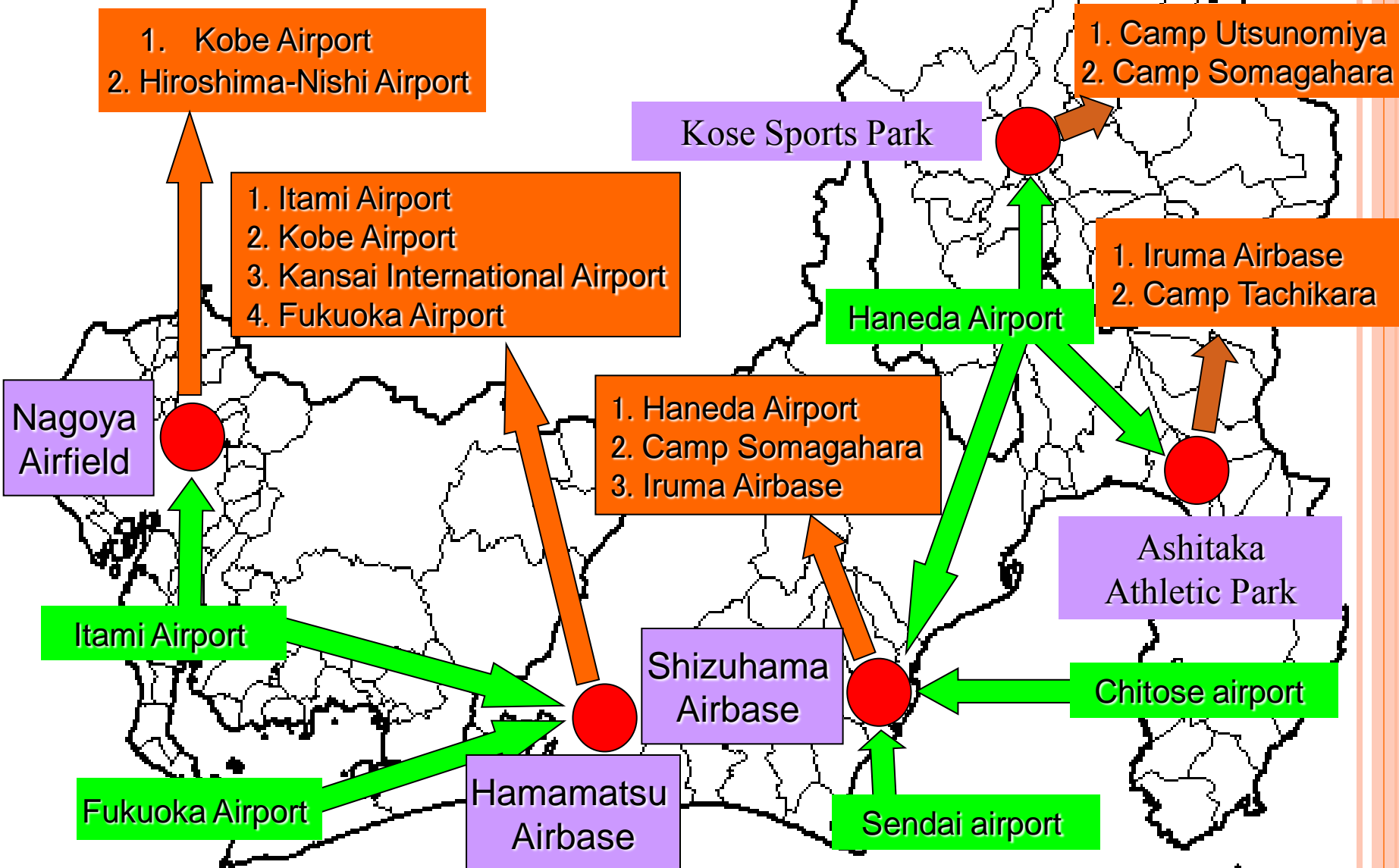


WIDE-AREA MEDICAL TRANSPORTATION PLAN FOR THE TOKAI EARTHQUAKE



Dispatch of DMATs

Transport of patients

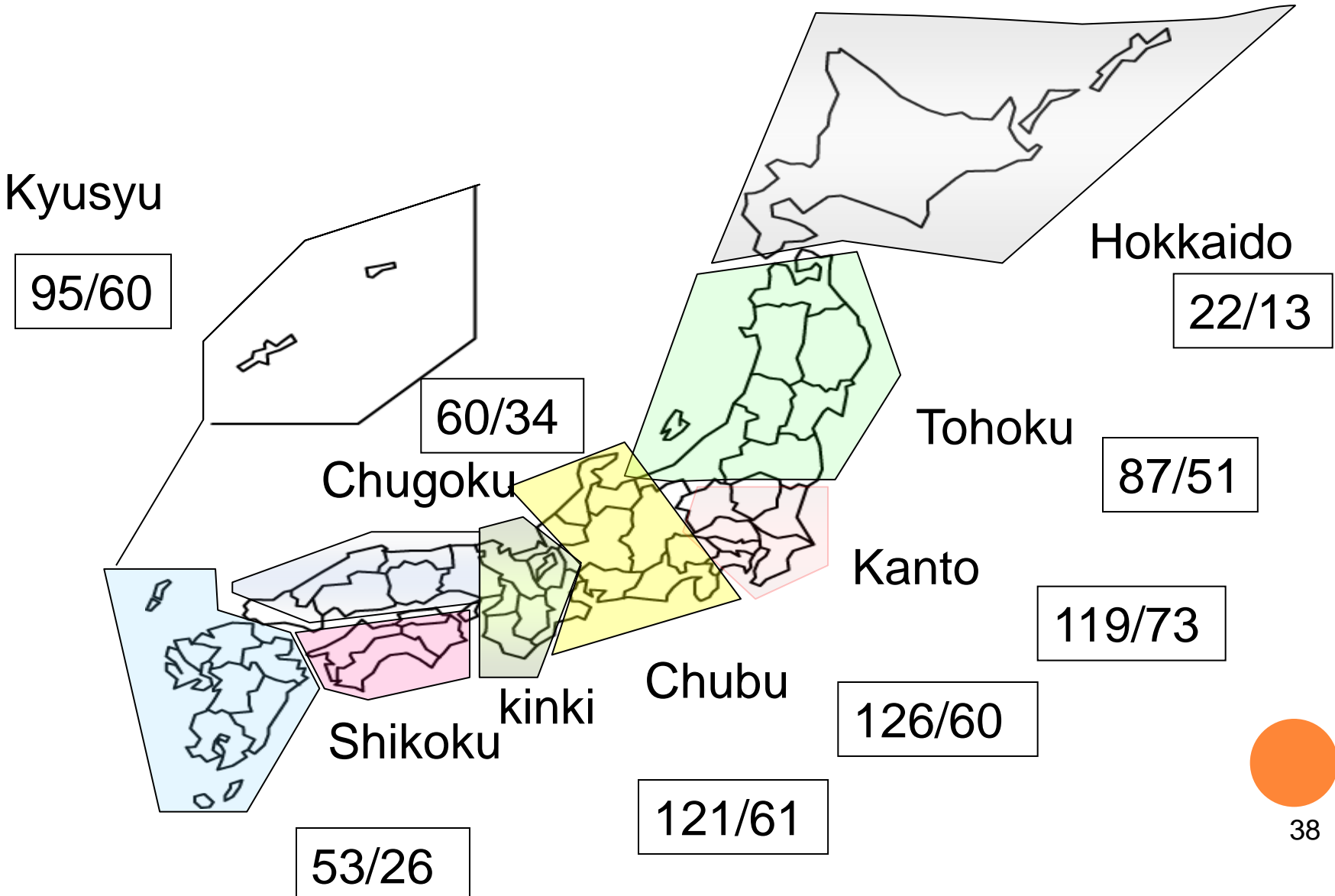


DMAT DISTRIBUTION

2010.4



Team/hospital





**THE ACTIVITIES OF JAPAN DMAT
IN THIS DEVASTATING DISASTER**

Summary of Japan DMAT activity



Number of DMATs: 383 teams, 1852 personnel

Active period: 3/11 ~ 3/22 (12 days)

Dispatched to:

Iwate 94 teams, Miyagi 108 teams

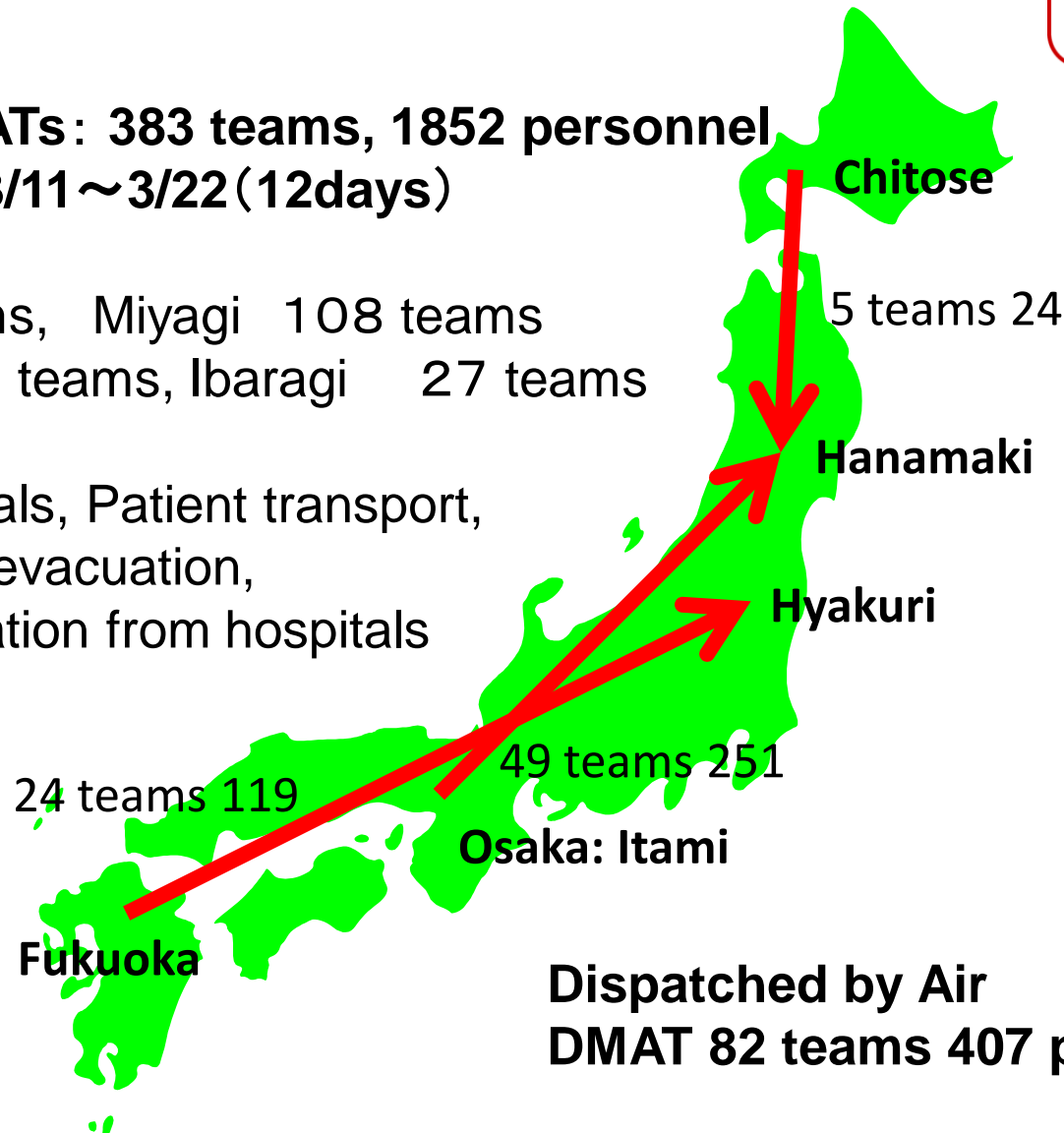
Fukushima 44 teams, Ibaragi 27 teams

Activities:

Support hospitals, Patient transport,

Wide-area air evacuation,

Patient evacuation from hospitals



Dispatched by Air

DMAT 82 teams 407 personnel



DMATs IN ACTION (MARCH 11) 45 TEMAS (115 TEAMS MOVING)



Sendai city
Sendai Medical Center



Outside base
Chitose Air port



DMATs IN ACTION (MARCH 12) 277 TEAMS (14 TEAMS MOVING)



Sendai city

Sendai Medical Center

Camp Kasuminome

Shelters



Outside base

Chitose Air port

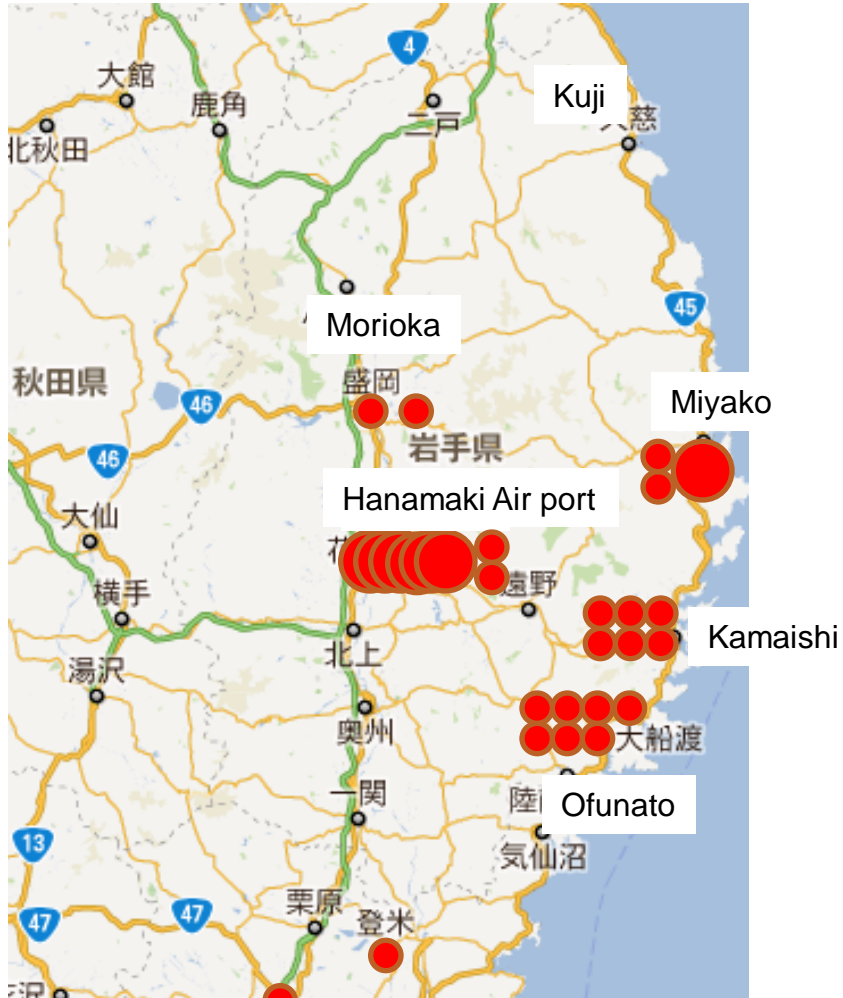
Haneda Air port

Osaka Air port

Fukuoka Air port



DMATs in Action (March 13) 264 teams (21 teams moving)



Sendai city	
Sendai Medical Center	
Sendai city hospital	
Camp Kasuminome	
Shelters	

Outside base	
Chitose Air port	
Haneda Air port	
Osaka Air port	
Fukuoka Air port	

Support Hospitals inside the affected area



Red area

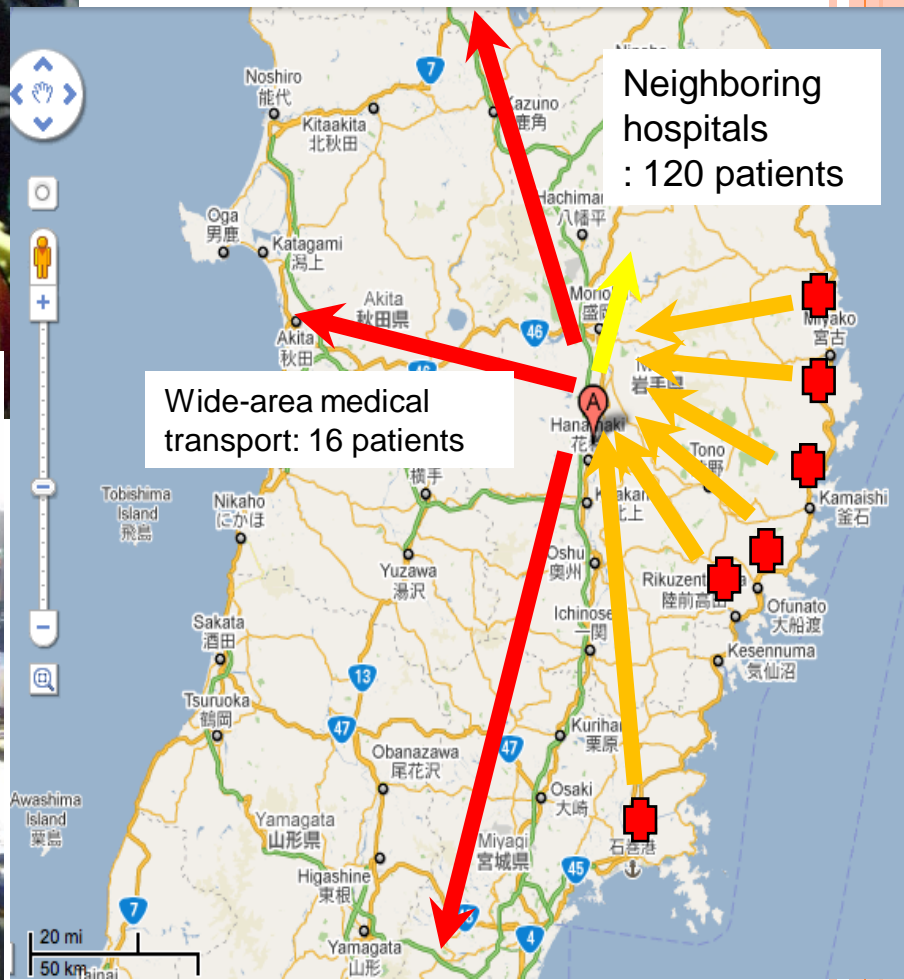


Yellow area (electrical power down)





Hanamaki Air Port Staging Care Unit



DMAT operations for the Great East Japan Earthquake

Wide-area Medical Transport
(Transporting patients from the affected areas to the non-affected areas)

Number of patients transported: 19

Airplanes used:
Five C1 cargo planes
(March 12 to 15)

Chitose Base

4 persons : 3/12 19:55

3 persons : 3/14 19:50

3 persons : 3/15 14:55

Akita Airport

Hanamaki Airport

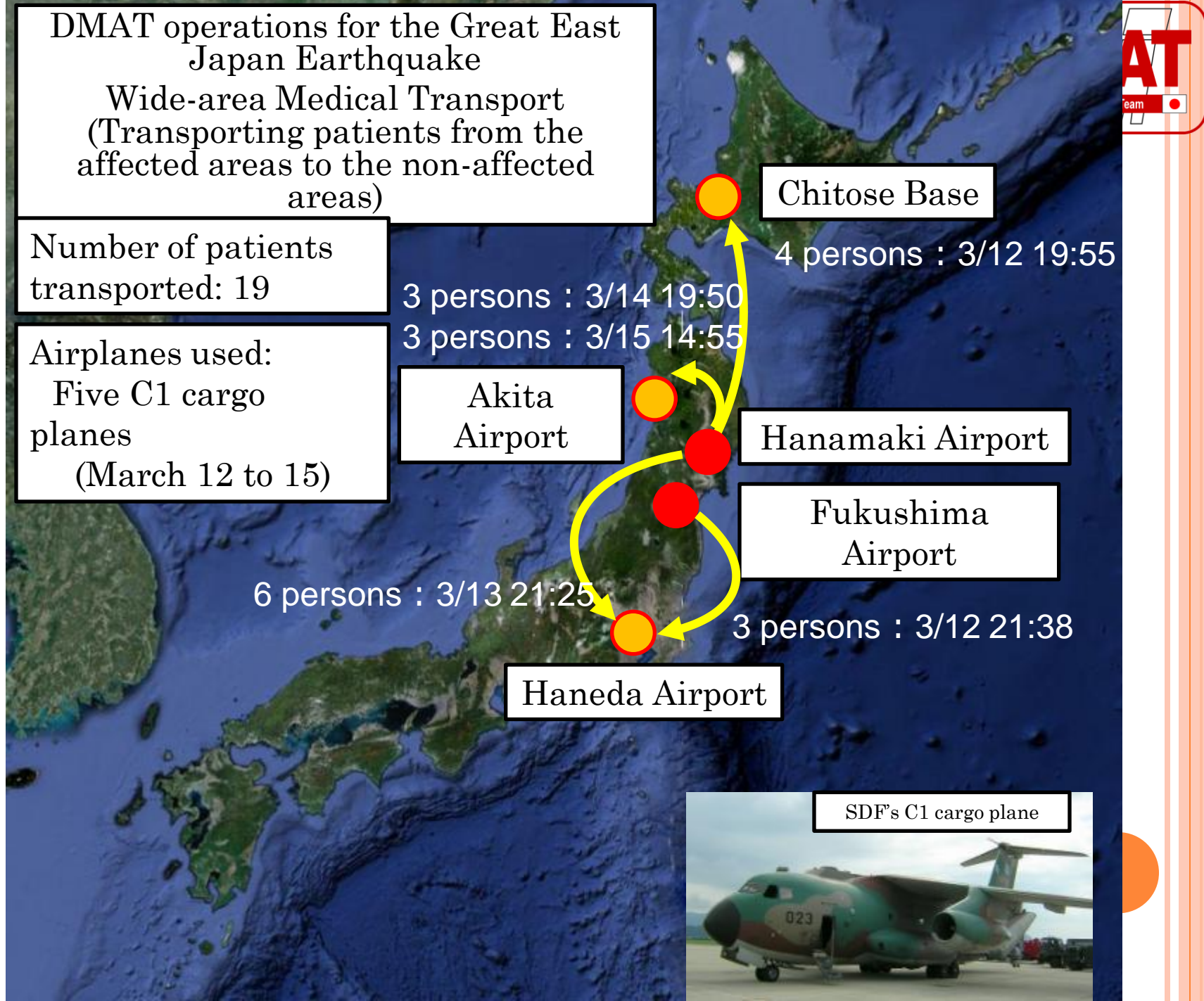
Fukushima Airport

6 persons : 3/13 21:25

3 persons : 3/12 21:38

Haneda Airport

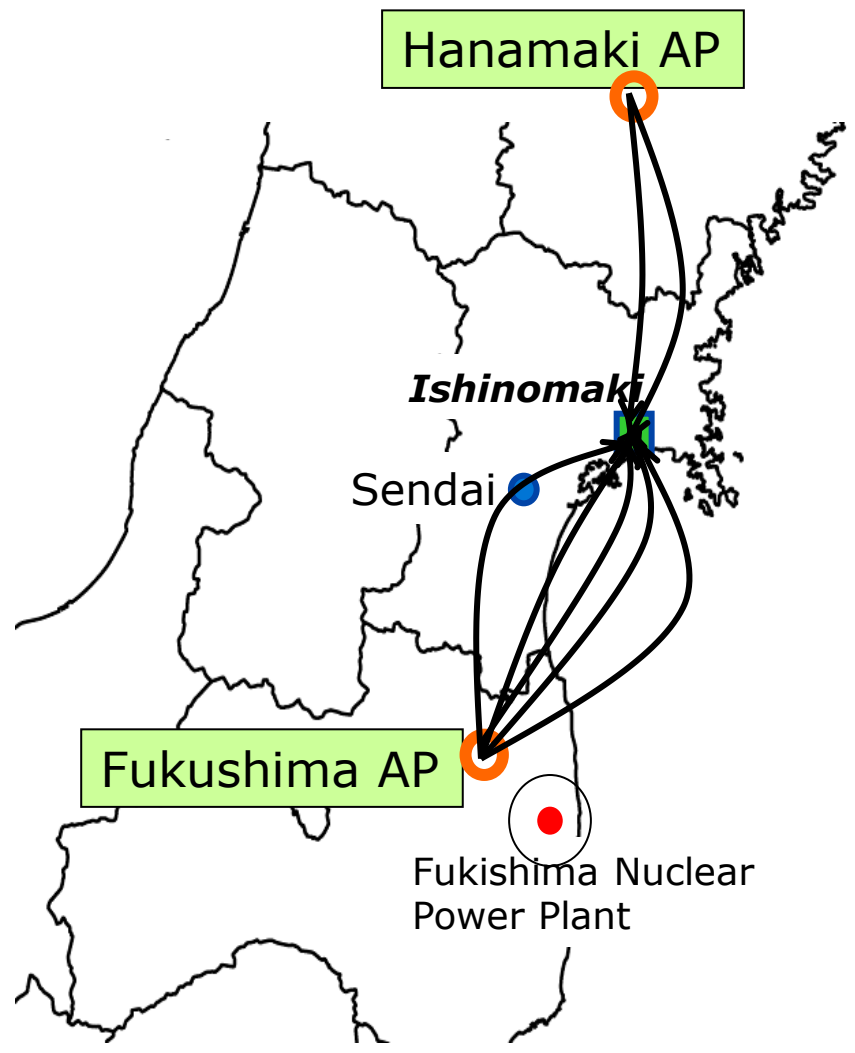
SDF's C1 cargo plane



INPATIENTS EVACUATION FROM HOSPITAL ISHINOMAKI CITY HOSPITAL



ALL INPATIENTS EVACUATION FROM ISHINOMAKI CITY HOSPITAL



OPERATION OF WHOLE HOSPITAL EVACUATION



Ishinomaki Athletic Park

Ishinomaki City Hospital

To Camp Kasuminome
By aircraft of JSDF



©2010 Google

DMAT ACTIVITIES IN FUKUSHIMA PREFECTURE

○ Additional Mission

- Evacuation from the medical facilities in the contaminated area



EVACUATION OPERATION FROM AREA 20-30KM FROM THE PLANT



Satellite Kashima Situation

- March 15, Government ordered the measure to stay in door
- Area 20km~30km from the plant. Cities and towns lost function without any supplies from outside
- Hospitals unable to continue
- About 1000 patients to be evacuated
- Operation
 - May 18~22
 - DMAT: 25 teams
 - actions: At staging base - Survey for radioactive contamination, Triage, First aid, Offer medical care during transportation by land and air
 - Total evacuated No. 509 inpatients



To Ibaragi

Iwaki-Koyo senior high school



***The DMAT system worked adequately.
Provide the medical support in the ultra-acute phase***





DISTINCTIVE ASPECT OF MEDICAL
BURDEN IN THIS TSUNAMI DISASTER

MEDICAL NEEDS WERE NOT HIGH DURING THE ULTRA-ACUTE PHASE

(A CHARACTERISTIC OF TSUNAMI DISASTERS)



Number of Victims at the National Sendai Medical Center

Date	Red Tag	Yellow Tag	Green Tag	Black Tag	Total	Patients Admitted
March 11	13	30	22	0	65	31
March 12	13	50	81	0	144	44
March 13	7	30	78	0	115	28
March 14	10	55	87	0	152	43
March 15	14	44	103	2	163	42
March 16	6	24	35	1	66	21
March 17	7	14	25	0	46	21
Total Number	70	247	431	3	751	230



Patient with Hypothermia



Great Hanshin-Awaji Earthquake Jan 17th, 1995



Dead and Missing 6,437
Injured 43,792

morbidity/mortality 6.80

Great Eastern Japan Earthquake Mar 11th, 2011



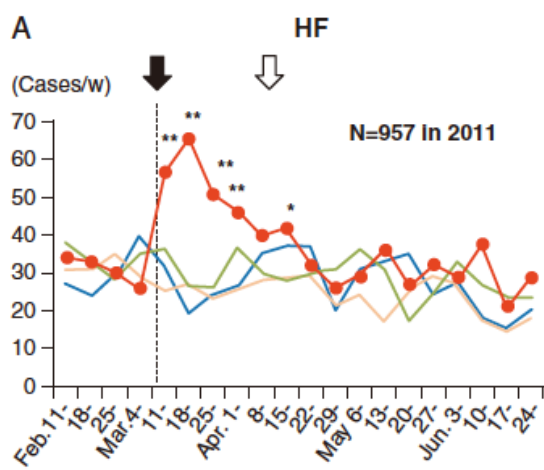
Dead and Missing 18,716
Injured 6,109
(as of August 15, 2012)

morbidity/mortality 0.32

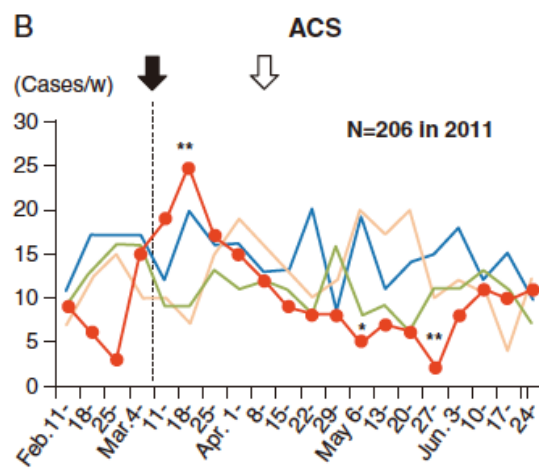
DISTINCTIVE ASPECT OF MEDICAL BURDEN IN THIS TSUNAMI DISASTER

- Types of Human damages were **all or nothing**
 - Dead or no injuries
 - Very few severe patients
- Large and many **hospital evacuation** were needed.
 - Isolated area in the Pacific coast
 - Radioactive contaminated area by Nuclear Power Plant

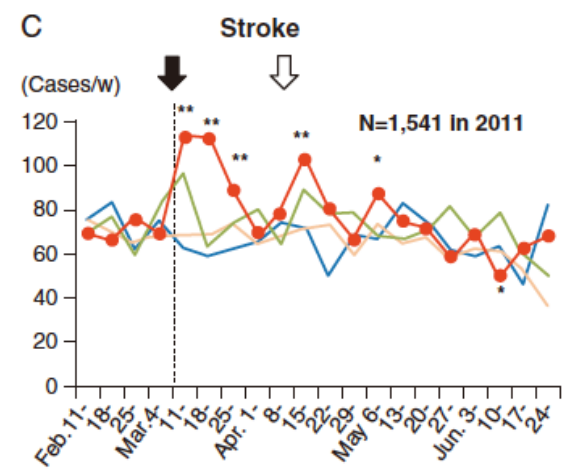




D CPA (All cause)

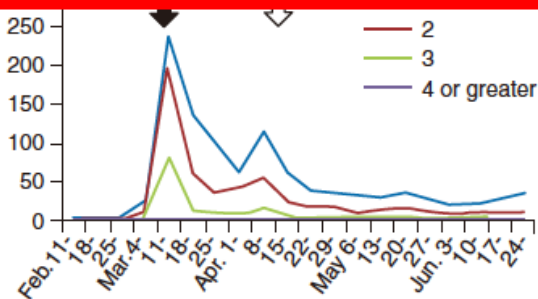


E CPA (Cardio-pulmonary causes)

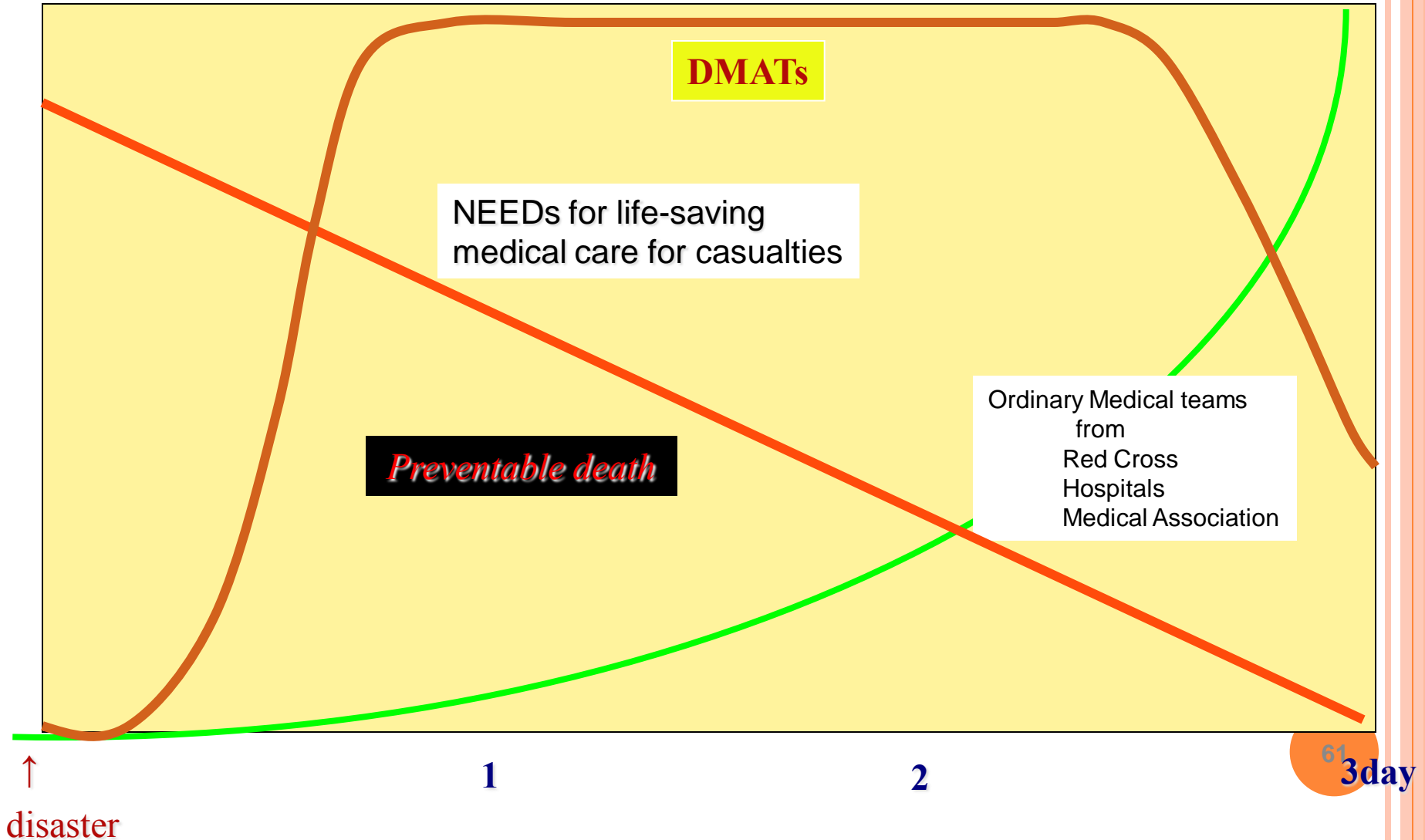


F Pneumonia

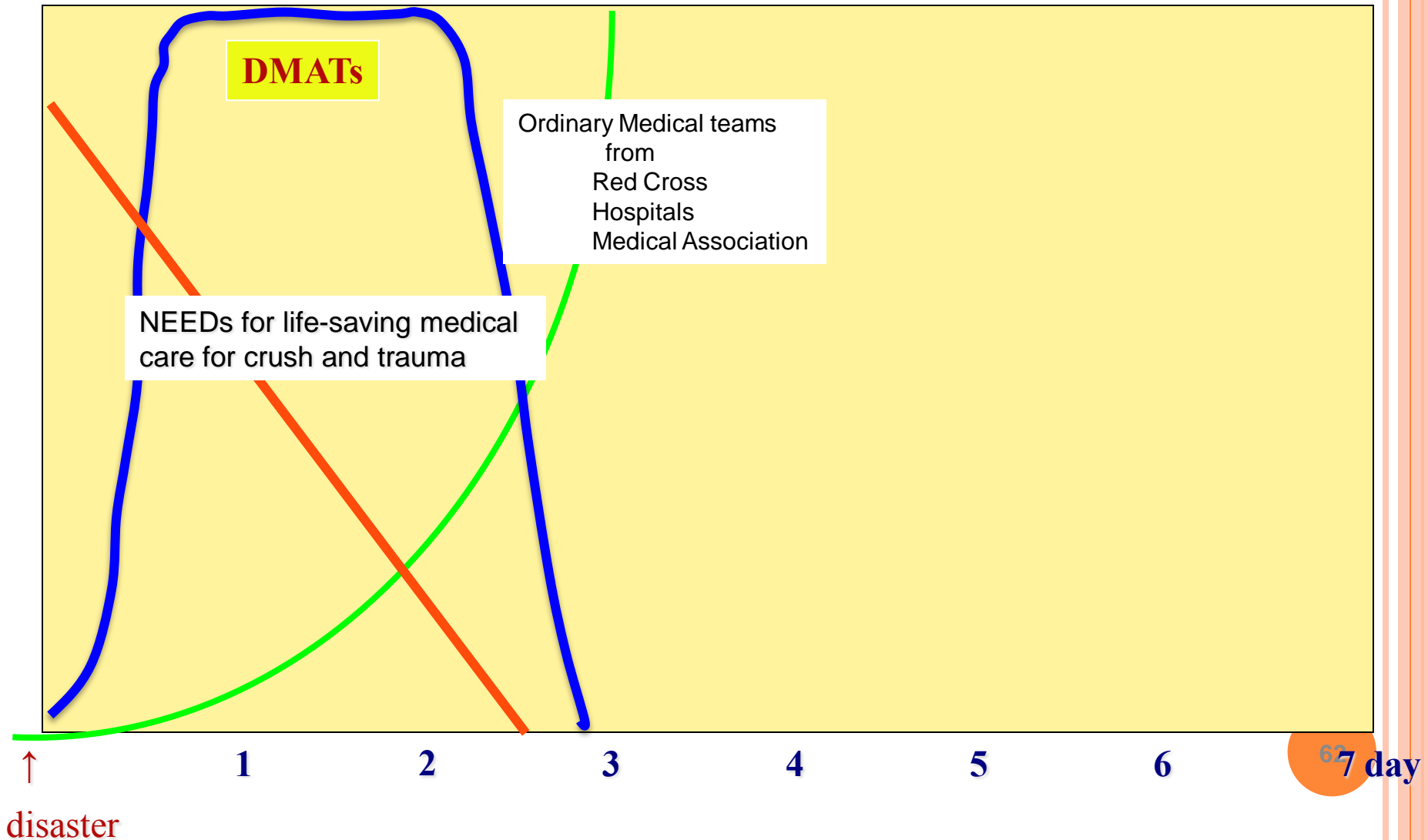
Japan DMAT had been developed focusing on life saving medical management on severe trauma and crush syndrome. In the great east Japan earthquake, however, Japan DMAT had to cope with quite different medical needs.



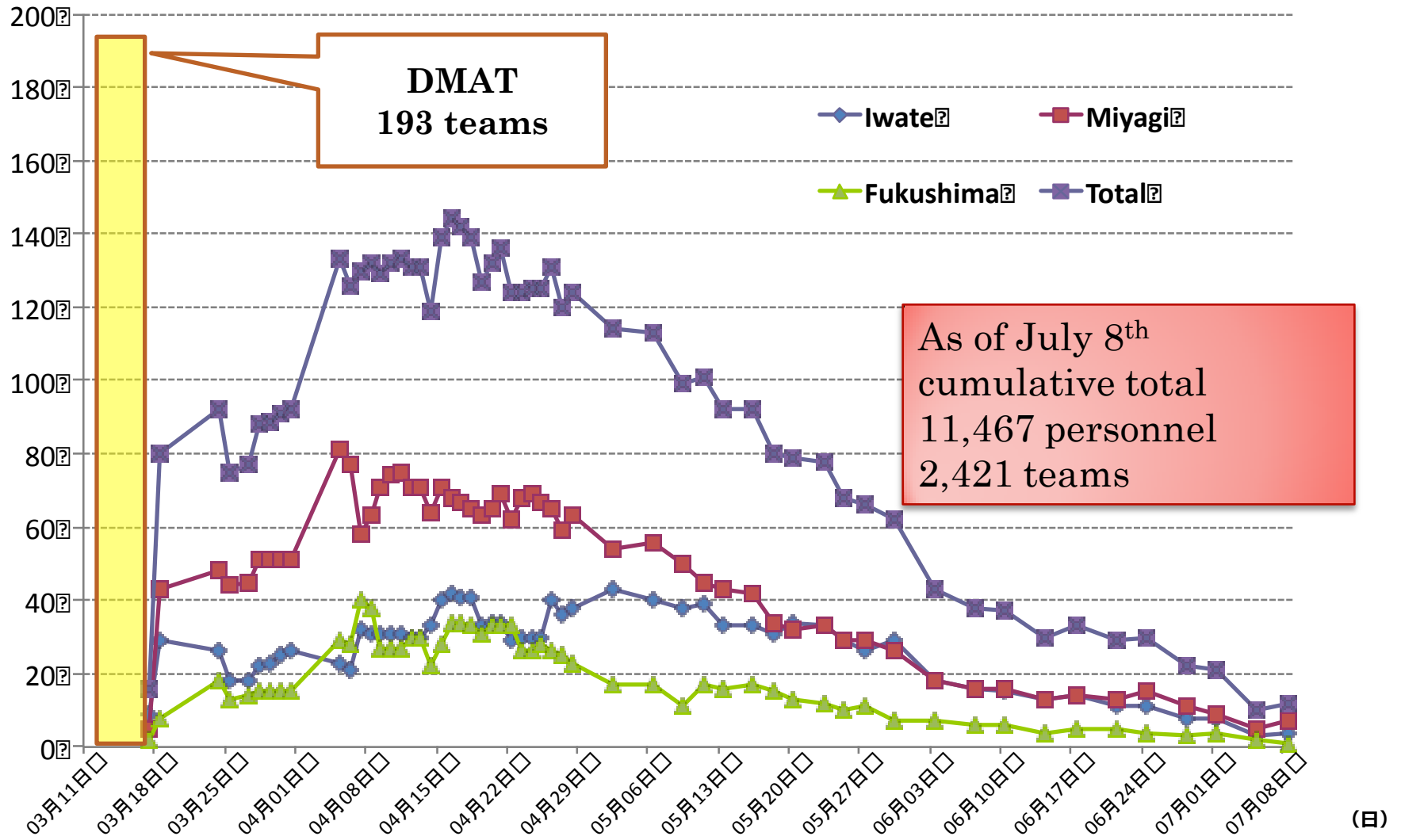
BASIC CONCEPT OF DMAT



NEW MEDICAL BURDEN IN GREAT EASTERN JAPAN EARTHQUAKE

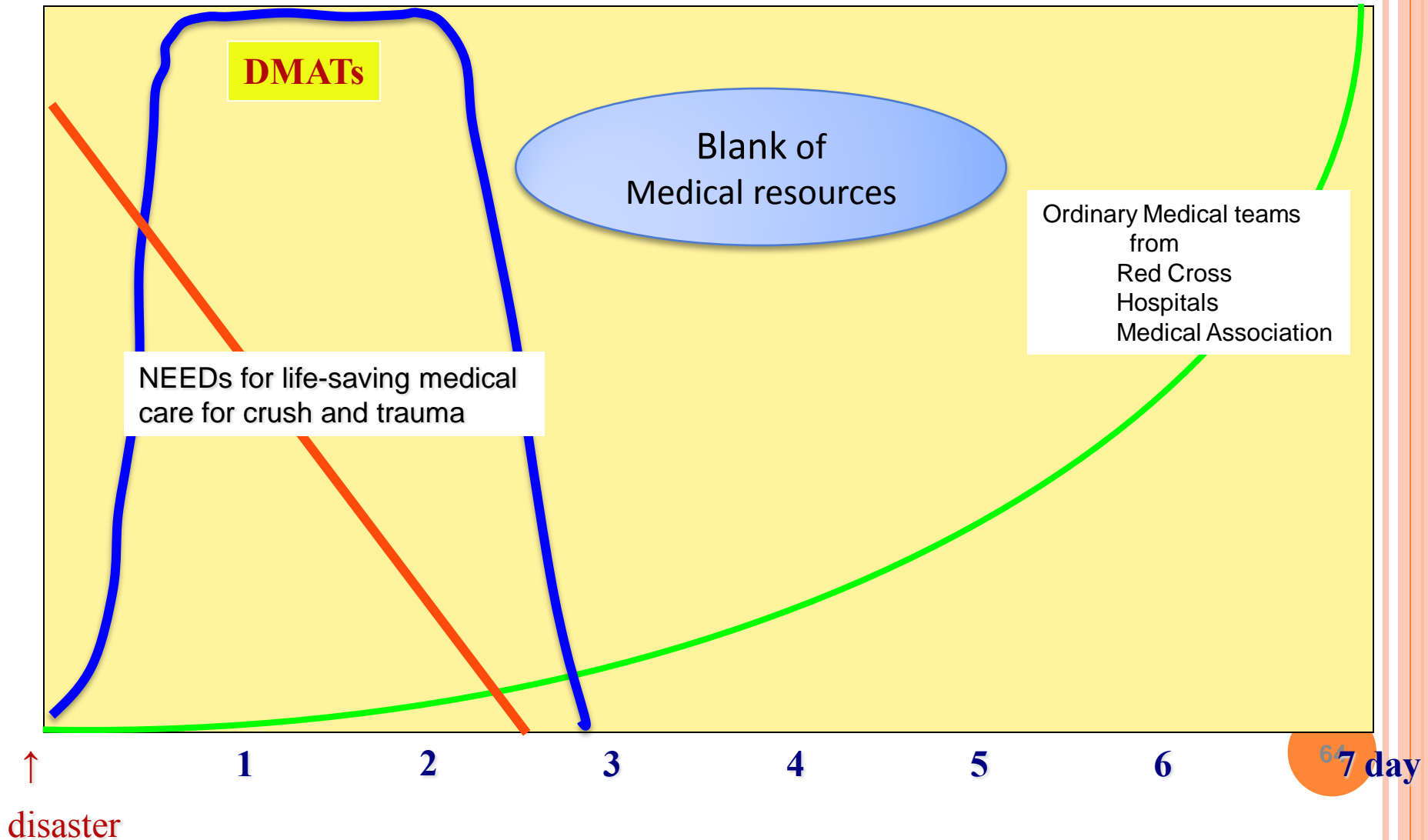


Number of Medical Teams dispatched to the Earthquake

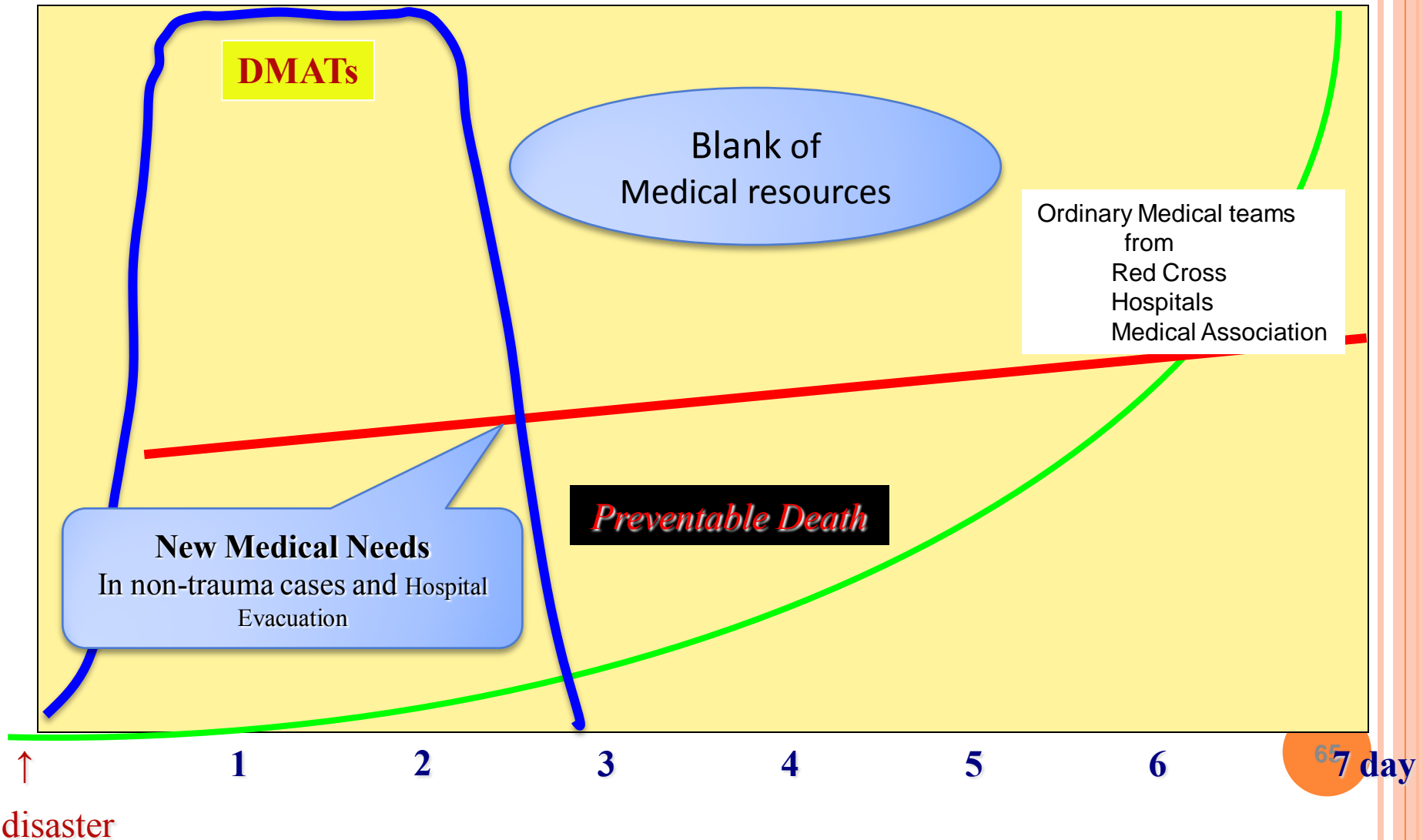


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NEW MEDICAL BURDEN IN GREAT EASTERN JAPAN EARTHQUAKE



NEW MEDICAL BURDEN IN GREAT EASTERN JAPAN EARTHQUAKE



THE NEXT STEPS OF JAPAN DMAT SYSTEM

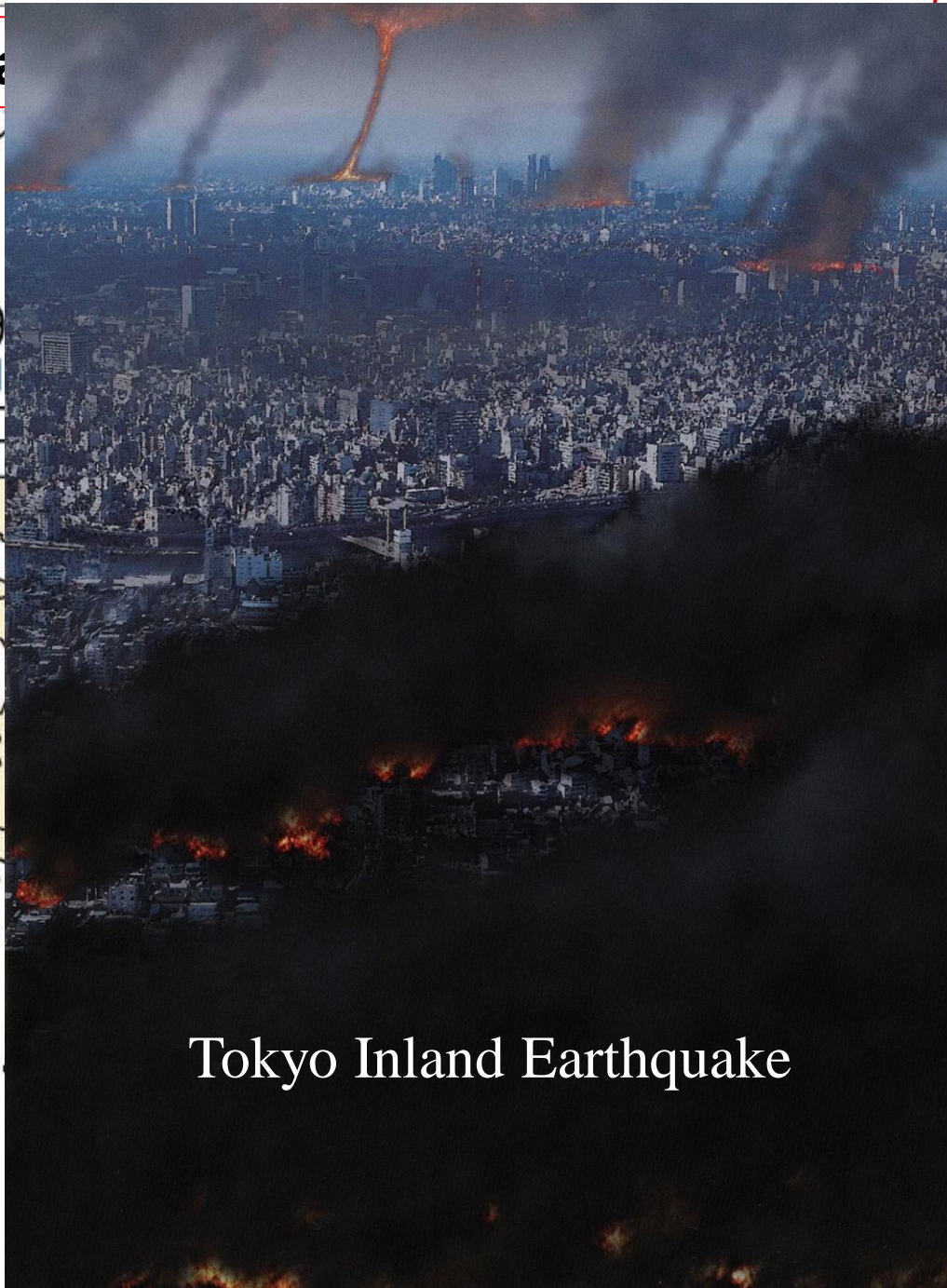


- Seamlessly provide sub-acute disaster medical support
- Upgrade the telecommunication equipment
 - Available to connect to internet during a heavy congestion
- Brush-up the wide-area medical evacuation strategy
- Reinforce the logistic support function



Nanka

(数字は)



Tokyo Inland Earthquake

