PART 6

SUMMING UP

Reports from the Working Groups

During the symposium three working groups met to discuss the three phases of disaster management: vulnerability reduction, preparedness and rehabilitation. The chairpersons and rapporteurs of the three working groups presented their summary reports to a plenary session. The health and well-being of people during and after earthquakes can be improved if appropriate measures are taken in all three phases of disaster management. It is clear that some overlap exists.

Report from the Working Group on Vulnerability Reduction

Introducing the issue

Vulnerability reduction is a term mainly used in disaster and emergency management.

The working group focused on two main areas: the planning and execution of preventive engineering measures, such as constructing to strict codes; and the selection, planning and preparation of organizational measures, with corresponding training programmes.

Major findings

Levels of hazard

As hazards and the risk of earthquakes prevail in many countries, these countries are encouraged to update seismic hazard maps and apply them to the local situation. A country's history of earthquakes and methods of modern geology and seismology can be used to establish such maps.

Structural and engineering measures

A hazard analysis for specific natural and man-made risks should be provided as an input to the planning process which should include, among other things, formulation of building codes, their adoption and enforcement, and design of lifelines and vital systems such as hospitals, water supply, sanitation, electricity supply, gas supply, communication, transportation and fire prevention, to a higher level of safety. Simple structures (wood, clay, plaster) should be made more resistant. Retrofit of old structures, insufficiently designed, with appropriate reinforcements is also possible and should be based on risk assessment. Strengthening hospitals or special hospital rooms, and/or protecting essential hospital contents, such as diagnostic or surgical equipment, against earthquakes should be considered.

Logistics, training and public health measures

The group also identified a number of non-engineering measures relating to preparation for future disasters by learning from the past, establishing effective organizational structures and providing training and drills.

Report from the Working Group on Preparedness

Introducing the issue

Preparedness is a much more generally accepted and understandable term than vulnerability reduction. However, in the context of earthquakes and people's health, it requires some explanation to differentiate it from rehabilitation and vulnerability reduction, with emphasis on the latter. Whereas longer-term preparation to deal with the effects of earthquakes, (such as training), is defined as a vulnerability reduction issue, most of the execution of such measures in an emergency is seen as a preparedness issue in the context of the working groups. Therefore, in terms of the health and well-being of the affected persons, preparedness involves both the prior organization of an effective reaction to an earthquake and the actions that are immediately necessary during and after an earthquake. This is reflected in the findings of the group.

Major findings

Public information

Public awareness programmes utilizing all possible media should constitute an integral and fundamental part of the disaster preparedness programme. Particular attention should be paid to vulnerable groups.

Appropriate procedures should be established for the management of public information, including mechanisms for rumour control and regular situation updates.

Communication

There should be communication systems, parallel to or backed up by secondary systems, in order to collect and disseminate information, mobilize resources and pass on orders.

Safeguarding lifelines

When necessary, temporary cut-off of dangerous or endangered supply lines, such as railways, gas, water and electricity, must be initiated.

Rescue operations

Local and voluntary resources must be organized and mobilized to carry out the vital early rescue of people buried in debris and to provide first aid. Search and rescue operations are to be coordinated and logistics and equipment support is to be provided. Logistics support should include stopping regular traffic and routine activities to give priority to rescue

Rapid assessment

Tools and instruments for the rapid assessment of casualties, as well as of damage to health facilities and systems, should be instituted with provision of training at the local level.

Methods should be included to authorize damaged hospitals to continue functioning where possible in order to avoid unnecessary evacuation.

Mitigating consequences

Early detection and mitigation (fighting) of secondary effects, particularly fires, traffic jams, floods and landslides, are necessary. The outbreak of communicable diseases must be avoided and the necessary standards of sanitation maintained. Temporary shelter, food, sanitation, transportation and money supply should be provided.

Psychological support

Mitigation of the observed consequences of psychological factors on the affected population and rescue workers must be an integral part of preparedness

Report from the Working Group on Rehabilitation

Introducing the issue

Rehabilitation, as with preparedness, is self-explanatory and generally understood. In the context of earthquakes, the term rehabilitation applies to the group of medium-term and long-term measures that are taken after an earthquake to support a healthy life for the people affected and to make such efforts sustainable. Short-term measures, on the other hand, are largely treated under preparedness. Particular issues which require long lead-times to be effective in the rehabilitation phase, such as insurance, are also treated under vulnerability reduction.

Major findings

Overall objectives for rehabilitation

There are two main overall objectives. The first is to achieve a sustainable state of health and well-being that is at least as good as before the disaster using self-reliance as far as is possible.

The second objective is to learn from past events and make the community both less vulnerable and better prepared for similar events in the future.

Health services

Breakdowns in the system of health services must be avoided. If interruptions occur, the services must be restored. Priority must be given to re-establishing routine basic health and social services to the stricken community and to launching community consolidation mechanisms as a way of preventing social and behavioural complications and dealing with post-traumatic stress disorder and earthquake psychosis.

Reconstruction

Reconstruction and rehabilitation forces should be mobilized by encouraging and coordinating initiatives of individuals, industry, volunteer organizations and government, paying particular attention to those who are socially isolated or economically weak.

Infrastructures such as transportation must be reorganized and safe waste disposal provided. Tertiary damage, such as loss of living accommodation, property, jobs, confidence and future perspective, must be mitigated.

Rehabilitation activities should be based on a project management approach and should preferably be time-limited.

Financial aspects

In the pre-disaster phase, governments and local authorities should establish contingency funds for relief and rehabilitation, directing external aid towards priority activities concerned with community participation. Successful models of financial solidarity with victims, such as the loss-balancing scheme of post-war Germany (see Annex 5), were discussed and acknowledged. But certain relief operations should be limited in duration to avoid people becoming dependent on them.

How to integrate earthquake vulnerability reduction, preparedness and rehabilitation into a holistic and intersectoral approach

Panelists: L.B. Bourque[1], Moderator
M. Gabr[2], Co-moderator
J. Oviedo[3]
M. Erdik[4]
K. Hayashi[5]
B. Mulyadi[6]
M. Meyers[7], Rapporteur

Panelists were asked to give their "sense" of what had evolved (as consensus or diversity of views) during the four-day conference, rather than giving their own opinion or presenting their own experiences. The topic was then opened to the audience for comment and discussion.

The panel theme was discussed under five questions, as follows:

Question 1: How can interactions between the health sector and other sectors be improved?

All panelists indicated that intersectoral interactions should occur and needed to be improved and that such interactions had to be undertaken in a systematic manner before a disaster occurs.

Dr Pretto called for the establishment of a clear intersectoral management structure which had as a major objective the facilitation of communications between the different sectors that,

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[2] M Gabr is Professor of Pediatrics, Cairo University; past president of the Advisory Committee on Health Research, WHO; immediate past president of the International Pediatric Association; and Secretary General of the Egyptian Red Crescent Society, Cairo, Egypt.

[3] J. Oviedo is General Director, Preventive Medicine, Ministry of Health, Mexico, D.F., Mexico

[4] M. Erdik is Professor and Chair, Department of Earthquake Engineering, Kandilli Observatory and Earthquake Engineering, Bogazici University, Istanbul, Turkey.

[5] K Hayashi is Director of the Kobe Institute of Health, Bureau of Health and Welfare, Kobe, Japan.

[6] B. Mulyadi, M.D., is Director for Private and Specialty Hospitals, Directorate General of Medical Care and Secretary of Crisis Centre, Ministry of Health, Jakarta, Republic of Indonesia.

[7] M. Meyers is Assistant Director, WHO Centre for Health Development, Kobe, Japan

of necessity, must be involved in the response to any disaster. Professor Erdik indicated that such a structure could be facilitated by first identifying the problem(s) to be dealt with and the areas of mutual interest across the sectors. On the basis of this, multisectoral means of handling these problems could be identified and specified at symposiums similar to this one. Dr Mulyadi stated that small, high-level groups were most appropriate for deciding which sectors and individuals should be involved, what should be done and what kinds of support each sector or group could and would supply. Dr Oviedo mentioned the need to develop common concepts, definitions and language in discussing disasters so that intersectoral communication could more efficiently and productively take place. He noted that doctors and engineers in Mexico City have been engaged in increasing intersectoral communication about how and when to strengthen hospitals, with an emphasis on learning from each other. Finally, Dr Hayashi noted that part of the problem of lack of intersectoral interaction in Japan came from the inflexibility of bureaucrats with differing responsibilities. The audience also noted that various governmental agencies first need to coordinate amongst themselves and then to bring in other groups (e.g. the private sector, nongovernmental organizations, etc.) The key to successful intersectoral interaction is decentralization and coordination.

Dr Verma mentioned that it was very difficult to compensate for losses. The government's role is important here to help provide long-term loans to support housing and recovery. It was mentioned that WHO could develop guidance concerning the methodology for such support.

Question 2: How do vulnerability reduction, preparedness and rehabilitation interface, and what role do they play in the enhancement of health and public health?

All panel members agreed that vulnerability reduction, preparedness and rehabilitation are part of a continuum. This continuum represents different phases of the same process which begins before the event and is active before, during and after the event. In planning, all three must be considered simultaneously; and the parties responsible within the various sectors at the national, provincial and district levels must be identified and a chain of command established. In order to plan properly within each area, we must break the planning process down into extremely small parts to examine needs closely and see how they can best be met. To the greatest extent possible, rehabilitation should be undertaken autonomously by the people affected by the disaster.

Dr Noji (from the audience) agreed that all three phases must be carried out with the overriding goal of decreasing the vulnerability of human beings to death and injury, and rehabilitation must be done in such a way that the community's resilience in dealing with future emergencies is enhanced. Dr Ben Yahmed (from the audience) pointed out that vulnerability reduction and preparedness should be carried out as part of the economic and social development process.

Question 3: Who should be trained, in what, and by whom?

The panel considered training in its broadest sense and concluded that all categories of persons and groups need more and better training These include medical personnel, professionals from other (non-health) sectors who are involved in dealing with disasters, the community and politicians who should be sensitized to the need for funding to facilitate adequate

training. Members of the public need to be made aware of the overall risk to better enable them to understand the need for increased investment in vulnerability reduction, preparedness and rehabilitation planning. They also need to be given training in what they should and could do at the time of a disaster, with particular attention to training in basic first aid. Dr Pretto pointed out that training is expensive and, therefore, not everyone can be trained. Thus, training priorities need to be established, selected and focused, with emphasis being placed on training that can be used every day by professionals in their routine work - not just in the event of a disaster or emergency.

The audience pointed out that obviously those involved in disaster rescue – such as police, fire fighters and doctors – had to be trained. The need for volunteers to be trained in advance of an earthquake or other events was emphasized. Widening the range of training, it was pointed out that people need to be identified and trained to formulate disaster-relevant policy and practice. The emphasis throughout the discussion was on training at the community level.

Question 4: What are the major gaps in knowledge and what areas and types of research should be initiated or increased?

All panel members agreed that existing knowledge about earthquakes is extensive. Much of the information is, however, found within a single sector; and it is often documented in conference proceedings and other poorly disseminated materials. Thus, there is a critical need to better synthesize, disseminate and implement the information. Dr Oviedo suggested the possibility of a website on the Internet. Some specific gaps in knowledge that were noted included: how to identify and have available what would be needed; how to evaluate and assess the methods to provide adequate sanitation systems and means for removing general waste, rubble and biohazards; and cost-effectiveness studies of vulnerability reduction and preparedness in less developed countries.

The public health role in disaster situations is not very well understood and must be strengthened in order to prevent short-term and long-term effects by

- maintaining adequate immunization levels at all times;
- care of diabetes and hypertension;
- good sanitation facilities with reduced vulnerability.

Preparedness should also rely more on public health than on medical emergency, through training, awareness and coordination of supplies.

It was suggested that further study of how to move people after a disaster (e.g. mass transport) when normal roads and railroads are disrupted would be useful. It was also recommended that medical operating teams undergo training and drills with emphasis on how to perform in a hostile environment (e.g. without electricity, water, etc.).

Question 5: Are disasters always a disaster? What, if anything, can we learn from them?

There was a general consensus that a disaster is an emergency that has been handled badly (see also definition by WHO/EHA/95 1). Every disaster provides opportunities for learning how to gather data better and how to utilize them better. If adequate vulnerability reduction and preparedness is carried out before the disaster and a good rehabilitation programme has been planned, a community can actually turn a disaster to its advantage. Post-disaster social and economic development can move along at a faster pace in the affected area than it otherwise would have moved.

Conclusions and recommendations

- Although earthquakes and other disasters are part of life and therefore are to be expected, proper planning of preventive measures ahead of time can reduce deaths and damage significantly. These measures should be agreed upon, broadly publicized, and carried out by all sectors involved. National, international and nongovernmental organizations, if included from the initial planning stages, can make meaningful and timely contributions. **Public health** must also play an important role.

- Well-coordinated planning and decision-making from beginning to end needs to be **decentralized through appropriate delegation** to the local level in order to help earthquake victims quickly and effectively. Local officials must be given sufficient resources beforehand and be empowered to make decisions without further consultation, both during planning and after the disaster strikes.

- The great majority of earthquake victims are saved by other family members or neighbours. The **local community/district/neighbourhood** must, therefore, be fully engaged in preparations to reduce vulnerability in case of disaster and be involved in the preparedness planning. Local volunteers should be organized and integrated into emergency teams, periodic drills conducted, and adequate search-and-rescue and first-aid training given. Ordinary citizens can play a meaningful role by securing household appliances and furniture, storing sufficient supplies of water and joining in rescue drills.

- Hospital **preparedness** should be improved by adopting and observing appropriate design codes, by upgrading the safety of essential rooms and equipment, by stocking adequate supplies of relevant medication and by creating safe and/or redundant lifelines for water, electricity, gas, communication, sanitation and fire protection. Alternative means of transporting victims and routes of access to hospitals must be planned.

- **Psychological stress** will affect not only victims but also health care providers (such as doctors and nurses) and volunteers. In order to combat this, it is therefore necessary to prepare these providers to deal with disasters through education during their studies, postgraduate courses and counselling sessions. These courses should be included in preparedness planning. When dealing with the general population, special attention should be given to particularly vulnerable groups such as children, the elderly, the socially isolated and the mentally and physically handicapped.

- The establishment of comprehensive and **affordable insurance** against the consequences of disaster should be encouraged through the solidarity of adequately large groups at risk, government-sponsored re-insurance, discounts for the application of adequate design codes, etc. Where necessary, such insurance programmes could be supplemented by effective **financial support**, such as "seed money" for accountable private and business recovery plans.

Closing session

Dr A. Wojtczak and Mr R. Schmidt, of the WHO Centre for Health Development, chaired a session in which participants were given the opportunity to make closing remarks. Dr Wojtczak asked a selection of participants from different regions and disciplines to offer concluding comments and suggestions. In addition to emphasizing support for the general recommendations, participants stressed that the symposium had been an opportunity for intersectoral and interdisciplinary interaction with insight into health community issues. The term "vulnerability reduction" had for the first time clearly been applied to public health. Because of this, the symposium was seen to represent a unique forum in bringing together so many disciplines and in defining their roles in the context of reducing human vulnerability (namely deaths and injuries).

It was felt that the complexity of the multisectoral tasks associated with earthquakes and people's health would require a systems approach which, if successfully applied to future research, could lead to an extraordinary opportunity to transform society.

A wide distribution of the results of the symposium to governments and nongovernmental organizations and the active role of the WHO Centre for Health Development as an information centre in disaster management was strongly recommended.

In closing the symposium, Dr Wojtczak thanked all the participants for their valuable contributions and very active participation. He explained the role of the WHO Centre for Health Development in collecting and disseminating information and emphasized the Centre's mission as a catalyst for research. He announced that complete proceedings were planned for publication by mid-1997.

Glossary

Terms

Preparedness: Activities designed to minimize loss of lives and damage, and facilitate timely and effective rescue relief and rehabilitation.

Rehabilitation: The operations and decisions taken after a disaster with a view to restoring a stricken community to its former living conditions, whilst encouraging and facilitating the necessary adjustments to the changes caused by the disaster.

Relief: (In most cases response is considered as a synonym to relief by most organizations): Assistance and/or intervention during or after disaster to meet the life preservation and basic subsistence needs.

Vulnerability: Potential degree of loss resulting from a damaging phenomenon likely to occur in that specific area.

Abbreviations

ATLS Advanced trauma life support

GIS Geographic Information System

I Intensity used in several of the Mercalli type scales

GSHAP Global Seismic Hazard Assessment Program

LSFA Life-supporting first-aid

M Magnitude on the Richter scale

MCS Mercalli - Cancani - Sieberg scale

MMI Modified Mercalli Intensity areas (MMIs) are determined by reports from U.S. Post Office employees who estimate the amount of shaking in the area around a post office and the extent and type of damage sustained by major structures (roads, freeways, houses, apartments, commercial buildings). Damage and intensity are classified using a scale from I - XII, where I represents "Not felt except by a very few under especially favorable circumstances," and XII represents "Total damage".

MSK-64 A special scale, related and close to the MMI scale

NASA National Aeronautics and Space Administration

NASDA National Space Development Agency of Japan

RGELFE Research Group for Estimating Losses from Future Earthquakes

WSSI World Seismic Safety Initiative

Participants

Speakers/Chairpersons/Moderators

Dr Falah Al Tawil, Director General, Treatment Services, Ministry of Health, Amman, Jordan
Dr Vladimir A. Astakhov, Deputy Director, Far-Eastern Regional Urgent Medical Care Centre, Khabarovsk, Russian Federation
Professor Shigeaki Baba, Professor Emeritus, Kobe University, Chairman, International Institute for Diabetes Education and Study and Honorary President, International Diabetes Federation, Kobe, Japan
Professor Linda B. Bourque, Department of Community Health Sciences, School of Public Health, University of California, Los Angeles, United States of America
Professor Mustafa Erdik, Chairman, Department of Earthquake Engineering, Bogazici University, Kandilli Observatory and Earthquake Research Institute, Istanbul, Turkey
Professor Mamdouh Gabr, Professor of Pediatrics, Cairo University and Secretary General, Egyptian Red Crescent, Cairo, Egypt
Professor Sergey Goncharov, Director, All-Russian Centre for Disaster Medicine "Zaschita", Ministry of Public Health and Medical Industry, Moscow, Russian Federation
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Dr Arthur K. Melkonian, Republican Information and Computer Centre, Ministry of Health, Yerevan, Armenia
Professor Ara M. Minasyan, Chairman, Emergency Medical Scientific Centre, Ministry of Health, Yerevan, Armenia
Mr Masao Miyakawa, Chairman, Earthquake Insurance Committee, The Marine and Fire Insurance Association of Japan, Inc. and Managing Director, Yasuda Fire and Marine Insurance Company Ltd., Tokyo, Japan
Dr Bagus Mulyadi, Director, Private and Specialty Hospitals, Directorate General of Medical Care and Secretary of Crisis Centre, Ministry of Health, Jakarta, Indonesia
Professor Yasushi Nagasawa, Department of Architecture, Graduate School of Engineering, The University of Tokyo, Tokyo, Japan
Dr Eric K. Noji, Chief, International Emergency and Refugee Health Programs, Centers for Disease Control and Prevention, Atlanta, United States of America
Dr Jorge Oviedo Arce, Director, Injury Prevention and Control and Health Care in Disaster Programmes, Ministry of Health, Mexico DF, Mexico
Dr Jean Luc Poncelet, Head, DisasterManagement Program for South America, WHO/Pan American Health Organization, Quito, Ecuador
Dr Ernesto Pretto, Associate Director, Safar Center for Resuscitation Research, University of Pittsburgh, Pittsburgh, United States of America
Professor Shigeaki Sato, Chairman, Department of Hygiene, Kobe University School of Medicine, Kobe, Japan

Dr G.N. Solar Oyanedel, Medico Coordinador, Comité de Emergencias, Servicio de Salud Metropolitano Occidente, Santiago, Chile
Dr Kiyoshi Tatemichi, Director, Emergency Department, Kobe City General Hospital, Kobe, Japan
Dr Ciro Ugarte Casafranca, Director, Disaster Preparedness and Response Division, Ministry of Health, Lima, Peru
Professor H. P. Wölfel, Professor of Mechanical Engineering, Technical University of Darmstadt, Germany and member of European Committee for Standardization (CEN)
Mr Yasuyuki Yasuda, General Manager, Kansai Project Development Division, The Sakura Bank Limited, Kobe, Japan

Panelists

Mr Shigeaki Araki, Director, General Manager, International Division, The Kobe Chamber of Commerce and Industry, Kobe, Japan
Dr Hiroko Minami, President, College of Nursing Art and Science, Hyogo, Japan
Ms Sheila M. Platt, MSW, Director, External Relations, Community and Family Services International, Makati City, Metro Manila, Philippines and New York, United States of America
Dr Daniel E. Rodriguez, Chief, Department of Medicine, Calderon Guardia Hospital, San Jose, Costa Rica
Dr Setsu Seo, President, Hyogo Medical Association, Kobe, Japan
Ms Kimberley I. Shoaf, Project Manager, Department of Community Health Sciences, School of Public Health, University of California, Los Angeles, United States of America
Dr Shigeru Suganami, President, Association of Medical Doctors of Asia, Okayama, Japan

Guests

Mr Toshitami Kaihara, Governor of Hyogo Prefecture, Japan
Mr Kazutoshi Sasayama, Mayor of Kobe City, Japan
Mr Fuyuhiko Maki, Chairman, Kobe Chamber of Commerce and Industry, Japan
Mr Koshi Mizukoshi, Executive Vice President, Kobe Steel, Ltd., Japan
Mr Hirokatsu Yokoyama, Managing Director and Head of Land Development Group, Kobe Steel, Ltd., Japan

Others

Mr Hajime Sasaki, Senior Liaison Officer, United Nations Environment Programme, International Environmental Technology Centre, Osaka, Japan

WHO

Dr Hiroshi Nakajima, Director-General, WHO, Geneva, Switzerland
Dr Sang Tae Han, Regional Director, WHO Regional Office for the Western Pacific, Manila, Philippines
Dr M. I. Al-Khawashky, WHO Representative, Egypt
Dr S. Ben Yahmed, Chief, Emergency Preparedness, Division of Emergency and Humanitarian Action, WHO, Geneva, Switzerland

Mr Youcef Ait Chellouche, WHO Liaison Officer, Algeria
Mr Igor Rozov, Information Officer, Health Communications and Public Relations, WHO, Geneva, Switzerland
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Dr Andrzej Wojtczak, Director
Ms Marilyn Meyers, Assistant Director
Ms Polly Chua, Administrative Assistant
Ms Janet Lowe, Economist
Mr Reiner Schmidt, Environmental Scientist
Dr Saiedeh Zakaria-von Keitz, Information Network Scientist

Annex 1: Outline of the symposium

For the preparation of the symposium, early contacts with experts on the subject via all available channels (including the Internet), ensured the participation of representatives of most countries that had recent experience of major earthquakes as well as a balanced representation of the relevant sectors. Clearly stated objectives provided orientation and guidance as follows:

- to share experience of severe earthquakes in urban areas and demonstrate the need for a multisectoral and interdisciplinary approach in analysing it,
- to draw the most useful lessons from analysis and synthesis of the findings;
- to identify areas where further research may be required.

The programme of plenary sessions was designed to cover issues related to the theme of the symposium through a mosaic of topical presentations involving renowned experts with personal earthquake experience and responsibility in one of the subject areas. A subject thesaurus of some 35 individual issues was developed to guide the authors to ensure that no major items were omitted. The issues in the thesaurus ranged from topics such as "first-aid and public health measures" to considerations like "avoiding long-term dependence of victims on newly-created welfare systems". The resulting overall programme of the symposium is summarized in Fig. A1.

The symposium was attended by 191 participants from 21 countries and five international organizations. The participants represented different specialities and professions such as engineers (13%), medical doctors (30%), public health specialists (26%), economists, bankers and lawyers (5%). The exchange of information and opinions was lively and underlined the fruitfulness of local and international cooperation (see Figs. A2, A3, A4).

Figure A1. Programme of the symposium

Monday, 27 Jan. 1997	Tuesday, 28 Jan. 1997	Wednesday, 29 Jan. 1997	Thursday, 30 Jan. 1997
Opening Session: - Director, WCK - Director-General, WHO - Regional Director, WHO/WPRO - Director, IA, MOHW, Japan - Governor of Hyogo Prefecture - Mayor of Kobe City	Field visit: to sites of the Great Hanshin-Awaji Earthquake	**Plenary Session 4: Long-term effects of earthquakes** Egypt, Indonesia, Japan	Plenary Session 5: Group reports and discussion
Plenary Session 1: Key-note presentations IDNDR, Japan, USA		**Panel 3: Mitigating long-term effects: health services after earthquakes** Colombia, India, Japan, USA	Concluding Panel 4: **How to integrate vulnerability reduction, preparedness and rehabilitation into a holistic and intersectoral approach** **Closing session:** Recommendations / Closing ceremony
Plenary Session 2: Short-term consequences of earthquakes China, Colombia, Japan, Russia, Turkey	Plenary Session 3: Prevention and rehabilitation Germany, Japan, the former Yugoslav Rep. of Macedonia, Mexico, Morocco	**Working Groups (3)** ♦ Vulnerability reduction ♦ Preparedness ♦ Rehabilitation	
Panel 1: Holistic view of major short-term consequences China, Costa Rica, Egypt, Japan, Turkey	**Panel 2: Lessons learned from the Great Hanshin-Awaji Earthquake** Japan, USA		

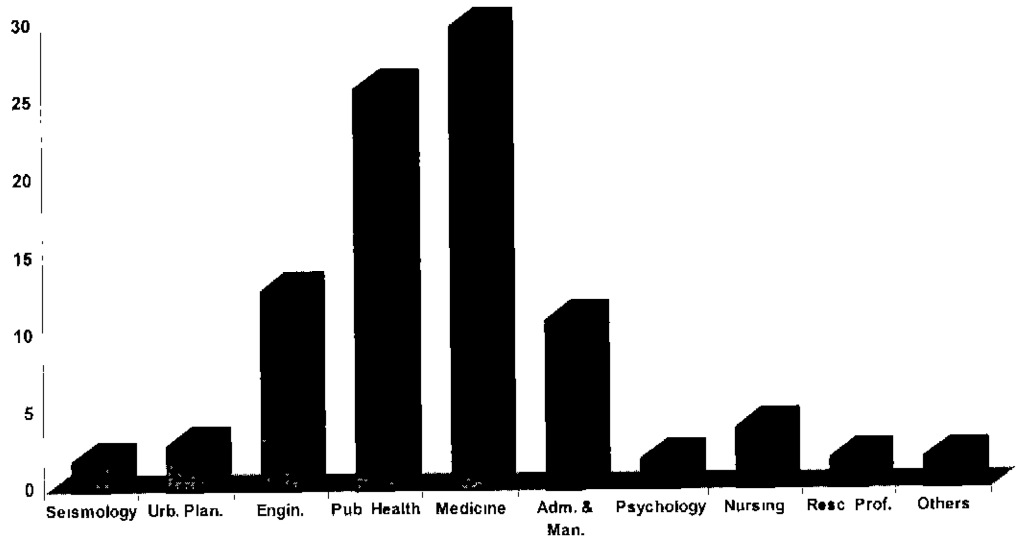

Figure A2. Symposium participants representing different sectors/disciplines (as a percentage)

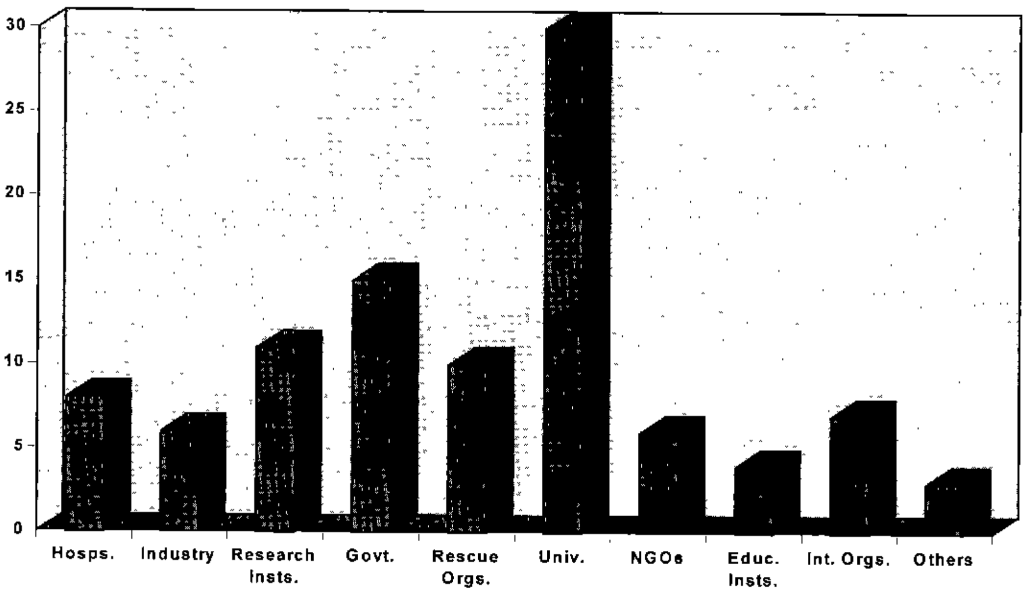

Figure A3. Types of organizations represented at the symposium (as a percentage)

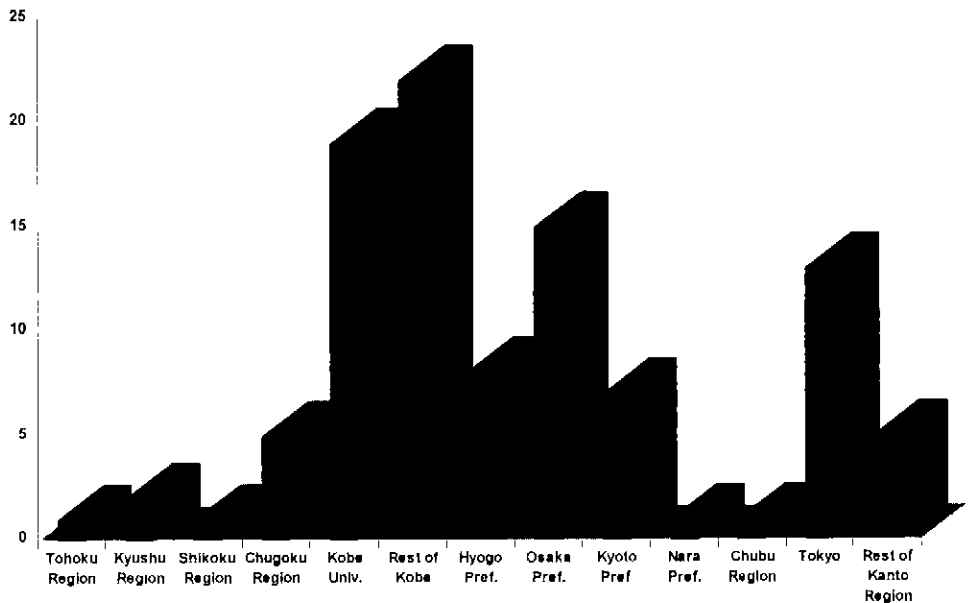

Figure A4. Geographical distribution of Japanese participants at the symposium (as a percentage)

Annex 2: Emergency inspection procedure in California

L.B. Bourque

Under the guidance of the Office of Emergency Services (OES), California has developed a procedure for conducting emergency inspections following an earthquake. This is based on a framework contained in *ATC 20-Procedures for Postearthquake Safety Evaluation of Buildings* (ATC. 1989). The emergency inspection is meant to be a rapid screening tool and not a comprehensive analysis of a building's integrity. After inspection, inspectors post a coloured "tag", placard or piece of paper at the entrance of a structure using the following guidelines:

- *Green tag (inspected)*· No apparent hazard found, although repairs may be required. Original lateral-load-resisting capacity not significantly reduced. No restriction of use or occupancy.

- *Yellow tag (limited entry):* Dangerous condition believed to be present. Entry by owner permitted only for emergency purposes and only at own risk. No usage on continuous basis. Entry by public not permitted. Possible major aftershock hazard.

- *Red tag (unsafe).* Extreme hazard, may collapse. Imminent danger of collapse from an aftershock. Unsafe for occupancy or entry, except by authorities.

For futher details, see Holmes and Somers, January 1996; EQE International, Inc. and The Geographic Information Systems Group of the Governor's Office of Emergency Services, May 1995; and Ranous, 1995.

Annex 3: Advance planning to reduce emergency workers' vulnerability to stress

S. Platt

Awareness of the need to minimize, manage and alleviate the effects of disaster stress on the responding workforce suggests that preparation for worker stress management be considered an integral element of disaster preparedness and response plans.

Preparation

In countries where mental health services are well developed, disaster mental health training involving crisis intervention, post-traumatic stress and grief reactions, and disaster psychology is provided to mental health workers who participate in disaster response. Opportunities to join practice drills and exercises with colleagues from emergency organizations are arranged, and mental health workers plan to take major responsibility for the support of the disaster workforce They must adopt a low-key, practical, educational approach, avoiding the use of mental health terminology, if their services are to be accepted by rescue workers.

In addition, emergency organizations teach their workers to expect disaster stress as an occupational hazard, to identify its sources in specific disaster scenarios, and to recognize both their own stress responses and those of colleagues. Emergency workers and their supervisors learn and practise coping and stress management techniques that can be used for mutual support during rescue work assignments.

All members of the emergency organization are familiar with the elements of stress management support that are routinely offered during and after rescue operations. These may include:

- end-of-shift meetings that provide information on the rescue effort along with a snack, drink and brief reminders about stress responses and their management;

- informal defusing sessions, presenting periodic opportunities to discuss how the work is going, share reactions and receive support;

- formal stress debriefings conducted by a mental health professional for members of a work unit in order to provide a structured opportunity to process personal experience in the rescue effort and to receive support for managing the stress that is associated with it;

- mental health consultation as needed when intense stress responses are causing distress or interfering with functioning.

In environments where mental health professionals and services are limited, plans can be made for medical and health workers to receive basic training about physical and

psychological responses to disaster. They can then share this knowledge with disaster response planners so that support for the rescue workforce with regard to stress can be integrated into disaster health planning.

Organizational stress management planning

Organizations committed to instituting an occupational stress management programme engage in a process which may have three phases.

Prevention

This involves commitment by the leadership and line management to an approach to occupational safety and security which includes stress management as an integral part of occupational health. Training in elements of disaster dynamics and stress response appropriate to different levels of responsibility is a first step towards minimizing workforce vulnerability to the adverse effects of disaster stress.

Preparation

Comprehensive stress management programmes may include elements such as the following:

- recruitment and selection procedures which consider hardiness and resilience;
- orientation and briefing which integrate concepts of stress management and safety;
- provision of accurate job descriptions, including preparation for the ambiguity, lack of structure, isolation and personal demands of disaster work (Paton, D. 1994);
- supervisor training in elements of coaching, team-building, stress education and stress management practices;
- development of stress management plans, including support for both normal "wear and tear" and traumatic critical events.

Annex 4: Vulnerability analysis

M. Erdik

A vulnerability analysis involves the elements at risk (physical, social and economic) and the type of risk (such as damage to structures and systems and human casualties). Vulnerability assessments are usually based on past earthquake damage (observed vulnerability) and, to a lesser degree, on analytical investigations (predicted vulnerability). Primary physical vulnerabilities are associated with buildings, infrastructure and lifelines. These vulnerabilities are agent- and site-specific. Furthermore, they depend on design, construction and maintenance particularities. Secondary physical vulnerabilities are associated with consequential damage and losses. Only limited vulnerability models exist for damage resulting from secondary hazards, such as post-earthquake fire, release of hazardous materials, explosions and water inundation. Socioeconomic vulnerabilities refer to risks to socioeconomic assets and systems, such as damage to social infrastructure, impact on production and employment, change of wealth distribution, and inflation. Socioeconomic vulnerabilities also include casualties and traumas.

In addition to the direct physical damage and casualties from ground-shaking and collateral hazards, indirect economic losses constitute a major portion of the total earthquake loss. Indirect economic losses arise as a result of the discontinued service of damaged facilities. These losses include:

- production and/or sales lost by firms in damaged buildings;
- production and/or sales lost by firms unable to receive supplies from other damaged facilities;
- production and/or sales lost by firms due to damaged lifelines;
- losses arising from tax revenues and increased unemployment compensations.

Socioeconomic vulnerabilities

In addition to physical vulnerability, the socioeconomic vulnerability of the urban system also needs to be assessed in terms of casualties, social disruption and economic loss for a comprehensive earthquake damage and loss scenario. Casualties in earthquakes arise mostly from structural collapses and from collateral hazards. Lethality per collapsed building for a given class of buildings can be estimated by the combination of factors representing the population per building, occupancy at the time of the earthquake, occupants trapped by collapse, mortality at collapse and post-collapse mortality Future research and data acquisition will be needed to decrease the large uncertainties regarding casualty estimates. Social disruption needs to be measured in both quantitative (e.g. number of displaced families) and qualitative terms. The ethnocultural context of social disruption should also be considered. Past earthquake disaster experiences indicate that single-parent families, women, handicapped people, children and the elderly constitute the most vulnerable social groups.

RGELFE provides the urban earthquake lethality rates of 0.0014%, 0.031%, 0.48% and 6.8% respectively for intensities VI, VII, VIII and IX. The lethality rate for intensity VIII coincides with data for the 1992 Erzincan (Turkey) earthquake. The serious injury rate

(requiring hospitalization) is given as four times the death rate, and the minor injury rate is 30 times the death rate. Ambraseys & Jackson , using data from Turkey and Greece, provide the following statistics regarding the number of people killed per 100 houses destroyed by earthquakes of magnitude 5 on the Richter scale: rubble masonry houses = 17; adobe houses = 11; masonry and reinforced adobe houses = 2; timber and brick houses = 1; reinforced concrete frame houses = 1. Data from the 1992 Erzincan earthquake indicate that, on the average, there was one death and three hospitalized injuries for each heavily-damaged or collapsed reinforced concrete building.

Annex 5: Sharing losses among citizens: The example of post-war Germany

The German example was introduced in connection with a visit of the Consul General[1] to Okinawa at a time of heated discussions on the subject of indemnity to landowners whose land had been leased to the US military under Japanese-US Security arrangements and who, therefore, had no chance to pursue more lucrative opportunities. This has been an issue of widespread Japanese public interest. According to the Consul-General's presentation, a somewhat analogous situation, but concerning larger-scale damages, arose in post-World War II Germany. At the Teheran and Yalta conferences, the Allied powers decided to change many boundaries which set in motion millions of people, among them Germans, who lived east of the Oder-Neisse line. The first wave of refugees from these areas arrived in West Germany in June 1945 and such immigration continued to the end of 1947. Some 13.6 million Germans lost their land and assets in this way.

The enactment in 1952 of the "Burden Adjustment Bill" was, therefore, one of the most important legislative acts for the new Federal Republic (of the West German states). The objective of this bill was to help the victims of destruction, expulsion and even of currency reform, to find new land, homes and jobs. As financial resources were scarce in the war-torn country, and poverty and misery were widespread, a drastic (large-scale) solution was sought and needed. It was decided that the financial equivalent of 50% of the entire capital assets of the country would be re-distributed. At the time, 50% of total assets left after the war amounted to 35 billion DM. Adjusted to today's value, 50% would be about 500 billion DM or 300 billion US dollars, an immense programme.

In accordance with the new law, both corporations and individuals who were lucky enough to still have possessions and had their domicile in the federal states or West Berlin had to share 50% of their assets via a special tax. The payment schedule, however, could be spread out so that the total of 50% could be paid in 10 yearly installments of 5% each. Such measures were employed so as to avoid the threat to the economic viability of taxpaying citizens and organizations. Tax payments were collected into a Burden Adjustment Fund, from which, upon application and careful examination, compensatory payments were made to the victims of the war, for homes, land, businesses, household goods, lost savings and disabilities. The Burden Adjustment Agency was established under the Minister of Finance. The substantial sums which were paid out to many applicants not only provided them with financial and psychological relief from their plight, but also greatly facilitated the resettlement of people and generally furthered the solidarity among citizens. Often the compensation received was used as substantial seed money to establish new businesses and resulted in an enterpreneurial boom in post-war Germany.

This unique experience of post-war Germany could contribute to the solution of other burden-sharing situations which could arise when man-made or natural disasters strike innocent people.

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[1] Information adapted from a speech in Okinawa in 1995, courtesy of Dr Nils Grueber, German Consul General, Osaka. Full text of the bill appeared in the German Federal Register, Bundesgesetzblatt of 18 August 1952, No 34, Part I.