who can be grouped into two categories. Some low-frequency oscillations of structures give rise to panic among inhabitants who rush to the staircases of multistoried buildings. The combination of a panic and gathering in the staircases that are the weakest structural element in building leads to casualties in non-damaged buildings. Some high-frequency oscillations produce heart attacks in persons who seem to be healthy.

The above aspects of medical casualties and corresponding LETs are discussed in this paper.

Keywords: causes of injury; damage; earthquakes; loss estimation techniques; panic; structural strength

G-65:
Simulation for Estimating Timing for Influenza Vaccination for Disaster Refugees

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Introduction: Prevention of infectious diseases by vaccination has been one of the major merits of medicine. In particular, influenza vaccination is recommended with expected benefits for high-risk groups such as the elderly, children, and adults who have serious health problems. Deaths and serious complications are largely preventable by timely vaccination under specific conditions such as the aftermath of a disaster. However, there, are few scientific studies that suggest the most appropriate timing for vaccination, which corresponds to actual surveillance data. This is true especially for the critical decisions, e.g., whether or when refugees following a disaster should have the vaccines has not been investigated using quantitative methods.

Methods: We conducted a decision analysis based on the decision-tree model as to whether the influenza vaccination should be performed or not in terms of maximizing life expectancy given the risk caused by the vaccination.

Results: We theoretically formulated the decision level at which the benefit of the vaccination overcomes the risk. Furthermore, we applied the results of this decision analysis to investigate the appropriate timing for vaccination in term of cost-effectiveness. The mathematical obtained formula will be helpful for decision-makers who wonder when the influenza vaccination should be conducted under the disaster circumstances in which the surveillance data suggest the influenza epidemic is highly likely to become a serious problem.

Conclusions: The computer simulations based on the records from the Great Hanshin-Awaji Earthquake, in Kobe, Japan in 1995, validated the formula to determine the optimal onset time for population-based vaccination activities.

Keywords: disasters; Great Hanshin-Awaji Earthquake; influenza; public health; refugees; surveillance; vaccination, timing of

G-66
Snow-Slide Accident with 41 Cases of Sudden Death

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This article deals with a snow-slide that occurred on the Ton Gu La Mountains at an altitude of 5,400 meters above the sea

Cause: The snow-capped tops of the mountains above the snowline are frozen all year. But, the temperature below the snowline is only 10–15° C. Therefore, the internal part of snow gradually dissolves and the snow loses its support. Eventually, snow slides occur.

Case Report: 41 persons were killed in a snow slide. They all were young men <25 years old and were submerged by a thick layer of snow. They died suddenly from traumatic asphyxia. The clinical signs of the dead showed that all of the dead persons were submerged under a few meters of snow and died of crush syndrome. The vocal cords closed immediately, and the air in the lungs and trachea could not be expired, and the intrathoracic pressure became elevated. The organs in the mediastinum were displaced. Most of the venous blood was forced toward veins of head, neck, and the upper part of chest that do not contain valves. Clinically, there were subcutanous ecchymoses, conjunctival hemorrhage, and fractures.

Prophylaxis: Any one wishing to pass through this area is advised to avoid passing through the mountains prone to develop snow slides. If it is necessary for persons to go this area, they should pass on the northern slope of the mountains. Some guides and natives of Xi Zang usually mark the safety line before mass corps can pass through the area.

Keywords: asphyxia; valanches; mountains; safety; snow-slides; traumatic asphyxia

General Session XV
Cardiopulmonary Resuscitation
Tuesday, 11 May, 8:30–9:45 hours
Chair: ***Judith M. Fisher, Kenji Oguri***

G-71
Out-of-Hospital Cardiac Arrests in the Northern Part of Osaka Prefecture: Utstein Style Reporting in Japan

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Objective: To describe the epidemiological features of

out-of-hospital cardiac arrests in the northern part of the Osaka prefecture, using the Utstein style.
Design: Prospective population-based cohort study.
Setting: An urban area surrounding Osaka City (population 1,680,000, area 339 km^2).
Patients: A series of out-of-hospital cardiac arrests between 01 November 1996 and 30 April 1998.
Results: A total of 1,211 patients were found to have neither palpable pulse nor independent respiration. The overall incidence of out-of-hospital cardiac arrest was 48.6/100,000 inhabitants/year. A total of 972 (80%) were attempted resuscitations. The cause of the cardiac arrest was cardiac in 49% and non-cardiac in 51%. The number of bystanders that witnessed the cardiac arrests of cardiac origin was 178 (18%). Ventricular fibrillation was the initial rhythm in 20% of the bystander-witnessed cardiac arrests of cardiac origin. 26% of patients received bystander-initiated cardiopulmonary resuscitation. The mean time intervals from the receipt of the call to the arrival of a first response, advanced-life-support unit and arrival at a hospital were 5.8 minutes and 27.0 minutes, respectively. When the cardiac arrest was witnessed by bystanders and was of cardiac origin (178 cases), 50 (28%) were hospitalized, and three (2%) were discharged alive. When cardiac arrest was witnessed by bystanders and was of non-cardiac origin (171 cases), 71 (42%) were hospitalized and two (1%) were discharged alive. When cardiac arrest was witnessed by Emergency Medical Services (EMS) personnel and was of cardiac origin (41 cases), 19 (46%) were hospitalized and five (12%) were discharged alive.
Conclusions: This discussion will compare these results with those published reports from other EMS systems.
Keywords: cardiac arrests; incidence; out-of-hospital; prehospital; Osaka; Utstein style

G-72
Retrospective Analysis of Cardiac Arrest for the Last 15 Years in the King Khalid University Hospital (KKUH), Riyadh, Saudi Arabia

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Background: Cardiopulmonary Resuscitation (CPR) was introduced to Saudi Arabia in 1984 after the first CPR course organized by the American Heart Association (AHA) was conducted. In 1987, the Saudi Heart Association and CPR Committee were established and became the sole responsible agency for CPR activities in the Kingdom of Saudi Arabia.
Objective: to review and analyze the outcome of CPR activities and the factors affecting that outcome, and to identify its progress over the last 15 years at the King Khalid University Hospital (KKUH)
Methods: The policy and procedure for CPR was revised in 1988 and in 1991. Accordingly, the period of review was divided into four stages for review: Stage I: before 1983; Stage II: 1983–1987; Stage III: 1988–1991; and Stage IV: 1992–1997. The records of 3,613 patients who underwent CPR during this 15 year period were reviewed retrospectively, and the following data were abstracted: 1) type of dysrhythmia at the time of the arrest; 2) drugs used; 3) DC countershocks applied; 4) condition of the patient at time of the arrest (monitors used, intubation, mechanical ventilation at the time of the arrest); 6) response time of the CPR team to the patient; and 7) outcome.
Results: There was a progressive, general improvement in outcome over the four stages. Most of the cardiac arrest occurred in the general wards and critical care units. They mainly were due to cardiac and/or respiratory causes. The overall attendance of the members of the CPR team improved across the stages with excellent responses in Stage IV (9.7% to 98.8%). The most common dysrhythmias were asystole and bradycardia (74%). Most of the patients, who arrested in Stage IV, had an intravenous line inserted during the time of the arrest (69.2%). Adrenaline and atropine were the drugs most frequently used in each of four Stages. The use of bicarbonate and calcium solutions decreased across the successive stages. The use of DC countershocks blindly and without the prior use of drugs increase over the Stages and paralleled an increased in the effectiveness of the DC shocks.
Conclusion: Based on these data, recommendations for further improvements in the outcome of CPR in KKUH include: 1) inclusion of a senior medical member in the CPR team; 2) emphasizing the blind use of DC countershocks; 3) avoiding the use of bicarbonate and calcium solution; and 4) frequent revisions of the policy and procedure for CPR at KKUH.
Keywords: arrest; cardiac; cardiopulmonary pulmonary resuscitation (CPR); countershocks; dysrhythmias; outcome; pharmacological interventions; process; review

G-73
Factors Influencing Survival after Out-of-Hospital Ventricular Fibrillation (OHVF) Cardiac Arrest in Japan

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Introduction: In 1991, a new Emergency Medical Services (EMS) system was introduced in which ambulance crews with special training were certified to provide defibrillation using a semiautomatic defibrillator for treatment of patients with ventricular fibrillation in the out-of hospital setting (OHVF). According to the national report of the Japanese Ministry of Home Affairs, 1,918 cases of OHVF were treated with defibrillation by ambulance crews in 1996, and the number has been increasing by approximately 20% every year.