

## Poster Sessions

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### 049. Training for Disaster: From Disaster Site to the Ward

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There has been no war within Japan since the end of World War II. Disaster medicine's history has been based upon a military-medicine model. Therefore, no disaster medicine program has been established. But Japan is prone to disaster and there is a need for disaster-relief training.

**Simulated Scenario:** More than 70 victims were identified following a major traffic accident, and the victims must be provided with adequate assessment and treatment. Fifth-year medical students served as victims and studied the signs and symptoms of the injuries assigned. Moreover, they have to make-up (moulaged) and play the a role appropriate to the severity of the trauma. (These fifth-year medical students were assigned either the roles of victim or emergency personnel. In assuming these roles, they were to exhibit the correct symptoms if acting as the patient, or diagnosis the nature of the injury.

A prehospital-care system transported the injured patients. A hospital-care team responded to the situation under the direction of the medical disaster supervisor. A post-exercise conference was conducted with representatives from each of the groups, both the prehospital and in-hospital care teams participated.

**Results and Discussion:** There was some delay in relaying information from the disaster site. Hospital personnel considered the speed of the response more important than the coordination between each section of the hospital care. Medical students could identify with the victims' feelings. All the participants agreed that the need of further periodic drills was important to the practice of disaster medicine.

### 069. Use of Infrared Thermometry to Measure Lavage and Intravenous Fluid Temperature

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**Background:** At present, there is no sterile means for measuring the delivery temperature of warmed lavage and intravenous fluids.

**Objective:** To determine the accuracy of tympanic thermometers for measuring the temperature of warmed fluids in fluid bags and in tubing at the delivery site (e.g., adjacent to the intravenous [IV] catheter).

**Research Design:** In-vitro laboratory study.

**Methods:** One liter 0.9% NaCl bags were warmed in a microwave oven. A thermocouple electronic temperature probe (BAT-12, Physitemp Inc. Clifton, NJ) then was used to measure the reference temperature. The probe was inserted into each bag and bathed in the fluid. Temperature changes were recorded simultaneously over 20 minutes using the probe and a First Temp Tympanic Thermometer. A total of 225 simultaneous measurements were made over the range of 34° to 48° C. The warmed fluid then was allowed to run through microdrip IV tubing. Temperature of the effluent was measured in the tubing using the tympanic thermometer externally and the probe internally at the same point. Again, 225 simultaneous measurements were made over the range of 31° to 45° C. The two measures were compared using linear regression and Student's *t*-tests.

**Results:** The correlation between the two probes was  $r = 0.99$  for both the fluid bags and the IV tubing. The mean difference between the probe and tympanic thermometer was small: 0.7° C and 1.2° C for the bags and tubing respectively, but were statistically different ( $p < 0.05$ ).

**Conclusion:** Infrared thermometry is an accurate method for measuring the initial and delivery temperature of warmed fluids. Although tympanic thermometer measurements were statistically different from reference readings, this difference was small and not clinically significant. Tympanic thermometers can measure the temperature of both warmed fluid bags and lavage, and IV effluent adjacent to the catheter site, ensuring that hypothermic patients receive fluid at therapeutic temperatures.

### 070. Optimal Temperatures for Intravenous and Lavage Fluid in Hypothermia

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**Background:** Present recommendations do not consider conductive heat loss from warmed fluid.

**Objective:** To determine ideal warming temperatures for lavage/IV fluid in hypothermic patients.

**Research Design:** In-vitro laboratory study.

**Methods:** One liter bags 0.9% NaCl were warmed to 60° C, and fluid run for one hour at 1,000, 800, 600, 400 ml/hour through microdrip tubing (Baxter, Deerfield, IL) into which temperature probes (BAT-12, Physitemp Inc. Clifton, NJ) were placed at 100, 180, 230, and 280 cm, approximating commercial tubing lengths. Fluid bags were also warmed to 39.3° and 75° C and run at 1,000 and 200 ml/hour respectively and temperatures recorded at the same distances for one hour. Sixty

ml of fluid at 39.7° C then was bolused through 50 cm tubing at 300 ml/hour.

**Results:** Initial and mean fluid temperature (C) versus distance during one-hour infusions.

rate (ml/hr)	Initial Bag	Mean Bag	100 cm	180 cm	230 cm	280 cm
1000	60.3	53.8	42.3	38.8	37.5	36.1
800	60.7	52.0	41.3	36.4	35.8	34.5
600	59.8	51.8	39.2	34.8	33.4	31.8
400	59.8	51.6	35.6	30.4	29.1	27.9
200	75.0	65.2	34.9	27.2	26.5	25.1
1000	39.3	36.1	31.7	30.0	29.6	28.9

Sixty ml of saline at 39.7° C run through 50 cm of tubing (300 ml/hr) was 37.6° C at delivery.

**Conclusions:** Warmed fluids cannot be delivered at therapeutic temperatures under current recommendations (37°–42° C). Emergency departments should store fluid at 60° C and physicians should consider both tubing length and flow rates when ordering warmed lavage and intravenous fluids, even when using fluid warmers. For hypothermia, intermittent boluses could deliver the same fluid volumes at higher temperatures than continuous drips and should be used when permitted.

## 071.

### International Relief as a Model for Disaster Response Training

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The Emergency Medicine Residency Training Curriculum encourages resident education in Disaster Response. The paucity of large-scale disasters in the United States makes such practical experience difficult to obtain. An elective created at an Emergency Medicine Residency Program offered a four-week experience at a field hospital in an African war zone. Between August and December 1994, AmeriCares, a non-government relief agency, operated a medical facility in a remote area of Rwanda along the refugee route linking Goma, Zaire, and Kigali. Review of the facility's epidemiologic log revealed that physicians evaluated and treated between 1,859 and 5,054 patients a week. Medical cases included tropical diseases such as malaria and filariasis, as well as entities commonly seen in the United States. Surgical cases ranged from burns and abscesses to traumatic injuries sustained in the war. Residents participated in triage, clinical evaluation and treatment, packaging and transport of patients and public-health planning decisions for the facility, including sanitation, water, and food distribution.

This elective constituted an excellent model of disaster-response training in austere conditions with limited medical resources. We submit that resident physician participation in international medical relief provides a unique opportunity for service and education.

## 072.

### Comparison of Two-Person CPR with Bag-Valve-Mask Device (BVM) to One-Person CPR Using the Kendall Cardiovent® (KCV®) Device in an Intubated CPR Mannequin

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**Objectives:** CPR in the prehospital setting requires at least two rescuers necessitating dispatch of additional rescue units. The KCV®, which permits simultaneous compression and ventilation by one rescuer was compared with two-person CPR with BVM.

**Methods:** A single-blinded, double cross-over study with six CPR instructors each performing one-person CPR with KCV and two person CPR with BVM on an intubated, recording, CPR mannequin (Resusci-Annie®). Tidal volume obtained by spirometry, and compression depth were recorded continuously during each 12-minute CPR session. Mean tidal volume (MTV), minute volume (MV), compression rate (CR), ventilation rate (VR), and errors in compression depth (ECD) were compared for CPR sessions performed by one person with KCV and two people with BVM. Student's *t*-test and regression analysis were used in statistical calculations (Statview II® software).

**Results:** A total of 1,894 ventilations and 10,532 compressions were performed in three separate 12-minute sessions. MTV and CR for KCV were significantly different than for BVM: 1,242.3 ml vs. 1,065.0 ml ( $p = 0.0018$ ) and 63.2/min vs. 81.3/min ( $p = 0.0076$ ) respectively. However, both KCV MV and VR were not statistically different than BVM: 14,760 ml vs. 16,058.7 ml ( $p = 0.5649$ ) and 11.9/min vs. 14.9/min. ( $p = 0.1226$ ) respectively. ECD rate of 9.78% was observed with KCV compared to 8.49% with two-person CPR ( $p = 0.1815$ ). ECD, rate increased as a function of time equally for both KCV (1.8%/min) and two-person CPR (1.4%/min) ( $r = 0.952$ ;  $p = 0.0001$ ).

**Conclusions:** One-person CPR with KCV was equivalent or better than two-person CPR with BVM in all measured parameters except CR. Use of KCV will effect better staff allocation upon the prehospital patient requiring CPR. Further work is needed to determine whether the lower CR associated with KCV is clinically significant or correctable with practice effect.

## 073.

### Physicians' (MDs) and Nurses' (RNs) Knowledge of and Attitude Toward Advanced Directives: Experience and Preference

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**Objectives:** Patients' preferences for intensity and duration of medical treatment often are delineated in legal documents