

establishment of contact with the local medical authorities and professionals; 4) role of MOH in provision of medical care to citizens in a foreign country; 5) organisation for evacuation of critically injured casualties; 6) incident management and interagency coordination; and 7) role of mental health professionals.

**Keywords:** aircraft; burns; coordination, interagency; crash; evacuation incident command; international; survivors; teams

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### **Hyperventilation Management: The Effectiveness of Rebreathing Bag and Breathing Retraining Techniques**

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**Objective:** Most common current practice in managing hyperventilation symptoms in the Accident and Emergency Department is by rebreathing bag. However, reviews of the literature have suggested that breathing retraining technique could effectively control the symptoms. This study compares the effectiveness of managing hyperventilation symptoms with either of these techniques. **Methods:** A prospective, randomized study was conducted over a period of three months in the Accident and Emergency Department of Changi General Hospital. Inclusion criteria included all patients >12 years old, SaO<sub>2</sub> >95%, respiratory rate >22b/minute. Exclusion criteria included asthma, pregnancy, and history of heart or lung problems. The odd numbered patients received a rebreathing bag, and the even numbered patients received breathing retraining technique. Effectiveness of the management was measured in terms of response to the treatment rendered and the time taken for the symptom to subside with patient's verbalization of relief.

**Results:** A total of 31 patients were enrolled in this study. Sixteen received rebreathing bags and 15 received the breathing retraining technique. Three patients did not respond to either treatment. Twenty-eight samples were analyzed. The majority of patients who hyperventilate are within the age of 12 to 30 years (n = 20 [71%]). Female patients are more likely to hyperventilate (n = 24 [86%]) as compared to men (n = 4 [14%]). Triggering factors included emotional stress (n = 10 [36%]) followed by high fever (n = 7 [25%]). The average time taken for relief of hyperventilation symptoms for patients given the rebreathing bag was 26.6 mins; the breathing retraining technique took 45.7mins ( $p = 0.017$  [ $>0.005$ ]).

**Conclusion:** Although current practice advocates the rebreathing bag in the management of hyperventilation, the result of our study indicates that breathing retraining technique also elicits an effect as generally both groups responded to treatment. Nonetheless, breathing retraining technique required longer time to relieve the symptoms as compared to the use of a rebreathing bag.

**Keywords:** bag; breathing retraining; hyperventilation; hyperventilation syndrome; rebreathing; retraining  
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### **HEAL (Hospital & Emergency Ambulance Link): Using IT to Enhance Emergency Prehospital Care**

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**Introduction:** Currently paramedics radio the hospital from ambulances regarding arrival of critically ill patients (stand-by cases), so that the emergency department (ED) could be prepared to receive such patients. Voice communication has its limitations and information transmitted usually is sparse. The objective of the HEAL pilot project was to exploit the use of electronic and information technology to convey patients' information from EAS ambulances to the ED.

**Methods:** A comprehensive electronic ambulance case record was created as a pilot project between 3 ambulances and an ED. All information captured by ambulance crews, including biodata, clinical information, vital signs, Glasgow Coma Scale (GCS), ECGs, and treatment information were entered or downloaded onto a ruggedised PC in the ambulance. The system was able to calculate the Trauma Score and the Revised Trauma Score from the raw data. The data were transmitted to the receiving ED via the public wireless mobile data network. Features such as canned text and interphasing of vital sign equipment with HEAL were employed to facilitate data entry in a moving ambulance.

**Results:** A 3-month analysis of this pilot project involving 1,694 HEAL ambulance runs and 1,239 non-HEAL ambulance runs (5.1% of the total runs were stand-by cases indicated the following: For the non-HEAL stand-by cases, radio communication that was used to transmit critical information to hospital took  $122 \pm 48$  seconds. In 31% of cases, the age was not given. Gender was not given in 9% and ETA in 42%. For non-stand-by cases, no patient information was available before arrival of the patients. For the HEAL runs, 95.5% of standby cases were able to transmit 100% of critical information before arrival in hospital. Transmission time for data was approximately 4 seconds. For the HEAL non-standby cases, 68% of data was transmittable in 75% of HEAL ambulance runs. It was possible to capture a complete ambulance case record electronically at a mean time of 94 seconds versus 7 minutes, 7 seconds for the traditional written record. Paramedics' time in the ED decreased from 15 minutes to 8 minutes as a result of the use of HEAL. The HEAL system was able to effectively prompt paramedics in carrying out critical aspects of treatment in 93 % of instances as compared to 59 % in the non-HEAL system.

**Conclusion:** HEAL provided timely advanced information on the condition of the incoming patients, thus enabling the ED to be prepared to receive the patient. The high compliance to treatment protocols in the HEAL ambulances suggests enhanced standards of prehospital medical treatment. A decision will be made as to whether the

HEAL system should be extended island-wide to cover all EAS ambulances and all public hospitals.

**Keywords:** hospital ambulance link; information technology; paramedics; prehospital care; records; severity score; standards; warning, advanced

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### **Transportation of Emergency Department Patients on Trolley by Head First Versus Feet First**

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*Objective:* The traditional method of transporting Emergency Department (ED) patients in Singapore by trolleys is the head-first approach. The nurse is at the trolley head to monitor the patient while the porter pushes the trolley from the trolley foot. A few patients have complained of dizziness and disorientation when they were conveyed in this direction. The purpose of this study was to determine the nature and incidence of physiological and psychological effects when patients are transported in the direction of head or feet first, and to utilize the knowledge gained to improve patients' comfort and safety.

*Method:* This qualitative-purposive study was conducted in the ED of a tertiary-care hospital in Singapore with 118,000 visits per year. Patients were randomly assigned to two groups: head-first ( $n = 20$ ) and feet-first ( $n = 20$ ). Data were collected using a 4-part questionnaire. The questionnaires obtained the patients' demographic information, heart rate and oxygen saturation before, and after transportation, as well as possible factors that may contribute to physiological and psychological effects, i.e., speed of transportation. Patients also were asked to describe the physical and psychological effects experienced.

*Results:* Eight patients (40%) conveyed via the head-first direction experienced physical effects such as dizziness (5), nausea (1), chest pain (1) and headache (1). Two patients (10%) experienced a sense of fear. Of those who were transported in the feet first direction, only 3 patients (15%) had physical effects such as dizziness (2) and palpitations (1) and all had positive psychological effects including 1 patient who reported a sense of well-being. The heart rate and oxygen saturation levels before and after transportation were almost similar in both groups.

*Conclusion:* The results showed that the traditional head-first method of transporting ED patients may cause greater discomfort than in the feet-first position.

**Keywords:** comfort; direction; hospital; safety; transport; trolleys

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