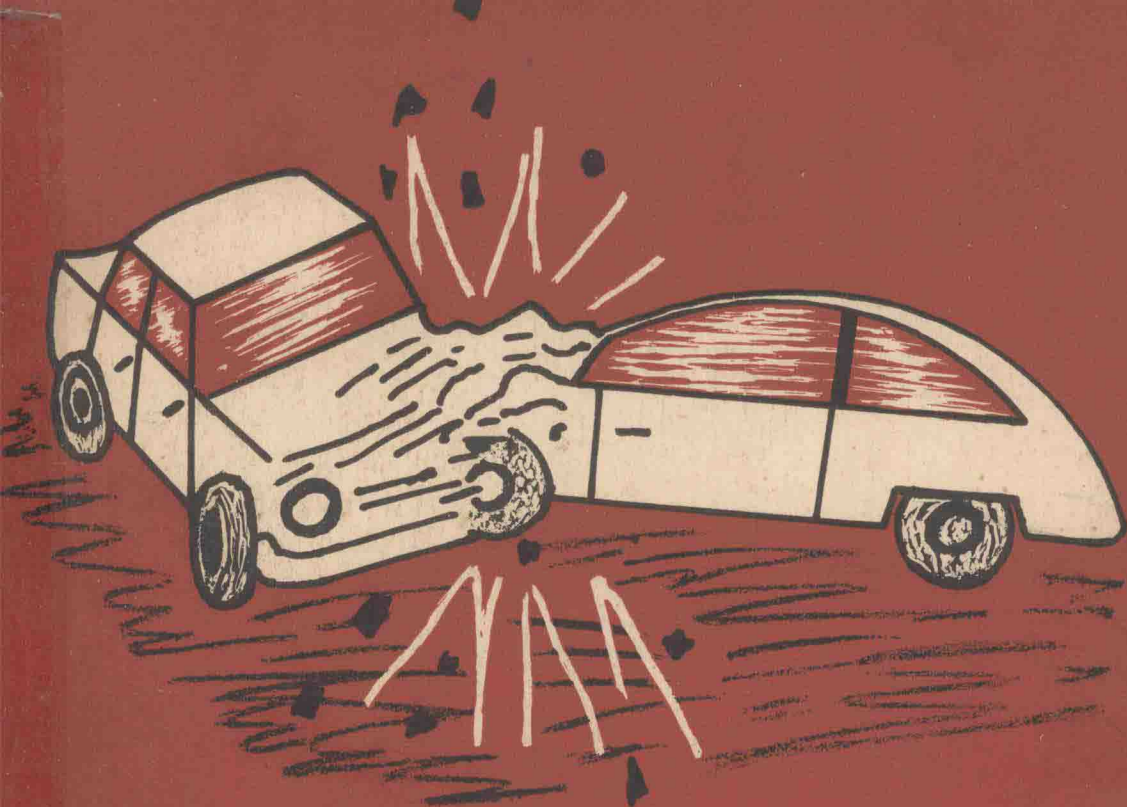




**Proceedings of
THE SECOND CONGRESS
OF THE INTERNATIONAL
ASSOCIATION
FOR ACCIDENT AND TRAFFIC
MEDICINE**

August 9 — 12, 1966, Stockholm, Sweden

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Edited by H. B. Wulff and E. Forsberg

No responsibility for the composition, contents or English text of the published articles can be assumed by the Organizing Committee.

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OPENING ADDRESS

by Professor Helge B. Wulff, M.D.

President of the Swedish Organizing Committee

The explosive development of traffic and means of communication that has taken place all over the world during the last two decades has given rise to unforeseen consequences for man. Different types of motor vehicles, of which the great majority are driven at high speeds, are nowadays everybody's possession. This primarily causes great risks for traffic accidents of more or less severe nature on our roads and streets. In countries where there is a high density of traffic, hundreds of thousands of people are killed and injured every year, and the economic losses amount to millions of dollars.

If the traffic problems in the thirties and forties from the medical point of view mainly consisted of taking care of a comparatively limited number of traffic victims and giving information on adequate therapy, the increasing frequency of traffic injuries in the fifties and sixties has also lead to organizational problems in addition to those of medical and technical nature. There is good reason to compare the extent of traffic injuries occurring in different parts of the world today with such severe sicknesses as cancer and cardiovascular diseases.

To solve these problems is no longer the responsibility of the isolated individual or organization but has become the task of a whole country or state, and even the object of cooperation between countries in great areas of the world. The solution of these problems is of the most vital importance. Intensified research, cooperation between technics and organization, extended medical therapy and, perhaps, first of all, working at traffic accident prevention are the main tasks set out for us.

The Second Congress of the International Association for Accident and Traffic Medicine, being held in Stockholm on August 9—12, 1966, has chosen three different fields as its main subjects. The first subject is "First aid for victims of road traffic accidents; principles and organization," the second deals with the question of "Diseased, disabled and elderly persons in road traffic," and the third topic is "Children and young people in road traffic."

The problems in these fields are all current, of vital importance and especially suitable for thorough research and discussion.

The Organizing Committee of the present international congress hopes and believes that the results given in this book and the opportunities for discussion and contact that will arise during the congress will lead to further development in the field of traffic accidents and stimulate intensified and deeper research.

All the members of the congress are cordially welcomed to Stockholm — the capital of Sweden.

It is the pleasure of the Organizing Committee to here express its sincere gratitude to the Swedish State for its generous support of this congress and to extend thanks to all those who have contributed to the realization of it.

Die seit zwei Jahrzehnten über einen grösseren Teil der Erde festzustellende explosionsartige Entwicklung des Verkehrs und der Verkehrsmittel hat nicht vor auszusehende Folgen für die Menschheit mit sich geführt. Fahrzeuge verschiedener Arten, die oft hohe Geschwindigkeiten erreichen, sind nun jedermann zugänglich. Das führt hauptsächlich auf unseren Strassen in der Stadt und auf dem Lande zu mehr oder weniger schweren Verkehrsunfällen. In Ländern mit hoher Verkehrsdichte werden jährlich hunderttausende von Menschen getötet und verletzt und die wirtschaftlichen Schäden gehen in die Milliarden Kronen.

Wenn in den 30er und 40er Jahren das Verkehrsproblem vom medizinischen Gesichtspunkt hauptsächlich in der Behandlung einer ziemlich begrenzten Anzahl von Verunfallten und der Verordnung der richtigen Therapie lag, so ist die Anzahl der Verkehrsschäden in den 60er Jahren zu einem organisatorischen, medizinischen und technischen Problem herangewachsen. Der Umfang der Verkehrsschäden in verschiedenen Teilen der Welt kann ohne weiteres mit so schweren Krankheiten wie Krebs und Erkrankungen der Herzkranzgefässe gleichgestellt werden.

Es geht jetzt nicht mehr länger darum, dass der Einzelne oder Organisationen diesem Problem zu Leib rücken, sondern das ist eine Aufgabe für ein ganzes Land, einen Staat, ja sogar eine Aufgabe für Länder die in verschiedenen Teilen der Welt zusammenarbeiten. Das Problem ist von vitalster Bedeutung. Die Hauptaufgaben bestehen in intensiver Forschung, Zusammenarbeit zwischen Technik und Organisation, medizinischer Therapie und vielleicht in allererster Linie in der Vorbeugung der Verkehrsunfälle.

Der zweite Kongress der internationalen Gesellschaft für Unfall- und Verkehrsmedizin vom 9. bis 12. August 1966 in Stockholm hat drei Hauptthemen gewählt. Das erste Thema lautet: „Erste Hilfe und deren Organisation bei Strassenverkehrsunfällen“, das zweite „Kranke, Invalide und alte Leute im Strassenverkehr“, und das dritte „Kinder und Jugendliche im Strassenverkehr“.

Auf allen diesen Gebieten sind die Probleme gegenwartsnah, wichtig und in hohem Masse zur eingehenden Forschung und Diskussion geeignet.

Das Organisationskomitee dieses internationalen Kongresses hofft und glaubt, dass die in diesem Buch dargelegten Ergebnisse und die Möglichkeiten zu Diskussionen und Kontakten, die sich während des Kongresses ergeben, für eine bessere Entwicklung auf dem Gebiet der Verkehrsschäden beitragen werden und auch eine intensiviertere und vertiefte Forschung anregen werden.

Alle Kongressteilnehmer werden in Schwedens Hauptstadt — Stockholm — herzlich willkommen geheissen.

Das Organisationskomitee will auch an diese Stelle seinen Dank an den schwedischen Staat richten, der den Kongress so grosszügig unterstützt hat, sowie auch allen denen, die zur Durchführung dieses Kongresses beigetragen haben.

Le développement spectaculaire de la circulation et des véhicules dans la majeure partie du monde au cours des deux dernières décennies a eu des conséquences imprévisibles pour l'humanité. Des véhicules de différents types qui souvent atteignent de fortes vitesses sont maintenant à la portée de tout le monde. Cela amène à de grands risques d'accidents plus ou moins graves surtout dans les rues des villes et sur les routes de campagne. Dans les pays avec une forte densité de la circulation des centaines de milliers d'hommes se tuent ou sont blessés chaque année. Les dégâts économiques s'élèvent à des milliards de couronnes. Dans les années trente et quarante les problèmes de la circulation consistaient du point de vue médical surtout en le traitement du nombre assez limité des victimes d'accidents de la circulation et de leur prescrire une thérapie adéquate. Dans les années soixante les dégâts de la circulation ont atteint une telle importance que cela représente un problème tant d'organisation que médical et technique. L'étendue des dégâts de la circulation dans

les différentes parties du monde peut sans autre être comparée à l'importance de maladies aussi graves que le cancer et les maladies coronaires du coeur. Ce n'est plus à l'individu ou à des organisations à s'en occuper, pour essayer de faire face à ces problèmes, c'est la tâche d'un pays tout entier, d'un Etat, voir même la tâche pour les pays qui collaborent sur le plan régional. Le problème est d'importance vitale.

Les tâches principales consistent en des recherches intensifiées, la collaboration entre la technique et l'organisation, la thérapie médicale et peut-être avant tout la prévention des accidents routiers.

Le second congrès international de la médecine des accidents de la circulation organisé à Stockholm du 9 au 12 août 1966, a inclus dans son ordre du jour les trois thèmes principaux suivants: Le premier étant: "Premiers secours apportés aux victimes des accidents de la route et leur organisation", le second "Malades, invalides, et vieillards dans la circulation routière", et le troisième "Les enfants et jeunes gens dans la circulation".

Les problèmes dans tous ces domaines sont d'actualité, importants et se prêtent admirablement à des recherches et discussions approfondies.

Le comité d'organisation pour ce congrès international espère que les résultats présentés dans ce livre et les possibilités d'avoir des discussions et d'établir des contacts au cours du congrès, profiteront à un développement plus poussé dans le domaine des dégâts de la circulation et encourageront des recherches plus intensives et plus approfondies.

Nous souhaitons la bienvenue cordiale à tous les délégués à ce congrès à Stockholm.

Le comité d'organisation désire également adresser ses remerciements à l'Etat suédois qui a appuyé généreusement le congrès et à tous ceux qui ont collaboré à la réalisation de ce congrès.

Lo sviluppo spettacoloso della circolazione e dei veicoli nella maggior parte del mondo durante gli ultimi due decenni ha avuto delle conseguenze imprevedibili per l'umanità. Dei veicoli di differenti tipi che spesso raggiungono delle forte velocità, sono adesso alla portata di tutti. Questo porta come conseguenza grandi rischi d'incidenti più o meno gravi, soprattutto nelle strade in città e nelle campagne. Nei paesi con una forte densità della circolazione centinaia di migliaia d'uomini muoiono o vengono feriti ogni anno. I danni economici raggiungono dei miliardi di corone.

Negli anni trenta e quaranta i problemi della circolazione consistevano dal punto di vista medicale soprattutto del trattamento del numero assai ridotto delle vittime degli incidenti della circolazione e di prescrivere loro una terapia adeguata. Negli anni sessanta i danni della circolazione hanno raggiunto un'importanza tale, che questo rappresenta un problema d'organizzazione, medicale e tecnico. L'importanza dei danni della circolazione nelle differenti parti del mondo può essere paragonata a l'importanza di malattie così gravi come il cancro e le malattie coronarie del cuore. Non è più l'affare dell'individuo o di un'organizzazione di occuparsene per trovare una soluzione. È la missione di tutto un paese, d'uno Stato, e incluso la missione dei paesi che collaborano sul piano regionale. Il problema è d'importanza vitale.

I compiti principali consistono nelle ricerche intensificate, la collaborazione fra la tecnica e l'organizzazione, la terapia medicale e forse anzitutto la prevenzione degli incidenti stradali. Il secondo congresso dell'Associazione Internazionale di Medicina degli Infortuni Stradali organizzato a Stoccolma dal 9 al 12 agosto 1966 a incluso nel suo ordine del giorno i tre temi principali seguenti: Il primo: "Primo soccorso alle vittime di incidenti stradali e relativa organizzazione," secondo "Malati, invalidi e persone anziane nel traffico stradale," e terzo "I bambini ed i giovani nel traffico stradale."

In tutti questi campi i problemi sono di attualità ed importanti e si adattano eccellentemente a delle ricerche e delle discussioni approfondite.

Il comitato d'organizzazione per questo congresso internazionale spera che i risultati presentati in questo libro e le possibilità di avere delle discussioni e di stabilire dei contatti durante il congresso, serviranno a uno sviluppo più intensivo nel campo dei danni del traffico e incoraggeranno delle ricerche più approfondite.

A tutti i delegati a questo congresso a Stoccolma auguriamo un cordiale benvenuto alla capitale della Svezia.

Il comitato d'organizzazione desidera ugualmente ringraziare lo Stato svedese del suo appoggio generoso al congresso e a tutti quelli che hanno collaborato alla realizzazione di questo congresso.

THE SECOND CONGRESS OF THE INTERNATIONAL
ASSOCIATION FOR ACCIDENT AND TRAFFIC MEDICINE

August 9—12, 1966

Stockholm, Sweden

Main subjects

- | | |
|-----------|--|
| August 10 | I. First aid for victims of road traffic accidents; principles and organization. |
| August 11 | II. Diseased, disabled and elderly persons in road traffic. |
| August 12 | III. Children and young people in road traffic. |

AUGUST 10

I. FIRST AID FOR VICTIMS OF ROAD TRAFFIC ACCIDENTS;
PRINCIPLES AND ORGANIZATION.

Chairman: Professor Cesare Gerin, M.D., Rome, Italy.

Secretary: Professor Martin H:son Holmdahl, M.D., Uppsala, Sweden.

Guest speakers

Professor Peter Safar, M. D., Pittsburgh, Pennsylvania, U.S.A.

Associate Professor F. W. Ahnefeld, M. D., Mainz, West Germany.

Associate Professor Stig Lindgren, M.D., Stockholm, Sweden.

Short papers on the main subject

Addendum

COMMUNITY-WIDE EMERGENCY CARE FOR ACUTELY LIFE-THREATENING CONDITIONS

by Peter Safar

From the Department of Anesthesiology, University of Pittsburgh School of Medicine, and the Presbyterian-University Hospital, Pittsburgh, Pennsylvania, U.S.A.

A comprehensive emergency care system should provide: (1) on-the-spot First Aid care; (2) safe emergency transportation; and (3) immediate and competent treatment in the emergency departments of hospitals. The life-saving potential of modern resuscitation calls for an upgrading of emergency care standards so that patients with acute life-threatening conditions have a better chance to survive. There has been justified criticism of the quality of present emergency care in many communities. We can no longer be satisfied with First Aid courses concentrating on bandaging; with ambulance services which merely transport victims; and with emergency rooms not staffed around the clock by physicians experienced in acute medicine.

Acutely life-threatening conditions include airway obstruction, apnea, pulselessness, unconsciousness (irrespective of the cause), respiratory distress, massive hemorrhage, shock, head injury, crushing injury of the chest and poisoning. The author believes that mortality from these conditions could be reduced if all that

Acknowledgements: Drs. T. Drapanas, F. Jackson and J. Kennedy, and Mr. R. Brose made valuable suggestions.

Adapted from: Safar, P.: Resuscitation and Intensive Care. C. V. Mosby Co. St. Louis, 1967. (In preparation).

is known were immediately and skillfully applied. Life-threatening conditions are present in less than 10 % of all emergency room admissions. Therefore, there has been a reluctance on the part of authorities to upgrade staffing and equipping of ambulances and emergency rooms beyond the requirements of the American College of Surgeons standards, which do not take into consideration optimal management of the difficult resuscitation case.

To up-grade emergency care the following should be considered: (1) Standards should be established by a committee of experts concerning organization of personnel and "what" should be taught "to whom" and "how". (2) A plan for teaching facilities and continuing education should be provided. (3) All involved should be required to abide by the standards by introducing an examination and licensing system. (4) Community-wide organization should be guaranteed by a responsible and authoritative individual or group.

(1) and (2) for cardiopulmonary resuscitation only have been developed recently by the American Heart Association CPR Committee for nation-wide application. Faculty training centers, up-to-date teaching materials (e. g. slides, manuals, posters, wallet cards, lists of films and training aids) and advice for teaching are provided. (3) is probably best accomplished on a state level as it is being planned for instance at present in Pennsylvania. (4) is probably a matter of local government.

The recommendations made in this paper are partially based on the author's first hand experience with resuscitation and his observations made of some existing emergency care programs in several countries around the world. Up-graded standards for ambulance transportation and emergency room care, recommended by the author to the Pennsylvania Department of Health, the Allegheny County Health and Welfare Association and the National Research Council during the past three years are included in the subsequent discussion.

Emergency care will be discussed subsequently in the chronologic sequence of care rendered to patients stricken by life-threatening emergencies outside of hospitals.

(1) First aid by general public

While waiting for the police, fire department or ambulance service to reach the victim, the passerby must support life and prevent further injury. Most adults should be able to recognize unconsciousness, airway obstruction, apnea, external bleeding, shock and pulselessness and treat these conditions accordingly with proper positioning, backward tilt of the head, clearing of the pharynx, mouth-to-mouth or mouth-to-nose ventilation and control of hemorrhage by direct pressure. They should also learn improvised immobilization of suspected fractures. The time-honored "four B's" of First Aid should be considered in this order of importance: Breathing and pulse; Bleeding; Bones and Burns (see Table 1).

Table 1
Techniques in emergency care
Personnel to be taught

	Lay Public	Special Lay Groups*	Police & Fire Dept.	Profes- sional Amb. & Rescue Personnel	Nurses	Medical Corps Men & Dentists	All M.D.'s	M.D. Acute Med.**
I. BREATHING-Pulse								
Cardiopulmonary resuscitation								
<i>(A) Airway:</i>								
Recognition of airway obstruction	×	×	×	×	×	×	×	×
Backward tilt of head, clearing mouth	×	×	×	×	×	×	×	×
Forward displacement of mandible				×	×	×	×	×
Insertion of pharyngeal tube				×	×	×	×	×
Suctioning of pharynx			×	×	×	×	×	×
O ₂ administration with spont. breathing			×	×	×	×	×	×
Tracheal intubation							?	×
Cricothyrotomy						×	×	×
Tracheotomy							?	×
Bronchoscopy								×
<i>(B) Breathing:</i>								
Recognition of hypoventilation & apnea	×	×	×	×	×	×	×	×
Mouth-to-mouth and mouth-to-nose	×	×	×	×	×	×	×	×
Mouth-to-adjunct (S-tube, mask)				×	×	×	×	×
Bag-valve-mask								
O ₂ ventilators hand-triggered			?	×	×	×	×	×
Elective transfer of comatose or apneic patient				?	?	?	?	×
Care of intubated patient				?	×		×	×
Thoracocentesis							×	×
<i>(C) Circulation:</i>								
Closed chest cardiac compression	?	×	×	×	×	×	×	×
Open chest cardiac compression							?	×
<i>(D) Drugs and I. V. fluids</i>								
<i>(E) Electrocardiography</i>					?	×	×	×
<i>(F) Fibrillation treatment</i>					?	×	×	×
<i>(G) Gauging (determine salvability)</i>							×	×
<i>(H) Hypothermia</i>								×

Table continued

	Lay Public	Special Lay Groups*	Police & Fire Dept.	Profes- sional Amb. & Rescue Personnel	Nurses	Medical Corps Men & Dentists	All M.D.'s	M.D. Acute Med.**
(I) <i>Intensive Care</i> (mechanical ventilation etc.)								×
II. BLEEDING (treatment of hemorrhage)								
Direct pressure	×	×	×	×	×	×	×	×
Tourniquet				×	×	×	×	×
Positioning in shock	×	×	×	×	×	×	×	×
Surgical hemostasis						?	×	×
Transfusion and infusion					?	×	×	×
Late management of shock								×
Major resuscitative surgery								×
III. BONES (treatment of fractures)								
Immobilization	×	×	×	×	×	×	×	×
Transportation		?	?	×			×	×
IV. BURNS								
Emergency treatment	×	×	×	×	×	×	×	×
I. V. fluids					?	×	×	×
Definitive treatment								×

* "high risk" groups (*e. g.* electric line men, beach guards, attendants of special cardiac patients)

** physician specialists

Although exhaled air ventilation (mouth-to-mouth and mouth-to-nose) has been universally introduced into First Aid teaching, few persons can perform this technique effectively. The teaching of external cardiac compression to the general public is under debate. An estimated 30 % of the one half million deaths related to coronary disease which occur annually in the United States are potentially reversible. Thus the life-saving potential of teaching laymen how to start cardiopulmonary resuscitation and of organizing effective follow-up care by ambulance and emergency room personnel is intriguing.

Winchell & Safar studied the teachability of cardiopulmonary resuscitation of about 1,000 lay and paramedical personnel. They concluded that: (1) high quality training including manikin practice and special teaching of the recognition of pulselessness is essential to minimize the likelihood of injurious performance and to obtain an acceptable passing and retention rate; (2) with high quality training selected lay groups taught by physician trained paramedical instructors performed as well as paramedical personnel trained directly by physicians; and

(3) the currently prevalent casual and uncoordinated teaching of cardiopulmonary resuscitation should be discontinued. Controlled training of selected lay groups is presently being recommended by the American Heart Association. The need for carefully controlled training and retraining will limit the number of lay persons taught until more practical methods of mass teaching are discovered.

(2) Communication and central ambulance dispatching

In most American communities communications and dispatching are only within ambulance organizations. Central dispatching has proved both feasible and effective in several European cities. It is essential to bring the patient with an acute life-threatening condition to the specialized personnel and equipment which can render up to date care and treatment. The lack of such a system and the multiplicity of ambulance services to call have led to confusion and incorrect decisions on the part of the calling public, and thus to unnecessary delays as well as less than ideal medical care.

Recommendations

Every major community should provide a physician-supervised screening and dispatching center which links all police departments, fire departments, ambulance services, hospital emergency departments, rescue squads and other emergency systems by radio and telephone.

(3) Emergency care by police and fire department personnel

Often police or fire department personnel are the first members of a system of emergency services to reach an actually ill or injured person. In the absence of professional ambulance or medical personnel, they must assume direct responsibility for the initiation of emergency care. Therefore, a selected number should be trained in resuscitation and other emergency techniques, to the same degree of efficiency as that expected of ambulance personnel.

(4) Emergency care by ambulance personnel

While some of the highly motivated part-time volunteer ambulance attendants offer excellent care, others are functioning with pitifully inadequate standards of personnel and equipment.

Recommendations. — Ambulances

Personnel: There should always be at least one attendant in addition to the ambulance driver.

Driver and attendant should have had a course in advanced First Aid and, in addition, special training under the guidance of physicians who have had first-hand experience in emergency care and resuscitation. Driver and attendant

should have demonstrated on manikins or patients the ability to provide a patent airway, artificial ventilation (mouth-to-mouth, mouth-to-nose, bag-mask) and external cardiac compression. They should have been instructed in suctioning, techniques for inhalation of oxygen, treatment of shock, control of hemorrhage, immobilization of fractures, proper positioning and the use of all their emergency equipment.

Ambulance personnel should be licensed, full-time professionals. Ambulances should be stationed near hospitals. Central community-wide ambulance dispatching and radio communication between all emergency systems including hospital emergency rooms are mandatory. Helicopter ambulances are desirable.

Equipment and design: Ambulance designed to allow access to the patient from his vertex for respiratory resuscitation and from his side for external cardiac compression. Firm stretcher allowing raising and lowering of head and feet.

Hand-operated ventilation equipment, for instance, self-inflating bag-valve-mask unit (masks for infants, children, adults) for use with air and oxygen for use outside and inside the ambulance. Powerful suction (from engine or electric motor) with suction tips and sterile catheters (for tracheotomized patients). Large oxygen source with flow meter and delivery tube. Transparent mask for oxygen inhalation. Oro-pharyngeal tubes for infants, children and adults. Thomas splint, triangular bandage or sling, several pillows, bass-wood splints, gauze pads, gauze bandages, adhesive tape, tongue blades, safety pins, bandage scissors, tourniquet.

Physician staffed ambulances

While the trend has been to remove physicians from ambulance duties, there are instances which require the attention of a well trained physician at the scene and during transportation. These cases include victims with multiple injuries, shock, partial amputations, or cavitory wounds, and those requiring cardiopulmonary resuscitation. Data on inhalation of gastric contents in patients with head injury and coma, and on heart attack victims requiring cardiopulmonary resuscitation en route, indicate that physician participation in ambulance work could improve salvage rates.

We, therefore, propose the co-existence of two types of ambulances: (1) a simple one for transportation of patients not in need of resuscitation, staffed by allied health personnel only; and (2) a special one for patients in need of resuscitation and for elective transfer of patients in coma, acute respiratory insufficiency or shock, staffed by physicians.

This dual system has been in existence for some time in some European cities where unnecessary physician assignment apparently has not been a major problem. For example in Prague among an average of 40—50 calls per day in which the dispatching center sent a physician staffed ambulance to the scene, a physician was actually needed in about 30 % of the instances.