Telemedicine Applications in Disaster Medicine

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"Nothing is actually more dangerous than action without decisions and know-how." In the construction of service systems for emergencies and disasters, we must start from the needs in the field. There is an obvious need to create a lead group that coordinates the actions and makes the decisions crucial for directing all of the available resources to produce the maximal benefit of input on output. Despite these self-evident principles of action, it is quite another matter to apply this theory to action. The coordination requires such experience that almost never is available at the site of an accident.

Fortunately, if the chain of information functions perfectly, such crucial actions can be directed from far away. It is the same as if the lead group is working at a distance of only hundreds meters or hundreds kilometres, provided that it is composed of the best experts available. Because the decisions and orders given by the lead group must match the actual situation at the scene, there is an obvious need for visualisation of the situation with updating video pictures from different points at the scene that use wireless methods for transmitting these images. These mobile-camera units should be directed and focused upon the most important views. The shadow areas in the standard wireless network field can be solved using transportable link-stations. Of course, the picture must be completed using verbal bidirectional communication. These elements complete the process from decisions to actions. One picture is worth of thousand words!

After completion of the action, there will be a rich data collection relative to the action. After analysis, these data can be used not only for improvement of the weak points detected, but also for training and teaching.

Currently, this quality of tele-coordination is just a dream, but it could become a reality. All of the needed technologies are available. The video, picture-based, dynamic direction of actions currently is used, but, so far, not in Disaster Medicine. As a matter of fact, management of a disaster by a lead group could be the masterpiece of tele-coordination.

Key words: coordination of resources; decision-making; disasters; disaster management; disaster medicine; telemedicine

Interactive Training, Evaluation, and Testing Using Computers

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Interactive training is based on the accepted fact that you will learn much more by doing than by listening or reading. *Performing Triage* at the scene of an accident means that you are arranging all actions in correct priority order. *Mastering Triage* is the crucial know-how obtained from experience gained at major accidents and disasters. In case of a sudden situation, you must have a tactical preparedness model of action ready in your memory. Since tactics are an essential component for emergency action, there should be sufficient training in their applications. Triage is know-how consisting of observations, conclusions, decisions in order of importance, and actions.

Tactical simulation software follows a natural sequence of actions, using a scenario such as an accident with several casualties. The trainee leads a group that provides the medical rescue. Because one is training for leadership in making decisions and in utilisation of resources, the members of the group actually are the only human resources without ability to think or act autonomously.

Interactivity means that the course of the situation is dependent upon the trainees' decisions and actions. This interactivity is the educative component that will help the leader to learn to make rational decisions. The development of traumas is time related, but you can affect it through the application of appropriate emergency procedures. Progressive challenge is accomplished by increasing the number of casualties and keeping the resources the same. Final evaluation with detailed information of the score attained during exercises is a very important part of learning. The software can be used as well for testing individual tactical preparedness, a method for which hitherto has been a missing until now.

The principal element in the concept of computer-aided training is to provide enough interactive feedback to create a tactical model in the memory. The applicable software must be available readily without a need for very powerful computers or special installations.

Key words: computer-assisted training; decision-making; disaster management; disasters; multicasualty incidents; simulation; triage

Are We Better Prepared After the Estonia Experience?

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The Estonia disaster in 1994 did not constitute a heavy workload as far as patient care was concerned. Eight hospitals in three Administrative Districts in Finland accepted 70 of the 137 survivors without difficulty. There were no capacity or treatment problems. Also, the Forensic Medicine Authorities performed 94 medicolegal autopsies that provided a lot of information and new guidelines were prepared and distributed to the regional officers. Lesson learned include:

1) A massive level of interest by domestic and foreign media personnel constituted a new phenomenon for the health-care personnel that must be taken into

account in future planning;

2) Communication problems between the different teams and authorities was again an obstacle. As a result, a new dispatching center network with modern data telecommunication system for fire, police, social- and health-care, and others is under construction for the whole country;

3) The incident management system must be improved. Instead of concentrating on each responding unit doing its own thing in separate branches, the focus should directed towards the management the whole situation;

4) Improvements, especially in the arena of psychosocial care, have been proven to be successful in recent years and crisis teams are in everyday readiness and operate all over the country using new guidelines.

The management of the recent railroad accidents have proved that the management of incidents with physical traumas now are functioning well. Readiness to handle massive hazardous material or bioagent exposures causing victims and community disaster needs special attention and new approaches in the future.

Key words: bioagents; communication; disaster preparedness; disasters; ferry accident; hazardous materials; incident command system; media in disasters; multicasualty accident; multicasualty incident; psychosocial care; physical trauma

Measurements and Analyses in Environmental Accidents and Disasters

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Gas analysis methods measuring gaseous ions produced by a radioactive source and affected by an electric field (DC or AC) are called ion mobility spectrometry (IMS). Commonly used detector constructions for the IMS have included drift tubes and diffusion chambers which used membrane inlets to the separate detector tubes from the ambient air. Recently, great strides have been made in the development of measuring devices based on IMS, much of it originating from innovations in military technology. This has led to the development of devices that are competing with the more traditional methods used in civil industry.

The IMCELL (MGD-1) technology developed by Environics Oy has promising possibilities for measuring different toxic and harmful compounds. The detector is sensitive and responds rapidly. It can accommodate high concentrations without saturation effects common to membrane inlet detectors. It can be transported from place to place as a portable device. Alternatively, it can be mounted in a fixed position to measure continuously.

In this presentation, the possible uses of MGD-1 detector in chemical accidents and disasters is presented.

Key words: chemical accidents; disasters; gas analysis; ion mobility spectrophotometry; toxic substances

How We can Prevent the Disaster of Millennium

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Our whole infrastructure of our society is computerised in that extent, that we are totally dependent on correct function of different computers and programs. An exact time and date calculation is involved in all digital processing's despite we are not aware of it. The date calculations are based on so called date value, which origin is from those times when computer memory was so small that even saving in each byte was critical. This historical decision results in a concrete danger that some important parts of our infrastructure can collapse just at the turn of the millennium. Because we are fully aware of this threatening possibility this man made wide scale disaster can be prevented by recoding all those part of computer software, which are involved with date calculations or assorting.

The potential disaster of millennium can include e.g. production of electric power, telecommunication or safety systems in air and ground traffic control. All functional troubles in these basic functions can result in large-scale accidents and emergencies. If the telecommunications are also jammed all emergencies (medical) services will not function properly and the appropriate help will arrive delayed if it arrive at whole. There are also many intrinsic date dependent functions in health care. For example, there will be malfunctions when patient databases are used after millennium. It is actually difficult to even imagine what all can occur! People responsible for each hospital data processing should make preventive measures, but also be prepared to backlashes.

Fortunately we have still one and half years time to prevent all those programmatic malfunctions we are aware about. Many of the date based calculations and conclusions are hidden functions, which are difficult to predict. The correction process is going on, but all the time new date dependent functions emerge. It is thus quite sure that some unexpected troubles will remain, and for those surprises we have to be prepared with plan B to act without computer support. Millennium is actually a potential dangerous situation and not any superstition.

Key Words: computers; data processing; date value; disaster; disaster prevention; malfunction; millenium; prevention;