


Bill Sacco, Ph.D

On-site triage of mass casualties is another critical homeland security issue for medical personnel. Two innovations of compelling value were discussed at the conference. The Sacco Triage Method (www.sharphinkers.com) and resource management system, (patent pending processes of ThinkSharp, Inc.) based on data from over 100,000 injuries over a multi-year period in Pennsylvania, uses the patient's respiratory rate, pulse, and motor response to predict survival and therefore assign triage urgency. The author, mathematician Dr. Bill Sacco, has been recognized for his many trauma triage innovations as an honorary fellow by the American Association for the Surgery of

Trauma. His system is a 12-tiered scale, with higher predicted survival for higher scores. Unlike many other triage systems, the Sacco system is evidence-based, outcome-driven, and scientific, not subjective. It is scalable – expandable to casualty streams of any size or complexity – and is reproducible in all types of casualty-producing disasters. Dr. Sacco's system is implemented from a laptop computer and on-site PDA's, and considers type of trauma, number and age of victims, evidence-based survival probability, timing and availability of transport and treatment resources, and type of treatment facilities. It is also dynamic, adjusting its triage decisions to the evolving conditions of the disaster. Reducing the subjectivity and anecdotal nature of triage from a mass casualty scenario could have a huge effect on maximizing the number of survivors.

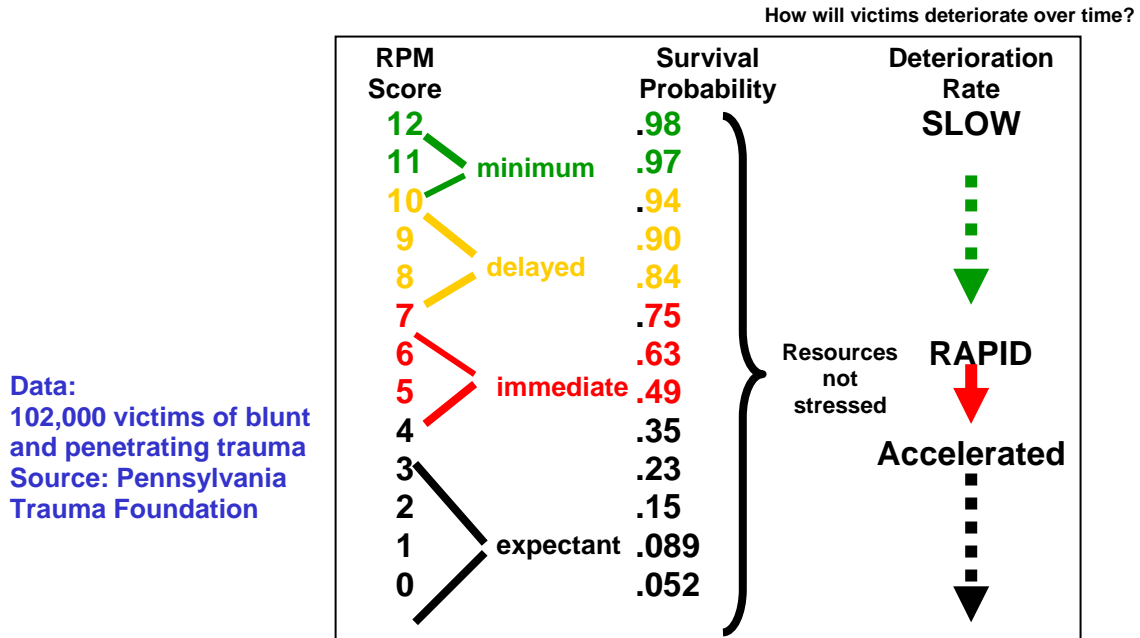
- **Use the RPM score of each victim**
 - similar in concept to Revised Trauma Score
 - funded by DOD in 80s; used by Navy SEALs and marines
 - respiratory rate (RR), pulse rate (PR), motor response (MR)
 - is practical -- victims scored at scene in 40 seconds, on avg
 - easy transition -- RPM used (not scored) by START
 - highly correlates to survivability

- **RPM = Sum of the coded values of RR, PR, MR**

	Coded Value:	0	1	2	3	4
• RR	0	1-9	35+	25-35	10-24	
• PR	0	1-40	41-60	120+	61-120	
• MR	0	EXT/FLEX	Withdraws from pain	Localizes pain	Obeys Commands	

This is the APGAR equivalent for trauma, simple and easily remembered.

The Probability of Survival and rate of Deterioration drive triage decisions



This trauma system beautifully coordinates injury severity, survival and deterioration rates so that all resources can be optimized for survival.

A second innovation for on-site triage is a non-contact vital signs device, utilizing micro-impulse radar to assess pulse and respirations through as much as 20 feet of concrete. Advantaca, Inc., of Livermore, California, offers a remote patient monitor (www.advantaca.com) The value of such a device in finding

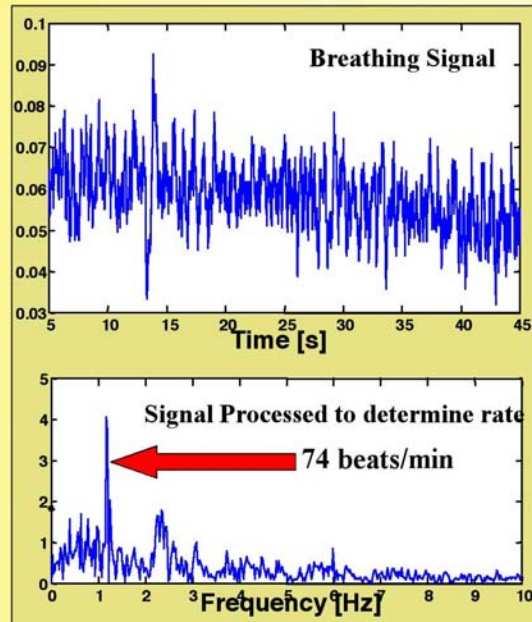
building collapse survivors, even if they are unconscious, is immeasurable. It would be of equally impressive value at a mass casualty triage site, where pulse and respirations are key indicators of where medical personnel need to direct their attention. If a casualty is on the opposite side of a site hazard, assessing the viability of the patient without risking the health of the medical personnel could be very important. The remote patient monitor was used at the World Trade Center site after the terrorist attack there in 2001.



Imagine the usefulness of being able to find vital signs through 14 feet of reinforced concrete in a situation like this.

Heartbeat detected in simulated rubble pile

Rubble Penetrated: 4 ft
Material Thickness: 2 ft
Void Spaces: 2 ft
Subject Position: Prone, holding breath



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ADVANTACA

This example of using this modern technology in a rubble pile was verified at Texas A&M Disaster City in College Station, a division of the National Emergency Response and Rescue Training Center (NERRTC)



The disaster site could also be an office, where an envelope of “white powder” has just been opened, or a transportation terminal, where an openly coughing man with an obvious skin rash has just been apprehended.

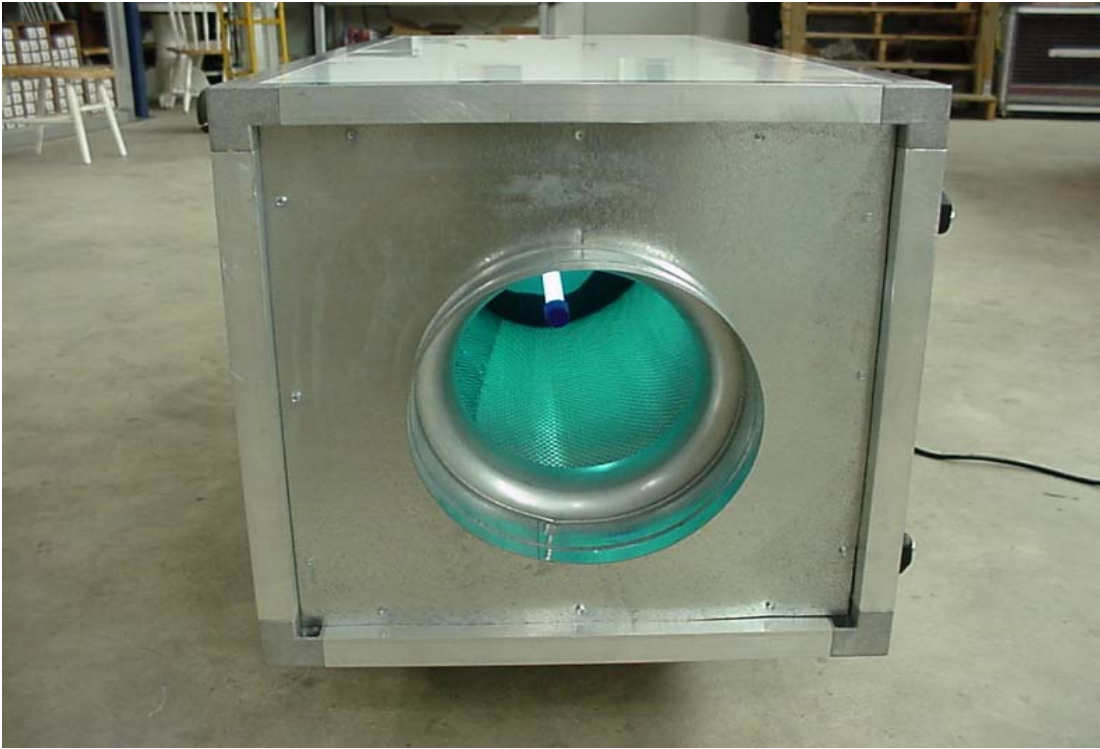
Triage in this case must focus on the disease – if any – that has just been spread. Which of the many potential bio-terror agents is involved? How long will it take to treat or reassure the exposed people at the site? Radix Biosolutions (www.radixbiosolutions.com) has led a substantial breakthrough in dealing with this disaster scenario. Instead of processing the sample through dozens of tests, taking days or weeks, their multi-agent probe looks for an array of agents simultaneously, providing results with high specificity in a matter of hours.

We know there is also a covert biological threat. Terrorists could use the air handling system to spread an agent throughout a large building. By the time the occupants show signs of exposure, the opportunity to contain the disaster is lost. The ducted ultraviolet ‘UVC’ light and HEPA filter systems of Isolate, Inc.

(www.isolate.com) kill 99.97% of biological agents in incoming air by trapping the agent on the filter while exposing it to the effective UVC light. The system is built from off the shelf products, then custom designed for inline attachment to existing duct systems, and can be retrofitted to create hospital 'clean room' quality airflow, which could be in much demand after a WMD disaster or SARS outbreak. The \$3,000 filters can allow a typical hospital room to be converted to a 'clean room', avoiding the \$100,000 this process often cost in the recent past. Filter handling and light changing is all on the 'clean side' of the device, protecting hospital workers.



Side view of inexpensive filtration system to make a “Clean Room”. Note: it is in a series with existing HVAC so no major changes need to be made.



Front view of “Isolate filter” showing the incorporation of UVC light with HEPA filter. This system has garnered over 20 patent licenses.
