CBRNE-Terrorism Newsletter

Summer Issue – Part 2

Moscow subway attack

Backpack-Wearing Cockroaches to Detect Radiation

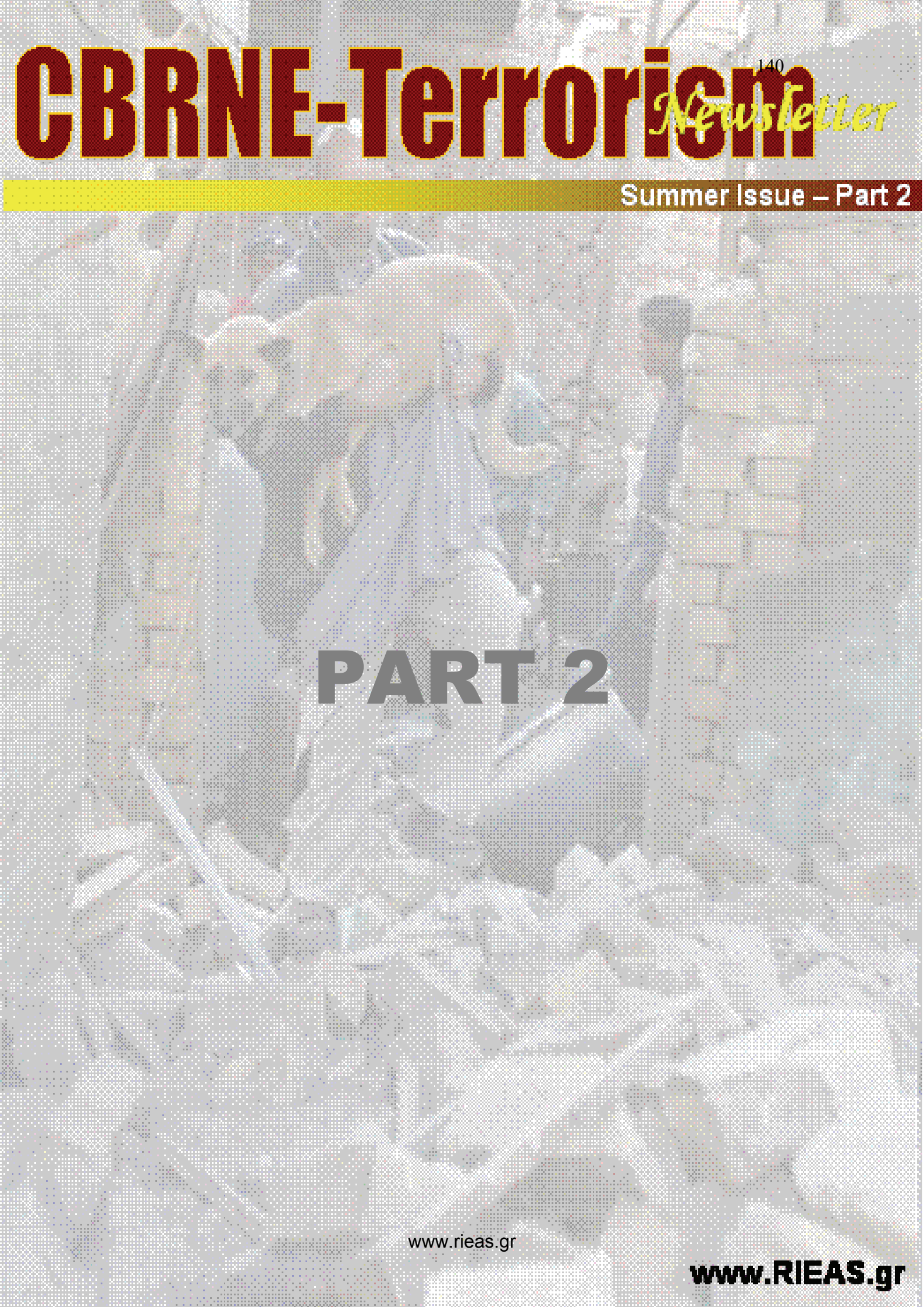
Non-toxic cleaners for terrorist attacks

Biosensors in briefs

www.RIEAS.gr

CBRNE-Terrorism Newsletter

Summer Issue – Part 2



PART 2

Future iPhone Could Gain Sense Of Smell

In about a year, the Department of Homeland Security's Science & Technology Directorate (S&T) hopes to have prototype phones from Apple, LG, Qualcomm, and Samsung that can sense carbon monoxide and fire. On Friday, the S&T said that it has begun actively funding a project that has been in the research phase since 2007 to develop cell phones equipped with sensors capable to detecting dangerous chemicals. The project, called Cell-All, aims to deploy low-cost sensor chips -- less than $1 each -- in mobile phones and to coordinate mass air sampling through mobile network carriers. NASA, Qualcomm, and Rhevision Technology -- an In-Q-Tel-funded optics company that has developed chemical-sensing silicon -- have been working on the core technology. The principal benefit of "crowd-sourcing human safety," as the government puts it, would be to reduce false alarms. A single report of chlorine gas from a subway might be the result of an error or anomaly. Multiple reports would be a sign of a potentially serious situation, enough to prompt warnings to phone users in the vicinity and to alert authorities. The S&T insists that phone subscribers will have to opt-in to the network and that data transmissions will be anonymous. "Privacy is as important as technology," said Stephen Dennis, program manager of Cell-All, in a statement. "After all, for Cell-All to succeed, people must be comfortable enough to turn it on in the first place." Detection, identification, and notification in the Cell-All system is supposed to take place within 60 seconds. Users supposedly will be able to choose their preferred form of incident notification: vibration, noise, text message or phone call. The S&T envisions the system as a way to defend against terrorism as well a way to avert incidents like one reported last year in which a woman near Swansea, South Carolina was killed by an invisible cloud of ammonia that had leaked from a local chemical plant. In December last year, S&T led a study with the help of the Massachusetts Bay Transportation Authority (MBTA) to better understand the dispersal of smoke or accidentally released chemicals in the MBTA subway system.

Laser Dazzlers

Laser dazzlers started out somewhat simply as a form of non-lethal crowd control and tactical area denial. The idea was to scan a laser quickly over a crowd, using a low-powered beam to “dazzle” the people into temporary blindness. Unlike other types of laser weapons, the beam would not be tightly focused, in order to hit as large an area as practical, but would still have enough energy density to burn enough of the retina to cause vision loss.Using the blinder gun rifle-like to target each human target eyes was considered impractical, both for crowd-control and battlefield use. What was needed was to play the beam quickly over a wide enough area to hit many potential targets near-simultaneously. This was solved through several methods. One was to use a focusing prism that rapidly moved or rotated on the end of the beam projector. Another was to use a large concave mirror, onto which the focused laser beam was quickly played across and reflected at the targets. Both methods allowed the weapon to cover a wide cone-like area in a fraction of a second, potentially blinding dozens of victims with every pull of the trigger. Laser dazzlers also had another insidious innovation; by operating in the near-infrared spectrum, which the eye is transparent to but which does not register as light, dazzler weapons can do their damage without invoking the blink-reaction that normally protects the eye. Dazzlers also have the added advantage of being able to blind enemy visual sensors, including those on fighting vehicles, artillery, and missile emplacements. The US military has two prototype anti-sensor

laser blinders in development, the Dazer and the Cobra. Both are static lasers meant primarily to detect and neutralize enemy optical and electro-optical sensors for various weapons

systems. As such they are designed for pinpoint fire mode as opposed to the scanning fire mode used for "crowd control" laser blinders. Laser dazzlers started out somewhat simply as a form of non-lethal crowd control and tactical area denial. The idea was to scan a laser quickly over a crowd, using a low-powered beam to "dazzle" the people into temporary blindness. Unlike other types of laser weapons, the beam would not be tightly focused, in order to hit as large an area as practical, but would still have enough energy density to burn enough of the retina to cause vision loss. Using the blinder gun rifle-like to target each human target eyes was considered impractical, both for crowd-control and battlefield use. What was needed was to play the beam quickly over a wide enough area to hit many potential targets near-simultaneously. This was solved through several methods. One was to use a focusing prism that rapidly moved or rotated on the end of the beam projector. Another was to use a large concave mirror, onto which the focused laser beam was quickly played across and reflected at the targets. Both methods allowed the weapon to cover a wide cone-like area in a fraction of a second, potentially blinding dozens of victims with every pull of the trigger. Laser dazzlers also had another insidious innovation; by operating in the near-infrared spectrum, which the eye is transparent to but which does not register as light, dazzler weapons can do their damage without invoking the blink-reaction that normally protects the eye. Dazzlers also have the added advantage of being able to blind enemy visual sensors, including those on fighting vehicles, artillery, and missile emplacements. The US military has two prototype anti-sensor laser blinders in development, the Dazer and the Cobra. Both are static lasers meant primarily to detect and neutralize enemy optical and electro-optical sensors for various weapons systems. As such they are designed for pinpoint fire mode as opposed to the scanning fire mode used for "crowd control" laser blinders.

Biochip Technology Reveals 'Fingerprints' of Biochemical Threats

Argonne biochemist Daniel Schabacker could be considered a Sherlock Holmes of bioterrorism. Although he doesn't carry around a pipe and magnifying glass as he attempts to nab the culprit, he has a far more powerful deductive tool: the biochip. The biochip offers Schabacker and his colleagues at Loyola University (Ill.) a chance to determine the "signatures" of biological agents that can be used for bioterrorism, most notably the bacterium that causes anthrax, Bacillus anthracis. While some scientists have used DNA analysis to identify particular strains of the anthrax bacterium, the biochips help scientists and government officials learn how anthrax bacteria are grown, narrowing the pool of potential suspects. This project, started only within the past couple of years, exemplifies the burgeoning field of microbial forensics. "Microbial forensics is one of the biggest topics in counterterrorism today, and one of the biggest challenges in dealing with bioterrorism," Schabacker said. "The proteomic analysis that we're able to perform with our biochips provides a new and different set of information about biological agents than we'd been able to see before; it can provide us with a

complete fingerprint of the organism that we can then use to more precisely identify its origin." According to Schabacker, most efforts in microbial forensics today rely on DNA analysis for their findings. But on its own, Schabacker said, DNA analysis may not be sufficient to give investigators all the information they need about a particular bioagent. "The problem with only using conventional DNA analysis is that it only tells you what strain you are dealing with, and strains used by the good guys can be obtained by our enemies. There can be dozens of labs that all share the same strain," he said. "Our approach attacks the problem in a completely different way. We take advantage of the fact that unlike cellular DNA, bacterial proteins change dramatically when the growth or preparation of the bacterial culture is altered -- and that information is incredibly important." Because the anthrax bacterium's proteins hold a unique and detailed record of how the cells were generated and handled, Schabacker believes that pursuing DNA and protein analyses in concert could yield a comprehensive database that identifies the conditions used to prepare almost any B. anthracis culture. "The ultimate goal of this project is to build a library of 'signatures' of B. anthracis grown and prepared under various conditions, which can be used to identify an unknown sample from a possible terrorist attack," Schabacker said. "This will be a major help to investigators who seek to attributing the agent to a particular perpetrator." Schabacker plans to leverage basic studies on the anthrax bacterium from the laboratory of Loyola professor Adam Driks to make biochips into a powerful tool for investigators and other scientists. Developed in the early part of the decade originally as a diagnostic tool, a biochip consists of a one-centimeter by one-centimeter array that contains anywhere between several dozen and several hundred "dots," or small drops. Each of these drops contains a unique protein, antibody or nucleic acid that will attach to a particular reagent. Scientists obtain the anthrax proteins to create the biochip through a process called fractionation. Essentially, the scientists use chemicals to break open the anthrax bacterium and collect its cellular proteins. They then use another process to separate the individual proteins by their physiochemical properties. This process creates hundreds of separate protein fractions, which are then deposited onto a single biochip. Scientists then use different chemicals, or reagents, to characterize the resulting biochips just as a detective would dust for fingerprints. Just like a police interview with a suspect, this chemical process is known as "interrogation." When a reagent interacts with a particular protein fraction, a spot will "light up," creating part of the protein signature. Although the biochip technology has the potential to develop protein signatures of just about any biological agent, Schabacker and Driks have devoted their initial focus initially to B. anthracis. The spores produced by this bacterium, which cause anthrax, are relatively easily manufactured and dispersed, making the anthrax bacterium a relatively easily produced biological weapon. "B. anthracis is a pretty forgiving species – it will grow in a bunch of different conditions," Schabacker said. "It's probably the single most attractive pathogen of choice to terrorists who don't have a lot of really expensive equipment or expertise, and the spores are the perfect package for dispersion." An expert on anthrax, Driks and his laboratory pioneered the forensic analysis of the spore coat of the bacterium. Schabacker combined the biochip technology with fractionation technology developed by Eprogen, Inc., providing a nexus that connects government research, academia and industry. Helping scientists track down terrorists isn't the biochip's only use. Biochips have already shown promise in diagnostic medicine. After developing the biochip technology, Schabacker licensed it to several companies, including Safeguard Biosciences in Toronto, Canada and Akonni Biosystems in Frederick, Maryland. Instead of looking at anthrax, Eprogen has put

biochips to use to look for common cancer biomarkers. That research could open the door for doctors to create "antibody profiles" that could help them design individualized drugs or treatment programs for patients. The work Akonni has done focuses on identifying other pathogens – those not normally associated with terrorist activity. Soon, biochips may begin showing up in greater numbers in doctor's offices around the country, as they provide accurate and speedy diagnoses of a wide variety of infections, such as those caused by Multidrug-Resistant Tuberculosis (MDR-TB) and the often deadly Methicillin-resistant Staphylococcus aureus (MRSA). Argonne National Laboratory seeks solutions to pressing national problems in science and technology. The nation's first national laboratory, Argonne conducts leading-edge basic and applied scientific research in virtually every scientific discipline. Argonne researchers work closely with researchers from hundreds of companies, universities, and federal, state and municipal agencies to help them solve their specific problems, advance America 's scientific leadership and prepare the nation for a better future. With employees from more than 60 nations, Argonne is managed by UChicago Argonne, LLC for the U.S. Department of Energy's Office of Science.

New Mobile Vaccination System

Emergency medical products and services provider DHS Technologies LLC recently revealed its newest shelter system – the Reeves Mobile Vaccination System. The Reeves Mobile Vaccination System provides medical and public health personnel with 442 square feet of usable space from which to administer seasonal vaccinations or vaccinations during a pandemic or other widespread outbreak. The system features two shelter end caps that can easily be added or removed, allowing personnel to create either a walk-up vaccination clinic with plentiful interior workspace or a drive-thru

clinic from which health officials can deliver vaccines while still protected from the elements. "The system's flexible design allows personnel to create the workspace that

is most effective for them and that will allow them to treat the greatest number of patients within a short period of time," explains Reeves representative Mark Vidovic. Constructed from military-tested shelter technology, the Vaccination System can also be set up or taken down by minimal personnel in minutes and withstands extreme weather and temperatures. Though new to the market, the Reeves Mobile Vaccination System has already been used by health departments across the country. Last November, in response to the H1N1 outbreak, the Madison County Health Department set up a drive-thru vaccination clinic to distribute nearly 2,000 vaccinations. "During a pandemic, the last thing we want to do is bring a large group of people together indoors where they can easily transmit the virus. This was a way to keep people separated while still ensuring they can receive their vaccine. And because the shelter was heated and protected against the elements, it provided our personnel with a more comfortable workspace," says Madison County Public Health Coordinator Stephanie Grimes.

Provide Medical Surge Care

The recent earthquakes in Haiti and Chile highlight the importance of preparing for the possibility of a large scale health emergencies. Healthcare organizations need products on hand to rapidly increase surge capacity to meet increased demand for medical care at a moment's notice. MasCache™ Surge Care Supplies provide an emergency medical cache of disposable medical supplies, ready for quick use by patients and personnel. DQE offers two product groupings for its MasCache line - the MOD and POD. Each contain configurations of prepackaged disposable patient care kits, linen kits, staff scrubs and lab coats that are conveniently grouped and packaged for easy deployment and use. Additional items such as privacy curtains, IV poles, disposable stethoscopes and more are also included. The MasCache™ 48 Hour MOD is a mobile disposable storage cabinet filled with essential supplies. Each cabinet can be easily rolled and positioned as needed in a central location within a surge care setup. Two storage cabinets contain enough supplies for 25 patients for 48 hours of care and are contained on one pallet. The MasCache™ 96 Hour POD is a grouping of MasCache surge care products that are designed to be stationed and dispensed at bedside. A POD is designed to create organized treatment areas so that temporary patient care areas can be rapidly deployed. Each POD contains enough supplies for 25 patients for 96 hours. When used together, the MOD and POD can rapidly distribute medical surge care supplies and organize patient treatment areas. From protecting hospital staff, to quickly deploying patient care to those in need, the MasCache POD and MOD provides essential disposable care products at an affordable price.

Η Αλλαντική τοξίνη (BOTOX) στο Αγγειακό Εγκεφαλικό Επεισόδιο

http://www.medreha.com

Τι είναι η Αλλαντική τοξίνη ;

Πάρα πολύς κόσμος γνωρίζει την αλλαντική τοξίνη ή «BOTOX®» από την χρήση της για την εξάλειψη των ρυτίδων. Λίγα πράγματα όμως είναι ευρέως γνωστά για την ουσιαστική φαρμακευτική της δράση και την χρησιμότητα αυτής της τοξίνης. Η αλλαντική τοξίνη παράγεται από το βακτηρίδιο Clostridium Botulinum. Υπάρχουν 7 γνωστοί τύποι αλλαντικής τοξίνης ταξινομημένοι από το Α έως το G. Στην ιατρική χρησιμοποιείται, μετά από κατάλληλη επεξεργασία, κυρίως η τύπου Α με την εμπορική ονομασία BOTOX®(Allergan).

Πώς δρα το BOTOX®;

Η αλλαντική τοξίνη εμποδίζει την μετάδοση των ερεθισμάτων από το νεύρο στον μυ, προκαλώντας έτσι μια τοπική, παροδική και δοσοεξαρτώμενη μυϊκή χαλάρωση.

Βοηθάει η αλλαντική τοξίνη στην αντιμετώπιση της Σπαστικότητας μετά από Αγγειακό Εγκεφαλικό Επεισόδιο;

Σήμερα γνωρίζουμε ότι τα εγκεφαλικά επεισόδια είναι μία σοβαρή πάθηση που συχνά οδηγεί στο θάνατο ή σε μόνιμη αναπηρία προκαλώντας λειτουργικά και νευρολογικά ελλείμματα Είναι ή τρίτη κατά σειρά αιτία θνητότητας στις ανεπτυγμένες χώρες και η πρώτη αιτία πρόκλησης αναπηρίας στον άνθρωπο. Υπεύθυνο για 25.000 περιστατικά ετησίως στη χώρα μας, σύμφωνα με τον Παγκόσμιο Οργανισμό Υγείας (ΠΟΥ). Έπειτα από ένα ΑΕΕ, χρειάζεται συχνά θεραπεία Αποκατάστασης για να βοηθήσει τους ασθενείς είτε να διατηρήσουν τις υπάρχουσα κινητικότητά τους είτε να κερδίσουν πάλι κάποιες από τις χαμένες ικανότητες ώστε να διατηρηθεί ο βαθμός αυτοεξυπηρέτησής τους.

Σπαστικότητα μετά από εγκεφαλικό επεισόδιο:

Όλοι μας έχουμε αντικρίσει ασθενείς με σπαστικότητα μετά από Αγγειακό Εγκεφαλικό Επεισόδιο και έχουμε δει πόσο βασανιστική είναι καθώς προκαλεί προβλήματα στην κινητικότητα, πόνο, δυσκολία στην καθημερινή υγιεινή και τραυματισμούς λόγω των μη ηθελημένων κινήσεων εξαιτίας της σπαστικότητας. Το μεγαλύτερο όμως πρόβλημα που δημιουργεί είναι ότι δυσκολεύει την κινησιοθεραπεία κατά την εφαρμογή προγραμμάτων Αποκατάστασης. Η σπαστικότητα είναι μια κινητική διαταραχή. Προκαλεί συσπάσεις μυών (καμπτήρες των άνω άκρων, εκτείνοντες των κάτω άκρων), ανωμαλίες του ελέγχου της στάσης και εμποδίζει την αρμονία των κινήσεων δυσκολεύοντας την λειτουργικότητα των μελών του σώματος. Η σπαστικότητα μπορεί να εμφανισθεί από το αρχικό στάδιο και μπορεί να είναι μικρού ή μεγάλου βαθμού. Η αντιμετώπιση της σπαστικότητας δεν είναι μονόπλευρη και επεκτείνεται σε διάφορα επίπεδα. Η κινησιοθεραπεία, η εφαρμογή φυσικών μέσων και ειδικών ναρθήκων και η κρυοθεραπεία, έχουν ρόλο επικουρικής παρέμβασης, αφού η αποτελεσματικότητά τους, όσον αφορά τη σπαστικότητα έχει πρόσκαιρο χαρακτήρα λίγων ωρών. Βασικά στοιχεία της αντιμετώπισης της σπαστικότητας αποτελούν η φαρμακευτική αγωγή από το στόμα και η χυμική νευρόλυση (αλλαντική τοξίνη-ενδομυϊκά) που προσφέρει τα μέγιστα αποτελέσματα όταν αρχίζει με τα πρώτα κιόλας σημάδια σπαστικότητας. Η αντιμετώπιση της σπαστικότητας με αλλαντική τοξίνη πρέπει να ακολουθείται από απαραίτητα προγράμματα κινησιοθεραπείας, εργοθεραπείας και επανεκπαίδευσης της κίνησης για να επιτευχθεί το μέγιστο λειτουργικό αποτέλεσμα.

Τα πλεονεκτήματά της χρήσης της αλλαντικής τοξίνης είναι:

- Απλός τρόπος χορήγησης, χωρίς ιδιαίτερη προετοιμασία.
- Οι ανεπιθύμητες ενέργειες είναι ελάχιστες, παροδικές και δεν επανεμφανίζονται με την κατάλληλη ρύθμιση της δόσης.
- Με την χρήση της αλλαντικής τοξίνης μπορούμε να μειώσουμε άλλα από του στόματος χορηγούμενα φάρμακα που χρησιμοποιούνται σήμερα ευρέως χωρίς ωστόσο να προσφέρουν ικανοποιητικά αποτελέσματα στην αντιμετώπιση της σπαστικότητας ενώ παράλληλα προκαλούν σημαντικές ανεπιθύμητες ενέργειες, όπως γενικευμένη κόπωση, γαστρεντερικές διαταραχές κλπ. Αντίθετα με τα από του στόματος χορηγούμενα μυοχαλαρωτικά φάρμακα η αλλαντική τοξίνη χορηγείται μόνο τοπικά με ενδομυϊκή έγχυση χαλαρώνοντας μόνο τους εν σύσπαση μυς χωρίς να επιβαρύνει τους υπόλοιπους και χωρίς να προκαλεί συστηματικές ανεπιθύμητες ενέργειες.
- Συνδυάζεται άριστα με άλλα φάρμακα χωρίς παρενέργειες.
- Προκαλεί αποδεδειγμένα ελάττωση της σπαστικότητας βελτιώνοντας την ποιότητα ζωής και προσφέροντας σημαντική βοήθεια στο πρόγραμμα Αποκατάστασης.

Πώς χορηγείται η αλλαντική τοξίνη και πόσο διαρκεί η δράση της;
Η αλλαντική τοξίνη χορηγείται με μια λεπτή βελόνα τοπικά στον μυ που θεωρείται υπεύθυνος για τα συμπτώματα σπαστικότητας. Η έγχυση του φαρμάκου πρέπει να γίνεται από εξειδικευμένο ιατρό που γνωρίζει την ανατομία της περιοχής και υπό ηλεκτρομυογραφική καθοδήγηση. Το αποτέλεσμα της χαλάρωσης των μυών όπου έγινε η έγχυση γίνεται εμφανές μετά από λίγες ημέρες , κρατάει 3 –4 μήνες και σε ορισμένες περιπτώσεις έως και 6 μήνες, γι' αυτό και πρέπει η έγχυση να επαναλαμβάνεται ανά τακτά χρονικά διαστήματα.

Είναι ασφαλής η χρήση της αλλαντικής τοξίνης;
Ναι. Παρόλο που είναι μια ισχυρή τοξική ουσία, οι δόσεις που χρησιμοποιούνται είναι τόσο μικρές που δεν έχουν επιβλαβές αποτέλεσμα. Άλλωστε έχει χρησιμοποιηθεί ακίνδυνα για πολλά χρόνια σε εκατομμύρια ανθρώπους σε περισσότερες από 70 χώρες.

9/11 World Trade Center Dust Caused Lasting Lung Damage

A study of nearly 13,000 rescue workers from the Fire Department of the City of New York (FDNY) shows that the significant proportion who suffered acute lung damage after exposure to World Trade Center (WTC) dust have not recovered normal lung function in the years since the 9/11 terrorist attacks. "This exposure at ground zero was so unique that no one could have predicted the impact on lung function. We demonstrated dramatic decline in lung function, mostly in the first 6 months after 9/11, and these declines persisted with little or no meaningful recovery of lung function among FDNY rescue workers (firefighters and emergency medical service workers) over the next 6 and a half years," said David Prezant, M.D., professor of medicine at Einstein and senior author of the study. In this 7-year study, the evaluated workers included nearly 92 percent of the 13,954 FDNY firefighters and EMS workers present at the WTC site between Sept. 11 and Sept. 24, 2001. Lung function in these 12,781 individuals was assessed by spirometry testing performed every 12 to 18 months. Spirometry measures the amount of air exhaled in a single breath.

"Severe and Persistent" Decline

All participants had been tested pre-9/11, so those spirometric results provided a baseline for assessing lung-function decline. Because the decline was severe and persistent, a substantial proportion of FDNY rescue workers were left with abnormal lung function by the end of this study – Sept.11, 2008. For example, the proportion of those who never smoked – and whose lung function was below normal – increased over the first year from 3 percent to 18 percent for firefighters and from 12 percent to 22 percent for EMS workers, stabilizing at about 13 percent for firefighters and 22 percent for EMS workers by the end of the seven-year study. "Previous studies have indicated that the effects of firefighting on lung function are mild and reversible," said lead author Thomas Aldrich, M.D., professor of medicine at Einstein and an attending physician in the pulmonary medicine division at Montefiore. "The difference seems to be that the workers in our study population experienced repeated daily exposures to much higher concentrations of airborne particulates (solid particles suspended in the air) and gaseous chemicals." Aldrich suggests that the lack of long-term recovery among the 9/11 rescue workers may be due to several factors: the unusual nature of the dust cloud itself, which was thick with particulates; inhaled pulverized material from the collapse of the towers; and smoke from fires that continued to burn until mid-December. "All smoke contains particulates, but not at the density seen in the WTC collapse, especially if you were at the site during the first two or three days or for long durations thereafter," said Aldrich. "In a normal fire, you don't get enveloped in a particulate cloud so thick that you can't even see through it." The paper, "Lung Function in Rescue Workers at the World Trade Center after 7 Years," appears in the April 7 online edition and April 8 print edition of The New England Journal of Medicine. The study was funded by the National Institute of Occupational Safety and Health.

Mass Notification Systems: A Useful Tool during Pandemic Response

The recent H1N1 flu pandemic clearly demonstrates why health facility administrators must prepare their responses to large-scale public health emergencies using every tool available. There is much at stake. Historical pandemics such as smallpox and avian flu have overwhelmed health care infrastructures and spread quickly through populations, causing serious illness and death for thousands of people. Because the potential impact of a pandemic is so great, health facilities and health organizations must be ready to quickly respond to such an event in order to mitigate the damage. Health care facilities now are using network-centric emergency mass notification to transform their existing Internet protocol (IP) networks and connected devices into highly capable emergency alerting systems. Alerts can be triggered using a Web browser on any network-connected PC (subject to authentication and granted permissions). Once activated, alerts are disseminated across the network in the form of intrusive audio/visual messages to desktop computers, as well as mobile devices such as phones, pagers, BlackBerry devices and personal digital assistants (PDAs). Since many traditional alerting channels (sirens, telephones, public address systems, etc.) now have IP interfaces, network-centric notification systems can trigger alerts to those channels, extending and unifying these systems under a single alert management platform.

Ten benefits

The advantages of a network-based emergency mass notification system for health facilities are numerous, and include:

- Unified notification: Integrates with many IP-based and legacy notification systems to provide easy and effective emergency notification from a single Web-based console.
- Rapid and pervasive reach: Distributes emergency alerts to hundreds of thousands of people through network-connected devices in minutes.
- Web-based system access: Operators can send alerts from anywhere they have a network connection (given authentication and authorization).
- Richer message delivery: Delivers detailed and tailored communications based on the threat or scenario.
- Multi-use/full-spectrum threat response: Has greater capability to respond to any pandemic or scenario requiring rapid and pervasive mass notification.
- Confirmed alert receipt and acknowledgment tracking: Tracks delivery and acknowledges every alert to ensure people have received the information.
- Personnel accountability: Receives rapid and reliable feedback on status of personnel.
- Regulatory compliance: IP-based notification complies with federal and Department of Defense (DoD) emergency mass notification guidelines.
- Cost savings: By leveraging the existing IP network, a health organization realizes substantial cost savings.
- Quick installation: By leveraging the existing network, installation and infrastructure integration can be completed within hours or very few days.

The network-centric model holds other significant benefits for health emergency managers. A network-centric alerting system gives facility emergency managers the ability to obtain and disseminate critical situational details. Alerts sent through the IP network to computer desktops can include detail unavailable through audio alerts made through a loud speaker, accelerating response times and getting the appropriate personnel to respond to each situation. Alerts can be tailored to target specific groups based on location, role and organizational hierarchy. For example, medical personnel can be directed to the emergency rooms, while non-essential building occupants are advised to stay out of infected areas of the facility. Such on-the-scene information can be invaluable to emergency managers and greatly increase the effectiveness of the response. Another critical capability of a network-centric mass alerting system is a feedback capability that can communicate the status of alert recipients. When an alert is sent, the system will require a response from recipients to determine their status (available, sick, etc.), locations and their abilities to act. This provides facility emergency managers with a reliable picture of personnel accountability and what resources are available to deploy. This amount of detailed information represents a tremendous asset in helping emergency managers make the best possible operational decisions during an emergency and will help ensure a safe outcome for all personnel. With third-generation mass notification systems, emergency managers can obtain reliable, detailed status of all impacted personnel in minutes during an emergency, thereby greatly enhancing their response to the pandemic or threat. Third-generation mass notification systems leverage existing IP networks to communicate rapidly to all connected devices, integrate and unify disparate existing mass notification channels, provide two-way communication from all personnel and achieve enterprise-level scalability and processes.

Interaction via social networking

The use of IP-based alerting in third-generation notification systems is an integral part of systems interoperability and connectivity — both critical attributes necessary to ensure the widest possible reach of any message. These systems also can leverage "IP aware media gateways," such as Web sites (commercial, public and government), social networks (Twitter, Facebook, LinkedIn) and other non-traditional channels. Adoption of standards such as common alerting protocol (CAP) can further aid with communication and getting the word out to the appropriate audience by incorporating information feeds from sources such as the Centers for Disease Control and Prevention (CDC) and the National Weather Service. Already, health facilities nationwide are using network-centric alerting to warn of emergencies, recall personnel and notify emergency workers of where they are needed.

IRWIN ARMY HOSPITAL

Recently, Irwin Army Hospital in Fort Riley, Kan., announced the deployment of an IP-based mass notification system to protect its personnel. As a hospital located on a fort, Irwin could confront a variety of emergencies such as attacks, pandemics, antibiotic-resistant bacteria outbreaks, hazmat spills and other health and safety concerns. The hospital's third-generation alerting system significantly increases its ability to contact personnel on and off site when an event occurs. Alerts rapidly are delivered through the IP network to all computer workstations using pop-up visual alerts, and computer speakers broadcast the message. The system also delivers alerts as SMS text messages to cell phones and can send emails to computers and mobile devices. Alerts can reach geographically dispersed people through multiple devices in a matter of minutes. The hospital benefits from tiered operator permissions, active directory integration and multi-unit support. Emergency operators have the ability to alert all personnel in times of emergency.

WILFORD HALL MEDICAL CENTER

Wilford Hall Medical Center serves as the Air Force's largest medical facility and is a national resource, providing complete medical care to military health care beneficiaries in the south central United States as well as specialized care to patients referred from all over the world.

As a military medical facility, Wilford Hall Medical Center uses network-centric alerting system to alert personnel of pandemics and all the types of situations, whether threats posed by weather or man-made sources. Because most people in a hospital cannot be mobilized easily in response to the threat, however, early warning is critical to enable Wilford Hall to effectively respond to emergency situations. Besides mobility challenges, Wilford Hall faces a different set of emergency scenarios. These emergencies can range from biological or chemical contamination to a large influx of patients coming into the hospital due to an accident. Additionally, the Medical Control Center serves as the eyes and ears for the medical community, and if an emergency situation arises, the group is responsible for alerting Wilford Hall personnel. When an emergency situation arises, the Medical Control Center uses IP-based mass notification system to alert the more than 5,000 computers distributed across the five-building medical facility.

LYSTER ARMY HEALTH CLINIC

Lyster Army Health Clinic at Fort Rucker in Alabama relies on third-generation mass notification to notify personnel about threats faced by domestic military installations,

whether threats posed by weather or man-made sources. The clinic provides primary care and ancillary services to a military population that consists of active duty service members, their families, a large retiree population and their family members. Lyster leverages network technology for the rapid delivery of alerts for clinic-related operational communications. These can range from biological or chemical contaminations to communication of epidemic or pandemic information or to a staff recall with a large influx of patients due to a mass casualty incident. In addition to outward-bound notifications, Lyster can connect to external sources of alerts, such as the CDC, to automate the dissemination of local or national CDC information such as recent H1N1 updates. Maintaining the privacy of personnel information is a requirement of all health care organizations, so it is vital that systems keep clinic personal information deployed behind the firewall and highly secure. The deployment of emergency mass notification at Lyster represents another step in the DoD medical community's adoption of third-generation mass notification technology. Third-generation systems leverage existing IP networks to communicate rapidly to all IP-connected devices and achieve enterprise-level scalability and processes. The result is the most effective, enterprise-wide mass notification capability with the best cost to benefit ratio. Investing in an emergency notification system architecture that leverages the existing IP infrastructure and integrates with existing sirens or public address systems promises to be the most effective way of alerting the most people in the shortest amount of time. DoD has placed its stamp of approval on network-centric alerting and health care facilities are following the DoD lead. Third-generation mass notification systems better protect people located in a health facility, but also will go a long way in helping health facility emergency managers perform their missions better.

Researchers Link World Trade Center Responders to Heart Disease

According to two studies conducted by Mount Sinai School of Medicine researchers, the World Trade Center (WTC) collapse has caused potentially dangerous heart problems in responders. The **first study**, "First Documentation of Cardiac Dysfunction Following Exposure to the World Trade Center Disaster," showed that WTC responders have impaired diastolic function of both the right and left ventricle, meaning their hearts do not relax normally, which can put them at risk for heart problems such as shortness of breath and heart failure. More than 50 percent of responders had abnormal relaxation of the left ventricle compared to only 7 percent of people of a similar age in the general population. Greater than 60 percent had isolated impaired diastolic function in the right ventricle of the heart, which pumps blood to the lungs. Lori Croft, M.D., assistant professor of medicine, and colleagues suspect that debris inhaled from the WTC site may have contributed to these heart abnormalities. They caution, however, that there is no comparison data of people working in a similar urban community plagued by air pollution and life/emotional stresses who were not exposed to the WTC site. "We know that inhaled debris may be linked to heart and lung disease," said Croft. "While we still have work to do in determining a definitive connection between heart abnormalities and the World Trade Center collapse, these data are an exciting first step." The **second study**, "Relationship between Erectile Dysfunction and Coronary Artery Calcification in a Population of Middle-Aged Men in the World Trade Center Medical Monitoring and Treatment Program," is the first to analyze the connection between erectile dysfunction (ED) and coronary artery calcification, or hardening, in middle-aged men (mean age 45.4). After adjusting for risk factors like diabetes, smoking and body-

mass index, Mary Ann McLaughlin, M.D., associate professor of medicine and cardiology, and her team found a significant independent association of ED with coronary artery calcification scores (CACS) in WTC workers. The study of WTC workers showed that men with ED were 53 percent more likely to have high-risk coronary artery calcification. The hazard ratio for ED was similar to other well-known cardiovascular risk factors such as smoking and hypertension. Coronary artery calcification is a known precursor to heart disease and can eventually lead to heart attack. "Our study is the largest to date to establish the link between ED and coronary artery calcification in middle-aged men," said McLaughlin. "These data from WTC workers provide further evidence that erectile dysfunction is an indicator of cardiovascular disease." "The findings from these analyses underscore the need to have long-term monitoring of potential health effects related to the WTC disaster," said Jacqueline Moline, M.D., vice chair of the Department of Preventive Medicine. "They also point to the need to evaluate first responders in general, to ensure that these public safety officers remain healthy and we identify what risk factors might be contributing to any potential health issues."

Predict next epidemic

http://supramap.osu.edu
Try it!

Nurses' beliefs about a bioterrorism event: Fear of abandonment

BACKGROUND/OBJECTIVES: During a bioterrorism attack in which infectious agents are used, nurses will provide direct care to ill and/or infected patients. Nurses have expressed concerns regarding possible transmission of microorganisms to their families and loved ones. There are few studies on nurses in disaster situations and the psychological stressors put on them related to the risk of infection to nurses and subsequent transmission to their families of others. The aim of this study is to identify beliefs, concerns, and feelings of nurses who work in hospitals designated as receiving sites for victims of a bioterrorism attack.

METHODS: A qualitative descriptive approach with focus groups was used. A total of 33 nurses from hospitals designated as bioterrorism-receiving sites participated in focus groups in 2003. Data from audiotapes were analyzed; categories and themes were identified.

RESULTS: Fear of abandonment was an overarching theme. Nurses believed they would be functioning in chaotic clinical settings, without a clear chain of command, and with some colleagues refusing to work. Limited access to protective equipment, risk of being infected with a deadly disease, unmanageable numbers of patients, and a potential risk of being assaulted for their personal protective equipment resulted in the sense that they would not be functioning in safe clinical environments. Loss of freedom to leave the hospital and fears that hospitals would not provide

treatment and care to them or their families should they become ill as a result of providing care to infected patients also resulted in a sense of abandonment.

CONCLUSIONS: Although the nurses in this study were in hospitals with comprehensive bioterrorism plans and resource materials, they feared they would not have readily accessible resources (human and material) to cope with the surge of patients during a bioterrorism event. Bioterrorism readiness plans should include a systematic assessment of the needs, concerns, and fears of the nursing personnel expected to provide care to infected patients. Using the assessment results, specific interventions could be incorporated into the plan to improve a sense of safety and control and facilitate nurses coping in the clinical environment.

Bioterrorism Decontamination Could Cost Trillions

The United States might need to spend trillions of dollars to decontaminate the site of a major biological attack, warns a report published last week by the University of Pittsburgh's Center for Biosecurity. The release of significant amounts of a biological warfare material could cause thousands of deaths and sicknesses, says the report, sponsored by the congressionally mandated Commission on the Prevention of Weapons of Mass Destruction Proliferation and Terrorism. The material also could spread through building interiors as well as the outside environment of a major U.S. population center, potentially settling indoors as well as on streets, parks and vehicles. The federal government has not assigned clear-cut cleanup research and execution duties to the federal entities that would be most involved in dealing with the aftermath of a biological strike -- the Environmental Protection Agency and the Defense and Homeland Security departments -- the report concludes in an assessment of federal decontamination policy and procedures. As they are now defined, the duties of each agency blur into one another and often receive inadequate funding, asserts the document. It was also uncertain what standards would have to be met for an area affected by a biological attack to be considered decontaminated or safe for habitation, according to the report. The paper urges the Homeland Security Department to designate clearer decontamination duties to each federal agency, and it presses lawmakers to increase spending on biological-weapon cleanup studies and personnel.

Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science
Volume 8, Number 2, 2010 © Mary Ann Liebert, Inc.
DOI: 10.1089/bsp.2010.0009

ENVIRONMENTAL DECONTAMINATION FOLLOWING A LARGE-SCALE BIOTERRORISM ATTACK: FEDERAL PROGRESS AND REMAINING GAPS

Crystal Franco and Nidhi Bouri

The process of environmental decontamination is a key step in a successful response to a large-scale attack involving a biological agent. Costs for the decontamination response following the 2001 anthrax attacks were estimated in the hundreds of millions of dollars, and some facilities could not be reopened for more than 2 years. However, a large-scale biological attack would likely result in an even greater amount of contamination, more areas that need to be cleaned and made safe, and a much greater cost to the American public. This article identifies gaps in decontamination policy and technical practice at the federal level and provides practical recommendations that will better enable the U.S. to undertake a biological decontamination response.

THE PROCESS OF environmental decontamination—that is, removing biological hazards from buildings, vehicles, and outdoor areas—is a key step in a successful response to a large-scale attack involving a biological agent. After the anthrax letter attacks in 2001, environmental decontamination was necessary for the mail sorting facilities that handled the contaminated letters and for the Congressional offices and media buildings that received them. The 2001 anthrax event, which resulted in 5 deaths and more than 20 illnesses, was the "worst case of bioterrorism in U.S. history"[1] thus far, but it is considered to be a small attack compared to the potential hundreds of thousands of illnesses and deaths that could result from a large bioterrorism event.[2] Still, remediation of the 2001 anthrax attacks was expensive and time consuming. Costs for the 2001 anthrax decontamination response were estimated in the hundreds of millions of dollars (not including lost time and productivity costs), and some facilities could not be reopened for more than 2 years.[3]

A large-scale biological attack would likely result in a greater amount of contamination, more areas that need to be cleaned and made safe, and a much greater cost to the American public. A biological attack on a U.S. city could contaminate both indoor and outdoor environments. Contaminated areas might include buildings, streets, parks, and vehicles, which would probably all need to be decontaminated before an affected city could be inhabited again. Given the U.S. experience with the 2001 anthrax attacks, it is possible that a city might be uninhabitable for an extensive period of time following a large biological attack.

BIOLOGICAL AGENTS OF CONCERN

The Select Biological Agents (biological organisms of particular concern) can be categorized along a continuum of decontamination difficulty, ranging from not problematic to very problematic, with a range of difficulty in between. Factors influencing the difficulty of decontamination for a particular agent following a biological attack would include both the natural stability of the agent in the environment

Crystal Franco, MPH, is Senior Analyst and Nidhi Bouri is an Analyst, both at the Center for Biosecurity of UPMC, Baltimore, Maryland.

Program Develops Mass Evacuation Simulation for Stadiums

Sports venues are supposed to be prepared for emergencies — such as a bombing or a lone shooter — that could require a quick evacuation of more than 70,000 fans. But venue managers "are not training their staffers as well as we would like," says Lou Marciani, director of the National Center for Spectator Sports Safety and Security. "They're not doing training exercises," he says, noting that it's costly to conduct live drills for events of this magnitude. Marciani is one of the leading researchers in a project that seeks to fill these training deficiencies. The Department of Homeland Security's science and technology directorate partnered with the University of Southern Mississippi and several other organizations to create a computer program called SportEvac that uses human avatars to simulate the behaviors of panicking crowds in sports stadiums. "Our goal was to try to find ways to reach security planners and give them a tool suite they can use for practicing these scenarios," says Marciani. The program can be customized to fit the specifications of individual stadiums. It uses algorithms to predict the behaviors of large groups, and it factors in variables such as irrational, drunken fans and wheelchair-bound spectators. Managers can determine how long an evacuation would take, how many people would crowd each exit and where signs could be placed to improve efficiency. The underlying concepts can be applied to evacuation simulations for shopping malls, concert halls and other crowded events, Marciani says. "This is just the beginning of the capabilities," he adds. "I hope that this modeling is carried over to other areas of critical infrastructure as a gift from the sports world." In March, developers began testing the software by applying its models to actual stadiums. They're also looking into options for commercializing the software, which they hope to get into the hands of as many stadium managers as possible.

What We Learned From H1N1's First Year

ONE year ago today, a government worker in Oaxaca, Mexico, became the first person to die of swine flu. At the bedsides of other men and women struggling to stay alive in Mexican critical care units, we clinicians noticed early on that this novel H1N1 flu virus diverged from influenza's usual pattern of activity in striking ways. It began in the Northern Hemisphere, not in Asia, and in mid-spring, not late fall or winter. It also had a worrying predilection for children and young adults, not the elderly and newborns. In the months after those first deaths, the virus ignited a global pandemic. While the epidemic never became as deadly as we initially feared, it was not as mild as some experts now believe. What's more, it exposed some serious shortcomings in the world's public health response. Those who now describe the pandemic as mild base their conclusion primarily on what, at first, seems like a mortality rate in the United States similar to those seen after seasonal influenza. But my colleagues in developing countries would strongly object. Though we lack reliable death rates from country to country, certainly no one who helped care for the large number of critically ill patients in Mexico could conclude that the flu in the United States was as severe as in developing countries that lacked our resources. Here, the vaccine arrived later than estimated, and only about 80 million Americans received it — not nearly enough, but a far higher proportion of the population than in many developing countries. In fact, only 26 of 94 poor countries in

need of the protective H1N1 vaccine have even received it so far. We also cannot count as mild any virus that was so devastating for young adults, along with pregnant women, obese patients and minorities. Worse yet, this virus made itself particularly hard for clinicians to identify. Whereas doctors associate fever and cough with outbreaks of influenza, one-third of patients admitted to hospitals and up to half of infected outpatients in this pandemic had no fever, yet they were infectious. And because it is likely that only patients with fever were tested for the presence of the virus, we greatly underestimated the number of people infected. A telling report from Britain showed that when children were tested in cross sectional surveys after the first wave of infection, one in three had antibodies to the virus, meaning that they had been infected — this was 10 times more people than estimated from clinical surveillance. H1N1 posed huge infection-control problems, especially in hospitals. This was because it was found not only on hard surfaces in the environment, which is common to all influenza strains, but in the stool of patients, a feature of avian influenza. Public health groups emphasized the necessity of frequent hand-washing, which surely helped reduce transmission. But those groups also disagreed on other preventatives: for instance, the World Health Organization and Society for Health Care Epidemiologists of America recommended the relatively inexpensive surgical mask, whereas the Centers for Disease Control and Prevention argued for the N-95 respirator mask. In our own country, the virus struck at a time when Americans seemed particularly skeptical about our government and large institutions. The C.D.C. faced an uphill battle to characterize the trajectory of the pandemic, to define its impact, to offer suggestions and to convince a wary public to get vaccinated. At times, health officials erred in their recommendations. C.D.C. authorities often said that ill children and adults could go back to school or work 24 hours after their fever disappeared — even though young children are contagious for up to three weeks and adults for 5 to 7 days. It is not an easy task, but our public health authorities need to become clearer about the lexicon of uncertainty — what they know and don't know about a pandemic. They also need to be transparent about how they devise their recommendations, which often have to balance between infection control and the daily activities of offices and schools. And we need to identify which social distancing techniques truly help control pandemics — for example, does the closing of schools and malls minimize the spread of viruses from infected children to adults?

One year after its appearance, we continue to have many unanswered questions about the virus. Will the novel H1N1 agent become a persistent seasonal virus? Can we produce vaccine more quickly by moving to a cell-based rather than egg-based method? Can we possibly identify the Holy Grail of influenza vaccination, finding a virus target common to all influenza A strains so that we can administer a single vaccination at 10-year intervals? Even as we work to solve these enigmas, we can try to prepare better for future pandemics. First, we need to approach disease control not as individual nations, but as a global community. In this, Mexico has already set an excellent example. Only 10 days passed between Mexican health authorities' recognition of a possible new epidemic and their announcement of it, a sharp contrast to the many months in 2003 between the outbreak of SARS in China and its public declaration. Mexico's transparency was a policy decision made with full recognition of the unfavorable economic consequences from H1N1, now estimated to have cost almost 1 percent of the gross domestic product. Thanks to that decision, we had an edge in fighting this virus. We should find ways to financially reward early reporting of novel infectious agents, while doing a better job of sharing resources and agreeing on common containment strategies. Second, we should rely not just on governments for reporting but on the cooperative efforts of international health organizations as well. These groups should set up better sentinel reporting systems in places where new swine or avian variants are most likely to occur — wherever people and pigs or birds live closely together — so that they can identify new virus progeny quickly. Eventually, we'll also need to encourage farmers in developing countries to follow agricultural and safety practices that make it less likely that viruses will jump species.

One predicts influenza at his own peril, but it is likely that H1N1 will continue to cause sporadic cases. In some highly susceptible, unvaccinated populations it may even produce local outbreaks. But the struggle between people and pathogens is a part of life itself. We cannot continue to be surprised every time a new virus emerges. Instead, we must use the

lessons we've learned during the year since H1N1 arrived to develop more effective public health responses.

Nuclear Terrorism: 5 Scary Scenarios

Security experts have long warned of the danger posed by terrorists determined to obtain a nuclear weapon. But now nuclear terrorism has moved to the top of the international agenda, with President Barack Obama deeming it "the greatest threat to U.S. and global security." Here are five of the leading scenarios:

1) Terrorists steal a nuclear weapon -- or buy a stolen one

Among the more harrowing scenarios would be if terrorists obtained a complete nuclear weapon, possibly from Russia, where lax controls, especially in the 1990s, made such a prospect plausible. Even today, experts wonder whether insiders in the Russian system could have slipped across the porous borders to ex-Soviet neighboring states with a nuclear weapon destined for the black market. Nuclear terrorism expert Graham Allison has been warning about such a scenario for decades, including in his 2004 book, "Nuclear Terrorism: The Ultimate Preventable Catastrophe." If terrorists did obtain a nuclear weapon, how easy would it be for them to actually detonate it? The U.S. equips its nuclear weapons with permissive action links, or PALs, which are integrated into the warhead and make it difficult for an unauthorized user to set if off. But some other countries, including Pakistan, notes David Albright of the Institute for Science and International Security, don't use PALs on their weapons.

2) A terrorist group builds its own nuke

An al-Qaida "Los Alamos" in the middle of the United States? It sounds preposterous, but some nuclear experts say a group of rogue terrorists working on a nuclear bomb in a remote U.S. location is in fact a plausible scenario. Peter Zimmerman, a nuclear physicist, and Jeffrey Lewis, an arms control expert, said in a Foreign Policy article that a technically competent terrorist could build a crude nuclear bomb using highly enriched uranium -- presumably bought on the black market -- on a budget of less than $10 million. A gun-assembled weapon, which, like the Hiroshima bomb, uses an initial charge to bring two fissionable masses together rapidly, could be transported in the back of a van or small truck for use in a terrorist attack on a major city. "In fact, it is perhaps easier to make a gun-assembled nuclear bomb than it is to develop biological or chemical weapons," they wrote. That's not to say such a scenario is likely. "A terrorist group would have to do many of the same things (though technological progress would make some steps easier) all while attempting to hide from law enforcement and intelligence," Michael Levi, a fellow at the Council for Foreign Relations, wrote of the terrorist-constructed nuke scenario. "This doesn't mean that terrorists couldn't build a gun-type bomb, but it suggests that their chances of failure aren't negligible."

3) A rogue state provides terrorists with a nuclear weapon

Would a desperate North Korean regime on the brink of collapse sell or give a nuclear weapon to a terrorist group? What about Iran? Improbable, say most analysts, who point out that countries that have gone through the trouble of developing nuclear weapons tend to keep a close eye on them. "It seems unlikely that terrorists could obtain a usable nuclear weapon from any of the nine countries that currently possess them, although there is some concern that a possible source could be the Pakistani stockpile, should that unstable country implode," wrote retired Lt. Gen. Robert G. Gard Jr., chairman of the Center for Arms Control and Non-

Proliferation, in 2008. That said, even the unlikely prospect of terrorists being given a nuclear weapon clearly worries security experts.

4) Terrorists construct a 'dirty bomb

Even those who believe a terrorist group could build or obtain a nuclear weapon admit that constructing a radiological dispersal device, better known as a "dirty bomb," would be significantly easier for terrorists to master. All it takes is radioactive materials -- such as medical or industrial isotopes -- and some conventional explosives. The International Atomic Energy Agency, which tracks trafficking of nuclear material, has registered 336 cases of unauthorized possession of nuclear or radiological material between 1992 and 2008. There is only some solace in the fact that just 15 of those cases involved highly enriched uranium or plutonium -- material suitable for a nuclear weapon. A dirty bomb wouldn't be nearly as destructive as even the smallest nuclear weapon, but by spreading radioactive material, it could sow mass panic and disruption. Set off in New York or Washington, such a device could have a devastating impact, making parts of a city uninhabitable for the long term.

5) Terrorists attack a nuclear facility

After the 9/11 attacks in New York and Washington, U.S. officials admitted they had never considered the prospect of an attack using commercial airliners on nuclear facilities. Now the Nuclear Regulatory Commission says the nation's nuclear power plants are secure from attack, but at least one former intelligence official claims that's not the case. Charles Faddis, a retired CIA official who reviewed nuclear plant security around the country, recently concluded that the facilities were woefully unprepared for a terrorist attack. "A full-scale meltdown of a major reactor would be catastrophic," he warned. "Such an incident at the Indian Point Plant in New York state, for instance, would likely render large parts of the metropolitan New York City area uninhabitable for decades and likely kill tens of thousands."

Al Qaida: Hiding in Plain Sight

With the almost daily killing and capture of key personnel in Pakistan, Al Qaida is being forced to communicate in a completely different way. "Electronic dead-drops," says Army Reserve Lt. Col. Tony Shaffer, a former Defense Intelligence Agency officer, are what Al Qaida is relying on since couriers and so many foot soldiers are being rolled up. When they get caught, so do key Al Qaida documents, plans and key communications. But Shaffer says now "they're hiding it on the internet." It's not a new concept, but certainly one that's gaining a lot of momentum since a growing number of critical commanders and operators have either been killed or arrested. So how are these dead drops happening? "Steganography in photographs is a good example of a dead drop," according to Shaffer. In a nutshell, a dead drop in a photo involves embedding a message in a picture. "If you take a photograph and you can take every, every other, digit in the digitization and make information instead of pixilation, you have essentially a message embedded in that," says Shaffer. For example: Shaffer says, "you could send 'Marwan' his picture of your wedding and within that is hidden a secret message." Just plain conversational emails can be loaded with secret messages. That's how Major Nidal Malik Hassan, the Ft. Hood shooter went unnoticed. Shaffer says, "when Maj. Hasan was talking with Awlaki, the radical cleric, there's evidence now that I don't think has been released publicly, there's evidence they were sending codes back and forth in open text." He adds secret messages hidden on the internet aren't always secret. "Obviously in the Maj. Hasan thing, sometimes they can code things openly."

Forsheda A4 NBC set consist of

- **NBC respirator A4**
- **NBC filter A4, spare filter to be ordered separate.**
- **Respirator bag**

FORSHEDA

FORSHEDA AB SE-330 12 FORSHEDA • SWEDEN
TEL. +46 370 89000 • FAX +46 370 81771

Warning
Even with best possible protection, never stay in a contaminated area.

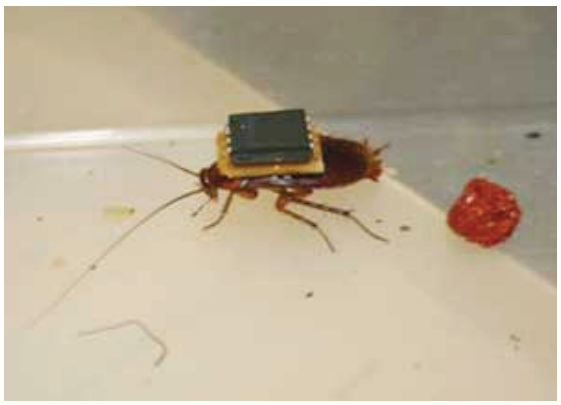
Avon Protection's Innovative FM53 Mask Awarded CE Certification

Avon Protection, part of Avon Rubber p.l.c., has received CE certification for its multi-functional FM53 mask. This, along with the recent NIOSH award, cements the FM53's position as the most advanced respiratory solution on the market, and Avon as the overall leading designer and manufacturer of CBRN respiratory products. The technically advanced FM53 is the first mask with twin 40mm filter ports to be awarded CE approval. These ports allow the user to easily select a right or left mounted filter. They also enable the use of the unique ST53 Self-Contained Breathing Apparatus (SCBA), which provides a filter and SCBA capability at the same time at the switch of a button. The ST53™ SCBA system is currently going through its CE approval and it is anticipated that this will be available as a CE approved product in April 2010. The FM53 is the only mask of its kind that has been specifically designed to protect users against the multiple threats and meet the asymmetric warfare challenge of today. This is due to the patented twin exhalation valve that provides end users with the capability to use the mask as a negative or positive pressure respirator via an easily accessible lever on the Variable Resistance Exhalation Unit (VREU), therefore enabling different threat environments to be entered without the need to change equipment. It offers the user the highest levels of comfort, and is available with a variety of features such as panoramic optically correct flexible visors, clear, sunlight, laser and blublocker outserts, voice projection units and interchangeable nosecups for maximum comfort and fit. Finally, the FM53 is interoperable with all communications systems. Both the FM53, and the ST53™, provide protection against traditional chemical and biological warfare agents, select Toxic Industrial Materials (TIMs) and particulate matter, including radioactive dust threats. This means a high protection factor for the wearer, and therefore complete peace of mind. With CE approval, and NIOSH last year, the FM53 is now accessible to a wider range of users, from SWAT teams, worldwide Special Forces and the FBI to leading European police forces, several of whom are currently trialling and evaluating the system for their officers. Matt Evans, Sales and Marketing Director, explains: "We at Avon design and manufacture respiratory solutions that focus on end user needs, by creating features that offer improved comfort, ease of use and adaptability with other systems. The FM53 is no exception, and is widely renowned as the best the marketplace has to offer in terms of respiratory systems. With CE approval being added to its long list of benefits, it is perfect for a broad range of users where the situations entered demand a versatile respirator with the ability to change according to the threat faced. Adding the CE mark is therefore a significant move forward, enabling us to target markets that so far have not had the opportunity to work with this exceptional respirator."

Backpack-Wearing Cockroaches to Detect Radiation

The creature that's expected to inherit the Earth following a nuclear holocaust might also be well suited to help prevent man's atomic self-destruction. Researchers at Texas A&M University's Nuclear Security Science and Policy Institute have attached radiation sensors to

the backs of cockroaches. They hope public-safety officials will one day send the souped-up insects into situations that are too risky for humans. “Cockroaches really are the perfect medium for this,” says William Charlton, an associate professor of nuclear engineering at the university and a principal investigator on the project. “They can go for extraordinarily long periods of time without food. They exist on every continent except Antarctica. They’re very radiation resistant, and they can carry extremely large amounts of weight compared to their body mass.” He envisions teams of about 20 remotely-controlled roaches — each carrying one of three types of sensors meant to detect different nuclear materials — that would march through areas of up to a square kilometer and send their readings back to an operator via a tiny, low-energy communications system. This would help officials determine if potentially contaminated areas — such as buildings where they suspect terrorists have planted a dirty bomb — are safe for humans. The operator will be able to manipulate the insects’ forward and directional movements — cockroaches can’t crawl backward — using devices that apply pressure to parts of their antennas and stimulate their leg muscles. “It’s like a cattle prod for cockroaches,” Charlton says. Five faculty members and about six graduate students at the institute are working on the project, which is funded by the National Science Foundation. They’re now designing sensors and communications systems that are small enough to fit on a roach’s back, and both devices will use low-energy circuits that could also be installed in cell phones and hand-held computers. The team originally planned to build bug-like robots, but they soon found that the motor functions consumed too much power. “A biological platform doesn’t take any power to move,” Charlton says. “That really was the breakthrough in the program.” Cockroaches can run tirelessly for 35 minutes, according to a university document describing the system. And the resilient insect can carry a 3-gram load for months.



Poll: Hypothetical anthrax attack and antibiotics

In a national poll aimed at helping with planning efforts for a public health response to a possible bioterrorism attack, researchers at the Harvard School of Public Health (HSPH) have found that, in response to a fictional scenario describing a significant anthrax attack in their city or town, most Americans (89%) will likely follow public health recommendations to obtain prophylactic antibiotics. However, a significant minority of those likely to pick up antibiotics (39%) will hold on to them rather than take them right away, which public health experts believe may put them at greater risk of serious illness. Further, 21% of Americans are 'not at all familiar' with the term 'inhalation anthrax,' and an additional 25% hold the mistaken belief that inhalation anthrax is contagious - two factors that could compromise their following emergency instructions meant to protect them against this biological agent. Anthrax has been identified by government planners as a likely agent should there be a future bioterrorist attack, and 'inhalation anthrax' is a potentially lethal illness that can be contracted when spores containing anthrax are inhaled. Public health experts believe antibiotics that are started quickly - possibly even before a person is certain they have been exposed to anthrax spores or before symptoms of the illness appear - may have the greatest likelihood of successful treatment. The poll was conducted December 9-28, 2009 among a national sample, as well as people living in areas that actually experienced anthrax attacks in 2001: Washington, DC, Trenton/Mercer County, NJ and New York City. The poll was conducted as part of an ongoing series by the Harvard Opinion Research Program at HSPH. The polls are aimed at helping federal, state and local governments better understand the general public's needs and beliefs in the event of a traumatic public health emergency, including biological

threats and natural disasters, and to formulate plans for the best delivery of countermeasures. The Harvard researchers have no knowledge of an impending biological attack using anthrax in the United States. 'Publicising key information - such as where to get antibiotics and that inhalation anthrax is not contagious - would be vital to helping people protect themselves effectively in the case of a significant attack,' said Professor Robert Blendon, Director of the Harvard Opinion Research Program and an expert in understanding the public response to emergencies that involve health threats. 'As these results show, clear communication with the public, in the context of what could be a frightening and catastrophic event, should be a critical priority.' The poll examined the public's reaction to a possible, significant anthrax attack in their city or town and their likelihood of responding effectively to public health recommendations to 1) go to local antibiotic dispensing sites and 2) take prophylactic antibiotics. Given this fictional scenario, more than 80% of adults said they would be worried about becoming seriously ill or dying, including about half (46%) of adults who said they would be 'very worried' and 36% who said they would be 'somewhat worried.' In addition, if they heard about this attack on the news, most adults (64%) would expect the event to be part of a series of attacks, and only 27% said they would expect it to be an isolated incident. The poll found that a majority of adults (89%) said they would likely follow public health officials' initial recommendations to go get antibiotics from a dispensing site after an anthrax attack. Among parents, 91% said they would be likely to go get the antibiotics for their children. Of adults who said they would be 'very likely' to go to the sites, the vast majority said they'd go even if they knew they had to wait in line for two hours (94%). However, the poll also finds that a sizeable minority of adults may not follow through on the public health recommendations. Of adults who said they were likely to go to the sites, only a little more than half (57%) said they would start taking the antibiotics right away. Thirty-nine percent said they would hold on to the pills and either wait to take them until they found out if they were truly exposed to anthrax (35%) or for the foreseeable future (4%). The responses of parents intending to get the pills paralleled these results, with 60% of those who were likely to go to the dispensing site saying they would start giving their children the pills right away, while 38% saying they would hold on to the pills and either wait to see if their child was truly exposed (36%) or for the foreseeable future (2%). 'It's concerning that some people will not take the antibiotics after picking them up at the dispensing site because such 'wait and see' behaviour could put those who were exposed at greater risk for serious illness or even death in the event of this kind of anthrax attack,' said Gillian SteelFisher, research scientist in the HSPH Department of Health Policy and Management and assistant director of the Harvard Opinion Research Program. 'Experts believe that antibiotics have the greatest effect when started quickly - before any clinical signs of disease - and this may be before people are certain they have been exposed.' The poll results also call attention to potential areas of resistance to public health recommendations by examining the reasoning among those who said they were unlikely or only 'somewhat likely' to go get antibiotic pills at these dispensing sites (for themselves or for their children); this included roughly a third (34%) of people. This group most often cited worries about officials being unable to control crowds (45%) as a 'major reason' for their decision. Other major reasons were that they would: worry about being exposed to anthrax while going to a dispensing site (41%); worry that there would not be enough antibiotics (40%); worry about the safety of the antibiotics (38%). Some also said that they would wait to get antibiotics until they were sure they truly had been exposed to anthrax (37%). While a majority of the public said they were confident in the government's ability to deliver antibiotics quickly to everyone in their city or town, it is notable that a sizeable minority did not agree. Nearly two-thirds (63%) were confident that there would be a sufficient supply of the antibiotics for everyone in their city or town who wanted them, but a third (36%) were not confident. The poll also included people living in areas that actually experienced anthrax attacks in 2001 (Washington DC, Trenton/Mercer County, NJ and New York City). The poll found that people from these areas had similar responses to the nation as a whole, but there are notable differences in responses to two questions. Adults from the DC metro and Trenton/Mercer County regions were less likely than those in New York City or nationally to be 'not at all familiar' with the term 'inhalation anthrax' (13% and 15% vs. 22%

and 21% respectively). In addition, upon hearing the scenario concerning possible anthrax attacks in their city or town, people in the DC metro, Trenton/Mercer County and New York City metro regions were all more likely than people nationally to expect the event to be an isolated incident (40%, 42%, 37% vs. 27%) rather than part of a series of attacks. This poll is part of an on-going series of surveys focused on the public's response to public health emergencies by the Harvard Opinion Research Program (HORP) at Harvard School of Public Health. It is the second poll focused on anthrax specifically, following a poll conducted in 2001 concerning the worries and behaviours of people in three metropolitan areas following reports of multiple anthrax attacks in those locations. This study was designed and analysed by researchers at the Harvard School of Public Health (HSPH). The project director is Robert J. Blendon of the Harvard School of Public Health. The research team also includes Gillian K. SteelFisher, John M. Benson, Mark M. Bekheit and Robin C. Herman of the Harvard School of Public Health, as well as Melissa J. Herrmann of SSRS/ICR, an independent research company. Interviews were conducted via telephone (including both landline and cell phone) for HORP by SSRS/ICR of Media (PA) December 9 through December 28, 2009 among a nationally representative sample of 2625 respondents age 18 and older. Of those a total of 1092 nationally representative respondents, 517 from the NYC metro area, 509 from the DC metro area and 507 from the Trenton/Mercer County, NJ area. The margin of error for total respondents is +/-2.44%; National +/-3.64%; NYC +/-5.61%; DC +/-5.74%; Trenton/Mercer +/-5.63% at the 95% confidence level. Possible sources of non-sampling error include non-response bias, as well as question wording and ordering effects. Non-response in telephone surveys produces some known biases in survey-derived estimates because participation tends to vary for different subgroups of the population. To compensate for these known biases, sample data are weighted to the most recent Census data available from the Current Population Survey for gender, age, race, education, region or state (where relevant), and homeownership. Sample data are also adjusted to National Health Interview Survey estimates of cell phone usage. Other techniques, including random-digit dialling, replicate subsamples, and systematic respondent selection within households, are used to ensure that the sample is representative.

Minrav to build emergency underground hospital

Minrav Holdings Ltd. has won the tender from Rambam Hospital in Haifa to build a three-floor underground car park, which can be used at short notice as an emergency hospital. The cost of the work will be NIS 250 million. The project covers 90,000 square meters and is being financed by the government, the Ofer family, the Rappaport family, and the Yosef Fishman family. Foundation excavations covering 20,000 square meters are currently being dug with millions of cubic meters of brackish groundwater being pumped into the sea. In regular times the three storey underground facility will be used as a car park for 1,500 vehicles and will provide a solution for the lack of parking at Rambam Hospital. In an emergency the facility can be transformed into a hospital for 2,000 patients and will provide protection from nuclear, chemical and biological weapons. The work is expected to take 22 months.

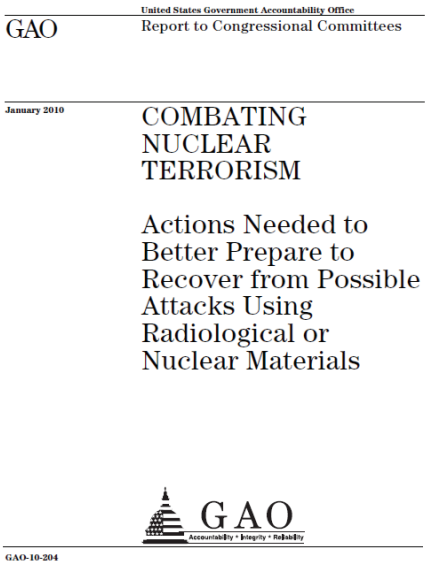
Canadian researchers study mass gatherings and risks of infectious disease threats

As the world watches the Vancouver Olympics, researchers at St. Michael’s Hospital in Toronto and Children’s Hospital Boston have teamed up to monitor and assess potential infectious disease threats to Vancouver during the Winter Games by integrating two independently developed intelligence systems that focus on global infectious diseases; bio.DIASPORA and HealthMap. The communicating systems, developed by two Canadians – Dr. Kamran Khan at St. Michael’s and Dr. John Brownstein of the Informatics Program at Children’s Hospital Boston – are now producing the first, real-time analyses on potential

threats to mass gatherings. The collaboration, and corresponding analysis of threats to the Olympic Games, is described in an article published online by the Canadian Medical Association Journal today. “Mass gatherings can potentially amplify and disperse infectious disease threats globally because they can draw millions of people from around the world into a single space,” says Dr. Kamran Khan, an infectious disease physician and scientist at St. Michael’s Hospital. “By enabling our two systems to communicate in real-time, we are exploring new ways to generate actionable intelligence to organizers of mass gatherings.” Dr. Khan is the developer of bio.DIASPORA, which enables the study of global air traffic patterns and applies this knowledge to help the world’s cities and countries better prepare for and respond to emerging infectious diseases threats. Dr. Brownstein is a co-founder of HealthMap, an online global disease-tracking and mapping tool which leverages information sources on the Internet to detect infectious disease outbreaks around the world. For the 2010 Winter Olympic Games, Dr. Khan analyzed recent worldwide air traffic patterns during the month of February, to predict where passengers travelling into Vancouver would be originating from. His team found that nearly two-thirds of all international passengers traveling to Vancouver came from just 25 cities. Dr. Brownstein’s team then concentrated its infectious disease surveillance efforts on those cities, which it continues to do on an hourly basis during the course of the Winter Games (a real-time view of this analysis is available online). “Internet-based, geographically-directed infectious disease surveillance may greatly compliment traditional preparations for infectious disease threats at mass gatherings by identifying infectious disease at their source and potentially preventing importation/exportation of infection among attendees,” explains Dr. Brownstein at Children’s Hospital. “We look forward to continued research and dialogue in this area and seeing how the information we glean from monitoring these Games may be useful in terms of preparing for future mass gatherings like the upcoming G20 Summit in Ontario, Canada and this year’s FIFA World Cup in South Africa.”

Dirty Bomb Recovery Plans Lacking

US cities recently surveyed by congressional investigators would require the assistance of the federal government to clean up after a dirty bomb attack, but they were confused as to which federal agencies from which to seek help in such a recovery. The Federal Emergency Management Agency (FEMA), which has responsibility for developing national recovery plans, should produce one for improvised nuclear devices (IND) or radiological dispersal devices (RDD) to designate clear lines of responsibility for cleaning up after a terrorist attack using a radiological device, the Government Accountability Office (GAO) said in a Feb. 26 report. A GAO survey of 13 US cities and most states revealed that they would require significant assistance from the federal government to clean up after a dirty bomb or nuclear attack. But city and state officials could not consistently identify which federal agency would help them after such an attack, said the GAO report, Combating Nuclear Terrorism: Actions Needed to Better Prepare to Recover from Possible Attacks Using Radiological or Nuclear Materials. "To date, most federal attention has been given to developing a response framework, with less attention to recovery," the report stated. "Responding to an attack would involve evacuations and providing treatment to those injured; recovering from an attack would include cleaning up the radioactive contamination to permit people to return to their homes and businesses. Existing federal guidance provides limited direction for federal, state,



and local agencies to develop recovery plans and to conduct exercises to test recovery preparedness." In the past six years, the Department of Homeland Security (DHS) conducted more than 90 RDD and IND response capabilities but only three of those tests included any recovery components, the report added. FEMA should correct this oversight by scheduling additional exercises to test recovery preparedness, GAO recommended. Rep. Bennie Thompson (D-Miss.), chairman of the House Homeland Security Committee, expressed concern over the findings of the report in a Feb. 26 statement. "The GAO has highlighted an important security gap that is often overlooked-recovery," Thompson said. "While our intelligence and law enforcement are exerting much effort in preventing radiological or nuclear terrorism, and our first responders spend a lot of time getting ready to respond, very little thought has been given to how we might recover from such an event. "Local and state governments have admitted that they could not handle cleanup and rebuilding efforts on their own. Focusing on prevention, interdiction, and response are understandable. To truly protect this country from long-term economic and social disruption, however, will require proper recovery plans, resources, and leadership to be ready and available at the federal level," he said. The report further suggested that the Department of Energy (DOE) and the Environmental Protection Agency (EPA) were the federal agencies best suited to clean up areas contaminated by radiation. However, GAO was not certain that their capabilities were sufficient to clean up the size of an area that could be radiated by large dirty bombs. "According to an expert at DOE's Idaho National Laboratory, experience has shown that not selecting the appropriate decontamination technology can generate waste types that are more difficult to remove than the original material and can create more debris requiring disposal-leading to increased costs," the report commented. "Limitations in laboratory capacity to rapidly test potentially millions of material samples during cleanup, and uncertainty regarding where to dispose of radioactive debris could also slow the recovery process. At least two-thirds of the city, state, and federal respondents expressed concern about federal capability to provide the necessary cleanup actions after these incidents," the report continued. Cities and states surveyed provided opinions to GAO on how to improve federal recovery preparedness. Almost all of them called for a national disaster recovery strategy that would address gaps and overlapping federal jurisdiction. Most sought more guidance on monitoring radioactivity levels, cleanup standards, and radioactive waste management.

Bacteria Trail Betrays Identity Of Computer Users

Scientists at the University of Colorado at Boulder have found that the bacteria trail left behind on objects like computer keyboards and mice can analyzed and used to help identify users of those devices. "Your body is coated with bacteria inside and out," says CU-Boulder assistant professor Noah Fierer in a video on YouTube. "You're basically a walking microbial habitat. And we found that the diversity of bacteria just on the skin surface is really pretty incredible. You habor hundreds of different bacteria species just on your palm, for example. We've also found that everybody is pretty unique. So of those let's say hundred or so bacteria species, very few are of them are shared between individuals." What Fierer and his colleagues have demonstrated in a new study is that the distinctive combination of bacteria each of us carries and distributes can be used to help identify what we've touched. Such work may one day help link individuals to malicious computer use or other crimes. The study, "Forensic identification using skin bacterial communities," appears in the March 15 Proceedings of the National Academy of Sciences. It describes how the researchers swabbed bacterial DNA from the keys of three personal computers and matched them to the bacteria on the fingertips of the owners of the keyboards. It also details a similar test conducted on computer mice that had not been touched for over 12 hours. The study indicates that the technique is 70% to 90% accurate and Fierer expects that accuracy will improve as the technique is refined. Until accuracy is extremely high, the technique is most likely to be useful as a way to augment more established forensic techniques, like fingerprinting and DNA identification. "There's still a lot of work we need to do to assess the validity of the technique and how well we can

recover bacteria from surfaces and how well we can match objects to the individual how touched that object," Fierer explains in the video. In a University of Colorado at Boulder news release, Fierer said that the new technique raises bioethical issues, including privacy. "While there are legal restrictions on the use of DNA and fingerprints, which are 'personally-identifying,' there currently are no restrictions on the use of human-associated bacteria to identify individuals," he said.

New anti-suicide bomber barrier

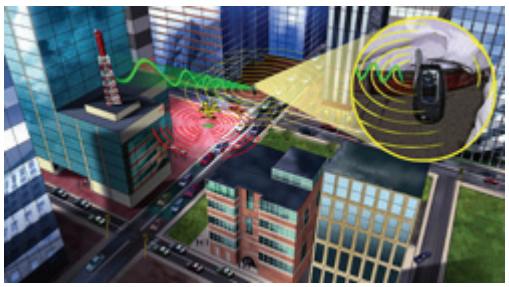
A new concrete security barrier, BsecB will be exhibited for the first time at the forthcoming Counter Terror Expo at London's Olympia on 14-15th April 2010. Developed by Britpave, the transport infrastructure group, BsecB has been developed to negate the threat of cars and lorries being used by suicide bombers. Full scale tests have proved that the barrier could stop a 7.5 tonne lorry travelling at 50mph (80kph) and would also prevent any follow-up vehicles from getting through. BsecB meets all the security impact standards of PAS 68:2007. The barrier has recently been installed at Edinburgh Airport to protect the terminal building.

CBRN defence worldwide market for the year 2009 totals $7.9 billion

The Infoshop by Global Information would like to present a new market research report, "CBRN Defence Market 2010-2020" by Visiongain. The leading markets for chemical, biological, radiological and nuclear (CBRN) defence products and services is one of the most important markets in the defence and homeland security sector. Moreover, there are substantial business opportunities in the CBRN defence market. Analysis at Visiongain concludes that in 2009, CBRN defence products are "a very significant market with worldwide spending totaling $7.9bn". It is crucial to understand the combination of restraints and drivers in order to recognize what is causing the worldwide growth of the CBRN market. Most importantly, there have been several historical cases of CBRN terrorism, including the 2001 US Anthrax campaign and the 1995 Sarin attack on the Tokyo subway. Therefore, research and analysis in the CBRN defence market is not only relevant, but vital for answering the question of how are major economies preparing their military and civilian personnel to respond to future CBRN attacks? Additionally, to what extent is sensitivity to the threat of terrorism driving sales of CBRN defence systems? Moreover, which regions present the most growth opportunities between the year 2010 and 2020? Finally, in what way are strategies for responding to CBRN attacks being modified to meet requirements that are constantly changing?

Cell-All: Super Smartphones Sniff Out Suspicious Substances

Years ago, if you wanted to take a picture, you needed a dedicated camera. You needed to buy batteries for it, keep it charged, learn its controls, and lug it around. Today, chances are your cell phone is called a “smartphone” and came with a three-to-five megapixel lens built-in—not to mention an MP3 player, GPS, or even a bar code scanner. This Swiss Army knife trend represents the natural progression of technology—as chips become smaller and more advanced, cell phones continue to absorb new functions. Yet, in the future, these new functions may not only make our lives easier, they could also protect us—and maybe even save our lives. The Cell-All initiative may be one such savior. Spearheaded by the Department of Homeland Security’s Science and Technology Directorate (S&T), Cell-All aims to equip your cell phone with a sensor capable of detecting deadly chemicals at minimal cost—to the manufacturer (a buck a sensor) and to your phone’s



battery life. “Our goal is to create a lightweight, cost-effective, power-efficient solution,” says Stephen Dennis, Cell-All’s program manager. How would this wizardry work? Just as antivirus software bides its time in the background and springs to life when it spies suspicious activity, so Cell-All regularly sniffs the surrounding air for certain volatile chemical compounds. When a threat is sensed, a virtual ah-choo! ensues in one of two ways. For personal safety issues such as a chlorine gas leak, a warning is sounded; the user can choose a vibration, noise, text message, or phone call. For catastrophes such as a sarin gas attack, details—including time, location, and the compound—are phoned home to an emergency operations center. While the first warning is beamed to individuals—a grandmother taking a siesta or a teenager hiking through the woods—the second warning works best with crowds. And that’s where the genius of Cell-All lies—in crowdsourcing human safety. Currently, if a person suspects that something is amiss, he might dial 9-1-1, though behavioral science tells us that it’s easier to do nothing. If he does do something, it may be at a risk to his own life. And as is often the case when someone phones in an emergency, the caller may be frantic and difficult to understand, diminishing the quality of information that’s relayed to first responders. An even worse scenario: the person may not even be aware of the danger, like the South Carolina woman who last year drove into a colorless, odorless, and poisonous ammonia cloud. In contrast, anywhere a chemical threat breaks out—a mall, a bus, subway, or office—Cell-All will alert the authorities automatically. Detection, identification, and notification all take place in less than 60 seconds. Because the data are delivered digitally, Cell-All reduces the chance of human error. And by activating alerts from many people at once, Cell-All cleverly avoids the longstanding problem of false positives. The end result: emergency responders can get to the scene sooner and cover a larger area—essentially anywhere people are—casting a wider net than stationary sensors can. But what about your privacy? Does this always-on surveillance mean that the government can track your precise whereabouts whenever it wants? To the contrary, Cell-All will operate only on an opt-in basis and will transmit data anonymously. “Privacy is as important as technology,” avers Dennis. “After all, for Cell-All to succeed, people must be comfortable enough to turn it on in the first place.” For years, the idea of a handheld weapons of mass destruction detector has engaged engineers. In 2007, S&T called upon the private sector to develop concepts of operations. Today, thanks to increasingly successful prototype demonstrations, the Directorate is actively funding the next step in R&D—a proof of principle—to see if the concept is workable. To this end, three teams from Qualcomm, the National Aeronautics and Space Administration (NASA), and Rhevision Technology are perfecting their specific area of expertise. Qualcomm engineers specialize in miniaturization and know how to shepherd a product to market. Scientists from the Center for Nanotechnology at NASA’s Ames Research Center have experience with chemical sensing on low-powered platforms, such as the International Space Station. And technologists from Rhevision have developed an artificial nose—a piece of porous silicon that changes colors in the presence of certain molecules, which can be read spectrographically. Similarly, S&T is pursuing what’s known as cooperative research and development agreements with four cell phone manufacturers: Qualcomm, LG, Apple, and Samsung. These written agreements, which bring together a private company and a government agency for a specific project, often accelerate the commercialization of technology developed for government purposes. As a result, Dennis hopes to have 40 prototypes in about a year, the first of which will sniff out carbon monoxide and fire. To be sure, Cell-All’s commercialization may take several years. Yet the goal seems imminently achievable: Just as Bill Gates once envisioned a computer on every desk in every home, so Stephen Dennis envisions a chemical sensor in every cell phone in every pocket, purse, or belt holster. If it’s not already the case, our smartphones may soon be smarter than we are.

Russia's Terror-Fighting Trains Back on the Rails

The armored train was an important weapon in the Russian Revolution and the ensuing civil war. Now, it looks as if the Russian government may bring a few out of retirement to fight insurgents in the restless north Caucasus. While the war in Chechnya may be officially over,

attacks on the railway system in neighboring Dagestan have become a major problem. Andrew McGregor of Eurasia Daily Monitor documents over half a dozen recent attacks by militants, who have targeted railways and other key infrastructure. And last year, terrorists struck the Nevsky Express, a luxury train on the Moscow-St. Petersburg line. A recent article in Russia's Nezavisimoye voennoye obozrenie (Russian only, sorry) quotes Lt. Gen. Sergei Klimets, commander of Russia's railway forces, as saying that the special trains were on standby in Russia's Stavropol region, should they be needed. "The situation is very tense and requires additional measures to ensure the safety of steel highways of the north Caucasus," the general reportedly said. "So if we get orders to move out, they will be implemented in full." It's an interesting development, with some pretty rich history behind it. The website of Russia's ministry of defense has a good photo gallery of railway troops in action in Chechnya (1995-1996) and in Abkhazia (in 2008). And if you've never seen the cheesy epic Reds, spare yourself three hours and watch the best nine minutes on YouTube: The climactic action scene in which the armored train carrying Warren Beatty gets ambushed by the Whites. The train, the report states "was derailed yesterday by a force of the enemy who were in ambush, and it is estimated the British loss was 100 to 150 in killed, wounded, and missing. Among the latter are Capt. Haldane and Lieut. Winston Churchill, son of Lady Randolph Churchill. Both, it is believed, are prisoners."

Chile's nuke fear

When the magnitude-8.8 earthquake struck, the radioactive material was already packed

tightly away, ready for shipment. But the planned exit route was impossible — huge cracks in the highway and the crane at the port was out of commission. Working closely with the Chileans, the team figured out a roundabout, eight-hour way to reach a functioning port, and drove through the night to reach the U.S. ships. Lo Aguirre raised fears about Chile's nuclear intentions during Pinochet's long dictatorship. But the generals never found a useful purpose for the HEU and finally shelved the military's nuclear program as too costly. The reactor hasn't been active for more than a decade. Its control room,

now in civilian hands, is frozen in time, with outmoded computers and indicator panels. Chile's older civilian reactor, La Reina, was converted to LEU about five years ago with U.S. help. Now that both reactors are free of HEU, Chile can worry less about thwarting terrorists. The government also hopes to show citizens it is managing waste responsibly — a key step toward securing popular approval for building nuclear power plants, explained Juan Carlos Chavez, a top Chilean nuclear scientist. "It's a win-win," Chavez said. "Without energy, we can't have development. But you can't sell the people a camel telling them that it's a horse.... We have to include in the discussion what we're going to do with the waste." After two and a half weeks at sea, a specially outfitted double-hulled ship arrived under U.S. Coast Guard escort in late March at the Charleston Weapons Station in South Carolina. Customs agents and nuclear inspectors climbed on board, measuring for radiation in the vast cargo hold before clearing its crew. A massive crane then gingerly lifted out the containers and loaded them onto flatbed trucks adapted to safely handle the extra weight. Another radiation check, and they were off, bound for Savannah River and Y-12. Chile's HEU will remain radioactive for 5,000 more years, but much of it will be converted to safer fuel and resold for nuclear power. In any case, it's a good bet now that it won't end up in a bomb.

Andrew Bieniawski was in bed when the earthquake struck. On Feb. 26, Bieniawski, the assistant deputy administrator for the U.S. National Nuclear Security Administration (NNSA), had arrived in Santiago, Chile, to join a group of scientists and nuclear engineers on a top-secret mission to remove a potential nuclear bomb from the country. Around 40 lb. (18 kg) of highly enriched uranium (HEU) — with enough latent energy to destroy a portion of a city — had already been inventoried, secured and made ready for transport to a highly secure facility in the U.S. Running ahead of schedule, Bieniawski had taken his team out for dinner with Chilean nuclear agency officials before heading to bed. Then the big one hit. The Chilean earthquake carried the power of 10,000 Hiroshima bombs. It severed power and communication lines, closed highways, sparked looting and led the country's President to declare a state of emergency. Within minutes of the quake, Bieniawski had gathered the NNSA officials in a hotel lobby, where the group spent the next four hours trying to make contact with two sites — a military base and research reactor — where the uranium had been stored. Unable to reach one of the sites by phone, the head of the Chilean nuclear agency, Fernando Lopez-Lizana, eventually had to drive there himself.

Concrete Safety Systems Provides Barrier For Vehicle Deterrence During Nuclear Security Summit

Concrete Safety Systems is providing 5,400 linear feet of the company's precast concrete barrier to help control the flow of vehicles in Washington during this week's Nuclear Security Summit. "We have provided precast concrete barrier for a number of high-profile events such as this one, including the Inauguration and political conventions," said Matthew Smith, Vice President of Sales and Marketing at Smith-Midland. "Our J-J Hooks barrier provides an advantage to organizers because it can be rapidly relocated to accommodate dynamic security needs, helping to ensure adequate safety for pedestrians and vehicles during a large event." The summit, taking place yesterday and today in Washington, was expected to draw about 800 people, including state leaders and their security details, and was expected to have a major effect on traffic and public transportation throughout the region due to numerous street closures near the site of the event. The J-J Hooks barrier connection system has been crash tested to National Cooperative Highway Research Program 350 standards and passed TL3 requirements. Self-aligning, identical ended J-J Hook connectors allow for quick, easy installation of the barrier. There is no loose hardware, permitting a single section to be easily removed without disturbing adjacent sections and eliminating the possibility of lost, stolen, or damaged parts. This is important for both easy emergency access and protection against tampering and vandalism. J-J Hooks can be used as either a temporary or permanent barrier system.

Valortim(R) Anthrax Anti-Toxin May Augment Immune System's Ability To Destroy Anthrax Bacteria

PharmAthene, Inc. (NYSE Amex: PIP), a biodefense company developing medical countermeasures against biological and chemical threats, announced that new data from the Company's Valortim® anthrax anti-toxin program were presented at the 8th Annual ASM Biodefense and Emerging Diseases Research Meeting, held in Baltimore, Maryland, February 21-24, 2010. The data were presented by Dr. Alan S. Cross, Professor of Medicine and Dr. Subhendu Basu, Assistant Professor, University of Maryland School of Medicine, in a poster presentation entitled Human Adaptive Immune Response to Bacillus Anthracis. Valortim® is a fully human anti-toxin monoclonal antibody being developed for the prevention and treatment of inhalational anthrax. Preclinical studies suggest that Valortim® has the potential to provide protection against anthrax infection when administered prophylactically (prior to the emergence of symptoms of anthrax infection) and also may increase survival when administered therapeutically (once symptoms become evident). Previous data presented by

Drs. Cross and Basu have shown that in addition to inhibiting anthrax toxin, Valortim® appears to augment the immune system's ability to kill anthrax bacilli by enhancing the human dendritic cell response to a challenge with anthrax spores. These new data expand upon these observations by showing that Valortim® also enhances the human T cell response to B. anthracis. In addition to Valortim's established toxin-neutralizing function, which has been previously described, these studies indicate that it may also assist in enhancing the adaptive immune response to anthrax, which may lead to a reduction and clearance of the bacteria in the host organism. Dr. Cross remarked, "Our latest research using human immune cells provides additional evidence of the role Valortim® may play in enhancing the elimination of B. anthracis to potentially minimize the severity of infection. We hypothesize that Valortim® may protect against lethal anthrax infection by its toxin neutralization activity that allows the development of a potent adaptive immune response that facilitates the elimination of harmful bacteria in a host organism." David P. Wright, President and Chief Executive Officer of PharmAthene, commented, "Drs. Cross and Basu continue to make excellent progress demonstrating how Valortim® may interact with the immune system to potentially minimize the extent and severity of infection with bacillus anthracis. These data, combined with the accumulating non-clinical efficacy results in animal models, continue to show how Valortim® may have important differentiating benefits, which, if confirmed, may make it a strong choice for procurement consideration in the Strategic National Stockpile." The work reported by Drs. Cross and Basu is supported by the Maryland Industrial Partnerships Program (MIPS). The MIPS program was developed to accelerate the commercialization of technology in Maryland by jointly funding collaborative R&D projects between companies and University System of Maryland faculty.

About Valortim®

Valortim® is a fully human monoclonal antibody designed to protect against and treat anthrax infection, including inhalational anthrax, the most lethal form of illness in humans caused by the Bacillus anthracis bacterium. The investigational antibody is designed to target a protein component known as the anthrax Protective Antigen (PA) of the lethal toxin complex produced by the bacterium. Preclinical studies suggest that Valortim® has the potential to provide significant protection against anthrax infection when administered prophylactically post-exposure (i.e., prior to the emergence of symptoms of anthrax infection) and also may increase survival when administered therapeutically (i.e., once symptoms become evident). Anti-toxins such as Valortim® are a key element in combating and treating anthrax infection, in addition to vaccines and antibiotics. The Department of Health and Human Services has issued a requirement for up to 200,000 anthrax anti-toxin treatments to be included in the Strategic National Stockpile and PharmAthene believes that Valortim® is well positioned to address this need.

Novel Antitoxin Strategy Developed Using "Tagged Binding Agents"

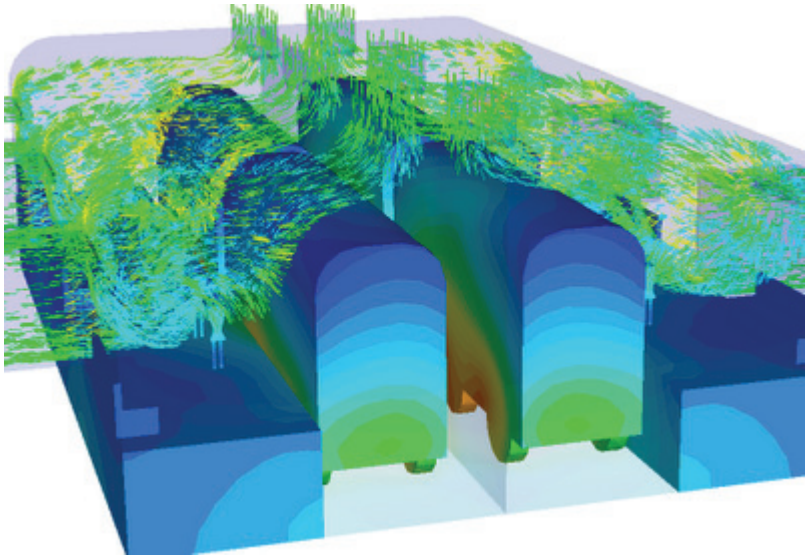
A study involving the world's deadliest substance has yielded a new strategy to clear toxins from the body - which may lead to more efficient strategies against toxins that may be used in a bioterrorist event, as well as snake bites, scorpion stings, and even some important chronic diseases. A Tufts-led team developed the new strategy to deliver small binding agents that seek out Botulinum toxin molecules and bind to them at several points. The binding agents each contain a common "tag" that is recognized by a single, co-administered anti-tag antibody. Once the toxin molecule is surrounded by bound antibodies, it is flushed out of the system through the liver before it can poison the body. Botulinum toxin, which causes botulism, is the most acutely poisonous substance known and is considered among the most dangerous bioterrorist threats. Studies have shown that one gram of the toxin, which is produced by a bacterium that lives in soil, could kill upwards of a million people. Although currently available antitoxins can be mass produced and delivered in the event of an outbreak,

they are costly to develop, house and deliver - and have a short shelf-life. The Tufts study, in collaboration with researchers at Thomas Jefferson University in Philadelphia, is published this month in the journal Infection and Immunity and was funded by the National Institutes of Allergy and Infectious Diseases (NIAID) and the New England Regional Center for Excellence (NERCE) for Biodefense and Emerging Infectious Diseases. "We've proven this approach to protect against Botulinum intoxication in mice and we hope this will lead to rapid development and deployment of many new anti-toxin therapies - for botulism and beyond," said Charles B. Shoemaker, PhD, professor of biomedical sciences at Tufts University's Cummings School of Veterinary Medicine and the study's corresponding author. The new findings expand on a 2002 breakthrough at the University of California at San Francisco, where scientists combined three monoclonal antibodies against Botulinum toxin that attached to different parts of the toxin molecule. Including three different antibodies dramatically increased the potency compared to fewer antibodies and prevented intoxication even following high-dose exposure. However, developing, producing, and stockpiling three different monoclonal antibodies against each toxin type is very expensive. Instead of using three antibodies, the Tufts approach uses three small binding agents to direct a single monoclonal antibody to multiple sites on the biomolecule being targeted for clearance. The type of binding agents used can be selected from many scaffolds developed for commercial therapeutic applications (e.g. nanobodies, aptamers, darpins, FN3, microbodies, etc). These binding agents can be rapidly identified and improved using modern technologies and generally have excellent commercial production and product shelf-life properties. The single anti-tag monoclonal antibody can also be selected to have optimal isotype and commercialization properties. What's more, the binding agents can be produced with more than one tag, which enables them to direct more antibodies to the toxin - and synergistically improve target clearance from the body. Many binding agent scaffolds can be produced as functional multimers so that the different binding agents could be produced as "beads on a string," leading to a single molecule that targets one, or even several, biomolecules for clearance from the body. Using this approach, the researchers say, one would only need to create new binding agents, not new antibodies, to create a therapy to clear a toxin from the body - paving the way for new therapies that combat toxins ranging from animal venom to bioterrorist agents such as ricin. Tufts researchers are currently targeting Shiga toxin and C. difficile along with other types of Botulinum toxin. Future plans include targeting clearance of pathogenic cytokines that are implicated in inflammation and autoimmune diseases. Treatment for botulism usually requires many weeks of intensive-care hospitalization, and exposure of even a small number of people would seriously disrupt health care delivery in any major city, studies have indicated. A vaccine has been developed, but widespread use is not currently being considered, the researchers say, since the likelihood of exposure is uncertain. Also, vaccination would block accepted treatments for a number of overactive muscle conditions, including dystonias, which respond to the toxin when administered in very small doses. The Division of Infectious Diseases at the Cummings School of Veterinary Medicine is Tufts University's largest research division. In 2003, the division was awarded a $25-million, seven-year contract from the National Institutes of Health (NIH) to develop products to rapidly identify, prevent, treat, and diagnose food and waterborne diseases that threaten public health. Tufts established one of seven national research units within the new national Food and Waterborne Disease Integrated Research Network. The award also launched the Microbiology and Botulism Research Unit, which combines botulism research efforts from Tufts and other public and private institutions in the U.S. and U.K. The division also oversees the New England Regional Biosafety Laboratory, a 41,000 square foot, level-2 and level-3 facility dedicated to the study of existing and emerging infectious, diseases, toxin-mediated diseases and medical countermeasures important to biodefense.

Homeland Security Study Of Subway Airflow

Researchers with the Lawrence Berkeley National Laboratory (Berkeley Lab) are

participating in a study sponsored by the U.S Department of Homeland Security (DHS) in conjunction with the Massachusetts Bay Transportation Authority (MBTA) to determine how airborne contaminants would spread if released into Boston's subway system. During the study, which rans from December 5-11, the Berkeley Lab researchers measured how gas gets dispersed throughout tunnels and subway cars. "The data we're collecting will help in the development of the next generation of biological and chemical agent detector systems," says Melissa Lunden, a chemist with the Environmental Energy Technologies Division (EETD) who leads Berkeley Lab's participation. "The information will also provide a better understanding of airflow characteristics in subway systems that should be useful for planning responses to fires, unintentional chemical or fuel spills, and other emergencies." In addition to Lunden, other Berkeley Lab EETD researchers working on this DHS study include Doug Black, William Delp, Toshifumi Hotchi, Jennifer Logue, Ann McDonagh, Richard Sextro, and Tracy Thatcher. While Boston's MBTA subway system has never been threatened or attacked, terrorists have threatened subway systems in New York and elsewhere. In 1995, a sarin gas attack on the Tokyo subway system by domestic terrorists killed a dozen people and injured dozens more. "Proactively studying and preparing for possible threats is one of our most effective strategies for fortifying our critical infrastructure," said DHS Secretary Janet Napolitano in announcing this study. "DHS is undertaking many studies such as this across the country to inform our emergency response planning in preparation for chemical or biological terrorist attacks." The MBTA study involved the release of common, harmless tracer gases used for indoor and outdoor air testing (sulfur hexafluoride and perfluoro-carbon); an inert particle tracer tagged with a biologically inert, non-toxic organic dye used in medical imaging applications; and, a common chemical often used as a brightening agent in laundry detergents and paper manufacturing. Particle and gas concentrations are being sampled in more than 20 stations and in subway cars, but normal MBTA operations are not being disrupted by the activities of the researchers. Joining Berkeley Lab in this effort were scientists from Argonne National Laboratory, ICx Technologies of Arlington, Virginia, the Defence Science and Technology Laboratory of the United Kingdom, and the Chemistry Centre of Australia. "The Argonne team, under David Brown, has created a computational model for predicting the behavior of airborne contaminants in subway systems," says Lunden. "We will now have actual subway data measurements that can be compared to the model's predictions and used to refine it." Because air temperature is a driver of airflow, Lunden and her colleagues will return to Boston in the summer of 2010 to conduct further measurements. Berkeley Lab EETD researchers were part of a similar study conducted in 2007 and 2008 by DHS of the "Metro" subway system that serves the Washington, D.C. metropolitan area.



Improved Healing Of Bone Fractures After Radiation Exposure

A drug currently under development by the University of Pittsburgh School of Medicine may help bone fractures heal more quickly after radiation exposure, according to a study by Pitt

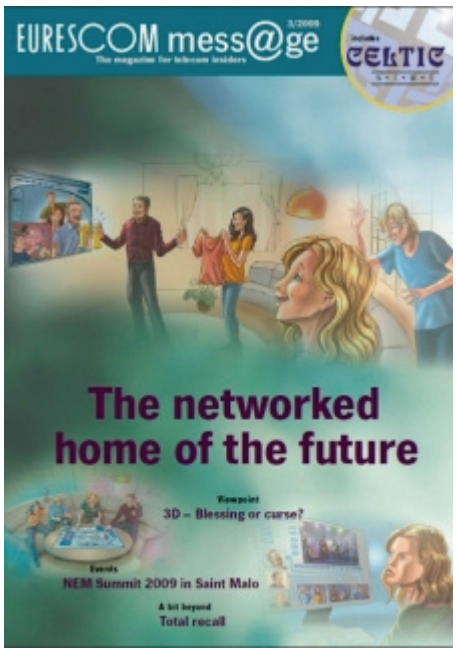
researchers. The study's results were presented during the American Society for Radiation Oncology (ASTRO) annual meeting in Chicago. The drug, JP4-039, is a free-radical scavenger targeted to the mitochondria, the energy generator of all cells. For this study, researchers compared the healing time of fractures in a mouse model system treated immediately after radiation exposure with JP4-039 against a control group of mice that did not receive the drug. The fractured bones in the group treated with JP4-039 healed much more rapidly than the control group. "This study has important implications on two levels," said study author Abhay S. Gokhale, M.D., M.B.A., chief resident in the Department of Radiation Oncology. "From a patient care standpoint, this drug could eventually be beneficial to pediatric cancer patients who are vulnerable to the late effects of radiation treatment on bone growth and development. From an emergency response perspective, if the ideal dosage of the drug is developed and we find a way to have it easily administered, it could potentially help people exposed to radiation in an accident or attack." The study, carried out in the laboratory of Joel Greenberger, M.D., and Michael Epperly, Ph.D., with co-investigator Peter Wipf, Ph.D., in the Department of Chemistry at Pitt, is overseen by Pitt's Center for Medical Countermeasures Against Radiation. The center is dedicated to identifying and developing small molecule radiation protectors and mitigators that can be easily accessed and administered in the event of a large-scale radiological or nuclear emergency. Previous research conducted by this team showed that JP4-039 helps protect cells from the damaging effects of radiation. This project has been funded in whole or in part with federal funds from the Biomedical Advanced Research and Development Authority, Office of the Assistant Secretary for Preparedness and Response, Office of the Secretary, Department of Health and Human Services, under Contract No. HHSO100200800062C.

Scientists Now Know How Smallpox Kills

A team of researchers working in a high containment laboratory at the Centers for Disease Control and Prevention in Atlanta, GA, have solved a fundamental mystery about smallpox that has puzzled scientists long after the natural disease was eradicated by vaccination.: they know how it kills us. In a new research report appearing online in The FASEB Journal, researchers describe how the virus cripples immune systems by attacking molecules made by our bodies to block viral replication. This discovery fills a major gap in the scientific understanding of pox diseases and lays the foundation for the development of antiviral treatments, should smallpox or related viruses re-emerge through accident, viral evolution, or terrorist action. "These studies demonstrate the production of an interferon binding protein by variola virus and monkeypox virus, and point at this viral anti-interferon protein as a target to develop new therapeutics and protect people from smallpox and related viruses," said Antonio Alcami, Ph.D., a collaborator on the study from Madrid, Spain. "A better understanding of how variola virus, one of the most virulent viruses known to humans, evades host defenses will help up to understand the molecular mechanisms that cause disease in other viral infections." In a high containment laboratory at the Centers for Disease Control and Prevention in Atlanta, scientists produced the recombinant proteins from the variola virus and a similar virus that affects monkeys, causing monkeypox. The researchers then showed that cells infected with variola and monkeypox produced a protein that blocks a wide range of human interferons, which are molecules produced by our immune systems meant to stop viral replication. "The re-emergence of pox viruses has potentially devastating consequences for people worldwide, as increasing numbers of people lack immunity to smallpox," said Gerald Weissmann, M.D., Editor-in-Chief of The FASEB Journal. "Understanding exactly how pox viruses disrupt our immune systems can help us develop defenses against natural and terror-borne pox viruses."

Magic Box For Mission Impossible - Improved Communication For Rescue Workers

For rescuers working in remote places, working phones and internet are literally a question of life and death. A team of researchers and businesses in Norway, Spain and Finland decided they need to be equipped with a box with the power to connect them to networks wherever they are. On September 11, firefighters, police officers and ambulance workers faced a terrifying rescue effort in the World Trade Center complex. They battled to save people from



the collapsing Twin Towers, searched for survivors, tackled fires and evacuated as many people as they could in an area which contained an estimated 17,000 people. And making their jobs even harder was the problem of poor communications: frightened workers and their relatives jammed mobile networks with calls and the emergency services' own radio communications turned out to be incompatible with one another. Ever since, emergency workers and public authorities across the world have tried to learn lessons from that unprecedented scene and some telecoms specialists have sought to provide some of the technological answers. In Europe, Norwegian, Finnish and Spanish telecoms specialists and researchers started the CELTIC project DeHiGate to develop a technology that would ensure the ability to use phones and internet even in difficult terrain and difficult circumstances. "Our idea was to make a sophisticated box that you could connect to all kinds of communications centres like satellite and wireless, a box that emergency services could take with them instead of a big satellite dish," says Vidar Karlsen, research and development manager at the Norwegian branch of French electronics firm Thales. Thales, which initiated the idea, quickly secured interested partners, including university researchers and the Spanish telecoms operator Telefonica. They realised that such technology would also have ready application in many standard emergencies such as accidents on motorways in areas where network coverage is poor. In particular, the researchers wanted to ensure that rescue workers could receive and send each other detailed maps of areas, pictures of a disaster and other graphics and images which might make the rescue quicker or safer. To do that, they needed to ensure emergency workers would have enough bandwidth. Telefonica developed an application to estimate the bandwidth available on a network in order to make a decision on whether to connect to another network. Karlsen says the box which the team began developing was an advanced router, which used existing hardware and equipment. The challenge was for the team to develop and test new software to make it work the way they wanted. Telefonica developed the best way to use large servers on the move, crucial work to make it easier to roll out networks in remote areas. Its workers explored the analysis of data in real time from geographical information systems. The knowledge gained by the partners in DeHiGate about setting up adhoc networks could also be easily transferred to other telecoms markets. Telefonica agrees. "The results and the ideas which came up in this project, both in terms of (network) architecture and applications, have been the foundation for the development of a large project about personalisation, advertising and the use of telephone directory services," said Erik Miguel Fernandez, Project Manager for Research in Information Systems at Telefonica. "We had a fire and accidents, we had a scenario where we had to bring people out from a burning building," remembers Karlsen. "As a developer you always have an idea of the user's requirements, but when you see the actual requirements you realise you could never think of all that." Firefighters took part in the simulations and gave their views on the technology. The developers set up emergency ad hoc

radio stations to deploy communications and watched as firefighters made calls, used the internet and even passed video footage of the disaster back to their colleagues at the base. "With this you can get reports on digital maps and see where each and every firefighter was," says Karlsen. DeHiGate hit hurdles, however. Initial partners struggled to secure funding or pulled out and project progress became sluggish. Developers had to use a mid-term review to get their focus back. They set themselves a deadline to develop a prototype box in time for a two-day emergency simulation in Finland. Firefighters pointed out aspects of the technology which they would prefer to work differently, pointing out, for instance, that ordinary video cameras might not be good enough quality for areas affected by a lot of smoke and thermal cameras might be needed. However, in general they gave the new box their approval. Since the project completed last year, Thales has continued to develop the router with a view to commercial contracts. "The direct users of this product might be limited groups - emergency workers - but what this project achieved could affect a broad group of people, whole countries," says Heinz Brueggemann, the director of CELTIC. A total of 411 rescue workers were among the 2,995 people who died in the September 11 attacks. During the struggle to save lives, much helpful information from 911 callers was not passed to rescuers on the ground because of poor communications. A police warning for emergency workers to evacuate the towers before they collapsed was also not well conveyed. If a system similar to DeHiGate had been in place, perhaps as many emergency worker lives might not have been lost in action. CELTIC found a way to improve the safety of those who put their lives at risk to save others.

With a few drops of blood, scientists are creating a way to tell who has absorbed dangerous radiation levels, part of the government's preparations against a terror attack, and advance research that just might point toward new cancer care, too. Duke University's work aims to allow rapid triage in the aftermath of a dirty bomb explosion or other radiological emergency, to sort out who among potentially thousands of panicked people need treatment for radioactive fallout and who can go home. At the same time, it illustrates an evolving new approach to developing so-called "medical countermeasures" for defense: They ought to have an everyday use, too. "There has to be a return on investment from this program in peacetime," Dr. Nicole Lurie, assistant secretary for preparedness at the Health and Human Services Department, told The Associated Press. At issue: The nation's stockpile of treatments, vaccines and tests against bioterror and chemical or radiological threats. Saying the arsenal is not growing fast enough, HHS Secretary Kathleen Sebelius ordered a major review of how to jump-start the development of countermeasures. That process now is spurred by contracts from the federal Biomedical Advanced Research and Development Authority, or BARDA, which helps fund research of promising products, often with guaranteed purchase of a certain amount should the work pan out. "There are gaps at every stage in the process, from the laboratory to the factory floor, that are slowing or stalling the development of key countermeasures," Sebelius said in announcing the review. HHS' recommendations are expected within three months or so, encompassing areas from industry's call for more reliable financing to how to prioritize the most urgent needs. In meetings with scientists and manufacturers, already officials are urging creation of countermeasures with a wider commercial use rather than ones focused solely on potential terrorism, so that more profit-driven companies might sign on to do the work, and so that more people might benefit. "The dual use is really where my heart is," says Duke hematology specialist Dr. John Chute, who discovered a genetic signature of radiation exposure detectable in blood within hours, and then won a five-year BARDA contract worth up to $43 million to turn the discovery into an emergency test. The flip side: That genetic activity, which predicts whether certain vital blood cells live or die, allows study of pathways that might help cancer patients' battered immune systems regenerate after intense therapy, like the whole-body radiation people undergo before receiving a bone marrow transplant. "It hits right in our wheelhouse of research," says Chute, who also has begun animal research with a potential drug to spur growth of blood-forming stem cells after radiation damage. Moreover, "radiation is just one type of problem you could be detecting," he adds. Duke's partners — California-based DxTerity Diagnostics; Arizona State University: and Australia's Invetech Corp. — are

developing the hand-held machines needed to make Chute's test quick and portable enough to take straight to an emergency site. He says that machinery "has huge potential" for more rapid diagnosis of conditions from cancer to infections, tests that today take days in standard labs. Outside of an immediate blast zone, there is no fast way to detect radiation poisoning, yet many of the injured could survive if they were diagnosed and treated quickly, Chute explains. Immune cells called lymphocytes that circulate in the blood are supersensitive to radiation, so it was there Chute began the hunt for genes that switch on and off in response. He found a pattern that predicted radiation poisoning in mice. Then he took samples of blood from cancer patients headed for a bone marrow transplant before and six hours after they were irradiated; he found a signature from just 25 genes that was 94 percent accurate in distinguishing who was irradiated. Next, he is working on teasing out the dose they received. It took days to test each blood sample. How to speed it up? That is where Chute's partners come in, with an automated method of reading genetic activity that promises an answer within an hour, and a desktop-sized machine to process droplets of blood that is already being developed for real-time DNA fingerprinting at crime scenes. The idea: Each machine could test a fingerstick of blood from a few dozen people an hour, with multiple machines dispatched to an emergency to handle the crowds. Merging the test and the technologies, Chute hopes to have a prototype machine in 2012, ready for a large study using blood collected from bone marrow transplant patients at several major cancer centers to prove whether the approach really works. Yet without the government's push for countermeasures, he says he would not have tried to speed up his radiation test: the dayslong version worked fine for cancer research.

Dirty-bomb test for terror may aid cancer research

Associated Press

With a few drops of blood, scientists are creating a way to tell who has absorbed dangerous radiation levels, part of the government's preparations against a terror attack, and advance research that just might point toward new cancer care, too. Duke University's work aims to allow rapid triage in the aftermath of a dirty bomb explosion or other radiological emergency, to sort out who among potentially thousands of panicked people need treatment for radioactive fallout and who can go home. At the same time, it illustrates an evolving new approach to developing so-called "medical countermeasures" for defense: They ought to have an everyday use, too. "There has to be a return on investment from this program in peacetime," Dr. Nicole Lurie, assistant secretary for preparedness at the Health and Human Services Department, told The Associated Press. At issue: The nation's stockpile of treatments, vaccines and tests against bioterror and chemical or radiological threats. Saying the arsenal is not growing fast enough, HHS Secretary Kathleen Sebelius ordered a major review of how to jump-start the development of countermeasures. That process now is spurred by contracts from the federal Biomedical Advanced Research and Development Authority, or BARDA, which helps fund research of promising products, often with guaranteed purchase of a certain amount should the work pan out. "There are gaps at every stage in the process, from the laboratory to the factory floor, that are slowing or stalling the development of key countermeasures," Sebelius said in announcing the review. HHS' recommendations are expected within three months or so, encompassing areas from industry's call for more reliable financing to how to prioritize the most urgent needs. In meetings with scientists and manufacturers, already officials are urging creation of countermeasures with a wider commercial use rather than ones focused solely on potential terrorism, so that more profit-driven companies might sign on to do the work, and so that more people might benefit. "The dual use is really where my heart is," says Duke hematology specialist Dr. John Chute, who discovered a genetic signature of radiation exposure detectable in blood within hours, and then won a five-year BARDA contract worth up to $43 million to turn the discovery into an emergency test. The flip side: That genetic activity, which predicts whether certain vital blood cells live or die, allows study of pathways that might help cancer patients' battered immune systems regenerate after intense therapy, like the whole-body radiation people undergo before receiving a bone marrow transplant. "It hits right in our wheelhouse of

research," says Chute, who also has begun animal research with a potential drug to spur growth of blood-forming stem cells after radiation damage. Moreover, "radiation is just one type of problem you could be detecting," he adds. Duke's partners — California-based DxTerity Diagnostics; Arizona State University: and Australia's Invetech Corp. — are developing the hand-held machines needed to make Chute's test quick and portable enough to take straight to an emergency site. He says that machinery "has huge potential" for more rapid diagnosis of conditions from cancer to infections, tests that today take days in standard labs. Outside of an immediate blast zone, there is no fast way to detect radiation poisoning, yet many of the injured could survive if they were diagnosed and treated quickly, Chute explains. Immune cells called lymphocytes that circulate in the blood are supersensitive to radiation, so it was there Chute began the hunt for genes that switch on and off in response. He found a pattern that predicted radiation poisoning in mice. Then he took samples of blood from cancer patients headed for a bone marrow transplant before and six hours after they were irradiated; he found a signature from just 25 genes that was 94 percent accurate in distinguishing who was irradiated. Next, he is working on teasing out the dose they received. It took days to test each blood sample. How to speed it up? That is where Chute's partners come in, with an automated method of reading genetic activity that promises an answer within an hour, and a desktop-sized machine to process droplets of blood that is already being developed for real-time DNA fingerprinting at crime scenes. The idea: Each machine could test a fingerstick of blood from a few dozen people an hour, with multiple machines dispatched to an emergency to handle the crowds. Merging the test and the technologies, Chute hopes to have a prototype machine in 2012, ready for a large study using blood collected from bone marrow transplant patients at several major cancer centers to prove whether the approach really works. Yet without the government's push for countermeasures, he says he would not have tried to speed up his radiation test: the dayslong version worked fine for cancer research.

«Αυξημένα» τα περιστατικά συγγενών ανωμαλιών στη Φαλούτζα του Ιράκ

Ιρακινοί ερευνητές αναφέρουν ότι η συχνότητα των γεννήσεων παιδιών με συγγενείς ανωμαλίες έχει αυξηθεί στη Φαλούτζα μετά την αμερικανική επέμβαση του 2004. Η Ιρακινή

ερευνήτρια Μαλίκ Χαμντάν, η οποία εργάζεται σήμερα στη Βρετανία, δήλωσε στο BBC ότι η Φαλούτζα βλέπει «πρωτοφανή αριθμό» παιδιών με συγγενείς ανωμαλίες, κυρίως στην καρδιά. Η Χαμντάν επικαλέστηκε στοιχεία που συγκεντρώνει μια γιατρός της ιρακινής πόλης, η οποία πριν από το 2003 έβλεπε μία περίπτωση ανά περίπου δύο μήνες, ενώ σήμερα

βλέπει τέτοια περιστατικά σε καθημερινή βάση. Όπως υποστηρίζει η ερευνήτρια, η συχνότητα των συγγενών ανωμαλιών στην Φαλούτζα έχει εκτοξευτεί στις 95 περιπτώσεις ανά 1.000 γεννήσεις και είναι πλέον 13 φορές μεγαλύτερη από ό,τι στην Ευρώπη.

Σύμφωνα με τον ανταποκριτή του BBC στη Φαλούτζα, το πρόβλημα είναι γνωστό στην πόλη και οι αξιωματούχοι συχνά συνιστούν στις γυναίκες να αποφύγουν την εγκυμοσύνη. Γιατροί και γονείς αποδίδουν το φαινόμενο στα προηγμένα όπλα που χρησιμοποίησαν οι αμερικανικές δυνάμεις στη μεγάλη μάχη της Φαλούτζα το 2004. Εκπρόσωπος του αμερικανικού στρατού δήλωσε στο BBC ότι οι ανησυχίες για την ανθρώπινη υγεία λαμβάνονται μεν σοβαρά υπόψη, ωστόσο μέχρι σήμερα δεν έχουν υπάρξει έρευνες που να συνδέουν τις συγγενείς ανωμαλίες με περιβαλλοντικούς παράγοντες. Πρόσθεσε πάντως ότι τα βλήματα που δεν έχουν εκραγεί, όπως και οι αυτοσχέδιες βόμβες των Ιρακινών, «αποτελούν αναγνωρισμένο παράγοντα κινδύνου».

TECHNICAL SPECIFICATION FOR

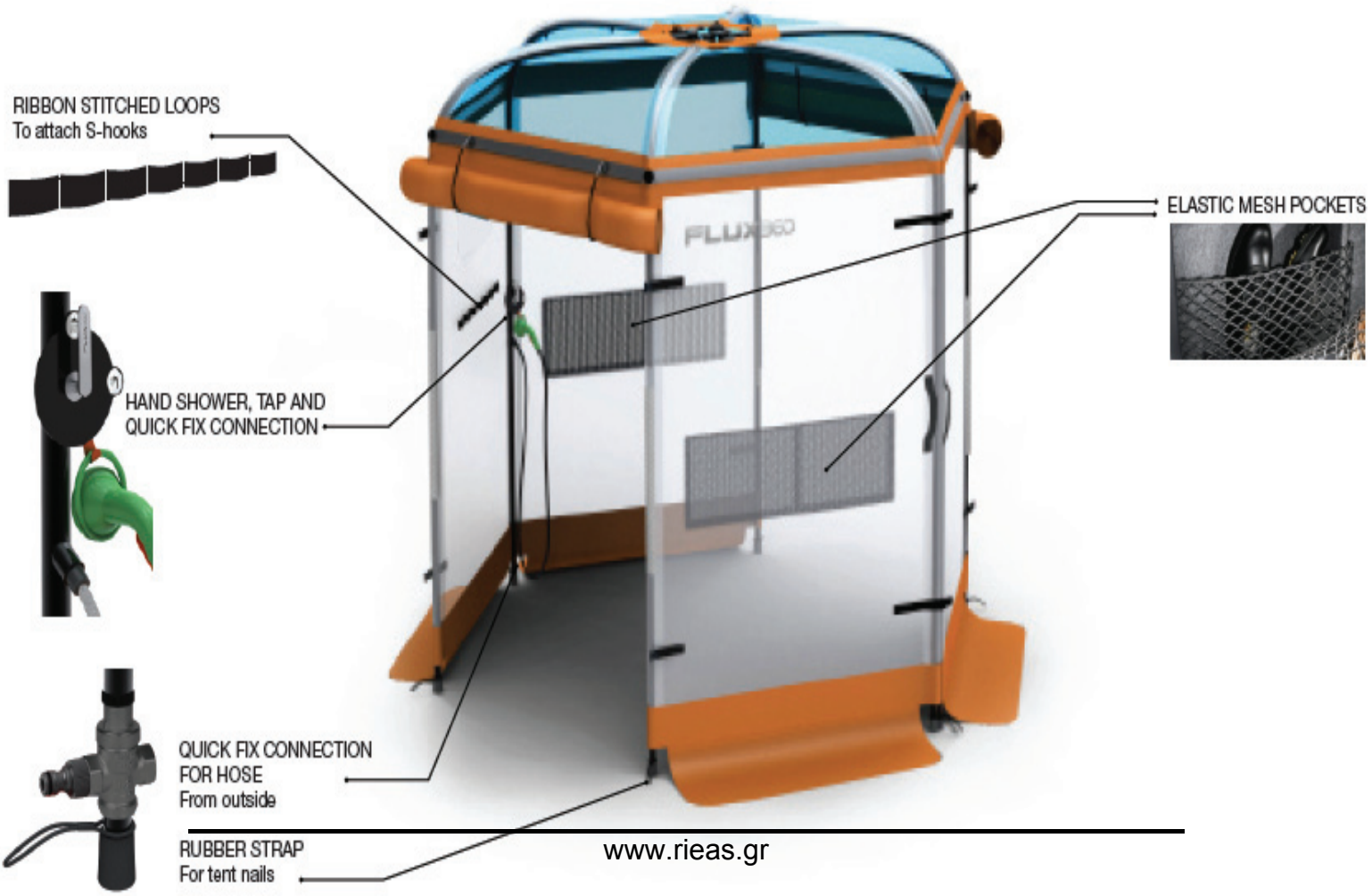
FLUX360® SHOWER SYSTEM

- The complete and easy-to-use personal decontamination system.
- Can be erected by a single person within a couple of minutes.
- Easy assembly - all parts included.
- Constructed of anodized and durable aluminium piping and double coated PVC textile.
- Interior space to comfortably decontaminate personnel outfitted in any level of protection or stretcher bound injuries.
- Integrated 20-25 liter/minute showerheads, a hand shower and a pressure valve regulator supply the right water flow necessary for thorough decontamination.

New Pac Safety AB

Jan Bergling CEO
Box 8
SE-564 21 Bankeryd

Phone +46 36 411 39
Fax +46 36 410 31
e-mail: info@newpac.se



They're Trying to Call HIV-Positive People Bioterrorists?

The body of a 44-year-old man is a bioterror weapon, according to a Michigan county prosecutor who is charging Daniel Allen, with "possession or use of a harmful biological device" for biting his neighbor during a neighborhood fight. Allen is African American and HIV-positive; his case is believed to be the first in the nation where prosecutors are linking anti-terrorism laws to an individual's HIV infection.. On October 18, 2009 Allen and his neighbor, Winfred Fernadis Jr., got into an argument that quickly turned violent. Allen contends he was the victim of a hate crime -- Fernandis allegedly taunted him about his sexual orientation after a stray football landed in Allen's yard -- and he has filed a complaint with the FBI. (He also filed a personal protection claim against the Fernandis family.) Fernandis, however, suffered a severe bite through his lip, as well as bites on his ear, nose and neck; he was hospitalized for his wounds. Allen too suffered injuries. At an early hearing on the case, Allen's lawyer presented 37 photographs of his wounds, including bite marks on his body. Allen was initially arrested on assault charges, but when Macomb County Prosecutor Eric Smith discovered he was HIV-positive from his disclosure on a local news broadcast, he decided to additionally charge him with using his body as a terrorist weapon. In court on April 8, Allen refused a plea deal offered by the prosecution, which would have obligated Allen to plead guilty to "assault with intent to cause great bodily harm less than murder," a charge that carries a 10-year-sentence. In exchange, Smith would have dropped the charges of "assault with intent to maim" (another 10-year felony), and "possession or use of a harmful biological device" -- the "device" being Allen's own body. This last charge -- a 15-year-felony -- would apply a state anti-terrorism law that was broadly rewritten in the wake of the 9/11 attacks. The American Civil Liberties Union of Michigan has filed an amicus brief in Allen's case that urges the terrorism charge to be dismissed. The Macomb Daily reports that Allen's lawyer, James Galen, intends to further file a motion to dismiss the charges. The case returns to court for final pre-trial hearings at the end of April. HIV-Positive People as WMD Contracting HIV through a bite is exceptionally uncommon, according to the Centers for Disease Control and Prevention. In fact, the CDC has only reported one case that suggests any possibility of blood-to-blood transmission of HIV by a human bite. Other possible cases all have involved "severe trauma with extensive tissue tearing and damage and presence of blood." What's more, the small number of these possible cases are dwarfed by the more than one million people in the U.S. who are living with HIV/AIDS. According to the National Institute of Allergy and Infectious Diseases, 33 million people live with the virus around the world. While the terrorism charge against Allen is unprecedented, it comes in the context of public policy that increasingly characterizes people with HIV as "weapons of mass destruction." More than 30 states criminalize consensual sex when one of the individuals has HIV (even when no transmission occurs). Federal law requires each state to have a criminal procedure in place for people who fail to disclose HIV status before engaging in activity that could transmit the virus. Willie Campbell, an HIV-positive man in Texas, was sentenced to 35 years in prison in 2008 for "harassing a public servant with a deadly weapon" when he spat on a police officer and taunted him, despite the fact that, in the entire history of the HIV epidemic, there has never been a case of the virus being transmitted via saliva. (In fact, saliva that is uncontaminated by blood inhibits the transmission of HIV.) Nevertheless, Campbell, who is African American and was homeless at the time of his arrest, must serve at least half his sentence before he is eligible for

parole. Campbell is not unique. HIV-positive individuals prosecuted for spitting have been convicted of, among other charges, attempted murder, assault with a deadly weapon, and "battery by body waste," according to the Yale University Center for Interdisciplinary Research on AIDS. One year ago, Canada issued what is believed to be the world's first murder conviction against a person with HIV for having unprotected sex with unsuspecting partners. Johnson Aziga, a native of Uganda, had unprotected sex with 11 women without disclosing that he is HIV-positive. Seven of the women contracted HIV, and two died of AIDS-related cancers. Aziga is serving a life sentence for first-degree murder with no parole eligibility for 25 years. While some might argue that such a violation merits some form of sanction, criminal charges also loom over HIV-positive people who do disclose their status to their partners. In October, a U.S. military court sentenced Petty Officer 1st Class Steven R. Franklin to three months in prison after he pled guilty to having unprotected sex with two women who knew he was HIV-positive. Neither contracted HIV. Other charges -- such as adultery -- were dropped as part of the plea deal. The 37-year-old officer had signed a document through the military that pledged to disclose his status and use protection for sexual activity. This officer, who had been in the Navy for 18 years, was demoted and given a bad-conduct discharge. The new intensity of HIV criminalization charges and convictions has dangerous implications. Current law provides a disincentive to getting tested and learning one's HIV status -- if a person is unaware he or she has HIV, that person is, legally, considered less responsible for the consequences of, say, infecting a sexual partner. High-profile cases like Daniel Allen's, then, have a serious public health cost. They also spread misinformation, exacerbating the stigma on those who do get tested, as if getting tested is evidence that someone is promiscuous, gay, or a drug user. "Prosecutions that hinge on an individual's HIV status, without proof of any intent to harm -- and frequently resulting in convictions in cases where in fact no harm has been done -- perpetuate public mispercpetions of HIV as easily transmitted and people with HIV as toxic and dangerous to be around," Catherine Hanssens, executive director of the Center for HIV Law & Policy, told AlterNet. "This is not only a huge, unfair burden on people with HIV, it undermines public health goals of destigmatizing HIV and getting people tested and into care and is therefore terrible public policy." Kristina Schmidgall, lead re-entry case manager with AIDS Partnership Michigan, contends that the stigma of HIV/AIDS is both exacerbated by legal cases like Allen's and is out of proportion with its threat on public health. "HIV is infectious, but it's much easier to transmit hepatitis C or hepatitis B -- though we don't have such a fuss about them," Schmidgall told AlterNet, adding that both hepatitis C and B are much more prevalent than HIV. "We want to normalize testing (for HIV/AIDS) as a regular part of health care," Schmidgall said. "Nobody asks me why I had a Pap smear; it's just a basic thing you do to take care of yourself." 'People have to push back against and stand up to this kind of persecution' William B. Turner is a lawyer and research fellow with the James Weldon Johnson Institute at Emory University. He believes that the criminalization of HIV/AIDS is rooted in the lingering suspicion of gay men as fundamentally irresponsible people who bring the disease upon themselves. "Although information about how to transmit [HIV], and, more importantly, how not to transmit HIV is widely available, as the story of the Michigan man indicates, even people who should know better don't always have very accurate info," Turner, who is himself a gay man living with AIDS, told AlterNet. "Biting is perhaps the single least effective way to transmit HIV. This is all hangover from the beginning of the epidemic, when no one was quite sure how it got transmitted." Turner said he believes the criminalization of HIV may have a concrete negative impact on the health of people who, like Allen, are prosecuted. "Then there's the impact of stress on one's health, well enough documented," Turner said. "Few experiences are as stressful, presumably, as a criminal prosecution. It may literally shorten [Allen's] life, although that will never be provable." Outside the realm of prosecutions and arrests, institutionalized misinformation has long led to policies that restrict people living with HIV, revealing the peculiar influence of the disease's stigma. In Michigan, for example, HIV-positive individuals are not allowed to work in the kitchens of state correctional facilities, despite the almost nonexistent possibility of anybody contracting HIV through contact with food. In contrast, Kristina Schmidgall points out, people with hepatitis C

are permitted to work in these same kitchens. The ACLU is currently challenging the Michigan Department of Corrections on its policy's targeting of HIV positive prisoners. Policies that affirm misinformation about HIV/AIDS persist, despite the fact that the virus has been thoroughly researched since it was first discovered in June 1981. "In the 29 years since, we figured out how (HIV/AIDS) is transmitted, how to test for it, how to treat it, and while we haven't found a cure, people can manage the disease," said Schmidgall, noting that this effort is supported by significant research funding. "In the spectrum of other diseases in history, that's not so slow." Schmidgall compared the trajectory of HIV/AIDS with that of polio, another epidemic disease. While polio was depicted in prehistoric art, its first clinical description came in 1789. The polio vaccine wasn't announced until 166 years later. But the wealth of research on HIV/AIDS over the last three decades contrasts sharply with ongoing public misperceptions that are codifed by polices that criminalize the disease -- paving the way for people like Allen to find themselves susceptible to terror charges for actions that not only are demonstrably incapable of spreading HIV, but would, for a non-HIV positive person, carry much less serious sanctions. While much HIV/AIDS funding, from federal and local governments to foundations, supports research and treatment, much less money is available for public awareness campaigns that might change the trajectory of HIV criminalization. Schmidgall warns that the disproportionate impact on communities of color may also influence how HIV-positive people interact with the justice system. What's more, communities that bear the brunt of the HIV/AIDS epidemic traditionally have less voice in the media and legal system, making pushback against misinformation an uphill battle. As a result, myths persist that override the reality. "Most [HIV-positive] people would be horrified to infect anyone else. They have a greater sense of responsibility about it," Schmidgall said. As for Allen, Turner believes his rejection of the plea deal and the ACLU's involvement is a good start in challenging the motives behind the terrorism charge. "People have to push back against and stand up to this kind of persecution -- a term I use advisedly," Turner said. As of this writing, 1,240 have signed the Change.org petition for Prosecutor Smith to drop the HIV-as-terrorism charges against Allen.

Anthrax Killing Sterilant Now EPA Approved

It has been nine years since the 2001 anthrax attacks sickened twenty-three people and killed five. Since that time, the U.S. government has spent hundreds of millions of dollars in remediation and billions in their search for a disinfectant that can reliably kill anthrax spores and other pathogens that might be used as weapons. The search is over. sBioMed®, a self funded biotechnology firm located in Orem, Utah, has been recently awarded Environmental Protection Agency (EPA) approval of STERIPLEX® Ultra for anthrax spore decontamination, the world's most deadly biological agent. Astoundingly, STERIPLEX® Ultra achieves rapid kill against anthrax spores while remaining harmless to the product users and the environment. STERIPLEX® Ultra completely destroys anthrax spores in less than 30 seconds as demonstrated with suspension test methods and destroys anthrax spores in only 30 minutes when used on specialized carriers using full AOAC test protocols as certified by an EPA approved Biosafety Level III laboratory. The U.S. military's bioweapons laboratory at Dugway Proving Grounds in Utah also verified the complete destruction of anthrax spores in less than 30 seconds in a suspension test using STERIPLEX® Ultra. "The world has long been interested in killing bacterial spores. It's a very difficult task," say the sBioMed® founders. Fortunately, only a few toxic bacteria can form endospores. When their life cycle is threatened by factors such as lack of food or change of

temperature, some bacteria can turn themselves into endospores to wait for better conditions. "They become like shriveled microscopic walnuts, wrapping themselves in layers of coating to become almost indestructible," founder Brian Larson said. Spores can lie dormant for thousands of years and then "come back to kill you." Spores found in Egyptian tombs may be the basis for legends about the curses killing those who disturb mummies' tombs. Anthrax remediation of the Senate Hart building, several postal facilities and other U.S. government and private office buildings showed that decontamination is possible, but it has been, historically, very time-consuming and extremely costly. Clearing the Senate office building of anthrax spores cost $27+ million, according to the Government Accountability Office. Decontaminating the Brentwood postal facility outside Washington cost $189 million with a downtime of 2+ years. The postal facility in Hamilton, New Jersey cost $75+ million, with a downtime of 3+ years. STERIPLEX® Ultra can decontaminate a building in a much shorter time and at a substantially lower cost. STERIPLEX® Ultra is a liquid solution, which can be applied using standard spray or automated dispersion devices. STERIPLEX® Ultra provides quick and comprehensive anthrax clean up when used by specially trained individuals to decontaminate buildings, vehicles, ships, aircraft, personal protective equipment and other articles infected with anthrax spores. A cost effective solution, STERIPLEX® Ultra provides rapid and effective anthrax remediation without damaging the treated area, allowing reoccupation of previously contaminated areas within a reasonable time. Beyond the anthrax approval, future amended EPA claims for STERIPLEX® Ultra will ultimately include STERIPLEX® Ultra's proven capability to rapidly destroy other potential weapons-grade microbes that cause diseases such as Smallpox, Bubonic Plague, Tularemia, Brucellosis and others. sBioMed® has filed sixty-one global patents including eighteen in the United States. The EPA registrations for STERIPLEX® Ultra (84545-8, 84545-9) were granted on April 2nd, 2010. The EPA has also approved the proposed sBioMed® training course materials designed for STERIPLEX® Ultra users. Governments and private industry around the world have been searching for an effective and viable countermeasure to the bioterrorism threats existing today. STERIPLEX® Ultra provides the answer. In the United States, STERIPLEX® Ultra can only be purchased by sBioMed® trained individuals. sBioMed® recently received another EPA registration approval on November 2, 2009 for the world's leading hospital grade sterilant and sporicide, STERIPLEX® Health Care (HC) that is able to rapidly sterilize a hard surface up to ten to thirty times faster than other sterilants currently available. Unlike most other sterilants that are toxic or corrosive, STERIPLEX® HC is health-wise, environmentally friendly and non-corrosive.

Scientists see potential shield against bioterror weapon ricin

Researchers in France said on Thursday they had found two possible compounds that could protect against ricin, a naturally-occurring poison used in murder and political assassinations and eyed as a bioterror weapon. The two molecules allowed lab-dish cells to survive the assaults of ricin, as well as so-called Shiga-like toxins that are made by the bacterium Escherichia coli. They worked not by acting on the poisons themselves but on the pathways taken by the poisons to cross the cell, the scientists reported. Dubbed Retro-1 and Retro-2, the compounds were found by a team led by Daniel Gillet of France's Atomic Energy Commission (CEA) during a screen of 16,500 chemical candidates. "We gave one of the compounds to lab mice and then gave the mice ricin, and found they were protected," Gillet told AFP. "There is no protection if you give the poison first followed by the compound." Ricin is one of the world's most notorious poisons, killing the victim within three to five days. As little as one milligram could suffice to kill an adult. No antidote currently exists. It works by travelling into a part of the cell called the cytosol, where it knocks out the ribosome, a tiny "factory" that produces all the proteins needed to keep the cell functioning. The toxin was used to kill Bulgarian dissident Georgi Markov in London in 1978. He was jabbed with a ricin-filled pellet, just 0.6 millimeters (0.024 of an inch) in diameter, fired from a KGB agent's umbrella. Ricin is a byproduct of the seeds of the castor oil plant, which is used to manufacture brake fluid, soap, varnish, ink and other products.

As a result, the plant is widely grown, which makes ricin more easily accessible to bioterrorists. It could be delivered in food, water, in a mist or, as in the Markov case, injected. "There is a real need for countermeasures against ricin. There are many plants growing and there is about one milligram of toxin per seed," said Gillet. The work is published online in a US journal, Cell.

Pets under scrutiny at Ben-Gurion Airport

In the cat-and-mouse tactics between security experts and terrorists trying to bomb airliners, dogs and cats and other family pets are the latest to suffer more intrusive security checks before flying. Israeli security services have reportedly ordered a retooling of screening at national airports which will require suspicious animals to go through X-ray machines to make sure bombs have not been hidden inside their bodies by terrorists. Any pet owner who refuses will not be allowed to board their flight unless they leave their pet behind, according to the Israeli Internet news site NRG. It said security screeners at airports have received new instructions requiring them to pass dogs and cats and other pets of suspicious passengers through X-ray machines. Security officials at Ben-Gurion Airport refused to discuss the matter. A spokeswoman for the Airport Authority would not confirm or deny the report, but told The Media Line their security procedures were dictated by national agencies. “The Airport Authority is responsible for the security of millions of travelers every year. It carries out this task according to instructions from government authorities who guide us in taking all the necessary precautions to ensure the safety of the travelers,” said Airport Authority spokeswoman Ma’ayan Malchin. “For obvious reasons, the authority does not elaborate or discuss the procedures and security checks with the media.” A former security checker, speaking on condition of anonymity, said that they had not been required to pass any animals through the X-ray machines. Occasionally, the animal crates would be screened, but never the live animal. According to the NRG Web site, two cases have already surfaced at Ben-Gurion Airport. One American tourist was required to put her cat through the X-ray. She initially refused, but after being told she would be barred from the flight if she didn’t oblige, she changed her mind. The cat was scanned, and cleared of all suspicion, and both were allowed to continue on their way. In another incident, a passenger who refused to allow his two cats to be scanned was reportedly not allowed to fly. Eytan Kreiner, founder and CEO of Terminal4Pets, said that over 4 million pets were flown across the world in 2009. Kreiner, who is also a board member of IVETAA, the International Vet Transportation Association for Animals, said that they have taken up the issue of X-rays for animals at airports. “We are trying to get the radiation exposure in X-ray machines lowered so animals are not harmed,” Kreiner said. He said their goal was to make sure the flying animals have micro chips imbedded inside them for identification as well as proper vaccinations for safety. This, he said, would lower the risk of animals being used for terrorism. “This isn’t so new. Animals have to be screened like everyone else. It seems that Israeli security officials want to publicize this now, to deter someone from trying it,” Kreiner said. Screening a cat could be a recipe for disaster. “This is much more difficult when it comes to cats. They aren’t like dogs which you can take out of their crates and put on a leash,” Kreiner said. The procedures were reportedly revamped following the attempted assassination of a Saudi prince eight months ago. The al-Qaida terrorist had hidden in his rectum a bomb rigged to be detonated from a mobile phone. The assassin reportedly flew on two international flights and passed through other stringent security checks without the bomb in his belly being detected. The assassin detonated himself, but the prince, who was a senior official combating terror, survived with only light injuries. In

the past, terrorists have used live animals to carry bombs. In 2003, a donkey rigged with explosives and metal rods on its back was detonated as a passenger bus passed on the road from Jerusalem to Gush Etzion. No one was injured in that attack. In 2001, a Palestinian drove a donkey cart laden with explosives toward a group of Israeli soldiers in the Gaza Strip. At the last minute he jumped off the cart and detonated the bombs that exploded only partially. In January 2001, Palestinians left a donkey cart laden with explosives unattended near a junction in the Gaza Strip. Israeli soldiers fired at the cart, detonating the large amount of explosives and killing the donkey. In June 1995, a Palestinian suicide bomber detonated a donkey-led cart rigged with explosives near an Israeli army base in the Gaza Strip. No soldiers were wounded in the blast, but the Palestinian and the donkey were killed.

Impact of Education, Income On Support For Suicide Bombings

Conventional wisdom holds that supporters of suicide bombers are people with low educational attainment and income, so investments in education and economic development should reduce support for such attacks. But a study by two Indiana University faculty members raises questions about that approach. In an analysis of public opinion data from six predominantly Muslim countries that have experienced suicide bombings, M. Najeeb Shafiq and Abdulkader H. Sinno show that the relationship of education and income levels to support for suicide bombing is complicated at best. Support for bombings and the influence of education and income vary greatly from one country to another; and attitudes differ significantly by whether the attacks target civilians in one's own country or foreign militaries.

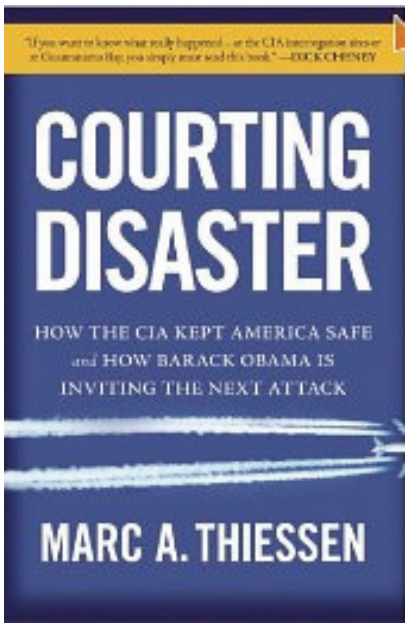
Shafiq is an assistant professor in the Department of Educational Leadership and Policy Studies in the School of Education. Sinno is an assistant professor in the Department of Political Science in the College of Arts and Sciences. They say the study, published in the February 2010 issue of the Journal of Conflict Resolution, points to the need for carefully developed policies to address terrorism and suicide attacks. "Each country is different, and the attitudes are different depending on the targets," Shafiq said. "By just asking about suicide bombing, you're not likely to get a very useful sense of what people think." The study, "Education, Income and Support for Suicide Bombings: Evidence from Six Muslim Countries," relies on detailed data collected in 2005 for the Pew Global Attitudes Project. It examines attitudes in Indonesia, Jordan, Lebanon, Morocco, Pakistan and Turkey, which have been hit by suicide bombings in recent years. Along with many other questions, the Pew survey asked if suicide bombings were often,

sometimes, rarely or never justified, both when carried out "against civilian targets" and "against Americans and other Westerners in Iraq." Generally speaking, the study found that people who were more highly educated were more strongly opposed to suicide bombings targeting civilians in their own countries. But support for suicide bombings against foreign targets tended to be consistent across education levels. The study also found that political dissatisfaction was a factor in respondents' attitudes, with those who felt that Islam was "under threat" more likely to support suicide bombing. Shafiq and Sinno introduce a conceptual model to explain how education and income interact to affect support for suicide bombing. According to the model, education should reduce support for suicide bombing by instilling values and skills that provide for peaceful resolution of conflict. Higher income should discourage support for suicide bombing because wealthy people are likely to be satisfied with life and not believe that drastic measures are needed to effect change. But education and income can also cause people to be more politically engaged and, in some cases, dissatisfied with government policies. The model shows that such political dissatisfaction moderates the extent to which education and income reduce support for suicide bombing. The study provides some support for the findings of Princeton economist Alan Krueger, whose 2007 book What Makes a Terrorist argued that education and income were not related to support for terrorism. "At the same time," Shafiq and Sinno write, "this study reveals that the effect of education and income on attitudes depends on the country and the target of suicide bombings. Therefore, this study draws attention to the difficulty of making generalizations about the relationship between educational attainment, income, and support for suicide bombing across Muslim countries." Shafiq and Sinno make two policy recommendations:

- Continued expansion of education should be supported, along with the adoption of peace education that discourages support for suicide bombing. The purpose is to introduce students to tactics that involve less suffering and damage to society.
- Governments of Muslim countries, the U.S. and other Western states should adopt policies that respect the dignity, welfare, interests and lives of Muslims, including support for trade, economic integration and cooperative security.

NEW BOOK – Courting Disaster

White House speechwriter Marc Thiessen was locked in a secure room and given access to the most sensitive intelligence when he was tasked to write President George W. Bush's 2006 speech explaining the CIA's interrogation program and why Congress should authorize it. Few know more about these CIA operations than Thiessen, and in his new book, Courting Disaster, he documents just how effective the CIA's interrogations were in foiling attacks on America, penetrating al-Qaeda's high command, and providing our military with actionable intelligence. Thiessen also shows how reckless President Obama has been in shutting down the CIA's program and releasing secret documents that have aided our enemies. Courting Disaster proves:



How the CIA program thwarted specific deadly attacks against the U.S. Why "enhanced interrogation" was not torture by any reasonable legal or moral standard How the information gained by "enhanced interrogation" could not have been acquired any other way How President Obama's actions since taking office have left America much more vulnerable to attack

In chilling detail, Thiessen reveals how close the terrorists came to striking again, how intelligence gained from "enhanced interrogation" repeatedly stymied their plots, and how President Obama's dismantling of this CIA program is inviting disaster for America. Marc Thiessen knows more than almost anyone outside the CIA about what went on at CIA "black sites" and at the detention center at Guantanamo Bay, Cuba. As chief speechwriter for President Bush, he was given unprecedented access to some of the most sensitive intelligence our government possessed on al Qaeda terrorists. He has since spent countless hours interviewing the men and women involved in the interrogations at every level—from Vice President Dick Cheney to the interrogators themselves. What he reveals is a shocking, thoroughly documented account of just how close we came to suffering follow-on 9/11 attacks, how so-called "enhanced interrogation techniques" (including waterboarding) were directly responsible for unearthing the actionable intelligence that foiled them, and the extraordinary measures the Bush administration took to stay well within the bounds of what was not only legally but morally right. Courting Disaster shows how America's dedicated intelligence professionals went head-to-head with the world's most dangerous terrorists, and won—only to have Barack Obama expose America's secrets to the enemy, endorse smears against our intelligence officers, and put them at risk of prosecution for defending our country. In Courting Disaster, Thiessen reveals: Why "enhanced interrogation techniques" did not qualify as torture by any objective standard Specific terrorist plots foiled by the CIA, based on information that came from "enhanced interrogation"—ranging from attacks against Los Angeles and London to the breaking up of an al Qaeda cell that was developing anthrax for terrorist attacks inside the United States. New evidence that House Speaker Nancy Pelosi knew about and approved CIA waterboarding. The real stories of abuse at Guantanamo—not of the detainees by the guards, but of the guards by the detainees, and how released detainees have returned to the jihad. How the Obama administration is giving captured terrorists more legal rights than are granted to legitimate prisoners of war—and denying our intelligence officers tools that police officers use everyday to question common criminals How information released by Barack Obama has aided our enemies and put America at greater risk of another terrorist attack

Pilot gas mask center opens in Or Yehuda

Purim is the traditional time of year for wearing masks, but the residents of Or Yehuda, who lined up at the post office Sunday, were there to receive masks of a completely different kind. The IDF Home Front Command, together with the Israel Postal Company (IPC), opened a gas mask distribution centre, where residents of the city can pick up their upgraded biological and chemical warfare protection kits. The distribution centre in Or Yehuda is the test case upon which country-wide distribution will be modelled. The pilot project is scheduled to last 10 days and will operate out of eight points across the city. To enable the entire population to be refitted quickly and efficiently, the distribution points at IPC branches will be open for extended hours. During the last mass distribution of gas masks, which took place in 1991, leading up to the Gulf War, the Home Front Command itself was in charge of distribution. This time the government decided to outsource the procedure to an external body. The IPC beat out seven other candidates, including Magen David Adom emergency response service and supermarket chain Shufersal, to win the tender for the distribution project. IPC vice-president of operations, Chaim Mazaki, was on hand to oversee the operations of the first and largest distribution centre, located in the city's downtown commercial centre. Because this is the pilot, we are investing all of our resources here, said

Mazaki. I don't think other cities will feature so many distribution points. There we will call people in on a street-by-street basis. Mazaki said he and his team have been working towards the opening of the centre for three months, ever since the IPC won the tender. There is a lot of logistics involved in an operation like this. It is up to us to make sure the entire population is provided with gas masks. That means we have to make sure everybody knows about the distribution and either comes to the centres or orders a delivery to their houses and make sure that every person has the right mask that suits them, said Mazaki. We work closely with the army and if any problems come up we refer the citizens to them. A new service that is available from the post office is to have the mask and the kit delivered to an individual's home. For a fee of NIS 25, a carrier will deliver any number of kits to a given address and even pick the old kits up if necessary. Those who, according to the Home Front Command's records, are still in possession of their old protection kits must return them before receiving the new ones. People who lost their old kits will be charged a NIS 70 replacement fee. Mazaki said the main thing he was worried about was citizen apathy. If we have to start chasing people down to make sure they receive their kits, it will drain our resources, he said.Ofra Shalem, 46, said she came to the centre to get it over with and not out of a sense of panic or concern. I was in the neighbourhood, so I dropped by, said Shalem. I don't think there is cause for fear or concern. Shalem, who came to pick up the kits for her husband and her 22-year-old son, who is currently out of the country, said she returned her old kits and didn't anticipate any problems in being issued new ones. She said she was pleased by the level of service and the smooth manner in which things were run. She said she heard about the project on the radio. Hagai Ezra, 78, said he had waited for half an hour for his kit, but as he was not in a rush was content to sit and wait. He said that because he lives in the area, he came down to pick the mask up himself, but if had lived further away, he would have considered ordering a carrier. I am not afraid of an attack, but it's important to be prepared in any case, said Ezra. Lea David, a woman in her forties, came to the centre to pick up masks for herself and for her daughter. She said it was a waste for her to have the kits delivered, but that it was good for elderly people who couldn't get around easily. I don't like the fact that they have to pay though [to get the kit delivered]. It is a life-saving kit. Why should people have to pay? said David. The only problem that arose was when one women came to pick up a mask for her and her husband, but did not receive the special mask that her asthmatic husband needed. Mazaki explained that people with special needs are referred to the army representative and that it is up to them to determine how to proceed. People with asthma require masks with compressors to improve airflow, said Mazaki. In order to receive one, patients have to go before a medical committee that will determine if they are entitled to it. After the Or Yehuda pilot is completed, another, wider pilot is planned for the entire Ono region. Mazaki said that if both prove successful, distribution will commence across the country, scheduled according to the plans of the Home Front Command and based on threat levels.

Engineering team developing helicopter that would investigate nuclear disasters

Students at Virginia Tech's Unmanned Systems Laboratory are perfecting an autonomous helicopter they hope will never be used for its intended purpose. Roughly six feet long and weighing 200 pounds, the re-engineered aircraft is designed to fly into American cities blasted by a nuclear weapon or dirty bomb. The helicopter's main mission would be to assist military investigators in the unthinkable: Enter an American city after a nuclear attack in order to detect radiation levels, map and photograph damage. "It's for a worst-case scenario," said project leader Kevin Kochersberger, a research associate professor of mechanical engineering and director of the Virginia Tech Unmanned Systems Laboratory. His team consists of several graduate and undergraduate students from the mechanical engineering and electrical and computer engineering departments. Kochersberger and his team re-engineered a remote-controlled Yamaha-built Unmanned Aerial Vehicle RMAX helicopter to fly in fully autonomous mode. They also created flight control software algorithms that will direct the

helicopter to radioactive sources on its own accord. To carry out various missions, the researchers outfitted the helicopter with various "plug-and-play payloads" as the vehicle's weight capacity is limited. The payloads are easily loadable and unloadable boxes that fit snugly under the helicopter's main body, carrying devices that would detect radiation levels in the atmosphere and on the ground, and take video and still images of damage. Flight control software would allow the mission to be changed mid-flight. One payload is unique: A miniature tray-like robot on treads that can be launched via a tether wire from the helicopter to collect evidence. The helicopter would hover over the robot, and pull it back via the wire.

A student team is building this robot, which will boast not only "chunk" sampling capability, but also a miniature vacuum which could suck up dust and dirt. The robot is expected to easily maneuver any terrain, including expected bomb craters, as part of its investigation, said Michael Rose, a graduate student in mechanical engineering, from Gilroy, Calif. The team plans to make the robot water proof, in the event that it comes across water – busted water mains, lakes, rain puddles, etc. "The electronics must be protected from the harmful elements," Rose said. The group also designed a downward-looking stereo camera system mounted to the helicopter, to image affected areas. The cameras would allow for computerized 3-D terrain mapping of affected areas, an absolute necessity to understand the characteristics of the blast. It is expected that the helicopter will have night vision capabilities, and enhanced imaging technologies that improve vision through smoke and fog as the project progresses, Kochersberger said. The project, already funded at $735,000 with an additional $650,000 allocated for 2010, is overseen by the U.S. Defense Threat Reduction Agency and spearheaded by the Department of Energy's Savannah River National Laboratory. Plans call for the helicopters to be mission-ready in three years. Department of Defense personnel already have visited Blacksburg to watch a demonstration as the craft zeroed in on a small, planted radioactive source at Kentland Farm, several miles from the Virginia Tech campus. More testing is underway, with another DoD demonstration planned for 2010 in Savannah, Ga.

New technology identifies bacteria, viruses, other organisms within 24 hours

Law enforcement authorities seeking to detect bioterrorism attacks, doctors diagnosing diseases and regulatory agencies checking product safety may find a new ally in a Lawrence Livermore National Laboratory (LLNL) detection technology. The advance, known as the Lawrence Livermore Microbial Detection Array (LLMDA), could enable law enforcement, medical professionals and others to detect within 24 hours any virus or bacteria that has been sequenced and included among the array's probes. Developed between October 2007 and February 2008, the LLMDA detects viruses and bacteria with the use of 388,000 probes that fit in a checkerboard pattern in the middle of a one-inch wide, three-inch long glass slide. The current operational version of the LLMDA contains probes that can detect more than 2,000 viruses and about 900 bacteria. 'The ability to detect the major bacterial and viral components of any sample can be used in countless different ways,' said Tom Slezak, LLNL's associate program leader for Informatics. 'This is important because it fills a cost-performance gap that is relevant to many missions: biodefence, public health and product safety.' In the area of biodefence, current systems are centred upon the detection of smaller prioritised sets of high-

risk pathogens, rather than testing for a much broader spectrum of organisms. 'The LLMDA allows us to not only identify the biological pathogens on a priority screening list, but also any other already-sequenced bacteria or virus in a sample that you might not have been expecting to find, including possible novel or emerging pathogens,' Slezak said. Current plans call for the detection array to be evaluated for operational bioforensic use at the Frederick, Md.-based National Biodefence Analysis and Countermeasures Centre of the U.S. Department of Homeland Security. As the cost of the array is reduced, the LLMDA technology could be used to improve public health diagnostics, Slezak said, adding that dozens of bacteria and viruses can be detected in a single test from the entire spectrum of sequenced organisms. One advantage of the Livermore array is that it provides researchers with the capability of detecting pathogens over the entire range of known viruses and bacteria. Current multiplex polymerase chain reaction (PCR) techniques can at most offer detection from among 50 organisms in one test. In April, in a Journal of Virology article, Livermore researchers working with a scientist from the San Francisco-based Blood Systems Research Institute said they used the LLMDA technology to confirm the presence of an apparently benign pig virus in a vaccine. The pig virus, porcine circovirus-1 (PCV-1), was unexpectedly found in GlaxSmithKline's Rotarix vaccine, which is used to prevent diarrhoea in babies. 'One result of this research is that it demonstrates how modern technologies could change and drastically improve product safety,' Slezak said. While product safety rules require demonstrating that a list of known contaminants is not present, Slezak said the use of modern advances in DNA sequencing and arrays would allow manufacturers to identify the potential presence of contaminating biological material present in quantities large enough to be of potential concern. 'For each bacteria or virus that has been sequenced anywhere in the world, we have several dozen squares on the checkerboard that will identify sequences from that organism,' Slezak explained. Currently, Slezak's team is testing a next-generation LLMDA that boasts 2.1 million probes. This version contains probes representing about 178,000 viral sequences from some 5,700 viruses, and about 785,000 bacterial sequences from thousands of bacteria. The latest LLMDA version also encompasses fungi and protozoa - with probes representing about 237,000 fungal sequences from thousands of fungi and about 202,000 protozoa sequences from 75 protozoa. As a screening tool, Slezak sees the LLMDA as occupying niche roles between PCR machines and sequencing. The LLMDA process starts with the purification of DNA or RNA from a sample, such as sputum or blood. The sample is next labelled with a fluorescent dye and hybridised on the microarray at 42 degrees C or about 107.6 degrees Fahrenheit. In turn, a fluorescent scanner and analysis software are used to detect the probes that have lit up, identifying the presence of viral or bacterial sequences. The Livermore team plans to update probes on the array with new sequences of bacteria, viruses and other microorganisms from GenBank and other public databases about once per year, in addition to using sequences obtained from collaborators for their probes. LLNL's current collaborators include the University of California, San Francisco; the Blood Systems Research Institute; the University of Texas Medical Branch (Galveston); the National Institute for Public Health and the Environment of Bilthoven, the Netherlands; the Statens Serum Institut of Copenhagen, Denmark; the University of California, Davis; Imigene; the U.S. Food and Drug Administration; and the Marine Mammal Centre of Sausalito, Calif. A computer scientist and the team's leader, Slezak came up with the idea for the LLMDA in 2003. His team includes biologist Crystal Jaing, who leads the microarray lab work and manages the collaborations; bioinformaticist Shea Gardner, who designed the array; biostatistician Kevin McLoughlin, who designed the analysis software; and James B. Thissen, who performs the microarray experiments.

Biologists discover an extra layer of protection for bacterial spores

Bacterial spores, the most resistant organisms on earth, carry an extra coating of protection previously undetected, a team of microbiologists reports in the latest issue of the journal Current Biology. Their findings offer additional insight into why spores of the bacteria that

cause botulism, tetanus, and anthrax survive methods to eradicate them. The study was conducted by researchers at New York University's Center for Genomics and Systems Biology, Loyola (Ill.) University's Medical Center, and Princeton University's Department of Molecular Biology. The researchers studied the spores of a non-pathogenic bacterium, Bacillus subtilis, which is commonly found in soil. Although non-pathogenic, B. subtilis spores exhibit many of the same structural features of the spore-forming pathogens. In this study, the scientists examined the proteins that comprise spores' protective layers. Previous research has shown that 70 different proteins make up these layers. Less understood is how these proteins interact to form the spores' protective coats. To do this, the researchers examined coat formation of both normal and mutant spores. In the latter case, they removed genes for selected coat proteins, allowing them to determine which proteins were necessary in—and extraneous to—the formation of the spores' coats. To observe proteins' behavior in living cells, the researchers fused the genes encoding the spores' coat proteins to a marker, a Green Fluorescent Protein (GFP). This procedure allowed them to monitor how the proteins localized to form spores' protective coats. A combination of fluorescence microscopy experiments and high-resolution image analysis enabled the researchers to overcome a theoretical limitation of light microscopy, pinpoint the location of the spores' coat proteins with a high degree of precision, and build a map of the spore coat. These experiments suggested the existence of a new outermost layer of the spore coat. They were then able to confirm the existence of this new layer using electron microscopy. The researchers named this coat layer, located on the spores' outer surface, the "spore crust." While it has not yet been confirmed, it is possible that the spore crust is a common feature of all spore-forming bacteria, such as the botulism, tetanus, and anthrax pathogens.

Moscow subway attack: Five ways to make mass transit safer

Mass-transit systems across the world responded to the Moscow subway attack by heightening security. But such knee-jerk reactions only expose the weakness of subway security, experts say.

Security on mass-transit systems should be a daily priority, like in airports, they add, suggesting that subway stations do not have to be soft terrorist targets. Of course, commuters'

expectations that public transit take them a few miles with minimal inconvenience makes it impossible to implement in subways the strict screening that exists in airports. But the need is great. More than 10.2 billion trips were taken on public transit in 2009. Yet in the first-ever quadrennial security review released by the Department of Homeland Security (DHS) last month, subways are mentioned only once in the 108-page report. As outlined in that report, the most severe threat facing any transportation system is a weapon of mass destruction such as a nuclear device or a biological weapon. Common-sense steps and new technologies can make mass-transit safer. Here are five ways:

1. 'Gaming technology'

It may sound like something from a Jason Bourne movie but some mass-transit systems, especially in Europe, are using so-called "gaming technology" to turn intelligence into preventing terrorist attacks. Gaming technology uses an array of hardware, software, and fast processor speeds. It records a scene in real time using 360-degree photography and immersive video – allowing for recording of every direction at the same time. It also often includes global positioning systems (GPS) and inertial guidance systems (IGS) for tracking and positioning information. If the computer picks up on a possible situation – say, a passenger has a dirty bomb or a bioweapon – a series of actions will occur. The train's driver will be notified, the entrance and exits doors may electronically be opened or closed depending on the situation.

2. Protect

Just as companies are providing next-generation surveillance technologies for trains, they are also trying to transform security in stations. One example is PROTECT, which consists of hardware and software that can provide automated detection of a terrorist attack. The exact suite of technologies in PROTECT, which stands for Program for Response Operations and Technology Enhancements for Chemical/Biological Terrorism, is not made public. But security experts say it contains biological and chemical sensor technology, video, wireless communications, and computer software to simulate the spread of potential contaminants. Washington has the program in a dozen stations and Boston has also implemented a permanent program. Chicago, San Francisco, and other cities are interested. "We need the kinds of things that help integrate the data from information that is coming in from sensors and cameras," says Charlie Fisher, vice president for the Mid-Atlantic Region of Witt Associates, a public safety and crisis management consulting firm. "That information has to be processed for security people in order to improve their situational awareness." But there's a money factor for most transit systems. Federal funding does not cover the cost, nor do subway operators' general funds. Mr. Fisher says many municipalities are pushing DHS for more federal grants to support such mass-transit detection systems.

3. Germ Warfare

The Houston Metro system has successfully tested the Breathe Safe System, which uses Ultraviolet Germicidal Irradiation to kill up to 99 percent of certain types of bacteria. The primarily goal is hygienic: preventing the spread of viruses such H1N1, bacteria, or mold. But the technology is also evolving to prevent against a biological attack on a mass transit system. Many office buildings already use this technology to guard against an airborne threat. The next step would be to add the such systems to subways in major metropolitan areas.

4. Blankets

New York City recently received some new tools in its battle against a possible attack: shields, vests, and blankets made from Demron, a state-of-the-art fabric blend that blocks chemical, biological, and nuclear agents. The shields and vests would be used by first responders. Blankets would be thrown over radiation victims to keep them from irradiating others. Another blanket – the "Hi-Energy Nuclear Suppression Blanket" – is designed to be placed over a dirty bomb about to go off. It traps chemical, biological, and nuclear agents and

reduces by more than half the distance they can spread. One goal is to make these blankets as common on subways as oxygen masks are on planes.

5. Emergency preparedness

The old tried-and-true security drill is still the best, security experts say.Transit systems regardless of size and capacity should have a plan for all possible disasters. Conducting exercises regularly is also crucial to avoiding a disaster or preventing mass causalities. Earlier this week, the Washington Metropolitan Area Transit Authority held two emergency response exercises involving simulated explosions on Metrorail and Metrobus "to test and practice the multi-jurisdictional coordination and response needed to mitigate such incidents," according to WMATA Metrorail's website.

Anthrax bioterror in Europe

The Obama administration has declared its intention to respond faster and more effectively to bioterrorism. But at least two bizarre incidents among drug abusers in Europe force us to question whether experiments with biological weapons might be under way already. In recent weeks, we have heard mystifying reports of the outbreak of anthrax infections among heroin users in Scotland and Germany. More than two dozen users in Scotland and London have been diagnosed, 12 of whom have died. At least one case has been reported in Germany.

Might this be a peculiar anomaly, or does it portend something far more sinister? As Scottish public health and criminal investigators search for the source of the contamination, we are left to ponder the probabilities. There are two principal sources of contamination in illegal drugs. The most obvious is the additives used to "cut" the drug to increase the quantity for street sale. While experts will attest to an amazing array of substances used, Bacillus anthracis hardly falls within that category. Using large amounts of a pathogen that would place the producer at risk makes no sense. The other source of contamination is exposure during production. If the source of the heroin is within a region where anthrax is endemic, there is a possibility that cross contamination can occur from tents, containers or utensils made from animal hides. This leads to subsequent questions: How much of a concentration has to be present to result in a significant contamination at the far end of the supply chain? Why have none of the distributors been affected? Why has the contamination been so localized?

This leads to a third, more ominous possibility: that the anthrax contamination of heroin is an act of bioterrorism. When we first suggested this prospect, colleagues asked, "But why target heroin users?" Granted, drug abusers exist at the margins of society and often are viewed as lost to the mainstream. Yet they also represent the essence of a society viewed as decadent

and evil, especially to a fundamentalist zealot. What better way to accomplish a divine mission than by the very means of the immorality? As a tactical terrorist strike, this offers multiple benefits. The first is a secure and highly efficient delivery channel. By its very nature, the trafficking of illegal drugs avoids detection by customs, law enforcement and health officials. This ensures delivery of the biological weapon, most likely to large population centers. The primary victims would be those who use drugs and, to a lesser extent, those who distribute the drugs - the "pushers" - violators of Shariah law who can be punished by death. Secondary victims would include law enforcement personnel, health care workers and other public servants such as trash collectors - all symbols and instrumentalities of the system of government you wish to take down. There also is a possibility that chance victims will succumb to incidental exposure, as happened during the 2001 postal anthrax attacks. The randomness of casualties would lead eventually to widespread fear and apprehension, a primary goal of the terrorist. Absent specific facts, it is impossible to say whether this is a plausible explanation or simply a bizarre coincidence. What is certain is that this event is a symptom of our continuing state of unpreparedness for a well-planned and -executed bioterror attack. The wake-up calls have been many. Al Qaeda has stated its intent to obtain and employ biological weapons. The national intelligence leadership's Feb. 2 statement that an attempted attack on the United States is a certainty within the next six months is a second alarm. Can the danger be any clearer? The call for immediate and definitive action is dead right. Failure in this regard could be dead wrong, with the emphasis on "dead."

Biosensors in briefs

US scientists have developed durable biosensors that can be printed directly onto clothing.

This could allow continuous biomedical monitoring outside hospitals. The expenses associated with hospital treatment have spawned a growing interest in methods for home based healthcare management. A reliable, wearable, physiological monitoring system would allow at-home physiological surveillance, which could reduce the load on hospitals. Wearable sensors would also be useful for stress and drug monitoring in sport and the military. Physical sensors that monitor blood pressure or heart rate have been integrated into clothing but little attention has been paid to wearable chemical sensors. Now, Joseph Wang and colleagues at the University of California San Diego, La Jolla have devloped a method for printing biosensors directly onto clothing. To form the sensors, Wang screen-printed carbon electrode arrays directly onto the elastic bands of mens' underwear. The tight contact and direct exposure to the skin allows hydrogen peroxide and the enzyme NADH, which are both associated with numerous biomedical processes, to be monitored using the sensor, explains Wang. Stresses associated with everyday wear, such as folding or stretching the clothing, did not affect the performance of the sensor, says Wang. He adds that this durability will allow many future applications of the technology. Richard Compton at the University of Oxford, UK comments, 'electrochemical sensors are widely used in niche applications and it is timely for a greater diversity of sensors to emerge, given the sensitivity and low cost of electrochemical measurements. I have full confidence in this idea coming to fruition.' Wang adds that 'on-

body non-invasive textile-based sensing is extremely challenging and requires proper attention to the key issues regarding reliable sample delivery to the electrode surface as well as sensor calibration and interconnection.' In future, he hopes to develop enzyme sensors for ethanol and lactate which could be used to monitor alchohol levels in drivers or stress levels in soldiers and athletes.

New Bee Sniffing Technology Can Detect Many Dangerous Vapors At Once

While bees are extremely important to our ecology, they are becoming important to our defense against biological and other weapons, as the bee's discreet sense of smell, equivalent to a dog's, is being exploited as a much cheaper way to detect various odors in the environment. As far back as 1999, the Defense Advanced Research Projects Agency (DARPA) Controlled Biological Systems Program funded a bee-training program to detect buried landmines, so that many thousands of acres of the world's land could be productively farmed without encountering landmines the ugly way. A bee's natural instinct is to extend its proboscis when it encounters a desirable odor, anticipating the taste of a flower, let's say. But the bees used in the 1999 DARPA experiment were trained, via classical Pavlovian conditioning, to respond to the odor of TNT instead. Their reward when they responded with a Proboscis Extension Reflex (PER), was a taste of sweet syrup. Then, trainers attached small diodes onto the backs of TNT-trained bees

and used handheld radar tracking devices to chart where the bees went. In 2010, bee training in the fields of defense and security, medicine, food, and building industries is big business. Bee training is essentially the same as it was in 1999, but the results are attained with more sophisticated and less expensive technology. Inscentinal Ltd. has been working on developing very unique sensing instruments that couple the biological performance of honeybees with the technology to translate bee response into an electronic response. Inscentanil's first proprietary

design is a hand held device called the VASOR136, a trace vapor detection unit that is very versatile. The VASOR 136 holds 36 bees in cartridges. They are all ready to detect the presence of something in the air. The VASOR136 contains 36 cartridges each containing one bee. Filtered in by a standard gas mask cartridge is a constant supply of clean air. When an operator presses a button on the VASOR, an air sample is taken from the environment that exposes the bees to ambient, unfiltered air. If the bees have been trained to respond to a vapor in that air, the bees will exhibit a PER response and the response will be translated by the VASOR into a simple result shown on the PDA screen display. This BBC News video provides a glimpse at the VASOR136. The short video that is next on the BBC video page shows how bees were trained to detect TNT in Croatia in 2007. Very neat. But the VASOR also allows for a modular approach insofar as each cartridge can contain a bee that's been trained to identify a different vapor, giving the VASOR the ability to trace up to 36 different vapors. For security at airports the VASOR's cost efficiency could not possibly be matched by 36 trained dogs, and other security technologies do not currently have that range of potential threats covered. Of course, there is also the ability of the VASOR to identify diseases and cancers in people and animals, to detect rapidly spreading bacteria in food, and to identify dry rot in buildings.... The applications for the VASOR136 are just beginning to unfold. As for the bees … after a few hours of training and two or three days on the job, they can go back to working for the Queen.

NJIT Physicist Sees Terahertz Imaging As Ultimate Defense Against Terrorism

John Federici, a physics professor at NJIT, sees the use of terahertz rays as a critical technology in the defense against suicide bombers and other terrorist activities. Federici and his research team recently described experimental results from a digital video camera invented in their laboratory that uses a terahertz imaging system. One day such a device could be used to scan airport passengers quickly and efficiently. "Video-Rate terahertz Interferometric and Synthetic Aperture Imaging" appeared in Applied Optics (July, 2009). The article examined experimental results from a video-rate device. The device uses terahertz (THz) rays that emit a continuous narrow bandwidth radiation of 0.1 (THz). The instrument creates a two-dimensional image of a point in an object. The image is reconstructed at a rate of 16 milliseconds per frame with a four-element detector array. The number of detectors, the configuration of the detection array and how well the baselines are calibrated affects the image resolution and quality. "Scientists favor terahertz radiation because it can transmit through most non-metallic and non-polar mediums," said Federici. "When a terahertz system is used correctly, people can see through concealing barriers such as packaging, corrugated cardboard, walls, clothing, shoes, book bags, pill coatings, etc. in order to probe for concealed or falsified materials." Once the rays penetrate those materials, they can also characterize what might be hidden - be they explosives, chemical agents or more - based on a spectral fingerprint the rays will sense which can identify the material. terahertz radiation also poses minimal or no health risk to either the person being scanned or the THz system operator. At this time, instruments using terahertz imaging are widely used in laboratories and have shown some limited use in commercial applications. However, a THz imaging system for security screening of people has not yet reached the market. Researchers say that such a system is at least five years away. The NJIT device, however, has great promise. According to Federici, THz imaging systems have an inherent advantage over millimeter wave imaging systems due to the intrinsically improved spatial resolution that one can achieve with the shorter wavelength THz systems (typically 300 micrometer wavelength) compared to longer wavelength millimeter wave systems. However, video-rate THz imaging systems are not as well advanced as their millimeter wave counterparts. One technical limitation in developing video-rate THz imaging is the cost of THz hardware components including detectors. Consequently, THz imaging systems create images using a very small number of detectors in contrast to the million or more detectors that are used in digital cameras. According to

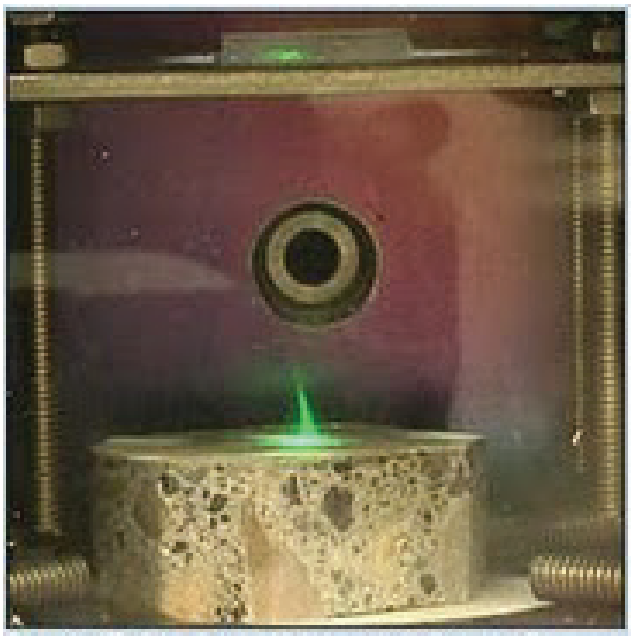
Federici, one can use advanced imaging techniques, such as synthetic aperture imaging methods, to compensate for the relatively few number of THz detectors in an imaging system. "The idea has been to apply different methods of imaging with radio waves, where many of the ideas for synthetic aperture imaging originated, to terahertz rays," said Federici. His research team has focused in particular on applications of synthetic aperture imaging to the terahertz range. "The advantage of this particular method is the ability to generate terahertz images with a large number of pixels using a limited number of terahertz detectors. This imaging method should also be capable of video-rate imaging, thereby enabling the real-time monitoring of people hiding concealed explosives or other dangers." A typical imaging system would be analogous to a still or video camera designed for this purpose. In 2005, Federici and his research team received a U.S. patent for a terahertz imaging system and method that enables video-rate THz imaging with a limited number of detectors. Since 1995, terahertz imaging has grown in importance as new and sophisticated devices and equipment have empowered scientists to understand its potential. The U.S. Department of Homeland Security, the Army Research Office, Department of Defense, and the National Science Foundation support Federici's work. While researchers have focused on the potential applications of terahertz rays for directly detecting and imaging concealed weapons and explosives, they say another application is the remote detection of chemical and biological agents in the atmosphere.

Identification Of First Molecules That Protect Cells Against Deadly Ricin Poison

The results of a high-throughput screen of thousands of chemicals in search of agents that could protect cells, and ultimately people, against the deadly ricin poison has turned up two contenders. Even better, the compounds also render cells immune to the effects of Shiga-like toxins that are produced by infectious strains of E. coli bacteria among other pathogens, suggesting they may be useful against other threats to public health and in fact any toxin that takes the same route to enter cells. The findings are reported in the April 16th issue of the journal Cell, a Cell Press publication. The discovery was made as part of a larger effort in France to address potential bio-terror weapons following the 9/11 attacks in the United States, said Daniel Gillet of Commissariat a l'Energie Atomique et aux Energies Alternatives. "There is a real need for countermeasures against ricin," one of the most toxic chemicals known to man, Gillet said. One of the reasons for concern is that ricin is not only deadly, but it can also be easy to come by. It is a natural ingredient in the seeds of castor oil plants, which are used in the industrial production of brake fluid, varnish, soap, ink and other products. "There are many plants growing and there is about one milligram of toxin per seed. Ricin is a byproduct of this industry." Ricin first gained notoriety when it was used to assassinate the Bulgarian journalist Georgi Markov in 1978, notes Matthew Seaman and Andrew Peden in an accompanying commentary about the new findings. There are currently no known antidotes to ricin or Shiga toxins, and the possibility that ricin might be used in a bio-terror attack is a major concern. Gillet said that other groups had looked for compounds to protect against ricin before without success. Some promising candidates didn't work consistently and others proved to be toxic in and of themselves. In the new study, the researchers found two compounds that allowed cells to survive the assaults of ricin and Shiga-like toxins. The compounds work not by acting on the toxins themselves, but through their effects on the route the toxins follow as they travel through cells, they report. (Both ricin and Shiga-like toxins normally travel through cells by the so-called retrograde pathway. Ricin delivers its fatal blow after it escapes into the cytosol where it disrupts the ribosomal "factories" that produce all the proteins needed to do the work of the cell.) The compounds, which they call Retro-1 and Retro-2, block the toxins' escape via a series of cellular components out into the cytosol after they've gained initial entry into cells, explained study coauthor Ludger Johannes of Institut Curie and Centre National de la Recherche Scientifique.

Experiments to Use Lasers Steam Cleaning of Dirty Bomb Radiation and Chemical Contamination Looks Very Promising

Idaho National Laboratory chemists are studying the potential of lasers to help clean up chemical and radiological contamination. The goal is to increase the nation's ability to respond to "unconventional" terror attacks such as dirty bombs. Experiments are ongoing, but



Laser light plays across a piece of cement spiked with chemical agent, creating a green "flame" of vapors and surface plasma.

Ultraviolet light breaks down a chemical agent inside a quartz cuvette. The brown material is the decomposition byproduct.

results thus far are very promising. Laser technology can also scale up to perform large-scale decontamination jobs. Some cleanup and restoration firms, such as adapt laser system, are already using lasers to scrub soot off building facades. Further, these industrial operations often use automated lasers, demonstrating that laser work can be done remotely. This would minimize risks to remediation personnel responding to a terrorist attack. Fox stresses that laser decontamination is a tool in the proof-of-principle stage. In theory, chemists already know how to clean up radiological contaminants. They can "chelate" affected areas, for instance, using grabby, reactive chemicals to wrench radionuclides off surfaces. But in the real world, that's easier said than done. Many building materials — like cement and brick — are extremely porous. "Getting contaminants off surfaces is difficult," says INL chemist Gary Groenewold. "They start inhabiting cracks and pores." Water inhabits those cracks and pores, too, and that's where lasers come in. Fox, Groenewold and their colleagues have shown that laser pulses can flash that water into steam, carrying the contaminants back to the surface for removal by chelation or other means. "It's a kind of laser steam-cleaning," Fox says.

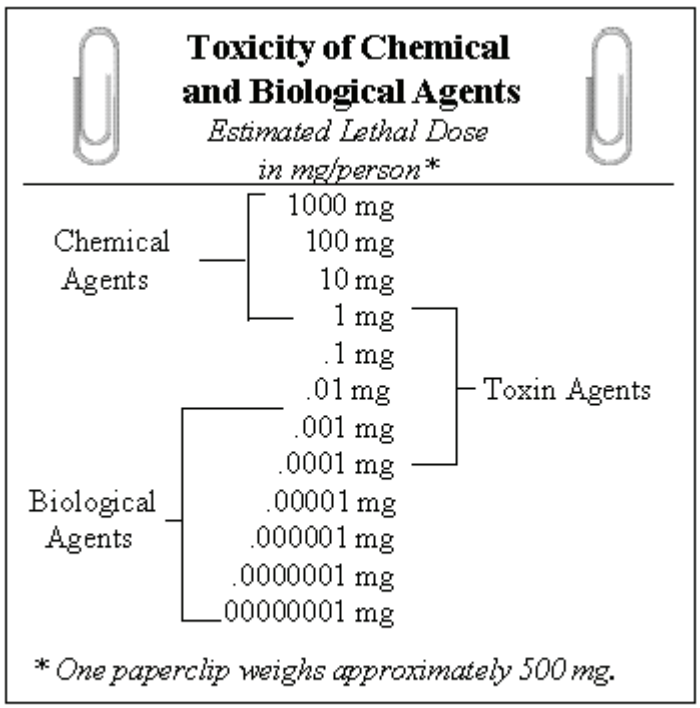
Cleaning Up Chemical Agents

The INL team has extended its work to chemical-weapon decontamination, another high national-defense priority. Nerve agents like sarin, VX and sulfur mustard are extremely dangerous, and cleaning them up can be difficult, costly and time-consuming. Most preferred methods employ other chemicals — bleach solutions, for example — which must themselves be dealt with. Ultraviolet light breaks down a chemical agent inside a quartz cuvette. The

brown material is the decomposition byproduct. "Using bleach creates a lot of secondary waste, which you have to collect and dispose of," Groenewold says. "And bleach is quite chemically aggressive, meaning it may well damage the structures you're trying to decontaminate." Again, lasers show promise as a possible remediation upgrade. In a series of tests still under way at the U.S. Army's Aberdeen Proving Ground, the INL team has been using ultraviolet-wavelength lasers to scrub surfaces of sulphur mustard and VX. The tests have been successful so far, even on complex, porous surfaces like concrete. Lasers can degrade weapons like VX in two ways: photochemically or photothermally. In photochemical decomposition, high-energy laser photons blast apart chemical bonds, slicing the agent into pieces. In photothermal decomposition, photons heat up the target surface enough to speed along natural degradation reactions. In some cases, the intense heat by itself can cause contaminant molecules to fall apart. Some chemical agents are susceptible photochemically, others photothermally. Knowing how chemical contaminants fall apart is key, because some of their degradation products can themselves be hazardous. But according to Fox, the tests look good in this regard, too. "The lasers are showing neutralization of agent without generation of dangerous by-products," he says

Novichok agent

Novichok (Russian новичок: "Newcomer") is a series of nerve agents that were developed by the Soviet Union in the 1970s and 1980s and allegedly the most deadly nerve agents ever made, with some variants possibly five to eight times more potent than VX nerve gas, though this has never been proven. They belong to "fourth generation chemical weapons" designed as a part of Soviet "Foliant" program. Initially designated K-84 and later renamed A-230. The Novichok family of analogs comprises more than a hundred structural variants. Of all the variants the most promising, from a military standpoint, was A-232 (Novichok-5).



Source: Office of Technology Assessment, *Technologies Underlying Weapons of Mass Destruction* (Washington, D.C.: U.S. Government Printing Office, December 1993), p. 77.

Design objectives

These agents are designed to achieve three objectives:

- To be undetectable using standard NATO chemical detection equipment
- To defeat NATO chemical protective gear
- To be safer to handle

Some of these agents are binary weapons, in which precursors for the nerve agents are mixed in a munition to produce the agent just prior to its use. Because the precursors are generally significantly less hazardous than the agents themselves, this technique makes handling and

transporting the munitions a great deal simpler. Additionally, precursors to the agents are usually much easier to stabilize than the agents themselves, so this technique also made it possible to increase the shelf life of the agents. During the 1980s and 1990s, binary versions of several Soviet agents were developed and are designated as "Novichok" agents (after the Russian word for "newcomer").

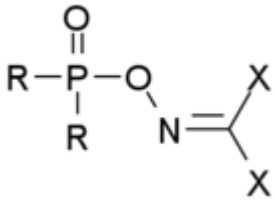
Disclosure

Extremely potent third-generation chemical weapons were developed in the Soviet Union and Russia from the 1970s until the early 1990s, according to a publication by two chemists, Lev Fedorov and Vil Mirzayanov in Moskovskiye Novato weekly in 1992. The publication appeared just on the eve of Russia's signing of the Chemical Weapons Convention. According to Mirzayanov, the Russian Military Chemical Complex (MCC) was using defense conversion money received from the West for development of a chemical warfare facility. Mirzoyanov made his disclosure out of environmental concerns. He was a head of a counter-intelligence department and performed measurements outside the chemical weapons facilities to make sure that foreign spies could not detect any traces of production. To his horror, the levels of deadly substances were 80 times greater than the maximum safe concentration. (A full account by Mirzayanov is available online.) The existence of Novichok agents was openly admitted by Russian military industrial complex authorities when they brought a treason case against Mirzayanov. According to expert witness testimonies prepared for the KGB by three scientists, novichok and other related chemical agents had indeed been produced and therefore the disclosure by Mirzoyanov represented high treason. Vil Mirzayanov was arrested in October 22, 1992 and sent to Lefortovo prison for divulging state secrets. He was released later because "not one of the formulas or names of poisonous substances in the Moscow News article was new to the Soviet press, nor were locations ... of testing sites revealed." According to Yevgenia Albats, "the real state secret revealed by Fyodorov and Nirzoyanov was that generals had lied — and were still lying — to both the international community and their fellow citizens." He now lives in the U.S.

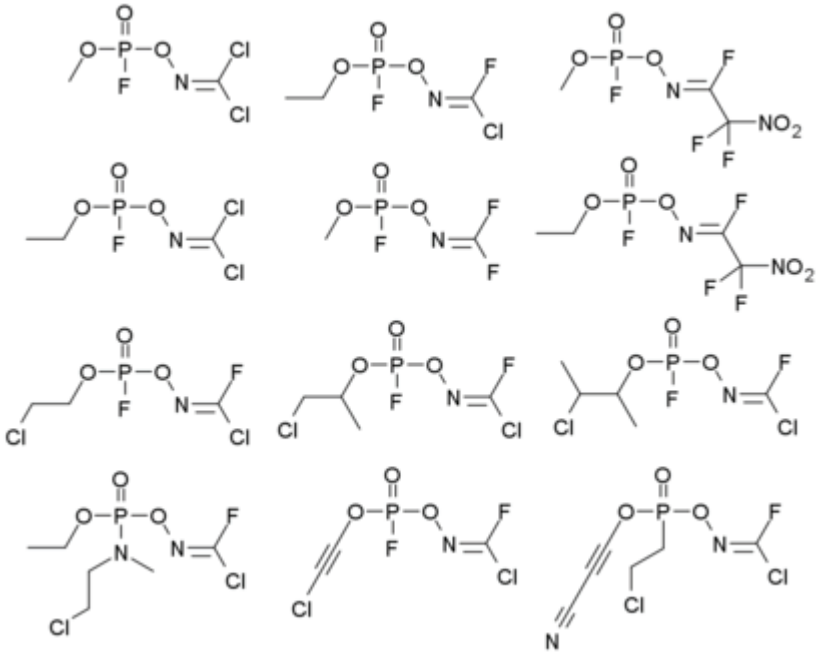
Description of Novichok agents

The first description of these agents was provided by Mirzayanov. Dispersed in an ultra-fine powder instead of a gas or a vapor, they have unique qualities. A binary agent was then created that would mimic the same properties but would either be manufactured using materials legal under the CWT or be undetectable by treaty regime inspections. The most potent compounds from this family, novichok-5 and novichok-7, are supposedly around 5-8x more potent than VX, however the exact structures of these compounds have not been reliably verified. One of the key manufacturing sites was a

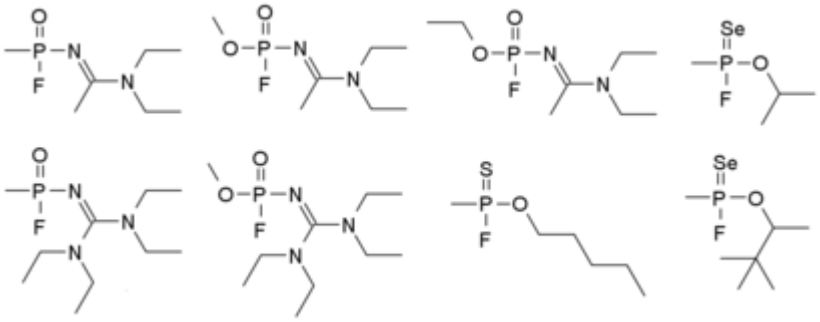
chemical research institute in what is now Uzbekistan, and small, experimental batches of the weapons may have been tested on the nearby Ustyurt plateau. Two broad families of organophosphorus agents have been claimed to be Novichok agents. First are a group of organophosphorus compounds with an attached dihaloformaldoxime group, with the general formula shown below, where R = alkyl, alkoxy, alkylamino or fluorine and X = halogen (F, Cl, Br) or pseudohalogen such as C≡N. These compounds are extensively documented in Soviet literature of the time, but it is unclear whether they are in fact the potent "Novichok" compounds.



Some examples of the first group of compounds reported in the literature are shown below, but it is unknown whether any of these is novichok-5 or novichok-7.



Mirzayanov gives somewhat different structures for Novichok agents in his autobiography, as shown below. He makes clear that a large number of compounds were made, and many of the less potent derivatives reported in the open literature as new organophosphate insecticides, so that the secret chemical weapons program could be disguised as legitimate pesticide research.



Effects

As a nerve agent, Novichok belongs to organophosphate acetylcholinesteras inhibitors. These chemical compounds inhibit the enzyme acetylcholinesterase, preventing the normal breakdown of neurotransmitter acetylcholine. Acetylcholine concentrations then increase at neuromuscular junctions to cause involuntary contraction of all muscles. This then leads to respiratory and cardiac arrest and finally death. The use of a fast-acting peripheral anticholinergic drug such as Atropine could block the receptors where acetylcholine acts to prevent poisoning (as is the treatment for poisoning by other acetylcholinesterare inhibitors). This is however quite dangerous in itself.

NYC fire department improves safety for 'dirty bomb' response

The Fire Department of New York recently added some landmark tools to its arsenal to aid the agency in the war on terror—blankets. These blankets aren't just ordinary blankets; they

are specifically designed to aid FDNY in responding to Chemical, Biological, Radiological, Nuclear, Explosive (CBRNE) incidents in which a dirty bomb may be used. There are two (2) models of blankets: The "High Energy Nuclear Suppression Blanket" and "Crew Protection Blanket." The "High Energy Nuclear Suppression Blanket" helps firefighters contain blasts

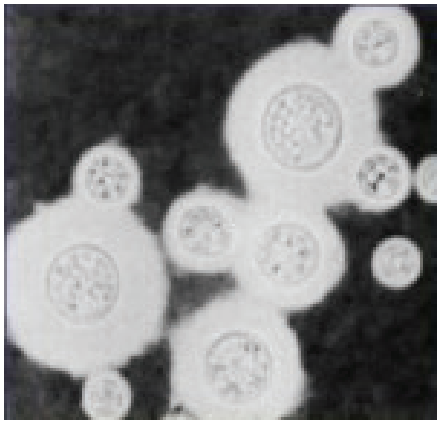
and high energy radiation sources. This process is accomplished by placing the blanket over a suspected dirty bomb prior to detonation. By doing so likely will reduce the force of the blast and provide some available time, distance and shielding (TDS) for first responders. Ron DeMeo, chief executive officer of Radiation Shield Technologies, said this blanket also traps radiation and reduces it by more than half the distance in which it can spread. Since a Radiological Dispersion Device (RDD) is designed to scatter various amounts of radioactive material over a wide area, this state-of-the-art technology would help mitigate this process if utilized correctly. The "Crew Protection Blanket" provides complete nuclear shielding for first responders and can be used to triage radiation victims without irradiating others. Both

blankets are made of Demron, which consists of a radiopaque nano-polymeric compound fused between fabric layers and manufactured into lightweight garments. According to Radiation Shield Technologies, the FDNY will incorporate Demron in its chemical protective clothing (CPC) upgrade program to enhance its response capabilities with universal protection.

The following Demron products have been deployed within the FDNY: the Two-Ply Radiation Torso Vest, High Energy Nuclear/Ballistic IED RDD RED Shield and Crew Protection Blanket. Hazardous Materials Company 1, located in Manhattan, was one of the first FDNY units to field these tools of counterterrorism. The blanket proved in tests by H.P. White Laboratory to provide Level IIIA ballistic protection and the highest fragmentation protection. The radiation torso vest proved in tests by the U.S. Department of Energy to shield against x-ray and low energy gamma emissions, and high- and low-energy beta and alpha particles. The Demron Two-Ply Triage Blanket has been tested by the Department of Energy, and confirmed to be effective in shielding for various forms or ionizing radiation. The specific molecular engineering of the Demron compound provides protection against X-Ray and low energy Gamma emissions, as well as high and low energy Beta and Alpha particles. The Demron triage blanket is constructed with two layers of Demron fabric, providing increased shielding to the vital organs.

Potentially Deadly Fungus Spreading in US, or Is It?

A potentially deadly strain of fungus is spreading among animals and people in the northwestern United States and the Canadian province of British Columbia, researchers reported on Thursday.The airborne fungus, called Cryptococcus gattii, usually only infects transplant and AIDS patients and people with otherwise compromised immune systems, but the new strain is genetically different, the researchers said. “This novel fungus is worrisome because it appears to be a threat to otherwise healthy people,” said Edmond Byrnes of Duke University in North Carolina, who led the study. “The findings presented here document that the outbreak of C. gattii in Western North America is continuing to expand throughout this temperate region,” the researchers said in their report, published in the Public Library of Science journal PLoS Pathogens at http://dx.plos.org/10.1371/journal.ppat.1000850. “Our findings suggest further expansion into neighboring regions is likely to occur and aim to increase disease awareness in the region.” The new strain appears to be unusually deadly, with a mortality rate of about 25 percent among the 21 U.S. cases analyzed, they said.



DHS questions article statements about deadly fungus

The Oregon Department of Human Services disputed some statements in an MSNBC.com article Thursday about the deadliness of a fungus. The article entitled “Deadly airborne fungus in Oregon set to spread” says that a new strain of fungus – VGIIc Cryptococcus gattii – is spreading in the state of Oregon and has killed about 1 in 4 people who have been

infected. It quotes a Duke University researcher by the name of Edmond Byrnes III: “This novel fungus is worrisome because it appears to be a threat to otherwise healthy people. Typically, we more often see this fungal disease associated with transplant recipients and HIV-infected patients, but that is not what we are seeing yet.” Patty Wentz, a spokeswoman for the Oregon Department of Human Services, said that is just plain wrong. “It’s a very rare disease,” she said Thursday evening. “It does not affect otherwise healthy people. It affects people who are already ill from other causes like respiratory disease, asthma and transplant patients.” She stressed that it is a “very, very rare” disease.

DIRTY BOMBS REVISITED: COMBATING THE HYPE

By Scott Stewart (Strafor)

As STRATFOR has noted for several years now, media coverage of the threat posed by dirty bombs runs in a perceptible cycle with distinct spikes and lulls. We are currently in one of the periods of heightened awareness and media coverage. A number of factors appear to have sparked the current interest, including the recently concluded Nuclear Security Summit hosted by U.S. President Barack Obama. Other factors include the resurfacing rumors that al Qaeda militant Adnan El Shukrijumah may have returned to the United States and is planning to conduct an attack, as well as recent statements by members of the Obama administration regarding the threat of jihadist militants using weapons of mass destruction (WMD). A recent incident in India in which a number of people were sickened by radioactive metal at a scrap yard in a New Delhi slum also has received a great deal of media coverage. In spite of the fact that dirty bombs have been discussed widely in the press for many years now -- especially since the highly publicized arrest of Jose Padilla in May 2002 -- much misinformation and disinformation continues to circulate regarding dirty bombs. The misinformation stems from long-held misconceptions and ignorance, while the disinformation comes from scaremongers hyping the threat for financial or political reasons. Frankly, many people have made a lot of money by promoting fear since 9/11. Just last week, we read a newspaper article in which a purported expert interviewed by the reporter discussed how a dirty bomb would "immediately cause hundreds or even thousands of deaths." This is simply not true. A number of radiological accidents have demonstrated that a dirty bomb will not cause this type of death toll. Indeed, the panic generated by a dirty bomb attack could very well result in more immediate deaths than the detonation of the device itself. Unfortunately, media stories hyping the threat of these devices may foster such panic, thus increasing the death toll. To counter this irrational fear, we feel it is time once again to discuss dirty bombs in detail and provide our readers with a realistic assessment of the threat they pose.

Dirty Bombs Defined

A dirty bomb is a type of radiological dispersal device (RDD), and RDDs are, as the name implies, devices that disperse a radiological isotope. Depending on the motives of those planning the attack, an RDD could be a low-key weapon that surreptitiously releases aerosolized radioactive material, dumps out a finely powdered radioactive material or dissolves a radioactive material in water. Such surreptitious dispersal methods would be intended to slowly expose as many people as possible to the radiation and to prolong their exposure. Unless large amounts of a very strong radioactive material are used, however, the effects of such an exposure will be limited. People are commonly exposed to heightened levels of radiation during activities such as air travel and mountain climbing. To cause adverse effects, radiation exposure must occur either in a very high dose over a short period or in smaller doses sustained over a longer period. This is not to say that radiation is not dangerous, but rather the idea that the slightest amount of exposure to radiation causes measurable harm is not accurate. By its very nature, the RDD is contradictory. Maximizing the harmful effects of radiation involves maximizing the exposure of the victims to the highest possible concentration of a radioisotope. When dispersing the radioisotope, by

definition and design the RDD dilutes the concentration of the radiation source, spreading smaller amounts of radiation over a larger area. Additionally, the use of an explosion to disperse the radioisotope alerts the intended victims, who can then evacuate the affected area and be decontaminated. These factors make it very difficult for an attacker to administer a deadly dose of radiation via a dirty bomb. It is important to note that a dirty bomb is not a nuclear device, and no nuclear reaction occurs. A dirty bomb will not produce an effect like the nuclear devices dropped on Hiroshima or Nagasaki. A dirty bomb is quite simply an RDD that uses explosives as the means to disperse a radioactive isotope, and the only blast effect will be from the explosives used to disperse the radioisotope. In a dirty bomb attack, radioactive material not only is dispersed, but the dispersal is accomplished in an obvious manner, and the explosion immediately alerts the victims and authorities that an attack has taken place. The attackers hope that notice of their attack will cause mass panic -- in other words, the RDD is a weapon of fear and terror. The radioisotopes that can be used to construct an RDD are fairly common. Even those materials considered by many to be the most likely to be used in an RDD, such as cobalt-60 and cesium-137, have legitimate medical, commercial and industrial uses. Organizations such as the International Atomic Energy Agency warn that such radioisotopes are readily available to virtually any country in the world, and they are almost certainly not beyond the reach of even moderately capable non-state actors. Indeed, given the ease of obtaining radiological isotopes and the ease with which a dirty bomb can be constructed, we are surprised that we have not seen one successfully used in a terror attack. We continue to believe that it is only a matter of time before a dirty bomb is effectively employed somewhere. Because of this, let's examine what effectively employing a dirty bomb means.

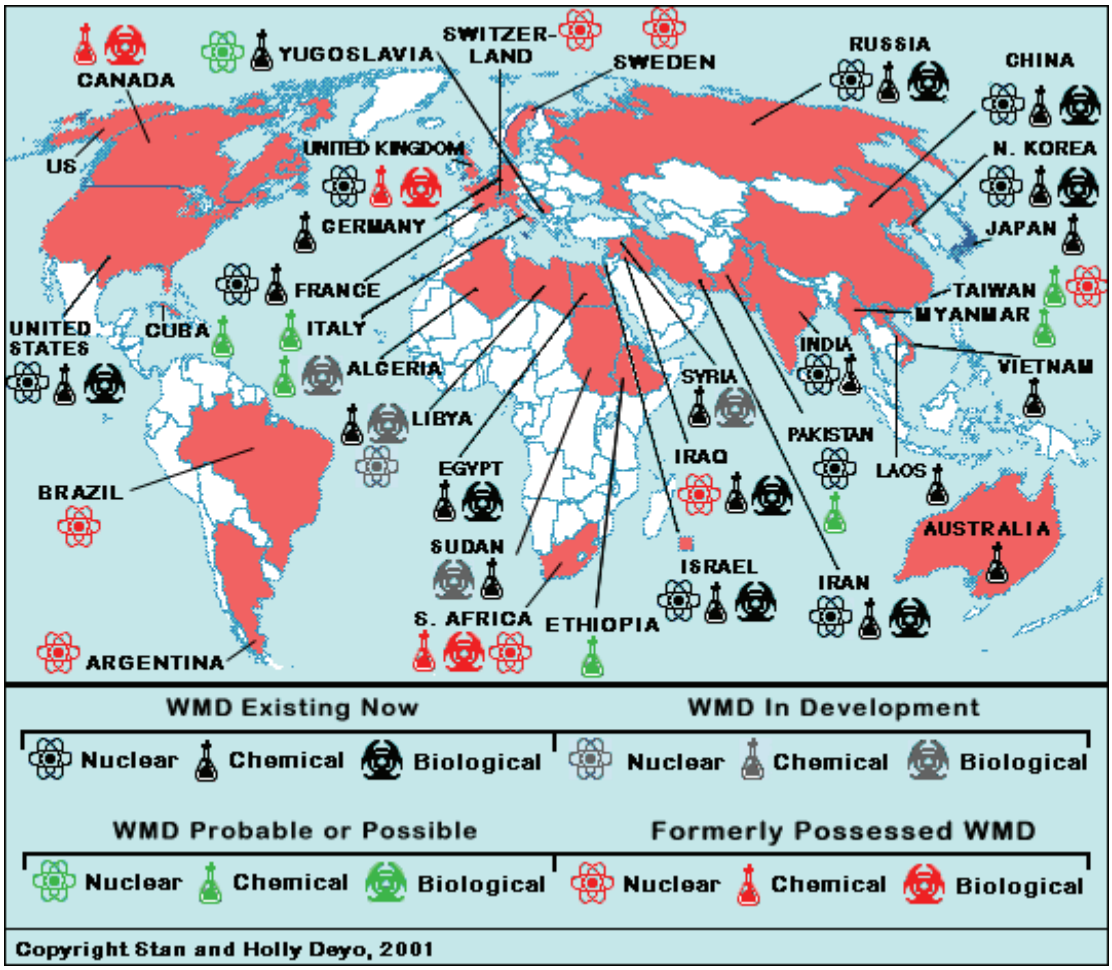
Dirty Bomb Effectiveness

Like a nonexplosive RDD, unless a dirty bomb contains a large amount of very strong radioactive material, the effects of the device are not likely to be immediate and dramatic. In fact, the explosive effect of the RDD is likely to kill more people than the device's radiological effect. This need for a large quantity of a radioisotope not only creates the challenge of obtaining that much radioactive material, it also means that such a device would be large and unwieldy -- and therefore difficult to smuggle into a target such as a subway or stadium. In practical terms, a dirty bomb can produce a wide range of effects depending on the size of the improvised explosive device (IED) and the amount and type of radioactive material involved. (Powdered radioisotopes are easier to disperse than materials in solid form.) Environmental factors such as terrain, weather conditions and population density would also play an important role in determining the effects of such a device. Significantly, while the radiological effects of a dirty bomb may not be instantly lethal, the radiological impact of an RDD will in all likelihood affect an area larger than the killing radius of the IED itself, and will persist for far longer. The explosion from a conventional IED is over in an instant, but radiation released by a RDD can persist for decades unless the area is decontaminated. While the radiation level may not be strong enough to affect people exposed briefly in the initial explosion, the radiation will persist in the contaminated area, and the cumulative effects of such radiation could prove very hazardous. (Here again, the area contaminated and the ease of decontamination will depend on the type and quantity of the radioactive material used. Materials in a fine powdered form are easier to disperse and harder to clean up than solid blocks of material.) In either case, it will be necessary to evacuate people from the contaminated area, and people will need to stay out of the area until it can be decontaminated, a process that could prove lengthy and expensive. Therefore, while a dirty bomb is not truly a WMD like a nuclear device, we frequently refer to them as "weapons of mass disruption" or "weapons of mass dislocation" because they may temporarily render contaminated areas uninhabitable. The expense of decontaminating a large, densely populated area, such as a section of London or Washington, is potentially quite high. This cost would also make a dirty bomb a type of economic weapon.

Historical Precedents

The world has not yet witnessed a successful dirty bomb attack by a terrorist or militant group. That does not necessarily mean that militant groups have not been interested in radiological weapons, however. Chechen militants have perhaps been the most active in the realm of radioactive materials. In November 1995, Chechen militants under the command of Shamil Basayev placed a small quantity of cesium-137 in Moscow's Izmailovsky Park. Rather than disperse the material, however, the Chechens used the material as a psychological weapon by directing a TV news crew to the location and thus creating a media storm and fostering public fear. The material in this incident was thought to have been obtained from a nuclear waste or isotope storage facility in the Chechen capital of Grozny. In December 1998, the pro-Russian Chechen Security Service announced it had found a dirty bomb consisting of a land mine combined with radioactive materials next to a railway line frequently used to transport Russian troops. It is believed that Chechen militants planted the device. In September 1999, two Chechen militants who attempted to steal highly radioactive materials from a chemical plant in Grozny were incapacitated after carrying the container for only a few minutes each; one reportedly died. This highlights another difficulty with producing a really effective dirty bomb: The strongest radioactive material is dangerous to handle, and even a suicide operative might not be able to move and employ it before being overtaken by its effects. Still, none of these Chechen incidents really provided a very good example of what a dirty bomb detonation would actually look like. To do this, we need to look at incidents where radiological isotopes were dispersed by accident. In 1987, in Goiania, Brazil, a tiny radiotherapy capsule of cesium chloride salt was accidentally broken open after being salvaged from a radiation therapy machine left at an abandoned health care facility. Over the course of 15 days, the capsule containing the radioisotope was handled by a number of people who were fascinated by the faint blue glow it gave off. Some victims reportedly even smeared the substance on their bodies. The radiation was then dispersed by these people to various parts of the surrounding neighborhood, and some of it was even taken to nearby towns. In all, more than 1,000 people were contaminated during the incident and some 244 were found to have significant radioactive material in or on their bodies. Still, only four people died from the incident, and most of those who died had sustained exposure to the contamination. In addition to the human toll, the cleanup operation in Goiania cost more than $100 million, as many houses had to be razed and substantial quantities of contaminated soil had to be removed from the area. In a more recent case involving a scrap dealer, this time in a slum outside New Delhi, India, eight people were admitted to the hospital because of radiation exposure after a scrap dealer dismantled an object containing cobalt-60. The material apparently arrived at a scrap shop March 12, and the owner of the shop was admitted to the hospital April 4 suffering from radiation-poisoning symptoms (again another case involving prolonged exposure to a radiation source). The radiation source was found at the scrap yard April 5 and identified as cobalt-60. Indian authorities hauled away eight piles of contaminated scrap. The cleanup operation was easier in the Indian incident, since the radioactive material was in metallic form and found in larger pieces rather than in powdered form seen in the cesium in Goiania. Intriguingly, a nearby scrap shop also was found to be contaminated April 16, but it appears from initial reports that the second site was contaminated by a second radioactive source that contained a weaker form of cobalt-60. Though we are watching for additional details on this case, so far, despite the long-term exposure to a potent radioactive source, no deaths have been reported. At the other end of the spectrum from the Goiania and New Delhi accidents is the 1986 Chernobyl nuclear disaster in northern Ukraine, when a 1-gigawatt power reactor exploded. It is estimated that more than one hundred times the radiation of the Hiroshima bomb was released during the accident -- the equivalent of 50 million to 250 million grams of radium. More than 40 different radioisotopes were released, and there was a measurable rise in cesium-137 levels across the entire European continent. No RDD could ever aspire to anything close to such an effect. Chernobyl wrought untold suffering, and estimates suggest that it may ultimately contribute to the deaths of 9,000 people. But many of those affected by the radiation are still alive more than 20 years after the accident. While STRATFOR by no means seeks to downplay the tragic

human or environmental consequences of this disaster, the incident is instructive when contemplating the potential effects of a dirty bomb attack. In spite of the incredible amounts of radioactive material released at Chernobyl, only 31 people died in the explosion and immediate aftermath. Today, 5.5 million people live in the contaminated zone -- many within or near the specified EU dosage limits for people living near operational nuclear power plants. It is this type of historical example that causes us to be so skeptical regarding claims that a small dirty bomb will cause hundreds or even thousands of deaths. Instead, the most strategic consequences of this sort of destruction are economic. By some estimates, the Chernobyl disaster will ultimately cost well in excess of $100 billion. Again, in our opinion, a dirty bomb should be considered a weapon of disruption -- one that will cause economic loss, but would not cause mass casualties or any real mass destruction.



Fighting Panic

Analytically, based upon the ease of manufacture and the historical interest by militants in dirty bombs -- which ironically may in part be due to the way the RDD threat has been hyped -- it is only a matter of time before militants successfully employ one. Since the contamination created by such a device can be long-lasting, more rational international actors probably would prefer to detonate such a device against a target outside their own country. In other words, they would lean toward attacking a target within the United States or United Kingdom rather than the U.S. or British embassies in their home country. And since it is not likely to produce mass casualties, a dirty bomb attack would likely be directed against a highly symbolic target -- such as one representing the economy or government -- and designed to cause the maximum amount of disruption at the target site. Therefore, it is not out of the question to imagine such an attack aimed at a target such as Wall Street or the Pentagon. The device would not destroy these sites, but would limit access to them for as long

as it took to decontaminate them. As noted above, we believe it is possible that the panic caused by a dirty bomb attack could well kill more people than the device itself. People who understand the capabilities and limitations of dirty bombs are less likely to panic than those who do not, which is the reason for this analysis. Another important way to help avoid panic is to carefully think about such an incident in advance and to put in place a carefully crafted contingency plan for your family and business. Contingency plans are especially important for those who work in proximity to a potential dirty bomb target. But they are useful in any disaster, whether natural or man-made, and something that should be practiced by all families and businesses. Such knowledge and planning provide people with the ability to conduct an orderly and methodical evacuation of the affected area. This allows them to minimize their exposure to radioactivity while also minimizing their risk of injury or death due to mass hysteria. For while a dirty bomb attack could well be messy and disruptive, it does not have to be deadly.

Hypersonic Cruise Missile: America's New Global Strike Weapon

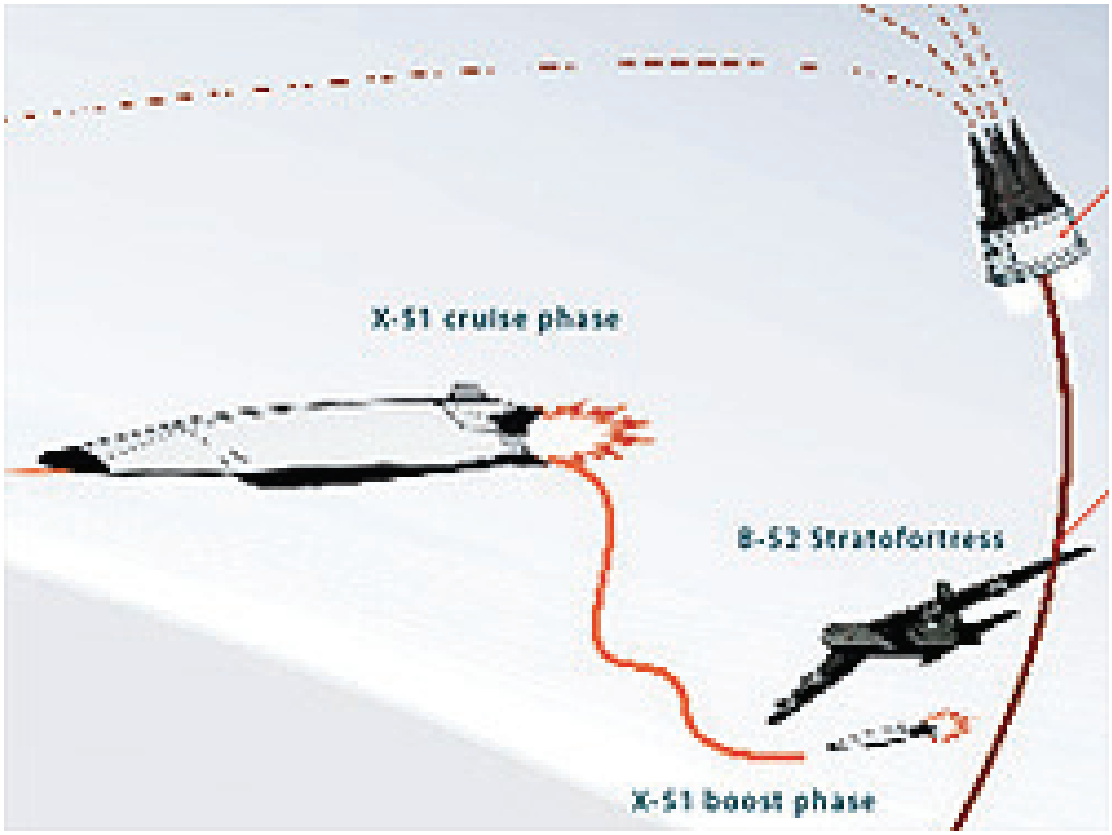
Launched from a B-52, the proposed X-51 hypersonic cruise missile could travel 600 miles in 10 minutes to strike elusive, fleeting targets. (Illustration by Render Room)

A tip sets the plan in motion -- a whispered warning of a North Korean nuclear launch, or of a shipment of biotoxins bound for a Hezbollah stronghold in Lebanon. Word races through the American intelligence network until it reaches U.S. Strategic Command headquarters, the Pentagon and, eventually, the White House. In the Pacific, a nuclear-powered Ohio class submarine surfaces, ready for the president's command to launch. When the order comes, the sub shoots a 65-ton Trident II ballistic missile into the sky. Within 2 minutes, the missile is traveling at more than 20,000 ft. per second. Up and over the oceans and out of the atmosphere it soars for thousands of miles. At the top of its parabola, hanging in space, the Trident's four warheads separate and begin their screaming descent down toward the planet. Traveling as fast as 13,000 mph, the warheads are filled with scored tungsten rods with twice the strength of steel. Just above the target, the warheads detonate, showering the area with thousands of rods-each one up to 12 times as destructive as a .50-caliber bullet. Anything within 3000 sq. ft. of this whirling, metallic storm is obliterated. If Pentagon strategists get their way, there will be no place on the planet to hide from such an assault. The plan is part of

a program -- in slow development since the 1990s, and now quickly coalescing in military circles -- called Prompt Global Strike. It will begin with modified Tridents. But eventually, Prompt Global Strike could encompass new generations of aircraft and armaments five times faster than anything in the current American arsenal. One candidate: the X-51 hypersonic cruise missile, which is designed to hit Mach 5 -- roughly 3600 mph. The goal, according to the U.S. Strategic Command's deputy commander Lt. Gen. C. Robert Kehler, is "to strike virtually anywhere on the face of the Earth within 60 minutes." The question is whether such an attack can be deployed without triggering World War III: Those tungsten-armed Tridents look, and fly, exactly like the deadliest weapons in the American nuclear arsenal.

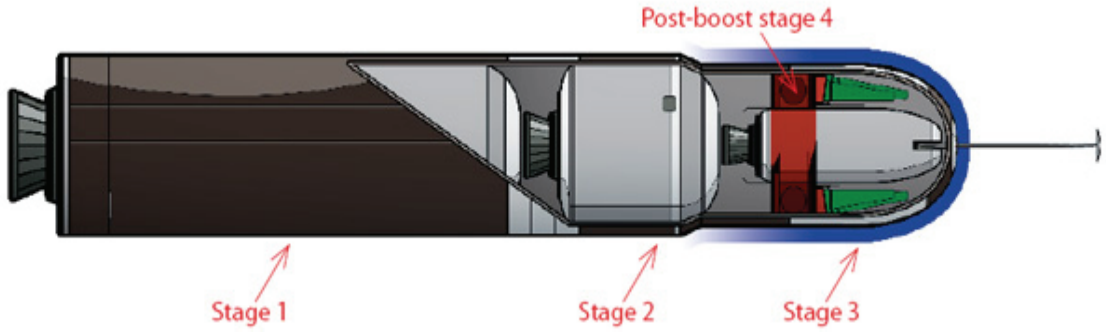
Quick hit

The military is convinced that in the coming years it will need to act with this kind of speed against threats -- terrorist leaders, smuggled nuclear or chemical arms -- that emerge and disappear in a flash. There may be only hours, or minutes, to respond. "We know how to strike precisely. We know how to strike at long distances," says Kehler, whose office is in charge of the Defense Department's Global Strike mission. "What's different now is this sense of time."



The leading candidates to deliver Prompt Global Strike's swift knockout punch are the sub-launched Trident II missile and the X-51, a cruise missile launched from a B-52 and boosted to supersonic speed by a rocket. A scramjet takes it hypersonic. Every strategist remembers Aug. 20, 1998, when the USS Abraham Lincoln Battle Group, stationed in the Arabian Sea, launched Tomahawk cruise missiles at an Al Qaeda training camp in eastern Afghanistan, hoping to take out Osama Bin Laden. With a top speed of 550 mph, the Tomahawks made the 1100-mile trip in 2 hours. By then, Bin Laden was gone -- missed by less than an hour, according to Richard A. Clarke, former head of U.S. counterterrorism. The American military already has weapons that can destroy just about anything in a matter of minutes: nuclear missiles. That terrifying capability was designed to contain Soviet adversaries. But as the Cold War recedes into memory, U.S. strategists worry that our nuclear threat is no longer credible -- that we are too muscle-bound for our own good. Are we really prepared to wipe

out Tehran in retribution for a single terrorist attack? Kill millions of Chinese for invading Taiwan? The answer is no. Paradoxically, the weaker our enemies have grown, the less ominous our arsenal has become. Military theorists call it self-deterrence. "In today's environment, we've got zeros and ones. You can decide to engage with nuclear weapons -- or not," says Capt. Terry J. Benedict, who runs the Navy's conventional Trident program from a nondescript office a few miles from the Pentagon. "The nation's leadership needs an intermediate step-to take the action required, without crossing to the one." In 2001, Defense Department planners began searching for something that could hit a foe almost instantly without risking a nuclear holocaust. Most of the solutions -- unmanned bombers, faster cruise missiles, hypersonic "glide vehicles" coasting in from space -- required a decade or more of development. The Navy, however, had been testing conventionally armed Trident II missiles since 1993. With a few hundred million dollars, strategists said, the first Prompt Global Strike submarines could be ready to go in just two years. The $60 million conventional missile needs to be far more accurate than the nuclear version. But the multiple warheads can lock onto GPS coordinates while streaking through space. Upon entering the atmosphere, the warheads use flaps to steer to a target. With the Trident II's range of 6000 nautical miles, subs armed with the missiles could threaten a whole continent's worth of enemy positions. "Now," says Benedict, who leads the Trident conversion effort, "we've got the capability to hold all of these targets in all these hot spots at risk at one time." In 1988, Lockheed Martin's Trident II D5 nuclear ballistic missile entered service on Ohio class submarines. In the Prompt Global Strike program, each sub would be armed with 22 nuclear Tridents, along with two retrofitted Tridents, each with four independently targetable warheads. here's how a conventional Trident II would work.



1 Gas pressure ejects the Trident II from a patrolling submarine. Once the missile clears the water, the first-stage engine ignites and the aerospike at the nose extends to improve aerodynamics. Stage 1 burns for approximately 65 seconds. When the Trident is locked onto targets at its maximum range (roughly 6000 nautical miles), this burn carries the missile a few hundred miles downrange at a 45-degree angle. Because all propellant must be used, the missile corkscrews to burn off excess fuel for closer targets.

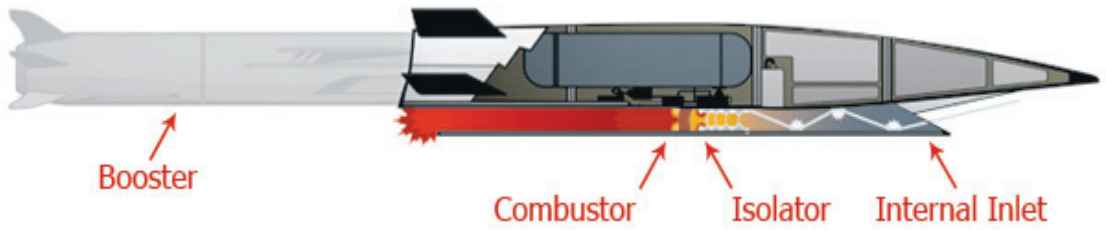
2 As stage 1 falls away from the missile, the second-stage engine ignites for another 65-second burn that carries the Trident an additional 500 to 800 miles downrange. The nose cone fairing (blue) is ejected to shed weight.

3 After separation from stage 2, the third stage engine burns for approximately 40 seconds, concluding the boost phase and lofting the Trident II up to 600 miles above the Earth -- the altitude of some weather satellites.

4 At the apogee of the Trident's trajectory, the third stage falls away, leaving the post-boost vehicle, or bus (red). It receives navigational updates and deploys the four individually targeted warheads (green). Traveling at 13,000 mph and accurate to 30 ft., the warheads are GPS-guided on descent by means of tiny flaps. Two types of warheads are under consideration: the fragmentation version, which shatters tungsten rods just above a target, and a bunker-busting metal "shock impactor" that relies on kinetic energy for its destructive power.

Nuclear ambiguity

Almost immediately, congressional critics and outside analysts attacked the missile plan. Everyone seemed satisfied that, technically, modified Tridents could meet Global Strike's requirements. But the Pentagon can't explain how the weapon will be deployed and who will be its intended target. "I just don't think they've got a plan for using these things," says a frustrated senior congressional aide. First, there's the matter of intelligence. If a president is going to launch the first intercontinental ballistic missile attack in history, he'll need overwhelming evidence. Our ability to nail down that kind of quality information is patchy, at best. On March 19, 2003, the United States launched 40 cruise missiles at three locations outside Baghdad in hopes of killing Saddam Hussein and other senior military officials. It turned out the former Iraqi leader wasn't in any of the locations; the strikes killed at least a dozen people, although it's not clear if they were civilians or leadership targets. The mission failed even though friendly forces controlled the area. At the heart of Prompt Global Strike is a much darker scenario: American troops are far from their intended target -- or the enemy's air defenses are too tough to penetrate. "So let me get this straight," says Jeffrey Lewis, a Harvard University nuclear energy and weapons analyst. "We've got exquisite, fleeting intelligence in an area of immediate concern, but no forces nearby and, miraculously, a sub in just the right spot to attack. I suppose there's some chance of that. But it's pretty small." More difficult to explain is how a conventional Trident could be launched without provoking a crisis even bigger than the one that it was meant to solve. The Navy's plan calls for arming Ohio class subs with two conventional and 22 nuclear Trident II missiles. (The Navy intends to cut its Ohio class fleet from 18 to 14 subs, with 12 in the water at any one time.) To outside observers, the subs' conventional and nuclear weapons would appear identical -- the same size, the same speed, shooting from the same location. Traditionally, the U.S. strategy is to shoot missiles over the North Pole. But the current, most likely Prompt Global Strike targets, North Korea and Iran, lie south of China and Russia -- which would put those countries right under a pole-launched flight path. "For many minutes during their flight patterns, these missiles might appear to be headed towards targets in these nations," a congressional study notes. That could have world-changing consequences. "The launch of such a missile," Russian president Vladimir Putin said in his 2006 state of the nation address, "could provoke an inappropriate response from one of the nuclear powers, could provoke a full-scale counterattack using strategic nuclear forces. The Navy and Strategic Command have proposed all kinds of fixes to address what a Senate Armed Services committee described as Prompt Global Strike's "nuclear ambiguity issues." The subs could be positioned in different locations for a conventional attack than for a nuclear one, military leaders argue. (But that could put the boats out of position for an instant strike.) Hotlines to Moscow and Beijing could warn leaders in those capitals of conventional missile attacks. That is, if those leaders take us at our word -- and don't warn their allies in Pyongyang or Tehran to get out of the missile's way. Former Secretary of Defense Donald Rumsfeld, in a press conference, didn't seem that concerned. "Everyone in the world would know that [the missile] was conventional," he said, "after it hit within 30 minutes." Congress is decidedly less blasé. The House and Senate have ordered the Pentagon to come up with something more certain before they'll provide the $127 million requested in this year's budget for conventional Trident modification. While Trident II missiles with conventional warheads could be deployed in a few years, it may take a decade or more to develop the X-51 WaveRider. The WaveRider destroys targets by simply crashing into them at hypersonic speeds. But the technology in this remarkable missile may have wider applications, including ultrafast planes and new space vehicles. Designed by Boeing and Pratt & Whitney for the Air Force Research Laboratory, the X-51 uses just one moving part -- the fuel pump -- to hit Mach 5, or 3600 mph.

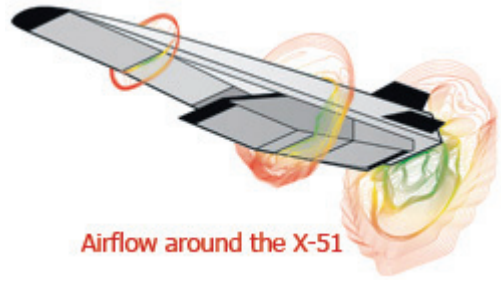


Rocket booster The X-51 is carried to 45,000 ft. by a B-52 bomber or a fighter jet, then released. A rear-mounted Army Tactical Missile Systems rocket kicks in to propel the 1600-pound missile to Mach 4.5 and 100,000 ft. The rocket then drops away and the X-51's engine takes over.

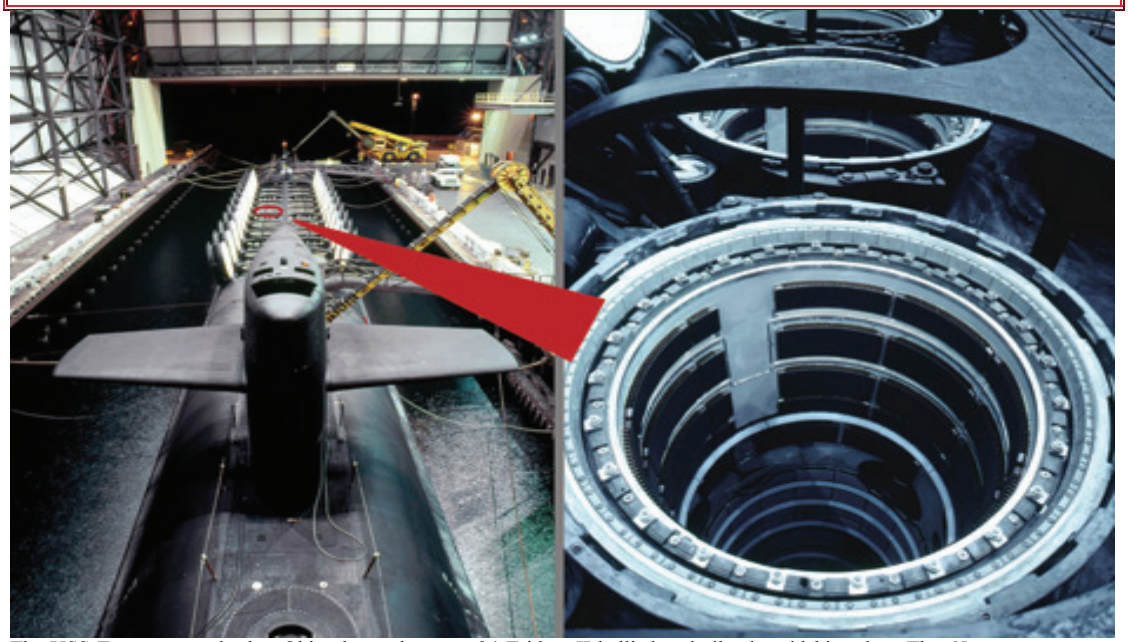
Internal inlet The missile's sharp nose funnels shock waves produced at hypersonic speeds into a rectangular opening on the craft's belly. The shock waves compress the air, eliminating mechanical parts that normally do this.

Isolator This component adjusts airflow -- which can reach 2500 pounds per square foot -- to a stable pressure for the combustor. Slowing airflow increases drag on the vehicle, but allows for more complete combustion.

Combustor Thrust is created when the compressed air mixes with a mist of JP-7 jet fuel and is ignited. Because hypersonic speeds generate sustained temperatures of up to 4500 degrees, the propellant also acts as a coolant -- and prevents the X-51's engine walls from melting.



Airflow PM consulted NASA to estimate the fluid dynamics for external airflow around the nose, engine, stabilizers and tail of an X-51 traveling at Mach 5. The rear contour illustrates the engine exhaust plume shape.



The USS Tennessee and other Ohio class subs carry 24 Trident II ballistic missiles in midship tubes. The 65-ton weapons are about 44 ft. long and 7 ft. wide. (Photograph by Yogi Inc / Corbis)

Wave-ridin weapon

Some officials in the Defense Department want to answer concerns about the Tridents with more radical solutions: exotic, high-tech devices capable of outracing any machine in their class to catch fleeting foes. If these weapons work as planned -- and that's a big if -- they could let the Pentagon launch lightning-quick attacks without risking a worldwide nuclear storm. On the coffee table in his cavernous office in the Pentagon's E Ring, Air Force chief scientist Mark J. Lewis has a model of such a machine, a 14-ft.-long missile called the X-51 WaveRider. With an angled nose, flaps in the middle and an inlet on the underbelly, the device looks like a cross between a spaceship and a futuristic cruise missile. It's designed to go nearly seven times faster than a Tomahawk -- a flight from the Arabian Sea to eastern Afghanistan would take 20 minutes -- and destroy targets with its own kinetic energy. Test flights are scheduled for 2008. The pressure, drag and high temperatures associated with hypersonic speeds (typically, greater than Mach 5, or 3600 mph) used to be considered too extreme for an aircraft to handle in a controlled way. Only ballistic missiles and spacecraft burning rocket fuel, shooting into space and roaring back to Earth, could go that fast. What the X-51 does is to turn some of the most brutal effects of hypersonic flight to its advantage. Take shock waves, for example. Bursting through the air at a hypersonic rate produces a train of waves, one after the other, which can drag down an aircraft. But the X-51 is a "wave rider," with a sharp nose shaped to make the waves break at precisely the right angle. All of the pressure is directed beneath the missile, lifting it up. The shock waves also compress the air to help fuel the X-51's combustion process. The craft is the same size and shape as a Joint Air-to- Surface Standoff Missile, so it can be attached to a B-52 or fighter jet. It runs on standard JP-7 jet fuel, not on rocket fuel, so it fits in neatly with the military's existing logistical chain. The X-51 is made from a fairly standard nickel alloy, not from exotic materials. And the advanced engine technology is very real. In 2004, NASA broke speed records while testing its X-43A, a precursor to the X-51 (see "Breakthrough Awards 2005," Nov. 2005). In a final test flight, the 12-ft.-long aircraft hit 7000 mph -- nearly Mach 10. In other words, the X-51 is not just some lab experiment; it's being designed from the start to deploy. "I've got tremendous confidence in it working," the Air Force's Mark J. Lewis says. That doesn't mean the X-51 will be in competition with a conventional Trident. It will have a range of only 600 nautical miles. And it first needs to be lifted into the air by a plane, then accelerated by a rocket-fueled booster before its hypersonic engine kicks in. But if the 2008 test flight is a success, the X-51 will be the first weapon other than a ballistic missile to fly at hypersonic speeds.

No confusion

The Trident II iteration of Prompt Global Strike foresaw a pushbutton war, fought from the White House. It assumed that the United States would have few allies or bases abroad from which to attack. Local commanders would be largely circumvented. But alternate scenarios being drawn up let U.S. forces act much as they do today, only faster. Hypersonic weapons could make that happen. Put an X-51-equipped plane in the air, and it could enable commanders to hit targets for hundreds of miles around in minutes. Tips could be acted on instantly; subs wouldn't have to be in a perfect position in order to strike. Intelligence wouldn't have to race all the way to the Oval Office. Wrong information would produce local damage. And because the X-51 wouldn't be confused with a nuke -- or have to fly threateningly over nuclear-armed countries -- "you don't worry about starting World War III" when you score a direct hit, Lewis notes. Hypersonic technology will take longer to develop than a conventional Trident. But the X-51, and weapons like it, might make the most sense for the Global Strike arsenal. After all, they reduce potential fallout from the riskiest part of the program: the human element.

Predicting What People Are About to Say

The study is to be published in the March 2010 issue of the scholarly journal Language. It is authored by Joan Bresnan and Marilyn Ford.

Everyone is familiar with the practice of completing someone else's sentence -- essentially predicting what the other person is about to say. To a remarkable degree, people are quite accurate in their ability to make these predictions, not only in terms of the basic content of the message, but also in terms of the word choices and phrasing of the sentences. This ability to effectively predict the syntax of others in context comes from our knowledge of "linguistic probability." The human capacity for determining this probability is based on our day-to-day experience of the language. The greater the amount of experience that individuals have of a language, the greater their ability to predict. This is true of different dialects within a language. For example, Australian speakers of English and American speakers of English detect slightly different patterns of phrasing and usage among their respective fellow speakers, thus enabling them to more effectively predict the syntax that will be used in a variety of contexts. This intrinsic ability to predict based on probability has implications for language comprehension. Educators engaged in foreign language instruction might effectively focus their initial efforts on the most probable sentence constructions. Entrepreneurs engaged in marketing their products or services might use the most probable phrases in preparing their advertising messages. These research findings on linguistic probability may also be helpful in making computerized language more natural. Another practical application would be in the refinement of tools used in profiling and diagnosing those with language disorders. As noted by the authors in an interview, "Linguistic patterns are important in predicting comprehension. If we can make better use of these patterns to enhance comprehension, then we can improve people's ability to understand one another."

Better Military Technology Does Not Lead to Shorter Wars

For long, researchers have thought that offensive military technology, such as armoured cars and attack jets, makes it easier to shorten the duration of a war. It is also generally perceived that when the offensive technology is more effective than the defensive technology, it is more advantageous to start a war. "While this may be seen in some wars where the attacker is clearly superior, it is not true on average. This means that the improved military technology has not resulted in any advantages for the attacking force, at least not in terms of war duration," says Marco Nilsson, who recently earned his PhD from the Department of Political Science at the University of Gothenburg. To investigate the effect of offensive technology on war duration, Nilsson statistically analysed all wars in the state system from 1817 to 1992. Interestingly, he did not find any effect at all. "I found that, in reality, the potential advantages of attack-oriented technology is limited by for example terrain, technological development, training of military personnel, climate, weather and norms. Due to these limitations, attack-oriented technology normally does not allow a state to run over an enemy as easily as expected. Unless the attacked country collapses right away, the duration of most wars is decided at the negotiation table," says Nilsson. If two fighting countries could sit down at the

negotiation table and base their demands only on military capacity, it would be easy for them to reach a mutually acceptable solution to their armed conflict -- the stronger would make high demands and the weaker would accept them. Yet, this hardly ever happens in real life. Nilsson's study of four different wars (the Winter War 1939, the Continuation War 1941-1943, the Iran-Iraq War 1980-1988 and the war between India and Pakistan 1965) shows that states do not always base their demands at the negotiation table on military capacity. "A major problem arises when a state has offensive expectations that do not match what is actually seen on the battlefield. These seemingly unrealistic expectations can for example be a result of a conviction that God will step in and influence the outcome of a war. Another reason may be that a country for some reason expects its offensive ability to soon improve," says Nilsson. Unfortunately, some states start wars expecting their attack-oriented technology to warrant quick success. Therefore, too much confidence in offensive technology may increase the likelihood of new wars and speed up arms racing, all due to a misunderstanding among decision makers. A better understanding of the potentials and limitations of military technology could lead to a world where many drawn-out and costly wars are avoided.

QUIZ

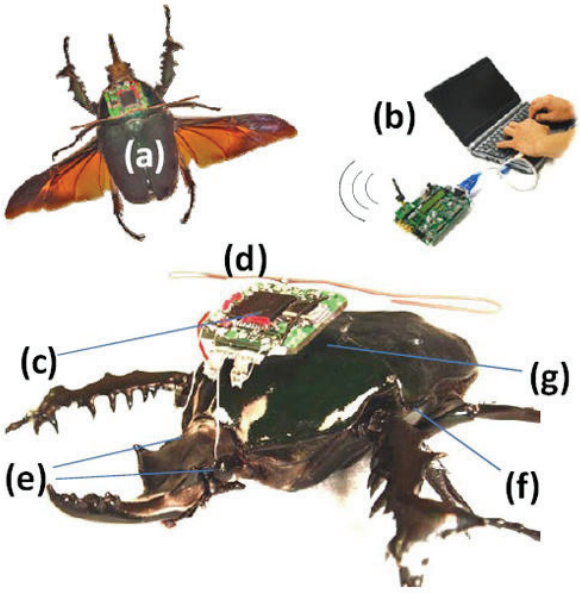
What is this?

Japan's New Hovering Hummingbird

Biomimicry isn't new, nor are robotic hummingbirds, but the latest 'bot to come out of Chiba University in Japan makes even the DARPA-inspired Nano Air Vehicle -- which is very cool, needless to say -- look like last year's robotics. Weighing only 2.6 grams and controlled by an infrared sensor, the tiny four-winged 'bot bobs and weaves through the air like a hummingbird, going as high as ten feet for up to six minutes at a time. By comparison, the makers of DARPA's Nano Air Vehicle were still working toward a 10-gram design last we checked. While Chiba's robot has a hummingbird's agility, it has not yet achieved the stationary hover that makes designs like this so exciting. However, researchers there plan to have it hovering very soon, and by 2011 they hope to have it hovering with a microcamera so it can relay images to its handlers. The idea is to use the 'bot in disaster scenarios in which search and rescue personnel need eyes in tight places or to perform recon in areas that are too dangerous for humans to go stomping around. But the military and intelligence benefits of a tiny, hovering robot like this are absolutely huge, offering an unparalleled means of surreptitiously looking around the next corner or inserting audio and visual devices into places where a special forces or intelligence operator might look out of place. That is, until the army of cyborg insects spies is ready to deploy. Darpa's Cyborg Insect Spies, Now Nuclear-Powered

Remote Controlled Cyborg Beetle

When you write for Popular Science, it's easy to become desensitized to wild and crazy future tech. To wit: When I first heard that Darpa wanted to develop cyborg insects to carry surveillance equipment, I thought "ok, cyborg insect spies are pretty cool, but not blowing me away." Then today, Cornell researchers working on the program unveiled a prototype transmitter for the cyborg bugs that runs on radioactive isotopes. Nuclear powered cyborg insect spies? Ok, now you have my attention. While the bugs can fly under their own power, any electronics added to the lil' sentry for keeping in contact with HQ or other cyborg drones in the swarm need some kind of external power. And a radioactive isotope working as a nuclear battery does the trick perfectly. The isotope in question is Nickle-23, a barely radioactive isotope that doesn't emit enough radiation to harm a human. However, even slight beta-particle emissions are powerful enough to fuel the on board electronics of our arthropod cyborgs for up to 100 years. For fun, let's see that cyborg

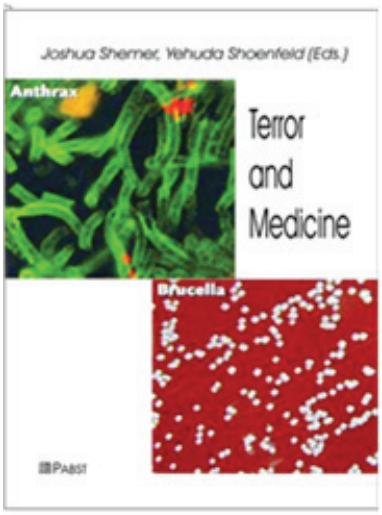


moth flight test from September one more time, shall we? Right now, the nuclear-powered electronics only include a 5-milliwatt RFID transmitter. But eventually, the cyborgs will carry a full suite of sensors, and hopefully, since we are talking about nuclear powered cyborg insects going to war, some kind of death ray.

Next Generation Bioterrorism Detector

A government biosecurity expert last week briefed lawmakers on the Department of Homeland Security's next-generation "lab-in-a-box" to detect, to identify, and to aid response to a biological terrorism attack. Dr. Tara O'Toole, undersecretary at DHS Directorate of Science and Technology (S&T), described how the department has and will continue to leverage new technology to refine and improve its BioWatch program before a House subcommittee. The program began in 2003 in response to the anthrax mailings of 2001. DHS initially deployed air samplers in a number of unspecified metropolitan areas to detect biological pathogens, including anthrax, smallpox, plague, and tularemia, according to a Federation of American Scientists' report from 2003.The number of urban areas covered now exceeds 30 and DHS wants to expand the program to approximately 20 more urban areas. O'Toole testified that S&T has developed a possible next-generation detector to improve the BioWatch program that's currently being tested by the DHS Office of Health Affairs (OHA), which is responsible for the day-to-day management of the program. Currently, filters from the air samplers must be collected every 24 hours. The filters are then analyzed for pathogens at a local laboratory. This process, however, takes considerable time. "With this sampler technology and deployment (known as Generation 2), as much as 36 hours may elapse between the collection of genetic material of interest and the availability of essential laboratory test results showing its presence," Dr. Bernard D. Goldstein, a University of Pittsburgh professor and chair of the Committee on Effectiveness of National Biosurveillance Systems, told the subcommittee. (The committee recently released a public summary of a report on BioWatch that it delivered to Congress.) When a pathogen is detected, a BioWatch Actionable Result (BAR) is created. The laboratory then notifies local public health officials and they determine how to respond. A BAR, however, does not mean a bioterrorism release has occurred. O'Toole testified that numerous BARs have occurred since 2003 and have been deemed benign. "In some BAR cases, BioWatch samples contained genetic material that was highly similar to that found in BioWatch target organisms, but which turned out to be from microbes that are present in the ambient environment but do not represent threats to human health." Generation 3 technology, says O'Toole, will improve the program by creating a lab-in-a-box. "Gen 3 Bio Watch would be far more technologically sophisticated than the current BioWatch sensors," she told lawmakers, "with the ability to automatically collect outdoor air samples, perform molecular analysis of the samples and report the results electronically to provide near-real time reporting." Pathogen detection rates could be reduced to 4 hours, O'Toole said. Goldstein and his committee, however, remain skeptical of this next-generation technology. "Our review of the plans that DHS had developed for testing and evaluation for Generation 3 (as presented to us in spring 2009) revealed that technology goals for Generation 3 will be very difficult to achieve." And even if Gen 3 detectors work as planned, they are only one layer to accurately identifying and aiding a response to a bioterrorism attack. One reason for this is logistics. The attack must occur in

an area where the detectors are already deployed. Goldstein told lawmakers that while BioWatch could potentially alert local, state, and federal stakeholders of a release in a timely manner, he places more confidence in public and private health care systems to do biosurveillance properly through information sharing. "It is broader and more flexible than BioWatch, permitting detection of a wider range of infectious diseases and diseases resulting from source of exposure that BioWatch is not designed or deployed to detect," he said. Another hurdle Goldstein said DHS must confront is BioWatch's ability to not only identify threats but coordinate and communicate the technology's findings with state and local public health decision makers and first responders. Testing on Gen 3 technologies will proceed as planned. Dr. Alex Garza, assistant secretary for health affairs and chief medical officer at OHA, testified that the agency has agreed to test bioterrorism detection systems from two vendors. If either or both vendors pass the initial testing, DHS will begin a "four-city operational testing phase...in a variety of outdoor and indoor environments to ensure the systems operate properly before committing the government to a large-scale buy."



Terror and Medicine - Medical Aspects of Biological, Chemical and Nuclear Terrorism

By: J. ShemerY. Shoenfeld

Publisher: ciando GmbH

Imprint: Pabst Science Publishers

This book offers a collection of Israeli specialists in the field of injures' treatment inflicted on the victims through biological, chemical or even nuclear weapons.

Terrorism's new target: Econo-Jihad

Jihadist terror organizations have set economic terrorism as their new target, intending to harm and paralyze Western economies, the United Sates in particular, claims Prof. Gabriel Weimann, expert researcher of terrorism over the Internet at the University of Haifa. Prof. Weimann monitored websites hosted by terrorist and terrorism-supporting organizations and concludes: "For the Jihadists, the present economic crisis signifies an ideal opportunity and platform to leverage a economic terrorist campaign." In the course of a study that was carried out over a number of years, Prof. Weimann surveyed public and encoded websites run by Islamic terrorist organizations, forums, video clips, and practically all the information related to Islamic Jihad terrorism that is flowing through the network. According to Prof. Weimann, the focus on economic terrorism was set in motion with the September 11 attack on the Twin Towers, when Osama bin Laden stated on the video tapes that he sent out that these attacks mostly damaged the United States' economic base and that these attacks, which cost $500,000 to carry out, cost the U.S. $500 billion. Other publications by bin Laden himself and by other terrorist leaders show that they understand that Western and U.S. power lies in their economic

strength and that the jihad movement should focus on damaging this power by employing various tactics, including: hitting international corporations directly; harming international corporations by means of 1.5 billion Muslims boycotting them, which would pressure the respective governments to adjust their policies; striking at resources that were "looted" from Muslim countries, such as oil-drilling companies in Iraq; assassinating key personalities in the global economy, most of whom they believe are Jews, and killing anyone who collaborates with these personalities. Monitoring the Muslim terrorist-related information on the Internet, Prof. Weimann also revealed that the armed struggle against the U.S. in Iraq and Afghanistan is aimed at prolonging American expenditure on maintaining forces in these countries, and not necessarily at military defeat. The jihadists believe that this would help drain America's financial resources and eventually critically damage the American economy. Therefore, they aim to make the U.S. open as many military fronts around the world as possible. Another result of this new focus on Econo-Jihad is an increasing jihadist interest in websites and online information on the American and Western economies, so as to glean an understanding of how these economies can be hit the hardest. Not only official websites are monitored: forums and e-mails of individual surfers are penetrated too. By tracking Jihadist forums, Prof. Weimann has found that these surfers are increasingly following Western finance-related media publications too, as well as expert and academic analyses of the factors influencing Western economy, such as the war in Iraq, global terrorism, natural disasters, oil prices, unemployment rates, and declines in the stock market. "One might think that an Econo-Jihad is less violent, but this is not the case. Jihadist Internet monitoring alongside terrorist activity in the field, is evidence that the economic turn actually influences the terrorists' targets, which have included oil-drilling infrastructures, tourism, international economic institutions and more. Indeed, Islamic terrorism's future devices will focus on targets that will yield the most economic damage," Prof. Weimann concludes.

The 15 Most Tragic Acts of Terrorism in History

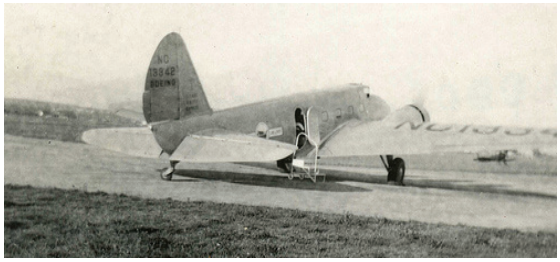
We've been hearing, reading and watching news/issues regarding terrorism almost everyday. These incidents are quite alarming especially in places where terrorists' acts seem an ordinary scenario already like the case of Iraq which is the scene of frequent terrorist attacks. We've been hearing, reading and watching news/issues regarding terrorism almost everyday. These incidents are quite alarming especially in places where terrorists' acts seem an ordinary scenario already like the case of Iraq which is the scene of frequent terrorist attacks. Terrorism traced back its origin more than 2,000 years ago. Terrorism is the deliberate creation and exploitation of fear for bringing about political change. All terrorist acts involve violence or—equally important—the threat of violence. Terrorism is the systematic use of terror especially as a means of coercion.

Here are the 15 most tragic acts of terrorism from the 20th century onward.

1. Wall Street Bombing: USA

One of the worst terrorist incidents that occurred during the early stage of the 20th century was the Wall Street bombing. It was a terrorist incident that occurred at 12:01 p.m. on September 16, 1920, in the Financial District of New York City. Thirty-eight were killed and 400 persons were injured by the blast. A horse-drawn wagon carrying 100 pounds or 45 kg of dynamite with 500 pounds or n230 kg of heavy slugs exploded in a timer-set detonation, sending the slugs tearing through the air. The horse

and wagon were vaporized. More than thirty people were killed immediately. The bomb claimed mostly messengers, stenographers, clerks and brokers as its victims. It caused over $2 million in property damage and wrecked most of the interior spaces of the Morgan building.



2. Boeing 247 Incident: USA

In October 10 1933 a Boeing 247 exploded in mid-flight by a nitroglycerin bomb. All seven people aboard are killed. This incident is the first proven case of air sabotage in the history of aviation

3. King David Hotel Bombing: Israel

The King David Hotel bombing was a deadly bomb strike by the Irgun, a militant Zionist group, on the headquarters of the British Mandatory authorities of Palestine, located at the King David Hotel in Jerusalem The offensive was carried out on July 22 1946 and was the deadliest attack against the British during the Mandate era (1920-1948). Operating in disguise, Irgun members planted a bomb in the basement of the main building of the hotel, part of which housed the Mandate Secretariat and the British military headquarters. Telephoned warnings were sent to the main switchboard of the hotel, the Palestine Post newspaper and the French consulate, but no evacuation was carried out, giving rise to much controversy over the reasons why people were not cleared from the building. The ensuing explosion caused the collapse of the southwestern corner of the southern wing of the hotel. Ninety-one people were killed and 46 were injured, with some of the deaths and injuries occurring in the road outside the hotel and in adjacent buildings.

4. Beirut Barracks Bombing: Lebanon

One of the most tragic incidents of terrorism in the 1980s was the Beirut barracks bombing. This was a major incident on October 23, 1983, during the Lebanese Civil war. 241 people perish on this terrorists attacked. Two truck bombs struck separate buildings in Beirut housing US and French military forces—members of the Multinational Force in Lebanon—killing hundreds of servicemen, the majority being US Marines. The blasts led to the withdrawal of the international peacekeeping force from Lebanon, where they had been stationed since the Israeli 1982 invasion of Lebanon. The organization Islamic Jihad took responsibility for the bombing, but that organization is thought to have been a nom de guere for Hezbollah receiving help from the Islamic Republic of Iran.

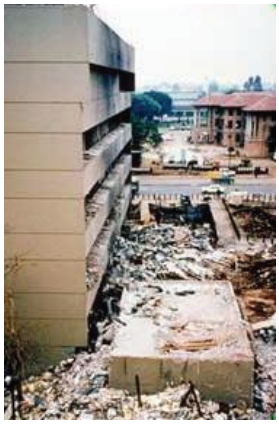
5. 1993 Bombay Bombings: India

Another tragic terrorists attack occurred in India known as the 1993 Bombay bombings. The bombings were a series of thirteen bomb explosions that took place in Bombay (now Mumbai), India on March 12, 1993. The coordinated attacks were the most destructive bomb explosions in Indian history. The single-day attacks resulted in up to 250 civilian fatalities and 700 injuries. The attacks are believed to have been coordinated by Dawood Ibrahim, don of the organized crime syndicate named D-Company, which had operated as a terrorist organization. It is believed that the attacks were carried out in retaliation for widespread massacre of Muslims in Mumbai during December and January, and also the demolition of the Babri Masjid.

6. Oklahoma City Bombing: USA

The United States of America have suffered numerous terrorist attacks in and outside her territory. One of the most tragic attack is the Oklahoma City bombing. It was a domestic terrorist attack on April 19, 1995 aimed at the US government in which the Alfred P. Murrah Federal Building, an office complex in downtown Oklahoma City, was bombed. The attack claimed 168 lives and left over 800 people injured. Until the 911 attacks, it was the deadliest act of terrorism on U.S. soil.

7. 1998 U.S. Embassy Bombings



Another tragic attack by terrorist occurred in August 7, 1998. Hundreds of people were killed in simultaneous car bomb explosions at the US embassies in the East African capital cities of Dar es Salaam, Tanzania and Nairobi, Kenya. It was known as the 1998 U.S. Embassy bombings. The attacks, linked to local members of the al Qaeda terrorist network headed by Osama bin Laden, brought bin Laden and al Qaeda to international attention for the first time, and resulted in the U.S. Federal Bureau Investigation placing bin Laden on its 10 Most Wanted list.

8. 2002 Bali Bombings: Indonesia

The 2002 Bali bombings occurred on October 12, 2002 in the tourist district of Kuta on the Island of Bali, Indonesia. The attack was the deadliest act of terrorism in the country's history, killing 202 people, 164 of whom were foreign nationals, and 38 Indonesian citizens. A further 209 people were injured. The attack involved the detonation of three bombs: a backpack-mounted device carried by a suicide bomber; a large car bomb, both of which were detonated in or near popular nightclubs in Kuta; and a third much smaller device detonated outside the United States consulate in Denpansar, causing only minor damage. Jemaah Islamiyah, a violent Islamist group, was responsible for the said attack. Many of their members were convicted and were sentence to death.

9. 11 March 2004 Madrid Train Bombings: Spain

One of the most tragic terrorist attacks in Europe happened in Spain on March 11, 2004. The incident was a coordinated bombing of commuter trains in Madrid that killed 191 people and injured more than 1,750. Al-Qaeda was responsible for the said attacked. The official investigation by the Spanish Judiciary determined the attacks were directed by an al-Qaeda-inspired terrorist cell although no direct al-Qaeda participation (only "inspiration") has been established. Spanish nationals who sold the explosives to the terrorists were also arrested.

10. 2004 SuperFerry 14 Bombing: Philippines

The Philippines had also suffered numerous terrorist attacks one of the most notable and most tragic attacks occurred on February 27, 2004 and was known as the SuperFerry 14 bombings. Abu Sayyaf admitted responsibility for the said incident killing 116. This act of terrorism was regarded as the world's deadliest terrorist attack at sea to date. A television set containing an 8-pound (4 kilograms) TNT bomb had been placed on board. 90 minutes out of port, the bomb exploded. 63 people were killed immediately and 53 were missing and presumed dead. Despite claims from various terrorist groups, the blast was initially thought to have been an accident, caused by a gas explosion. However, after divers righted the ferry five months after it sank, they found evidence of a bomb blast.

11. 2006 Sadr City Bombings: Iraq

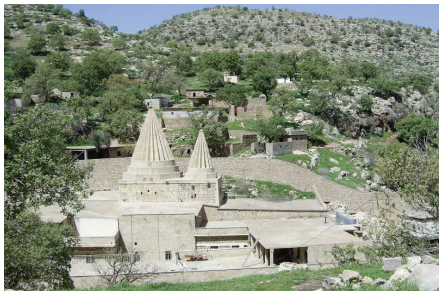
The 2006 Sadr City bombings in Baghdad, Iraq is one of the most tragic terrorist attacks in the city. The bombings were a series of car bombs and mortar attacks in Iraq that began on November 23. Six car bombs and two mortar rounds were used in the attack on the Shi'ite Muslim slum in Sadr City. The attacks killed at least 215 people and injured 257 others, making it the second deadliest sectarian attack since the beginning of the Iraq War in 2003.

12. 18 April 2007 Baghdad Bombings: Iraq

Another tragic terrorist attack in Iraq is the 18 April 2007 Baghdad bombings. The bombings were another series of attacks that occurred when five car bombs exploded across Baghdad, the capital city of Iraq, killing nearly 200 people. The attacks targeted mainly Shia locations and civilians. The Sadriya market had already been struck by a massive truck bombing on February 3 of the same year and was in the process of being rebuilt when the attack took place. The bombings were reminiscent of the level of violence before

Operation Law and Order was implemented to secure the Iraqi capital in February 2007.The attacks came as Prime Minister Nouri al- Maliki said that Iraqi forces would assume control of the country's security by the end of the year, and they also came as officials from more than 60 countries attended a UN conference in Geneva on the plight of Iraqi refugees

13. 2007 Yazidi Communities Bombings: Iraq



The 2007 Yazidi Communities bombings is one of the most tragic terrorist attacks in Iraq. This incident occurred on August 14, 2007, when four coordinated suicide bomb attacks detonated in the Iraqi towns of Qahtaniya and Jazeera (Siba Sheikh Khidir), near Mosul. Iraqi Red Crescent's estimates say the bombs have killed 796 and wounded 1,562 people, that would make this the Iraq War's most deadly car bomb attack to date.

14. 2007 Karachi Bombing: Pakistan

The 2007 Karachi bombing of October 18, 2007 in Karachi, Pakistan, was an attack on a motorcade carrying former Prime Minister Benazir Bhutto. The bombing occurred two months before she was assassinated. The bombing resulted in at least 139 deaths and 450 injuries. Most of the dead were members of the Pakistan Peoples party (PPP).

15. 911 Attacks

The most tragic terrorist attack in history is the 911 Attacks. The September 11, 2001 attacks killed 2,997 immediately, and many more lately from exposure to toxic dust in a series of hijacked airliner crashes into two U.S. landmarks: the World trade Center in New York City, New York, and The Pentagon in Arlington, Virginia. A fourth plane, originally intended to hit the United States Capitol Building, crashes in Somerset County, Pennsylvania, after an apparent revolt against the hijackers by the plane's passengers; being the most catastrophic terrorist event ever known. Tragic pages in history, let's not forget these sorrowful events and pray for the souls of those who perished on the said events.

The Bomb for Beginners

Building a nuclear weapon has never been easier. NATO's Michael Rühle provides step-by-step instructions for going nuclear, from discretely collecting material to minimizing the fallout when caught. These simple steps have worked for the likes of Israel, Pakistan or North Korea, and your country could be next. Tired of being bossed around? Want your neighbors to treat you with more respect? Want to play in the majors? If so, you have to have your own nukes. Impossible? Not really. Granted, if your country is a signatory of the Nonproliferation Treaty (NPT), as most countries are, the constraints on your bomb building are considerable. Inspections by the International Atomic Energy Agency (IAEA) are difficult to circumvent. And the IAEA can no longer be fooled as easily as in the 1980s, when it failed to uncover Saddam Hussein's military nuclear program in Iraq despite regular inspections. The IAEA's increased awareness means that you have to be imaginative. Here are some steps to consider.
First, begin developing a civilian nuclear program. Under the NPT, you are not only entitled to a civilian nuclear program, you may even ask for help from the IAEA. The IAEA will provide you with the basic ingredients and much of the know-how for a military program. Moreover, you can legally buy reactor fuel, and thus do not have to acquire it by performing hair-raising stunts like those the Israelis pulled in 1968, when they had to hijack a ship carrying uranium after France stopped its supplies. As you start building your civilian nuclear infrastructure, which should include nuclear plants to produce plutonium and/or uranium and appropriate nuclear research facilities, aim for the full fuel cycle: mining, milling, conversion, enrichment. This allows you the greatest possible independence -- which you may need later, once you are caught or go public. And let there be no mistake: You will get caught. But the notion of getting caught need not concern you at this stage. You will need to build research and nuclear enrichment facilities at several sites. Some will be publicly declared sites, i.e. they can be inspected by the IAEA. Other facilities, however, will remain secret, preferably underground or in mountainous areas (you did not forget to buy advanced drilling equipment, did you?). It is within these military facilities that enrichment of reactor-grade uranium to weapons-grade levels, as well as plutonium reprocessing will take place. If you are not too concerned about raising international suspicions, you can be so bold as to invest in other nuclear activities as well, such as nuclear submarine propulsion. Dubious? Yes. Illegal? No -- ask the Brazilians.

Getting Off the Ground

In order to run your secret military program, you need to buy a lot of stuff. Try to be discreet. Once you have raised suspicions, you will be put under international surveillance, and buying critical components will become much harder. Make sure you buy nuclear components from several sources so that you have backups in case one seller drops out. You will be less visible if you use intermediaries to buy certain things for you. In some cases, you may have to buy and then reverse engineer certain technologies. Others have done it in the past, so can you. Intrigued? Ask the Pakistanis. Too bad A. Q. Khan, the father of all nuclear smugglers, is no longer in business. He could have supplied you with everything you need to give the United States the finger: from centrifuges all the way to warhead designs. With Khan's help, Libya almost made it into the nuclear club. But along came the Bush administration and shut down the Khan franchise. As a consequence, buying all the necessary items will now take longer and will probably cost you more; but, with enough patience and money, you will still be able to get what you need. North Korea will help you, just as they offered to help Iran and Syria. You need nukes; they need hard currency -- a match made in heaven. If this direct approach is too risky for you, do not despair. Instead, help fund the nuclear program of another would-be nuclear power. In return, you may receive certain nuclear components -- or even warheads -- when you deem that the time has come for them to return the favor. For confirmation, ask the Saudis why they used to finance A. Q. Khan's laboratories.

It's Best to Go Ballistic

To be a credible nuclear power, you need appropriate systems to deliver your nuclear weapons. One method of delivery uses dual-capable carriers, such as aircraft and cruise

missiles. They are not too difficult to purchase, but let us be honest: Ballistic missiles are the real thing. To obtain them, you do not have to work alone. If you designate your missile program as a "space launch" program, other states can legally support you, just like Russia is doing in Iran. And even when you have missiles that are obviously not intended for a space program, you can team up with other countries and share test results, as do North Korea and Iran. Sharing test results cuts development time and costs. When deciding on warhead design, you can play it safe and simply buy some older Chinese or Pakistani designs. These designs have been in circulation for quite some time, and are readily available on CD-ROM. Once you have built a nuclear weapon, you may want to test it. Of course, you could get around testing by choosing a weapons design that does not require testing, like the first U.S. nuclear bomb from 1945. If you want your weapon to be more sophisticated, however, you need to be creative. The old trick of staging a "peaceful nuclear explosion" will no longer suffice, since no one is going to believe that you need nukes to dig a canal or blow away a mountain. But with a bit of luck, you will find another nation that still conducts "real" tests and allows you to bring your scientists and your technical equipment along for the event. North Korea is a strong candidate, and has acquired a considerable amount of foreign currency that way. You can also try to have another nation test weapons on your behalf, as South Africa did for Israel, and China did for Pakistan. Or you can conduct a "cold test," without the fissile material. This gives you at least some reassurance that your warhead design will work in a pinch. Becoming a nuclear weapons power takes years, perhaps decades. So how should you behave internationally while secretly working on your nuclear program? As a general rule, keep a low profile, even at NPT Review Conferences. Of course, nothing is wrong with you joining in the ritualistic condemnation of the "double standards" of the Nuclear Weapons States, or with arguing for a nuclear free zone in your region. But you should leave the most vocal attacks to others. There are enough diplomats desperate to bask in their 15 minutes of fame by taking on the Nuclear Weapons States during the NPT Review Conferences. Rally the Non-Aligned Movement (NAM) around your cause. Find a few anti-Western countries to front for you. Systematically demarche capitals of small countries whose diplomats try to inject some reason into NAM statements. Raise the topic of Israel. And if the UN Security Council should pass a non-binding resolution about global nuclear disarmament, try to keep a straight face and agree.

Getting Caught: Control the Fallout

You will get caught, either by a US spy satellite (as in the case of North Korea), a disgruntled defector (as in the case of Iraq), or even an indigenous human rights group (as in the case of Iran). So what should you do if you get caught? First and foremost, do not overreact. Deny. Should the evidence become too powerful, then, change tack. Create a distraction. Argue that the uranium particles found in your country were purposely scattered by a hostile nation. Challenge the credibility of the information provided to the IAEA. Bring up Israel again. Once these lame excuses have run out of steam, shift gear. Admit that you have indeed failed in certain cases to be as open as the NPT requires. Promise to cooperate with the IAEA from now on. But never admit that you are seeking anything beyond nuclear energy. If you are a Muslim country, you can also cite some arbitrary fatwas that argue that nuclear arms are incompatible with Islam. If none can be found, have one written by a clergyman. Most importantly, continue to insist on your "inalienable right" to peaceful nuclear energy. Since the NPT is not very precise, the international community may spend years trying to agree what to do with you. Claim the "nuclear powers" are trying to deny your nuclear rights and protect the political and economic benefits of monopolizing nuclear weapons and energy. Accuse the IAEA of bias. Raise Israel again. Once you have mastered the complete fuel cycle, you could, in principle, declare yourself a nuclear power. But since you want to become a true Nuclear Weapons State, you need to achieve weaponization. Should your program become the subject of international negotiations before it has reached that critical stage, the key will be to buy time. Offer concessions. Then take them back. Offer them again, etc., etc. The Security Council will seek to punish you, of course, but the rivalries in that body almost guarantee that no serious punishment will ever be set. If you have access to oil and

gas, you are even better off; one or more P-5 members will need your natural resources so badly that they will protect you from severe international pressure. You can also count on the support of others. The IAEA, for example, will be divided into those who believe that a true watchdog should also bite, and those who feel that they must side with the underdog, i.e. with you. Many non-proliferation experts will take your side as well, writing thousands of pages arguing that you are innocent until proven guilty. Although by this point, buying more paraphernalia for your program on the international market may have become next to impossible, at this stage you should be able to run your program without outside help.

Don't Blow It (Yet)

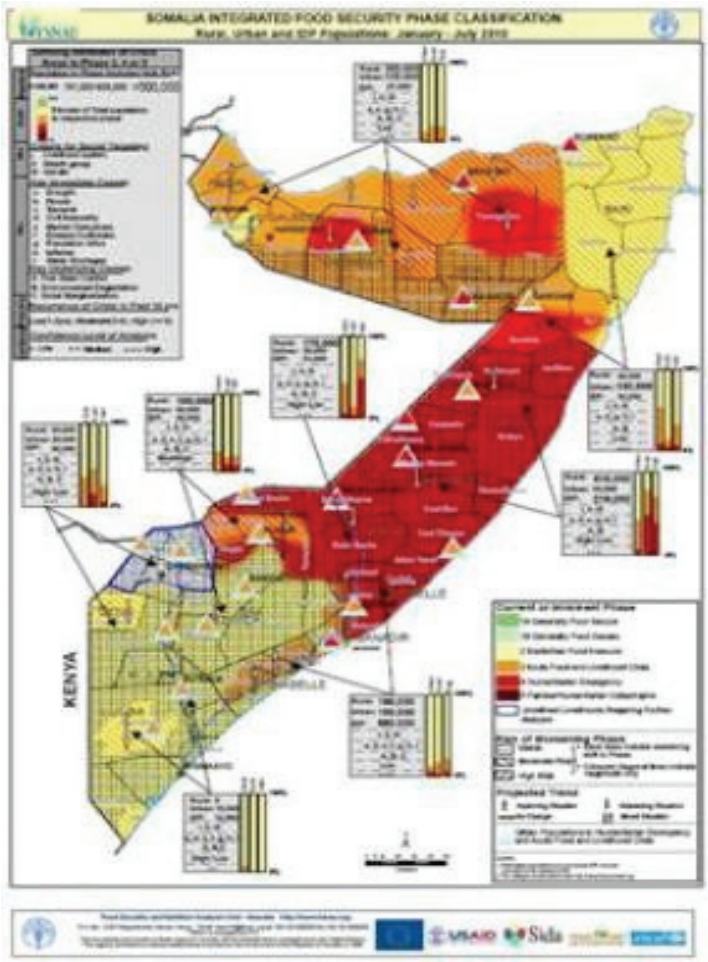
Fortunately, time is on your side. Do not blow it by issuing extreme public statements, such as describing your neighboring countries as a cancer that needs to be eliminated. Maniacal outbursts do not go over well, even with the countries that sympathize with your cause. Also, never argue that you need nukes because your neighbors have them, as that would give away your true intentions. Instead, always claim that your conventional defense capabilities are sufficient. You will appear less suspicious, which is necessary to deter your nervous neighbors from preemptively knocking out your nuclear program. The last choice for you to make is whether to remain a "virtual" nuclear power or announce your arrival with a big bang, i.e. with a nuclear test that establishes your credentials as a Nuclear Weapons State. By this point, you will have spent billions of dollars and much political capital. You may have become an international outlaw, and if you do not control oil, your country may now be impoverished. A decline in relations with your neighbors is complemented by an increase in number of alliances against you. Does all this add up to a net gain? Well, perhaps not quite as good an outcome as you had initially hoped. But no one ever said that being a nuclear power is easy.

*MICHAEL RÜHLE is deputy head of the policy planning unit of the NATO Secretary Gener*al.

U.S. military develops non-toxic cleaners for terrorist attacks

The U.S. military has developed non-toxic, ultra-strength cleaners that could be used in the aftermath of a terrorist attack. The peroxide-based "green" decontaminants are tough enough to get rid of nerve gas, mustard gas, radioactive isotopes and anthrax, report U.S. military scientists in the American Chemistry Society's Industrial Engineering and Chemistry Research, a bimonthly journal. The scientists say they developed "Decon Green" cleaners because chlorine- and lye-based agents are potentially hazardous and can react with chemical weapons and other materials in the environment to form new toxic substances. The main ingredients in each formula are peroxides, used in household cleaners and whitening toothpaste. To bolster their efficacy, they're mixed with bicarbonates and other non-toxic bases. "Such solutions can be fashioned which will not freeze at very low temperatures (−32 °C) so that they can be easily deployed in cold weather," report the scientists at the U.S. Army Edgewood Chemical Biological Center.

Where Will the Next Food Crisis Strike? Extended Geographical Monitoring Using Satellite Observation



Somalia's Integrated Food Security Phase classification map. (Credit: Image courtesy of European Commission Joint Research Centre)

The European Commission Joint Research Centre (JRC), the Food and Agriculture Organization of the United Nations (FAO) and the American Famine Early Warning Systems Network (FEWS NET) are working to innovate and reinforce their food security monitoring systems and to develop more efficient early warning tools. These efforts come as a response to the 2007-2008 global food crisis that increased significantly the number of countries under threat of famine. Satellite observation is the key instrument that will allow to double in 2010 the number of countries monitored in real time for detecting first indications of adverse agricultural outcomes. The new Integrated Phase Classification (IPC) system facilitates and accelerates the reaction time to food security crises by allowing a common and internationally recognised classification of their severity. According to the Food and Agriculture Organization, more than 1 billion people go to bed each night with an empty stomach. In addition, the latest global food crisis resulted in more countries being added to the list of food insecure populations. This is probably the most urgent and dramatic problem that humankind faces today. Food security is not only a crucial issue for developing countries and their more vulnerable inhabitants; it is also key to building a more stable, equal, wealthier and safer world. Special programmes are run and significant funds are mobilised every year by the international community in an effort to combat the increasing number of food insecure populations. Identifying the times and places where aid is required is crucial to deliver targeted and effective responses. Here is where the scientific community comes into play by developing methodologies and tools to provide timely information and objective assessments of the food requirements, thus supporting the decision-making process with solid evidence.

The power of satellite imagery

Several organisations dealing with food security both in Europe and in the United States traditionally rely on satellite observations to support their assessment activities. As a consequence of the alarming spike in global food prices in 2008, many more countries are potentially threatened by food insecurity and need to be constantly monitored in order to detect early signs of adverse agricultural conditions. Satellite-based forecasting systems will therefore take on increased importance in the next years, allowing organisations to monitor a larger number of countries than it is currently possible to do with in-country offices. The Joint Research Centre (JRC) will extend this year the real time monitoring system it has developed to forecast food crises. It will cover not only the Horn of Africa, but all the most food insecure countries in Sub-Saharan Africa. As the earth observation and agroclimatic data

regularly received by the JRC are global, other countries outside Africa can also be monitored in case of food security crises. This JRC operational system for regional crop monitoring and forecasting is based on satellite data and innovative agro-climatic models. More than 40 regional bulletins provide each year quantitative and qualitative yield forecasts for food insecure countries around the world, with a particular emphasis in Africa. In 2009, JRC provided for instance an early warning of the drought affecting Kenya, and correctly predicted a 15% below average maize yield one month before harvest. In the United States, the Famine Early Warning Systems Network (FEWS NET) will extend this year its food security monitoring system from the current 20 to 50 additional countries around the world. The US Geological Survey (USGS), the National and Oceanic Atmospheric Administration (NOAA), and the National Aeronautics and Space Administration (NASA) are establishing expedited procedures for processing of satellite data and model runs to support FEWSNET in this task. Integrated Food Security Phase Classification (IPC): bringing scientific results closer to the decision making process. When it comes to taking decisions on committing aid resources, policy makers need to have clear and reliable information integrating all dimensions of food security (climate data, economic analysis, nutritional and health data) and a common language on the basis of which all stakeholders can agree on the analysis of the food security situation and possible response options. The new Integrated Food Security Phase Classification (IPC), built on a large consensus and accepted internationally, makes it possible, avoiding at the same time contradictory results deriving from the use of different scales. Facilitating therefore the donors' response. This common classification has been recently developed by seven organisations (JRC, FAO, FEWS NET, Care International, Oxfam GB, Save the children and World Food Programme) dealing with food security information management. It is a standardised scale that integrates the following parameters: food security, nutrition and livelihood information, leading to clear statements about the nature and severity of a crisis. It covers the full spectrum of possible situations -- from 'food-secure' to humanitarian crisis -- and takes into account the multiple dimensions of food security, i.e. availability, access/livelihood and nutrition. It provides as well a comprehensive framework of concepts, indicators, scales or benchmarks and a common, internationally accepted language. This facilitates the technical consensus on diagnostic among experts and allows sending clearer and coherent messages to decision-makers. Appropriate reporting and mapping tools provide synthetic views on the severity, extension and nature of the food security concerns and their likely evolution in the near future. In December 2009, the European Commission decided to allocate € 1 276 269 (more than 1.7 million US dollars) over a period of 14 months to the Food and Agriculture Organization of the United Nations (FAO).Together with the JRC, FEWS NET and the other organisations involved in the development of the classification, the FAO will implement the second phase of the IPC initiative in at least 8 focus countries (6 of which located in Sub Saharan Africa) through improved technical development, field support and institutionalisation.

World first research to save lives during bomb attacks

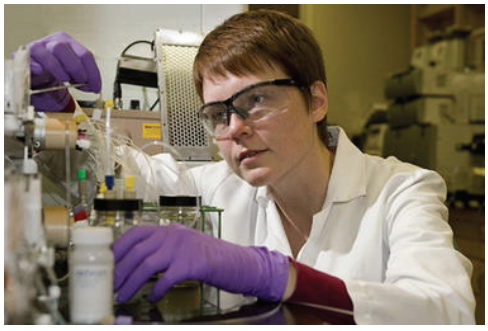
A team of researchers from the University of Melbourne is working on a program that will provide decision-makers in crisis situations accurate predictions of which buildings could fall following a bomb blast. The technology will also provide information about the vulnerability of critical underground infrastructures such as water, gas pipelines and urban utility networks. Research Manager of the Project from the Department of Civil and Environmental Engineering at the University of Melbourne, Dr Tuan Ngo, says predicting the impact of a bomb blast, and knowing the most effective evacuation route from any CBD location in Australia could save thousands of lives during a disaster. “Using precise mapping systems of Australian cities which include precise details of all natural and man-made features the technology can predict the impact of a bomb blast and provide real time information about safe evacuation routes,” he says. “The accuracy of this technology is based on analysing variables such as the type of explosive, the fragmentation effects caused by the device and

varying effects of the urban environment. Imagine if they knew how the buildings were going to collapse during September 11, a lot of lives would have been saved." The team will spend the next two years making this information available to all Australian police and emergency management services after being awarded the largest 2010 Research Support for National Security Grant from the Australian Government. The grants were officially announced at The University of Melbourne yesterday. The tool is also capable of predicting the size of charge which caused a blast, which can prove vital during police investigations. Dr Ngo says he believes it is the first system in the world to combine evacuation information, building and infrastructure vulnerability as well as post blast analysis. The software platform has already been successfully used by state police authorities during various counter-terrorism exercises, and this funding will enable the team to create an online program which can provide this vital information to all emergency and police services across the nation in real time.

Outbreak of rare disease in the Netherlands

"The Netherlands is grappling with an outbreak of a rare disease. It normally strikes farm animals, but it's now sickening hundreds of people who have no contact with farms. While most people get something like the flu or pneumonia for a few weeks, some are sick for months, and a handful have died. The disease is caused by a type of bacteria so resilient that the U.S. government considers it a bioterrorism agent. From the Netherlands, Emily Kopp reports. Truck driver Frank van Lent lives in a small town an hour southeast of Amsterdam. He used to play tennis and jog, but now a short stroll through his neighborhood is all he has energy for. His trouble began ten months ago. He became exhausted, he says. He developed a fever, headaches, muscle aches, heart palpitations. At first, his doctor was stumped. He prescribed antibiotics, but those didn't help. Two months went by, but van Lent didn't get better. He went in for more tests." (Public Radio International; 26Mar10)

U.S. trains nuclear detectives to trace 'loose' nukes



"Now, almost a decade after the 9/11 terrorist attacks, the US government wants to ensure its nuclear forensics proficiency – and an adequate stable of scientists who know their way around radioactive materials. The Nuclear Forensic and Attribution Act, signed into law last month, aims to improve coordination among US agencies that probe cases of nuclear terrorism or nuclear smuggling. And it encourages tighter international cooperation in probing incidents beyond US soil. But just as important, it is designed to attract a fresh crop of scientists to the field, in recognition of a looming shortage of such expertise as current scientists near retirement. Scholarships for undergrads, fellowships for PhD candidates, and research awards to professors teaching in relevant fields are the government's incentives. In return for the PhD fellowships, graduates must work two years at a national lab or at other federal agencies that help investigate nuclear terrorism or illegal trafficking. Federal agencies already were beefing up their ability to trace radioactive materials to their sources – either samples intercepted during an investigation or, in the worst case, residue collected after a 'dirty' bomb or nuclear

device detonates. Still, the new law gives these efforts a more formal status, something that is 'gratifying' to William Daitch, head of the Department of Homeland Security's National Technical Nuclear Forensics Center (NTNFC) in Washington." (Christian Science Monitor; 12Jun69; Peter N. Spotts)

Innovative Uses for Syndromic Surveillance

Erin K. O'Connell, Guoyan Zhang, Fermin Leguen, Anthoni Llau, and Edhelene Rico
Author affiliation: Miami–Dade County Health Department, Miami, Florida, USA

Abstract
To determine if expanded queries can be used to identify specific reportable diseases/conditions not detected by using automated syndrome categories, we developed new categories to use with the Electronic Surveillance System for the Early Notification of Community Based Epidemics. Results suggest innovative queries can enhance clinicians' compliance with reportable disease requirements. Surveillance and control of communicable diseases are critical for the health status of a community. Traditional passive surveillance refers to health authorities' receipt of reports of diseases or conditions submitted by physicians, laboratories, and other healthcare providers as required by public health legislation. However, reportable diseases are often underreported to health departments. Syndromic surveillance has been defined as "an investigational approach where health department staff, assisted by automated data acquisition and generation of statistical alerts, monitor disease indicators in real-time or near real-time to detect outbreaks of disease earlier than would otherwise be possible with traditional surveillance". Since 2005, the Miami–Dade County Health Department has used the Electronic Surveillance System for the Early Notification of Community Based Epidemics (ESSENCE) as part of its comprehensive syndromic surveillance system. The system categorizes chief complaints into 11 syndromes: botulism-like, exposure, fever, gastrointestinal illness, hemorrhagic illness, influenza-like illness, injury, neurologic, rash, respiratory, and shock-coma. Of the county's 23 acute-care hospitals, the 17 largest, which account for 90% of the county's emergency department visits, participate in ESSENCE. Staff epidemiologists rotate duties and dedicate 2 hours a day, including weekend, to syndromic surveillance activities. Monday through Friday daily reports are sent to community partners. Syndromic surveillance was primarily designed to detect disease outbreaks and unusual public health events earlier than could be detected by traditional public health surveillance methods. However, if an outbreak or cluster of illness is too small, the method used currently for syndromic surveillance cannot trigger a statistical alert. We wanted to ascertain the value of syndromic surveillance in improving regular communicable disease surveillance and reporting. The possibility of using ESSENCE to detect specific diseases emerged when varicella (chickenpox) became a newly reportable disease in Florida in 2006; few cases were being reported despite the fact that guidelines had been mailed to all healthcare practitioners. We used a query in ESSENCE to search for "chicken pox or varicella" in the chief complaint field and contacted the hospital Infection Control Practitioners to verify if identified events could be confirmed as reportable conditions. After we did preassessment of the underreporting of chickenpox in 2007, three additional query categories for daily investigation were created in ESSENCE.

The Study
The following category queries were performed during March–December 2008: 1) Severe or time-sensitive diseases/conditions: anthrax, botulism, smallpox, and meningitis; 2) outbreaks not detected by regular alerts in ESSENCE: diarrhea, vomiting, and food poisoning with spatial-temporal clustering; and 3) other reportable diseases/conditions, consisting of varicella (chickenpox), carbon monoxide poisoning, ciguatera, cryptosporidiosis, cyclosporiasis, dengue fever, encephalitis, hepatitis, malaria, measles, mercury poisoning, mumps, pertussis, salmonellosis, shigellosis, and rabies. When descriptions of the diseases/conditions were found in the chief complaint field, staff contacted the hospital's Infection Control Practitioner.

If the disease was confirmed, further investigation was performed. Potential outbreaks were detected from clustering by age, gender, race/ethnicity, resident ZIP code, hospital, time of visit, and chief complaint. A total of 740,320 emergency department visits (mean 2,419 visits/day) were monitored in ESSENCE during the study period; 1,813 (0.25%) of those had information leading to 1 of the queried reportable diseases in the chief complaint (mean 5.9 visits/day). After further investigation, we found 58.0% (1,052/1,813) of these additional queries were relevant after excluding unrelated terms, such as "malabsorption" instead of "malaria" or "chicken bone in the throat" instead of "chicken pox." On August 31, 2008, the newly designed query for severe or time-sensitive diseases or conditions detected a group of 5 women who had arrived at the same hospital within a 2-hour period with a chief report of either meningococcemia or exposure to meningococcemia (Table 1). This cluster of potentially epidemiologically linked patients did not initiate an automated alert in a syndrome in ESSENCE, and the hospital did not report it by phone immediately. Therefore, without the query, the health department would not have been aware of these patients in a timely manner. The findings from the query enabled health department staff to give postexposure prophylaxis to 36 persons identified as close contacts. Gastrointestinal outbreaks are an example of outbreaks not detected by regular alerts in ESSENCE that were often detected through the use of the specialized query. One outbreak identified was among persons staying in the same homeless shelter (Table 2), another was among residents at an assisted living facility, and a third was among a group of persons who visited a restaurant. After the outbreaks were confirmed with the Infection Control Practitioner, recommendations for infection control and prevention were made to each facility. The most common terms found under other reportable diseases or conditions were meningitis, hepatitis, chicken pox, and postexposure prophylaxis for rabies (Table 2). These 4 conditions accounted for 68.2% (717/1,052) of the queried chief complaints. When we contacted providers with regard to query findings, it was apparent that some providers were not familiar with reporting requirements for chicken pox and animal bites requiring postexposure prophylaxis for potential rabies exposure.

Conclusions

Results suggest ESSENCE can enhance healthcare practitioners' compliance with reportable disease requirements for individual diseases and potential outbreaks. Results demonstrated how expanded queries can detect potential outbreaks or diseases not found in automated syndrome categories. Without the specialized queries, we would have missed the opportunity to implement proper disease control measures required for these events. Indiana State Health Department investigators found that certain keywords such as "exposure" and "meningitis" may uncover trends previously undetected and they continue to explore similar data-mining techniques. Syndromic surveillance systems use statistical algorithms to alert users when the number of reports for a syndrome exceeds the norm. Current spatial–temporal algorithms are used to detect large-scale outbreaks over a certain extended period. However, this method has not been successful for detecting many small clusters of patients with similar characteristics visiting the emergency department from the same home ZIP code, hospital, or within a short period, such as a few minutes. By contacting the Infection Control Practitioner when reportable disease names are found in the chief complaint field, the health department has developed a stronger relationship with hospitals. One of the limitations of the study was that even when queries were performed with parsers, there were often misspellings, typographical errors, and abbreviations that can lead to a failure to capture all possible events. Because the level of investigation can vary from making a phone call to a participating hospital to dispatching a team to interview patients, the cost of time spent on each disease may need to be weighed before initiating action. Replication of this study depends on a health department's capabilities to contact the hospital for follow-up. Future research will examine the information gathered from this new project, and we expect that better disease reporting compliance will result from this innovative use of syndromic surveillance.

Hospital Preparedness: A Critical Community Infrastructure

Hospitals are community symbols. Their ability to provide patient care is an indicator of a functioning society. During disasters their continued ability to provide patient care is essential, not only for disaster victims, but for their role in representing a resilient community that can withstand adversity. Hospitals are also dependent upon critical infrastructures, e.g., power, water, information technology. The loss of their operational capacity during a disaster is devastating to a community and will call to question the confidence its members have in their jurisdictional leadership – at local, state or national levels. Many would argue that hospitals are critical community infrastructures in and of themselves. The Hospital Preparedness Program (HPP), initiated by the Bush Administration and continued in the Obama Administration, is now in its eighth year of funding and represents an approximate $4 billion national investment. It is clear that strengthening hospitals' resiliency is a priority, but given its competition with other national priorities, are preparedness levels improving fast enough? Will US hospitals be prepared not if, but when, our next disaster occurs? We know that disaster frequency is increasing, both natural and manmade threats, nationally and internationally. Since HPP was started, the US has experienced over 475 federally declared disasters of over 20 disaster types. Most recently, the Haitian and Chilean earthquakes reveal a painful truth: any community is at risk, at any time, for abrupt devastation. Hospitals as critical community infrastructures must be strengthened. Mitigation investment strategies that ensure hospital operational status in post-disaster periods are essential. In addition to power, water, information technology, hospitals must be designed architecturally to withstand threats. Expenditures that consider hospital security during its formation represent approximately 4% of the construction costs—far less than those of rebuilding, or redesigning existing construction. Further, mitigation strategies must stem from quantitative, high quality research efforts that accurately reflect ground truths of disasters—not just US disasters, but global disasters. The World Association for Disaster Emergency Medicine promotes the standardization of disaster terminology and research design. The United Nations International Strategy for Disaster Reduction promotes research agendas in economically disadvantaged countries. In "Safe Hospitals" the Pan American Health Organization underscores that "Protecting critical health facilities, particularly hospitals, from the avoidable consequences of disasters, is not only essential to meeting the Millennium Development Goals, but also a social and political necessity." Given the devastation that is now seen in both Haiti and Chile, and given the ongoing impacts of disasters that are of higher probability and of lower catastrophic consequence (e.g., flash flooding and severe storms) ongoing research and mitigation strategies specific to hospitals must emphasize their role as a critical community infrastructure.

Armor could form 'force field'

A new type of armor would use pulses of electrical energy to repel projectiles away from an armored vehicle, British scientists say. Researchers at the Defense Science and Technology Laboratory, better know as "Dstl" and located at four sites in England, say it is possible to corporate material known as supercapacitors into armor that would turn a vehicle into a kind of giant battery, The Daily Telegraph reported. Dstl is the research and development arm of the Ministry of Defense. The report said when a threat from an incoming projective is detected, the energy in the supercapacitor can be rapidly pushed into the metal plating on the outside of the vehicle. That produces a strong electromagnetic field. The researchers say this would produce a momentary "force field" which in theory could repel incoming projectiles. Although the force field would last for only a fraction of a section, correctly timed it could repel a projectile, such as a rocket-propelled grade, the report said. Scientists claim this would produce a momentary "force field" capable of repelling the incoming rounds and projectiles. The supercapacitor would then be rapidly recharged. The idea is similar to force fields in science fiction that produce an invisible

deflector around a vehicle or object. Professor Bryn James, head of Dstl's armor and protection science and technology center, said the electric armor could dramatically decrease the weight of vehicles and tanks. "You would think this would require huge amounts of energy, but we have found it can be done with surprisingly small amounts of electrical power," he told the Telegraph.

Anthrax threat to British troops in Afghanistan

BRITISH troops in Afghanistan may be facing a new threat after claims by Taliban commanders that home-made bombs are being loaded with anthrax. So far there is no evidence of biological weapons being used by insurgents. But one of Britain's leading terrorism experts warned last night that Taliban extremists linked with Al Qaeda would have the technology to produce the deadly disease. An ITV camera crew filmed a bomb-making factory last week in caves at Tora Bora on the Afghan-Pakistan border. One bomb maker, identified as regional commander Mullah Doud, said: "We use anthrax so when a bomb explodes it produces a toxic cloud." A drug user in Blackpool last week became the 10th person in Britain to die of anthrax-tainted heroin, thought to have been produced in Afghanistan. Professor Paul Wilkinson, of the Centre for Terrorism Studies at St Andrews University, said: "Anthrax is an effective weapon and producing it needs only basic levels of biology and chemistry. "There are certainly extreme elements within the Taliban, those loyal to Al Qaeda, who would not think twice about this method. However, there is a wide chasm between producing anthrax and using it effectively in home-made bombs. "Japanese terrorists had intended to use anthrax on the Tokyo metro in 1995. They experimented with it extensively but in the end opted for the nerve agent sarin. This shows that it is not an easy substance to control." Professor Wilkinson said the only safeguard against anthrax was anti-nuclear, biological and chemical warfare equipment. Unlike in Iraq, where coalition soldiers regularly donned the suits, troops in Afghanistan do not wear them, though they are believed to have access to them if necessary. Colonel Richard Kemp, former commander of British forces in Afghanistan, said: "It would not be unusual for extremist forces to use dirty bombs. In Iraq chlorine was the flavour of choice. "However, most Taliban sympathisers, the farmers and villagers, use materials they can get their hands on, like fertiliser and car parts, and would not risk experimenting with substances like anthrax."

Multifunctional polymer neutralizes both biological and chemical weapons

In an ongoing effort to mirror the ability of biological tissues to respond rapidly and appropriately to changing environments, scientists from the McGowan Institute for Regenerative Medicine have synthesized a single, multifunctional polymer material that can decontaminate both biological and chemical toxins. They described the findings recently in Biomaterials. "Our lab applies biological principles to create materials that can do many things, just like our skin protects us from both rain and sun," said senior investigator Alan Russell, Ph.D., University Professor of Surgery, University of Pittsburgh School of Medicine, and director, McGowan Institute, a joint effort of the university and UPMC. "Typically, labs engineer products that are designed to serve only one narrow function." Those conventional approaches might not provide the best responses for weapons of mass destruction, which could be biological, such as smallpox virus, or chemical, such as the nerve agent sarin, he

noted. Terrorists aren't going to announce what kind of threat they unleash in an attack. "That uncertainty calls for a single broad-spectrum decontamination material that can rapidly neutralize both kinds of threats and is easily delivered or administered, and it must not damage the environment where it is applied," Dr. Russell said. "Much work has gone into developing ways to thwart either germ or chemical weapons, and now we're combining some of them into one countermeasure." He and his team have devised a polyurethane fiber mesh containing enzymes that lead to the production of bromine or iodine, which kill bacteria, as well as chemicals that generate compounds that detoxify organophosphate nerve agents. "This mesh could be developed into sponges, coatings or liquid sprays, and it could be used internally or as a wound dressing that is capable of killing bacteria, viruses and spores," said lead investigator Gabi Amitai, Ph.D., of the McGowan Institute and the Israel Institute for Biological Research. "The antibacterial and antitoxin activities do not interfere with each other, and actually can work synergistically." In their experiments, the material fended off *Staph aureus* and *E. coli,* which represent different classes of bacteria. After 24 hours, it restored 70 percent of the activity of acetylcholinesterase, an enzyme that is inhibited by nerve agents leading to fatal dysfunction of an essential neurotransmitter. The researchers continue to develop alternate decontamination strategies to address chemical and biologic weapons.

Ις Usama Bin Laden Living Comfortably in Iran ?

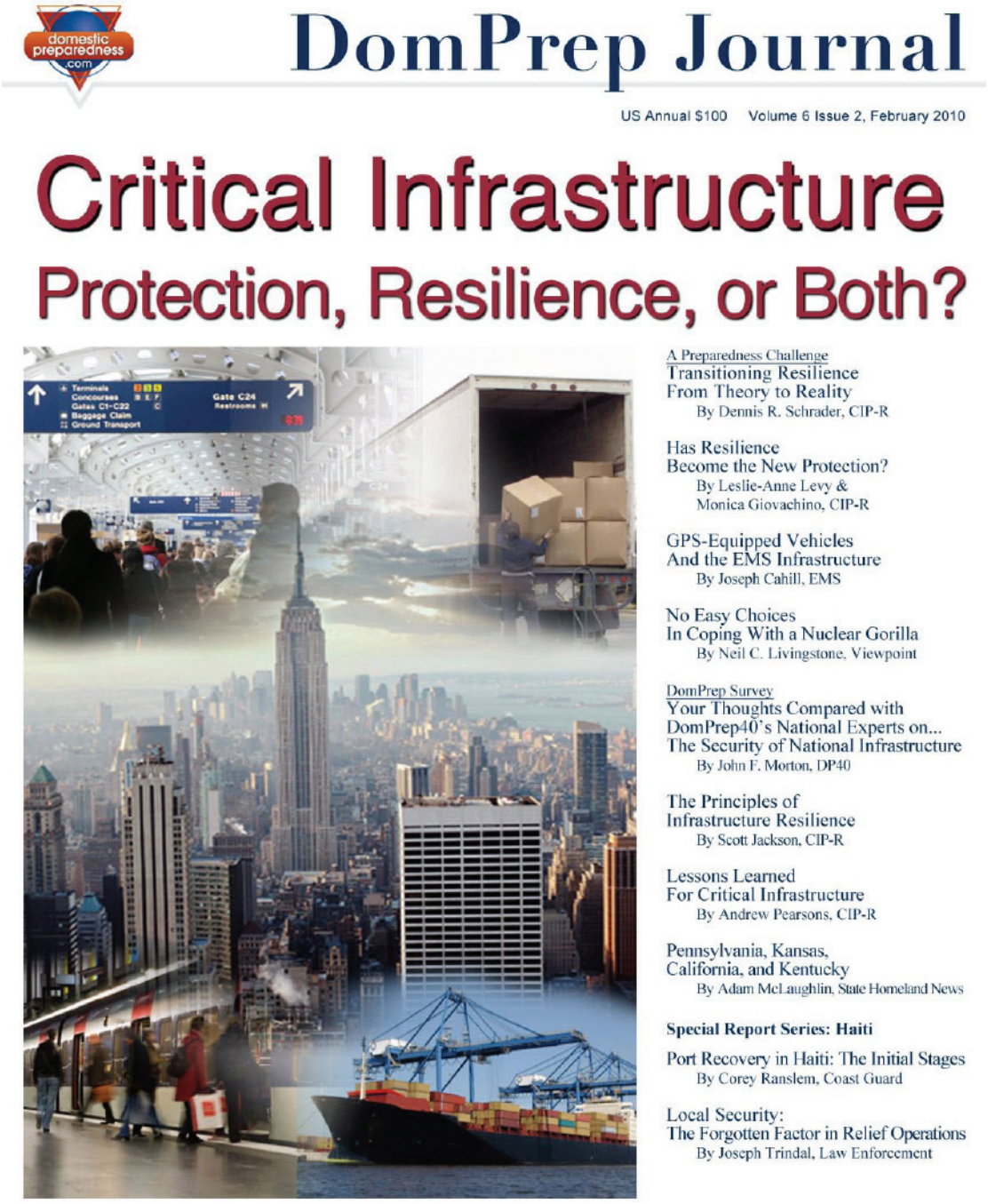
Usama bin Laden gets up each morning in his dark, damp cave in northern Pakistan, gripped by fear, listening carefully for the telltale sound of a drone that is searching for him... An Iranian who supplied falcon camps says he saw and met with Usama Bin Laden six times since 2003. His eyewitness accounts adds to a growing body of evidence that the world's most wanted is living comfortably in Iran. Usama bin Laden gets up each morning in his dark, damp cave in northern Pakistan, gripped by fear, listening carefully for the telltale sound of a drone that is searching for him. His isolation is almost complete. Only a few trusted associates know where he is, and they visit rarely -- bringing food and news, but careful not to fall into a routine. There is no radio or other electronic device whose signal might be followed. He can't go out in daytime for fear of satellites. It is a grim, lonely existence. At least, that is the picture that has emerged of the life of the world's most wanted man since he fled Tora Bora in 2001. But a new and vastly different picture of the Al Qaeda leader's life has been emerging over the past few years. In this scenario, he wakes each morning in a comfortable bed inside a guarded compound north of Tehran. He is surrounded by his wife and a few children. He keeps a low profile, is allowed limited travel and, in exchange for silence, is given a comfortable life under the protection of Iran's Revolutionary Guard. The idea that Bin Laden is in Iran got a strong boost recently with the premiere of a documentary called "Feathered Cocaine." In it, Alan Parrot, the film's subject and one of the world's foremost falconers, makes a case that Bin Laden, an avid falcon hunter, has been living comfortably in Iran since at least 2003 and continues to pursue the sport relatively freely. He is relaxed, healthy and, according to the film, very comfortable. To make his case, Parrot, president of the Union for the Conservation of Raptors, took two Icelandic filmmakers, Om Marino Arnarson and Thorkell S. Hardarson, into the secretive world of falconers. It's a world in which some birds can sell for over $1 million, and in which the elite of the Middle East conduct business in luxurious desert camps where money, politics and terror intermingle. Parrot, who was once the chief falconer for the Shah of Iran and who has worked for the royal families of Saudi Arabia and the United Arab Emirates, still has extensive contacts in Iran and the falcon world. One of those contacts, described as a warlord from the north of Iran and disguised in a balaclava, reveals in the film that he has met Bin Laden six times on hunting trips inside Iran since March 2003. He says the Al Qaeda leader is relaxed and healthy and so comfortable that "he travels with only four bodyguards." Their last

confirmed meeting was in 2008, Parrot says. “There may have been more since then, but I haven’t talked to my source since we left Iran,” he said. Parrot told FOX news.com that the extraordinary disclosure by the warlord, who supplies the falcon camps Bin Laden visits on hunting forays, was not done out of altruism. “One of my men saved his life and this was the repayment," he said. "He was asked to talk. He wasn’t happy about it.” To prove his case, Parrot said he managed to get the telemetry setting for the falcons Bin Laden was flying, and he provided them to the U.S. Government. “They could locate him to a one-square-mile area using those unique signals”’ he said. He says the government never contacted him to follow up. Maj. Sean Turner, a Pentagon spokesman, said the U.S. Military would not comment on the whereabouts of Bin Laden. Parrot's story is supported in the documentary by former CIA agent Robert Baer, an outspoken critic of U.S. policy in the Middle East and of how the CIA is managed. Baer, the onetime Middle East operative on whom the movie Syriana is based, explains that while he was in the CIA, he used satellites to watch the camps and they proved to be one of the key ways Al Qaeda was funded. He underscored how important falconry is to the vastly wealthy, and how Parrot’s position gave him a unique lens on that world. Parrot's disclosures add another piece to a jigsaw puzzle that for years has fed suspicion that Bin Laden is living in Iran. Among the other clues are:

- Iran accepted 35 Al Qaeda leaders after the fall of the Taliban, despite the schism between Al Qaeda’s Sunni roots and the Shiite regime in Iran.
- In February 2009 the U.S. Treasury placed sanctions on several high-ranking Al Qaeda operatives working out of Iran and helping run the terror network.
- In 2004 author Richard Miniter, in his book “Shadow War,” wrote that two former Iranian Intelligence agents told him they had seen Bin Laden in Iran in 2003.
- In June 2003 the respected Italian newspaper Corre de la Sierra, http://www.corriere.it/,quoting intelligence reports, reported that Bin Laden was in Iran and preparing new terror attacks.
- Some analysts believe the reason Bin Laden switched from video to audiocassettes for his announcements was that he couldn’t find a place in Iran that matched the terrain of northern Pakistan.
- In December 2009 it was widely reported that one of Bin Laden's wives, six of his children and 11 grandchildren were living in a compound in Tehran. The living situation was made public after one of the daughters escaped the compound and sought asylum in the Saudi Embassy. It is in this compound, Parrot says, that Bin Laden has found sanctuary.

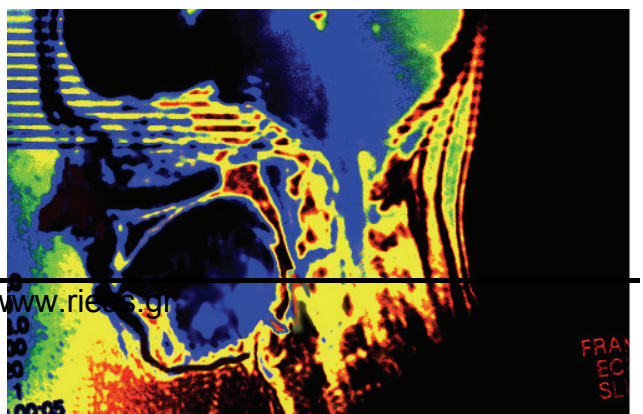
Parrot said Bin Laden was renowned as an avid falconer who captured most of the falcons around Kandahar to raise funds to support his terror efforts. Each spring wealthy Arabs from the Gulf would fill military cargo planes full of specially equipped Toyota Land Cruisers and other equipment and fly to the falcon camps in Afghanistan. "Usama would arrive and presented the falcons as gifts," Parrot said. "In return, the wealthy princes would leave the cars and equipment with him when they left, giving Al Qaeda a considerable material advantage over others, including the Taliban.” Richard Clarke, the former counterterrorism expert at the White House through two administrations, has admitted in interviews and before the 9/11 Commission that on one of the three occasions the United States was able to place Bin Laden, he was in a falcon camp set up by falcon hunters from Dubai. The CIA requested a cruise missile strike against Bin Laden. Clarke said he stopped the government from firing

at the camp because “it didn’t look like an Al Qaeda camp.” “I am not political,” Parrot says, “But he is the most wanted terrorist in the world and it has been frustrating getting the government to listen. Perhaps now they will.”



Μία νέα επιστήμη γεννιέται: «Πολιτισμική νευρολογία»

Ένας νέος κλάδος της επιστήμης, η «πολιτισμική νευρολογία», εντοπίζει



διαφορές ανάμεσα στον «δυτικό» και τον «ανατολικό» εγκέφαλο. Πώς λειτουργεί ο ανθρώπινος εγκέφαλος; Ποιες περιοχές του ενεργοποιούνται στα ερεθίσματα που δέχεται; Με βάση ποια διαδικασία αντιλαμβανόμαστε τα πράγματα και ποιοι παράγοντες επιδρούν; Οι απαντήσεις σε αυτά τα ερωτήματα εξαρτώνται από τη γεωγραφική περιοχή που ζει κανείς και το κοινωνικό του περιβάλλον. Σε αυτό το πρωτότυπο όσο και αμφιλεγόμενο συμπέρασμα έχουν καταλήξει οι ειδικοί ενός νέου κλάδου της επιστήμης, της «πολιτισμικής νευρολογίας», οι οποίοι υποστηρίζουν ότι οι κάτοικοι του ανατολικού ημισφαιρίου σκέπτονται με διαφορετικό τρόπο από τους Δυτικούς και ότι για αυτές τις διαφορές υπάρχει πλέον επιστημονική απόδειξη. Προσπαθήστε, για παράδειγμα, να σκεφτείτε πρώτα τη μητέρα σας, μετά τον εαυτό σας και, τέλος, έναν γνωστό πολιτικό. Εάν έχετε γεννηθεί στη Μαδρίτη, το Λονδίνο ή τη Νέα Υόρκη, ο εγκέφαλός σας θα ενεργοποιηθεί με διαφορετικό τρόπο για κάθε μία από αυτές τις σκέψεις. Αντίθετα, εάν ζείτε στο Τόκιο, το Πεκίνο ή το Νέο Δελχί, τείνετε να ενώσετε σε ένα σύνολο την αντίληψη του Εγώ, την οικογένεια και την κοινωνία. Σε αυτό το σημείο, οι πολιτισμικοί νευρολόγοι έχουν μια πρώτη παρατήρηση: ο ατομικισμός ως χαρακτηριστικό γνώρισμα των Δυτικών και το συλλογικό πνεύμα ως ιδιότητα των Ανατολικών, αναγνωρίζεται στη γνωστική διαδικασία. Με τη βοήθεια πολύπλοκων πειραμάτων και τη χρήση του μαγνητικού τομογράφου, οι ειδικοί διαπίστωσαν ότι ο μέσος προμετωπιαίος φλοιός στον εγκέφαλο ενεργοποιείται σε έναν Δυτικό όταν σκέπτεται την ταυτότητά του. Αντίθετα σε έναν Ανατολικό, η ίδια περιοχή ενεργοποιείται όταν σκέπτεται τη μητέρα του. «Δυτικός Εγκέφαλος, Ανατολικός Εγκέφαλος» τιτλοφορείται το σχετικό αφιέρωμα του Newsweek, το οποίο παρατηρεί ότι υπό το φως αυτών των θεωριών η σύγκρουση των πολιτισμών θα μπορούσε να είναι απλώς ζήτημα των νευρώνων. Το αμερικανικό περιοδικό επισημαίνει, πάντως, ότι η έρευνα των πολιτισμικών νευρολόγων βρίσκεται ακόμη σε πειραματικό στάδιο και ότι κατέστη δυνατή χάρη στις «νευροεικόνες», μια τεχνική που επιτρέπει την παρατήρηση των λειτουργιών του εγκεφάλου «ζωντανά» για πρώτη φορά στην ιστορία της επιστήμης. Με βάση αυτή την τεχνική αποδείχθηκε ότι οι Κινέζοι ενεργοποιούν διαφορετικές περιοχές του εγκεφαλικού φλοιού από τους Αγγλοσάξονες εξαιτίας των διαφορών ανάμεσα στα ιδεογράμματα και το λατινικό αλφάβητο. Ωστόσο, η γνωστική διαδικασία ανάμεσα σε Ανατολικούς και Δυτικούς είναι διαφορετική ακόμη και στους μαθηματικούς υπολογισμούς, παρά το γεγονός ότι οι αριθμοί είναι οι κοινοί. Στην μαθηματική πράξη της πρόσθεσης, οι Ανατολικοί χρησιμοποιούν την περιοχή του εγκεφάλου που σχετίζεται με τα αφαιρετικά σχήματα και τα σύμβολα, ενώ οι Δυτικοί την περιοχή της γλώσσας. Σε ένα άλλο πείραμα διαπιστώθηκε ότι όταν οι Ανατολικοί βρίσκονται σε ένα δωμάτιο παρατηρούν γενικά το περιεχόμενο, ενώ οι Δυτικοί στέκονται σε κάθε ξεχωριστό αντικείμενο. Στην πρώτη περίπτωση, οι ειδικοί αναγνωρίζουν τα ίχνη της «ολιστικής» φιλοσοφίας, η οποία βασίζεται στη σύνθεση της σχέσης ανάμεσα στα πράγματα και τους ανθρώπους. Στη δεύτερη περίπτωση, των Δυτικών, εντοπίζουν μια μεγαλύτερη αναλυτική ικανότητα με μια τάση να λαμβάνονται υπόψη τα ατομικά χαρακτηριστικά. Κάποιες από αυτές τις θεωρίες θεωρούνται αμφιλεγόμενες κι έχουν γίνει αντικείμενο έντονης διαμάχης. Μήπως σε έναν όλο και πιο παγκοσμιοποιημένο κόσμο, δεν έχει απολύτως κανένα νόημα ο διαχωρισμός ανάμεσα σε Δυτικούς και Ανατολικούς; «Δεν πρέπει να πιστέψουμε ότι αυτός ο κλάδος της επιστήμης θέλει να προκαλέσει διακρίσεις ανάμεσα στις διάφορες φυλές», σημειώνει ο καθηγητής της Γνωστικής Νευρολογίας Σαλβατότε Μαρία Αλιότι, ο οποίος τον περασμένο μήνα διοργάνωσε συνέδριο στη Ρώμη με αντικείμενο την πολιτισμική νευρολογία. Αν και συμφωνεί ότι «στον εγκέφαλο εντοπίζονται ίχνη κοινωνικών φαινομένων ή συμπεριφορών», αρνείται ότι αυτά τα πειράματα μπορούν να τροφοδοτήσουν προκαταλήψεις ή ότι αποδεικνύουν, για παράδειγμα, πως η ενσωμάτωση ενός μετανάστη σε μια δυτική κοινωνία είναι αδύνατη για βιολογικούς λόγους. «Θέλουμε μόνο να αποδείξουμε ότι το σύνολο των κανόνων που μας περιβάλλει, επηρεάζει αποφασιστικά τον εγκέφαλό μας. Αλλά ο εγκεφαλικός φλοιός είναι "ελαστικός"• μεταβάλλεται συνεχώς κι επομένως μπορεί να προσαρμοστεί εύκολα σε νέες κοινωνικές συνθήκες». Οι πολιτισμικοί νευρολόγοι δεν έχουν ακόμη διακριβώσει με ποιον τρόπο επιδρά στον εγκέφαλο το κοινωνικό περιβάλλον και γιατί ενεργοποιούνται διαφορετικές περιοχές στον εγκεφαλικό φλοιό ανάλογα με την καταγωγή μας, πώς δηλαδή συνδέονται οι κοινωνικές συνθήκες με τη βιολογία. Για να λύσουν αυτούς

τους γρίφους, θα χρειαστούν ενδεχομένως τη συνδρομή άλλων κλάδων της επιστήμης, όπως είναι η κοινωνιολογία και η ανθρωπολογία.

ANSWER TO THE QUIZ

The 309th Aerospace Maintenance and Regeneration Group outside of Tucson. Better known as the "Boneyard," it's the place where nearly 5,000 aerospace vehicles have gone to die.