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Sold.

EDITORS CORNER



Editorial Brig Gen (ret'd) Ioannis Galatas, MD, MSc, MC

Editor-in-Chief C²BRNE Diary



Dear Colleagues,

As you have already noticed there is a change in the title of this publication: C²BRNE Diary! The abbreviation is new (and might be proven prophetic): Chemical Cyber Biological Radiological, Nuclear Explosives, since cyber is a component that can easily released either alone or in combination with the other threats. "Diary" because the previous title did not reflected well the size of the publication – usually a newsletter is a periodic publication not exceeding 20-30 pages. Logo and website's URL will remain the same as before connecting the today with the past. You will also notice that the "Terror News" will not be included under the new title since terrorist incidents are extensively covered by related websites and blogs. Finally, "Editor's Comments" will be limited to technical issues only. Many of you might read behind lines and wonder why all these changes? I will not provide an explanation here but something [unexpected] did happened that made me realize that freedom of speech, beneficial criticism, pluralism, and honest expression of personal thoughts are not consistent with reality, politics, high-up mentality or ways to do things the right way. I am proud of the "CBRNE-Terrorism Newsletter" that I edited for 14 years and I will continue to edit the "C²BRNE Diary" with the same zeal and responsibility as I did before mainly because I think that CBRN First Responders are unique people dedicated to a special mission. I am very proud I was one of them and still am but from a different perspective.

Take care First Responders! Summer is just in the next corner! And Greece (photo below) is just a few hours away!

The Editor-in-Chief



Using proteins from bones to identify people

Source: http://www.homelandsecuritynewswire.com/dr20180522-using-proteins-from-bones-to-identify-people

May 22 – When a team of researchers led by <u>Lawrence Livermore National Laboratory</u> (LLNL) developed a new biological identification method that exploits information encoded in proteins, they thought it could have multiple applications.

Nearly two years later, they've turned out to be right.

In September 2016, LLNL scientists announced they had developed a science-based, statistically validated way to use protein markers from human hair to identify people and link individuals to evidence. LLNL <u>says</u> that now they've found a second way to use protein markers from human tissue for identification — this time from bones. Their work is described in a paper published online by <u>Forensic</u> <u>Science International</u>, an Amsterdam-based journal.

"One of the most exciting aspects of this research is that it seeks to provide a completely new objective methodology for human identification," said LLNL chemist Brad Hart, the director of LLNL's <u>Forensic</u> <u>Science Center</u> and a co-author of the paper.

"It is critical that the forensic science community expand the suite of objective tools available that allow for forensic results to be expressed with statistical rigor. Expanding the proteomic approach to include bone tissue promises greater potential for determining the identity of remains recovered from challenging environments and circumstances."

The new protein marker technology addresses a 2009 National Research Council report on forensic science that detailed the weaknesses of many current approaches and reported an urgent need for new science-based forensic methods.

Livermore researchers view the protein marker advance as an additional tool for the forensic science community and a complement to DNA, which is the gold standard for human identification, but fragile in several ways.

"The use of protein markers from human hair and now bones can complement existing techniques based on DNA," said Lab chemist and paper co-author Deon Anex. "It can be especially valuable if DNA is missing or compromised."

Another LLNL team member, biochemist Katelyn Mason, the paper's lead author, noted: "This is the first manuscript to describe the detection and validation of protein markers from human bones. The results show this approach can provide a powerful new tool for forensic science."

In the new study, the team examined rib bone samples from 10 recently deceased individuals – five male and five female – of European-American ancestry, finding a total of 35 different protein markers.

Using their current sample sizes, the researchers have found enough markers to provide a unique pattern for an individual that would distinguish that person in ranges of from 1 in 6 people to 1 in 42,000 people. Although rib bone samples were used in the study, it is believed that any type of human bone could be used for identifying people or linking them to evidence.

While Hart sees protein markers from human hair as being markedly more valuable for identifying people or linking them to evidence, the use of bone protein markers could help with human identification in cases where there isn't other evidence.

"There is inherently less genetic variability in proteins present in bone compared to human hair," Hart said. "For purposes of identifying people or linking them to evidence, hair proteins are more valuable.

"Nonetheless, there are situations where bone tissue may be all that is available and for those cases there may be no other way to the identify human remains."

Consequently, one possible important application for using protein markers from human bones could be to help determine the identity of partial remains from catastrophic events, such as plane crashes, fires or the 9/11 terrorist attacks.

The Livermore research team believes that protein markers from bones could be useful on archeological time scales, such as 250 years or more, as has been demonstrated with protein markers from human hair.



While nuclear DNA has been used by law enforcement for more than three decades and boasts extensive databases, the development of using protein markers from human hair and bones is still in its infancy.

However, researchers can take observed biological markers associated with genetic variation in hair and bone proteins and correlate them to specific DNA mutations in individuals, which could be helpful until protein marker databases are developed.

Currently, the sample preparation, instrument run time and analysis period for the protein identification method requires about $2\frac{1}{2}$ days, Anex said, noting the team expects the costs to be competitive with other similar technologies.

Proteins are long molecular chains formed from amino acids — the basic building blocks of life. DNA is the pattern or template the body uses to produce proteins.

In the research, the protein markers used by the scientists have been variants in the proteins resulting from amino acid substitutions that stem from DNA mutations and are known as single amino acid polymorphisms (SAPs).

Using the LLNL-developed process, proteins are first extracted from a bone sample and broken down into shorter amino acid chains, called peptides. The researchers then use liquid chromatograph-mass spectrometry to separate, detect and quantify the peptide sequences.

Results are compared to a protein sequence database to identify known SAPs present in the sample. Given data on the frequencies of each corresponding DNA mutation, the researchers can derive identifying information and determine the biogeographic origin of the person who provided a sample.

In addition to developing ways to use protein markers from hair and bones to identify people, Livermore researchers also are working to show the feasibility of a third use of protein markers — from shed skin cells.

"Forensic scientists exploit DNA from touch evidence, such as fingerprints. Those fingerprints also contain shed skin cells that we believe can be used to identify people," Hart said.

The team members' work to assess and use protein markers from human hair has come a long way since they first announced the breakthrough in September 2016, Hart emphasized.

LLNL notes that the researchers, using their current sample sizes, now are able to find enough distinctive markers to provide a unique pattern for an individual that would distinguish that person among a population of one billion people.

— *Read more in Katelyn Elizabeth Mason et al., "Protein-based forensic identification using genetically variant peptides in human bone,"* <u>*Forensic Science International*</u> 288 (July 2018).

High-ranking Russian GRU officer linked to downing of MH17

Source: http://www.homelandsecuritynewswire.com/dr20180525-highranking-russian-gru-officer-linked-to-downing-of-mh17

May 25 – Researchers from the British-based group Bellingcat have published a report that, for the first time, establishes what they say is the involvement of a high-ranking Russian military intelligence officer in connection with the downing of Malaysia Airlines Flight 17 (MH17) over eastern Ukraine in 2014.

The 25 May report comes a day after the **Dutch-led** international Joint Investigative Team (JIT) said it had concluded the Buk missile that downed the MH17 was <u>fired by Russia's 53rd Antiaircraft Missile</u> Brigade from separatist-controlled territory in eastern Ukraine.

Meanwhile, the Dutch government said on 25 May that the Netherlands and Australia will hold Russia legally responsible for shooting down MH17 and the deaths of all 298 people on board.

"The government is now taking the next step by formally holding Russia accountable," Dutch Foreign Minister Stef Blok said, adding that holding a nation-state responsible for a breach of international law would involve "a complex legal process."

Blok called on Russia to "accept its responsibility and cooperate fully with the process to establish the truth and achieve justice for the victims of flight MH17 and their next of kin."





But despite mounting evidence of Russian involvement, Moscow continues to deny having anything to do with the downing of the civilian passenger plane.

Russian Foreign Minister Sergei Lavrov responded to Blok's call by accusing the Netherlands of speculation to "achieve political goals."

The Kremlin also insists it has not intervened to support pro-Russia separatists in eastern Ukraine, despite compelling evidence that Moscow has provided military, economic, and political support for the separatists in their war against Ukrainian government forces.



"Orion" Calling

But Bellingcat said on 25 May it had "identified conclusively" that 50-year-old Russian military officer Oleg Ivannikov was in charge of military operations in eastern Ukraine when the MH17 was shot down over separatist-controlled territory on 17 July 2014.

The research group described Ivannikov as being on active duty in eastern Ukraine as an officer of the Main Intelligence Directorate (GRU) of the General Staff of the Russian Defense Ministry.

Bellingcat said Ivannikov held the post during an "undercover deployment" into eastern Ukraine that began during the first half of 2014 and that he remained in eastern Ukraine until at least 2015.

The research group also said Ivannikov "coordinated and supervised the military activities of Russian militants, pro-Russia separatists," and contingents of a "private army" from "Wagner group" — a Russian paramilitary organization reportedly associated with Yevgeny Prigozhin, a Russian oligarch and close associate of President Vladimir Putin.

"Ivannikov also supervised the procurement and transport of weapons across the Russia-Ukraine border," Bellingcat said. "He held these functions at the time of the downing of MH17" in July 2014.

According to the Bellingcat report, Ivannikov was known by militants and separatists under his command in eastern Ukraine's Luhansk region as Andrei Ivanovich and under the radio call name "Orion."

The JIT had said on 24 May that it was seeking the identity of the person known as Andrei Ivanovich, with the call sign "Orion," in connection with its international criminal investigation into the MH17 downing.

Bellingcat said that in addition to his undercover deployment in eastern Ukraine, Ivannikov had previously worked as a GRU agent to support separatists in Georgia's breakaway region of South Ossetia.

The Bellingcat report said Ivannikov had used the alias Andrei Ivanovich Laptav from 2006 through 2008, when he was the minister of defense and emergencies in the self-declared government of the breakaway region.



Russian denial, Western condemnation

Russia and pro-Russia separatists deny shooting down MH17 and have offered several other theories to explain the tragedy, all of which have been rejected by the JIT.

The JIT comprises investigators from Australia, Belgium, Malaysia, the Netherlands, and Ukraine.

Kremlin spokesman Dmitry Peskov said Russia had not been a fully-fledged participant in JIT's investigation and could not therefore trust its findings.

Peskov also said he could not comment about the Bellingcat report, saying he was "not familiar with its materials" and did not know "on what basis those conclusions were made."

But the European Union foreign-policy chief Federica Mogherini and NATO Secretary-General Jens Stoltenberg on May 25 both called on Russia to "accept its responsibility and to fully cooperate with all efforts to establish accountability."

"The downing of MH17 was a global tragedy, and those responsible must be held accountable," Stoltenberg said.

Britain's Foreign Secretary Boris Johnson also said Russia "must now answer for its action in relation to the downing of MH17."

"The Kremlin believes it can act with impunity," Johnson said in a statement. "This is an egregious example of the Kremlin's disregard for innocent life," Johnson said, noting that ten British citizens were killed in the shoot down.

Kurt Volker, the special U.S. envoy for Ukraine, said on 24 May that the JIT's latest report was "very significant" because it underlines "the lack of ambiguity that there is indeed a direct responsibility in Russia."

"We need Russia to turn the corner here and decided to make piece," Volker said.

What is the AR-10 point?



2018 Graduation Day @ Kent State University, Ohio, USA...

Is Sweden's zero-tolerance approach to drugs a failing model?

Source: https://www.thelocal.se/20180517/is-swedens-zero-tolerance-approach-to-drugs-a-failing-model

May 26 – Sweden is accustomed to being praised for its forward-thinking approach, but there's one area where many feel it lies behind the curve. The country's "zero tolerance" policy towards drugs is an increasingly isolated one compared to its neighbours, and has even been subject to criticism from the UN. The Local's Sweden In Focus series looks at why Sweden takes such a hard-line stance on drugs, what the consequences are, and if it will ever change.

Sweden's long-standing zero-tolerance drugs policy is based on the fundamental vision of a "drug-free society", and was shaped by <u>lobbying group</u> The Association for a Drug-Free Society (RNS). The group, founded by psychiatrist and "<u>father of Swedish drugs policy</u>" Nils Bejerot in 1969, pushes for the prevention of drug use through penalties rather than treatment of drug addiction. This has led to tough policing with a focus on small crimes of possession.

As the Swedish government's website explains, the zero-tolerance <u>policy makes no distinction</u> between "hard" and "soft" drugs. Police <u>can detain and give a compulsory urine test to anyone they suspect</u> of being high – followed by a criminal charge if proven to be true.

When it comes to cannabis, <u>the Swedish model can claim success</u>: the country has one of the lowest consumption rates of the drug in Europe, though it has increased since 2000 and many countries have insufficient data in the area, which makes broad comparisons difficult.

When it comes to opioids however, Sweden's hard-line approach looks increasingly ineffective and dated. In 2017, the <u>World Health Organization called for the decriminalizing</u> of drug use and possession of drugs for personal use, saying current laws have "proven to have negative health outcomes and counter established public health evidence". That followed a <u>WHO report from three years earlier</u> which called for wide-ranging drug policy reforms including decriminalization of drug use and a focus on harm reduction measures like needle exchanges.

Successive Swedish governments have had a very different opinion, and were criticized for as much in 2015 by the UN, whose deputy commissioner for human rights Flavia Pansieri said she was "surprised to see that Sweden lags behind a number of other countries in terms of its policies on drugs". In particular, a lack of needle exchange programmes – something Sweden was traditionally resistant to and viewed as doing more harm than good – was highlighted as a key problem.

Pansieri's criticism is supported by evidence. In a 2016 report by the European Monitoring Centre for Drugs and Drug Addiction, Sweden registered the <u>second highest rates of death due to overdoses in</u> <u>Europe</u> (93 people per million, behind only Estonia), with the rate among adults (15-64) steadily increasing from 2006. In the same report Sweden was one of the European nations with the lowest totals of syringes provided through specialized programmes.

Malmö University's Torkel Richert, whose research specializes in drug overdoses and usage, says Sweden is not performing well:

"The bigger picture is that Sweden has for a long time had a big increase in overdoses. And if you compare it with Europe in general we're doing badly."

"You have to be very careful when comparing stats between countries as different countries compile them in different ways. Some are better at reporting than others, and Sweden is generally very good. So there's an argument that it's not as bad as it looks, but I would say that we are in a very bad position in any case, even if it's perhaps not the highest. And if you look at Sweden at a national level you can also see a significant increase. So you can be clear about seeing Sweden as having a very bad situation when it comes to drug-related fatalities," he adds.

According to Richert, Sweden's failure to mirror other European countries' focus on harm reduction and overdose prevention methods, combined with an increase in use of opioids, could create a lethal outcome.

"The attitude towards drug addicts in Sweden has been embarrassing in many ways. They're a very stigmatized group. The phrase here in Sweden was 'it should be difficult to be a junkie'. And politically the idea is that if it is tough, more will want to stop. So there has been a hard



policy with police playing a central role in order to fight narcotics at street level. That has impacted the vulnerability of that group: for example you don't dare call an ambulance when a friend has overdosed because you're worried police will also come and there's a penalty as a result. So drug policies can impact the vulnerability and life situation for those who have a problem."

In 2015 there were only nine needle exchange programmes across the entirety of Sweden, a consequence of a prevailing sentiment that they enabled drug users rather than solved problems. In 2016 however the Swedish government made a significant change to legislation in the area as part of a new four-year national drug strategy, removing the right for municipalities to veto the creation of syringe exchange programmes, and dropping the minimum age for access to exchanges to 18. By 2017 the number of needle exchange programmes in the country had increased to 14, with more planned to open this year.

Sweden's minister for Health and Social Affairs Annika Strandhäll says the country's drug policy needs to evolve.

"Swedish drug policy needs to be developed, and we're in the middle of that work. During the current mandate period we've increase access to needle exchanges and put greater emphasis on reducing harm and fatalities caused by narcotics. Efforts we know are effective. We've also mapped mortality and developed measures to reduce it. There's still a lot left to be done, but I feel sure we're on the right track and have taken important steps in the right direction," she tells The Local.

According to Sweden's National Board of Health, in 2016 the number of narcotics-related deaths in the country reduced for the first time in ten years, suggesting the increase in needle exchanges has had an impact – though it is too early to say if a real trend change has occurred. The agency emphasizes however that the fatality rate remains high.

"We have a comparatively high narcotics fatality rate in Sweden, and that's very serious. Every person



who dies as a result of drugs is one too many, and that's also one of the key reasons why we've brought in several important changes during our mandate period," Strandhäll notes.

An injection room in Copenhagen. Photo: Drago Prvulovic/TT

"I think we need to continuously consider what methods we can use to reduce drug-related fatalities – methods built on research and proven experience,"

she adds, pointing to not only increased needle exchanges, but also improved access to the drug Naloxone, which can counteract opioid overdoses and save lives.

Malmö University's Richert says there have certainly been positive developments in Sweden, but they should have happened earlier.

"If you compare us with many other countries, needle exchanges were considered a no-brainer for years. Naloxone has been given out in Norway and Denmark for quite a long time, as well as other countries. So we're behind there," he says.

So what could the next step be in modernizing Sweden's drug policy? One radically different approach being seriously considered not far from Swedish soil is the one pioneered by Portugal. There, possession for personal use and the consumption of drugs was decriminalized in 2001, with state funds shifting to education, care and treatment rather than putting people in prison.

The result? Use of illicit substances among the adult population has been in decline in Portugal over the last decade. The most recent comparative data shows that the drug-induced fatality rate among adults there was 5.8 per million in 2015 – well below the



European average of 20.3 deaths per million, and a tiny fraction of Sweden's 100 deaths per million for the same year.

Portugal's success has not gone unnoticed in the Nordics. <u>At the end of 2017</u> there was cross-party backing in Norway's parliament for decriminalizing drugs, where politicians are following Portugal's lead and changing focus towards providing help for those struggling with addiction. Safe consumption rooms, where drugs can be injected in a hygienic, controlled environment, already exist in Norway as well as Sweden's other western neighbour Denmark. Denmark's health ministry says the rooms have saved hundreds of lives since they were opened in 2012.

"You could argue that consumption or injection rooms like they have in those countries are a way of reducing the risks for vulnerable groups like homeless drug users. That's a controversial question in Sweden, but I think we need to consider in any case having a discussion about these kind of measures," Richert says.

Going even further, like Portugal has and Norway plans on doing, is more controversial still. But Richert contests Sweden should at least look at the Portuguese model and see if there is anything it could learn: "Many other countries are considering following at least parts of that model. Sweden should at least look at that, see what can be learned. You can't directly copy policy from one country to another, but you can look at what worked and see what would work in a Swedish context, which we're still bad at."

There are small signs bigger changes could happen in Sweden in the future. <u>Youth branches of the Centre</u> <u>Party and Liberal Party</u> have called for a loosening of the current hard-line model and the decriminalizing of some drugs, suggesting a generational shift in power may one day lead to different ideas in the area. Some sitting MPs are already calling for major changes, like Liberal MP Christina Örnebjär, who argues Sweden's current approach has failed.

"A zero tolerance against drugs has unfortunately become a zero tolerance against those who use drugs. It's rare that we take those who we're actually talking about with us when we talk about drugs and problematic use of them. We talk about people instead of with them. I think user associations being part of the discussions on these issues should be a no-brainer," Örnebjär tells The Local.

Örnebjär <u>backs decriminalizing drugs in Sweden</u>, and is convinced a more serious conversation on the matter will happen in the future.

"It's on its way. A couple of weeks ago I held a seminar in the Riksdag where MPs from six parties were invited to speak about a forward-thinking drug policy. It was an historic seminar: we've never seen anything like it with as broad a backing. There are also more and more of us highlighting the issue in debates and articles," she says.

"At my own party's congress in November the issue of decriminalization was raised, and even if we lost the vote, many important steps forward were made, and even just the debate in itself was important. On top of that, it wasn't a big majority at all that voted against it, so I have good hope that at the next congress we can raise the issue again."

The Social Democrat government does not agree that decriminalization would be a solution to Sweden's high drug mortality rate however.

"I think it's too easy to say that decriminalizing or legislation would solve the problems we see. The drug issue is more complex than that. That doesn't mean we can't do more to give people with addiction and dependencies care and treatment. There's no contradiction there," Strandhäll argues.

"I think you have to be careful about thinking that the same solutions work in all countries. It's a different context and different starting point. We have different problems to solve."

Liberal MP Örnebjär would like to see an improvement in the level of debate on drug policy in Sweden going forward, where she feels discussions are still too easily shut down, and also called for more independent information to be made available.

"It's easy to communicate that it should be illegal to take drugs and that we should have a drug-free society. However anyone who tries to raise the problems, contrast use with abuse, or have a

discussion on whether we should have information available on how drugs are used is certain to be labelled as a drug liberal," she says.

"We need more evidence in the debate. For teenagers who want to know more and are looking for information it's unbelievably difficult to know which sites are based on facts. It's



difficult even for a member of parliament. More independent research and clear, independent information is needed."

Overdose resarcher Richert is ultimately optimistic that Sweden has turned a corner and will keep moving in a more constructive direction:

"If you look at what has happened in the last five years there have been a lot of positives. It's also not the case that everything about a restrictive model is bad. So you can combine it with a more humane policy which takes care of those who have serious drugs problems," he recommends.

"You can keep working with an attitude that we should have as few people as possible caught in drug problems, that's good. But what we've been bad at is taking care of people who for various reasons have a hard time dropping their drug problem – that group has been stigmatized by this hard line. That has to change."

Electronic nose could find its way into your phone

By Ben Coxworth

Source: https://newatlas.com/smelldect-electronic-nose/54791/



The prototype smelldect electronic nose sensor(Credit: Martin Sommer, KIT)

May 28 – It's important for us to be able to detect odors such as those emitted by smouldering electrical wiring, or spoiled food. However, what if there were a low-cost "electronic nose" that was even better at detecting those things, providing us with an earlier warning? That's what's being developed at Germany's Karlsruhe Institute of Technology.

Part of the university's "smelldect" project, the prototype device is just a few centimeters in size, and incorporates a sensor chip connected to multiple individual sensors – each of those sensors is in turn made up of an array of tin oxide nanowires, which have a very high electrical resistance.

When the device is being used, however, that resistance is temporarily lowered by irradiating the wires using an ultraviolet LED that's built into the sensor housing. Once the airborne molecules that make up an odor settle on the nanowires, that resistance decreases further. By noting the specific amount of decreases in resistance, on specific sensors, the device is able to establish a pattern for the odor. It then compares that pattern to those for various known odors, which have already been

programmed into it, and within seconds lets the user know if it finds a match.

The university is now working on commercializing the technology, and in fact has previously collaborated with industry partners JVI Elektronik and FireEater to create the combustion gas-smelling SmokeSense fire alarm.



"In the future, the electronic nose might be incorporated into all electric devices in order to prevent cable fires," says project coordinator Dr. Martin Sommer. "Or it can be used in smartphones. When going shopping, everybody might be accompanied by his/her own highly sensitive electronic nose." Other electronic noses currently in development include ones designed to detect disaster victims, diseases, and nerve gas.

A Traveller's Record of Syrian Monuments Before the War

By John Gendall

Source: https://www.newyorker.com/culture/photo-booth/a-record-of-syrian-monuments-before-isis May 26 – In April, 2009, Peter Aaron, a veteran architectural photographer, went on vacation with his family, to Syria. It was about one year into President Obama's first term, long before the name *IS/S* was broadly known. That same month, Seymour Hersh would write with a note of optimism, <u>in this magazine</u>, of the "Administration's chance to engage in a Middle East peace."



Aaron brought along a Canon 5D that he had modified several years earlier, removing the infrared coating on its lenses. Shooting with this camera would render blue skies in dark black and foliage in milky white, but he would gain a great level of detail and contrast in the gray-and-earth-colored stones of Syria's buildings. His wife, a writer, professor, and history enthusiast, came up with the itinerary.

Aaron's images from that trip amount to a staggering chronicle of ancient and historic monuments, many of which have since been badly damaged or completely destroyed by the war's many belligerents. In Palmyra, at the Temple of Bel, for example, he captures, from multiple perspectives, the two-thousand-year-old Mesopotamian structure, which, six years after Aaron's visit, in August, 2015, appeared in *ISIS* propaganda enveloped by a plume of smoke and was later confirmed to have been levelled. At the Tower Tomb of Elahbel, in Palmyra, his pictures lay bare each crack and joint of its masonry blocks, which would later be entirely razed.

While architecture is the subject of his attention, Aaron considers his subject broadly, often capturing glimpses of the lived experiences that buildings are designed to support. At Palmyra's Great Colonnade, during a visit just after the Friday prayers, he shows two men eating in the shade of a column base. At Aleppo's souq, he shows the merchant stalls bustling with activity. Both sites are now gone.



China sonic attack: how sound can be a weapon

By Ian McLoughlin

Source: http://www.homelandsecuritynewswire.com/dr20180531-china-sonic-attack-how-sound-can-be-a-weapon



May 31 – **Reports of <u>"sonic attacks"</u> in China, and previously in Cuba,** have left many wandering whether sonic weapons could be targeting U.S. diplomats. Victims have reportedly



experienced mild brain injuries <u>with symptoms</u> <u>including</u> "subtle and vague, but abnormal, sensations of sound and pressure." Little is known for definite, but the symptoms do suggest that some sort of sonic interference could have taken place. It is unlikely to be the result of a deliberate "sonic attack." Instead, these injuries are probably the side effects of intrusive surveillance.

Sonic weapons fall into two categories: those that involve audible frequencies, and those that are

either ultrasonic or infrasonic and so are inaudible.

Infrasonic weapons like the <u>long range acoustic device (LRAD)</u> rely on loud, low frequency sounds (infrasound). These bulky units have been used for crowd control and <u>repelling pirates</u>. When on high power, the effects are like a "punch in the guts," ranging from nausea to involuntary evacuation of the bowels. Not quite the injuries reported by the diplomats.

Audible weapons include <u>playing Bruce Springsteen</u> and music from Barney the Dinosaur at very loud volumes to enemy troops or those undergoing interrogation. But Barry Manilow also <u>drives teenagers</u> from shopping malls.

Ultrasonic (high frequency) bursts have been used as a <u>teenager repellant</u>, and ultrasound is known to cause <u>headaches and nausea</u>. It also cannot be felt or heard, which fits the facts reported by the diplomats. So has ultrasound been used against them?

How to weaponize ultrasound

The effect of sound on humans is complex. It can vary depending on the frequency, modulation (pattern), loudness, time of exposure, environment, and the age and hearing characteristics of the individual. Some people are more sensitive than others, and although skin reflects 99.9 percent of ultrasonic sound waves, our ears are much more susceptible to the energy carried by those waves.

There are two ways <u>ultrasound can harm humans</u>. The first is that it can heat up cells in the body, causing damage. The second is that ultrasound can cause "cavitation." All sound waves are longitudinal – involving a cyclic pushing and pulling motion of molecules as the wave travels, called <u>compression and</u> <u>rarefaction</u>. This happens in air as well as when it travels through an object, such as the body. Cavitation is when the pressure difference between a strong push and a strong pull in a very loud sound causes <u>bubbles to form</u>.

The effects of ultrasound increase with amplitude (loudness), but heating is mainly a problem with contact ultrasound (when an ultrasonic emitter touches you), rather than waves transmitted through the air. Cavitation, by contrast, might occur in the fluid of the inner ear, in body tissue or cells. It can be transitory (the bubble forms and disappears with each frequency cycle) or sustained. In either case, it is not considered a good thing for bubbles to form in body tissue (just ask <u>scuba divers</u>).

The extent of these biological effects depend on how the ultrasound reaches the person being "attacked". Any sound gets less powerful the further you are from a loudspeaker, but ultrasound loses power far more quickly with distance than audible sounds do. A single ultrasonic emitter (loudspeaker) would

struggle to generate enough power to affect someone halfway across a typical room.

Ultrasound is also highly directional. Precise alignment in millimeters would be needed to steer an ultrasonic "beam" to hit someone from across a room. Every time they move, each emitter would have to carefully steer its beams accordingly.



Given that it is hard for powerful ultrasound to reach us – and that most of it then bounces right off our skin – it seems to be a strange choice of weapon.

Not a weapon but a side effect

Despite some disadvantages, ultrasound is used in various tools including motion sensors. It has also been used to <u>detect people's mouth movements</u> in noisy locations, or where subjects are whispering (or miming speech). Both are useful in active surveillance, particularly when subjects are trying to avoid being overheard.

Although not deliberate, this could lead to cavitation damage. An ultrasonic loudspeaker designed to operate on a subject who is two meters away would be thousands of times more powerful at two centimeters. Just walking past, or sitting near, the active emitter for a short time could cause damage.

Multiple ultrasound emitters used for surveillance would be worse. If a subject moved their head into just the right location, waves from different emitters could combine at the eardrum, causing much higher energies. Sitting in the wrong position for too long could then cause hearing damage without the subjects noticing.

We may never know for certain what is the cause of these incidents. Given the reported symptoms, an audio related cause is likely – and if so, it is probably ultrasonic. But the nature of ultrasound suggests that these cases are probably the result of surveillance rather than a deliberate "sonic attack."

Ian McLoughlin is Professor of Computing, Head of School (Medway), University of Kent.

Radars Will Not be Able to Tell Bird-Like Drone from Real Birds

Source: https://i-hls.com/archives/83291

June 01 – Drones have their limitations. A drone can be seen and heard which is counterproductive to the purpose of surveillance drones. People on the ground will be alerted and perhaps attack the drone. The Silent Flyer (Flygildi) drone developed by Hjalti Hardarson tries to cope with this challenge. This



autonomous drone is quiet, and it looks and flies like a bird. "The Holy Grail for drone technology has always been the ability to fly without rotors and using flapping wings instead," says Hardardson. The unique wing design makes the device fly like a bird while the drone operator has real-time control of the wings for steering the device.



The bird drone could prove useful for law enforcement and military purposes. It will make it a lot easier to do surveillance for law enforcement, says Hardarson. "In any scenario where you do surveillance on a



large group of people, at a concert or a soccer game, you can now do it without being detected. In addition, the Silent Flyer can stay airborne longer than regular propeller drones because the wings make it more energy efficient."

For the military, the other obvious target group besides the police, the Silent Flyer comes with an added bonus. "The drone is so bird-like that radars cannot tell it apart from real birds. Naturally, that is a

crucial factor for military use."

The idea is both simple and radical. "First, we build a bird-like device where we use seabirds as models. Secondly, we use evolutionary computational methods to teach the device to fly like a bird," Hardarson explains.

The bird drone uses flapping wings for silent flight and vertical takeoff and landing.

Flygildi is currently working on prototypes that have been successfully tested. Hardarson explains. "We are constantly improving the flying performance." That improvement depends on the second part of the idea, teaching the device to fly like a bird.

The Icelandic startup expects to start pilot sales in 2019 and have a fully developed product by 2020. The price tag will be between in the range of €70-80,000 (\$US80,000-92,000).



Sweden calls on citizens to prepare for war, terror attacks — and fake news

Source: http://www.cbc.ca/news/world/proaganda-terrorism-1.4685607

June 02 – In nearly five million mailboxes all over Sweden, an updated version of a Cold War-era brochure arrived this week as a definitive, modern family's guide to 21st century emergency preparedness.



As such, in addition to war, the government-issued booklet included mention of terrorist attacks, cyber threats and climatechange fuelled weather — all of which were negligible or nonexistent risks back in the Soviet era when the If War Comes pamphlet was regularly printed in Sweden.

The updated version Sweden is distributing to some 4.8 million households about what to do in the event of a crisis dedicates a full page to false information, whether in peacetime or during war. (Pontus Lundahl/TT/Associated Press)

When the new <u>20-page version</u> was unveiled to the public last week for the first time in nearly 30 years, headlines

worldwide focused on the threat of war. Sweden is just downwind from Russia, after all, and the new nervousness in the neighbourhood is infectious.

But many of those headlines missed details of a significant addition on page 4: the warning about fake news.



With that, Sweden becomes one of the first nations to directly warn its citizens, in plain language, about the perils of disinformation in the modern age — and to provide concrete advice on how to avoid falling for it.

Addressing the threat of 'false information'

Of course, the threat of made-up news masquerading as legitimate is an old problem with a new name, given new life by new technology.

Some of the old pamphlets shown to CBC News in Stockholm do make a passing mention of being "on



guard" against propaganda in relation to war's "spies and saboteurs." One depicts that multiple threat with the image of a large spider.

One of the Cold War-era pamphlets previously distributed in Sweden uses an image of a spider alongside descriptions of the multiple threats of propaganda and spies. (Nahlah Ayed/CBC)

But the brochure's modern version dedicates a full page to disinformation — whether in

peacetime or in war.

"States and organizations are already using misleading information in order to try and influence our values and how we act," it reads under the heading "Be on the Lookout for False Information."

"The best protection against false information and hostile propaganda is to critically appraise the source," it continues. "The way to do that is to ask questions like 'Is this factual information or opinion?' or 'Is the source trustworthy?"

It goes on to advise seeking out information from more than one source in order to verify it.

The warning arrives just months before a fall election in which foreign meddling and fake news are a significant concern. For authorities, it's a happy coincidence.

"That is quite a big issue in Sweden especially now — we are going into elections," said Christina Andersson of the Swedish Civil Contingencies Agency, which prepared the brochure.

"It's a problem in the society as a whole," she said in an interview at the agency's offices in Stockholm. She would not speculate as to the main source of existing fake news in Sweden.

Worldwide response to disinformation

Revelations that false news, believed to be largely from Russia, reached millions of Americans on social media prior to the 2016 election prompted parliaments in several countries — from the U.K. to Singapore — to study fake news and its effects.

Since then, Malaysia criminalized fake news. Germany created a law that says media companies that won't take down false posts <u>can be fined</u>.

The Pope has also warned against fake news. To combat it, earlier this year he recommended a rediscovery of truth-based journalism.

And many voluntary and state-funded organizations have sprung up around the world to combat disinformation through fact-checking, raising awareness and media literacy.

But few governments have done what Sweden has done —a nationwide warning. It put the threat of false information high up on the list of threats in a pamphlet issued to ordinary



people during the highly publicized emergency preparedness week, right alongside advice on how to stay nourished and warm during a crisis or war.

"This time the threats are much more complex and we are talking about peacetime crisis as well as the threat of war," Andersson said.

There is a difference of opinion on how much governments should be doing to combat fake news, especially given it could be easy to veer into unobjective, political judgment of news.

Governments ponder what role to play

But it is generally agreed that it also cannot be left to social media platforms and traditional journalists alone to combat hoaxes and disinformation that can spread unchecked — especially on social media.

Given that polarizing and confusing disinformation could have an influence on crucial democratic exercises like elections, what more can a government do?

Some, like British MP Bob Seely — an expert on Russian warfare and a member of the British Parliament's newly formed <u>Russia Coordination Group</u> — are actively pondering the question. He wonders, for example, whether a government warning scheme, similar to that on cigarette packages, should exist to tell consumers of the risks associated with certain consistent sources of disinformation.

At a minimum, governments like the U.K. or Canada could fund an arms-length institution that can do what only newspapers now do and "investigate and expose subversive techniques and attacks," Seely said in a recent interview.

Others suggest a multipronged approach, in which governments should focus on educating the public — as Sweden has with its pamphlet.

"Both public and private institutions should fund digital media literacy programs for children and adults alike," Lorenzo Marini, co-creator of uCheck, a social platform for collective news verification, recently wrote.

In addition to paper form, the Swedish preparedness brochure is being made available online and in 13 languages.

In it, the government pre-emptively engages in countering the most damaging kind of fake news that could come up in the case of war: "If Sweden is attacked by another country, we will never give up," it says. "All information to the effect that resistance is to cease is false."

Document: http://s3.documentcloud.org/documents/4481608/Om-Krisen-Eller-Kriget-Kommer-Engelska.pdf

Colombia joins NATO, and that means trouble

By W. T. Whitney Jr.

Source: https://www.peoplesworld.org/article/colombia-joins-nato-and-that-means-trouble/

June 05 – It was no surprise. Already Colombia had sent personnel to military training schools in Germany and Rome and troops to the Horn of Africa to fight Somali pirates, all under the auspices of the North Atlantic Treaty Organization. Already, in 2013, Colombia and <u>NATO had agreed to</u> cooperate in intelligence-sharing, military-training exercises, and so-called humanitarian interventions. And in May 2017, Colombia and NATO agreed that the former would become a NATO "global partner." On May 25, 2018, Colombian President Juan Manuel Santos made an announcement to that effect. He mentioned too that Colombia was joining the Organization for Cooperation and

Economic Development, "an international club of creditors of deeply indebted poor countries," according <u>to one observer</u>. Within a few days, Santos was conferring in Brussels with NATO Secretary General Jens Stoltenberg.

Colombia thus becomes NATO's first global partner in Latin America. Those in other regions include Afghanistan, Iraq, Pakistan, New Zealand, Japan, Mongolia, and South Korea. But planning for Colombia's association with NATO apparently <u>preceded that</u> for the

seven other nations. As a global partner, Colombia isn't bound by Article 5 of NATO's founding treaty of 1949 which declares



that an attack on one member state is an attack on all of them, something applying to the 29 fully-fledged members.

The job description of a global partner, according to the NATO website, is to "develop cooperation with NATO in areas of mutual interest, including emerging security challenges, and some [partners] contribute actively to NATO operations either militarily or in some other way." Thus an "intimate bond between the country and the structure of NATO" involves "close collaboration in most military areas."

Colombia boasts two qualifications for associating with NATO. One, it's a regional military power. <u>Representative numbers</u> tell that story: Colombia's military force includes 550,550 troops (369,100 active duty), 273 helicopters, 1,345 armed fighting vehicles, and <u>\$8.976 billion</u> in budgeted military spending for 2017. Only Brazil, at \$25.75 billion, exceeds Colombia in this regard in Latin America. The Colombian government <u>spends 13.1 percent</u> of its total outlay on military spending, which accounts for <u>3.4 percent</u> of Colombia's GDP, the highest such rate in South America, says a <u>source citing</u> a percentage of 3.1.

Secondly, Colombia's relations with a powerful sponsor are tight. The bond between the United States and Colombia has persisted since 1948 when Bogotá hosted the conference at which the Organization of American States took shape, since 1951 when the "Colombian Battalion" joined U.S. troops in the Korean war (alone among Latin American soldiers), since 1962 when U.S. military advisors in effect turned Colombia's counter-insurgency effort over to paramilitaries thereby sowing seeds of murder and chaos, since the 1980s when common purpose in dealing with illicit drugs first emerged, since 2000 when billions of dollars in military aid started to flow under Plan Colombia, and since 2009 when arrangements for seven U.S. bases in Colombia were finalized.

Colombia enters a NATO where its U.S. patron has exerted <u>leadership at the highest level</u>. Partnership between the United States and Colombia, resting on shared commercial and economic interests of the dominant social classes of both countries, now plays out within a militarized, multi-national entity that protects such interests. A dreadful duo thus has the back of Colombia's oligarchy. The prospect is good that new grief will be falling upon the underclass not only in Colombia, but also in the region and farther afield.

Criticism centers on facades obscuring possible NATO and U.S. militarized interventions in Colombia and Latin America generally. These include operations like humanitarian assistance, fighting illicit drugs, and countering alleged terrorism. Intelligence sharing and standardization of military equipment can be expected.

There is speculation that a NATO-U.S. alliance may lead to new impediments to struggles in Colombia for justice and peace. It will "fence in possibilities for <u>social transformation</u>," says one analyst. With NATO on the scene, the government's zeal for implementing the recent peace agreement with the FARC, enfeebled already, may weaken even more. And Colombia's army and paramilitary forces may soon be acting "like a <u>praetorian, imperial</u> guard in the region controlling all the narco-trafficking in the region."

There is worry too that with NATO's intrusion in Latin American affairs, recent advances toward regional unity may be doomed. The presence of NATO, real or imagined, may cancel out or damage regional alliances that deal with social programs, or promote mutually beneficial trade arrangements, or foster military and diplomatic cooperation. The prototype of the latter has been the Latin America and Caribbean Economic Community (CELAC), with its mission of ameliorating conflict among member states. In retrospect, CELAC's declaration of January 2014 in favor of a "Zone of Peace" looks now like wishful thinking.

President Santos has come under serious criticism, for example, that "he brings to a peaceful and denuclearized region like Latin America and the Caribbean a weapon [capable] of mass destruction of peoples and states like NATO." And according to <u>Venezuela's foreign ministry</u>, Colombian authorities now "lend themselves to introduce, in Latin America and the Caribbean, a foreign military alliance with nuclear capacity, which in every way constitutes a serious threat for peace and regional stability." That has



meaning, says another observer, especially "along the borders of progressive states like Venezuela and Ecuador."

Lastly, claims are heard that Colombia's now close association with NATO represents a fundamental shift in U.S. strategies for global control. Formerly, and especially during the Cold War, NATO leaders targeted Soviet Russia ostensibly because of its communist government. For reasons that are less clear, but having to do generally with control, NATO undertook to encircle post-Soviet Russia. While engaged in the Middle East and Afghanistan, NATO had its eyes on Russia too.

Now, however, NATO has a Western Hemisphere ally with a coastline and ports on the southern reaches of the Pacific Ocean. U.S. machinations may have accounted for Colombia joining NATO, and, if so, with a rationale. At least one analyst there thinks that "China seriously threatens the political economic, military, and cultural hegemony of the United States." In fact, he says, the Pacific Ocean is "today the most important battlefield of the Second Cold War." And "for imperialist plunderers of the 21st Century, Colombia has become the point of their sword."

W.T. Whitney Jr. grew up on a dairy farm in Vermont and now lives in rural Maine. He practiced and taught pediatrics for 35 years and long ago joined the Cuba solidarity movement, working with Let Cuba Live of Maine, Pastors for Peace, and the Venceremos Brigade. He writes on Latin America and health issues for the People's World.

Cold War-era KGB "active measures" and the Kremlin's contemporary way of war

Source: http://www.homelandsecuritynewswire.com/dr20180606-cold-warera-kgb-active-measures-andthe-kremlin-s-contemporary-way-of-war



that

June 06 – Bob Seely, a Conservative MP for the Isle of Wight, has just published the first comprehensive definition of the nature of modern Russian warfare.

The paper, A Definition of Contemporary Russian Conflict: How Does the Kremlin Wage War?, published by the Russia and Eurasia Studies Center at the Henry Jackson Society, draws a direct comparison between Cold War-era KGB "Active Measures" and the aggression of Putin's Russia.

Seely warns that the West faces a new kind of conflict — one in which military and non-military tools are combined in a dynamic, efficient, and

integrated way to achieve political aims. The Henry Jackson Society says until now, there has been no common agreement on what we are fighting - but Seely offers a comprehensive definition.

In his paper, the Conservative MP and Russia researcher offers the term "Contemporary Russian Conflict" to describe the covert and overt forms of malign influence used by the Kremlin.

In this coordinated approach to warfare, at least fifty tools of state power are used, grouped into seven elements: Political Conflict; Culture and Governance; Economics and Energy; Military Power; Diplomacy and Public Outreach; and Information and Narrative Warfare. At the heart of this is the seventh element: Command and Control.

This model is less a military art so much as a strategic one, in which all the tools of national power are woven together. Armed conflict - whether overt, covert, or via proxy forces - is but one part of a full

spectrum of tools used in the pursuit of political aims. The role of the Armed Forces in this definition is supporting, not supported - used to bolster the wider political conflict being waged.

A Definition of Contemporary Russian Conflict examines the ways in which Russia goes to war and how it came to adopt this hybrid warfare model. It highlights how:



- The Kremlin considers non-military tools to be potentially more powerful than military tools, with instruments such as information warfare, cultural manipulation and social media hacktivism being used to achieve foreign policy goals without the use of direct force.
- There is an enduring influence of the secret services on Russian strategic planning, with the stages of Contemporary Russia Conflict based heavily on the 'Active Measures' toolkit used by the KGB as political warfare during the Soviet Union.
- President Putin and the security clique around him, judging by Russian foreign, defence and security
 doctrine, believe that the Western system, based on the rule of law and universal human rights, is
 antithetical to Russia and that the West is an adversary not a partner of Russia, with Russia a
 victim of Western action.
- Putin wants to undermine NATO, the EU, and other Western institutions; and wishes to use disinformation campaigns and the tools of subversive warfare to undermine trust in our values, leaders, and way of life.

Seely said:

From fake news aimed at Europe to the propaganda of RT, and from the occupation of Crimea to the streets of Salisbury, Russia is waging a very modern kind of conflict on the West – as well as on the Russian people themselves.

Putin's tactics owe much to the "active measures" practiced by the KGB during the Cold War, subverting truth to undermine our faith in our institutions. He seeks to demoralize and divide us.

The coming years will test our resilience in multiple ways. If we are to counter Russian aggression and deter future attacks on us and our allies, understanding Contemporary Russian Conflict is a crucial first step."

Foreign Affairs Select Committee Chair Tom Tugendhat, MP, said:

Up until now, the West has been without a definition of Russian warfare in all its complexity and sophistication. Bob Seely has now provided us with an approach based on common understanding of the threat we face. I will be raising this with the other Select Committees that are investigating Russian activity in the U.K.

Peer reviewed by leading scholars, this paper is a critical element in understanding how Russia and other powers are using often malign influence to achieve their strategic goals. It is important to understand the tools and techniques they are using so we are better prepared to defend and respond.

— Read more in Bob Seely, MP, <u>A Definition of Contemporary Russian Conflict: How Does</u> <u>the Kremlin Wage War?</u> Research Paper No. 15 (Russia and Eurasia Studies Center, Henry Jackson Society, June 2018).

Your iPhone case can now double as a weapons detector

Source: https://www.fastcompany.com/40582016/your-iphone-case-can-now-double-as-a-weapons-detector

Your iPhone can already take pictures, play music, make phone calls, keep track of what a lazy bum you are, help you bulk order your weekly supply of Cheetos, and a whole bunch of other stuff. Now, a company wants your phone to help you detect weapons and explosives at 40 paces. Royal Holdings, a Los Angelesbased startup focused on real-time intelligence and threat detection, has developed SWORD a smartphone attachment that uses the phone's "audio sound waves as a sort of sonar to detect whether someone is carrying a gun, knife, or explosive device," *CNET* reports.

The smartphone case includes an array of "18 antennas that can create an image profile based on the radio frequency waves" which when paired with the app's artificial-intelligence and machine-learning driven database of weapons and explosive devices can figure out who is packing a weapon and who is just happy to see you. Per CNET, the early tests showed no false positive readings. The cost is a mere \$1,250, a bargain when it comes to personal safety.





If all goes well, sales will begin next year, although the company claims they've already had interest and even pre-orders from Department of Homeland Security, private security companies, casinos, a very large school district, and other people who are into that sort of thing. Not bad considering the company doesn't have a working prototype yet. They hope that will be ready in August and, hopefully, they'll send one this way to test out in the office, 'cause the coffee in this place is definitely a weapon of mass destruction.

Is this why Greece sold the name "Macedonia"?



Transfering [German RWE-Qatargas] natural gas [LNG] from Aegean Sea via Danube River with river tankers all the way to northern Europe, making EU independent from Russian gas.



Overseas Travel Safety and Security Checklist

International travelers should take careful measures to ensure personal safety and security, as well as any business information in your possession when traveling outside of the country.

This 4-page document, compiled with the assistance of members of the intelligence, special operations, and foreign service communities, will help you effectively organize and prepare for trips abroad.



Print out a copy and run through the checklist prior to each trip. https://s3.amazonaws.com/alertsusa/travel/Travel-Checklist.pdf

Country Reports: Extremism & Counter-Extremism – interactive map

Source: https://www.counterextremism.com/countries

Drone Can Identify Violent Behavior Through Deep Learning Tech

Source (+video): https://i-hls.com/archives/83504

June 13 – Police and other governmental agencies around the world have been employing drones to be their eyes, searching the horizon for crime or terrorist activity. Drones can be found in war zones monitoring hostiles or in the air spying on foreign drug cartels. Cambridge researchers have taken this notion one step further and figured out a method to classify live footage from the drone and notify authorities of suspicious and violent behavior.



The project was undertaken by several researchers and is entitled 'Eye in the sky: real-time drone surveillance system (DSS) for violent individuals identification' using scatternet hybrid deep learning network (a hybrid deep network between Bluetooth-enabled devices).



The drone uses pyramid networks to identify the humans and focus on them. It uses scatternet to help the drones analyze the footage and let the authorities know what the situation is.

In the eye of the drone, the human form is broken down into 14 points from head to toe. These points are connected by lines that signify the arms, legs and body. The drone can tell, based on quick measurement of the angles, if the subject is potentially dangerous.

Analyzing these videos proves difficult due to illumination changes, shadows, poor resolution, and blurring, but the recent tests have proved quite resilient, according to designboom.com.

New Bus Stop Features Smart City Technology

Source: https://i-hls.com/archives/83524

June 15 – Singapore was recently ranked the top performer in a global smart city ranking by Juniper Research. The country's efforts in the area of mobility reflect "smart, connected traffic solutions" together with a very strong policy curtailing car ownership in an effort to reduce the number of vehicles on its roads. The country is a leader in allowing citizens to access digital services and city information, reports channelnewsasia.com.





Among the smart city applications is a new bus stop, the Airbitat Oasis Smart Bus Stop that was recently



installed in Singapore. It is equipped with sensors and a ceiling camera. It collects data on commuters' flow and waiting time, as well as detecting possible suspicious items. The bus stop also has a cooling and purification unit on its roof, which keeps the air inside fresher and cooler than the surrounding area with its automobile exhaust fumes and tropical heat.

The "smart bus stop" was developed by the

state-backed Singapore Technologies Engineering. For the company, the bus stop is a testbed for its new technologies in the areas on which it focuses — transportation, security



and energy. The company aims to further develop technologies and provide useful services for public spaces by targeting customers such as the government.

The Airbitat Oasis Smart Bus Stop was developed in ST Engineering's open innovation laboratory, which also developed innovations such as a "smart wheelchair" system for Singapore's Changi Airport, allowing a single operator to handle three wheelchairs simultaneously in order to address the manpower shortage. The system features an accurate trajectory-following technique and obstacle detection that allows the wheelchair convoy to weave through high-volume human traffic.

FBI Releases Study of Pre-Attack Behaviors of Active Shooters

Source: https://www.fbi.gov/file-repository/pre-attack-behaviors-of-active-shooters-in-us-2000-2013.pdf/view



This report, covering active shooter incidents in the United States between 2000 and 2013, examines specific behaviors that may precede an attack and that might be useful in identifying, assessing, and managing those who may be on a pathway to violence – MJH.

Key Findings of the Phase II Study

- The **63** active shooters examined in this study did not appear to be uniform in any way such that they could be readily identified prior to attacking *based on demographics alone*.
- Active shooters take time to plan and prepare for the attack, with 77% of the subjects spending a week
 or longer planning their attack and 46% spending a week or longer actually preparing (procuring the
 means) for the attack.
- A majority of active shooters obtained their firearms legally, with only very small percentages obtaining a firearm illegally.
- The FBI could only verify that **25%** of active shooters in the study had ever been diagnosed with a mental illness. Of those diagnosed, only three had been diagnosed with a psychotic disorder.
- Active shooters were typically experiencing multiple stressors (an average of 3.6 separate stressors) in the year before they attacked.
- On average, each active shooter displayed 4 to 5 concerning behaviors over time that were observable to others around the shooter. The most frequently occurring concerning behaviors were related to the active shooter's mental health, problematic interpersonal interactions, and leakage of violent intent.
- For active shooters under age 18, school peers and teachers were more likely to observe concerning behaviors than family members. For active shooters 18 years old and over, spouses/domestic partners were the most likely to observe concerning behaviors.



- When concerning behavior was observed by others, the most common response was to communicate directly to the active shooter (83%) or do nothing (54%). In 41% of the cases the concerning behavior was reported to law enforcement. Therefore, just because concerning behavior was *recognized* does not necessarily mean that it was *reported* to law enforcement.
- In those cases where the active shooter's primary grievance could be identified, the most common grievances were related to an adverse interpersonal or employment action against the shooter (49%).
- In the majority of cases (64%) at least one of the victims was specifically targeted by the active shooter.

*All percentages in this report are rounded to the nearest whole number.

Authors

James Silver, Ph.D., J.D., Worcester State University Andre Simons, Supervisory Special Agent, Behavioral Analysis Unit, FBI Sarah Craun, Ph.D., Behavioral Analysis Unit, FBI

The 2016 French Female Attack Cell: A Case Study

By Robin Simcox

Source: https://ctc.usma.edu/2016-french-female-attack-cell-case-study

The Islamic State has inspired dozens of women to attempt terrorist attacks in its name in Europe. One all-female cell allegedly planned several attacks in France over a matter of days in September 2016, including an attempt to blow up gas cylinders near Notre Dame Cathedral. The suspected plotters were largely radicalized online, and social media was integral to both their recruitment and plotting. One of the Islamic State's 'virtual entrepreneurs,' Rachid Kassim, helped guide their activities. Though the alleged plots failed, Kassim exploited the dedication shown by these women to shame males into attempting a subsequent wave of attacks.

The Islamic State has had great success in drawing European women into its ideological orbit, with multiple women plotting to commit attacks in Europe on behalf of the terrorist group. Between January 2014 and April 2018, women were involved in 33 separate plots in five separate countries—most frequently in France, but also Belgium, Denmark, Germany, and the United Kingdom. The first all-female terror cell in this period was disrupted in August 2014; three teenage girls who had connected via social media had discussed a suicide bombing in a synagogue in Lyon, France. The first female to successfully conduct an attack in this period was Safia S., a 15-year-old German Moroccan in contact with the Islamic State who was jailed for six years for stabbing a police officer in Hanover, Germany.

This is not a phenomenon unique to the Islamic State, however. One high-profile 2010 example from the United Kingdom saw Roshonara Choudhry, a 21-year-old student, stab a British politician who had voted for the Iraq War. Choudhry was inspired by the teachings of the al-Qa`ida in the Arabian Peninsula ideologue, Anwar al-Awlaki.

This article focuses on a female cell that allegedly planned a series of attacks across France in September 2016. It details the plots and the perpetrators' background, and it shows how despite their plans ultimate failing, they were weaponized by the Islamic State to instigate new plots in the West.

Robin Simcox is the Margaret Thatcher Fellow at The Heritage Foundation, where he specializes in counterterrorism and national security policy.





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Palestine joins Chemical Weapons Convention

Source: http://www.xinhuanet.com/english/2018-05/24/c_137201265.htm

May 23 – Palestine has officially joined the Chemical Weapons Convention and the move will take effect on June 16, the implementing body for the Convention, the Hague-based Organization for Prohibition of Chemical Weapons (OPCW) announced on Wednesday.

Palestine "deposited on 17 May 2018 its instrument of accession to the Chemical Weapons Convention with the Secretary-General of the United Nations, the depositary of the Convention. The Convention will enter into force for the State of Palestine on June 16 2018", said the OPCW in a statement.

The OPCW oversees the global endeavor to permanently and verifiably eliminate chemical weapons. Since the Convention's entry into force in 1997 -- and with its **192 States Parties** -- it is the most successful disarmament treaty eliminating an entire class of weapons of mass destruction.

Palestine became an observer in the United Nations in 2012. This status allowed Palestine to become a party to some important international treaties such as the Rome Statute, the fundamental document of the International Criminal Court ICC) and now of the Chemical Weapons Convention.

Palestine joined Interpol in September 2017 and the International Criminal Court (ICC) in April 2015.



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Source: http://www.intermatstealth.com

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- After a Short Training by our Mobile Training Team customer can paint at any current painting facility or even at the field.

Real Stealth Capability:

- The thermal signature reduction, the Infrared Cross Section, is reduced down to minimum or zero.
- Intermat paints perform with Real Stealth Capability Short Wave-IR SWIR, Mid-Wave MWIR(3-5µm), Long wave IR LWIR (8-12µm) and up to 20µm (SAT-recon): Multispectral performance for modern threats.

 Unlike obsolete fabrics solutions, paint is there on 24/7 basis to secretly protect your valuable asset from head to toe.

Solar Reflective

- Extra feature which reduces surface temperature
- Ideal for desert or hot operational environments

Maintenance Free

- Unlike fabrics, paint does not need any attention
- No extra weight, no extra time for deployment

• Fabrics suffer from tears or rip offs. Paint performs under any circumstances.

Full Vehicle Mobility

- Paint does not affect in any way vehicle's systems
- All hatches, doors, openings, guns, turrets, wheels or other systems are not affected.
- Fabrics obstruct vehicle's easy passage from jungle or narrow passages. Paints do not.
- Paint can be applied on any vehicle modern or old. No restriction.

Robust, effective & leading edge result

Maximum durability due to advanced production techniques







• Our technology is combat proven.

Available in ALL military hues and colors

 Intermat paints can be adapted to any given military pattern or color combination for Army, Navy or Air-Force requirements.

Ultimate Protection

- Survivability is the key to win battles. Survivability starts with "Don't be seen" because "You can't hit what you can't see". This is Intermat's job!\
- Simply, Intermat paints increase impressively the survivability rate and hence reduce drastically Probability of Kill(PoK).

Read more on CBRN capabilities of this stealth paint in the July 2018 issue of the Diary.

Why America Is 11 Years Late in Its Promise to Destroy its Chemical Weapons

Source: https://www.inverse.com/article/45473-chemical-weapons-us-russia-agreement

June 01 – Friday marks the 28th anniversary of an agreement between the United States and <u>Russia</u> to both end their production of <u>chemical weapons</u> and destroy their previously existing stockpiles. The agreement, made in 1990, was largely symbolic, designed to discourage smaller nations from amassing their own weapons of mass destruction. In September 2017, Russia declared it had eliminated its chemical arsenal. The US government, however, can't say the same.



OPCW agents inspecting in the field

The original agreement was that both Russia and the U.S. would finish destroying the weapons in 2007. Both countries missed that deadline and got an extension to 2012. They missed *that* deadline, too, but Russia didn't need another extension. **The U.S. now has a**



new deadline of 2023. When the Organization for the Prohibition of Chemical Weapons (OPCW) evaluated the U.S. stockpile in 2012, it reported that America still had 3,134 tons of chemical weapons agents, including mustard gas, sarin, and the nerve agent VX.

In 2013, the *New Yorker* <u>succinctly summed up why</u> America is taking so long to hold up its end of the deal: It's because "chemical weapons can be destroyed easily or safely, but not both."

According to the OPCW, a chemical weapon is a "toxic chemical contained in a delivery system, such as a bomb or shell." The <u>Chemical Weapons Convention</u> specifies that the way in which a toxic chemical is delivered causes death and injury. The most famous chemical weapons are categorized into four types: choking, blister, blood, and nerve agents.

America is trying to get rid of all four, after a long history of chemical weapon production. The US established its Chemical Warfare Service in 1918 as a response to German chemical weapons during <u>World War I</u>. At the time, the US mostly produced mustard gas, a <u>blister agent</u>, and phosgene gas, a <u>choking agent</u> that can cause fluid buildup in the lungs. World War II brought along new weapons, like cyanogen chloride, hydrogen cyanide, and lewisite. After that war came sarin and the nerve agent VX.

US production of chemical weapons briefly halted in 1969, under President Richard Nixon. It started up again under President Ronald Reagan in the 1980s. The Bilateral Destruction Agreement between President George Bush and Mikhail Gorbachev, the last leader of the Soviet Union, was supposed to mark the end of the long ordeal.

How Do You Destroy Chemical Weapons?

There are many ways a nation is *not* allowed to destroy a chemical weapon. These include: dumping them into water, burying them in land, or burying them in a pit. For a long time, these environmentally dangerous techniques were the default disposal methods. After WWII, for example, about <u>40,000 metric</u> tons of chemical munitions were tossed into the Baltic Sea.

The drained munitions cases and the emptied containers are decontaminated by thermal treatment."



The JACADS plan, a chemical weapons destruction facility in the U.S.

The <u>OPCW recommends</u> that nations instead destroy chemical weapons using high-temperature destruction technologies, like incineration, or low-temperature destruction technologies, like hydrolysis. The US primarily uses the former. It's a complicated process, as the OPCW outlines:

"When chemical weapons munitions are dismantled, three groups of component parts are generated; the agent, the explosives and some metal parts. Each component group is treated further separately. Agent combustion in the first chamber of the liquid incinerator at about 2,700 degrees F and additional treatment in the afterburner (second chamber) at



approximately 2,000 degrees F leads to the 99.9999 percent destruction and full mineralization of organic compounds; the generated oxides and acid gases are removed by scrubbing.

Where Are Weapons Destroyed in the US?

To be fair, although the US missed its deadline, it has still destroyed a sizable chunk of its arsenal. As of 2013, <u>90 percent</u> of its Category I agents and all of its Category II and III agents have been destroyed. **The remaining agents are mustard gas, VX, and sarin.**

These are kept at the Chemical Depot in Pueblo, Colorado and the Blue Grass Army Depot in Richmond, Kentucky. Approximately 2,611 tons of mustard gas are stored in Colorado, while the Kentucky facility contains 523 tons of the nerve agents as well as mustard gas-filled munitions.

Twenty-eight years after the original agreement, the US government maintains that its decades-long delay is due to a lack of <u>funding</u>, specialized equipment, and time. This argument is at least partially supported by history: the Desert Army Chemical Depot in Toole, Utah, which once stored 43 percent of American <u>chemical weapons</u>, is now empty and being dismantled — but safely gutting the chemicals and the accompanying munitions took *16 years*.

The State Department "remains committed to the complete destruction of its declared chemical weapons stockpile by the end of 2023," <u>reported</u> the *New York Times* last year. Time will tell whether or not that will turn out to be true.

New tool to detect deadly chemical weapon agents: Butterflies

Source: http://www.homelandsecuritynewswire.com/dr20180601-new-tool-to-detect-deadly-chemical-weapon-agents-butterflies

June 01 – Every spring caterpillars shed their cocoons, emerging as butterflies. This timeless symbol of change is now being applied to enhanced chemical detection for U.S. soldiers. Researchers from the military service academies, funded by the <u>Defense Threat</u> <u>Reduction Agency</u>'s Chemical and Biological Technologies Department, are using butterflies to detect trace amounts of chemical warfare agents with increased precision and speed.

DTRA says that researchers at the U.S. Air Force Academy, managed by DTRA CB's Brian Pate, demonstrated that analyzing light reflected from the scales of a butterfly wing may fill a critical capability gap for our service members. Currently, only expensive, non-

portable instrumentation exists for the required sensitivity of certain CWA. Other tools, such as colorimetric and nanomaterial methods show promise, however, they pose challenges for long-term field use such as inadequate sensitivity or sensor poisoning.

Highlighted in the <u>ACS Omega article</u> "Sensing Chemical Warfare Agent Simulants via Photonic Crystals of the Morpho didius Butterfly," researchers tested both naturally occurring and synthetic photonic crystals for CWA vapor detection. Using the reflective properties of the butterfly wings, researchers were able to identify changes in the refractive index or distance between structure layers.

When exposed to water, methanol, ethanol and simulants for mustard gas, researchers found that vapors could be detected at parts per million concentrations in under one minute. Offering an innovative, low-cost and rapid means of threat agent detection, this sensing technique may offer significant advantages for deployed warfighters. The portable technique only requires a small photonic crystal, a visible light source and a fiber optic cable. Further, this method could potentially be used as a long-term, continuous, passive sensor.

While promising, these sensing agents present some challenges such as generating a synthetic butterfly wing to increase vapor sensitivity and selectivity towards chemical agents. Ongoing efforts are underway at the Air Force Academy to address this issue

Collectively, these efforts highlight the capability of the service academies to contribute to the chemical and biological defense enterprise's mission of protecting our force from threat agents, while fostering critical thinking and technical excellence in the next generation of military leaders.



— Read more in Joshua D. Kittle et al., "Sensing Chemical Warfare Agent Simulants via Photonic Crystals of the Morpho didius Butterfly," <u>ACS Omega</u> 2, no. 11 (21 November 2017).

Healthcare Professionals Speak to the Need for CBRN Training

By Dr. Terry Oroszi

Source: https://www.cbrneportal.com/healthcare-professionals-speak-to-the-need-of-cbrn-training/

June 05 – FBI Director Christopher Wray, in a February 2018 meeting with eighteen local public sector leaders, spoke of the ever-changing US landscape when it comes to Chemical, Biological, Radiological, and Nuclear (CBRN) events. During the Cold War (1947 – 1991), the predominant fear in the US was a domestic nuclear attack. The most likely threat scenario has evolved to attacks in small clusters, or localized events around the country using a wide spectrum of CBRN hazards. The potential for such an incident to occur without warning has prompted the government to fortify preparedness efforts in hospitals. That preparedness may not extend to the health care professional's knowledge of CBRN response.

Health care professionals are the first line of defense when it comes to identifying and treating patients that have come into contact with CBRN hazards. If a patient arrives with nausea, vomiting, and tremors a physician lacking CBRN training may lean toward a diagnosis of Parkinson's disease, epilepsy, or an opioid overdose. Physicians with advanced CBRN training may consider diagnoses such as nerve agent exposure or acute radiation sickness.

Biological incidents can provoke fear and panic for both the patients and the medical professionals. Bioterrorism attacks such as the Anthrax letters of 2001, and natural outbreaks such as the Ebola outbreaks in western Africa place unexpected and extreme burdens on emergency room facilities and staff. CBRN incidents often require special triage, decontamination and isolation, and patient treatment procedures. The Center for Disease Control and Prevention (CDC) distributes readiness plans and has identified hospital competencies, but the training typically stops there. Lessons learned from the Tokyo sarin attack in 1995, and chemical attacks in Syria since 2012 indicate the urgent need for medical professionals to become aware of the special requirements of CBRN incidents (Francis, 2012, and Rosman, et al., 2014).

An article by Alexander and Wynia (2003) acknowledges the physician's need for advanced knowledge to better prepare them for an event. The article states that only 21% of physicians feel prepared to manage victims of a CBRN incident, and that 20% of physicians may not be willing to treat infected patients. To learn more about the importance of advanced training in CBRN, two medical students that have incorporated CBRN advanced training as part of their medical curriculum share their thoughts on why they sought the training and how it will make them better physicians.

Medical students weigh in on why they participated in CBRN training:

Megan Smith, MPH – Pathology:

I discovered the field of CBRN through my studies with the Wright State University Master of Public Health program. Before engaging with the coursework, I knew almost nothing about the role of medicine and public health in preparing for CBRN incidents. After studying CBRN Defense, I wish more medical students were exposed to this material. Though CBRN incidents are thankfully uncommon in our area, studying these threats allows for a more inclusive differential diagnosis when encountering potential CBRN patients. This means that victims may be recognized, treated, and reported earlier so that the public health response to the threat is expedited. On top of the utility of studying CBRN as a future physician, the subject is simply fascinating. I can't predict where my career will take me, but I would love to integrate my CBRN experience with pathology and public health to protect the well-being of our communities.

P Read the rest of this article at source's URL.

Terry Oroszi is an Assistant Professor and Director at Wright State University, Strategic Planner with HJF at WPAFB, and Chairperson of the Dayton Think Tank.



Terry is a published author and speaker in the areas of CBRN, Terrorism, Crisis decisionmaking, and Leadership. Contributors to this piece include Captain Kelley Williams, M.S., Analytical Science Officer 64th WMD-CST, Jaree Naqvi and Megan Smith, MPH, both medical students at Boonshoft School of Medicine.

EDITOR'S COMMENT: I met this "enthousiasm" many times before and in many different countries. The point is that it was a momentary enthousiasm instead of a longtime dedicated relationship. CBRN is like smoking or drinking: You taste it once and either you start smoking or you never put a cigarete into your mouth.



Eurosatory 2018: Ouvry started manufacturing SIM KIT CBRN training case

Source:https://www.armyrecognition.com/eurosatory_2018_official_news_online/eurosatry_2018_ouvry _started_manufacturing_sim_kit_cbrn_training_case.html

June 11 – Launched and patented in 2012 by the men with hands-on experience, former members of OPCW (Organization for the Prohibition of Chemical Weapons), the SIM KIT® is already distributed in



more than 20 countries. Ouvry was already profiting from an exclusive agreement for the distribution in France. Hotzone Solutions Group now wants to focus on its core business: training, counseling and integrated systems supply (mobile laboratories, CBRN threats categorization and evaluation kit). For its part, Ouvry designs and manufactures, in its local manufacturing units in Lyon, products that answer to every CBRN protection and decontamination needs. Already active in 27 countries, the brand wishes to broaden its portfolio and keep on developing its export activities.

This product is intended to be part of CBRN (Chemical, Biological, Radiological and Nuclear) threats training and practice. The SIM KIT® is made of 3 simulants with the same physiochemical properties as real Chemical Warfare Agents as persistency, color, viscosity, volatility. Thus, simulants and real CWAs have the same environmental behavior.





Both are detected in the same way by any existing means: detection, alert and identification devices (ion mobility spectrometer, flame spectrometer, etc.) and detecting paper. SIM KIT® simulants now have a fluorescent marker, a light emitting additive visible when lit with the supplied UV lamp. As detection devices and paper react in the same way to simulants and real agents, the fluorescent marker distinguish them very fast. It also allows the visualization of the simulant presence or absence during realistic training scenarios: quantifying residual contamination after decontamination, quantifying crosscontaminations, etc.

Moreover, SIM KIT® simulants are no longer contain the CMR (Carcinogenic, Mutagenic,

Reprotoxic) chemicals. The simulants' toxicity for human beings or the environment was thus greatly reduced.

EDITOR'S COMMENT: This is a fantatic product that I highly recommend. It will make your drills more interesting and catch the interest of your trainees! Both safe and cost effective.

UK Proposes OPCW Begins Attributing Responsibility for Chemical Attacks in Syria

Source: https://sputniknews.com/middleeast/201806131065382588-uk-opcw-chemical-attacks-syria-responsibility/

June 13 – The United Kingdom proposed to expand the mandate of the Organisation for the Prohibition of Chemical Weapons (OPCW) in Syria to allow it identify those responsible for the use of chemical weapons in the country, UK Foreign Secretary Boris Johnson said on Wednesday.

"UK has tabled draft decision aimed at strengthening the ban on chemical weapons. We propose the OPCW begins attributing responsibility for chemical weapons attacks in Syria. We also want action to support states to address the chemical terrorism threat. With proven technical expertise on chemical weapons the OPCW is the right body to study who is behind an attack," Johnson wrote on Twitter.

The statement followed the release of the OPCW Fact-Finding Mission's (FFM) report on chemical weapons use in Syria, which confirmed that sarin was very likely used as a chemical weapon in the south of Ltamenah, Syrian Arab Republic, on 24 March 2017. However, the document noted drawing final conclusions on the issue would require a longer period of time, due to "the collection of information and material, interviewing witnesses, as well as analysis of samples."

The existing OPCW Fact Finding Mission (FFM) is only responsible for the establishment of facts around the reports about the use of chemical weapons in Syria. The UN-OPCW Joint Investigative Mechanism (JIM) was mandated with attribution of responsibility for chemical attacks in Syria. However, this mission's mandate expired in November.

The claimed use of chemical weapons in Syria has become one of the main topics of the international agenda within the last several years after numerous accusations by the Syrian opposition, as well as Western countries, against Syrian government forces.

The Syrian authorities have repeatedly said that their chemical weapons stockpiles had been destroyed under the supervision of the OPCW.


Chemical weapons body confirms more sarin use in Syria

Source: https://www.channelnewsasia.com/news/world/chemical-weapons-body-confirms-more-sarin-use-in-syria-10429194

June 14 – The banned nerve agent sarin and chlorine were used in attacks in northern

It is the latest in a series of reports from the Organisation for the Prohibition of Chemical Weapons (OPCW) confirming the use of toxic agents in the country's civil war.

The OPCW is also investigating a suspected chemical attack on April 7 this year in the **Douma enclave** near Damascus, which prompted missile strikes by the United States, France and Britain.

It is expected to publish the results of that inquiry this month.

The OPCW said in a statement that sarin had been used south of the city of Ltamenah in the Hama area on March 24, 2017.

It also "concluded that chlorine was very likely used as a chemical weapon at Ltamenah Hospital and the surrounding area on 25 March 2017".

The findings in Ltamenah were based on witness testimony, epidemiological analysis and environmental samples, it said.

The OPCW did not assign blame for the attack. Syria denies using chemical weapons.

Syrian government forces have used both sarin and chlorine, according to a United Nations-OPCW joint investigation, while rebel forces used sulphur mustard gas once.

Their so-called JIM mission was disbanded in November after a proposed renewal of its mandate was vetoed by Russia on the U.N. Security Council.



EUROJUST CBRN-E Handbook

Overview of EU and international legislation applicable to CBRN (Chemical, Biological, Radiological and Nuclear) substances and Explosives

Supranational entities, systems and databases active in the field of CBRN-E

Source: <u>http://www.eurojust.europa.eu/doclibrary/Eurojust-framework/Casework/Eurojust%20CBRN-</u> E%20Handbook%20(June%202017)/2017-06_Eurojust-CBRNE-Handbook_EN.pdf

The Military Logic Behind Assad's Use of Chemical Weapons

By Luke O'Brien and Aaron Stein

Source: https://warontherocks.com/2018/06/the-military-logic-behind-assads-use-of-chemical-weapons/

June 15 – When Syrian President Bashar al-Assad's regime uses chemical weapons, as it has done on at least four different occasions in the past five years (<u>August 2013</u>, <u>March 2017</u>, <u>April 2017</u>, and <u>April 2018</u>), conspiracy theorists and Russian propaganda outlets immediately kick into gear to begin denying it. They posit that the Syrian regime would never use chemical weapons because, after all, it is already winning the civil war. Instead, these



outlets <u>suggest</u>, the anti-Assad opposition (<u>working with external powers</u>) stages "false flag" events to provide excuses for an American military strike aimed at toppling the regime.

These denials are absurd for a number of reasons, one of which is that there is an obvious – but often overlooked – rationale for the regime's use of chemical weapons. The Syrian conflict has demonstrated



the value of these weapons for Assad's enemy-centric approach to counterinsurgent warfare, which is premised on the idea of using overwhelming force to populations punish local where insurgents are active. Rather than working to deliver services and stability to contested spaces to compel popular support, the intent is to re-establish central government control through naked aggression. Conspiracy theorists who

suggest that chemical weapons attacks are fabricated to invite U.S. intervention also ignore the fact that the United States faces a number of political constraints on the use of force in Syria. The regime concludes that, in certain instances, the value of using chemical weapons exceed the potential costs of external military intervention. The result is a decision to use these weapons as they were intended: to win wars and to terrorize a population into submission.

Assad's enemy-centric approach has boosted the regime's near-term security by helping to offset its military weakness and drive down the cost of killing as many people as possible. While chemical weapons tend to be seen as largely an occasional horror, or a rogue threat from terrorist groups, the Assad regime has, once again, demonstrated their value for warfighting – and is likely to use them again. This poses a challenge for the United States, which has emphasized nonproliferation as the most effective tool to prevent the spread and to eliminate stockpiles of weapons of mass destruction. As the war in Syria continues, it remains as critical as ever to accept that chemical weapons have value for the aggressor, and to devise political means to compel states to trade away these dangerous weapons.

The Syrian Arab Army: Doctrine and Logistics

American counter-insurgency <u>doctrine</u> emphasizes the need to isolate and defeat the insurgent actor, empower the population to support such operations, and gain legitimacy with the population. The Syrian Arab Army and its backers, by contrast, favor mass punishment and ethnic cleansing, part of an approach referred to as "<u>draining the swamp</u>." Chemical weapons have proved to be more <u>psychologically</u> <u>damaging</u> to populations than conventional munitions, and are thus well-suited to the regime's strategy of mass punishment.

For Assad, chemical weapons also compensate for the limitations of his army's older, less sophisticated weapons. While the use of precision-guided munitions has <u>grown</u> in militaries around the world, they are still a comparatively small part of most countries' arsenals, limited to <u>anti-tank</u> roles or against <u>naval</u> <u>targets</u>. As a result, most states are forced to use unguided munitions instead. Many targets, if sufficiently protected, can weather most unguided attacks by sheltering in structures, tunnels, or fighting positions. For example, it can take upwards of <u>147</u> unguided 155mm artillery shells to destroy a moderately-sized structure. Most of the shells fired won't even hit the building. Those that land near the building will be unable to strike any of those sheltering inside unless many fragments have chipped away at the concrete wall. Though <u>manifestly unpleasant</u>, the majority of people seeking shelter are likely to survive.



Chemical weapons, however, can <u>seep</u> into these buildings with relative ease, as long as the shells land even reasonably close to the target. In Syria as well as in other conflicts, the anti-Assad opposition has <u>dug fairly sophisticated tunnel systems</u> that are, in theory, impervious to the regime's heavy artillery and unguided bombs. To effectively target these buried facilities, Assad has turned to chemical weapons, which often <u>descend and concentrate</u> in low-lying areas. The advantage is clear: The regime can ensure heavy casualties with a small amount of effort, either by incapacitating or killing combatants, or by terrorizing these groups and the civilians who live alongside them.

These tactics are not unusual. In 1988, the Iraqi government used chemical weapons to kill civilians hiding in basements in <u>Halabja</u>. Indeed, the Iraqi army was quite transparent that this was their intent. To <u>quote</u> Ali Hassan al-Majid, known more widely as "<u>Chemical Ali</u>" for his use of chemical weapons during the Anfal campaign, "I told the mustashars [village heads]... I said I cannot let your village stay because I will attack it with chemical weapons. Then you and your family will die. You must leave right now." In Yemen in the 1960s, Egyptian forces <u>used</u> nerve agent to target civilians and insurgent sheltering in caves near Royalist strongholds.

Chemical munitions are also relatively cheap to produce. Unlike expensive precision-guided munitions (and the <u>advanced command, control, communications, and intelligence systems</u> needed to use them), even smaller and less advanced states can field chemical weapons programs relatively cheaply. As the CIA <u>observed</u> when assessing Iraq's chemical weapons program in the 1980s:

The chemical warfare program has been a relatively cheap investment for Iraq. We estimate the program has cost slightly above \$200 million in capital expenditures during the past decade, less than 2 percent of Iraq's military expenditures over the same period.

Chemical weapons, it has been <u>estimated</u>, cost approximately \$600 to generate one civilian casualty per square kilometer, as opposed to \$2,000 to achieve comparable effects using conventional weapons. If you're an army forced to fight a war on the cheap, chemical weapons make a great deal of sense.

International Retaliation: Weathering the American Cruise Missile Storm

<u>Conspiracy theorists are fond of asserting</u> that Assad would never use chemical weapons because this would be provoking Western military reprisals. This argument underestimates both the value of chemical weapons to the Assad regime and the serious constraints on Western action in Syria.

The regime presumably weighs the expected cost of retaliatory strikes against the clear military benefit of chemical weapons use. The United States, for its part, has to balance the desire to punish the regime for violating its commitment not to use chemical weapons with other factors, like protecting American troops in northeast Syria and limiting the risk of unintended escalation with Russia. The United States and its allies have signaled that they do not want to risk such escalation over the war in Syria. Thus, Assad can count on the presence of Russian forces in Syria to act as a deterrent against strikes that could threaten regime stability. He can reasonably assume that American military action has to be refined to try and prevent unintended escalation, and will therefore be relatively small in scale. In addition, Assad has almost certainly dispersed chemical weapons storage facilities and production centers to ensure that they cannot be destroyed from the air. The likely outcome, therefore, is that American airstrikes will set the program back but won't completely destroy the program. Assad can assume that Russian diplomatic and military support – combined with American hesitance to topple his regime – will protect him from regime-threatening external intervention.

Weapons of War

In many ways, our popular imagination views chemical weapons as magical McGuffins to be pursued by Bond villains, two-dimensional terrorists, and commandos, not as actual battlefield weapons that help state actors defeat insurgents. They are less <u>military history</u> and more <u>Michael Bay</u>. To those unfamiliar with chemical weapons, reports of their use can take on a feeling of unreality, like a mustachioed villain tying someone to a railroad track. The truth, however, is that chemical weapons remain of military value. Understanding this allows us to see past transparent propaganda campaigns and instead grapple with the <u>long-term</u> <u>psychological</u> and humanitarian impact <u>civilians are subject to</u> after chemical weapons use.



Understanding how chemical weapons are of value to state actors also allows us to focus our resources in the right place. The idea of terrorists using chemical weapons may capture the popular imagination, but it is the far <u>lesser threat</u> when compared to state use, where professional militaries trained to maximize lethality use the weapons to achieve military effects. Russia has <u>proposed</u> a new treaty focused on non-state actor chemical weapons use. Clearly, this effort is misdirected, and a naked attempt to distract from the fact that its ally is using chemical weapons in a war Moscow is directly supporting.

The clear logic underpinning Assad's use of chemical weapons should challenge widely held <u>assumptions</u> about the <u>prohibitive norm</u> against the use of weapons of mass destruction. The Syrian regime is pursuing a straightforward strategy of mass punishment to defeat an internal threat to its survival, and has demonstrated chemical weapons' value for warfighting.

Chemical weapons are not distinct from Assad's war machine. They're as much a part of it as his artillery, his aircraft, and his tanks. By treating chemical weapons as a unique and discrete threat instead of an integrated part of the regime's military means, it becomes difficult to devise policies to deter and prevent future use. If the United States and the international community chooses to respond to future chemical weapons use with military strikes, they will have to consider imposing costs on conventional warfighting capabilities as well, because Assad's conventional and unconventional systems work in concert to achieve strategic effects — the destruction of the insurgency. However, any such effort would be beholden to political considerations about American strategy and appetite for risk.

Assad has, thus far, absorbed the costs of chemical weapons use and correctly anticipated his relative safety from Western airstrikes. But it is important to look beyond the current conflict in Syria and consider the implications for future conflicts. To prevent chemical weapons attacks, paradoxically, the policy community has to accept that chemical weapons are not unique weapons. Regimes have integrated them into conventional battle plans, making chemical weapons part of a broad spectrum of munitions options for fighting and winning wars. The ideal policy response is to incentivize regimes to voluntarily disarm, making a political choice to trade away a valuable tool, in return for some form of inducement. Indeed, the United States and Russia pursued this policy in <u>September 2013</u>, only for the Assad regime to hold some weapons back and eventually use them again to support combat operations. The policy failed, but its premise — general state disarmament — remains an important policy goal for the United States.

In the absence of disarmament, it is important to accept chemical weapons as part of a state's war fighting capabilities, not a niche or exotic capability. Policymakers should think less John le Carré and more <u>John</u> <u>Keegan</u> – using historical analysis to craft effective policy options to deter and prevent future use, with an eye toward creating the conditions for the eventual total elimination of chemical weapons.

Luke J. O'Brien is an analyst and military historian and a contributing editor at War on the Rocks. He is also an Army reserve officer, and as such his views are his own and not those of the Army, the Department of Defense, or the United States Government. *Aaron Stein* is a senior fellow at the Atlantic Council's Rafik Hariri Center for the Middle East.

US Department of Defense is developing radical X-ray bomb that can knock out chemical and biological weapon sites safely

Source: http://www.dailymail.co.uk/sciencetech/article-5845213/US-Depart-Defense-developing-X-ray-bomb-knock-chemical-biological-weapon-sites.html

June 14 – The US Department of Defense is building a radical X-ray bomb that could knock out chemical and biological weapon sites without spreading the chemicals over a large area.

The secretive project has been under development since at least 2015.

The DoD has contracted specialist electronics company Hyperion Technology Group to develop a prototype, which would fit inside an existing warhead casing, and could also be used in close combat.





The DoD is working with Hyperion Technology Group to develop a prototype, which would fit inside an existing warhead casing. Pictured, the U.S. Navy guided-missile destroyer USS Barry (DDG 52) launches a Tomahawk cruise missile

It would use a strong burst of X-rays to render chemical and biological weapons useless, without damaging the vessels containing them.

The Department of Defense has contracted specialist electronics company Hyperion Technology Group to develop a prototype.

Last year the firm received \$980,745.00 for what appears to be phase two of the project, to 'develop a second generation X-ray system and conduct a series of static arena test against targets of interest to demonstrate the utility of a fully developed weaponized X-ray source for use as a Directed Energy Weapon.'

The award states 'Traditional weapon systems often fail to meet the requirements of close combat typical of the previously discussed engagement, where insurgents often blend in or store weapon amongst friendly or non-combatant forces, to shield them from precision strike munitions of a technologically superior force.'

Although most details of the project are secret, a 2015 document called 'High Power X-ray Munition to Attack and Defeat Weapons of Mass Destruction' reveals the beginnings of the programme.

HOW WOULD AN X-RAY BOMB WORK?

At high enough exposure levels, X-rays destroy bacteria, spores and other biological agents. X-rays would also be able to break down complex molecules like organophosphate nerve gases, such as sarin. However, a simple gas like chlorine would be unaffected.

First integrated national CBRN centre in Kuwait

Source: https://saabgroup.com/media/news-press/news/2017-07/first-integratednational-cbrn-centre-now-operational-in-kuwait/





the first centre to cover a whole country with fixed and mobile CBRN sensors and units, whilst also providing a unique capability for simulated training.

During 2015, Saab delivered the AWR (Automatic Warning and Reporting) system for the Kuwait National Guard. AWR is a flexible, modular and future-proof solution for the detection, identification, warning, monitoring and reporting of CBRN hazards. The system can be operated from fixed locations and carried by personnel or mounted on vehicles. It helps the operator to make fast and accurate decisions to limit the effects of a CBRN attack and it is a key part of the national CBRN centre.

Saab, through a successful triangular partnership with Bader Sultan & Bros and the Kuwait National Guard, has found a solution for support and training, which has now resulted in the national CBRN centre. "This CBRN centre in Kuwait strengthens our position as a supplier of advanced CBRN solutions. Our ability to take the prime contractor role for this ground-breaking CBRN solution is built on deep expertise and innovations in CBRN technology. It also derives from our detailed knowledge of C4I – Command, Control, Communications, Computers, and Intelligence systems – as well as systems and platform integration", says Torsten Öhman, acting Head of Business area Support and Services within Saab.

"The Kuwait National Guard is proud to both lead the way and protect the Kuwaiti people with our new national CBRN capability. Bader Sultan and Saab have been great partners in creating the system and making our vision real. We look forward to a continued successful partnership in expanding and supporting the system over the coming many years", says General Hashim Al-Refaae, Undersecretary for the Kuwait National Guard.

Threat of CBRN weapons becoming a 'reality', says Indian Army Chief

Source: https://economictimes.indiatimes.com/news/defence/threat-of-cbrn-weapons-becoming-a-reality-says-army-chief/articleshow/62473980.cms

Jan 2018 – Army Chief Bipin Rawat today said the threat of the use of Chemical, Biological, Radiological, and Nuclear weapons, collectively termed as CBRN, was becoming a "reality", particularly from "non-state actors".



Rawat said that unlike the conventional military, CBRN combat requires operations in a "highly unpredictable" environment, where the adversaries may use "asymmetrical" means to counter India.

"The threat of the use of CBRN weapons is indeed becoming a reality, particularly as a threat from non-state actors. Use of CBRN weapons could jeopardize life and property and take a long time to recover," Rawat said.

The chief of army staff made the remarks at the inauguration of a

workshop on CBRN defence technologies at the DRDO (Defence Research and Development Organisation) headquarters here.

Defence Minister Nirmala Sitharaman, who was scheduled to inaugurate the event, did not attend, citing pressing engagements elsewhere.

Rawat said in the absence of any restraint, the best way to keep the nation secure was to develop protection, technologies, equipment and systems and impart advanced training to soldiers.





Anti-Poisoning Treatment for First Responders

Source: https://i-hls.com/archives/78844

Sept 2017 – A first-of-its-kind treatment for the life-threatening effects of cyanide poisoning will be developed soon. The treatment is needed because cyanide could be used as a chemical weapon against the United States.

The development will take place under an agreement between the HHS (US Department of Health and Human Services' Office of the Assistant Secretary for Preparedness and Response) and the Marylandbased company Emergent BioSolutions, a life sciences company which focuses on providing specialty products for civilian and military populations that address accidental, intentional, and naturally emerging public health threats.

The company announced that it has been awarded a contract valued at approximately \$63 million by the Biomedical Advanced Research and Development Authority (BARDA) to develop an antidote spray device for the treatment of known or suspected acute cyanide poisoning. The **single-use intranasal spray** device will deliver a stabilized form of **isoamyl nitrite** (SIAN) and is intended for use by first responders and medical personnel following a cyanide incident, according to the company's website. Under the five-year contract, Emergent will work together with Southwest Research Institute, an independent, nonprofit applied R&D organization headquartered in San Antonio, Texas, to advance the development of SIAN towards licensure, including completing regulatory activities required to submit an Investigational New Drug (IND) application to the U.S. Food and Drug Administration (FDA) to enable first-in-human studies, conducting initial clinical studies, and advancing non-clinical and Chemistry, Manufacturing, and Controls development activities.

This contract is funded by BARDA, a division of the U.S. Department of Health and Human Services. "Emergent has a successful history of developing medical countermeasures that address the U.S. government's top priority public health threats," said Sean Kirk, senior vice president at Emergent BioSolutions. "We are committed to fulfilling BARDA's requirements for an easily-administered treatment for acute cyanide poisoning, in collaboration with Southwest Research Institute. The development of the intranasal SIAN device will expand the company's portfolio of novel devices to combat chemical threats. We are excited about the potential of this product candidate to meet the needs of both the government and commercial markets."

Researchers Discover Process to Combat the Effects of Nerve Agents

Source: https://i-hls.com/archives/69595

May 2016 – Sarin is a colorless, odorless liquid fatal even at very low concentrations. Serious sarin poisoning causes visual disturbance, vomiting, breathing difficulties and, finally, death. The nerve agent causes a deadly overstimulation of the nervous system that can only be stopped if treated with an antidote within minutes of poisoning. Now, Homeland Security News Wire reports, a ground-breaking study done



by Swedish and German researchers has been published in *PNAS*, which describes in detail how such a drug works.

Nerve agents destroy the function of a very important protein in the nervous system called acetylcholinesterase. The antidote HI-6 removes the nerve agent chained to the protein and which prevents it from functioning and restores the function of the nervous system. Drugs against nerve agent poisoning have been used for a long time, still it has been unclear how they actually work.

"Nerve agents are dreadful weapons, and our hope is for these results to lead to improved drugs against them," says Anders Allgardsson, Biochemist at the Swedish Defense Research Agency (FOI), who took part in the research.

After years of hard work, chemists from FOI and Umeå University are now presenting a three-dimensional structure that depicts the HI-6 moments before the bond between the



nerve agent and the protein is broken. The structure gives a high-resolution image that, in detail, describes the individual positions of atoms and provides an understanding of how the bond breaks.

The scientific breakthrough was enabled by combining three-dimensional structural depictions with advanced calculations and biochemical experiments. The study describes a model which shows how sarin and HI-6 are positioned in the protein acetylcholinesterase just before HI-6 removes sarin and restores the function of the protein. The model was developed by a combination of X-ray crystallography and quantum chemical calculations.



Sarin in magenta, HI6 in green, oxygen in red, phosphorus in orange, and nitrogen in blue.

"With the help of X-ray crystallography, we could see weak traces of the signal we were looking for. As the signal was weak, we decided to integrate the data with quantum chemical methods. After demanding calculations on the supercomputer at the High Performance Computing Center North at Umeå University, we finally succeeded," says Anna Linusson, Professor at the Department of Chemistry at Umeå University.



Europe Preparing for A Different Sort of Terrorist Attack

Source: https://i-hls.com/archives/74420

Jan 2017 – Following the Christmas market attack in Berlin, the German government issued a paper stating the country is at "high risk" of terrorist attacks carried out by "Islamistmotivated perpetrators" who may employ large amounts of chemicals to target drinking water supplies.

According to rt.com, the government is treating the threat seriously and has ordered the

German armed forces, intelligence agencies and emergency services to prepare for action in the event of a chemical attack.

"A determined and well-trained terrorist group is

likely to be in a position to exploit Germany's potential chemical hazards in order to stage an attack," says the report jointly prepared by the government and



the federal police (BKA) to evaluate level of threats to civilian population. Islamist-motivated perpetrators are able "procure and use large amount of chemicals," it states, also describing "realistic options" of a chemical attack.

There is also "a high-risk potential" of terrorist organizations using chemicals to target food and drinking water supplies used in large residential buildings, and attacking chemical industry's infrastructure. The German armed forces have been preparing for this "more intensively than before," the report adds in conclusion.

The paper comes weeks after the December Christmas market attack in Berlin, where a Tunisian national rammed a heavy truck into the crowd, killing 12 people. The attack took place despite the terrorist suspect has been under police surveillance for several months. In early January, British Security Minister Ben Wallace said Islamic State militants are keen to carry out large-scale attacks in the UK and have "no moral objection to using chemical weapons." Wallace said the elimination of an IS cell in Morocco last February indicated that the terrorists planned to target Europe.

Reports that IS was in possession of chemical weapons stockpiles emerged in the past from time to time. The Russian Air Force said it had destroyed several chemical weapons facilities in IS-controlled parts of Syria, while the Organization for the Prohibition of Chemical Weapons (OPCW) maintained that the terrorist group may have produced and deployed sulfur mustard gas in both Syria and Iraq.



Hackers Penetrate, Control Water Utility

Source: https://i-hls.com/archives/69015



Mar 2016 – Hackers managed to gain privileged access to a water utility's control system and change "the levels of chemicals being used to treat tap water," *The Register* reports.

The attack was first documented in the Verizon Security Solutions IT breach report <u>using a pseudonym</u> for the company, Kemuri Water Company, without disclosing its location.

Kemuri was **attacked by a hacking group with ties to Syria**, according to the report, who exploited unpatched vulnerabilities in the company's internet-facing payment website. After gaining access, they infiltrated the utility's internet-connected operational control system, through which the hackers manipulated the valves controlling the flow of chemicals used to treat water before it's ready to be put into the general water-system.

Fortunately, despite changing valve settings at least twice, it appears the hackers' activity had no particular effect on the water. This is either due to the hackers not knowing how to operate the system in guestions, or due to them having no ill intent.

What this attack does demonstrate is the risible state of cybersecurity prevalent throughout the industry and at critical infrastructure facilities at large.

"Dedicated and opportunistic attackers will continue to exploit low-hanging fruit present in outdated or unpatched systems. We continue to see infrastructure systems being targeted because they are generally under-resourced or believed to be out of band or not connected to the internet," commented on the incident Monzy Merza, director of cyber research at Splunk.

"Beyond the clear need to invest in intrusion detection, prevention, patch management and analyticsdriven security measures, this breach underscores the importance of actionable intelligence. Reports like Verizon's are important sources of insight. Organisations must leverage this information to collectively raise the bar in security to better detect, prevent and respond to advanced attacks. Working collectively is our best route to getting ahead of attackers," he added.

The present state of cyber security at critical infrastructure installations is simply unacceptable. Hackers are more than capable of causing serious damage to a compromised facility if they choose to, as the recent breach at a German steel mill clearly demonstrates.

Vendors, operators, and regulators must step up their game, because in the fight against hackers, at this stage, they're not even in the running.



GAO Finds Progress, Challenges in DHS Management of Chemical Facility Security Program

Source: https://www.hstoday.us/federal-pages/dhs/gao-finds-progress-challenges-in-dhs-management-of-chemical-facility-security-program/

June 15 – The U.S. Government Accountability Office released a study on the Department of Homeland Security's progress in addressing challenges the GAO previously identified in managing the Chemical Facility Anti-Terrorism Standards (CFATS) program.

The GAO summarized the progress made and the challenges remaining in these key points:

- Identifying high-risk chemical facilities. In July 2015, GAO reported that DHS used self-reported and unverified data to determine the risk of facilities holding toxic chemicals that could threaten surrounding communities if released. GAO recommended that DHS better verify the accuracy of facility-reported data. DHS implemented this recommendation by revising its methodology so it now calculates the risk of toxic release, rather than relying on facilities to do so.
- Assessing risk and prioritizing facilities. In April 2013, GAO reported weaknesses in multiple aspects of DHS's risk assessment and prioritization approach. GAO made two recommendations for DHS to review and improve this process, including that DHS enhance its risk assessment approach to incorporate all of the elements of consequence, threat, and vulnerability associated with a terrorist attack involving certain chemicals. DHS launched a new risk assessment methodology in October 2016 and is currently gathering new or updated data from about 27,000 facilities to (1) determine which facilities should be categorized as high-risk because of the threat of sabotage, theft or diversion, or a toxic release and (2) assign those facilities deemed high risk to one of four risk-based tiers. GAO has ongoing work assessing these efforts and will report later this summer on the extent to which they fully address prior recommendations.
- Reviewing and approving facilities' site security plans. DHS is to review security plans and visit facilities to ensure their security measures meet DHS standards. In April 2013, GAO reported a 7- to 9-year backlog for these reviews and visits. In July 2015, GAO reported that DHS had made substantial progress in addressing the backlog—estimating that it could take between 9 and 12 months for DHS to review and approve security plans for the approximately 900 remaining facilities. DHS has since taken additional action to expedite these activities and has eliminated this backlog.
- Inspecting facilities and ensuring compliance. In July 2015, GAO reported that DHS conducted compliance inspections at 83 of the 1,727 facilities with approved security plans. GAO found that nearly half of the inspected facilities were not fully compliant with their approved security plans and that DHS did not have documented procedures for managing facilities' compliance. GAO recommended that DHS document procedures for managing compliance. As a result, DHS has developed an enforcement procedure and a draft compliance inspection procedure and expects to finalize the compliance inspection procedure by the end of fiscal year 2018.

▶ View the full report <u>here</u>.

Ohio Bust Seizes Enough Fentanyl to Kill Four Million People

Source: https://www.hstoday.us/subject-matter-areas/law-enforcement-and-public-safety/ohio-bust-seizes-enough-fentanyl-to-kill-four-million-people/

June 13 – Ohio officials announced Tuesday the seizure of enough fentanyl in one bust to kill more than four million people.

The 20 pounds of synthetic opioid with a street value of \$3.6 million were recovered by the Miami Valley Bulk Smuggling Task Force, which is part of the Ohio Attorney General's Ohio Organized Crime Investigations Commission.

Four suspects were arrested on drug trafficking charges: Aguilar Reyes-Espinosa of New Carlisle, Ohio, Omar Cantu-Garcia of Nuevo Leon, Mexico, David Cantu-Garcia of Nuevo



Leon, Mexico, and Pedro Medina, of Nuevo Leon, Mexico. Authorities also seized about \$100,000 in cash and a large stash of marijuana.



"We are certain that this investigation has saved lives by stopping this poison from getting to the streets and into the hands of those fighting addiction," said Ohio Attorney General DeWine. "Each day, my office and law enforcement agencies across the state are fighting hard against the drug epidemic, and we must continue to press forward in the battle against the drug cartels."

"The amount of fentanyl seized in this case is enough to kill millions of people," said Steve Francis, Homeland Security Investigations special agent in charge of Michigan and Ohio. "There is no doubt that a significant seizure like this one has saved the lives of many Ohioans. HSI is a proud partner of the Miami Valley Bulk Smuggling Task Force and is committed to the incredible work that is being done on behalf of the residents of Ohio."

The Miami Valley Bulk Smuggling Task Force, which includes local, state and federal officers and prosecutors, has seized 79 pounds of fentanyl, 122 pounds of heroin, 219 pounds of cocaine, 110 pounds of methamphetamine, 4,134 pounds of marijuana, and more than \$7 million in U.S. currency since its inception 2013.

ASAP V for Critical Infrastructure Protection Automated Chemical, Biological and Nuclear Threat Detection

Source: http://www.pastiche.ae/products-services/cbrn/asap-v/

Urban infrastructures worldwide are coming under increasing threat from vandals, gangs, and recently, terrorists. The ASAP V for Critical Infrastructure Protection is a modular, multisensor surveillance system designed for subways and other high-value/high-risk areas. Sensor modules are available that can detect a wide range of threats, from the presence of nuclear, biological and chemical agents, to smoke and fire.



ASAP V/CIP systems may be configured to uniquely match your particular concerns and budget. A nodal

approach is used that allows local or remote monitoring of a single suite of detectors or the monitoring of a number of nodes in different locations. Information from the individual nodes can flow to a central PC-based monitoring system via secure optical fiber, cell phone, Internet, Bluetooth, or other appropriate data linking technology. Research International can supply the following monitoring capabilities: NBC threats, explosives, smoke and fire, video and sound, intrusion, thermal imaging and meterological data.

Product Features

AIR SAMPLER:

- Air Collection Rate: 390 LPM using 30,000 hour life brushless fan.
- Particulates Range: 1 to 10 um.
- Air/Liquid Concentration Ratio: 78,000/min. nominal.
- Liquid inventory maintained at user- preset level independent of collection time, relative humidity, or temperature.
- Liquid Inventory: 4 to 5cc, nominal; continuously adjustable under computer control.
- Make-Up Water: System includes 8 L distilled water reservoir that provides fresh water needs for more than 5 days.

BIOINDENTIFIER:

- Detects virtually all bio-threats: Spores, bacteria, viruses and toxins
- Minimal or no sample pre-preparation
- Insensitive to most interferents. Has been used to test whole blood, urine, raw sewage, milk, and 10% meat slurries.
- Fast; 15-20 minutes per assay depending on analyte
- Sensitivity;Analyte dependent, 1 to 10 ppb typical for toxins, 100 to 100,000 CFU/ml for bacteria.
- All fluids and reagents stored onboard.

Typical Application

- Transit systems/subways
- Critical infrastructure protection
- Homeland security
- Air quality



ASAP V system installed in Kazan, Taterstan bus terminal.





Countering the Chemicals

By Andy Oppenheimer

Source: https://asianmilitaryreview.com/2017/10/countering-the-chemicals/

October 2017 – In the latter half of 2015 and early 2016, the Middle East remained the main theatre where CBRN (Chemical Biological Radiological Nuclear) threats are an ongoing threat, translated into reality by the Islamic State of Iraq and Syria (ISIS).

To this end, the organisation has employed mustard gas and chlorine in multiple attacks using bombs and mortars, mainly in Iraq throughout 2015 and into 2016. That said, any region is at risk from insurgent CBRN action and, as for protecting against incidents using such weapons, Asia-Pacific, European and North American countries are better-equipped than their Middle Eastern counterparts.

Under Threat

In February US Central Intelligence Agency Director John Brennan assessed that ISIS had used "chemical munitions on the battlefield" and cited reports that the group had access to chemical precursors (which can be used to make chemical weapons) and munitions, and had the ability to make small quantities of chlorine and mustard gas. According to leading Chemical Weapons (CW) expert Colonel (rtd) Hamish de Bretton Gordon, who provides CW advice to non-governmental organisations operating in Syria and Iraq, leading several missions to Syria to this end, ISIS has chemical weapons albeit in very small quantities, including mustard agent and Toxic Industrial Chemicals (TICs) like chlorine. Test results held by the Organization for the Prohibition of Chemical Weapons (OCPW), which verifies adherence to the 1993 Chemical Weapons Convention, revealed that ISIS used sulphur mustard gas against Kurdish



forces in Iraq in 2015 based on samples taken from 35 Kurdish *Peshmerga* fighters battling ISIS who became ill in August 2015 near the city of Irbil in northern Iraq.

CW expert Col. Hamish de Bretton Gordon analyses suspected chlorine samples on the Syrian border. Col. de Bretton Gordon is a leading authority on ISIS' use of chemical weapons. (Avon Protection)

Col. de Bretton Gordon sees more CW being deployed by ISIS to defend Mosul, also in northern Iraq. The city has been under ISIS occupation since

10 June 2014, and on 21 January 2016 Peshmerga forces and the Iraqi Army, with support from US air power, began attempts to liberate Mosul although at the time of writing (March 2016) ISIS remains in control of the city. ISIS has 'form' in this regard. The outfit used chlorine-laced bombs to defend Tikrit in northern Iraq which it occupied on 11 June 2014, during the Iraqi Army's liberation of the city in March 2015. Chorine causes more injuries than fatalities, but in areas with little available medical treatment, these injuries are often long-lasting. Col. de Bretton Gordon added, "ISIS also had the desire, but probably not the capability, yet to produce an Improvised Nuclear Device (IND). There is also unsubstantiated speculation that they are trying to develop a Biological Weapon (BW) utilising anthrax and possibly plague."

The importance of Mosul is that it houses facilities taken over by ISIS which were used for erstwhile Iraqi dictator Saddam Hussein's CW programmes, although Syria's chemical stockpile was a likely source of ISIS's sulphur mustard. Also at Mosul nuclear isotopes are housed that could be used for Radiological Dispersal Devices (RDDs), but not for INDs,



which require special weapons-grade nuclear materials notably uranium and plutonium. In mid-February reports emerged that ISIS had stolen radioactive material stored in a laptop-sized case from a storage facility near the southern Iraqi city of Basra. A RDD can be fashioned from civilian-use isotopes such as cesium-137 and cobalt-60, commonly used in hospitals and research centres. The material reported stolen is typical of civilian use, in this instance iridium-92, which is used in industrial gamma radiography to test flaws in materials used for oil and gas pipelines. It is classed as a 'Category 2' radioactive source by the US Nuclear Regulatory Commission, that is, it can cause permanent injury to a person in close proximity to it for minutes or hours, and could be fatal to anyone exposed for hours or over several days. If used in an explosive device, a prime problem is detecting if it has emitted radioactivity as the signs and symptoms of such an effect would not show up immediately unless first-responders are equipped and



trained to detect all types of radioactivity from a bomb explosion.

ISIS Targets

An improvised chemical device recovered by the Indonesian Police that had been planted in a supermarket in Jakarta by returning ISIS cadres. The country faces a clear and present danger from such individuals using CBRN. (Indonesian Police)

But the threat does not stop at the Middle East and Europe. Col. de Bretton Gordon puts Australia close to the top of the ISIS attack list, marginally behind Russia and France, since Australia became heavily involved in the global fight against ISIS

deploying the Royal Australian Air Force and the country's Special Forces to the United Arab Emirates in September 2014 to support operations against ISIS in Iraq. He described a chlorine bomb recovered by the Indonesian Police in late-March 2015 that had been planted in a supermarket in the capital, Jakarta, by returning cadres who had been fighting with ISIS in Syria. "The device shows a level of sophisticated construction, with two detonators and five kilograms (eleven pounds) of chlorine and acids." Col. de Bretton Gordon estimated this had not been acquired through the Internet but possibly from the northern Syrian city of Raqqa, or Mosul, where ISIS's CW programme is based.

Returning ISIS members from Afghanistan, Iraq, Syria or from other training camps elsewhere will have become 'sleeper cells' in Australia waiting for the opportunity to strike in an attack similar to those launched by Islamists in Paris in January and November 2015, or the hostage attack in Sydney in December 2014. In mid-2015 Australian foreign minister Julie Bishop warned of the use of improvised CW like chlorine, organophosphates (pesticides) and RDDs, saying later, "(ISIS') recruitment of highly technically trained professionals, including from the West, have revealed far more serious efforts in chemical weapons development."

Stepping Up

Therefore, pre-attack and post-attack procedures will become more prevalent in Australia and other Asia-Pacific countries under threat to demonstrate resilience to an attack. The Australian Government's Defence Science and Technology Organisation (DSTO) provides science and technology support to improve the Australian Defence Force (ADF, which includes the country's army, navy and air force) CBRN defence capability through the protection of personnel from the



strategic, tactical and physiological impacts of exposure to CBRN weapons and TICs. A new, purposebuilt laboratory is being built in Melbourne, due for completion later in 2016. This will enable the DSTO to



protection. The Australian Chemical, Biological, Radiological and Nuclear Data Center (CBRNDC) provides technical intelligence products and services to support law enforcement and it collects, collates, analyses and disseminates invaluable technical information and intelligence when CBRN agents are used.

Indigenous Protection

The Duram Dual-Blower Hood consists of a head covering with a panoramic front visor. It excels in its particularly high air-supply rate. The high air-supply rate and the simplicity of use make the blower hood suitable for people performing high-stress work. (Duram)

Australia's indigenous CBRN protection company, Duram Products, manufactures respirators, escape hoods and PPE (Personal Protective Equipment) suits for security forces, Special Forces and civilians. A mode of protection becoming more widely deployed is the escape hood. To protect against chemicals and toxic fumes, the new Duram Personal Escape Mask can be carried in pocket size pouches, designed as "one size fits all" with two filter assemblies to provide electrostatic particles filtering, and active charcoal specially impregnated to absorb acid gases with an optimal exhalation valve

which enables rapid exhalation and improves physiological conditions for the user. Protection is guaranteed for around one hour against toxic gases discharged in fires in modern buildings.



use scientific support to the ADF for CBRN defence.

The DST Group provides science and technology support to improve the Australian Defence Force's CBRN defence capabilities. Australia faces a tangible threat from ISIS' use of CBRN weapons on its territory. (Australian Department of Defence)

The mission of Australia's Special Operations Engineer Regiment (SOER) includes neutralising CBRN threats and the ability to respond both domestically and in support of Australian forces deployed overseas in highthreat environments. The ADF provides specialist CBRN advice and resources for detection, decontamination, rendering safe and recovery in Hazmat (Hazardous Materials) emergencies including analysis of CBRN material, personnel and civilians, and areas affected by CBRN materials. Its International Deployment Group utilizes the Specialist Response Group for particular medium- and high-risk planned operations or emergency incidents in addition to force

The Market

In terms of market expansion, according to the *CBRN Defence Market Report 2016-2026*, published by London-based research company Visiongain, overall world revenue for the prime CBRN defence sectors of detection, protection, decontamination, simulation and training is forecast to reach \$11,2 million in 2016 in the following client countries: Brazil, France, Germany, India, Israel, Japan, the Republic of Korea (RoK), the United Kingdom and the US, and in burgeoning markets in the People's Republic of China, Russia, Saudi Arabia and Turkey.

A leading company in the CBRN field, Battelle, focuses on developing state-of-the-art test and evaluation systems which are vital in the field and also for 'post-event' operations. Vice president and general manager of Battelle CBRN Matt Shaw said, "We go beyond the simple 'pass-fail" test approach and that is what makes us stand out. As the question of how to protect become more sophisticated, the tools being used to answer them, the test equipment, analysis and understanding, need to keep pace."



Battelle has developed a range of test and evaluation systems to help experts address CBRN incidents. Here, a Battelle employee applies chemical agent during swatch testing of military uniform fabric. (Battelle)

RoK Readiness

Out of countries facing real CBRN threats, the RoK is on constant alert in response to its northern belligerent neighbour. On 6 January the Democratic People's Republic of Korea (DPRK) announced it had successfully carried out its first underground test of a hydrogen bomb. The seismic analysis that led to this claim was, however, doubted by experts, including Rand Corporation analyst Bruce Bennett who said, "The bang they should have gotten would have been ten times greater than what they are claiming. So Kim Jong-un (the DPRK's Supreme Leader) is either lying, saying they did a hydrogen test when they did not, they just used a little bit more efficient fission weapon, or the hydrogen part of the test really did not work very well or the fission part did not work very well." The RoK's National Intelligence Service also stated that the blast "probably fell short" of a hydrogen detonation, which is vastly more powerful and technologically advanced than a fission bomb explosion.

Nevertheless, the January nuclear test was the fourth by the DPRK since 2006. According to US Director of National Intelligence James Clapper, in January the country restarted the plutonium reactor at the Yongbyon Nuclear Scientific Research Centre, north of the capital Pyongyang, which provides fuel for its nuclear weapons, and had taken steps towards



making an Intercontinental Ballistic Missile (ICBM), having launched a long-range rocket under the guise of its Bright Star-4 satellite launch on 7 February, soon after the January test. This was internationally condemned as the DPRK is banned under United Nations sanctions from using any ballistic missile technology.

DPRK Threats

The DPRK has also long-posed a serious CW threat. It is not a member of the Chemical Weapons Convention and, according to the RoK 2012 Defence White Paper, began producing CWs in the 1980s and has an estimated 2500 to 5000 tons in several facilities nationwide, as well as possessing the capability to produce BWs including anthrax and smallpox. For CBRN protection, the RoK imports much of its PPE and respirators from Avon Protection (UK), Optrel (Switzerland) and Apollo Safety (US). The threat of the DPRK's BW has prompted the US and the RoK to carry out joint defence exercises for biological warfare, codenamed ABLE RESPONSE, every year since 2011. These involve both countries' departments of defence and health, the US Department of Homeland Security, their disease control centres, and the US Federal Bureau of Investigation and Federal Emergency Management Agency (FEMA). This preparedness is also meant to deal with the possibility that pathogenic bacteria could accidentally spread from the DPRK, prompting the need to detect and to confine these organisms swiftly. Joint training exercises are also carried out by US Air Force (USAF) Bio-environmental Engineering, Emergency Management, and Republic of Korea Air Force CBRN teams, such as that held in August 2015 at Osan airbase in the northern RoK. Two groups within the USAF 51st Fighter Wing jointly responded to an improvised explosion as part of a week-long series of intense, integrated emergency response capability exercises for emergency managers from the 51st Civil Engineer Squadron and bioenvironmental engineers from the 51st Aerospace Medicine Squadron, and specifically designed for Hazmat emergency responders. According to the commander of the 51st Aerospace Medicine Squadron Major Jung Lee, "this training event focused solely on our areas of responsibilities, and allowed us to fully utilize our knowledge and skill sets without any interruptions. It is not intended for all military members or all emergency responders." Months earlier, in March 2015, soldiers from 20th CBRNE Command of the United States Army carried out a two-week exercise, KEY RESOLVE, in the RoK, with UN Command (the United Nations' unified command for multinational military forces supporting the RoK) troops from Australia, Canada, Denmark, France and the UK.

Japan

Japan has experienced the worst CBRN attack to date, when the doomsday cult Aum Shinrikyo released near-weapons grade sarin nerve agent on the Tokyo subway on 20 March 1995. Japan also experienced the nuclear disaster at the Fukushima Daiichi Nuclear Power Plant following the *Tsunami* which hit the western coast of Honshu Island in the Fukushima Prefecture on 11 March 2014. This was the world's worst nuclear disaster since the meltdown at the Chernobyl Nuclear Plant in the Soviet Union (now Ukraine) on 26 April 1986. The Fukushima disasters showed the vulnerability of nuclear power plants also to insurgent attacks. The environmental effects and psychological impact caused by the dispersion of, and contamination by, radioactive substances in the environment and food chain from the Fukushima accident has dwarfed anything that guerrillas could accomplish to date. But a physical or cyber-attack on a nuclear power station, and particularly on a spent fuel pond, could trigger an environmental disaster on this level.

At the military level, Japanese Self-Defence Forces (encompassing the country's sea, land and air forces) use protective masks and protection suits to prevent internal exposure, and cooperate with agencies to measure contamination and to transfer casualties in the wake of such disasters. The Chemical Defence Units of these services are equipped with chemical reconnaissance vehicles shielded from radiation and provide practical training for civil protection by local governments every year.

The sarin incidents spurred national agency defence against chemical attacks. Therefore the chemical protection, chemical detection, transportation of casualties, decontamination and medical activities overseen by the Chemical Defence Unit of the Japan Ground Self Defence Force (JGSDF) have been boosted. Enhanced cooperation between the armed forces and



related agencies also includes lending suitable chemical protection suits and dispatching liaison personnel from the Chemical Defence Unit. The Technical Research and Development Institute of the Japanese Ministry of Defence and the JGSDF are developing and procuring personnel protection equipment and detection technologies, with research and development into CBRN technologies, CBRN Threat Assessment Systems and equipment for CBRN decontamination, chemical agent surveillance, medical countermeasures for biological agents, new system for biological agent detection and CBRN reconnaissance vehicles.

Singapore

Among countries possessing gold standard CBRN defence capabilities, Singapore is in the forefront. Its Civil Defence Force (SCDF), under the purview of the Ministry of Home Affairs, mitigates hazardous materials incidents and provides fire-fighting, rescue and emergency medical services. The SCDF operates a collective protection sheltering system to complement an island-wide Public Warning System used to warn the public of military threats such as an air raid, and have hardened Metro rail transit stations to serve as civil defence shelters.

Singapore's Defence Medical and Environmental Research Institute (DEMRI) conducts research into force protection against CW and BW. During the SARS (Severe Acute Respiratory Syndrome) crisis in 2003, DMERI defence engineers launched the world's first precision temperature scanning system, effectively preventing the spread of the virus. This illustrates the 'all-hazards approach' now prevalent in many countries to defend not only against CBRN attacks and threats but those, with the potential to cause world pandemics, produced by Nature. Just as this preparedness approach is aimed at protecting populations from both deliberate and accidental attacks, all countries at risk have to become better-equipped and trained to deal with CBRN *modus operandi* which combine the bomb, the bullet and the machete along with hostage-taking and increasingly CBRN.

EDITOR'S COMMENT: An interesting tip from this article is the use of Avon's Escape Hood NH-15 in a chlorine contaminated environment (top photo).

Oracle Non-Contacting Gas Detector

Source: https://www.resrchintl.com/Gas_Detection.html

The Oracle is a non-contacting gas identifier with part-per-million sensitivity that requires no consumables and which is operable over a wide temperature range. It is essentially a long baseline infrared spectrometer that identifies gases by comparing their infrared (IR) signatures with a

built-in library of target gas signatures. A beam of infrared light from a remote source (it may be located up to 50 meters away) is intercepted and spectrally analyzed by a base station spectrometer. The unique vibrational spectra associated with the target gases or atmospheric reaction products enable high reliability identification. Figure in next page shows the Oracle installed in an ASAP V (p.46). However, the **Oracle may also be used as a stand-alone system.**

Advantages of this method are that it is fast (1 second to alarm), sensitive, specific, reliable, and requires no

consumables. In contrast to electrochemical detectors, the Oracle has a much lower chance of false readings due to cross-sensitivity, and there are no electrolytes to dry or leak out. In contrast to IMS gas detectors, Oracle's spectral signatures are generally more unique than IMS signatures and there is a smaller chance of misidentifying the target gas. In addition, there is negligible effect of humidity and there are no scrubber packs to periodically replace. Perhaps most importantly, the **Oracle is not a point sensor** - it will detect gases that pass anywhere between its remote light source and the main spectrometer receiver (max



50m). This means that the probability of detecting a toxic gas plume within the local area is significantly improved since the targeted gas does not have to contact either the remote light source or the instrument. This can also reduce the number of detection devices required for a particular application since area coverage per detector is greatly improved.



The device is provided with Ethernet connectivity. This means that each unit can be queried from anywhere in the world if the user knows the unit's IP address.

Typical Applications

- Transit systems and subways
- Critical infrastructure protection
- Sports stadiums and arenas
- Homeland security

CBS News: \$1.4M ISIS Cache Of "Jihadist's Drug" Seized, U.S. Says

June 18 - "U.S. allies in the war against the Islamic State of Iraq and Syria (ISIS) have found and destroyed



an massive cache of narcotics previously held by the jihadist group in Syria, the Pentagon said early Monday morning. The haul of 'Captagon,' an amphetamine-type narcotic often used by militants to stay awake and alert during prolonged battles, was worth an estimated \$1.4 million, according to the U.S. military's statement. The Pentagon statement said the allied Free Syrian Army group Maghawir al-Thowra found the drugs during anti-ISIS operations near al-Tanf, an area on

Syria's southeast border with Iraq, on May 31. 'Despite Daesh's façade of Islamic purity, its criminal terrorists are known drug users and traffickers,' the military statement said, referring to ISIS by an Arabic acronym. 'The cache included more than 300,000 pills of Captagon, an illegal drug frequently trafficked and used by Daesh members.'"



Eurosatory 2018: introducing Ouvry DEC POL emergency decontamination wipe

Source:https://www.armyrecognition.com/eurosatory_2018_official_news_online/eurosatory_2018_intro ducing_ouvry_dec_pol_emergency_decontamination_wipe.html

June 13 – The synergy of an ultra-absorbent material and targeted catalysts in the DEC'POL® Wipe decontaminates by transfer more the 99% of chemical and biological agents. The wipe destroys the absorbed contaminants, reduce cross-contamination and contaminated powder liberation risks, with no over-contamination by spreading.

In 2016, using technological innovations from scientific partnerships, Ouvry launched the DEC'POL® Mitt, a CBRN emergency decontamination device, natural prolongation of individual CBRN protection. This emergency decontamination mitt is based on the combination of absorption effects and targeted chemical and biological degradation by active agents.

The DEC'POL® material is made of an ultra-absorbant material in which catalysts that target chemical and biological toxics are embedded. DEC'POL® can absorb a wide range of contaminants before destroying them. It is not a powdery material and thus avoids cross-contaminations.

DEC'POL® was developed as a part of the RAPID-DGA plan (the Directorate General of Armaments). It is the successful outcome of the collaboration between research team of Ouvry, the Pharmaceutical and Biological Faculty of Claude Bernard Lyon 1 University, and the CEA of Grenoble (French Alternative Energies and Atomic Energy Commission) provisions.

Many research and studies on the degradation of Chemical Warfare Agents and pathogenic biologicals lead to the development of the DEC'POL® active agent.

The research paper Degradation of Paraoxon (VX Chemical Agent Stimulant) and Bacteria by Magnesium Oxide depends on the Crystalline Structure of Magnesium Oxide was published in 2016.

The DEC'POL® material is used in two products:

- The DEC'POL® Mitt: perfectly appropriate for individual and personal decontamination, DEC'POL® Mitt can be used by first-responders or not CBRN protected people: a special CBRN-agents-proof material protects the hand against contaminants absorbed by the mitt.
- The DEC'POL® Wipe: Developed to be used by CBRN-equipped first-responders and soldiers. More
 flexible, it is better suit for immediate decontamination of materiel and equipment (PPE, weapons,



surfaces with roughness, etc...). The compact packaging let soldiers to have it in their pockets at all times.

EUROPOL Te-Sat 2017: CBRN threats

Source: <u>https://www.europol.europa.eu/activities-services/main-reports/eu-terrorism-situation-and-trend-report-te-sat-2017</u>

To date, no large-scale CBRN attacks in the EU by any terrorist group have been reported. However, IS has significantly improved its capacity to produce explosives and improvised explosive devices through the adaptation of existing military ordnance stolen or retrieved from abandoned or conquered military facilities. There is concern that they have also accumulated knowledge to develop CBRN weapons that could later be used in attacks. In territories under its control, IS might have gained control of CBRN facilities (abandoned military and industrial facilities, laboratories or stockpiles) allowing access to



chemical agents. In addition, the group might have recruited, voluntarily or by force, scientists previously

working in the chemical, biological or radio-nuclear sectors. The Organisation for the Prohibition of Chemical Weapons–United Nations (OPCW-UN) Joint Investigative Mechanism confirmed that IS has used chemical weapons in Syria. Furthermore, in 2016, CBRN-related topics continued to appear in terrorist propaganda. Various jihadist media outlets used social media channels, in particular Telegram, to express intentions to commit CBRN attacks, share possible tactics for attacks and suggest targets. For

example, in May 2016, a jihadist tutorial on ricin toxin extraction, addressing lone actors, was published online.

Food contamination threats

Threats to intentionally contaminate food or water occurred in 2016, both in criminal and extremist contexts. In two cases, anarchists threatened to use toxic chemicals. In June, Italian anarchists threatened to poison foodstuff in supermarkets in Lombardy using herbicide. The campaign aimed to protest against the use of toxic chemicals in the agriculture, engineering and food production industries. Those anarchists posted a technical description of the methods to be used and a list of potential

targets on their website.

In December, Greek anarchists published a warning claiming that they had contaminated several food and drink products of multinational companies. Their operation, "Green Nemesis #2", was planned to take place between Christmas and New Year in Athens, Greece. The warning message posted on the anarchist website explained how to introduce chlorine and hydrochloric acid into products while leaving packaging intact. Similar threats to contaminate beverages were also expressed in December 2013.

Use of radioactive materials

In November 2016, several Slovak institutions including the Ministry of Justice, district courts and a regional police office, received suspicious envelopes containing anonymous letters. The letters expressed dissatisfaction with the judicial system and mentioned a lost court trial.

One letter referred to radioactive contamination and incidents in 2015 and 2016 when employees of various judicial institutions were exposed to radioactive material emitting alpha-particles. Further laboratory expertise confirmed the presence of small amounts of radioactive Americium-241

in the envelopes. The case was investigated by the Slovak authorities as an act of terrorism. This incident demonstrated that certain CBRN materials that are commonly used in various civilian applications, in particular radioactive substances, can be acquired by criminals or terrorists due to inadequate security measures.



Patriot® 5510 Hybrid Assault System

Source: http://www.wilcoxind.com/PATRIOTreg-Assault-System-P147.aspx



The PATRIOT Assault System is a modular, state of the art Land Based Hybrid Life Support System that



allows an individual to operate in containment levels (masked up) for an unprecedented **eight hours** before performing service. The Assault System utilizes low profile cylinders when a shorter on-target time is anticipated. The system delivers blower or non-blower assisted filtered air (PAPR Mode) or open circuit breathing gas (SCBA Mode) in this one integrated system.

Positive pressure air is delivered from the *PATRIOT*, utilizing the principle of a clean room, but within the operator's mask. If the facial seal is broken, clean air continues to feed the operator. The positive pressure also works as an anti–fog system, providing assistance in keeping the mask clear, allowing an improved field of view than offered by traditional breathing systems. The 2.5 liter breathing bag can be attached on either side of the *PATRIOT* to accommodate left or right handed marksman. A specially designed load bearing backpack system allows the operator to comfortably and securely carry the entire system.

The PATRIOT easily integrates with most current use

chemical masks. The system can also be operated as an Air Purifying Respirator (APR) or Supplied Air Respirator (SAR). The

PATRIOT has been tested to operate in CBRN contaminated environments and is



manufactured of chemically hardened high strength polycarbonate materials and aerospace grade aluminum for durability.

EDITOR'S COMMENT: The system is excellent but the adv photo is not (yellow circles).

Syria's chemical attacks: Smoke and mirrors, truth and lies

Source: https://www.aljazeera.com/programmes/listeningpost/2018/06/syria-chemical-attacks-smoke-mirrors-truth-lies-180624084208275.html

June 24 – Seen as one of the most contentious aspects of the Syrian war, the alleged use of chemical weapons has alternately shocked and confused media outlets and consumers alike.

Chemical attacks, said to be conducted by the Bashar al-Assad regime against rebel forces since 2012, have elicited the most widely broadcast footage of the war.

However, the legitimacy of footage procured, the motives of specific sources, news outlets and individuals, and the validity - and at times lack thereof - of the evidence put forward have all created an information war, with players battling to make sense of the "facts" at hand.

"We should be sceptical of everything coming out of Syria, because, at the end of the day, there's not people on the ground to actually know what's happening," says journalist and copresenter of podcast Unauthorized Disclosure, Rania Khalek.

"Reporters can't go in, civilians can't go out. So, internet videos are the only evidence of their suffering. All we're hearing is from biased sources, whether it be the Syrian government, or whether it be Western governments or insurgents on the ground who have been pushing for regime change. We should be sceptical of all allegations coming out of this war."

Writer at global news and current affairs publication Foreign Policy, Elias Groll, echoes Khalek's sentiment and cites the historical false claims of weapons of mass destruction in Iraq as a potentially equivocal comparison to what could be happening in Syria.

"The Iraq War is exhibit-A for why it is so important to critically evaluate these types of statements by the government," says Groll. "It shattered trust in government, it shattered trust in media, there was not enough critical reporting."

Max Blumenthal, journalist and editor of online news website the Grayzone Project, is of the opinion that regime change has taken precedence over the verity of the facts put forward.

"I cannot think of one pundit on the national scene, in cable news or in any major newspaper who has questioned the drive for regime change in Syria," says Blumenthal. "And so, it's really left to a small group of journalists and online activists to really sift through what we believe is disinformation from our own governments aimed at stimulating a war of regime change."

While the Syrian war remains one of the mostcovered military conflicts in the history of the world, propaganda, misinformation and denialism continue to create a labyrinth of truths and falsities for journalists to decipher. And it appears whether a more satisfactory explanation is available or not, the average consumer will continue to imbibe whatever information is easiest to digest.

"People generally have less time to read an 80page report from the United Nations," says Kristyan Benedict, campaign manager at Amnesty International. "They're going to pick the tweet which says, Jaysh al-Islam were responsible for the attack in Douma. And they're going to go with that because they have a sense that that's some information that they can run with. It's easily digestible. It's like the McDonald's of information."





Ebola vaccine drive launched in DRC as number of cases rise to 49

Source: http://www.homelandsecuritynewswire.com/dr20180522-ebola-vaccine-drive-launched-in-drc-as-number-of-cases-rise-to-49

May 22 – In a development that global health officials say is a turning point in how the world fights Ebola, vaccinators today began immunizing health workers in the Democratic Republic of Congo (DRC), the first stage of a ring vaccination strategy.

In other developments, four more illnesses were reported, along with another healthcare worker death, and more countries signaled financial support to help with the international response to the outbreak.

The launch of the vaccine campaign comes at the start of the World Health Assembly, the World Health Organization's (WHO's) decision-making body made up of delegates from 194 countries. WHO Director-General Tedros Adhanom Ghebreyesus in his opening speech today. spoke of his visit last week to the DRC's outbreak hot spot. He said he was proud of the WHO's response so far and thanked the WHO's global health partners for their quick actions.

"The outbreak in Bikoro illustrates again that health security and universal health coverage are two sides of the same coin. The best thing we can do to prevent future outbreaks is to strengthen healthsystems everywhere," Tedros said.

Vaccination begins with health providers

CIDRAP reports that in an update yesterday, the WHO said healthcare worker and ring vaccination began in the country's two Ebola hot spots, Mbandaka and Bikoro, both located in Equateur Province. It said Merck has provided the WHO with 8,640 doses of VSV-EBOV, the experimental vaccine furthest along in clinical trials that was shown to be highly effective in a phase 3 trial in Guinea at the end of West Africa's outbreak.

The unlicensed vaccine is being deployed on a compassionate use basis along with a clinical trial. Merck has donated the vaccine doses, and Gavi, the Vaccine Alliance has contributed \$1 million toward the vaccine campaign's operational costs.

On Twitter today, Peter Salama, the WHO's deputy director-general for emergency preparedness and response, said, "Today marks a turning point in how we deal with Ebola—we are moving from a strategy of containment to one of offering communities protection and care."

Seth Berkley, Gavi's chief executive officer, in the DRC today to see the launch of the campaign, said in a statement, "The DRC government, alongside the WHO, MSF [Doctors Without Borders] and others, are working hard to slow the spread of Ebola. We now hope that deploying the vaccine will give a vital boost to these efforts, helping to defeat this outbreak."

Of the WHO vaccine stock, 7,540 doses are slated for the DRC, enough for 50 rings of 150 people. Contacts and contacts of contacts are slated for voluntary vaccine, and health workers will regularly monitor those who are vaccinated. Frontline response workers will also be offered the vaccine, as will be health workers and responder in countries at risk for spread of the disease. An extra 8,000 doses will be available in the coming days.

Health teams with experience in Ebola vaccination from Guinea arrived in the DRC over the weekend to help with the DRC's campaign. The WHO said the ring vaccination strategy depends on tracing all contact and contacts of contacts as soon as possible after a case is confirmed. So far, more than 600 contacts have been identified, the WHO said.

The Africa Centers for Disease Control and Prevention (Africa CDC) said yesterday that it has recruited 25 epidemiologists to support teams working in the affected areas of the DRC.

The WHO said each vaccination team has one or two social mobilizers who will visit the community and explain the process to people who are eligible for vaccination. It also emphasized that although the use of the vaccine marks a milestone for controlling the disease, it is just one of several outbreak control steps, such as case finding, contact tracing, isolating sick patients, lab testing, infection control, and safe burials.



New cases lift outbreak total to 49

Salama today said the Ebola case total has grown by 4 more cases over the weekend, to 49 cases, reflecting 22 confirmed, 21 probable, and 6 suspected cases.

One more death has been reported in the outbreak, involving a nurse in Bikoro where the outbreak is centered, the Associated Press (AP) reported today, citing the DRC's health minister, Oly Ilunga.

So far it's not clear where the new cases are from, but health officials are worried about spread in Mbandaka, which has a population of 1.2 million, where four cases had been reported by the end of last week. Salama said in a May 19 tweet that three cases from Wangata health zone in Mbandaka were confirmed and that the fourth is a new suspected case that's not linked to the others.

A report from *The Atlantic* said inaccurate maps are stirring some confusion about the boundaries of the Wangata health zone where the Mbandaka patients are from.

So far, there's no evidence that the map problems are hurting the response, Cyrus Cinai, a cartographer from the University of California at Los Angeles who is working with the health ministry to improve map accuracy, told *The Atlantic*. Health officials in the DRC, however, said it's important to have good visualizations to communicate conditions on the ground to international partners who don't know the area and to get a clear grasp on where the outbreak is and how it's moving.

Support grows for outbreak response

Canada's government on 19 May announced that it will provide an additional \$2.5 million in emergency humanitarian assistance to help support organizations responding to the outbreak. Marie-Claude Bibeau, minister of international development, said in a statement, "Preventing further transmission of the Ebola virus is essential to controlling the current outbreak. This emergency funding will go directly to trusted humanitarian partners and enable health care workers and response teams to continue to quickly manage this outbreak."

Meanwhile, the *Washington Post* reported on 18 May that the United States is planning to provide several million dollars to support the DRC's Ebola outbreak, with details being finalized and an announcement expected early this week.

The WHO has said it and its partners need \$26 million for the Ebola response over the next three months.

The White House signals that bioterrorism and disease don't matter — again

By Kenneth W. Bernard

Source: https://www.washingtonpost.com/gdpr-consent/

May 22 – Has our national security leadership forgotten that, in 2001, <u>anthrax-laced letters killed</u> <u>five</u> and sickened 17 others in multiple states? Or that in 2014, <u>11 people were treated</u> for Ebola in the United States, resulting in two deaths and <u>widespread panic</u> that nearly shut down the city of Dallas? Or that <u>smallpox killed more people</u> in the 20th century than <u>all the wars</u> of that century combined?

Apparently so. In <u>eliminating</u> the Office of Global Health Security at the National Security Council, it seems these events have slipped the mind of newly installed national security adviser John Bolton. But he is not alone.

This marks the third time that the national security community, in both Democratic and Republican administrations, has downgraded the importance of disease and bioterrorism threats in the hierarchy of national security issues. This raises a question: What is it about international epidemics and biosecurity that so offend national security professionals that their default approach to the threat is to reorganize and eliminate it as a priority focus?

In 1998, I was finishing my posting as the international health attaché at the United Nations when Health and Human Secretary Donna Shalala assigned me to report to the Clinton White House — the first time a policy expert was sent to work full time on international health issues at the NSC.



At first, no one had much of an idea why I was there. But it became clear two years later when national security adviser Samuel R. "Sandy" Berger <u>explained</u> that global health threats had the potential to kill huge numbers, cross borders and destabilize whole regions. "To dismiss it as a 'soft' issue," Berger wrote, "is to be blind to hard realities."



A health care worker at a treatment center in Congo. (John Bompengo/AP)

Then in 2001, the incoming George W. Bush administration abolished the Health and Security Office, deciding it was not really the business of the National Security Council. Just a year later, after the 9/11 and the 2001 anthrax attacks, former Pennsylvania governor Tom Ridge, the president's homeland security director, <u>called me back</u> to reopen the White House Health and Security Office, and both the administration and Congress gave full staff and financial support to building the portfolio.

But, alas, after President Barack Obama was elected, the office was abolished yet again. In his second term, Obama eventually was convinced that creation of his <u>Global Health Security Agenda</u> and the unforeseen Ebola epidemic mandated the re-creation of a senior director for global health security — a position at the NSC that continued through the first year of the Trump administration.

So Bolton's decision is nothing new; it's just another repeated mistake of previous administrations.

By this action, the administration has broadcast that health, as a security issue, is unimportant. From my nearly 30 years in government dealing with these issues, I know what message it sends, and, more important, what message is heard around the world.

Why does this keep happening, one administration to the next? Mostly, it is tribalism. A functional disconnect exists between health and national security, and it is based on the innate differing interests and cultures of the security tribe and health tribe. By training and inclination, they just differ on what they perceive as priority issues.

But tribalism is no longer an acceptable justification for the White House downgrading leadership on the national security aspects of global epidemics and bioterrorism. We no longer live in the 20th century where international epidemic threats were relegated solely to public-health experts.

It is time to stop pretending health security is a soft issue just because some want it to be. Epidemic disease — whether natural, accidental or intentional — will predictably recur during this and future administrations, and it will affect whole populations and economies as well as individual lives. Leadership at the White House and the NSC is not the whole solution. But without it, we are fighting while handcuffed.



Kenneth W. Bernard served as a special assistant to the president for security and health during the Clinton and George W. Bush administrations.

Growing concerns about DIY gene editing

Source: http://www.homelandsecuritynewswire.com/dr20180523-growing-concerns-about-diy-gene-editing

May 23 – It is likely that you have heard about growing concerns regarding the rising popularity of do-ityourself (DIY) gene editing. From the <u>horsepox *de novo* synthesis</u> to public stunts at conventions where biohackers injected themselves with HIV treatment, it is becoming difficult to ignore why these actions are dangerous.

Saskia Popescu <u>writes</u> in *Pandora Report* that the concern regarding the DIY gene editing community is that there are very few restrictions or regulations surrounding what they can or cannot do in a homemade lab. Sure, you cannot go buy Ebola online, but you can start stitching together horsepox, which is pretty scary.

New York Times reporter Emily Baumgaertner writes:

The study's publication in the journal PLOS One included an in-depth description of the methods used and — most alarming to Gregory D. Koblentz, the director of the biodefense graduate program at George Mason University — a series of new tips and tricks for bypassing roadblocks. "Sure, we've known this could be possible," Dr. Koblentz said. "We also knew North Korea could someday build a thermonuclear weapon, but we're still horrified when they actually do it."

Baumgaertner points to several DIY biohackers who show an unsettling willingness to inject themselves with things they have made in their garage labs and that there are fundamentally large gaps in any kind of regulatory system. It is important to remember that the stop-gap measures in place, imperfect as they are, are for academic researchers, and do not pertain to those DIY'ers doing it at home.

Baumgaertner writes:

Authorities in the United States have been hesitant to undertake actions that could squelch innovation or impinge on intellectual property. The laws that cover biotechnology have not been significantly updated in decades, forcing regulators to rely on outdated frameworks to govern new technologies. The cobbled-together regulatory system, with multiple agencies overseeing various types of research, has left gaps that will only widen as the technologies advance. Academic researchers undergo strict scrutiny when they seek federal funding for 'dual-use research of concern': experiments that, in theory, could be used for good or ill. But more than half of the nation's scientific research and development is funded by nongovernmental sources.

Baumgaertner notes that there are those in the DIY community who want to ensure biosecurity/biosafety and are just experimenting, but even biohacker celebrity Josiah Zayner has admitted an accident could happen, which would lead to negative outcomes.

"Whether you're at home with your mail-order CRISPR kit or you are working on policies to implement regulations on the biotech industry, we can all admit that the potential for nefarious actors or laboratory accidents is one that warrants safety measures and a hardcore cultural evaluation within the DIY biohacking community," Popescu concludes.

— Read more in Emily Baumgaertner, "As D.I.Y. Gene Editing Gains Popularity, 'Someone Is Going to Get Hurt'," <u>New York Times</u> (14 May 2018); Gregory Koblentz, "The synthesis of horsepox virus and the failure of dual-use research oversight," <u>HSNW, 24 January 2018</u>; and watch the latest <u>BBC Radio5Live</u> with Rhod Sharp, in which Dr. Koblentz discusses genome editing, biodefense, CRISPR, and biosecurity issues.



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Biosecurity: Do synthetic biologists need a license to operate?

By Kostas Vavitsas

Source: http://www.homelandsecuritynewswire.com/dr20180523-biosecurity-do-synthetic-biologistsneed-a-license-to-operate

May 23 – A recent <u>article</u> in New York Times about DIY biology and biohacking sparked a vigorous discussion about biosecurity and regulation of synthetic biology.

The article starts with the rather sensationalist title, "As D.I.Y. Gene Editing Gains Popularity, 'Someone Is Going to Get Hurt'." In it Emily Baumgaertner explores DIY biology, with a particular take on security. Through personal stories and particular incidents, this story has a particularly negative tone, essentially portraying DIY biology as risky towards the practitioners and the society.

Advances in gene editing technology and the drop in costs make it possible for individuals to perform more sophisticated molecular biology experiments in private spaces. This hobby attracts <u>a variety of people</u> and has been hailed as <u>a way to democratize genetic engineering</u>.

However, a few recent stunts such as attempting to <u>self-edit to increase muscle</u> <u>content</u> or <u>gene-edit to reduce HIV virus content</u> raise concerns about what are the hazards of individuals with gene-editing capabilities.

A more dangerous scenario would involve the intentional or unintentional—creation of or modification of human pathogens (as shown by the <u>reconstruction of a horsepox virus</u> using commercially available DNA). Professor <u>George</u> <u>Church</u>, who was quoted in the *New York Times* article, warns that it is straightforward to enhance pathogens, and he mentions that "anyone who does synthetic biology should be under surveillance, and anyone who does it without a license should be suspect." Professor <u>Drew Endy</u> responded in a light tone, creating a "<u>Synthetic Biology License Generator</u>". But should you really need a license to do synthetic biology experiments?

Inadequate regulation frame

The <u>regulations that govern synthetic biology</u> are not designed for synthetic biology, and are inadequate to regulate newer gene editing applications (such as CRISPR editing). The current frame <u>focuses on genetically modified</u> products on not on the procedures to make

them. Also, there are different laws in Europe, US, and other countries, laws that mostly reflect the attitudes towards GMOs. Regulation is the first step towards responsible use of synthetic biology and biohacking; hobbyists should be aware of what is legal and safe to do and law enforcement should know what they should keep an eye for.

An easy—but extreme—option is to completely ban genetic modifications outside designated labs (citizen scientists in parts of Germany may face up to three years in prison for breaking that law). However, treating all genetic engineering the same, without differentiating between potentially dangerous and proven-to-be-safe experimentation is not optimal. This would stifle potentially interesting research findings outside mainstream laboratories, obstruct innovation, and feed public distrust for synthetic biology (perceived as a de facto obscure and inherently dangerous discipline). DIY biologists should continue their operations, educate themselves and the public, and explore the biological world. The communities are willing to cooperate with the authorities and their principles include transparency and openness.

Modifying organisms is not easy

Despite what is portrayed in the media, genetic engineering is not something that "any idiot can do." As Dr. Devang Mehta argues in a previous post, even doing simple experiments in bacteria can be tricky, even in fully equipped laboratories. Doing more elaborate and extensive modifications is practically impossible for anyone without years of experience and high-level training, and even then with high failure rates. Therefore, the creation and release of pathogens by ill-wishing individuals is not a considerable threat at the moment. That of course may change in the future, as automation and computer aided design advance.

Nevertheless, as knowledge and understanding of biological systems increase, so will our ability to counter potential biothreats more effectively. Crime prevention



should also be informed and be alert for different outcomes, and that can be achieved by adequate training and effective risk assessment.

Synbio community takes biosecurity seriously

The risk of dual use of synbio exists though. Synthetic biologists are aware of them, and include ethical and societal considerations in their research. Biosecurity sessions are common in synbio meetings (also see Eric van der Helm, "Biosecurity and synthetic biology: it is time to get serious," *PLOS* [22 August 2017]). The FBI gives a presentation and informs iGEM students yearly at the Giant Jamboree, while there are initiatives to <u>assess potential</u> <u>biothreats</u>. Gene synthesis companies <u>screen</u> DNA<u>orders</u> against parts from pathogenic organisms (though at-home gene synthesizers may remove this checkpoint). That is in stark contrast with cybersecurity for example, which developed after computer applications were well-embedded in our lives.

DIY biology has its role in synthetic biology. <u>It</u> reflects the culture of openness and transparency in the field, a feature that actually increases safety by including and addressing public concerns. Though it should be clear that some experiments cross the line (such as human experimentation or work with human pathogens), fear and unnecessary regulation burden can only backfire and hinder the advancement of biotechnology.

And I don't think that biohackers need a license; they need to be encouraged and allowed to cultivate transparency and a sense of responsibility within their communities. And so far they are doing a great job.

Konstantinos (Kostas) Vavitsas is a Postdoctoral Fellow at the University of Queensland, working on expanding the synthetic biology potential of cyanobacteria.

Human Vaccine to Be Developed for Deadly Nipah and Hendra Viruses

Source: http://www.newswise.com/articles/human-vaccine-to-be-developed-for-deadly-nipah-and-hendra-viruses

May 24 – Antibody therapy developed at the Uniformed Services University of the Health Sciences as a treatment against the Nipah and Hendra viruses has led to an agreement announced today between USU, the Henry M. Jackson Foundation for the Advancement of Military Medicine (HJF), Profectus BioSciences, Inc., and Emergent BioSolutions, Inc., for development of a human vaccine against the two deadly viruses. The USU-HJF Joint Technology Transfer Office licensed the technology, which is supported by the Coalition for Epidemic Preparedness Innovations (CEPI).

Dr. Christopher Broder, of USU, and Dr. Antony Dimitrov, of Profectus Biosciences, started their Nipah virus and Hendra virus collaboration in 2011 with support from the National Institutes of Health, Bethesda, Maryland. That pre-clinical Nipah vaccine support was critical in bringing this project to the current stage of development. As a next step in the Nipah vaccine development for use in people, Dr. Thomas Geisbert, a 2003 USU alumnus at The University of Texas Medical Branch at Galveston, and the Galveston National Laboratory, will conduct the preclinical studies at its biosafety level 4 facility. USU, HJF, and Profectus will collaborate on the development of a clinical assay for the evaluation of the anti-Nipah virus vaccine response.

"Based on the success of this vaccine technology against both Nipah virus and Nipah's close relative, Hendra virus, it is highly likely that the Nipah vaccine to be developed here will also work against Hendra virus," said Broder.

A new outbreak of Nipah has emerged in India's southern state of Kerala, with 10 deaths reported to date. Nipah's human-to-human transmission has been documented, and an initially small

outbreak could take the same course as the recent Ebola virus outbreak in West Africa. The public was introduced to Nipah virus through the medical thriller "Contagion," a 2011 film about a global pandemic. Nipah virus and Hendra virus, Nipah's close relative, emerged in the 1990s causing serious disease outbreaks in humans and livestock in Australia,



Malaysia, Singapore, Bangladesh and India. Recent Nipah outbreaks have resulted in acute respiratory distress syndrome and encephalitis, person-to-person transmission, and greater than 75 percent case fatality rates among humans. The viruses are found naturally in several species of Pteropid fruit bats (flying foxes).

The vaccine is based on Nipah virus and Hendra virus technology developed over more than 15 years by Broder and Dr. Katharine Bossart in the Department of Microbiology and Immunology at USU. Bossart, who is a graduate of USU's class of 2003 and founder/CEO of Integrated Research Associates, LLC, in San Rafael, Calif., developed the sG vaccine with Broder while a student in his laboratory at USU. The vaccine was evaluated in multiple animal models and was demonstrated to be completely protective against both Nipah virus infection and Hendra virus infection. In addition, Broder, in collaboration with Dr. Dimiter Dimitrov who is now a professor at the University of Pittsburgh, developed an antibody therapy as a treatment against Nipah and Hendra virus which is also in clinical development.

"In the movie *Contagion*, scientists frantically raced to invent a vaccine against Nipah virus. Fortunately, Drs. Broder and Brossart have already done that. This development agreement is a huge step forward." said Dr. Art Kellermann, dean of USU's F. Edward Hebert School of Medicine.

This antibody was given to the government of Queensland, Australia for humanitarian purposes and was later successfully tested in a Phase 1 clinical trial in that country. A formulation of this vaccine was shown to be effective in preventing Hendra virus infection of horses in Australia where the USU-HJF Office of Technology Transfer licensed it to Zoetis, Inc., who has marketed it since 2012.

The vaccine component is just a single protein from the virus known as the G glycoprotein which is produced in a soluble form (sG) in cell culture by genetic means and purified to exceedingly high levels. No virus or any infectious agent is involved in the production of the sG glycoprotein vaccine. "It is a single dose, extremely safe, simple and highly effective vaccine that has proven time and time again to provide complete protection against two incredibly deadly viral pathogens that are a biological threat to not only people but important livestock as well," said Broder.

"Since the vaccine is just a recombinant piece of the virus, it is a type of vaccine known as a subunit, thus making it extremely safe to use," Bossart said.

The Nipah and Hendra virus use the G glycoprotein to attach to and infect cells. Nipah and Hendra can infect and cause serious and often highly fatal disease in people and also in pigs, horses, cats, dogs, and several other animal species. When used as a vaccine, the immunized subject develops antibodies that bind to the virus' G glycoprotein and effectively neutralizes the virus preventing it from infecting cells within the host.

CEPI Awards \$25 Million Contract to Profectus BioSciences and Emergent BioSolutions to Develop Nipah Virus Vaccine

Source: http://cepi.net/news/cepi-awards-25-million-contract-profectus-biosciences-and-emergent-biosolutions-develop-nipah

May 24 – CEPI—the Coalition for Epidemic Preparedness Innovations—today announced a collaboration with Profectus BioSciences, Inc. and Emergent BioSolutions Inc. (NYSE: EBS) under which Profectus and Emergent will receive up to \$25 million to advance the development and manufacture of a vaccine against the Nipah virus, a bat-borne virus that can spread to both humans and livestock.

Under the terms of the Framework Partnering Agreement for the collaboration among the three parties, Profectus will receive development funding from CEPI for advancing its Nipah virus vaccine and Emergent will provide technical and manufacturing support for the CEPI-funded program. Emergent, through a separate agreement with Profectus, has an exclusive option to license and to assume control of development activities for the Nipah virus vaccine from Profectus. The international nonprofit organization PATH will also be working

with the consortium under a separate agreement with CEPI to work on clinical development. Nipah virus (NiV) and Hendra virus (HeV) are closely related



Paramyxoviruses that cause respiratory and encephalitis disease in a variety of animal hosts and in humans. The natural reservoir for these viruses is thought to be flying foxes (bats of the genus Pteropus) found in Southeast Asia and Malaysia. Human infection occurs after direct exposure to tissues and secretions from infected horses, pigs, and bats. There is currently no approved vaccine or therapeutic against either NiV or HeV. The primary treatment for human cases is intensive supportive care, and the mortality rate is high at approximately 75% of cases.

The Southern India state of Kerala is currently in the midst of a Nipah Virus (NiV) outbreak, where the virus has killed 10 people. These are the first documented cases in Kerala.

Previously unidentified, a 1999 NiV outbreak killed 105 people in Malaysia. In addition, more than one million pigs were slaughtered to stem the spread of the virus, which caused significant trade loss and market turmoil. Outbreaks occur annually in Bangladesh and have been reported numerous times in India (CDC). NiV has a 75 percent mortality rate . NiV is shed by bats in Southeast Asia and Malaysia and is transferred to humans via bat urine and saliva on fruit or from infected horses and pigs. It can also spread human-to-human.

Dr. Richard Hatchett, CEO of CEPI, said: "The current outbreak of Nipah in India, the government of which is one of CEPI's founders, demonstrates that this is a deadly pathogen that has already travelled thousands of kilometers, has serious epidemic potential and the ability to surprise us. This is the first funding agreement we have signed to develop a vaccine against Nipah and our partnership with Profectus, Emergent, and PATH represents a vital move forward in the global battle against this devastating disease."

The investment of up to \$25 million represents an innovative approach to funding vaccine development, unlocking research and development potential so that vaccines are ready for efficacy studies during an outbreak. The agreement will enable funding for development efforts over a five-year period.

Thomas Lynch, Chair and CEO of Profectus BioSciences, said: "Profectus gratefully acknowledges CEPI's leadership and funding of this strategic collaboration to rapidly produce a vaccine against the emerging Nipah virus threat. Nipah's human-to-human transmission has been documented, and any initially small outbreak could take the same course as the recent Ebola outbreak. With CEPI's support and the talents of these highly regarded global health innovation partners, we look forward to applying our expertise and technologies and leveraging our partnership with Emergent to rapidly advance our pre-IND vaccine candidate for Nipah virus as an effective countermeasure that will be positioned to save patients around the world from this devastating disease."

Daniel J. Abdun-Nabi, CEO of Emergent BioSolutions, said: "Emergent has a 20-year track record of success working with government and industry partners to provide life-saving medical countermeasures against identified biological agents particularly when a rapid response to an emerging outbreak may be necessary. We look forward to leveraging our expertise in advanced development and manufacturing, including our U.S. governmentdesignated Center for Innovation in Advanced Development and Manufacturing, which is designed to provide surge manufacturing capabilities during public health emergencies. We expect to work closely with Profectus enabling our companies to provide synergistic and complementary capabilities for a successful collaboration with CEPI."

Steve Davis, President and CEO of PATH, on the PATH-CEPI partnership: "PATH is delighted to partner with CEPI and leverage the end-toend capabilities of our <u>Center for Vaccine</u> <u>Innovation and Access (CVIA)</u>, particularly our success record in clinical development and scaling the introduction of new vaccines in lowresource settings. PATH looks forward to collaborating with CEPI to achieve our shared goals for epidemic preparedness by equipping the world with new tools to protect against these deadly threats."

About the Nipah Vaccine Development The vaccine in development is based on Nipah virus and Hendra virus technology developed beginning more than 15 years ago by Dr. Christopher Broder and Dr. Katharine Bossart at the <u>Uniformed Services</u> <u>University of the Health Sciences</u>

(USU). The vaccine was tested in multiple preclinical models and



licensed to Profectus BioSciences by <u>The Henry</u> <u>M. Jackson Foundation for the Advancement of</u> <u>Military Medicine</u> (HJF) to develop the human vaccine. Dr. Broder began a collaboration with Dr. Antony Dimitrov of Profectus BioSciences to develop the human vaccine with financial support from the United States National Institutes of Health. As a next step in the Nipah vaccine development, Dr. Thomas Geisbert, a Professor in the Department of Microbiology and Immunology at The University of Texas Medical Branch (UTMB) at Galveston National Laboratory (GNL), will conduct correlate of immunity studies at its biosafety level 4 facility; and HJF, USU, and Profectus will collaborate on the development of a clinical assay for the evaluation of the anti-Nipah virus vaccine response. <u>PATH</u> is responsible for the clinical development of the Nipah vaccine candidate. *"Based on the success of this vaccine"*

technology against Nipah and Nipah's close relative, Hendra virus, it is highly likely that the Nipah vaccine to be developed here will also work against Hendra virus," said Dr. Broder.

Designing Immune Tissues to Create Next-Generation Vaccines and Immunotherapies

Source: https://www.genengnews.com/gen-news-highlights/designing-immune-tissues-to-create-next-generation-vaccines-and-immunotherapies/81255850

May 24 – Scientists at the University of Maryland, College Park and Baltimore campuses say they are working to shed new light on how immune tissues could be designed and implanted to create next-generation vaccines or immunotherapies for a range of diseases, or serve as novel tools for the early diagnosis of cancers or other illnesses.

The team's review ("<u>Designing Natural and</u> <u>Synthetic Immune Tissues</u>") was published in the June print edition of *Nature Materials*.

"Vaccines and immunotherapies have provided enormous improvements for public health, but there are fundamental disconnects between where most studies are performed-in cell culture and animal models-and the ultimate application in humans. Engineering immune tissues and organs, such as bone marrow, thymus, lymph nodes and spleen, could be instrumental in overcoming these hurdles. Fundamentally, designed immune tissues could serve as in vitro tools to more accurately study human immune function and disease, while immune tissues engineered for implantation as next-generation vaccines or immunotherapies could enable direct, on-demand control over generation and regulation of immune function," write the investigators.

"In this Review, we discuss recent interdisciplinary strategies that are merging materials science and immunology to create engineered immune tissues in vitro and in vivo. We also highlight the hurdles facing these approaches and the need for comparison to existing clinical options, relevant animal models, and other emerging technologies."

"One day engineers might be able to design immune tissues for implantation into patients to generate the exact immune responses needed to fight a disease such as cancer without side effects," said University of Maryland (UMD) Fischell Department of **Bioengineering (BIOE)** associate professor Christopher Jewell. Ph.D., corresponding author on the paper and principal investigator of the BIOE Immune Engineering Lab. "These technologies might also create accurate immune tissue models that enable rapid screening of vaccines or immunotherapies outside the body."

Vaccines and immunotherapies provide benefits for human health, ranging from the eradication of diseases to improved outcomes for patients with cancer or autoimmune disease. But, there exists a fundamental disconnect between where vaccines and immunotherapies are studied—in cell culture and animal models—and their application to humans.

Scientists in the immunoengineering field are hopeful that engineered immune tissues and

organs—such as bone marrow, lymph nodes, and spleen—could be used as *in vitro* tools to more accurately study human immune function and diagnose disease.



Ultimately, immune tissues engineered for implantation could serve as vaccines or immunotherapies capable of on-demand control to produce immune responses tailored for specific infections or disease.

"The field of bioengineering has advanced to the point that we understand at least some of the ways in which chemistry and material properties-such as mechanical stiffness and 3D structure-impact immunological function and regulation," Dr. Jewell said. "The field is starting to put these two areas together to recreate very complicated immune functions, but much of the work thus far has been in controlled settings. As such, these advances could provide new opportunities anywhere in which the immune system is involved in either fighting or causing disease. This covers infection, cancer, autoimmunity, transplantation, and many other areas where great unmet medical needs exist."

"There are major important and imaginative advances highlighted by this review," added Jonathan Bromberg, M.D., Ph.D., professor of surgery and microbiology and Immunology at the University of Maryland School of Medicine, and a co-author of the Nature Materials paper. "First is the combination of immunologic and materials sciences approaches to guide and control the immune response. Second is the possibility of creating not only 'positive' vaccines that generate proinflammatory or curative immune responses for cancer or infectious diseases, but also 'negative' vaccines that prevent or curtail responses for autoimmunity or transplantation."

Current clinical translation of vaccines and immunotherapies is generally inefficient as it relies on trial-and-error methods and testing in cells and animals, then in humans, notes the research team. Even more, this approach does not provide a complete picture of how vaccines and immunotherapies will ultimately perform in humans, Dr. Jewell said. As such, engineered immune tissues could also serve as important tools for studying immune function outside the body.

"Researchers do a lot of work in cell cultures and animal models, but both have limitations," explained Dr. Jewell. "In the case of cell cultures, most often, researchers work with 2D cultures; but, everything in the body is threedimensional. And, if you're working with one or a few cell types in culture, the results could be very different from what they might be in the human body where there is a heterogeneous mixture of cells everywhere. This is significant because the types of immune responses that develop during disease are impacted by all of these characteristics."

Last year, Dr. Jewell's group demonstrated that, by controlling the local signaling environment in a lymph node, the specificity and effectiveness of an immune response throughout the entire body can be controlled without systemic exposure.

"The knowledge base in immunology, materials science, and engineering is sophisticated enough—and there are enough researchers working at the interface with sufficient momentum and cooperativity —that we're able to see that breakthroughs are possible," Dr. Jewell said.



Russia renewing development of Ebola-smallpox virus mix, Ukraine suggests

Source: https://www.unian.info/politics/10131959-russia-renewing-development-of-ebola-smallpox-virus-mix-ukraine-suggests.html

May 27 – Russia is returning to the Soviet-era development of a deadly Ebola-smallpox virus mix, according to a report by a Ukrainian delegation to NATO Parliamentary Assembly. Ukrainian delegation head Iryna Friz presented the corresponding report highlighting research and development efforts of Russian experts in biological and chemical weapons at the meeting of the NATO PA Committee on the Civil Dimension of Security in Warsaw, according to the press service of the BPP faction. "For at least the last three years, Russia has been conducting research on hemorrhagic fever viruses, in particular, Ebola and Marburg, claiming they are trying to develop vaccines. In fact, it's about their returning to a Soviet project of an **Ebola and**



smallpox virus mix, which is confirmed by the analysis of more than 5,000 tenders in public procurement and scientific activity of several Russian institutions managed by the Russian defense ministry. At the same time, another research organization has been actively ordering and conducting studies indicating development of new military-type poisonous substances with nerve gas properties. The corresponding report was handed over to the Alliance's Headquarters," Friz said. Read alsoPoisoned ex-Ukraine leader warns of Russia's "medieval policy" The Deputy believes that, taking into account the recent report by Lord Jopling (UK), it is necessary to also brief NATO PA members on the report focusing on the issue of chemical and biological weapons of mass destruction. "I do not exclude the prospect of this aspect being included in Lord Jopling's final report as another threat in the framework of Russia's hybrid efforts against other states," added Friz. As UNIAN reported earlier, Lord Jopling presented at NATO PA a report titled "2018 – Countering Russia's Hybrid Threats: An Update" providing a systemic analysis of a wide spectrum of hybrid threats coming from Russia. "The report presents rather clearly a map of the hybrid war Russia is waging against Ukraine as well as the means to counter the threat with NATO help," Friz wrote. She also recalled Lord Jopling's call for the Western countries to do their utmost to strip Russian plutocrats of opportunities to hide their dirty money in the West.



Little-known virus could become the next global pandemic

Source: http://www.homelandsecuritynewswire.com/dr20180529-littleknown-virus-could-become-the-next-global-pandemic

May 29 – A little-known virus discovered twenty years ago could become the next global pandemic.

A <u>recent outbreak</u> in South India has renewed interest in **Nipah virus**, a disease that generally spreads from bats or pigs to humans and kills nearly three-quarters of those infected. It has no vaccine and no cure. The virus has so far killed 11 in the current outbreak, with fourteen additional cases confirmed. It has many strains capable of spreading from person to person, which increases the chances of a strain emerging that rapidly spreads among South Asia's densely populated communities and beyond.

Among other Nipah research, Stanford scientists have illustrated <u>potential pathways</u> between people and bat secretions, shown <u>Nipah contaminating hospital surfaces</u> and piloted <u>a way of preventing</u> transmission. Stanford epidemiologist and Nipah expert <u>Stephen Luby</u> has co-authored recent work linking <u>changes in temperature</u> with the virus's spread from bats to humans and examining the impact of <u>behavioral changes</u> that reduce the likelihood of people consuming potentially virus-contaminated tree sap. Luby is also a senior fellow at the <u>Stanford Woods Institute for the Environment</u> and the <u>Freeman Spogli Institute</u> for International Studies.

Luby <u>spoke</u> with Rob Jordan of the *Stanford Report* about risks posed by the current Nipah

virus outbreak and interventions that could slow or halt its transmission.

ob Jordan: How might Nipah adapt to more efficient human-to-human transmission and thereby become a global pandemic threat?

Stephen Luby: It is conceivable that there is currently a strain of Nipah virus circulating among bats that, if it infected people, would efficiently transmit from person to person. So far, we have not identified such a strain.

Characteristics that might increase the risk of person-to-person transmission would be a virus that has a stronger tendency to move to the respiratory tract in high numbers. It is conceivable that the virus could acquire a mutation that would enhance this capacity. One concern is that anytime a virus infects a human, it is in an environment that selects for survival in that context.

Jordan: What role, if any, does land conversion have in altering the epidemiology of infectious diseases, including the emergence of novel infections such as Nipah?

Luby: The natural habitat for Nipah-carrying *Pteropus* bats is tropical forests. As these forests have been converted into agricultural

lands, the bats have sought out other sources of food. In Bangladesh, the virus moves from bats to people because the bats are licking fresh date palm sap and


so passing their saliva – which occasionally is infected with Nipah virus – on to people who drink the sap. Because of habitat loss, *Pteropus* bats in Australia are more likely to stay in suburbs where fruit trees are available, and people and horses are nearby. The bats have halted much of their annual migration because of habitat loss.

Jordan: Why are emerging diseases such as Nipah important to study?

Luby: Emerging infections have resulted in the most devastating infectious diseases that humanity has ever faced. These include HIV, tuberculosis, measles and smallpox. History has taught us that emerging infections can be major threats.

Jordan: How can the global community thoughtfully respond to the threat?

Luby: Both Ebola outbreaks and hospital-based transmission of Nipah illustrate that hospitals in low-income countries are important sites for transmission of potential pandemic organisms. We cannot predict which organism is likely to be the next pandemic, nor are we likely to have everyone vaccinated against these unknown threats. There has been much less enthusiasm for efforts to reduce the risk of transmission in

low-income country hospitals. This requires addressing difficult problems with adequate supplies, behavior and accountability. In addition to developing vaccines and drugs, improving conditions in health care facilities is a key step for reducing global risk. As an example, Lily Horng of Stanford has published nice work on the difficulty of implementing basic hand hygiene practices in Bangladesh hospitals.

Investing in research to develop and test new strategies for sustaining improved infection control practices in low-income country hospitals would be a particularly useful area for research. It would also be useful to enhance surveillance, so we have a better idea about where the human cases are occurring, how many there are, what strains are involved and what pathway the virus is using to infect people. Jordan: Nipah was discovered 20 years ago, and there is still no vaccine. Why?

Luby: Vaccine development requires large amounts of money. The number of people infected with Nipah is small, and so, until very recently, there has been limited investment in developing a vaccine. The <u>Coalition for</u> <u>Epidemic Preparedness Innovations</u> recently announced plans to fund the development of a human vaccine against Nipah.

Ebola response in Congo runs into community resistance

Source: http://www.homelandsecuritynewswire.com/dr20180529-ebola-response-in-congo-runs-into-community-resistance

May 29 – Ebola responders in the Democratic Republic of Congo (DRC) are revealing more about local practices and community mistrust, which in some instances are hampering the actions needed to curb the spread of the disease in the country's outbreak hot spots.

In another development, Kaiser Family Foundation (KFF) on Friday <u>said</u> the United States is playing a less prominent role in the response, a sign that suggests the international response is more prepared to tackle such outbreaks but also raises questions about the nation's mixed signals regarding global health security.

Responders face familiar foe in community mistrust

A representative from Doctors Without Borders (MSF) said at a news conference in Geneva that

a doctor and nurse were threatened by local people who accused the health workers of bringing the disease into the communities, while residents of another town blocked medics from testing the body of a person who died from suspected Ebola, Reuters reported today. Jean-Clement Cabrol, MSF's emergency medical coordinator, said the information campaign is under way, but it's still insufficient, and religious and traditional leaders need to be tapped more to help with the messaging. During West Africa's outbreak, responders faced similar challenges, sometimes even marked by violence. And the WHO and its partners deployed anthropologists and community messaging in the current outbreak's early days. The Reuters report also had more details about the two patients who



www.cbrne-terrorism-newsletter.com

left an Ebola isolation unit in Mbandaka, the heavily populated Equateur province capital. One was a woman who was taken to an evangelical church where she prayed with nineteen other people before returning to the hospital where she died the next night.

Health officials went to the church to vaccinate several people, according to the report.

In other developments, a Catholic priest has been isolated in Mbandaka with a suspected Ebola infection, Agence-France Presse (AFP) reported today, citing an anonymous source.

CIDRAP <u>notes</u> that health officials haven't announced any new outbreak totals. Last Thursday, the DRC health ministry said 12 people have died of the infection, and that there are 52 additional cases — 31 confirmed, 13 probable, and 8 suspected.

The DRC's health minister Oly Ilunga Kalenga on Friday tweeted pictures of himself receiving the experimental Ebola vaccine, given that he's a frontline health worker. "However, the most effective measures remain the respect of hygiene measures, the rapid management of cases, and the follow-up of contacts," he added.

KFF: Funds help fill gap, but policies send mixed signals

The United States has played much less prominent role in the latest Ebola outbreak, raising some questions about the nation's commitment to global health security but also reflecting that the global capacity to respond to such an outbreak has become much more robust following West Africa's massive outbreak, the Kaiser Family Foundation (KFF) <u>said</u> Friday in a policy brief.

The authors of the report spelled out key changes since West Africa's outbreak, including World Health Organization (WHO) reorganization, new leadership engaged in the response, and the group's creation of an emergency contingency fund. Also, the international community and global health groups have stepped forward with \$59.6 million in support for the DRC's outbreak, far exceeding the WHO's 18 May request of \$26 million to support its activities.

Other differences in the current outbreak—the largest involving Ebola since West Africa's epidemic—include the DRC's past experience managing Ebola outbreaks and the availability of an experimental vaccine to help battle the disease.

The United States engaged early in the response, especially the Centers for Disease Control and Prevention (CDC) with epidemiological and other support and USAID with technical assistance and support totaling \$8 million, an amount KFF said essentially filled the gap in the WHO's donor request.

Though the United States is not leading the response on the ground, it is providing valuable assistance at a time when cases have risen past 50, KFF said. "Today, the increased capacity of WHO to address Ebola outbreaks and its quick response in partnership with DRC mean that the current landscape, as well as the potential role for the U.S., may be quite different from four years ago."

However, recent U.S. policy has sent mixed signals about support for global health security, the authors note. Most of the emergency appropriation that Congress approved for West Africa's outbreak, with a chunk of funds earmarked for to help countries improve their capacity to respond to similar outbreaks, is set to expire at the end of the 2019 fiscal year, and the White House has submitted a proposal to cut remaining USAID funds by \$252 million, though Congress hasn't acted on it.

But the group noted that the White House did request an increase for global health security programs at the CDC for the 2019 fiscal year. "Taken together, these recent funding moves have created an air of uncertainty about the U.S. commitment to global health security more broadly, brought into stark relief in the midst of a new Ebola outbreak," KFF wrote.

Uncertainty over lack of US point person

The report also pointed out that though the DRC situation isn't as dire as West Africa in 2014, the US government hasn't designated a leader for its international outbreak response activities. The authors noted that the Trump Administration had appointed Tim Ziemer to lead biosecurity and global health efforts, but his position was recently eliminated in reshuffling within National the Security Council (NSC).

So far, no other NSC staff or the CDC director have made public statements, the report said, noting



that in comparison, senior Obama administration officials had highly visible roles. "Whether and how to designate a point person on outbreaks is a debate that predates the DRC Ebola outbreak, but the ongoing outbreak has added some urgency to this discussion," they wrote. Though the outbreak in the DRC is unpredictable, if it expands and crosses borders, responders will probably need more international assistance, which might come with a request for the United States to ramp up its engagement, the report concluded

Biosensor technologies to offer more effective approaches to disease treatment

Mibel Aguilar et al. Exploring Molecular-Biomembrane Interactions with Surface Plasmon Resonance and Dual Polarization Interferometry Technology: Expanding the Spotlight onto Biomembrane Structure. *Chemical Reviews*, 2018 DOI: <u>10.1021/asc.chemrev.7b00729</u>

May 25 – The inward and outward orchestration of cell life and death is made possible by the biomembrane's firm but malleable structure. However, this ability to ebb and flow with everything around it is what makes the nanostructure very difficult to observe.



Schematic diagrams of membrane-based biosensors (a) electrochemical biosensor and (b) optical biosensor

Until recently, researchers have been unable to see the whole picture when trying to understand what is going wrong on the surface of a biomembrane affected by disease. Now, new technology has opened up a new area of research that makes it possible to study how the biomembrane functions, including how it responds when a disease molecule attacks.

Monash Biomedicine Discovery Institute's Professor Mibel Aguilar leads a group that has pioneered the application of newly-developed biosensors, which can be used to study how the biomembrane responds to the binding of biomolecules. This technology makes it possible to study molecules whose effects are known to be linked to the interaction with a cell membrane, such as hormones and antibacterial agents. "We can then design new molecules that help biomembranes resist disease molecule

attacks or avoid unwanted side effects of a drug," Professor Aguilar said.

"We can also design other molecules that can enter and even destroy the biomembrane, such as agents that could preferentially kill invading organisms. This could be a useful way



to design novel anti-infective drugs by selectively targeting unwanted invading cells," she said.

In a paper published today in *Chemical Reviews*, Professor Aguilar and her team provide the first authoritative review of the field of **membrane-based optical biosensors** and chart the development of biosensor technologies. The review also highlights the capabilities of these new biosensors, including the ability to measure how strongly and how rapidly something -- like a disease -- can bind to the biomembrane, and more importantly, the ability to allow researchers to observe how the biomembrane reacts when molecules bind to it and try to penetrate the cell.

"This review highlights the impressive capabilities of biosensor technology," Professor Aguilar said.

"This technology will have significant impact on our ability to design more effective approaches to the treatment of diseases associated with membranes interactions, including cancer, cardiovascular disease and bacterial resistance," she said.

Special Operations Forces Are Changing Combat Medicine With Jury-Rigged Hospitals and Freeze-Dried Blood

By Patrick Tucker

Source: https://www.defenseone.com/technology/2018/05/special-operations-forces-are-changing-combat-medicine-jury-rigged-hospitals-and-freeze-dried-blood/148522/

May 27 – Get shot or wounded within an hour of a hospital and your chances of survival are a lot better than if you were farther away. But for U.S. Special Operations Forces and their partners, "farther away" is where the fighting happens, sometimes hundreds of miles from the nearest friendly hospital. So they're



closing the gap in places like Syria using jury-rigged emergency rooms that fit on the back of trucks and lots of freeze-dried, powdered blood.

James Smith, the acquisition executive for U.S. Special Operations Forces Command, or SOCOM, described a recent incident in Syria. U.S. troops were supporting a partner military fighting "well outside of the golden hour" — meaning more than an hour away from a useful hospital.

But the U.S. forces had a Mobile Technical Repair Complex, or <u>MTRC</u> — basically a tent that comes with a lathe, some drilling equipment, and 3D printer to rapidly manufacture tools or parts you might need. SOCOM has 13 such complexes deployed in remote places around the world, along with technicians and engineers to run them.

To help the partner force in Syria, the MTRC crew welded together two transportable sleeping units and put them in the back of a flatbed truck, along with packets of freeze-dried blood. Soldiers maneuvered the makeshift medical facility to within a couple hundred meters of the front lines, Smith said during the annual SOFIC conference in Tampa, Florida, this week.



"These guys with their surgical teams, our Operational Detachment Alphas have great medical capability just with the physician assistants that are part of the teams," he said. "They were doing combat medicine within a few hundred meters" of the fighting he said, and "well within the golden hour in support of this partnered force."

The use of freeze-dried plasma is likely to become common on future battlefields. The French and German militaries use it already. The U.S. Army is working on its own version, which will need FDA approval before it sees widespread use by American forces.

USSOCOM got special permission to use a French-produced freeze-dried plasma product from a company called Teleflex, with a small number of teams in very, very tough environments, said Smith, which they've been doing for years. The AP reported in November that U.S. Special Forces had used the plasma 24 times in five years. Some 15 of those patients lived long enough to be transferred to a hospital.

"You can't carry plasma around on battlefields and into remote austere locations. You've got to keep it refrigerated; keep it fresh. But when you use freeze-dried plasma and you can reconstitute it with water," he said."You take that in combination with these mobile technology repair complexes, these shops in a box that we have. all of a sudden you've got something that can save lives."

But even the French freeze-dried blood doesn't quite fit their needs because it comes in glass containers, not quite suitable for desert gunfights. Smith says that SOCOM's experiences will likely help the Army in its pursuit of FDA approval for a product that is, perhaps, still years away from seeing wide use.

Patrick Tucker is technology editor for Defense One. He's also the author of <u>The Naked</u> <u>Future: What Happens in a World That Anticipates Your Every Move? (Current, 2014)</u>. Previously, Tucker was deputy editor for The Futurist for nine years. Tucker has written about emerging technology in Slate, The Sun, *MIT* Technology Review, Wilson Quarterly, The American Legion Magazine, *BBC* News Magazine, Utne Reader, and elsewhere.

An evaluation of emergency guidelines issued by the World Health Organization in response to four infectious disease outbreaks

By Susan L. Norris, Veronica Ivey Sawin, Mauricio Ferri, Laura Raques Sastre and Teegwendé V. Porgo (May 30, 2018)

Source: http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0198125

The production of high-quality guidelines in response to public health emergencies poses challenges for the World Health Organization (WHO). The urgent need for guidance and the paucity of structured scientific data on emerging diseases hinder the formulation of evidence-informed recommendations using standard methods and procedures.

Objectives

In the context of the response to recent public health emergencies, this project aimed to describe the information products produced by WHO and assess the quality and trustworthiness of a subset of these products classified as guidelines.

Methods

We selected four recent infectious disease emergencies: **outbreaks of avian influenza A—H1N1 virus** (2009) and H7N9 virus (2013), Middle East respiratory syndrome coronavirus (MERS-CoV) (2013), and Ebola virus disease (EVD) (2014 to 2016). We analyzed the development and publication processes and evaluated the quality of emergency guidelines using AGREE-II.

Results

We included 175 information products of which 87 were guidelines. These products demonstrated variable adherence to WHO publication requirements including the listing of external contributors, management of declarations of interest, and entry into WHO's public database of publications. For guidelines, the methods for development were incompletely



reported; WHO's quality assurance process was rarely used; systematic or other evidence reviews were infrequently referenced; external peer review was not performed; and they scored poorly with AGREE II, particularly for rigour of development and editorial independence.

Conclusions

Our study suggests that WHO guidelines produced in the context of a public health emergency can be improved upon, helping to assure the trustworthiness and utility of WHO information products in future emergencies.

Clade X pandemic exercise: Preventing the worst outcomes in future pandemics

Source: http://www.homelandsecuritynewswire.com/dr20180531-clade-x-pandemic-exercise-preventing-the-worst-outcomes-in-future-pandemics

May 31 – The outbreak of a moderately contagious and moderately lethal novel pathogen precipitated a catastrophic end to the scenario in Clade X, the day-long pandemic tabletop exercise hosted by the Johns Hopkins Center for Health Security. The scenario opens with the present-day outbreak of a new, serious respiratory disease in Germany and Venezuela. Clade X quickly causes widespread, worldwide anxiety as case counts and deaths mount. Within a year, 150 million people die from the disease—15 million in the United States alone.

The outbreak of a moderately contagious and moderately lethal novel pathogen precipitated a catastrophic end to the scenario in Clade X, the day-long pandemic tabletop exercise hosted by the <u>Johns</u> <u>Hopkins Center for Health Security</u> on 15 May in Washington, D.C.

<u>Clade X</u> simulated a series of National Security Council–convened meetings of ten U.S. government leaders, played by individuals prominent in the fields of national security or epidemic response. Their dialogue as the scenario unfolded addressed significant uncertainties in current prevention and response capabilities, hamstrung by policy challenges at the federal level.

The scenario opens with the present-day outbreak of a new, serious respiratory disease in Germany and Venezuela. Soon after, Clade X is identified as a novel strain of human parainfluenza virus with genetic elements of Nipah virus. In the weeks that follow a fringe group bent on reducing the human population claims responsibility for the creation and intentional release of the disease. Authorities confirm those claims and verify that the novel strain was indeed engineered by the group's scientists. There is no vaccine, and pressure grows as pockets of cases appear in the United States. Clade X quickly causes widespread, worldwide anxiety as case counts and deaths mount. Within a year, 150 million people die from the disease—15 million in the United States alone.

At the conclusion of the exercise, the Center presented six strategic policy goals needing commitment from the United States to prevent or reduce the worst possible outcomes in future pandemics. Those recommendations are:

- 1. Develop capability to produce new vaccines and drugs for novel pathogens within months not years.
- 2. Pioneer a strong and sustainable global health security system.
- 3. Build a robust, highly capable national public health system that can manage the challenges of pandemic response.
- 4. Develop a national plan to effectively harness all US healthcare assets in a catastrophic pandemic.
- 5. Implement an international strategy for addressing research that increases pandemic risks.
- 6. Ensure the national security community is well prepared to prevent, detect, and respond to infectious disease emergencies.

A full description of each policy recommendation is available on the <u>Clade X website</u>, along with <u>video</u> recordings of the four exercise segments.

Johns Hopkins <u>says</u> that in the weeks ahead, the Center's Clade X project team will synthesize the most important points from unscripted discussions among players during the exercise and disseminate those findings widely among members of the U.S. and international biosecurity policy communities.



— Read more in Antonio Regalado, "It's fiction, but America just got wiped out by a man-made terror germ," <u>Technology Review</u> (30 May 2018).

Winners announced in \$300K biothreat prize competition

Source: http://www.homelandsecuritynewswire.com/dr20180531-winners-announced-in-300k-biothreat-prize-competition



May 31 – The Department of Homeland Security (DHS) Science and Technology Directorate (S&T) the other day announced the grand prize winner of its \$300,000 <u>Hidden Signals Challenge</u>. The prize competition, issued in collaboration with the Office of Health Affairs <u>National Biosurveillance Integration</u> <u>Center</u> (NBIC), called for the design of an early warning system to keep communities safe by using existing data sources to uncover emerging biothreats.

The Computational Epidemiology Lab at Boston Children's Hospital will receive the grand prize of \$150,000 for their proposed solution called Pandemic Pulse. This system provides a dashboard that integrates Twitter and Google Search data with infectious disease monitoring tools, Flu Near You and HealthMap, to detect biothreat signals. The tool filters data based on pathogen category, information source, and transmission mode, using a tiered evaluation method.

"By exploring these untapped data sources we aim to improve how city-level operators make important public safety decisions," said William N. Bryan, DHS Senior Official Performing the Duties of Under Secretary for Science and Technology. "The grand prize winner and runner-up have strong system designs that harness streams of information in a manner that could allow us to identify an emerging problem faster."

The runner-up solution, **Pre-syndromic Surveillance**, submitted by Daniel B. Neill and Mallory Nobles of Pittsburgh, Pennsylvania, will receive \$50,000. This system integrates emergency department chief complaints with data from health clinics and social media to discover outbreaks that do not correspond with known illnesses. The team is piloting a working prototype with New York City's Department of Health and Mental Hygiene and other city agencies.

S&T says that a panel of seven judges with expertise in bioinformatics, biological defense, epidemiology, and emergency management helped to select the grand prize winner and runner-up for Stage 2 of the Challenge. In Stage 1, <u>five finalists</u> received \$20,000 each and refined their submissions during the Virtual Accelerator.

"The Pandemic Pulse system utilizes digital exhaust of syndromic data to detect and monitor biothreats. The signals from various informal monitoring sources will be utilized in a sensitivity-driven layered approach for detecting and presenting signals from well-known, to



less-familiar biothreats," said Dr. John Brownstein, Director of the Computational Epidemiology Lab at Boston Children's Hospital. "Participating in the Hidden Signals Challenge was extremely exciting and interesting. Mentorship from some of the best in the field and access to informative online resources made our participation extremely rewarding and efficacious."

Ebola vaccine: What took so long?

By Christopher K. Brown

Source: https://thebulletin.org/ebola-vaccine-what-took-so-long11861

May 31 – In a typical Ebola outbreak, the fatality rate is often 30 percent or more. Tens of thousands of people have contracted the disease since it was discovered in 1976, with the bulk of the cases recorded during the 2014– 2016 West African epidemic. Many calendar years have seen at least a handful of people sickened with this frequently fatal disease. So why is a vaccine just now reaching the public in Africa?

This question is especially pertinent because a new Ebola outbreak is under way in the Democratic Republic of the Congo. More than 50 cases of the disease have been reported so far, including several in Mbandaka, a city of about 1.2 million people. Preventing the spread of the virus from infected individuals to their close contacts, including in densely populated areas and in Ebola treatment centers, is crucial to arresting the outbreak. One critical new tool for controlling the disease is an experimental vaccine against Zaire ebolavirus, the species that causes most human Ebola cases, including those associated with the current outbreak. About 7,500 doses of the vaccine are available. or soon will be, to the public health authorities working feverishly to contain the spread of the disease. The deployment of the vaccine is good news-but again, why has it taken decades for an experimental vaccine to reach the site of an Ebola outbreak?

Vaccine development is a complex process. It involves both public and private partners and requires that a variety of funding issues be considered. Competing <u>market forces</u> influence how a vaccine project advances—from discovery to laboratory and clinical trials, and later to registration, regulatory approval, and large-scale manufacturing and implementation. Is a particular disease a high-enough priority to warrant investment in vaccine development in the first place? Can available technology address the challenges of identifying vaccine candidates? These questions, among others, are germane to almost all vaccine projects past, present, and future. In the case of forthcoming vaccine candidates for Ebola virus, investment considerations and political realities likely played a significant role in the slow development of a market-ready Ebola vaccine.

Technology: Not the main barrier

Importantly, difficulties in identifying effective vaccine candidates are not the major reason that no licensed Ebola vaccine yet exists. By no means is this to say that vaccine discovery is simple; to the contrary, it's hard.

Vaccine discovery is the process of identifying a pharmaceutical formulation that can confer immunity to a disease, or at least reduced susceptibility to it, without causing the disease itself or producing too many adverse side effects. Scientists must find a target to work on-for example, a suitable surface protein or piece of genetic code that can trigger an appropriate immune response. They must also identify a viable delivery vehicle, such as a killed or weakened pathogen or a benign organism that can carry the immunity-inducing material into the body. Generally speaking, the technology to achieve these aims is within reach. Dozens of safe, effective vaccines are readily available, especially in the developed world, including for serious diseases such as anthrax and smallpox. Hundreds more projects in vaccine research and development are under way in laboratories around the world.

For Zaire ebolavirus, a potential vaccine has been in existence for about 15 years—but this promising vaccine candidate hasn't yet been fully vetted through clinical trials and is still not ready for widespread use. Work on

a second potential vaccine, conceived a few years before the 2014–2016 epidemic, made it only



as far as early clinical trials during the West African crisis a few years ago.

In the early 2000s, a team of scientists at the Public Health Agency of Canada aimed to verify the results of a study involving Ebola's outer protein and sugar coating—its surface glycoprotein. The scientists devised a <u>method</u> for replacing the glycoprotein of the relatively harmless vesicular stomatitis Indiana virus (VSV) with that of the *Zaire ebolavirus*. But when the scientists inoculated mice, and eventually macaques, the animals showed immunity to Ebola. The researchers realized that they had inadvertently created a <u>vaccine</u> that could replicate within an animal's body—that could trigger both humoral and cellular immunity, without resulting in pathogen replication.

Separately, before the 2014–2016 Ebola epidemic, scientists at GlaxoSmithKline—a large British drug company—had begun engineering a chimpanzee adenovirus to produce Ebola virus glycoprotein. That vaccine, known as cAd3-ZEBOV, produces an immune response similar to that of the VSV-based vaccine and causes the body to recognize and resist Ebola virus infection.

Within a couple of years of the discovery of the VSV-based vaccine (known as rVSV-EBOV), Canada licensed it to BioProtection Systems, a subsidiary of US biopharmaceutical company NewLink Genetics Corporation. But the vaccine made little progress toward the market-at least until 2014, when the West African Ebola outbreak reinvigorated the effort. In that year, NewLink entered into an agreement with drug giant Merck to manufacture and distribute the rVSV-EBOV vaccine-which is being used to contain the current Ebola outbreak. Since its reboot, the VSV-based vaccine has continued to advance toward readiness for widespread use: Phase III clinical trial data have shown that it offers "substantial protection" against Ebola.

Meanwhile, as new cases in the 2014–2016 West African epidemic subsided, so did work on the cAd3-ZEBOV option. According to the National Institute of Allergy and Infectious Diseases, the <u>decline</u> in Ebola cases made it impossible to carry out the large studies that were originally planned as part of phase III trials.

Return on investment?

The slowdown of the 2014-2016 epidemic, however, doesn't fully explain why work on possible Ebola vaccines has sometimes stalled. or failed to start. Another issue is the perception, if not the real risk, that drug companies will earn a small return on their investments in markets where vaccines are needed most. With minor exceptions in the United States, Italy, and Spain during the epidemic earlier this decade, natural transmission of Zaire ebolavirus has occurred almost exclusively in Africa. (Twice, Russian researchers have been infected while working with the virus in laboratories.) Yet nations such as the Democratic Republic of the Congo, Liberia, and Guinea-the countries with the greatest number of total Ebola cases-have limited ability to purchase vaccines, much less contribute to the hundreds of millions of dollars required to bring a new vaccine to market. As it stands, funding for research and development comes mostly from governmental agencies in the United States, Canada, the United Kingdom, Switzerland, and EU nations, as well as from multinational organizations supported by those countries. In developed countries. nongovernmental organizations such as the Bill and Melinda Gates Foundation and the Rockefeller Foundation also support vaccine research and development.

Many of the biggest drug companies are based in the same nations that provide the greatest support for research and development. Indeed, once an effective vaccine candidate is identified. a key factor in advancing it to market is identifying corporate partners with the resources to fund animal studies and clinical trials, as well as the manufacturing capability to produce the vaccine in large quantities. Only a limited number of large drug companies—or, in some cases, partnerships between drug companies and smaller biotechnology firms-have such resources. These firms can only support the development processes—especially during the research and development phase-of a limited number of vaccines at one time.

When a vaccine is ready for production and delivery, there must be customers to buy it. Historically, heavy government investment—including large purchases for emergency stockpiles—has enabled production of vaccines for rare



diseases. The anthrax vaccine BioThrax, for example, has been propped up largely by funding from the US government, which purchases millions of doses for the Strategic National Stockpile. In 2016, the Centers for Disease Control and Prevention signed a contract worth almost \$1 billion with Emergent BioSolutions to deliver more than 29 million doses of the vaccine through 2021. Another contract, awarded by the Biomedical Advanced Research and Development Authority, added \$100 million in support for the BioThrax manufacturer. But Ebola virus-compared to Bacillus anthracis, the bacterium that causes anthrax-is not as easily stabilized (or weaponized) for environmental dissemination, such as might be accomplished over a wide area through use of an aerosol. Thus nations less likely are much to stockpile countermeasures against Ebola than against anthrax, especially if they lie outside Africa, where the Ebola virus is endemic.

These resource limitations force prioritization of diseases: Which ones warrant the resources required to produce an effective vaccine? When the funders of research and development efforts spend taxpayer dollars, a vaccine's benefit to those taxpayers certainly factors into the decision-making process. Government agencies may be less apt to support development of vaccines for Ebola than, for example, influenza, which sickens and kills many thousands more people at home each year than Ebola kills abroad. In the United States, the Centers for Disease Control and Prevention estimates that 9 to 36 million cases of flu occur annually, resulting in 12,000 to 56,000 deaths each year. In most years, there are no Ebola cases in the United States; excluding medical evacuations to US hospitals, only four cases were reported in the United States during the 2014-2016 West Africa epidemic. Even with this vast difference in disease-specific morbidity and mortality, there is still no universal influenza vaccine; the formulation must be changed each year based on epidemiological forecasts of which viruses are likely to circulate during flu season. Is it a smart investment for the United States to pour half a billion dollars into an Ebola vaccine when so many of its own people are infected with influenza viruses each year?

Even comparing Ebola to other diseases that disproportionately affect African countries, it is hard to argue that Ebola is, or ever has been, the best disease on which to focus vaccine research and development resources. Malaria. a febrile illness caused by parasites and spread by mosquito bites, is a vivid example. Most years witness only isolated Ebola outbreaks in Africa, in which a handful of people are infected and killed, but malaria kills close to half a million people each year, with at least four times that number experiencing non-fatal infections. Africa bears 90 percent of that burden. Although a malaria vaccine exists, it is only effective up to about 50 percent of the time. HIV/AIDS also kills many hundreds of thousands more people in Africa each year than does Ebola. The World Health Organization estimates that three in four people who die from HIV-related causes are African, with about 800,000 HIV/AIDSattributable deaths occurring on the continent each year. Although access to antiretroviral therapies and pre-exposure prophylactics is improving, no approved vaccine exists. Potential HIV vaccines are undergoing clinical trials, but show somewhat limited early results effectiveness. Additional research is needed to support development of more protective vaccine formulations for malaria, HIV, and other diseases—formulations for important safeguarding vulnerable populations from infections much more rampant than Ebola.

Time to reevaluate

An effective Ebola vaccine, despite the stopand-go nature of its development, is now helping control the outbreak in the Democratic Republic of the Congo. Under World Health Organization and national emergency-use approvals, public health and other aid workers are conducting a ring vaccination campaign, tracing back infected patients' contacts to vaccinate them and, in some cases, their contacts. Certain other individuals, such as health care workers, can also get the vaccine. Beyond the 7,500 doses of vaccine that the World Health Organization has deployed, a partnership called Gavi, The Vaccine Alliance, has <u>agreed to buy</u>,

as needed, 300,000 more investigational doses of the vaccine for use in the Democratic Republic of the Congo. Gavi also



plans to <u>purchase</u> the rVSV-EBOV vaccine and make it available for combatting future outbreaks once it is formally approved. Much of the work to support that approval is complete as mentioned, the rVSV-EBOV vaccine has shown success in phase III trials. Additional vaccine candidates, including several not mentioned in this article, are at various stages of research and development, and may be viable options for controlling future outbreaks.

The illnesses and deaths associated with the current Ebola outbreak, and potentially with the

2014–2016 epidemic, might have been prevented if a vaccine for the disease had been deployed sooner. After all, a promising vaccine candidate had been discovered years earlier. Today's approach to vaccine discovery market-driven, just-in-time—is inherently problematic, as the current Ebola outbreak highlights. It is time to re-examine how resources are allocated for research into and development of medical countermeasures.

Christopher K. Brown is a scientist with the Occupational Safety and Health Administration. He holds a PhD in biodefense from George Mason University, a Master of Public Health in biostatistics and epidemiology from the University of Nebraska Medical Center, and a bachelor's degree in biology from the University of Louisville.

Fragile supply chain causing antibiotic shortages, resistance threat

Source: http://www.homelandsecuritynewswire.com/dr20180601-fragile-supply-chain-causing-antibiotic-shortages-resistance-threat

June 01 – A new report is warning about an emerging crisis in the global antibiotic supply chain that's causing antibiotic shortages and contributing to antimicrobial resistance (AMR).

In a <u>white paper</u> released yesterday, the Dutch nonprofit Access to Medicine Foundation argues that a fragile global supply chain that's dependent on a small number of antibiotics manufacturers, along with a financially unstable economic model, are responsible for shortages of antibiotics on a global and national level. Because of these shortages, some patients in need of antibiotics are being treated with lowerquality medications that don't cure their infections and increase the risk of resistance.

"Less effective or more toxic treatment alternatives can contribute to AMR because every time we use an antibiotic, we give bacteria the chance to adapt and develop resistance," the authors write. "To reduce the threat of AMR, doctors must ensure that the right antibiotic is used against the right organism."

The shortages highlighted in the report include the commonly prescribed benzathine penicillin G (BPG), which is the first-line therapy for syphilis and rheumatic heart disease. In 2015, BPG was unavailable in 39 out of 114 countries. The shortage coincided with a syphilis outbreak in Brazil that has led to a doubling of the babies born with congenital syphilis.

Meanwhile, a global shortage of the combination antibiotic piperacillin-tazobactam, which is used for a variety of infections and is on the World Health Organization's essential medicines list, has forced clinicians to reserve the drug for more serious infections and increase their reliance on other antibiotics. In some cases, this has resulted in increasing use of powerful lastresorts drugs like meropenem. In other cases, the piperacillin-tazobacatm shortage has meant switching to antibiotics that can increase the risk of Clostridium difficile infections.

Supply chain can't meet rising demand

CIDRAP <u>notes</u> that the shortages come at a time of rising antibiotic use. According to a recent study from the Center for Disease Dynamics, Economics & Policy, global antibiotic use grew by 65 percent from 2000 through 2015, driven largely by rising living standards in low- and middle-income countries. At the same

time, however, because the market for antibiotics is less lucrative than it is for other drugs, there are fewer companies producing and developing antibiotics.



With fewer pharmaceutical companies in the antibiotic market, there are only a handful of manufacturing facilities, mainly in India and China, that are producing the active pharmaceutical ingredient (API) for antibiotics. This not only makes it hard for companies to respond to surges in demand for antibiotics, it also means that problems at a single manufacturing facility can cause worldwide shortages. The shortage of piperacillin-tazobactam, for example, was caused by an explosion at a Chinese manufacturing facility in 2016. The factory was the only facility producing the API needed for the drug.

The report warns that if pharmaceutical companies continue to leave the antibiotic market, there will be fewer API manufacturers, weakening the supply chain even further.

To address the issue in the short-term, the authors of the report argue that pharmaceutical companies must take steps to strengthen their supply chains. Citing examples of steps some vaccine makers have taken to address shortages, they say that supply chains can be bolstered by focusing on demand planning, which involves forecasting future demand for antibiotics using consumption data and epidemiological patterns and sharing that information with healthcare workers, government health ministries, and public health organizations. This can help ensure that the right quantities of antibiotics are being produced.

They also encourage pharmaceutical companies to use multiple manufacturers and procurement sources and improve stock management to ensure an uninterrupted supply of antibiotics, and to strengthen the distribution chain so that patients are getting the right drugs at the right time.

But in the long run, the report cautions, to get more companies commit to producing antibiotics and maintain a sufficient supply of affordable antibiotics, steps to improve the market for antibiotics are needed. These could include market entry rewards or other economic incentives to encourage new antibiotic development. "Without a competitive market, there will not only be more frequent shortages and quality issues, but the last few companies left in the market will have greater power to dictate prices," the authors write.

This effort, they say, will require collaboration between the pharmaceutical companies, regulators, governments, public health officials, and other stakeholders.

Bolstering the body's defenses against public health, national security threats

Source: http://www.homelandsecuritynewswire.com/dr20180601-bolstering-the-body-s-defensesagainst-public-health-national-security-threats

June 01 – Protection against many common pathogens and environmental stressors is written into our DNA. Our skin responds to sun exposure. Our immune system mounts defenses when we get the flu. Our bodies inherently work to mitigate the potential for harm caused by these health threats. However, these intrinsic responses are not always quick, robust, or appropriate enough to adequately defend us from harm, which is why many people experience sunburn after intense sun exposure or suffer severe symptoms, even death, following exposure to the flu.

Military service members, first responders, and civilian populations face threats far more severe than sunburn and respiratory infections. Pathogens with pandemic potential, toxic chemicals, and radioactive materials can all quickly and powerfully overwhelm the body's innate defenses. And though significant public and private investment has been focused on the development of traditional medical countermeasures such as drugs, vaccines, and biologics to guard against the worst effects of these health threats, current countermeasures are often limited in their effectiveness and availability during emergencies.

DARPA <u>says</u> that it is looking to make gains beyond the status quo. Inspired by recent

advances in understanding of when and how genes express their traits, DARPA's new PReemptive Expression of Protective Alleles and Response Elements



(PREPARE) program will explore ways to better protect against biological, chemical, or radiological threats by temporarily and reversibly tuning gene expression to bolster the body's defenses against – or directly neutralize – a given threat.

"The human body is amazingly resilient. Every one of our cells already contains genes that encode for some level of resistance to specific health threats, but those built-in defenses can't always express quickly or robustly enough to be effective," said <u>Renee Wegrzyn</u>, the PREPARE program manager. "PREPARE will study how to support this innate resistance by giving it a temporary boost, either before or after exposure, without any permanent edits to the genome."

The program will focus on four key health challenges as proofs of concept for what DARPA ultimately envisions as a generalizable platform that can be rapidly adapted to emerging public health and national security threats: influenza viral infection, opioid overdose, organophosphate poisoning, and exposure to gamma radiation.

"Each of these four threats are major health concerns that would benefit from disruptive approaches," Wegrzyn said. "Seasonal flu vaccines, for example, are limited in that they try to hit a perpetually moving target, so circulating flu strains are often mismatched to vaccine strains. Programmable modulation of common viral genome sequences could potentially neutralize many more circulating viral strains simultaneously to keep up with moving targets. Combining this strategy with a temporary boost to host protection genes could change how we think about anti-virals."

PREPARE requires that any treatments developed under the program have only temporary and reversible effects. In so doing, PREPARE diverges sharply from recent geneediting research, which has centered on permanently modifying the genome by cutting DNA and inserting new genes or changing the underlying sequence to change the genetic code. Such approaches may cause long-lasting, off-target effects, and though the tools are improving, the balance of risk versus benefit means that these therapies are reserved for individuals with inherited genetic disorders with few to no other treatment options. In addition, some indications, including treatment of pain, may only require temporary solutions, rather than life-long responses.

The envisioned PREPARE technologies would provide an alternative that preserves the genetic code exactly as it is and only temporarily modulates gene activity via the epigenome and transcriptome, which are the cellular messages that carry out DNA's genetic instructions inside cells. This would establish the capability to deliver programmable, but transient, gene modulators to confer protection within brief windows of time for meaningful intervention.

"Focusing only on programmable modulation of gene expression enables us to provide specific, robust protection against many threats at once, with an effect that carries less risk, is limited but tunable in duration, and is entirely reversible," Wegrzyn said.

Success will hinge on developing new tools for targeted modulation of gene expression inside the body. Researchers must identify the specific gene targets that can confer protection, develop in vivo technologies for programmable modulation of those gene targets, and formulate cell- or tissue-specific delivery mechanisms to direct programmable gene modulators to the appropriate places in the body. Although the immediate program goal is to develop defenses against one of the four focus areas determined by DARPA, the ultimate objective of PREPARE is to develop a modular, threat-agnostic platform solution with common components and manufacturing architecture that can be readily adapted to diverse and emerging threats.

Research will be conducted primarily using computer, cell culture, organoid, and animal models to establish proof of concept. However, DARPA's vision is to generate new medical countermeasures for future use in humans. As such, DARPA is working with independent bioethicists to identify and address potential ethical, legal, and societal issues.

DARPA says that by the end of the four-year program, the agency aims for each funded team to submit at least one final product to the U.S. Food and Drug Administration (FDA) for regulatory review as an Investigational New Drug or for Emergency Use Authorization. Throughout the program, teams will be required to work closely with



the FDA to ensure that the data generated and experimental protocols meet regulatory standards.

DARPA will hold a Proposers Day on 13 June 2018, in Arlington, Virginia, to provide more information about PREPARE and answer questions from potential proposers.

25 more ill, 4 new deaths in **E coli** outbreak tied to Arizona lettuce: CDC

Source: http://www.cidrap.umn.edu/news-perspective/2018/06/cdc-25-more-ill-4-new-deaths-e-colioutbreak-tied-lettuce

June 04 – A multistate *Escherichia coli* outbreak linked to romaine lettuce grew by 4 deaths and 25 cases, according to an update Friday from the Centers for Disease Control and Prevention (CDC).

The CDC has now confirmed 197 cases in 35 states and 5 deaths in this outbreak. Three more states— Arkansas, North Carolina, and Oklahoma—reported sick people since the CDC's previous update on 16 May.



CIDRPA <u>reports</u> that the four new fatal cases occurred in Arkansas (1), Minnesota (2), and New York (1). Eighty-nine people have been hospitalized since the outbreak began in March, including 26 people who developed hemolytic uremic syndrome, a serious kidney complication. According to the U.S. Food and Drug Administration (FDA), this is the largest *E coli* outbreak in

a decade.

The CDC said health officials continue to question patients. Of 158 patients interviewed, 140 (89 percent) said they ate romaine lettuce in the week before their symptoms started. Patients range in age from 1 to 88 years, with a median age of 29. Most patients (68 percent) are female.

"Most of the people who recently became ill ate romaine lettuce when lettuce from the Yuma growing region was likely still available in stores, restaurants, or in peoples' homes. Some people who became sick did not report eating romaine lettuce, but had close contact with someone else who got sick from eating romaine lettuce," the CDC said.

The CDC warned that any illnesses occurring after 6 May might not be reported, as the lag time after symptom onset can be 2 to 3 weeks.

FDA confirms no Yuma lettuce on shelves

No single grower or supplier of romaine lettuce has been implicated in this outbreak, but produce from the Yuma, Arizona, growing region has been identified as the likely source of the harmful bacteria. On Friday the FDA <u>said</u> romaine lettuce is no longer being produced and distributed from the Yuma growing region, and that the last date of harvest was 16 April.

"At that time, due to the 21-day shelf life, we could not be certain that romaine lettuce from that region was no longer in the supply chain," the FDA said.

FDA Commissioner Scott Gottlieb and Deputy Commissioner Stephen Ostroff, issued a statement on the FDA's blog yesterday, saying any immediate risk from the Yuma growing region is over, but trace-back efforts are still under way to determine how and where romaine lettuce got contaminated.

"The FDA's investigators are actively searching for answers as to the source of this outbreak, and what steps can be taken to prevent it from recurring in future growing seasons," they said. "Based on the information we have to date, there are still no obvious points of convergence along the supply chain."



Though one farm has been identified as being the grower of lettuce that sickened inmates at an Alaskan correctional facility, the commissioners said there isn't a "simple or obvious" explanation for the outbreak. "If the explanation was as simple as a single farm, or a single processor or distributor, we would have already figured that out," Gottlieb and Ostroff said.

In a counterpoint published by Food Safety News Friday, its publisher Bill Marler said the FDA should name any and all point-of-sale restaurants implicated in this outbreak.

While the FDA defends its decision to redact the names because of the uncertainty of supply chain contamination, Marler said legal teams have already determined clusters of illnesses tied to Panera, Texas Roadhouse, Red Lobster, Papa Murphy's, and the processor Freshway Foods.

2015-2016 National Report of Medical Countermeasure Readiness

The "2015-2016 National Report of Medical Countermeasure Readiness" provides insights into the ability of the United States to plan and successfully execute a public health response requiring life-saving medical countermeasures. This report identifies key findings and recommended steps to advance the nation's health security.

Anthrax: Developing Drugs for Prophylaxis of Inhalational Anthrax Guidance for Industry

The U.S. Food and Drug Administration issued final guidance, "Anthrax: Developing Drugs for Prophylaxis of Inhalational Anthrax," which assists in the development of drugs for prophylaxis (prevention) of inhalational anthrax for individuals who may be potentially exposed to or have inhaled aerosolized *Bacillus anthracis* (B. anthracis) spores, but who have not yet displayed related signs and symptoms.

Analysis of 3800-year-old *Yersinia pestis* genomes suggests Bronze Age origin for bubonic plague

By Maria A. Spyrou, Rezeda I. Tukhbatova, Chuan-Chao Wang et al. *Nature Communications;* Volume 9, Article number: 2234 (2018) Source (full paper): https://www.nature.com/articles/s41467-018-04550-9

The origin of Yersinia pestis and the early stages of its evolution are fundamental subjects of investigation



given its high virulence and mortality that resulted from past pandemics. Although the earliest evidence of *Y. pestis* infections in humans has been identified in Late Neolithic/Bronze Age Eurasia (LNBA 5000–3500y BP), these strains lack key genetic components required for flea adaptation, thus making their mode of transmission and disease presentation in humans unclear. Here, we reconstruct ancient *Y. pestis* genomes from individuals associated with the Late Bronze Age period (~3800 BP) in the

Samara region of modern-day Russia. We show clear distinctions between our new strains and the LNBA lineage, and suggest that the full ability for flea-mediated transmission causing bubonic plague evolved more than 1000 years earlier than previously suggested. Finally, we propose that several *Y. pestis* lineages were established during the Bronze Age, some of which persist to the present day.





Population genetic analysis to infer the ancestry of RT5. **a** Geographic location (map purchased from vectormaps.de) and picture of RT5 burial in the Mikhailovsky II site (picture credits to V.V. Kondrashin and V.A. Tsybin). **b** Principal component analysis (PCA) of modern-day western Eurasian populations (not shown) and projected ancient populations (n = 82, see population labels), including the newly sequenced RT5 individual from Samara and **c** estimation of ancestral admixture components using ADMIXTURE analysis (K = 12)



www.cbrne-terrorism-newsletter.com

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Winning hearts and minds in the newest Ebola zone

By Louise Dewast

Source: https://www.nbcnews.com/storyline/ebola-virus-outbreak/winning-hearts-minds-newest-ebola-zone-n881541



UNICEF-supported social mobilizers address a group of children in central Mbandaka, the capital of Equateur Province. Since the start of the Ebola outbreak in the DRC, UNICEF and its partners have reached more than 300,000 people with lifesaving information about how to avoid contracting the deadly virus.Naftalin / UNICEF

June 11 — The Ebola outbreak in the Democratic Republic of the Congo appears to be under control, although the virus can always surprise, World Health Organization officials said this week.

Around 1,000 people who have been in contact with Ebola patients have been vaccinated and health workers are working to get vaccine to more remote affected parts of this giant, central African country. And they are working to get the word out to people in city and country alike about Ebola, which has never

And they are working to get the word out to people in city and country alike about Ebola, which has never affected this particular part of Congo before.

It has not been easy, and not only because the region lacks roads, electricity or telecommunications.

"These are communities that often deal with many other illnesses, so why is the world suddenly paying attention, coming to their villages to see them," said Mari Nythun Sorlien, an anthropologist working for Medecins Sans Frontieres (MSF or Doctors Without Borders).

"This outbreak has been particularly difficult because we've had a lot cases. Some people have lost multiple family members, so there's a lot of drama and worry," she added.

WHO, MSF and other groups have learned to take a gentle approach, even as they feel pressed to quickly educate people about the risks of Ebola, whose symptoms can resemble those of a half-dozen common tropical illnesses such as malaria.

Patients with suspected Ebola must be isolated as soon as possible, and anyone coming into close contact should be protected with layers of gear. The virus is passed in bodily fluids such as

blood, feces and sweat - all of which can be on the bodies of patients suffering from the virus.

Anywhere between 50 percent and 90 percent of people who become infected with Ebola will die.





A health worker from the Ministry of Health monitors the temperature of a traveller from the Democratic Republic of Congo at each port in Bangui on June 3, 2018. Florent Vergnes / AFP - Getty Images

The Democratic Republic of the Congo's (DRC) health ministry says there have been 38 cases in this outbreak, with 13 deaths.

Getting people to change their habits and valued practices takes tact and patience. But it's a matter of life and death, because Ebola virus can be transmitted even after death, unlike many other diseases.

Burials must be sterile, the bodies wrapped tight. That can go against the grain in communities where sick patients are usually lovingly tended closely, and where the dead are carefully washed and dressed before burial.

"It's a human reaction. In every culture, whatever your social background, it's very difficult for someone to be isolated from their loved one whether they are sick or deceased," said Sorlien. "Most important for me is to give a role to the family — letting them know they can come and visit the treatment center to see their loved ones from a safe distance."

Health workers learned from their mistakes during the 2014-2016 Ebola epidemic in West Africa, in which 28,000 people were infected and 11,000 died. There, they often lost the trust of communities when strangers stormed in and demanded they hand over their sick and dying.

"Before, our approach was top-down and much more medical. This time we made a decision to use a different approach and use community participation," said Raoul Kamanda Mangamfu, a spokesman for the DRC's health ministry.

Ebola was first identified in the DRC, in 1976, when the country was called Zaire. This is the country's ninth outbreak, but the first in this particular part of the country.

And it's the first to show up in a city in DRC – in Mbandaka, a city of 1 million that sits on the Congo River. It's also been seen in the nearby community of Bikoro.

People in this area are not used to hearing about Ebola. And they are not used to taking orders.

"Here in Bikoro people like to debate. They don't accept messages as they come, so we spend a lot time explaining where the virus is and how it is transmitted," Sorlien told NBC News.

"What works best are community events, Q&As and discussions. People here like going deep into the issues, which is helpful for us to understand what they are integrating."



So trained educators are going door to door, visiting people in their homes. They are calling meetings, and using materials they know will work. When possible, people who speak local dialects are employed. "We try using concrete examples and we show them very simple drawings, which are especially helpful with children," said Sorlien, who is working on her fifth Ebola outbreak. Respect is also important.

"When we investigate a case, see a patient, our teams are required to ask permission to ask questions," said WHO representative Dr. Franck Mboussou. "Usually it works, and then we ask the patient where they've been and who he/she has been in contact with."

It's important to track down every patient, and then find everyone that patient has been in contact with. WHO is employing a technique called ring vaccination, in which anyone who has been with or near an Ebola patient gets immunized, and then all of their contacts are also tracked down and vaccinated. It's tedious, and requires trust.

"People are often worried about side effects, that they'll have to stop working, and so we reassure them," Mboussou said.

"We also work with important people in the community, from women's associations or local elected officials for example, and we make sure they accompany us in the field," said Chiran Livera, who leads



the International Federation of the Red Cross Ebola response in DRC.

A health care worker wears virus protective gear at a treatment center in Bikoro, Democratic Republic of Congo. Congo's latest Ebola outbreak has spread to a city of more than 1 million people, a worrying shift as the deadly virus risks traveling more easily in densely populated areas.John Bompengo / AP

As in Liberia, Sierra Leone and Guinea, one of the hardest negotiations is over the funeral. A dozen or more people can get

infected with Ebola during the preparation for a traditional burial.

"The most difficult for our outreach teams are the burials," said Mboussou.

Traders walk at an open air market near the Congo River during the vaccination campaign aimed at beating an outbreak of Ebola in the port city of Mbandaka, Democratic Republic of Congo on May 23, 2018.Kenny-Katombe Butunka / Reuters

They've found it's often easier to just bury everyone who dies in the safest possible way, to



avoid stigmatizing Ebola victims and their families.

"Our teams are trained in negotiation and the most important message we always give is that we don't say their family member died of Ebola — but we explain to them that in a time of Ebola outbreak it is better for the entire community to take precautions," Mboussou said. Some people were reluctant to believe that a virus was causing the deaths and illnesses.



"A majority of people thought it was a masquerade," Joseph Zambo, a resident of Mbandaka and father of two. "For example, people who go to certain churches are told the virus is a demon that needs to be chased as the Bible requires."

But Zambo said he was convinced by the outreach teams. "In our family, we've made it a habit at home to wash our hands with chlorine," he said. And he said most people now understood the need for hand hygiene.

"We also use dispensers at the office and when we go to church," Zambo said. "This is a major logistical and boots-on-the-ground epidemiological endeavor now," Peter Salama, WHO's Deputy Director-General for Emergency Preparedness and Response, told a news conference in Geneva on Friday.

"Phase one, to protect urban centers and towns, has gone well and we can be cautiously optimistic," Salama said.

Reporting by Louise Dewast in Kinshasa. Additional reporting and writing by Maggie Fox in Washington.

The Division 2 is Political, Despite What Its Developers Say

By Heather Alexandra

Source: https://kotaku.com/the-division-2-is-political-despite-what-its-developer-1826776710



The Division 2 shifts the setting from New York City to a <u>ruined Washington D.C.</u> While the gameplay aims to fix issues players had with the original, statements from one of the game's creative directors about the narrative are frustrating. The goal, we've been told, is not to make a political statement, but in this day and age, that's impossible. It's about time we stop pretending that it is.

In the world of *The Division*, a massive bioterrorist attack on Black Friday led to the outbreak of a plague that ravaged the United States. As institutions and order crumbles, it's left to government agents from "The Division," a group of sleeper agents hidden among the populous, to restore order. In gameplay terms, this means shooting bad guys and finding rare loot. *The Division* was a fun game to play, its snowy Manhattan setting striking and gunfights intense. But the implications were

unsettling. The player was special, a man or woman with a badge given free rein to shoot mostly hoodie-wearing looters. In real life,



issues of violence by police and everyday citizens had been brewing in America. When *The Division* released in March 2016, it had been four years since George Zimmerman shot and killed Trayvon Martin. In 2014, police officer Darren Wilson shot and killed Michael Brown. Following the shooting, protests in Ferguson, Missouri lasted for two weeks. Police used tear gas, flashbangs, and rubber bullets to disperse crowds. More waves of protest would follow Wilson's acquittal in 2015. In light of all this, it could feel strange to play *The Division*, a game where you gun down whoever you want without consequence. It wasn't an intentional commentary, but it was, undoubtedly, political.

The Division 2, with its setting of a broken Washington D.C. and mission of saving America, arrives during a similarly charged political climate. Speaking to *Kotaku* editor in chief Stephen Totilo yesterday, Terry Spier, one of the game's creative directors at Red Storm Entertainment, denied any intentional political commentary on the game's part.

"I think it's important to remember that it's a Clancy game and Clancy is always predicated on clear and present danger," Spier said. "Not the specific book but just that premise. Once you're past that and step into the fiction of, ok, now what are we pretending? Green poison is what we were pretending. So, the goal isn't to make a political statement. It's not to reflect on any of the things that are happening in the current world, in the live world. It's truly: you are here to rebuild."

Speaking with <u>Charlie Hall of Polygon</u>, Spier reiterated the game's absence of political ambitions: "It's not a political statement," he said. "No, we are absolutely here to explore a new city."

Marcus, played by African-American actor Jesse Williams, stands before riot police during a peaceful protest in *Detroit: Become Human*. Cage told *Kotaku* the game was not meant to be political.

By now, we should be familiar with the phrase "it's not a political statement" when it comes to video games. Although *Far Cry 5* was <u>revealed</u> to the press in a presentation referencing Brexit and the 2014 standoff between Cliven Bundy's militia and law enforcement, the released game shied away from naming these inspirations directly. Last year, *Detroit: Become Human* director David Cage told *Kotaku* that his game was " really about androids," and devoid of political commentary even though Detroit has a history regarding both manufacturing and race relations—including one of America's bloodiest race riots in 1967—that make Cage's choice of setting fraught. The game quotes Martin Luther King Jr, investigates public sentiment toward "violent" political action like property destruction, and allows players to demand voting rights and property ownership for androids. It was about more than just androids, and *The Division 2* will be about more than loot drops.

The idea that a game about saving the American capital has no political bent would strike anyone as absurd, even if we should not be surprised at Spier's insistence. This has to do with how our brains process symbols. The various symbols of America—the White House, the American flag, the Washington Monument—have history attached to them. When we see these symbols, we cannot help but recall that history and the emotions they evoke. The American flag is nothing but a piece of cloth, but, depending on the individual, it's either a symbol of aspirational ideals or the banner of imperial conquest.

Video games are packed with symbols, all of them evoking different thoughts in players. A withered White House viewed through the eyes of a 2018 gamer might remind them of grift and corruption. It might pluck at patriotic heartstrings. Spier might want nothing more than a fun new city to explore, but every street corner holds potential meaning. This was true of The Division, which had missions tasking the player to restore power to Times Square, New York's capitalist and tourist center, while also having them fight off prisoners from Riker's Island. The game's action and the context it occured in revealed political messages. What is The Division saving? Government, commercial interests, and infrastructure. Who is the enemy? Convicts, industrial workers, and rioters. How do we save the country? By firing enough 5.56 ammo. The Division 2 will have its own set of answers to these questions.

This isn't to say that you shouldn't load up *The Division* 2, zone out, complete a raid, and call it a night. You can

definitely do that, and you'll probably have a lot of fun. For all its dissonance, I enjoyed playing



The Division with my friends and had a ton of fun in the Dark Zone. But games can't pretend not to have politics, that *The Division 2*'s D.C. setting has no implications to players, that the corpses you leave behind don't say anything at all.

At the end of the day, *The Division 2* will be a game about government agents banding together to revive America's capital. We will <u>fight</u> in the downed wreckage of Air Force One, in the

shadow of the Washington Monument, and possibly in the actual halls where political power rests. What *The Division 2's* team decides to put in their game will speak to their values and beliefs. It will be affected by their biases and blindspots. Passing on the responsibility of that, as Spier did, disrespects the intelligence of the players, who will bring their own interpretations to the setting whether the developers want them to or not.

Heather Alexandra is Staff Writer at Kotaku.

Bioterrorism and the role of the country's information structure in its control

By Sajad Abedi

Source: https://moderndiplomacy.eu/2018/06/13/bioterrorism-and-the-role-of-the-countrys-information-structure-in-its-control/



June 13 – Today's wars are a new form and have a lot of complexity. Changes and widespread changes in the type and structure of wars have led to the introduction of new vocabularies into the world's military literature, which is bioterrorism as a new form of terrorism. The unpredictability and suddenness, the power of mass destruction and destruction and the psychological stress caused by bioterrorism have made it one of the top priorities of societies and countries that want peace and security.

The fear of being exposed to a variety of diseases has always been a concern for man over the course of history. In the meantime, humane animals with animal



temperament have always sought to exploit various factors to dominate and harm others. These people, with knowledge of the general panic of disease and the power of pathogens in paralyzing societies, have always sought to make the most of these factors in order to achieve their goals. With the advances made in genetic and medical sciences, this concern and general panic in diseases have been somewhat resolved, but these developments have led to some abuse.

Although bioterrorism is one of the main problems of public health and a threat to infection control, the fact is that bioterrorist thoughts and practices have always been in the aggressive nations, incite mental and politicaleconomic rivals on the one hand, and in adversarial or retaliatory thoughts in individuals On the other hand, thousands of years ago, the governments, and threatened armies. personalities have existed and have sometimes come up with an incredible myth that all of these events reflect the oldness of thoughts and rarely bioterrorist practices. But the word Bioterrorism and Terrorist Wars came back after the 9/11 incident, so that the annual US budget was tens of times tallied to fight these criminal acts. The widespread propaganda that has taken place in this area has caused more and more people to be afraid of this phenomenon and compromising the mental health of societies. However, many people still believe that biological warfare has come to fruition of military imagination, while today, political developments and biotechnology advances have changed this belief.

Despite the irreparable risks and impacts of bioterrorist attacks on various societies, the fear and fear of society, patients, health workers and the general public is much wider than their real consequences. The mental responses of people who have been traumatized may be horror, anger, unnecessary worries about infection, and fear of spreading illness, desires, getting out of the community and turning to immoral things. Therefore, when planning to prepare for bioterrorist attacks, the psychological aspects of the problem as well as the way to prevent fear among people should be considered.

In assessing the factors affecting a bioterrorist attack, a number of other factors must be considered in addition to the assessment of the potential risks of biological agents or the likelihood of bio terroristic attacks. Therefore, it cannot be said that a terrorist's unwillingness to use a dangerous biological risk reduces the risk of a terrorist attack on it, and on the contrary, even the most dangerous terrorists, in order to achieve their terrorist goals, need to have biological agents for harm and terror.

Dependency of factors causes each other to disproportionately focus on the above branches and to ignore the link between factors that reduce the threat, preventing a bioterrorism operation will be impossible. A tangible example of the above is that by reducing the vulnerability through a general vaccination against a specific agent, the bio terroristic motives and goals will be weaker in applying this particular factor.

In dealing with bioterrorism purposes, in addition to practical (objective) evaluations such as: determining the value of assets, the target vulnerability or the potential risk of a particular factor, consider the mental aspects of the case (the lines in the above diagrams Note). Knowing this subtlety can formulate separate policies that cannot be achieved without tackling terrorist intentions. For example, it is impossible to completely eliminate the vulnerability of the masses to a particular factor, but diverting terrorists' thoughts from the vulnerability of a region's people will reduce the likelihood of a terrorist attack. Most of the debates on bioterrorism focus more on the potential risk and less attention is paid to qualitative aspects such as the motivation of terrorists to use such deadly weapons or the vulnerability of different societies to bioterrorism.

One of the new theories about bioterrorism is "opportunity theory." Thus, rationally, a bioterrorist attack occurs when a person is induced by a bioterrorist attack in a cost-benefit analysis and finds more than its cost. The aforementioned theory states that if the interests of the bioterrorists are more than the costs incurred by them, the probability of committing the crime from the strikers will increase. This theory states that by changing the cost-benefit components, the probability of a crime can be reduced. Also, by eliminating the excuse of the opposition groups to carry out bioterrorist activities, it is possible to prevent such offenses to a very large extent.

Any action taken to prevent the proliferation of biological agents will make it harder to achieve biological agents and will offer more opportunities to counteract the use of these agents. Therefore, by increasing the cost of doing such operations and taking into account the cost benefit analysis, incentives for using biological weapons are reduced.

The country's capabilities in this area can be evaluated in various areas such as: public awareness, coping and prevention, treatment and removal of attack lesions. Since our country is an incident and a natural disaster is abundant in it, so looking at how to deal with these crises can be used to counteract bioterrorism attacks in most areas as well. Unfortunately, the unconscious, weak and slow handling of various devices in events such as floods and earthquakes and subsequent reconstruction shows that our country is by no means prepared to deal with such crises. The low level of knowledge and understanding of the executive bodies of the country and the people in coping with crises such as floods and earthquakes, which are well-known phenomena, illustrates the fact that there is a lot of work against threats such as bioterrorist attacks, which are even somewhat unfamiliar to specialized organizations such as the Ministry of Defense and Health. It is difficult and perhaps impossible. As preparations for dealing with these crises are not achieved in the short term, so at the present time, we should focus more on our strength, the country's intelligence and security systems, which have proven their effectiveness in confronting various threats and prevent them from doing. Such operations will be ideal for the country as well as preventing such attacks from the consequences and pathology.

Preventing bioterrorism attacks using information work is much better and less costly than coping with it. And intelligence and security services have a great role to play. On the other hand, the use of a bioterrorist agent may become so rapid that it is impossible to control it, and the damage and losses incurred even for users is unpredictable and surprising. In some of the bioterrorist attacks, its perpetrators, which are more than the domestic opposition, are not intended to inflict human injuries or economic damage, but to mock the intelligence and security services and to weaken them in preventing and detecting these handicap threats. They take such actions.

Regarding the geographical situation of our country and opposition groups with the regime, it can be said that among the above groups, the MEK, the Kurdistan Workers Party and most importantly ISIS have the motivations to carry out bioterrorist operations against our country. It should be noted, however, that the MojahedinKhalg Organization has recently announced that it is no longer planning to carry out terrorist operations in order to gain EU-US support more openly and more openly. The Kurdistan Workers' Party also does not have such terrorist operations on its record. The most important threat that can be mentioned is the ISIS group, whose history shows that there is no shortage of widespread and horrific operations. The hatred of this group of Iran's Shiite system may well be due to the cause. But in my opinion, and given the recent developments in the region, emerging groups such as Jundallah, which do not have a clear and accurate regulation, are far more dangerous, given the violent and overwhelming attacks that have been taking place in recent years. The dependence of these emerging economies on large and advanced countries has increased the risk of these attacks, which indicates the heavy responsibility of the country's intelligence and security systems at the present time.

Since the terrorist attack may not follow the expected pattern, the military and police forces' efforts to identify and respond to biological attacks should remain high. In addition, a small prevalence of the disease can be a primary warning to more serious attacks, and the detection and use of preventive measures, such as vaccines and effective antibiotics, can save thousands of lives. In order to facilitate the rapid identification of bioterrorist attacks, all personnel of the military and police forces, such as health and medical personnel, should have at least basic "epidemiological" skills. Any small or widespread disease should be considered as a bioterrorist attack. This preliminary study should not be time consuming or requires new rules. In order to determine everything that seems unusual and refers to bioterrorism, the prevalence of surroundings should be considered.

The discussion of biological wars is a sensitive and preventable task by politicians of military strategists, scientists and lawyers. Performing a pre-biologic action is to create a strong barrier against less-likely threats, but with wider consequences, the most effective way to deal with these attacks. The discussion of bioterrorism attacks is not a cross-sectional one, and the readiness to deal with the bioterrorist attacks should be permanent and permanent. All countries are vulnerable to biological terrorist attacks (Bioterrorism) and should not be ignorant of these attacks. Evidence suggests that the threat of biological attacks is on the rise, and emerging-age groups with less ethical responsibilities are expanding, so focusing on ways to confront the terrorist and concealed biological invasion is necessary. Finally, it should be noted at the end that, as ignoring and disregarding the bioterrorism threats is extremely dangerous, the magnitude and controversy in this case is also false and should be addressed logically.

Sajad Abedi is a Resident Research Fellow at the National Security and Defense Think Tank. He obtained his Ph. D. degree in National Security from the National Defense University under group of leader of Islamic Republic of Iran. His research interests pertain to Arab-Israeli studies, the Cyber Security studies, and National Security.

Crispr goes global: A snapshot of rules, policies, and attitudes

By Kathleen M. Vogel (Bulletin of the Atomic Scientists)

The gene editing technology Crispr has been in the news a great deal over the last few years. The lion's share of media coverage has focused on the revolutionary technology's vast potential for improving human life and its disturbing potential for harm. Crispr, compared to traditional methods of genetic engineering, enables more precise and efficient genetic modifications. These attributes have sparked great excitement, and provoked many concerns, regarding the economic, social, biosafety, bioethical, and biosecurity implications of Crispr-related work.

Ebola Outbreak Opens Way to Chaotic Jockeying to Test Experimental Drugs

By Helen Branswell

Source: https://www.scientificamerican.com/article/ebola-outbreak-opens-way-to-chaotic-jockeying-to-test-experimental-drugs/

May 30 – Companies and other players involved in the development of experimental Ebola drugs are jockeying to have their products tested in the outbreak in the Democratic Republic of the Congo, part of a chaotic and politically charged effort to use them in the <u>midst of a crisis</u>.

With one vaccine already being used in the field, plans are underway to see if another might also be tested. And as many as five drugs, most of which are not supported by much human data, could be used in head-to-head trials. When considering one of those treatments recently, scientific experts told the World Health Organization they couldn't recommend its use at this time, but the DRC government has already said it's eager to move ahead.

Experts say the maneuvering for space in which to try vaccines and drugs brings to mind the frantic days of the West African Ebola outbreak, when there were so many research teams in the field that a free-forall of experimental testing ensued. Most of the clinical trials <u>produced little</u> in the way of insight into what actually might work against Ebola.

There's a "rush to evaluate [treatments] because the window of opportunity for evaluating these interventions is always going to be short," said Ross Upshur, a physician and ethicist who was on the WHO panel.



There are "tensions" among organizations "that are rivalrous with each other," not unlike the case in 2014, said Upshur, who is scientific director of Toronto's Bridgepoint Collaboratory for Research and Innovation. The final decision on which treatments to use rests with the government of the DRC. But the WHO expert panel has sought to provide guidance, and various nonprofits on the ground, particularly Doctors Without Borders, have their own views on the best course ahead.

Still, health officials say the crisis provides a crucial opportunity to better understand how to help contain outbreaks in the future.

"If we don't use the opportunity to learn in this situation, we'll never be able to know which is better than the other in terms of the drugs," said Dr. Peter Salama, the WHO's deputy director-general for emergency response.



A nurse working with the World Health Organization displays a bottle containing Ebola vaccine. *Credit:* Junior D. Kannah Getty Images

Salama urged caution about the utility of experimental treatments, saying the efforts to use them will answer key questions about how feasible these therapies are in low-resource settings. "Everyone's really excited about the use of these drugs, but are they useful in a rural African setting with very little infrastructure? The jury's out," he said.

Bikoro, one of two remote communities at the epicenter of the outbreak, has no power, no functioning lab, and very little infrastructure. The other, Iboko, is more remote and out of cellphone range. Health facilities in the region are rudimentary, and won't easily lend themselves to the type of intensive care most of these therapies require.

"It's not a simple effort to do this sort of trial in this kind of environment," Salama said.

Three of the other experimental therapeutics are monoclonal antibodies—immune system warriors that can recognize and combat Ebola.

Two are cocktails that combine three antibodies—ZMapp, which was tested in West Africa, and a product made by Regeneron called REGN3470-3471-3479, which has already completed a small Phase 1 trial. The third, called mAb 114, is being developed by the National Institute of Allergy and Infectious Diseases.

It appeared to be efficacious in primate testing, but the Phase 1 study designed to determine if it's safe to use and to establish the proper dosing only began on May 16.

The WHO expert panel advised against the use of mAb 114 in the outbreak response, given the limited data. But NIAID Director Dr. Anthony Fauci said he will send 100 doses of mAb 114, at the request of the DRC government.



DRC Health Minister Dr. Oly Ilunga told STAT in an interview that his government was "keen" to use it, nonetheless, because the treatment has its roots in his country's third Ebola outbreak, in 1995 in the city of Kikwit.

The 114 antibody was isolated from the blood of a Kikwit survivor, and the DRC's leading Ebola expert, Jean-Jacques Muyembe, collaborated with the NIAID on the research. Muyembe is the director general of the DRC's National Institute for Biomedical Research.

"For us, it's something very important, because the idea is derived from the research of a Congolese team with Dr. Muyembe," Ilunga said.

There are two other drugs being considered for use in the outbreak—an antiviral called Remdesivir being developed by Gilead and a Japanese influenza antiviral known as favipiravir, which was tested in the West African outbreak.

A trial involving favipiravir <u>failed to show it worked</u>, and the WHO expert panel questioned the value of using it. But the fact that it is easier to administer than the others may improve its chances of being used. The expert panel said ZMapp and Remdesivir ought to be the first and second choices, based on the available evidence.

Doses of ZMapp have already been shipped to the DRC, according to Larry Zeitlin, president of San Diegon-based Mapp Biopharmaceuticals. Although he would not specify how many doses were shipped, he said in an email that it was "more than they had asked for and we can resupply quickly and easily should it be needed."

If ZMapp and Remdesivir aren't available, the Regeneron cocktail could be used, the expert panel said. Leah Lipsich, Regeneron's vice president for strategic program direction, said the company has "on the order of 100s of doses that would be ready to ship."

The antibody therapies are delivered by infusion, which requires a level of patient monitoring that will be tough to achieve, Salama warned. And the Gilead drug requires daily kidney and liver function testing—also a challenge in these settings.

Vaccination of health care workers and people who have been in contact with Ebola cases—and contacts of the contacts—has been underway since May 21. This ring vaccination campaign, designed to prevent continued spread of the virus, has already vaccinated more than 400 people, Salama said.

The Merck vaccine is the only one that is currently being used in the ring vaccination program. But people are also eager to see if a second Ebola vaccine can be tested in this outbreak. This vaccine, made by Johnson & Johnson, requires two doses given one or two months apart—a drawback in an outbreak setting. Still, it's believed the protection it triggers will last longer than that induced by the Merck vaccine. The hope is that one day this vaccine, which is methodically making its way towards licensure, could be given to health workers throughout Africa's Ebola zone. In the early days of Ebola outbreaks, health care workers are often among the virus's victims, contracting the disease before it is recognized that Ebola is spreading.

Dr. Paul Stoffels, J&J's chief scientific officer, said the company is exploring if there are ways to use its vaccine in the DRC in this outbreak.

"We are offering and we are evaluating options. The crisis is such that that is no place for politics and pushing," said Stoffels, who noted J&J has 2 million doses of vaccine it could ship within a day or two of being asked. "We are open and ready to do whatever is needed."

With the way the case counts look at the moment, that call may not come. Growth of the outbreak has slowed; the feared explosion of cases in Mbandaka—a city of over 1 million people—so far has not occurred. To date there have been 51 cases and 25 deaths. Nearly 90 percent of the cases have been in Bikoro and Iboko, a remote village inland from Bikoro.

If spread in Mbandaka has been halted, there may not be a way in for the J&J vaccine, Salama acknowledged.

"Is a trial actively being considered today? No. Is it a potential option at some point if the outbreak gets worse? Yes," Salama said.

Helen Branswell is STAT's infectious diseases and public health reporter. She comes from the Canadian Press, where she was the medical reporter for the past



15 years. Helen cut her infectious diseases teeth during Toronto's SARS outbreak in 2003 and spent the summer of 2004 embedded at the US Centers for Disease Control and Prevention. In 2010-11 she was a Nieman Global Health Fellow at Harvard, where she focused on polio eradication. Warning: Helen asks lots of questions.



German police arrest man for building a biological weapon

Source: http://www.homelandsecuritynewswire.com/dr20180614-german-police-arrest-man-for-building-a-biological-weapon

June 14 – The police in Cologne, Germany, on Tuesday arrested 29-year old Sief Allah H. for trying to build biological weapons in his apartment. He came to Germany in 2016 and had been under police surveillance for terrorist sympathies.

Der Spiegel reports that on Thursday federal prosecutors charged the Tunisian citizen with producing a ricin-based biological weapon. The police found the toxic materials in his apartment.

Sief Allah H. has been arrested for violating the War Weapons Control Act and "preparing a serious act of violence against the state."



The German security services, which had kept H. under surveillance for some time, became suspicious after H., in mid-May, ordered 1,000 castor seeds — the main ingredient for used in ricin toxin — and a coffee grinder from an online store. In June he managed to produce the toxin.

Kölner Stadt-Anzeiger notes that ricin is 6,000

times more powerful than cyanide, and its production and possession are restricted by a 1997 international convention on chemical weapons. Exposure to ricin causes organ failure and death can occur within 36 to 48 hours.

There is no known antidote.

Kölner Stadt-Anzeiger says that H. first came to Germany in November 2016, and that he had had sympathies for the Islamic State.

The prosecutors said they have not found evidence the he was planning an attack at a particular time or place, or that he was a member of any terrorist organization.

Der Spiegel notes that H. was following IS's online instructions for building a ricin bomb.

White House Preparing Bio-Defense Strategy As Germ Warfare Fears Rise

By Loren Thompson

Source: https://www.forbes.com/sites/lorenthompson/2018/06/07/white-house-preparing-bio-defense-strategy-as-germ-warfare-fears-rise/#768947794a7d

June 07 – The National Security Strategy released by the Trump Administration in December U.S. policymakers. In the past, that phrase has almost always been used as a euphemism for nuclear weapons. But in a break with tradition, the administration is putting increased emphasis on combating bio-threats and pandemics. In fact, the National Security Council staff is preparing a dedicated bio-defense strategy.

Bio-threats originate in microscopic organisms -- bacteria, viruses, fungi -- that cause diseases such as influenza, smallpox and anthrax. Highly transmissible, often lethal pathogens have ravaged humanity since homo sapiens first emerged in Africa. Smallpox alone killed more people than all the wars of the 20th Century combined. The Spanish Flu epidemic of 1918 infected a quarter of the world's population, killed 50-100 million, and depressed life expectancy in the U.S. by a dozen years.



Until recently, all of these outbreaks occurred spontaneously in nature as what were once called "germs" evolved to exhibit novel features -- features against which most people had little or no resistance. But now a new danger is looming, as breakthroughs in the life sciences enable scientists to engineer lethal pathogens in their laboratories. One group of Canadian researchers figured out how to synthesize a virus



similar to smallpox -- and then published an article explaining how they did it.

Ebola virus on the surface of a cell. In the past, pandemics occurred spontaneously. In the future, they may spawned by extremists.

The Trump Administration apparently has concluded this is a catastrophe waiting to happen. Virulent pathogens might escape labs to spread globally, killing millions. Worse, they might be exploited by nihilistic extremists to undermine the international order. Various terrorist groups are thought to have sought out

scientists who could help them implement such a strategy. The technology and skills needed to synthesize novel pathogens are increasingly available in global commerce, and largely unregulated. There is no point in trying to stuff this genie back into its bottle. Too many people around the world now know how to manipulate genetic material with great precision. And even if they didn't, there is a very high likelihood that naturally occurring scourges such as the Spanish Flu will appear again. One scientist at a highly respected research institution told me that humanity is two mutations of the influenza virus away from species extinction. So the Trump Administration has decided it needs to be prepared.

This could be the single most important policy initiative President Trump undertakes, given the potential consequences of a devastating pandemic. It does not require a great deal of additional federal funding, but it does need some sort of mechanism to coordinate all the federal players. The most important player at present is the Assistant Secretary of Health and Human Services for Preparedness & Response, who works with the Centers for Disease Control and others to maintain adequate stockpiles of medical countermeasures.

But a comprehensive bio-defense strategy would require participation by many other players, from the Department of Homeland Security to the Federal Emergency Management Agency to the National Guard. It also requires somebody with presidential authority to set priorities. For instance, the Department of Homeland Security last year proposed defunding the government's only bio-defense analysis and countermeasures lab -- a very untimely move. Someone in the White House needs to be enforcing preparedness priorities.

Beyond that, biological threats need to be removed from the catchall category of "weapons of mass destruction," and addressed according to their unique characteristics. As long as the same officials who are responsible for dealing with chemical or radiological threats also oversee bio-war preparedness, the danger is likely to be neglected. Bio-threats aren't like nerve gas or radiation -- they are living organisms that evolve and may grow worse over time rather than dissipating after their initial impact.

Although the prospect of lethal pandemics in the near future is profoundly unsettling, it is good news that the Trump Administration has recognized the threat and is drafting a response strategy. A bipartisan commission on bio-threats complained that the Obama Administration was not doing enough to prepare for the arrival of new pathogens, whether they originated naturally or were contrived by scientists. Perhaps the Trump Administration can fix this defect in our nation's security posture.

Loren Thompson focuses on the strategic, economic and business implications of defense spending as the Chief Operating Officer of the non-profit Lexington Institute and Chief Executive Officer of Source Associates. Prior to present positions, he was Deputy Director of the Security Studies Program at Georgetown University and taught graduate-level courses in strategy, technology and media



affairs at Georgetown. He has also taught at Harvard University's Kennedy School of Government. He holds doctoral and masters degrees in government from Georgetown University and a bachelor of science degree in political science from Northeastern University. Disclosure: The Lexington Institute receives funding from many of the nation's leading defense contractors, including Boeing, Lockheed Martin, Raytheon and United Technologies.

Vaccination – Yes or No? (smallpox)

Source: https://www.youtube.com/watch?v=YFauihFXKHk



Where the Anti-Vaxxers Are

By Beth Skwarecki (Health Editor) Source: https://vitals.lifehacker.com/where-the-anti-vaxxers-are-1826841232



June 15 – A new study has <u>identified the hotspots of philosophical and religious vaccine exemptions</u>: the paperwork that (in some states) you can fill out in lieu of getting your kindergartener vaccinated. Most are in rural areas, but 15 mid-size cities have a dangerous combination of a large population and a high rate of these exemptions.

These are *non*-medical exemptions, by the way; all states allow medical exemptions for children with immune system disorders or other conditions that would make vaccines too



risky for them. And ironically, those children who are unable to be vaccinated (and those who are too young to be vaccinated) are the most at risk from policies that allow healthy people to skip out on vaccines. Why Hotspots Matter

One person can't spread a vaccine-preventable disease by themselves. Imagine you go on vacation and catch measles, and then come home and start coughing on all your neighbors. If they're all vaccinated, the disease won't go far. (The measles vaccine is <u>97 percent effective</u> for people who get both recommended doses.) A few vaccinated folks will be able to catch and spread the disease (3 percent of them in our example), but that's just not enough people to sustain an outbreak. So that's why it's concerning any time there is an area with a lot of unvaccinated people—which is exactly <u>how measles</u> <u>spread in Disneyland in 2015</u>. You need a combination of a lot of people to cough on, and a high percentage of them unvaccinated.

The <u>researchers who made the map above</u> also looked for counties with more than 400 kindergarteners with non-medical exemptions. They found 15, and the largest cities in each of those counties are:

- Phoenix, AZ (2,947 exemptions in 2016-2017)
- Salt Lake City, UT
- Seattle, WA
- Portland, OR
- Troy, MI
- Provo, UT
- Houston, TX
- Fort Worth, TX
- Plano, TX
- Warren, MI
- Detroit, MI
- Pittsburgh, PA
- Austin, TX
- Kansas City, MO
- Spokane, WA (405 exemptions)

If you're suprised California didn't make the list, that's because after the Disneyland measles outbreak, the state <u>passed a law</u> eliminating non-medical exemptions. The next year, California saw an uptick in the number of kids who were <u>supposedly medically unable to be vaccinated</u>, but in total, exemptions went down and <u>more kids got vaccinated</u>.

But the fact is, there are likely more hotspots than just the ones on the list above. It's not like anti-vaxxers marched their teenagers to the doctor the day California's law passed; unvaccinated kids (and adults!) are still out there. There may be plenty of unvaccinated people in states that don't have the exemptions, too, especially if state law makes it easy to get a not-entirely-honest medical exemption.

CONGO Ebola 2018 update

DRC Ministry of Health (14 Jun 2018) Source:https://us13.campaign-archive.com/

The epidemiological situation of Ebola Virus disease dated 14 June 2018:

- 11 new suspected cases, including 1 in Bikoro, 4 in Iboko, 1 Wangata and 5 in Ingende
- 11 samples were negative
- 24 people have been cured of Ebola Virus disease since the beginning of the epidemic
- No deaths reported so far [to date total of 28 deaths (possibly 29 since MSF tweeted a
 death possibly due to Ebola); 14 of them among the confirmed cases].
- No new cases confirmed



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New Software to Prevent Biological Attacks

Source: https://i-hls.com/archives/81106

Feb 2018 – US Federal research facilities rely on internet-connected devices to automate many basic building functions like ventilation, heating, and security, as well as more hazardous processes like decontaminating equipment and preventing lethal microbes from escaping the lab. Hackers could potentially exploit these IoT devices to take control of building operations, but the DHS Science and Technology Directorate is investing in software that smothers attacks before they start.

The US Homeland Security Department is testing new software to protect government laboratories from cyberattacks that could potentially release dangerous pathogens into the environment.

Developed by Red Balloon Security, "Symbiote Embedded Defense" technology injects software into each device's binary operating system and constantly analyzes the code to prevent rogue commands from executing. Because the technology doesn't rely on a particular operating system, it works for every single embedded device.

Homeland Security awarded the company a \$1 million contract to test the software at the agency's Plum Island Animal Disease Center, S&T Chief of Media Relations John Verrico told nextgov.com. Researchers at the facilities work with dangerous microbes like SARS, West Nile virus and yellow fever, meaning even a small attack on building operations could have enormous consequences.

Assailants can cause the containment to breach, can cause damage to the people inside and release dangerous pathogens outside the facility by just manipulating the small embedded computers that control the building.

Building control systems at government labs and many production facilities run mostly on legacy software, which makes them particularly susceptible to an attack. Because the Symbiote software integrates directly into the operating system and detects any unauthorized changes to the code, it's able to lock down most outdated technology.

Aerosol Simulants (Chemical and Biological)

Source: http://www.pastiche.ae/products-services/cbrn/aerosol-simulants/

This product administers a small aerosol challenge to chemical and biological collection, detection and identification equipment. Many situations arise where it would be useful to have a method for qualitatively determining that equipment is working. With gas detectors, a small pulse of gas is commonly administered to the equipment before it is taken out into the field to see if an upscale reading is obtained. This safety measure is called a 'bump test' and shows that the equipment is operational.

For performing both chemical and biological "bump tests," we provide a medical inhaler that has been charged with a nontoxic pressurized propellant and in the case of biological bump tests, a small amount of simulant powder. When the inhaler canister base is depressed, a fixed volume of propellant and any suspended aerosol material present is discharged as a turbulent jet. Some applications include:

- Testing air sampling and extraction equipment;
- Testing ultraviolet biological aerosol detectors such as Research International's TacBio[™] aerosol detector;
- Testing bioidentification devices such as tickets(lateral flow immunoassays);
- Testing gas detectors that have the propellant used in this product in their gas library
- Studying aerosol dispersion in various settings; and
- Equipment demonstrations for customers

The propellant used in RI's Aerosol Simulants is the same propellant used in most medical inhalers and is of a high purity, with minimal oil and other contaminants. A special high accuracy metered-volume valve is used which provides an output dose that is consistent to within 5% from shot to shot.

Since the simulant materials are physically suspended in the propellant, it is essential that the unit be well shaken before each use. The check source size and shape minimizes issues



with airline personnel who otherwise prefer to confiscate all pressurized products found in carry-on luggage.

Product Features

- Advantages
- Compact
- Easy to use
- Easy to transport
- Toxin simulants
- Spore simulants
- Chemical/flammable gas simulant
- Repeatable doseage
- Long life- over 100 shots
- Nontoxic

Typical Application

- CBW/TIC gas detectors
- UV biotriggers
- Air samplers
- Lateral flow immunoassays
- Automated bioanazyzers
- Postal room biothreats
- Product demonstrations



UAV-Based Aerosol Collectors and Detectors

Source: http://www.pastiche.ae/products-services/cbrn/uav-based-aerosol-collectors-and-detectors/

Pastiche is partnering with the Russian company ENICS and Research International, Inc. to offer the world community unmanned aerial vehicles (UAVs) with integrated CBRN capability. These systems offer



the user new levels of capability and flexibility. Most CBRN detection devices are point sensors — that is, they provide target detection and identification at one location. This can be mitigated to an extent by mounting the sensor to a person or vehicle, but in either case travel is limited to the area accessible by foot, vehicle, or boat. Typically the only solution for wide area monitoring is to deploy a sensor array, locating them at what are hoped to be optimal points as determined by average seasonal

or yearly weather conditions and local topography.

In contrast, sensors on a UAV platform can perform monitoring and surveillance tasks virtually independent of ground conditions; search patterns can be varied in response to immediate weather conditions; and sensors can be deployed to other venues with little advance notice. One sensor-equipped UAV can perform the same level of surveillance as 12 to 24 fixed location sensors and with greatly increased flexibility. Possible application areas include:

- ♦ Agriculture
- Public health
- ♦ Oil industry
- Environmental protection
- Homeland security
- First responders
- Police
- ♦ Military
- Public event security



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Users typically require a customized solution that reflects their needs and local government regulations that impact on the use of UAVs. To determine basic feasibility, potential users are urged to first examine the information provided here on detectors and UAV platforms in terms of volume and weight compatibility, flight duration, and surveillance distance.

US Military Report Warns Of Terrifying New Bioterrorism Threat

Source: http://www.iflscience.com/health-and-medicine/us-military-report-warns-of-terrifying-new-bioterrorism-threat/

The idea of bioterrorism and biological warfare is nothing new. As far back as antiquity, people have been meddling with <u>biological materials and using them as a weapon</u>. However, in the emerging era of synthetic biology, this old threat has an ugly new face.

The US Department of Defense has recently commissioned the National Academies of Sciences, Engineering, and Medicine to look at the biggest threats posed by the rapidly advancing field of "synthetic biology".

All in all, the report is pretty damn scary but devilishly fascinating.

One of the most concerning threats, according to the report, is the ability to recreate known viruses in the lab. For example, scientists have already shown how it's perfectly possible to re-create an

eradicated virus like smallpox using just its DNA. In the wrong hands, this could mean serious trouble. The report imagines an especially terrifying scenario involving the creation of a genetically-altering ordinary human gut bacteria to produce toxins. You would effectively be killed by your own microbiome, meaning the attack is subtle and extremely hard to detect.

Equally, gene-editing could be abused to make an existing bacteria or virus even more deadly and contagious. Thanks to the burgeoning field of CRISPR gene editing, this has never been easier or cheaper.

In May 2018, the Johns Hopkins Center for Health Security <u>posed a hypothetical scenario</u> of just this. They attempted to speculate how the world would deal with an outbreak of "Clade X," a fictional mix of Nipah virus and a human parainfluenza virus released by a fictional terrorist group. It didn't end well for the US.

The report also identifies the threat of modifying the human immune system. It could be possible to develop a way of "purposely weakening a person's immune system," meaning even a usually innocent virus could wreak havoc on a population.

Biotechnology is currently blowing up as a field of study, meaning it's extremely hard for policy-makers to keep up with the latest developments. This in itself raises bioterrorism to an even more concerning threat than more conventional means of warfare.

"The US government should pay close attention to this rapidly progressing field, just as it did to advances in chemistry and physics during the Cold War era," study author Michael Imperiale, Professor of Microbiology and Immunology at the University of Michigan, explained in <u>a statement</u>.

"It's impossible to predict when specific enabling developments will occur; the timelines would depend on commercial developments as well as academic research, and even converging technologies that may come from outside this field," added Imperiale.

"So it is important to continue monitoring advances in synthetic biology and other technologies that may affect current bottlenecks and barriers, opening up more possibilities."

Report: Scientists Have Advanced Bio-Weapon Capabilities

Source: https://www.telesurtv.net/english/news/Report-Scientists-Have-More-Advance-Bio-Weapon-Capabilities-20180620-0002.html

<u>Advancement in synthetic biology</u> now gives scientist the tools to recreate dangerous viruses, a 221-page Department of Defense report has disclosed.



"Right now, recreating pretty much any virus can be done relatively easily. It requires a certain amount of expertise and resources and knowledge," Michael Imperiale, a microbiologist at the University of Michigan, said.



CRISPR/Cas9 system for editing, regulating and targeting genomes. The Cas9 protein uses a gRNA (guide RNA) sequence to cut DNA at a complementary site. Molecular structure - RNA in red, DNA in yellow. Image Credit: ibreakstock / Shutterstock

The field of synthetic biology – which is described as a futuristic field of science that seeks to master the machinery of life – can <u>facilitate altering the structure of bacteria</u> to make them more harmful as well as modify microbes to distribute lethal toxins.

"What people don't think about very often is the potential for an engineered organism to become an epidemic or even a pandemic. One of the goals of this exercise was to show that an engineered organism could be the cause of something that we are not really preparing for," Dr. Tom Inglesby, director of the Johns Hopkins center, explained.

The ability to make bacteria more resistant to treatment, creating harmful biochemicals, altering the human genome, altering human healthy bacterial microbiome, altering human immune systems, and creating new pathogenic organisms are among other concerns expressed in the report.

"What we wanted to show in the exercise was that there are different ways of getting to a pandemic. And we need to be prepared for all of them," Inglesby stated.

NPR noted that making the simplest change to a virus can produce "drastic deficiencies" in key properties, making recreation difficult.



But, Imperiale, who chaired a committee convened by the National Academies of Sciences, Engineering, and Medicine to assess the state of synthetic biology, added that "there are certain capabilities that may not be possible now, but in those cases we tried to identify what the bottlenecks or barriers might be that, if overcome, would enable those to be more possible."

This commissioned report, authored by 13 experts in the field, comes from the National Academies of Sciences and is the first that outlines national security threats from biological weapons using genetic-engineering tools, such as the <u>gene-editing</u> CRISPR tool.

In 2016, the U.S. intelligence community had mentioned gene-editing as a potential biological weapon of mass destruction. CRISPR is reportedly effective in both the animal kingdom as well as forests and fields.

Source: National Academies of Sciences, Engineering, and Medicine. 2018. Biodefense in the Age of Synthetic Biology. Washington, DC: The National Academies Press. https://doi.org/10.17226/24890. https://www.nap.edu/catalog/24890/biodefense-in-the-age-of-synthetic-biology

IRGC says prepared to counter bioterrorism

Source: http://www.tehrantimes.com/news/424570/IRGC-says-prepared-to-counter-bioterrorism

June 20 – Commander of the Islamic Revolution Guards Corps' (IRGC) security squad has highlighted the measures that the military force has taken to protect authorities from bioterrorist attacks, saying his department is offering training courses and has developed homegrown equipment for that purpose. In an interview with Tasnim, General Ali Nasiri said the IRGC is duty bound to combat any kind of threats and prepare the necessary facilities and training programs, including plans to counter bioterrorism. The general said his department has already prepared the necessary training programs and equipment, much of which, he said, is home-grown.



EDITOR'S COMMENT: Strange statement. Or a warning? Or just fear?

Indel-correcting DNA barcodes for high-throughput sequencing

By John A. Hawkins, Stephen K. Jones Jr., Ilya J. Finkelstein, and William H. Press Source: http://www.pnas.org/content/early/2018/06/19/1802640115

Significance

Modern high-throughput biological assays study pooled populations of individual members by labeling each member with a unique DNA sequence called a "barcode." DNA barcodes are frequently corrupted by DNA synthesis and sequencing errors, leading to significant data loss and incorrect data interpretation. Here, we describe an error correction strategy to improve the efficiency and statistical power of DNA barcodes. Our strategy accurately handles insertions and deletions (indels) in DNA barcodes, the most common type of error encountered during DNA synthesis and sequencing, resulting in order-of-magnitude increases in accuracy, efficiency, and signal-to-noise ratio. The accompanying software package makes deployment of these barcodes straightforward for the broader experimental scientist community.

Abstract

Many large-scale, high-throughput experiments use DNA barcodes, short DNA sequences prepended to DNA libraries, for identification of individuals in pooled biomolecule populations. However, DNA synthesis and sequencing errors confound the correct interpretation of observed barcodes and can lead to significant data loss or spurious results. Widely used error-correcting codes borrowed from computer science (e.g., Hamming, Levenshtein codes) do not properly account for insertions

and deletions (indels) in DNA barcodes, even though deletions are the most common type of synthesis error. Here, we present and experimentally validate filled/truncated right end edit (FREE) barcodes, which correct substitution, insertion, and deletion errors, even when


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these errors alter the barcode length. FREE barcodes are designed with experimental considerations in mind, including balanced guanine-cytosine (GC) content, minimal homopolymer runs, and reduced internal hairpin propensity. We generate and include lists of barcodes with different lengths and error correction levels that may be useful in diverse high-throughput applications, including >10⁶ single-error–correcting 16-mers that strike a balance between decoding accuracy, barcode length, and library size. Moreover, concatenating two or more FREE codes into a single barcode increases the available barcode space combinatorially, generating lists with >10¹⁵ error-correcting barcodes. The included software for



happens only upon observation (fifth column). del., deletion; div., divergence; ins., insertion; sub., substitution; trunc., truncation.

creating barcode libraries and decoding sequenced barcodes is efficient and designed to be userfriendly for the general biology community.

Applications and error correction strategies of DNA barcodes. (A) Illustrative examples of highthroughput sequencing assays that require large lists of error-correcting DNA barcodes. Barcodes are used to identify individual cells or molecules in pooled libraries (1, 10, 10)13). (B) Current strategies to correct synthesis and sequencing errors in DNA barcodes are confounded by indels. Hamming distance can only handle substitutions. Levenshtein distance is confounded by the fact that barcodes are prepended to other sequences of interest. Indels thus produce phantom Levenshtein distance errors when bases from the remaining DNA molecule shift into or out of the barcode window. (C) Examples of FREE divergence (this work), given the actual edit history. Levenshtein (Lev) and Hamming distances are also shown for comparison. A substitution and insertion are correctly attributed as two edits by FREE divergence (first column). FREE divergence is a symmetrical function [i.e., FreeDiv(E, O) = FreeDiv(O, E)second columns). (first and Different actual edit paths can result in the same observed sequence (second and third columns). Indels can have zero cost, particularly near the end of the barcode, where they can occasionally be undone by fill or truncation (fourth column). Edits past the barcode end

can matter since the fill/truncation step div. divergence: ins.



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An interesting photo to study



German Police Special Forces (@ the recent Liege ricin crime scene)

Western nations are already investing in the third generation of vaccines to respond to possible bio-weapons

Source: https://www.financialexpress.com/opinion/western-nations-are-already-investing-in-the-third-generation-of-vaccines-to-respond-to-possible-bio-weapons/1215559/

June 22 – Given the real dangers of unconventional warfare—sample the chemical attacks in Syria and Russia's killing exiles in foreign jurisdictions using radioactive toxins—there has been some focus from countries on developing responses to biological weapons/ bioterrorism. For instance, even though smallpox was eradicated in 1979, if Variola (the smallpox virus) was engineered to be resistant to existing vaccines in a lab somewhere and released on troops of a country or on the general population, the disaster will be of incalculable proportions. Given how generating a new vaccine response will be time-consuming, a potential crisis could well bring a nation to its knees. The world, thus, is increasing its reliance on 'DNA' vaccines—these use viral-specific RNA/DNA sequences, usually coding for surface proteins on the virus's shell, that trigger an immune response in humans. A subject inoculated with the vaccine will develop immunity to the virus within weeks. Given the ease of developing DNA vaccines (DNA is a misnomer here because the genetic material used could also be RNA), an effective response is possible if the right delivery systems are developed.

To that end, the US Department of defense has funded the Global Research Centre of GE, the American conglomerate, for "amplification" of viral DNA, that is rapidly increasing the amount of the genetic material in the sample for more efficient testing. GE scientist John Nelson had developed a DNA amplification technique in the 1990s which is now key to



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mounting an effective DNA vaccine shield. DNA vaccines, the third generation in vaccine evolution, need not only be thought of as a response to bio-terrorism. Perhaps, with increasing efficiency in delivery and greater efficacy, these could some day become a part of the regular vaccine programme.





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