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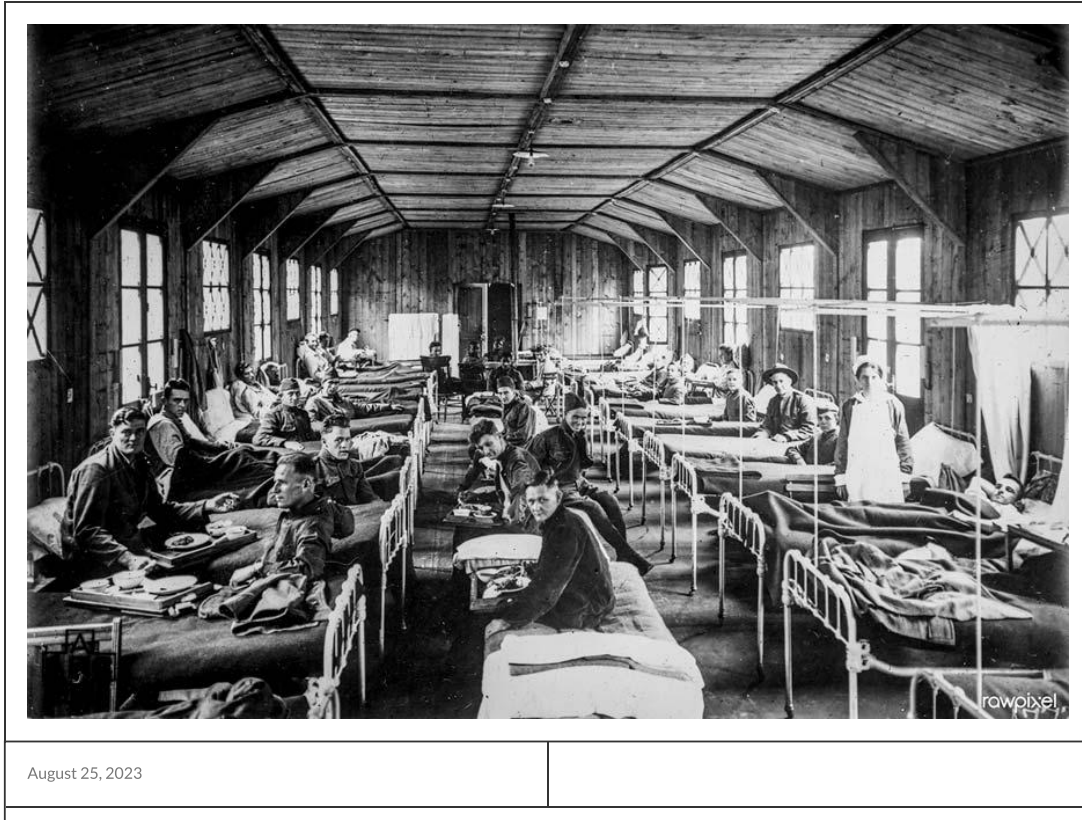
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CBRNe Medical Countermeasures 2001 to Date – A Reflection

Articles CBRN



By David Bates

David Bates addresses how actors can counter an adversary’s desired effects through information manoeuvre, as well as traditional defensive methods by exploiting previous experience and learning alongside professional education and training.

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The somatic and psychological effects of Chemical Biological Radiological and Nuclear (CBRN) agents are well characterised and documented as are their modes of deployment and use (Bland, 2013). NATO troops are well versed in deploying defensive measures to counter their effects across the mission spectrum from warfighting to hybrid operations including violent extremism, propaganda and deception (NATO, 2023). CBRN and its newer sibling high energy explosives (e) are deliberately deployed by adversaries to create disorienting dilemmas in a government, entity, population or community and they are most effective against unprepared groups.

History

Early defensive methods are still effective in the 21st century, such as hazard avoidance, reduction of the hazard and vulnerability through physical means, elimination or sharing the burden within a multi-agency plan. In World War I, where chemical weapons were first deployed *en masse*, troops made improvised protective masks by urinating on first field dressings and wearing goggles. Porton Down in the United Kingdom (UK) rapidly developed respirators for British and Allied troops and that organisation continues to research and forge capability across the range of CBRNe defence from intelligence to physical and psychological rehabilitation

Innovation

Innovation in World War I was borne out of necessity and troops faced with the disorienting dilemma of being killed or injured by intoxicating gases fought through the problem rather than freezing or retreating. No doubt the early attacks experienced by Canadians on the Western Front did necessitate withdrawal, but learning was rapidly building buoyancy into troop formations on both sides and the ability to fight dirty rather than having to take an operational pause, decontaminate and then fight on.

The range of CBRNe weapons combined with other hybrid warfare effects are deployed with the aim of undermining socio-political and economic stability creating a blurred perception of social reality between peace and war. Peter Sandman in his 2022 article entitled *Commentary: Navigating COVID language traps* articulates the effect on the population well in his Risk Communication thesis where he assesses risk as being a sum of hazard and outrage. Focusing on timely and accurate information as a countermeasure can reduce the resulting public or population anger thereby reducing the risk or the assault and its subsequent effect. His work on disaster risk management through quality information has been demonstrated to be effective since his first program covering the Five Mile Island Power Plant catastrophe up to his more recent work covering the impact of COVID-19 on populations' measures of anger.

COVID-19 vaccine bottles, ©schluditsch/unsplash

Medical Countermeasures

One of the elements that created the conditions for anger and outrage in populations across the world during the COVID-19 pandemic has been the rapid roll out of vaccines. Poor dissemination of information about the disease in the first place, subsequent veering and hauling of policy by governments, lack of engagement with the public and poor use of language amplified anger and outrage in some populations. Some governments

were economic with the truth which led to mal or misinformation. The positive message surrounding the rapid development, upscaling to manufacture and rollout of the various vaccines was not exploited.

The medical countermeasures community has been striving for years to accelerate the process whereby new vaccines and other products may be developed to deliver an effective capability. One area being *in silico* down selection of candidates. This not only accelerates the process allowing hundreds if not thousands of candidates to be examined rapidly, but it also reduces the need for *in vivo* and *in vitro* models. Safety trials remain a speed bump but are obviously necessary as are efficacy trials which continue throughout the product's lifecycle. Public suspicion around licensing added to the outrage and sometimes anger as the public was not educated on emergency use policy or orphan drug status even though treatments in specialist areas might be stuck in this state as no one will resource or take responsibility for licensing. Teaching evidence-based medicine, one is aware of many older drugs that no longer enjoy the same level of pharmacological scrutiny as these new vaccines, such as aspirin and paracetamol, but the public will accept them without question!

An area where interest has grown over the last twenty years is exploiting treatments originally designed for mainstream pathophysiology such as using Alzheimer's medications to counter or protect against the neurological effects of nerve agents. Following the dual use of pyridostigmine bromide for treating Myasthenia Gravis and its well-known use as nerve agent pre-treatment. Of course, this product was subject to similar anger and outrage when Coalition troops were ordered to take it during the early 1991 operations in Iraq and Kuwait. 'Gulf War Syndrome' continues to be diagnosed and challenged in courts across the world with medical countermeasures being at the centre of most cases surrounded by environmental factors.

Recent Success

Hybrid warfare attacks employing CBRNe agents have been frequently witnessed in recent history with examples such as Georgi Markov's unlawful killing with ricin in 1978 up to the attempted assassination of the Skripals with novel nerve agent in 2018. The results of both these incidents were polar opposites with Markov dying in London's Westminster Hospital of septicaemia, without the causative agent being identified until *post mortem*. The Skripals on the other hand were rescued by emergency first responders and treated successfully in Salisbury Hospital. It can be argued that two major factors were responsible for these outcomes: one being the health of the victims with Markov said to have been in poor health with kidney problems and the Skripals being reasonably healthy. Both agents are slow acting so one would expect positive identification within the treatment window of opportunity. Both scenarios took place where there was a low index of suspicion that CBRN agents might be the cause of the pathology.

Waterloo Bridge in London – the site of Georgi Markov's assassination with ricin loaded into a pellet fired from an 'umbrella gun'; an example of clandestine, non-attributable attacks that have happened multiple times in the UK within the past two decades, ©Tom Arthur/Wikimedia Commons

Medical countermeasures and treatments are only part of a suite of components that make up the CBRNe defence capability. Intelligence based on information from surveillance, detection and diagnostics is as important in the health and medical force protection environment as it is across the spectrum of operations (NSO, 2018). The use of ‘fentanyl’-like compounds to break the Moscow Dubrovka Theatre siege in October 2002 illustrates this well. Again, like in the case of Markov, emergency services and hospital clinicians could only treat what they were seeing until they received accurate information about the analogue(s) that had been introduced to the auditorium by the security services. Civilian health and care services will always be at least ‘one tactical bound’ behind without the benefit of actionable intelligence. NHS England (2022) and the UK Health Security Agency (HPA, 2008) both publish excellent handbooks as do other countries. AMedp-7.1 (NSO, 2018 and Bland, 2013) is a CBRN medical doctrine that has been crafted from good practise across NATO countries and beyond. This doctrine served the health and care teams in Salisbury well only losing one patient whose health may have been compromised pre-morbidly due to lifestyle (Baxter C, 2021).

President Vladimir Putin visiting victims of the Dubrovka Theater attack, ©Presidential Press and Information Office/Wikimedia Commons

So What?

The Salisbury incident followed by the COVID-19 crisis present important lessons in situational awareness, developing a common operating picture, understanding and applying an ‘all-hazards’ approach to emergency and disaster management – all wrapped in a combined joint doctrine that everyone complies with. Unfortunately, this is not a universally accepted philosophy and is often plagued by politics, as we have discussed already, and the friction caused by poor resourcing which reduces the effectiveness of the capability as lines of development become eroded. Identifying synergies between mainstream health and medicine and regaining the ‘one health concept’ or fusing environmental, animal and human health and medicine might lead us some way to improving our global biosecurity as well as strengthening our ability to respond, remaining buoyant when facing CBRNe and other hybrid threats to global security in the future.

Arguably the most important lesson over the last two decades has been promulgating high quality and accurate information to an increasingly sceptical public, particularly when important components of defence capability, such as medical countermeasures, are being challenged (Sandman P, 2022).

About the Author:

Colonel David Bates has completed over 42 years’ service in the British Army initially as a nurse specialist in burns trauma, but more recently focusing on force health protection in general and CBRNe in particular. Now a Senior Lecturer at the University of Cumbria, UK, he teaches and lectures globally on disaster response and humanitarian action.

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* Heading Picture: *In World War I, Allied Troops would be treated in Medical Facilities such as this following exposure to disease and injury, ©gavi.org*
