Dr Christina Baxter, of EmergencyResponseTIPS.com, is joined by a special guest to relook at old cases

Lessons Learned: Ghouta

This series takes a fresh look at historic events to see how responses would be different today, using what we have learned, and new technologies. Here, we focus on the chemical attack on the civilian residents of Ghouta in 2013.

At the request of the Syrian government, the UN set up a mission to investigate alleged uses of chemical weapons (CW) in the Syrian Arab Republic (SAR). While the mission team was waiting to deploy to investigate the Khan Al Assal chemical attack, another attack was launched against Ghouta, killing anywhere between 300 and 1,700 people. This was not the attack that SAR had wanted investigating, and the joint UN/WHO/OPCW team faced security challenges from both the SAR and rebel forces. All the while the world demanded answers.

Boban Cekovic, general manager, operations, at Hotzone Solutions, was part of the team that deployed.

I was in my eighth year with the Organisation for the Prohibition of Chemical Weapons (OPCW) in 2013, and acting as head of demilitarisation inspections. In late 2012 we organised a large scale Investigations of Alleged Uses (IAU) exercise with real CW agents. It was a milestone in protocols, training and equipment lessons learned that addressed some of the challenges and controversies not covered in previous training and preparedness work for OPCW inspectors. Past IAU CW training was based on the requesting state party having full control over the site of alleged use and the inspection team only deploying in a safe environment with no communication or logistics issues.

Syria was not an OPCW member state when allegations of CW use started in late 2012. The IAU of CW was initiated in March 2013, and OPCW and the World Health Organisation (WHO) were requested and tasked with supplying inspectors and experts. A mission leader and two deputies were appointed, one from the WHO and one from the OPCW. The team was organised by functional tasks, and I was to deputy to Scott Cairns, the OPCW team leader, and lead a field sub-team for collecting physical CW samples.

The scope of the UN secretary general's IAU mission was simply to collect and report on the facts and ascertain whether or not CW had been used. Although that mandate was counterintuitive for the public, had it included attribution, the SAR might not have permitted the investigation. It was not, however, limited in collecting relevant facts about the incident.

In its final report the IAU team drew conclusions on seven investigated incidents, with the strongest ones giving clear and convincing evidence that CWs were used against civilians, including children, on a relatively large scale in the Ghouta district of Damascus.

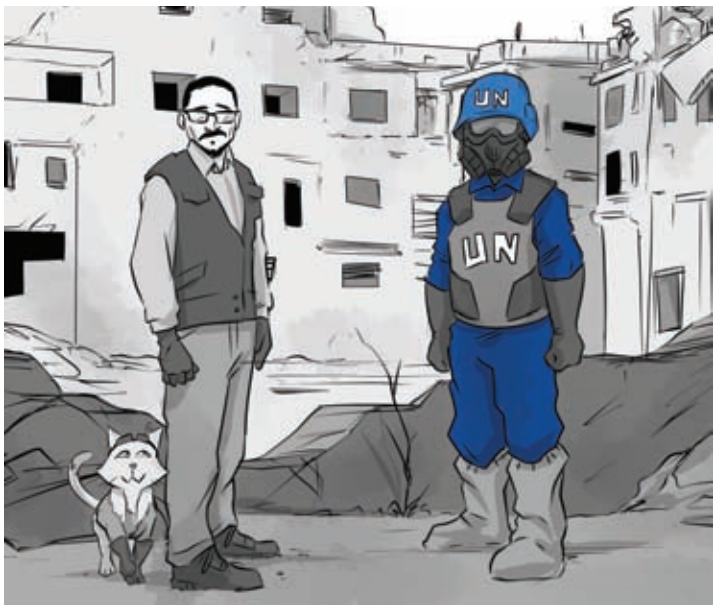
Even preparing for the deployment ,the team learned a number of lessons. For example, personnel had not been trained in a non-permissive environment, so there were issues with security confidentiality and protocols between OPCW and WHO members. We had to learn how to react if a father with an injured child sought help, or if civilians wanted to approach when our detectors showed significant sarin vapours around us!

We had to get used to constant media recording, which gave us visibility before official communications happened. We were also operating with extreme time

limitations. Evidence collection should have taken days, but we had an agreed five hour time limit, then the ceasefire was shortened, with less than 30 minutes notice. That led to the introduction of a new protocol: lets continue collecting evidence until the last 15 minutes and perform emergency limited decon, risking potential secondary vehicle contamination!

Equipment was also an issue. We needed ballistic protection with PPE when it was excessively hot, but not wanting to be too visible we wore civilian clothes over the top. Even for staff with physical fitness clearances the environment was challenging!

GPS trackers that relied on mobile networks were an issue in a civil war with challenged mobile comms. We also had to recognise and monitor other threats like volatile organic compounds (VOC), carbon dioxide and oxygen deficiency, and radiation especially when entering enclosed spaces. Continuous recording on body cameras allowed us to record all sampling points numbers and procedures implemented, so we didn't need to complete forms during the ceasefire… but this was challenging for batteries and created high heat in contaminated areas. We also had to consider what happens to collected chemical samples when the electricity for refrigeration is unstable. It was necessary to be flexible with standard operating procedures (SOPs), and decide that if something wasn't in a SOP then let's use experience and knowledge to execute safely and amend the SOP later.



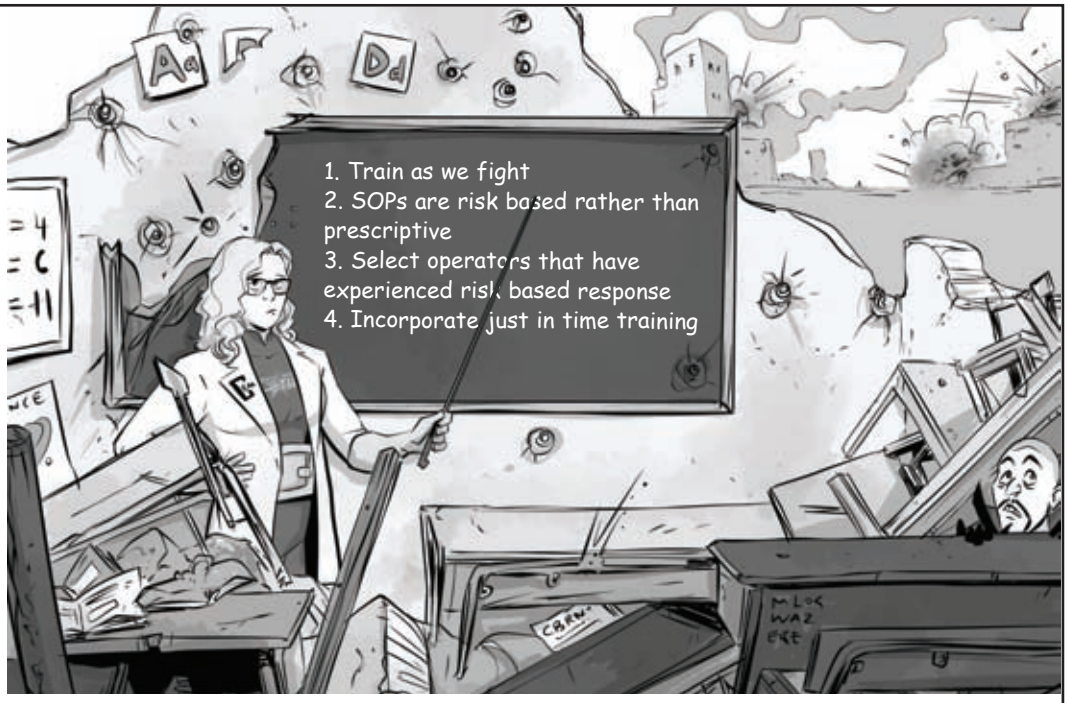
In terms of what I'd do differently… I'd like to have been able to choose personnel based on their background knowledge and mental/physical fitness. To train more often with potential partner organisations/entities, and not just SOPs but to hold table top exercises for non-SOP based scenarios when unexpected events happen (hostile intent/action, crowd breaches, family of the deceased interaction, media attention, etc). It's really important to monitor and regularly address mental fitness as well, and plan alternatives in addition to personnel rotation - every expertise must have a backup.

Much has improved in equipment since 2013, especially in miniaturisation of scene reconnaissance and recording equipment. Having at least two methods of detection, such as ion mobility spectrometry and flame photometric detection, both capable of processing wiped samples, and field identifiers such as Raman and Fourier transform infrared spectroscopy (FITR) is vital. They also need to be miniaturised, so you don't need to hold devices in both hands, and be intrinsically safe and easily taken off-line. Equipment should be transportable as regular cargo, not dangerous goods, allowing fast deployability on commercial flights. Safety monitors, such as for carbon dioxide, oxygen, VOCs, etc are still required .

It's clear from recent events around the world that not everyone feels the stigma preventing CW usage. Collecting evidence to document the use of such weapons within conflict zones requires skill sets that are not common among response personnel and the environment can be very challenging, both physically and mentally. Standard operating guidelines, training, exercises

We must train as we fight. The training and exercises needed to plan operations, collect evidence, or use equipment in non-permissive and potentially hostile environments must reflect changing situations, pressures, and hazards associated with operating in contested locations. The dangers within a conflict zone add a level of complexity that is rarely challenged in training and exercises.

Lessons Learned: Ghouta



Standard operating guidelines should be risk based rather than prescriptive to ensure that new situations do not hinder progress. Operators should be selected according to their experience and knowledge, which should include the risk based response process.

Just-in-time training should be incorporated, focusing on the immediate need and outcomes sought, not the ancillary information. For example, a responder might be using a particular detector or sampling technique for the first time outside the classroom within these environments. This operator will need aids such as an operational 'cheat sheet', while information on calibration and data application is unimportant. This approach can quickly provide operators with the right knowledge and reinforce skills to perform a specific function, thereby improving effectiveness and safety during the sampling mission while reducing information overload.

Training and exercises must be multi-agency, incorporating a mix of complex yet credible events including the influence of hostile work zones, heightened civilian awareness and interaction, and media interest. They must also address planning, tactical, operational and strategic objectives. These include the collection, decontamination, packaging, and transport of samples, chain-of-custody paperwork, field clearance and laboratory analysis of samples, decision making, communication, logistics, and more. Exercising in sterile safe environments with little time pressure or other threats, doesn't directly translate into operational relevance.

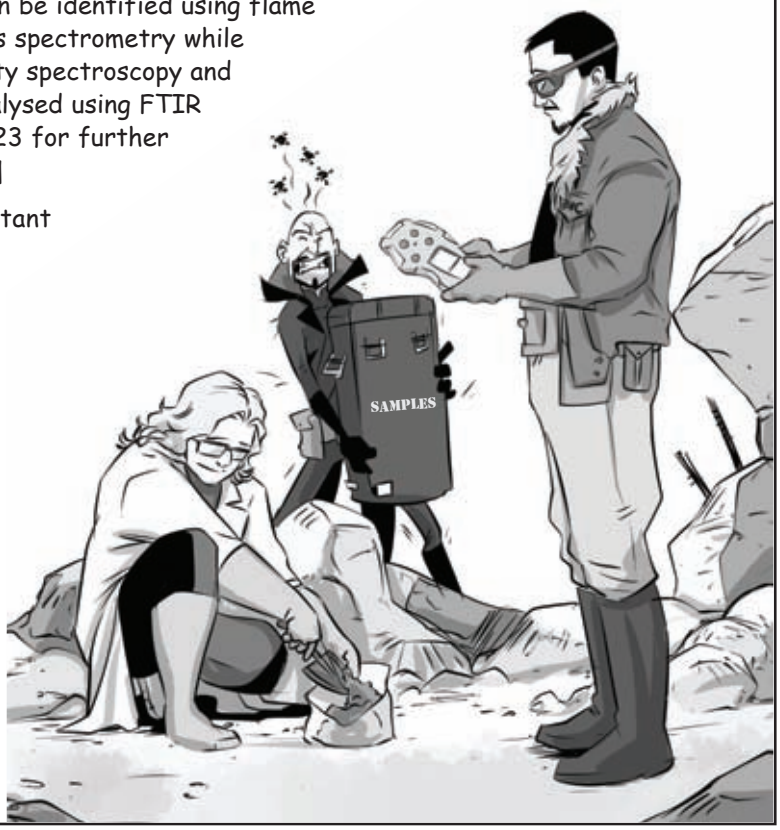
Protective equipment

When working in a conflict zone, protection against ballistic and explosive threats is needed along with protection from chemicals. The added weight of ballistic protection along with chemical protection greatly reduces material breathability, thereby increasing the individual's metabolic work rate and heat stress. Acclimatisation to the environment and protective gear is necessary before sample collection can safely occur on scene. In addition, responders must utilise effective work/rest cycles to minimise long-term health effects on team members.

Situational Awareness
In conflict zones like Ghouta, it is vitally important that, as far as possible, all field sampling and detection activities are recorded for location, sample integrity and data quality. Incorporating two and three dimensional imaging of the scene and collecting post event change detection data can be critical in the eyes of the international community. The use of 3D imaging can inform the rapid building of situational awareness, mission priorities, and sampling plans within the contaminated zone. [See *CBRNe World* December 2022 for further details on mapping.]

Field sampling and detection
Time on target is minimised in non-permissive environments, so sampling protocols and forward detection are critical. Sampling kits and equipment must be standardised but flexible and modular to allow for a variety of situations and samples. For example, there is little need for gas phase sampling systems if the sampling is months to years post event, however, soil and water sampling kits could be critical. [See *CBRNe World* October 2020 for further details on sampling.]

Multiple modes of detection should be provided for each type of chemical to be tested to ensure data rigour. For example, traditional CWAs at trace levels can be identified using flame spectrophotometry and gas chromatography mass spectrometry while moderate levels can be identified with ion mobility spectroscopy and colorimetric chemistry. Bulk materials can be analysed using FTIR and Raman systems. [See *CBRNe World* April 2023 for further details on detection of chemical warfare agents.]



In addition to monitoring for CWAs, it is important to ensure that the safety of operational personnel is also monitored for other hazards including toxicity, flammability/explosivity, reactivity, corrosivity and radioactivity. This can easily be done using traditional four to six gas detectors (incorporating sensors for oxygen, flammability, carbon monoxide, VOCs, and radioactivity) as well as traditional colorimetric papers.

Detection data must be accessible in standardised formats, preferably without using proprietary software. Instruments must be capable of onboard data logging as well as transferring to computer systems via wired or wireless methods. Data security should be considered as the information will be used to establish whether a CW event has occurred.

Decontamination
Modern decontamination techniques are critical in situations like this as the logistics support and timeline means a limited opportunity for traditional wet decon. Science has demonstrated that a hybrid or dry decontamination solution is suitable. [See *CBRNe World* February 2021 for hybrid decon and *CBRNe World* June 2024 for dry decon.]

Remember, for a team to be successful in a conflict zone, it is critical to select the right people with experience and skill sets, continuously monitor their physical and psychological wellbeing and take a flexible, risk based approach with fit for purpose equipment and PPE.

Images are courtesy of Phil Buckenham *https://philbuckenhamart.wixsite.com/philbuckenham*