

I am Steven Patterson, a retired Army Environmental Science and Engineering officer.

I am here today to assist with your understanding of burn pits, environmental health exposures, and how those were documented. Primarily, I can speak to the time of 2008 to 2009 when I was the senior Environmental Science officer for CJTF-101 while it was the headquarters for Afghanistan. In this position I traveled the nation extensively and saw most locations where US forces were deployed. My job was to help conserve the fighting force and identify environmental health exposures.

The deployed environment is very challenging and it is very difficult to document a person's exposure in such a setting. The equipment to identify and quantify exposures is often lacking as are trained personnel, especially in remote locations. This is made more difficult as we often have exposures which one would not anticipate as well as the challenge of accurately placing a certain person in a location at a given time. This is made worse when attempting to look back 10 or 20 years as camp names often changed and the personnel system doesn't operate down to the person.

Almost all of the locations I visited had burn pits operating at that time and few, if any, separated their waste before burning it so many contained pressure treated lumber, galvanized metal, significant quantities of plastics, and lithium batteries. These were not pits, but simply low lying areas where the waste was thrown and burned. Typically, they smoldered a great deal which is important as the combustion is not complete, more toxic compounds may form, and these toxins will not be lifted away so stay in or near the air around the camp.

Many of these burn pits were within the perimeter fence for security reasons, or very close to the perimeter if outside of the camp. Most of the small camps had few, if any, air samples taken at them due to limited personnel, equipment, transportation challenges, and time.

We had about 20 people to attempt to document the environmental exposures of roughly 37,000 people spread over an area roughly the size of Texas. However, I do not think that more environmental health people are the ideal solution.

The limited environmental health data; mostly air samples with some soil and water samples cannot be linked to a person but only to a location, and even if the person can confirm that they were at that location it does not mean that they had that exposure. Their exposures could have been much less or much more than that sample indicated.

The DoD has this responsibility and must address it as industry likely will not as they do not face these particular challenges. We have struggled in this space since Desert Storm and we must look at different options moving forward. We must leverage technology and address policy issues to fix these gaps.

Some possible options to consider;

1. Creation of a Joint Program Executive Office in order to focus the research and funding on environmental health surveillance while also providing a central location to hold responsible in the future.

2. Silicone brackets could be provided to service members to track their exposures, these have been shown to capture more than 1500 different chemicals and would allow us to mitigate exposures much sooner while also providing the service member with personal exposure data.
3. Research and build a replacement for the silicone bracelet which would provide near real time information on exposures and dose for a service member.
4. Create a repository of frozen soil samples from each deployment location so they can be tested in the future as needed when new concerns are identified.
5. Improve the personnel reporting system so that each individual can be located rather than their unit headquarters which may be 100s of miles away. This will allow for individual exposures to be more accurately documented.
6. Remote sensing should be researched to address gaps in environmental surveillance. This will be key for small teams operating in remote areas or dense urban environments which may never have an environmental health professional visit them.
7. Further research biomarker monitoring to document exposures a person had during a deployment or over their military career.
8. Educate leaders on the hazards of toxic exposures and hold them responsible if they needlessly expose their people.