



## Exploring Total Exposure Health and Total Worker Health

Kirk Phillips, MS

Jennifer Sahmel, PhD, CIH, CSP

This week we welcomed Dr. Jennifer Sahmel and Kirk Phillips to explore the concepts of Total Exposure Health (TEH) and Total Worker Health (TWH). TWH's primary goal is to improve the well-being of the U.S. workforce by protecting their safety and enhancing their health and productivity. Total Exposure Health is a strategy to evaluate individuals' exposures to hazards at work, from the environment, and lifestyle choices, integrating these evaluations with health promotions initiatives to better ensure the long-term health of the individual. TEH and TWH take a more holistic approach to health, safety and well being. These concepts are gaining traction and this week we had two of the concepts leading advocates.

Dr. Jennifer Sahmel is a Managing Principal Scientist with Insight Exposure and Risk Sciences in Boulder, Colorado. She is a Certified Industrial Hygienist and a Certified Safety Professional with 25 years of experience in exposure assessment science and workplace health and safety. She has worked in a variety of public and private sector positions including the U.S. EPA's Office of Pollution Prevention and Toxics the National Park Service and Comprehensive Health Services at NASA's Goddard Space Flight Center. She earned her MPH degree in Environmental Health and Industrial Hygiene from the University of California at Berkeley and her PhD in Environmental Health at the University of Minnesota. She is a Research Fellow with the University of Minnesota's Exposure Science and Sustainability Institute. She is also active in the American Industrial Hygiene Association and is a past member of their national board of directors.

Colonel (ret) Kirk A. Phillips currently holds the position of Director, Air Force Office of Energy Assurance (OEA), Washington DC. Prior to his current position Kirk was the Health Safety and Environmental Practice Leader and Vice President at LJB Inc. In 2018, he retired as the BSC Associate Chief for Bioenvironmental Engineering (BE) in the Office of the Air Force Surgeon General. In 2014 he developed Total Exposure Health as a strategic initiative to institutionalize primary prevention in

work, environmental and lifestyle exposures. Prior to his current assignment, Col Phillips was the Director of Policy and Programs for the Deputy Assistant Secretary of the Air Force for Environment, Safety and Occupational Health, Pentagon, Washington DC. Mr. Phillips entered the Air Force from a four-year AF ROTC scholarship in 1985. He obtained his BS in Aerospace Engineering and his MS in Engineering and Environmental Management. Colonel Phillips has held a broad range of leadership positions throughout the Air Force.

### **Nuggets mined from today's episode:**

Dr. Sahmel currently works as a consultant for governments, private industry and trade associations. She formerly worked for the US government as: consultant, contractor, and employee. Through industrial hygiene, her interest in risk assessment lead her into exposure science where she focused on characterization of dermal exposure. Her interest in Total Worker Health (TWH) and Total Worker Exposure (TWE) piqued her interest in Total Exposure. Due to workplace evolution and growth of nontraditional workplaces; the separation between workplace and home is now often blurred.

Workplace information and guidelines provide information useful outside of the workplace, what if an employee who has low level lead exposure at work is an avid fisherman or shooter? Both Workplace Exposure to lead and recreational lead exposure need to be considered to determine Total Exposure. Workers should be provided the opportunity to volunteer and aid in improving their health.

Kirk Phillips has a career in environmental safety and health. He was a CIH for 20 years. Mr. Phillips pioneered the concepts of Total Exposure Health and Total Worker Health (TWH). Exposures don't stop at the workplace. As professionals we must consider quiet time at night when working in noisy environments. The DOD has considered TWH the whole person for a long time through: social services, psychosocial, etc. When serving in Okinawa, Japan he oversaw 10,000 homes and handling wide-ranging issues: from lead paint to sewage backups.

Burn pits and Gulf War Syndrome have raised awareness to new health risks. The DOD does look to the AIHA for guidance. The DOD moves slow. Just understand people want to be healthy and want information, guidance and advice.

## Slide Comments by Dr. Sahmel

- An alphabet soup of terms: Total Worker Health, Total Worker Exposure, Total Exposure Health, Environment, etc.
- The workplace is changing: people work from home, people work from their cars; people extend work life after retirement, etc.
- CITISENSE and CLEANSPACE allow volunteers wearing sensors to monitor the air in cities and buildings. ISPEX monitors aerosols.
- There have been declines in health. Fewer people report being in excellent health, more people report physical limitations, obesity and asthma are increasing.
- Improvement health requires a multiprong approach.
- Eliminate, Substitute, Redesign, Educate and Encourage personal change
- Total Work Environment when working from home. It's blurred where work stops and home begins. Development and implement of new programs and policies.
- IH's can expand their abilities to help through gaining additional skills (e.g. organization, physical and psychosocial).
- There is an ongoing debate in the AIHA over the ethics of collecting information and data outside the workplace. Issues include: where will the sample data be used, where will it not be used? How will the data be protected? Develop rules or actions to best serve workers and their health.
- Ethics of data collection. Voluntary data collection NOT mandatory. Transparent data use. Validated technology. Data collection limitations. Secure storage.
- Early adopters: Caterpillar, CIGNA, Daimler Chrysler, CITIBANK, FEDEX, etc.

## Slide comments by Kirk Phillips

- Fewer acute exposures today in workplaces. Low exposures can have unique effects in individuals. Asked to provide exposure where overexposure to population doesn't occur, lowers exposures.
- Want to learn more? [Total Exposure Health, An introduction.](#)
- We can't just worry about the ill. We need to prevent disease. We make choices in life: should I get the Xray or MRI? Should I be vaccinated? We are all different, with different gene expressions, each unique. Find out where we are unique? People want to know and buy DNA testers and sensors. People are seeking info and treatment.

- Genomic research, monitor, understand and advance.
- Different people are bothered by different things at different levels. Noise standards are set to protect only 70% of the population.
- Limited exposures, better sensors, better records and record keeping, personal exposure monitors enabled and connected to the internet.
- The benefits of being in a better position to improve health outcomes. Encourage genetic research of interest to us. We can make a difference together.
- Healthcare, Precision Medicine, Exposure Health, Lifestyle, Environment, Work, Preventative Health, Precision Health.
- In support of the working population. Children, retired/elderly are not included under total worker, and are included under total population.

#### Dr. Sahmel

Attraction to the concepts of Total Exposure Health and Total Worker Health because they consider holistic exposure. More effort and interest in inhalation exposure resulted in a better understanding of inhalation exposure. Dermal Exposure Assessment is less researched and less well understood. -We need holistic exposure science: how to measure-how low levels of chemicals interact. Total Exposure consideration is better understanding both worker health exposures and individual exposures.

#### Kirk Phillips

Earlier in his career when challenged to show where he made a significant difference by improving people's lives, he found it difficult to demonstrate. More hazardous jobs are being eliminated. Taking care of the masses. Geneticists study what interests them. We need exposure scientists.

A mastectomy costs the health insurance company \$10K. Treatment for breast cancer costs the insurance company \$1M. 5X more people have the sprained ankle gene than the breast cancer gene. 27X more people have the hearing loss gene than have the breast cancer gene.

## FINAL THOUGHTS

Kirk Phillips

1. A slippery slope. Minimum health environment must be provided by employer. Individuals seeking more protection must seek it out on their own.
2. Whether you are an IH, environmental engineer, remediator you are an exposure scientist and have a piece of this pie.

Dr. Sahmel

1. Both opportunities and responsibilities come with emerging technologies. If willing to volunteer to share data transparently, read privacy disclosure information carefully.
2. The future is exposure science, as practitioners get involved and help advance.

*Z-Man signing off*

## Trivia

Question: Who was the first scientist to demonstrate that a cancer may be caused by an environmental carcinogen?

Answer: Percival Potts, 1775

Answered by: Victor Cafaro