



Episode 664 | May 6th, 2022 | 12:00 PM EST

**Joe Spurgeon, PhD**

Surface Dust Samples, ERMI Scores and Assessing Mold Exposures

This week we welcomed back Dr. Joe Spurgeon to talk about the use of surface dust sampling for assessing mold exposure. Many IEP's are frustrated with the lack of consensus on how to take and interpret surface dust samples for mold. They are also frustrated with the misuse of ERMI scores to assess exposure. Dr. Spurgeon will review his work and discuss his methods. Dr. Joe hopes our audience will poke and prod, to help him improve his recommendations.

Joe Spurgeon, PhD has a multidisciplinary doctorate degree in Analytical Chemistry and Environmental Health from the University of Pittsburgh; and was a Certified Industrial Hygienist from 1993 – 2013. His career has included working as a research chemist on the NBS Lead-Paint Poisoning Program, directing the FAA's Combustion Toxicology Laboratory, performing Health Assessments for CDC/ATSDR, implementing US EPA's Laboratory Exposure Assessment Project, and working as a consultant specializing in microbial indoor air quality for US PHS. He has performed over 4,000 residential and commercial investigations involving water intrusions and microbial contaminants; has taught courses on mold investigations, sampling, and data interpretation methods; and has served as an expert witness in numerous mold cases. Articles from Dr. Spurgeon are available at [www.bi-air.com](http://www.bi-air.com). His books are available at <http://expertonmold.com/> LEARN MORE this week on IAQ Radio+.

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

***What led to your interest Surface Dust Samples, ERMI Scores and Assessing Mold Exposures?*** After reviewing reports as an expert witness, he found that IEPs commonly overstepped the use of dust sampling and ERMI scores. He became concerned about sampling methods and how samples were analyzed and the impact on sample interpretation. Joe wants to stimulate discussion on these topics, and invites e-mail comments ([jospur46@gmail.com](mailto:jospur46@gmail.com)).

- Begin by having an understanding of the sampling objectives and sampling “rationale”. We assess Building-Related Contamination and Occupant Exposure Potential, but we should not assess Occupant Risk (health effects).
- Think about what you will be doing before you do it. What is the rationale for sampling? Why are we collecting this sample in this location? Why are we using this sampling method? Why are we requesting this type of analysis? Will the sampling plan allow us to detect sources or concentration gradients?
- Pre-plan what you will be doing onsite, but understand that when onsite the sampling plan will likely change.
- The decision as to whether or not occupants should vacate should be made by a physician. However, most physicians don’t know what to do with mold reports, so we need to write our reports with that in mind, and be willing to work with the client and their physician to interpret the results.
- The sample describes the environment, but It’s not easy to collect a representative sample. According to Koppen: “One of the primary challenges of assessing exposures (*to environmental contaminants*) is the collection of representative samples, with the sampling step typically contributing the largest variability” (*in the assessment of results*). [Koppen, R., et. al.; Determination of mycotoxins in foods: current state of analytical methods and limitations; Applied Microbiology and Biotechnology (May, 2010)]
- A sample that is not representative of the fungal loading in an indoor space will not be representative of the occupant exposure potential in that space. However, the sample not only should be representative. In order to be meaningful, it needs to be interpretable. Joe believes that not all sampling methods that are in common use can be interpreted.
- Both the collection method and laboratory analysis method for dust samples impact their ability to be interpreted. Just like air samples need to be standardized by air volume in order to be compared and interpreted, dust samples need to be reported on a standardized basis in order to be compared and interpreted.

- One option is to report the results on an Area Basis rather than the typical Weight-Analyzed Basis. Joe explained a case study where carpet was cleaned 3 times and failed clearance due to using a Weight-Analyzed Basis, but passed when the more logical Area Basis was substituted as the criterion.
- There are few standardized or validated mold sampling methods; and there has been little interest in researching sampling methods. Joe suggests using the “SOCS Criteria” for evaluating sampling methods: Does it provide the **Significance** of results; **Objective** assessment of results-high, average or low; **Consistent** assessment across projects and inspectors; and a **Stable** base for assessment that does not vary between projects.
- ERMI Method. ERMI scores were initially developed using mold levels in carpet dust samples collected by a specific sampling method to assess Building-Related Contamination.
- Assessing “Occupant Exposure Potential” can be another objective. This is different than the “potential for exposure”. In this case it means more like voltage is an electrical potential, a measure of exposure. Is there an exposure, and how high is the exposure?
- Some IEP and physicians use ERMI scores for a third objective, as a measure of Occupant Risk. Joe’s data showed ERMI scores should not be used as a measure of either Occupant Exposure Potential or Occupant Risk. When ERMI scores were plotted versus fungal concentration, it was a bell-shaped curve, with the maximum concentration occurring between an ERMI score of 0 and +2. There was no association between ERMI scores and Group 1 or Total fungi.
- Knowing from what type of surface the sample was collected was very important (hard surface, soft surface, air supply grill, etc.). The surface sampled should be considered when assessing the sample result.
- Joe described an alternative approach to interpreting surface dust samples. This method considers each type of surface independently. For example, one would expect the normal fungal loading on air return filters and air supply ducts, or carpets and clothing, to be substantially different. Therefore, the

same sample result may need to be interpreted differently depending on the surface sampled.

- Dust sampling air supply registers can be informative as to the HVAC as a source of occupant exposure. Joe will sample Air Return filters, Air Supply registers, and horizontal surfaces; and look for patterns in the fungi from the three samples. Joe opines that QPCR is a very good methodology.
- Depending on the project objectives, Joe uses what he considers to be the most appropriate sampling methods, laboratory methods, and data interpretation methods to achieve those objectives.

[Link to Dr. Spurgeon's Presentation](#)

In the past we have talked to Joe about his book on surface sampling, air sampling for mold and sampling after wildfires. Check them out here.

- [Episode 375](#)
- [Episode 525](#)
- [Episode 648](#)

*Z-Man signing off*

**Trivia:**

Name the EPA's technical contact for Environmental Measurement and Modeling?

**Answer:**

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