HERTSMI-2
Simplifying analysis of safety of WDB

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What is HERTSMI-2?

- Health Effects (For known patients)
- Roster (using QPCR from ERMI)
- Type Species
  - Designated representative of genus
- Mycotoxin and Inflammagen (formers)
- Updated from first version, a 9-species roster developed in 2010

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Goal for use of new roster

- Targeted to patients known to be sickened by exposure to WDB
- Targeted to physicians not mycologists!
- The basis for the use of HERTSMI-2 is the need to answer a common question: “Will this building make me sick?”

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Development Procedure

- 738 ERMI scores from Mycometrics
  - Patients' illnesses well documented
  - 146 with < ERMI 2; 592 with > ERMI 2
- Did not use other mycology labs
- Classify by ERMI > 2 or < 2 as known health risk (re-acquisition of inflammatory illness with re-exposure if >2 and MSH <35) for previously ill
- Sort by occurrence of fungi by PCR

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Relative Risk > 10 required

- Sorted by water saturation needs
- Stratified by spore equivalents/mg
- If levels of fungi in ERMI > 2 over levels in ERMI < 2 not > 10, then that organism is not retained in roster
- Arbitrary goal was to reduce ERMI to three saturation conditions with no more than 5 organisms

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Plug and chug!
What organisms tell the tale?

- For 90-100% saturation
  - Stachybotrys and Chaetomium
- For 80-90% saturation
  - Aspergillus penicilloides and versicolor
- For 60-80% saturation
  - Wallemia

Assigning a value-1

- No A. pen or A. versicolor > 500 in ERMI <2; no Chaetomium or Stachy > 125 in ERMI < 2; no Wallemia > 2500 in ERMI < 2. Assigned 10 points if present.
- For A. pen and A. versicolor > 100, only 2 found in ERMI < 2; Chaetomium and Stachy > 25 were 2; Wallemia > 500 were 7 in < 2; 218 in > 2 group.
- Assigned 6 points.

Assigning a value-2

- For A. pen and A. versicolor > 10; and Stachy and Chaetomium > 5 the relative risk is 4. For Wallemia > 100 relative risk is 3.5.
- Assigned 4 points.
- HERTSMI-2 score is sum of points from each categories (Max = 50)

Cut-off scores

- HERTSMI-2 $\geq$ 16 only found in ERMI > 2 but none of ERMI < 2.
- HERTSMI-2 $\leq$ 10 in no ERMI > 2.
- ERMI < 2 had 25% with ERMI 11-15
- ERMI < 2 has weaknesses for prediction of safety
- What to do with the 11-15 group?

11-15 HERTSMI-2 suggestions for patients current buildings

- Sort by water saturation:
- Prudent to find and correct water sat 90-100% and then re-evaluate
- If 80-90% cleaning and then re-test
- If Wallemia is 6, correct humidity, duct work and re-evaluate
- More work needed here

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Labs don’t show dose response

- No difference mean VIP, MSH, MMP9, C4a, TGF beta-1, CD4+CD25+ sorted by HERTSMI-2 of 12, 14, 16, and > 16.
- HERTSMI-2 < 10 no difference in C4a, TGF beta-1, MMP9, CD4+CD25+ from controls, but MSH and VIP still markedly low

Don’t do re-exposure until labs corrected

- Starting to assess a patient’s potential for re-acquisition of illness without treatment of known abnormalities *will not show changes* solely due to damp building contents
- Ongoing exposure to HERTSMI-2 > 16 guarantees reduced rate of improvement in labs

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HERTSMI-2 has a role in data base

- Most important value assesses building risk for patients with MSH < 35 pg/ml even after Rx
- Re-exposure to HERTSMI-2 (data obtained from chart review, n=86) >16 resulted in 100% re-acquisition of illness
- Re-exposure to < 10 (N=32), 0% ill.

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Conclusion

- Treating physicians
  - need to know the proteomics of their patients' illnesses to make decisions about re-exposure
  - may use HERTSMI-2 to advise known patients on safety for re-exposure
- HERTSMI-2 can direct remediation efforts to targeted water saturation
- Prospective data is being collected

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