

No More Canaries in Coal Mines: A Systematic Review of Environmental Health Monitoring

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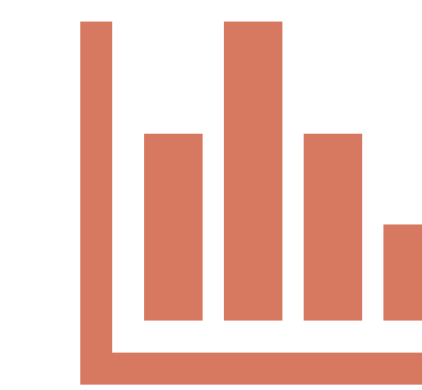
Traditionally Colony Health is Monitored with Sentinels

- Soiled bedding is transferred from colony cages to sentinel cages
- Periodically these animals are euthanized and sampled to detect potential colony pathogens. This is termed soiled bedding sentinels (SBS)
- New techniques can replace sentinels via Environmental Health Monitoring (EHM)
- **Problem: Despite limited data to support using sentinels, some facilities remain skeptical of EHM**

Methods



- Followed PRISMA & SYRCLE Guidelines for systematic reviews to **ensure high rigor & objectivity**, avoiding bias and cherry-picking

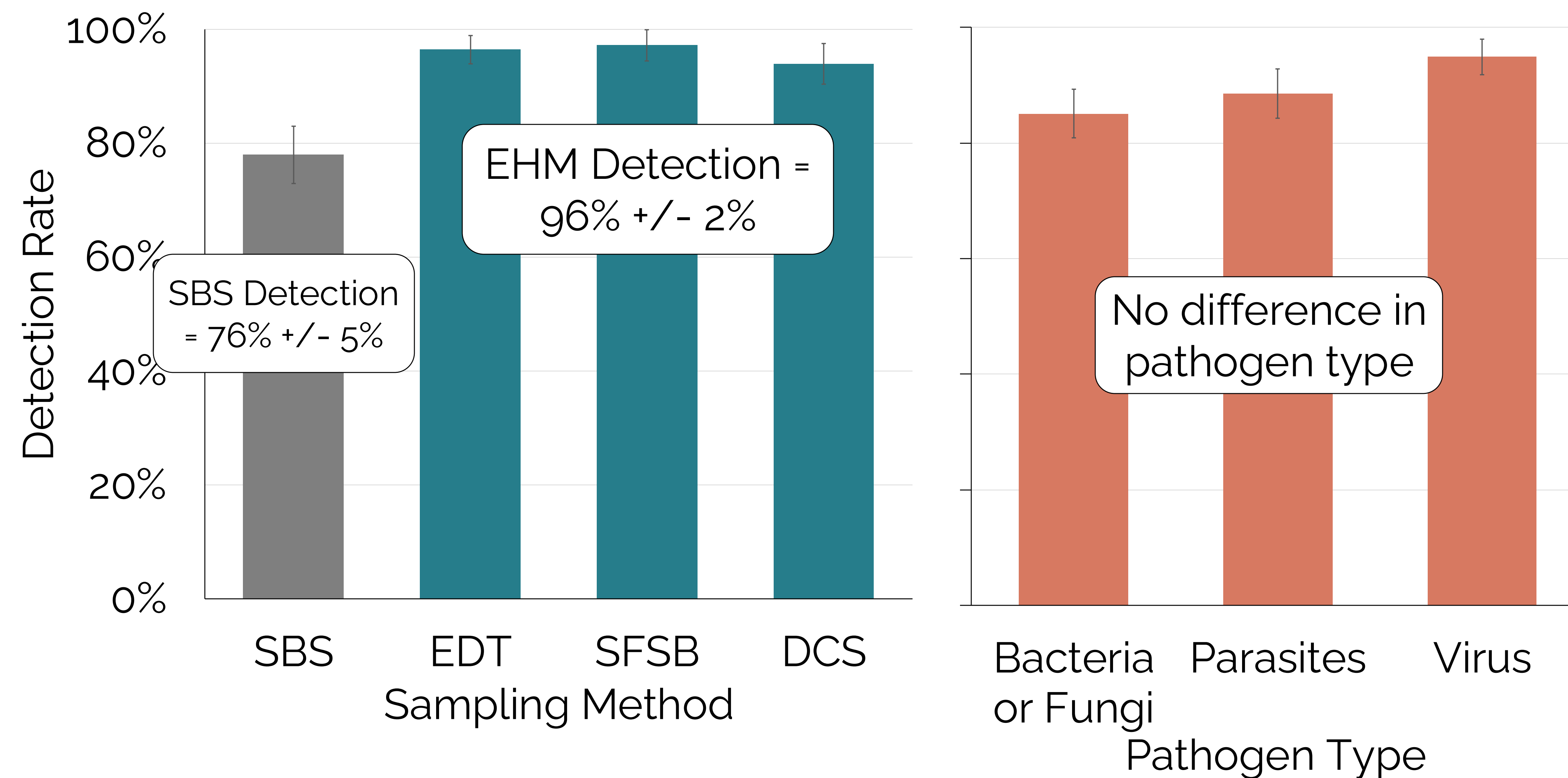


- Searched 3 databases (PubMed, Web of Science, Scopus) for peer-reviewed experimental articles that investigated EHM
- Extracted data from articles that met standard inclusion criteria
- Analyzed with statistical and descriptive methods

Our Goal: Establish the scientific evidence base for environmental health monitoring

Results: Across 42 articles EHM is superior to SBS in pathogen detection

Environmental health monitoring detects pathogens more often than soiled bedding sentinels, regardless of sampling method or pathogen type or importance.



In head-to-head studies, where environmental health monitoring detected a pathogen, soiled bedding sentinels failed in 25% of cases.

		SBS		SBS Relative Sensitivity
		No	Yes	
EHM	No	1	2	
	Yes	20	60	20/80 (25%)
EHM Relative Sensitivity			2/62 (3%)	

Pathogen Name	Detection by SBS/EHM
<i>Pneumocystis</i> spp.	0/2
Sendai Virus	0/1
<i>Pseudomonas aeruginosa</i>	1/0
<i>Proteus mirabilis</i>	2/5
Ectoparasites	3/7
<i>Streptococcus</i> spp.	2/1
<i>Rodentibacter</i> spp.	5/8
<i>Spironucleus</i> spp.	2/3
<i>Tritrichomonas</i> spp.	3/4
<i>Entamoeba</i> spp.	4/5
Pinworms	4/5
<i>Helicobacter</i> spp.	8/10
<i>Staphylococcus</i> spp.	6/7

Read the publication to learn more:



Conclusion: Overall strong evidence supports replacing SBS with EHM

- EHM benefits **science** & the veterinary team by being more accurate.
- EHM benefits **the 3Rs** by replacing sentinel rodents
- EHM benefits **operations** by reducing labor and often leads to cost savings
- EHM benefits **people** by reducing emotional fatigue of conducting euthanasia

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