Case 1

Environmental Microbiology Summary: Bacterial and Toxin-Producing Contaminants

This client had a recurring skin infection that failed to respond to treatment until we successfully identified the cause and remediated.

Client: ***Redacted***
Property:
Inspection Reference: BF-ENV-25-08-JCS
Prepared by: Jeff Charlton – Building Forensics
Date: October 2025

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Company Registration Number: 8837566

Independent Enviroscope® and DNA-based microbial testing confirm that the dwelling remains affected by contamination arising from the previous **water damage and ceiling removal event**.

Moisture retention within loft and wall cavities, together with poor ventilation and dust spread, has supported **bio-amplification of bacteria, cyanobacteria and toxigenic moulds.**

Several bacteria and mould species have been identified which are associated with both neurological respiratory issues and chronic fatigue

Occupants currently report dermal irritants or opportunistic pathogens capable of producing pustular skin lesions, as seen in the photograph.

2 Key Findings

Contaminant Group	Confirmed Genera / Species	Environmental Source	Health Relevance
Streptococcus spp. – *S. salivarius, S. vestibularis, S. mitis, S. thermophilus*	Human-associated bacteria aerosolised from damp dust and biofilm on wet plaster surfaces	Causes superficial skin and mucosal infections; can trigger pustular rash or folliculitis	

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Contaminant Group	Confirmed Genera / Species	Environmental Source	Health Relevance
		in sensitive or immune-stressed individuals	
Actinobacteria / Cutibacterium / Corynebacterium group	*Actinomyces odontolyticus, Cutibacterium acnes, Corynebacterium kroppenstedtii*	Moist plasterboard and cellulose insulation	Common skin flora that becomes inflammatory under damp, anaerobic conditions; linked with follicular eruptions and chronic dermal irritation
Cyanobacteria (blue-green algae)	*Anabaena, Nostoc, Lyngbya, Brasilonema, Cylindrospermum*	Microbial film in residual water or dust from loft insulation	Produce cyanotoxins (microcystins, anatoxins, cylindrospermopsin) causing dermatitis, eye irritation, fatigue, and flu-like symptoms after inhalation or contact
Mycobacteria (Non-tuberculous)	*M. madagascariense, M. moriokaense*	Moist airways, plaster, or HVAC condensate	Opportunistic respiratory pathogens; resistant to normal disinfection; aggravate hypersensitivity and prolonged cough
Toxigenic moulds	*Aspergillus / Penicillium*, *Stachybotrys*, *Wallemia*, *Chaetomium*	Water-damaged plasterboard and insulation	Produce mycotoxins (gliotoxin, trichothecenes, walleminol) and volatile irritants; cause respiratory inflammation, headache, and dermal burning sensations
Endotoxins (Gram-negative bacterial fragments)	Elevated relative to UK baseline	Bacterial cell-wall residue in fine dust	Potent inflammatory agent; causes redness, rash, cough, and systemic fatigue even

Contaminant Group	Confirmed Genera / Species	Environmental Source	Health Relevance
			when bacteria are non-viable

3 Causation and Pathway

- The **original water leak** created a humid, nutrient-rich environment that favoured microbial growth.
- During **ceiling removal without containment**, dried bio-film and contaminated dust were released into the habitable area.
- The subsequent **mix of Gram-positive, Gram-negative, Actinobacteria and toxigenic fungi** has resulted in a biologically active indoor aerosol.
- These aerosols settle on bedding and skin, explaining the distribution of **pustular and follicular lesions** observed.
- Cyanobacterial and fungal toxins act as **inflammatory amplifiers**, worsening any bacterial or allergic skin reaction.

4 Health Significance

While none of the identified organisms is rare, their **combined concentration and diversity** represent an **abnormal indoor exposure**.
Typical clinical outcomes include:

- Recurrent folliculitis or pustules on exposed or occluded skin areas.
- Exacerbation of eczema, dermatitis or acneiform eruptions.
- Eye and throat irritation, coughing, headaches, fatigue.
- Worsening of CIRS-type inflammatory response in susceptible individuals.

Medical management should focus on both **symptom treatment and environmental correction**, as re-exposure will perpetuate inflammation.

5 Recommended Actions

1. **Source removal:** Undertake controlled remediation of loft insulation, plaster dust, and cavity moisture using negative-pressure containment and HEPA extraction.
2. **Ventilation upgrade:** Install or service mechanical heat-recovery ventilation to maintain air exchange and reduce bacterial amplification.
3. **Targeted cleaning:** Carry out high-efficiency vacuuming, followed by wet-wipe disinfection with neutral surfactant cleansers (avoid chlorine or peroxide fogging).
4. **Post-remediation verification:** Repeat airborne and surface sampling for total bacteria, Actinobacteria, endotoxin and ERMI/HERTSMI to confirm clearance.
5. **Medical liaison:** If lesions persist, provide this report to the GP or dermatologist for correlation with culture or swab results.
6. **I recommend our safe Hypochlorous Acid Micro dry fog as an intermediate resolution during detailed cleaning and decontamination.**

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6 Conclusion

The evidence demonstrates that **bacterial and fungal contamination from earlier water damage continues to affect** the indoor environment.
Elevated concentrations of *Streptococcus*, Actinobacteria, cyanobacteria and toxigenic mould fragments provide a plausible and medically recognised explanation for the pustular eruptions and inflammatory symptoms described by the occupants.
Comprehensive remediation and improved ventilation are required to restore a safe living condition.

Prepared for: Redacted
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