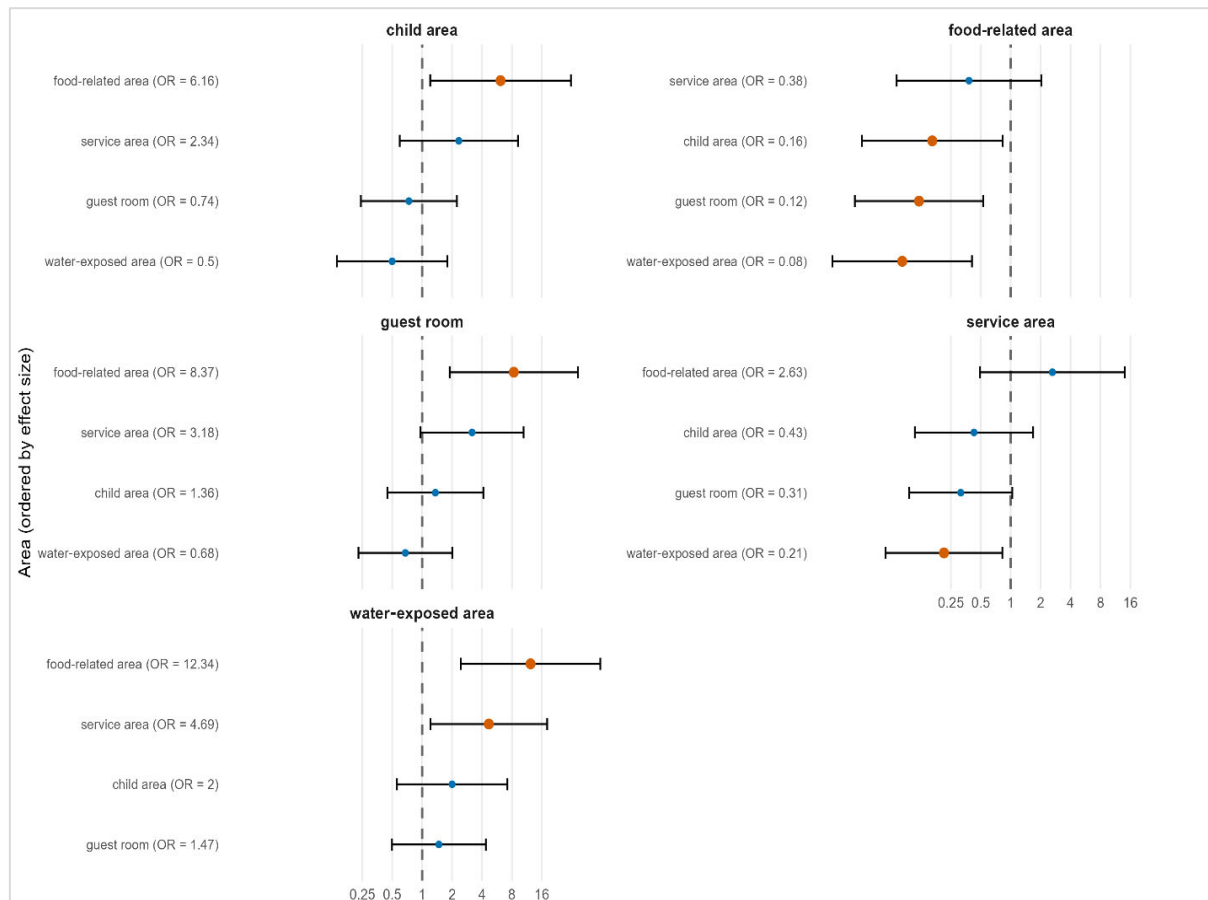


## Supplementary Materials

**Table S1. Classification criteria for bacterial taxa considered clinically relevant or opportunistically pathogenic in the pathogen prevalence analysis**

| Identified taxon                   | Included in analysis | Classification category              | Rationale for classification                                                                                        |
|------------------------------------|----------------------|--------------------------------------|---------------------------------------------------------------------------------------------------------------------|
| <i>Staphylococcus aureus</i>       | Yes                  | Established pathogen                 | Major human pathogen associated with skin and soft tissue infections, bloodstream infections, and foodborne disease |
| <i>Staphylococcus epidermidis</i>  | Yes                  | Opportunistic pathogen               | Clinically relevant coagulase-negative staphylococcus associated with device-related and bloodstream infections     |
| <i>Staphylococcus hominis</i>      | Yes                  | Opportunistic pathogen               | Coagulase-negative staphylococcus associated with opportunistic bloodstream infections                              |
| <i>Staphylococcus haemolyticus</i> | Yes                  | Opportunistic pathogen               | Clinically relevant coagulase-negative staphylococcus associated with healthcare-associated infections              |
| <i>Staphylococcus warneri</i>      | Yes                  | Opportunistic pathogen               | Reported as an opportunistic cause of invasive infections                                                           |
| <i>Staphylococcus cohnii</i>       | Yes                  | Opportunistic pathogen               | Rare but documented opportunistic human infections                                                                  |
| <i>Staphylococcus spp.</i>         | No                   | Not included                         | Genus-level identification does not allow reliable assignment of pathogenic potential                               |
| <i>Micrococcus luteus</i>          | No                   | Environmental /commensal organism    | Predominantly associated with normal skin flora and environmental habitats; limited pathogenic relevance            |
| <i>Bacillus cereus</i> group       | Yes                  | Environmental opportunistic pathogen | Associated with foodborne illness through toxin production and occasional invasive infections                       |
| <i>Bacillus pumilus</i>            | No                   | Environmental organism               | Limited evidence of human pathogenicity; mainly environmental                                                       |
| <i>Bacillus simplex</i>            | No                   | Environmental organism               | No established clinical relevance                                                                                   |
| <i>Bacillus spp.</i>               | No                   | Not included                         | Species-level identification insufficient for pathogenicity classification                                          |
| <i>Lysinibacillus fusiformis</i>   | No                   | Environmental organism               | Rare clinical relevance and insufficient evidence for routine pathogenic classification                             |
| <i>Actinomyces spp.</i>            | No                   | Commensal /opportunistic genus       | Many species represent endogenous flora; pathogenicity depends on species and clinical context                      |
| <i>Acinetobacter baumannii</i>     | Yes                  | Opportunistic pathogen               | Important healthcare-associated pathogen with recognized antimicrobial resistance relevance                         |
| <i>Acinetobacter spp.</i>          | No                   | Not included                         | Genus-level identification insufficient because pathogenic potential varies among species                           |

|                                     |     |                                |                                                                                                 |
|-------------------------------------|-----|--------------------------------|-------------------------------------------------------------------------------------------------|
| <i>Pseudomonas aeruginosa</i>       | Yes | Opportunistic pathogen         | Environmental organism with well-established association with human infections                  |
| <i>Pseudomonas putida</i>           | No  | Environmental organism         | Primarily environmental species with rare opportunistic infections                              |
| <i>Pseudomonas fluorescens</i>      | No  | Environmental organism         | Primarily environmental organism with limited clinical relevance                                |
| <i>Pseudomonas spp.</i>             | No  | Not included                   | Species-level identification insufficient for pathogenicity assignment                          |
| <i>Stenotrophomonas maltophilia</i> | Yes | Opportunistic pathogen         | Clinically relevant opportunistic pathogen associated with infections in vulnerable individuals |
| <i>Stenotrophomonas spp.</i>        | No  | Not included                   | Species-level identification insufficient for reliable classification                           |
| <i>Escherichia coli</i>             | Yes | Established pathogen           | Important human pathogen associated with intestinal and extraintestinal infections              |
| <i>Citrobacter spp.</i>             | Yes | Opportunistic pathogen         | Enterobacterales genus associated with opportunistic infections                                 |
| <i>Klebsiella spp.</i>              | Yes | Opportunistic pathogen         | Clinically relevant Enterobacterales genus associated with healthcare-associated infections     |
| <i>Leuconostoc mesenteroides</i>    | No  | Food-associated organism       | Mainly food-associated organism with limited pathogenic relevance                               |
| <i>Serratia liquefaciens</i>        | Yes | Opportunistic pathogen         | Reported in healthcare-associated and opportunistic infections                                  |
| <i>Candida spp.</i>                 | No  | Not included                   | Fungal organisms were outside the bacterial pathogen prevalence analysis                        |
| <i>Aspergillus spp.</i>             | No  | Not included                   | Fungal organisms were outside the bacterial pathogen prevalence analysis                        |
| <i>Corynebacterium spp.</i>         | No  | Commensal /opportunistic genus | Predominantly normal skin flora; pathogenicity depends on species-level identification          |



**Figure S1. Sensitivity analysis of contamination-risk comparisons using alternative reference categories.** Forest plots showing odds ratios (ORs) from cumulative link mixed models with a random intercept for subarea. Each panel represents a separate model using a different functional area as the reference category. Error bars represent 95% confidence intervals displayed on a logarithmic scale. Orange symbols indicate statistically significant comparisons ( $p < 0.05$ ), whereas blue symbols indicate non-significant comparisons.