**Objectives**
Fungal diseases pose a major global health challenge, affecting over 6.5 million people annually and contributing to ~ 3.8 million deaths. *Aspergillus fumigatus* accounts for around 32% of all invasive fungal infections. The rising prevalence of triazole-resistant *A. fumigatus*, which undermines the effectiveness of first-line antifungal treatments—is believed to be largely driven by environmental exposure to agricultural triazole fungicides. This study presents findings from two pilot air sampling studies conducted in Ireland (Pilot 1 and Pilot 2), which aimed to develop a standardized method for environmental surveillance of triazole resistance in *A. fumigatus*. This work forms part of a broader multinational initiative, GAP-AFR, focused on bridging the gap between the environment and patients by investigating the risk and transmission of antifungal resistance in *Aspergillus fumigatus*.

**Materials & Methods:**

A passive air sampling method, utilizing delta traps and sticky seals was implemented across two phases of sampling in Ireland—at seven locations during Pilot 1 (August-September 2024) and ten locations during Pilot 2 (February–March 2025). The seven sites screened in Pilot 1 were also included in Pilot 2, with three additional sites added in the second phase. In Pilot 1, three traps were deployed at each site and exposed for 4, 6, and 8 weeks respectively. Based on the findings from this phase, the sampling strategy was refined for Pilot 2, where only two traps per site were used, each exposed for 4 weeks. Colony-forming units (CFUs) were quantified using *Aspergillus*-selective media, and the proportion of triazole-resistant isolates was assessed on media containing itraconazole and voriconazole.

**Results:**

Samples yielding < 25 or > 250 CFUs were excluded from resistance analysis, as these counts do not support reliable estimation of resistance fractions. In Pilot 1, only one site—located in the Dublin area—met the CFUs threshold for both the 6- and 8-week exposure durations. During Pilot 2, due to the experimental standardisation and, deployment of two traps for a 4-week duration, CFUs counting—based on itraconazole and voriconazole plates—did not lead to accurate CFUs enumeration or resistance fraction estimation. Notably, azole-resistant *A. fumigatus* was isolated from all sampled sites in both phases of the study, indicating a consistent and widespread environmental presence of triazole resistance.

**Conclusions:**
This study highlights the feasibility of implementing a standardized, cost-effective passive air sampling method for environmental surveillance of antifungal resistance. The two-phase pilot approach provided valuable insights into sampling performance across diverse sites in Ireland. These results underscore the need to optimize sampling protocols, particularly in relation to exposure durations and the number of traps deployed per site. Based on current data, it has been postulated that deploying three traps per site for a 4-week exposure period may offer more reliable outcomes in the Irish context. Final decisions on standardized sampling protocols will be made in consultation with the GAP-AFR consortium. Following consensus, the plan is to perform more widespread air sampling to determine resistance fraction across the country and potentially identify “hot spots” of triazole resistance.