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Title: Transfer of wheat allergen and fungal α-amylase from workplace to home by bakers

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Body: Background Exposure to flour dust is a leading cause of occupational asthma. Paternal occupational exposure to flour has been associated with childhood asthma, raising the possibility of 'take-home' exposure. Aim to establish whether workplace contamination of skin/clothing with wheat flour allergen(WFA) and fungal α-amylase(FAA) is associated with increased levels of these allergens in bakers' homes. Methods Bakeries in north-east Scotland were invited to participate. Controls were recruited from staff/students at the University of Aberdeen. Exposure assessment was carried out in bakeries, bakers' cars and bakers'/controls' homes using surface wipe and vacuum sampling; samples were analysed for total protein, FAA and WFA. Results 164 wipe and 49 vacuum samples were collected from 38 bakers (5 bakeries) and 10 controls. Compared to non-bakers, bakers had higher median levels of WFA and FAA in house vacuum samples; the difference was statistically significant for WFA/total protein ($516x10^{-6}$ vs $164x10^{-6}$, p 0.031), FAA/total protein ($1.5x10^{-6}$ vs $0.04x10^{-6}$, $p<0.001$) ratios and FAA loading (median $1.2pg/cm^2$ vs $0.1pg/cm^2$, $p<0.001$). We found positive correlations between WFA contamination of the bakers' foreheads and cars (r_s0.57, p=0.028), foreheads and houses (r_s0.46, p=0.025), shoes and houses (r_s0.45, p=0.029); and between FAA contamination of shoes and houses (r_s0.46, p=0.023), and cars and houses (r_s0.70, p=0.008). Conclusions This work demonstrates pathways for 'take home' exposure of occupationally sourced flour. Taken with our previous work, showing that bakers' children are more likely to have asthma, this supports the need for workplace intervention trials to prevent asthma in bakers' children.