**Introduction:** The RESPIRA study showed living in Malta (urban), Gela (industrial) is a risk for respiratory symptoms compared to rural south Sicily.

**Method:** FAI pumps at 10/min and Teflon(Whatman) filters collected PM$_{2.5}$ for 48 hours, Malta(n=54), Gela(n=42) and rural areas (n=42), including schools and homes. The ionic component of ICP-MS extraction was measured at CNR Rome. Aerosol IOM(OM) measured PM$_{2.5}$ levels in Malta. PM$_{2.5}$ in Sicily was calculated from filter weights.

**Results:** Outdoor PM$_{2.5}$, Malta(n=53) Mean14.1 µg/m$^3$, Median32.9, Q1-13.9, Q3-57.7, p<0.001, Gela(n=34) MN16 µg/m$^3$, MD15.1, Q112.1, Q3 19.1 p<0.01 and Rural (n=85) MN 12.36, MD 11.28, Q1 9.4, Q3 14.2. Chemical analysis showed higher metal levels in Malta and Gela compared to rural. (Malta, Gela, rural, mean and (Median) in ng/m$^3$ of V 4.01(7.6), 2.3(1.50), 0.60(0.27), Ni 2.18(1.37), 0.98(0.82), 0.47(0.64), Cd 0.32(0.07), 0.11(0.072), 0.05(0.027), Pb 1.39(1.01), 0.91(0.81), 0.39(0.29), Fe 45.0(27.76), 3.5(0.05), 3.5(1.03), Cu 3.49(1.22), 1.44(1.07), 1.09(0.56), Sr 1.21(0.14), 0.18(0.075), 0.50(0.078), Ba 1.08(0.52), 0.36(0.25), 0.04(0.06), Sn 0.1(0.059), 0.053(0.032), 0.04(0.0035), Mn 1.01(0.8), 1.37(1.19), 0.66(0.41), Sulphur 460(209), 741(705) 342(202), and Antimony Sb 0.42(0.18), 0.72(0.85) 0.22(0.19) were higher in Gela. No difference noted for As 0.19(0.13), 0.19(0.19), 0.17(0.17), Rb 0.37(0.18), 0.45(0.37), 0.53(0.32).

**Conclusion:** Malta with risk for asthma symptoms, had higher PM$_{2.5}$ level and most heavy metals. Gela with risk for rhinoconjunctivitis had higher level of sulphur content.