Humans spend nearly 90% of their time indoors, which means that understanding the effects of acute and chronic exposures to elevated concentrations of indoor air pollutants on human health is imperative. In the past ten years, a vast quantity of affordable, consumer-grade air quality sensors has come on the market. These sensors, while less accurate than their research-grade counterparts, provide researchers the opportunity to understand bulk indoor air quality (IAQ) across a wide range and quantity of indoor spaces due to their affordability and ease-of-use. During the same period, other commercial sensors like those in mobile phones and wearable fitness trackers, have given researchers with the ability to understand people’s behaviors and health on a greater scale. Combining data streams from IAQ sensors and mobile sensing devices provides researchers the opportunity to conduct large-scale studies at a fraction of the cost while gather ecologically valid data. We conducted such a study over a period of 11 weeks with 70 student participants gathering information on health, activity, movement, mood, and IAQ. This presentation will focus on the IAQ device that we developed – the Building EnVironment and Occupancy (BEVO) Beacon – and how we were able to use data from this device and the other study modalities to accurately assess ventilation and occupancy. Results from this analysis were then used to understand the relationship between ventilation/IAQ and sleep quality, which we also provide. This study is one of the many emerging that highlight the utility of consumer-grade sensors for IAQ applications.