Nepal’s rapid urbanization has led to a country-wide struggle with health outcomes and pollution; as of 2018, Nepal is one of the ten most polluted countries in the world [1]. The Kathmandu Valley faces a unique problem with air quality; due to the high surrounding mountains in the region, winds cannot easily carry air into and out of the valley. Thus, pollution generated in urban areas can affect the entire valley. The negative ecological and health effects of heavy air pollution are well-understood by scholars and professionals, but the effects on daily life for Nepalese citizens are not yet understood.

Our study is motivated by the goal to understand how air pollution affects the daily lives of individuals within the survey area and to understand air pollution patterns therein. These two pieces of information combined give both individuals and policymakers the information necessary to understand the air pollution issue and take action steps towards mitigating the health and safety risks associated with air pollution.

The effects of air pollution on their lives. To search for air quality patterns, we compared survey variables to the respondents’ self-reported life satisfaction. While these results were puzzling at first, they make sense in the context of how air pollution affects health; high PM$_{2.5}$ counts cause very few direct deaths but instead reduce lung function and development in children, making a population in highly polluted areas more susceptible to disease and infection [2].

The daily averages of PM$_{2.5}$ demonstrate a convex curvilinear relationship over the course of the year, with the highest counts occurring during winter and spring (November – March) and the lowest counts appearing during summer and autumn (April – October). This pattern suggests that ambient air pollution is related to temperature and/or weather patterns. As a result, we expect this pattern to repeat in subsequent years and be related to a combination of weather effects and additional pollution during cold months.

While reductions in PM$_{2.5}$ over the long term are achievable through infrastructure improvements, this study has already provided useful information for improving health outcomes in the short-term:

- Days with dangerous PM$_{2.5}$ levels are generally predictable and thus sensitive individuals can prepare for them (through face masks, etc.)
- The survey area has a strong association between quality of life and air pollution levels, but this could be due to confounding factors (inner city vs. outer city, etc.)
- Air quality varies on a yearly time scale, providing avenues for future research into the cause(s) of this fluctuation.

In order to improve outcomes for health and safety in the short-term, awareness of solutions is more necessary than awareness of the problem. As such, our short-term action plan is to expand our data-gathering capabilities in the survey area for both air pollution and weather data, then to make our findings accessible to the public alongside safety information and resources.