COVID-19 Hackathon 3: Ecosystem Services Supplementary material

Team MeLLT :Matthew Greenwell, Lisbeth Hordley, Luke Evans and Tom Johnson

This document contains supplementary figures and tables for our entry to the COVID-19 Hackathon 3: Ecosystem Services

Table S1: Variables to model against each of the two COVID-19 metrics

Type	Variable	Description	Proposed effect for Covid metrics
Ecosystem	Green space (km2) per person	Population size divided by total green cover (km2). Green cover (km2) derived from average percentage green cover (all grassland and woodland categories) in 10 raster sampling locations multiplied by size of local authority in km2 (Source: CEH 2020)	More space results in slower case growth and faster case drop.
	Urban space (km2) per person	Population size divided by total urban cover (km2). Urban cover (km2) derived from average percentage urban cover (urban and suburban categories) in 10 raster sampling locations multiplied by size of local authority in km2 (Source: CEH 2020)	More space results in slower case growth and faster case drop.
	Fragmentation	Landscape shape index depicting edge density scaled relative to the size of the green space. This value is calculated in each of the 10 raster sampling locations and averaged. A value of 1 equates to contiguous forest (no patches) and larger values depict increasing patchiness. (Source: CEH 2020)	More patchy/fragmented habitats lead to slower case growth and faster case drop.
	Addresses with gardens (%)	What percent of addresses in a local authority have gardens (Source: ONS 2020)	More gardens results in fewer people using communal spaces and therefore slower case growth and faster case drop..
	Average garden size (m2)	Of residences with gardens, what is the average area of garden (Source: ONS 2020)	Larger gardens so feel less trapped and use fewer communal spaces resulting in slower case growth and faster case drop.
Mobility	Average mobility	Average* mobility across six different categories (retail, food, transport, work, residential, and parks) relative to pre COVID-19 baseline. (Source: Google 2020)	Decrease in mobility results in slower case growth and faster case drop.
	Park preference	Average* mobility across five of the six categories (retail, food, transport, work, and residential) relative to pre COVID-19 baseline. This value is subtracted from mobility in parks e.g. how much does park mobility differ to overall mobility (Source: Google 2020)	More mobility in outdoor parks than confined indoor areas hence slower case growth and faster case drop.
Core predictors	Population density (km2)	Local authority population size divide area (Source: ONS 2020)	Lower population density results in slower case growth and faster case drop.
	Population white (%)	Percent of local authority population that self-represent as non-white (Source: ONS census 2011)	Public Health England (2020)
	Population unemployed (%)	Percent of local authority population (adult) unemployed in December 2019 (Source: ONS 2020)	Public Health England (2020)
Control	Latitude	Latitudinal centroid of local authority in decimal degrees (Source: ONS 2020)	No proposed effect but controls for any location effect
	Longitude	Longitudinal centroid of local authority in decimal degrees (Source: ONS 2020)	No proposed effect but controls for any location effect

* For the pre-peak cases model, these averages represent the mobility up until the peak. Whilst for the post-peak cases model, these averages represent the mobility after the peak. For the peak and cumulative cases models, these averages represent the entire period.

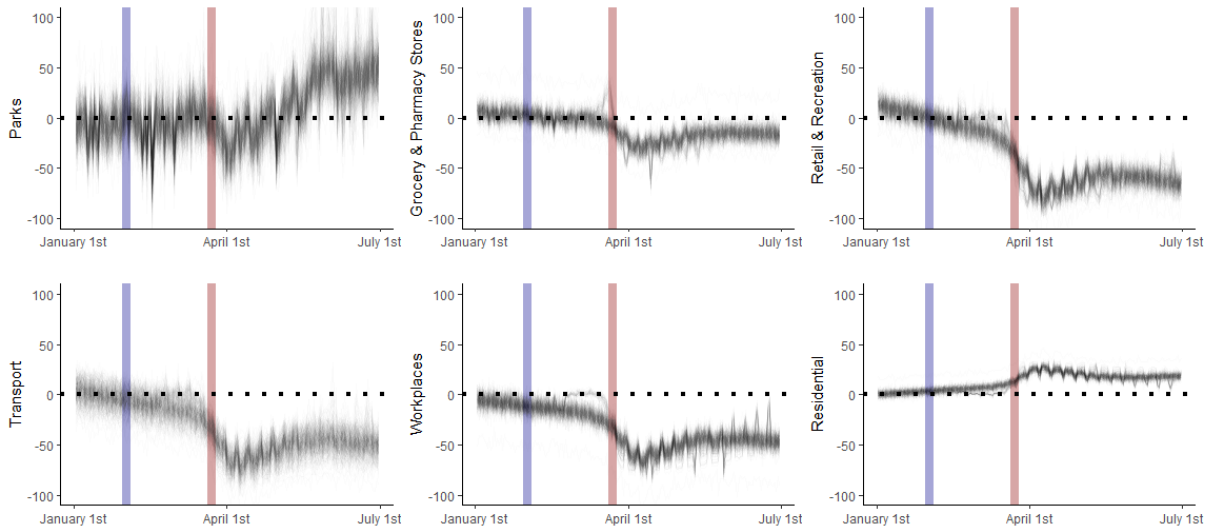

Figure S1: Relative change in movement over time since the baseline period (3rd Jan - 6th Feb 2020) for each of the 343 Local Authorities for 6 categories: Parks, Grocery & Pharmacy stores, Retail & Recreation, Transport, Workplace and Residential. The blue line represents the date of the first UK case and the red line is when lockdown was introduced in the UK (23rd March 2020).

Post-peak cases results

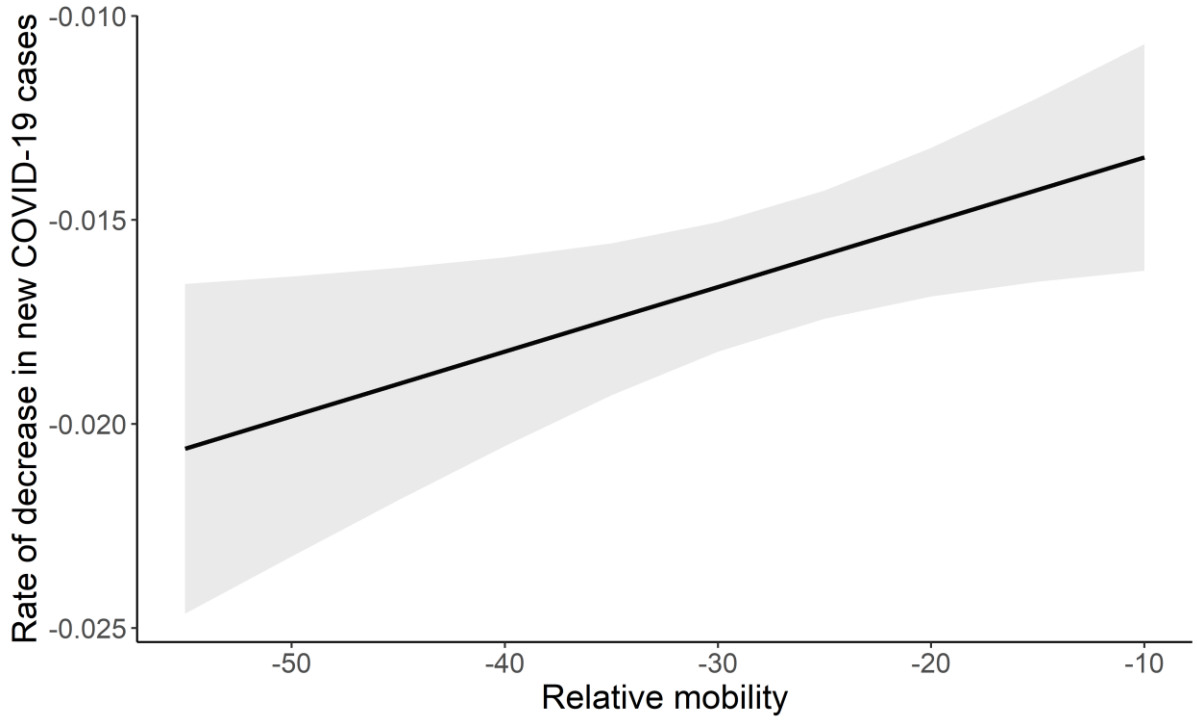

Figure S2: Impact of relative mobility on COVID-19 post-peak case rate. Shaded area around the line represents the 95% confidence intervals.

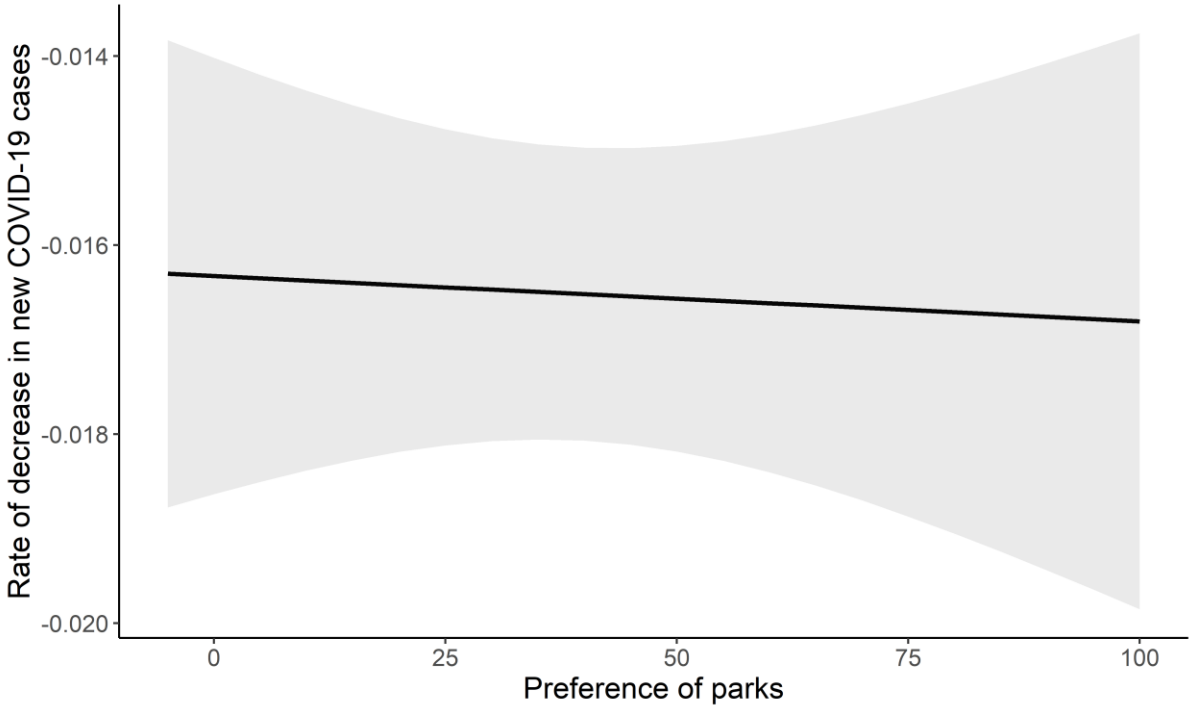

Figure S3: Impact of using parks (relative to other mobility categories) on COVID-19 post-peak case rate. Shaded area around the line represents the 95% confidence intervals.

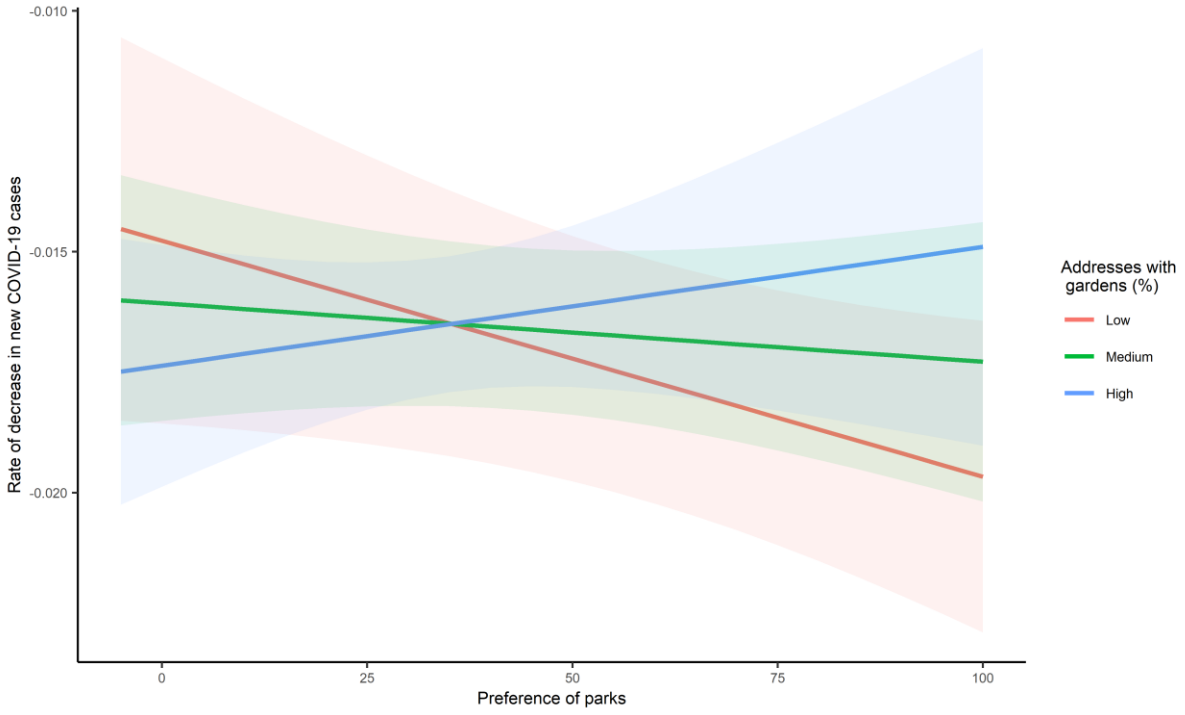

Figure S4: Relationship between % of addresses with gardens and preference of parks with the post-peak case rate. Shaded area around the line(s) represents the 95% confidence intervals.

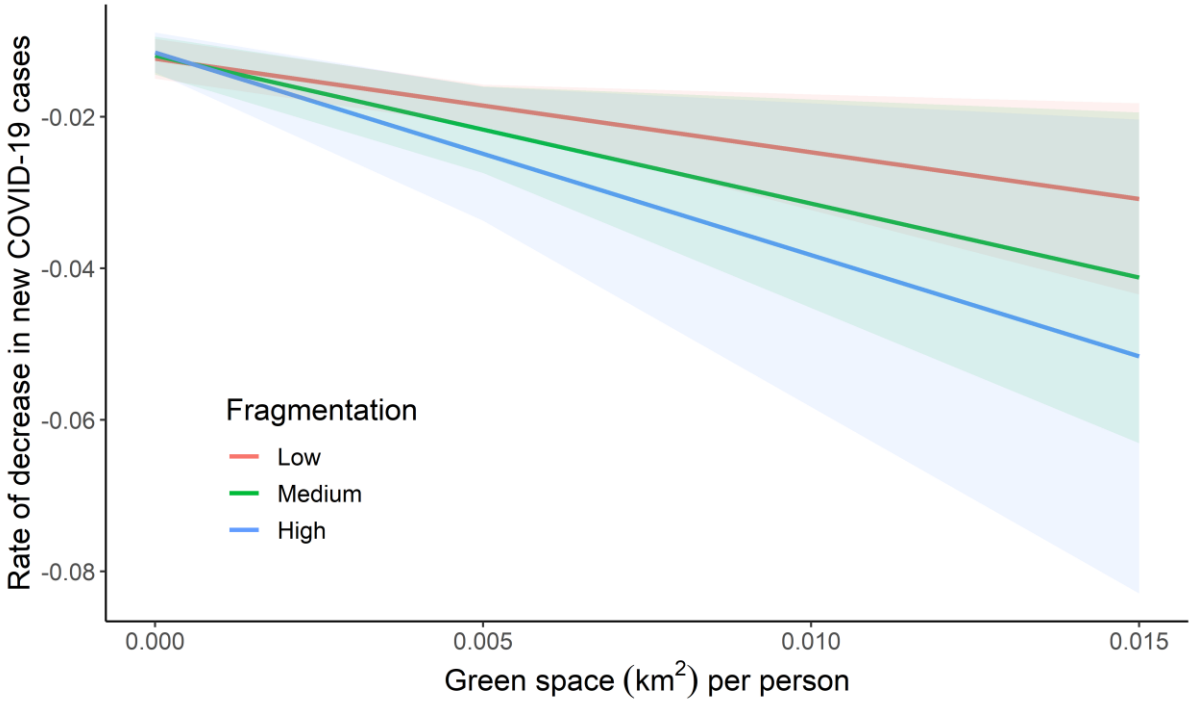

Figure S5: Relationship between green space (km2) per person and fragmentation with the post-peak case rate. Shaded area around the line(s) represents the 95% confidence intervals.