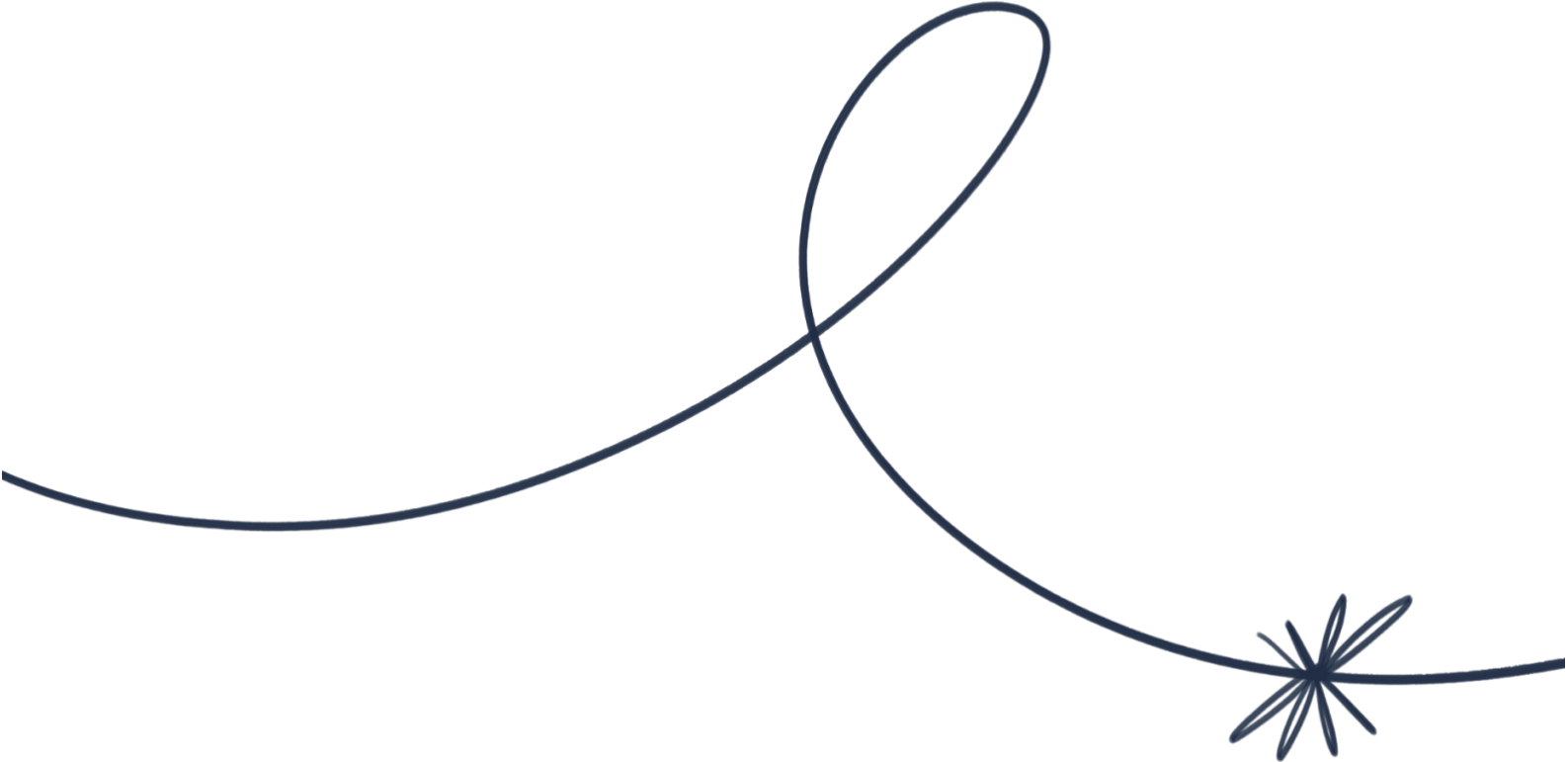


# Food Insecurity in the Lancaster District

Beyond Imagination Life Survey  
ImaginationLancaster

June 2022





## Executive Summary

This report summarises the findings of the **Food Insecurity** case study proposed by Lancaster City Council. In the analysis of the data collected from over 1,600 people in Lancaster and Morecambe the following key findings were established:

- Foodbank usage and food insecurity are most heavily concentrated in the Morecambe Bay area.
- Over the period from April 20 to March 21 foodbank usage was highest April to June, mostly likely related to the impact of the Covid-19 pandemic on employment and household income.
- Food insecurity is correlated with household income. Those with high household incomes were unlikely to report difficulties in accessing food.
- Those living in wards with higher foodbank usage are also more likely to have issues with mould in their homes.

## Background

Lancaster University, Lancaster City Council and Blackburn with Darwen Council have come together to initiate the Beyond Imagination Life Survey. Commissioned by Lancaster University and undertaken by BMG Research the survey of just under 3,000 residents aims to gather a representative picture of views, attitudes and experiences, which will in turn inform strategy, activities and research opportunities for ImaginationLancaster, the local authorities and other local partners.

Lancaster City Council and Blackburn with Darwen Council priorities have formed a key part of the survey development throughout, resulting in a survey structure which combines the needs of different stakeholders, based on four themes:

- Health and Wellbeing
- Wealth and Opportunity
- Sustainability, Transport and Travel
- Connected Communities and Services

## Bringing the data to life

Connected Places Catapult were commissioned to develop an interactive data dashboard solution to explore and visualise the Life Survey data, and to enable future interactive data analysis, research and visualisation. To this end, a series of case studies have been produced by Connected Places Catapult based on research themes developed with the project partners in Beyond Imagination workshops. Within the series, this case study serves as an example that demonstrates how the Life Survey data can be combined with and enriched by additional datasets, and how the dashboard solution can enable this fusion.

## Introduction

This is the report for the Food Insecurity case study for the Beyond Imagination Life Survey created by Connected Places Catapult in collaboration with ImaginationLancaster and Lancaster City Council. The results



and findings presented here were extracted from the analysis and visualisations produced in the Food Insecurity Dashboard.

Lancaster City Council is an active, leading member of the Lancaster District Food Poverty Alliance, working with local food providers to address local issues of food security. One of the challenges in coordinating and delivering impact at scale across the Alliance is the inconsistent availability and type of data around food security. This case study sought to better understand food insecurity and help to address these challenges by combining the Life Survey with a data extract from the Morecambe Bay Foodbank for the period April 2020 to March 2021. In the future, Lancaster City Council intends to build on this case study by working with different providers across Lancaster District Food Futures. This will create a richer dataset that will provide deeper insights.

## Methodology

The data in the Life Survey was collected by BMG Research who took measures to increase the representativeness of the participants of the survey. The data collection for the survey consisted of online surveys and (offline) in-person interviews. The anonymised data were securely transferred to Connected Places Catapult, where the data was verified, cleansed and processed using a Jupyter Python Data Science environment, which included the joining to geospatial data provided by Ordnance Survey and Office for National Statistics. The data was loaded into a PostgreSQL database and connected to Apache Superset. Here the dashboard solution was developed, the data analysis was carried out, the dashboards built, and the visualisations created. The Exploratory Dashboard was used to discover relationships in the data, and only then were custom visualisations created for the case study dashboard.

The data extract from the Morecambe Bay Foodbank, provided by Lancaster City Council, recorded monthly foodbank usage for the period April 2020 to March 2021. This followed a similar data pipeline to the Life Survey data. An exploration page was created that enabled geospatial and temporal investigations of the foodbank use.

A proof of concept data linking methodology was developed for this case study. The analysis was restricted to region in the vicinity of the Morecambe Bay Foodbank, as the extract did not account for all foodbank usage in Lancaster, see the Appendix for further details. The foodbank usage was measured by the number of vouchers used over the April-March year period, aggregated to the ward level. To make the comparisons between wards more meaningful, the number of vouchers was scaled by the Office for National Statistics ward-level population estimates, resulting in the number of vouchers per 1,000 residents as the foodbank usage metric. Finally, the metric was discretised into lower (0.39-3.23), medium (3.23-6.05) and higher (6.05-8.88) usage categories. The foodbank usage could then be joined to the Life Survey data, using the ward as the linking variable. This enabled relationships to be discovered between wards with similar foodbank usage and Life Survey responses from residents of those wards. With this methodology, it should be possible to link any external data source to the Life Survey, provided that the data can be aggregated to the ward level.

Food insecurity was targeted by analysing question 44 (Q44) of the Life Survey, which is the Food Insecurity Experience Scale (FIES) developed by the Food and Agriculture Organisation of the United Nations. This is a series of eight questions that focuses on self-reported food-related behaviours and experiences associated with increasing difficulties in accessing food due to resource constraints. The additional variables of household income (Q67) and issues with mould during the winter months (Q21) were also used.



## Results and Discussion

### Foodbank usage and food insecurity are geospatially correlated.

Figure 1 displays the total foodbank usage over the period and the number and share of respondents per ward that were unable to eat healthy and nutritious food. The maps show strong correlations between foodbank use and food insecurity, with both being most prevalent in the Morecambe Bay and Skerton areas.

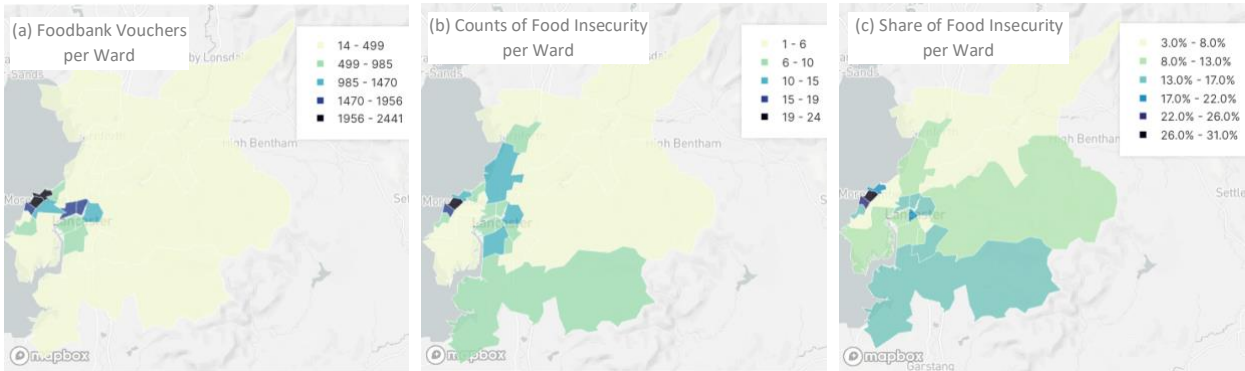


Figure 1: (a) Total number of foodbank vouchers used per ward over April 20 to March 21 period. (b) Number of respondents that were unable to eat healthy and nutritious food per ward. (c) Percentage share of respondents that were unable to eat healthy and nutritious food per ward.

### Foodbank usage was highest at the start of the first national lockdown.

The visualisation in Figure 2 shows that foodbank usage was highest in the April 20 to June 20 period. A likely explanation for this is the Covid-19 pandemic. The first national lockdown was announced on 23rd March. A second gentler peak is observable over the November-January Winter period, which could be explained by higher energy bills and the costs of the festive period.

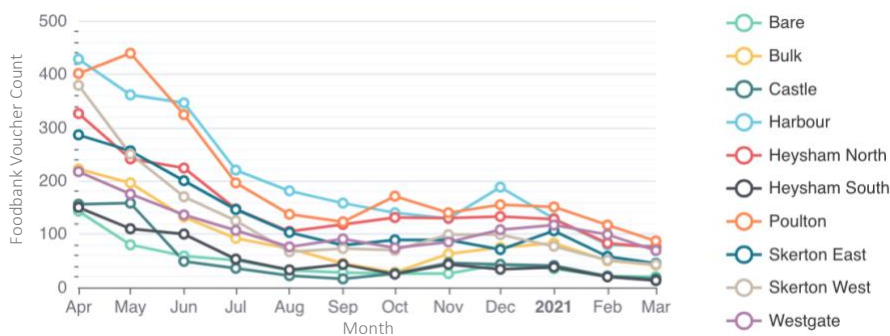


Figure 2: Time series of the number of foodbank vouchers used per month in the ten wards with the highest foodbank usage.

### Those on high household incomes rarely experience food insecurity.

Approximately 12% of the respondents experienced some level of food insecurity. The most common levels were only having access to a few kinds of foods and not being able to eat healthy and nutritious food. Whereas the least common (5-6%) types were amongst the most severe on the food insecurity scale: not eating for the whole day and running out of food.

It is expected that food insecurity is experienced the most by those on the lowest incomes. By using the Life Survey, the responses were connected to their reported household income. Figure 3 shows that those on high household incomes are highly unlikely to be unable to eat health and nutritious food. This is evident from the drop in food insecurity reports (answering yes) for those above £35,000 annual household income.

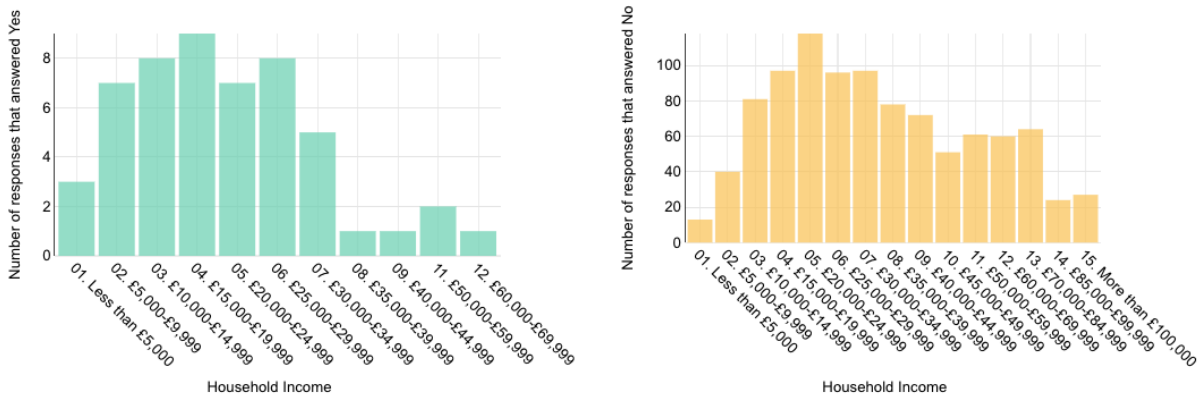


Figure 3: The distribution of household income for those that responded were not (left) and were (right) able to eat healthy and nutritious food. If the number of respondents was zero, the income band is not shown.

### Those living in wards with higher foodbank usage are more likely to experience issues with mould.

Figure 4a shows the distribution of foodbank usage, scaled by ward population, for the wards near Morecambe Bay Foodbank. The unexpectedly low usage in Heynsham Central and Heynsham South can be explained by the presence of other foodbanks in this area.

Analysing question 21 of the Life Survey found that over 1 in 5 (21.6%) of the respondents in Lancaster report issues with mould and fungus during the winter months. These responses were grouped by foodbank usage at the ward level, which is presented in Figure 4b. This shows that the participants that live in wards with higher foodbank usage have a greater chance of experiencing issues with mould. In the group with higher usage (composed of Heynsham North, Overton and Poulton) the likelihood of mould was over 1 in 3 (34%), whereas in the wards with lower usage the chance of mould was just over 1 in 5 (20.6%). This difference in probabilities was found to be statistically significant with a 95% confidence level.

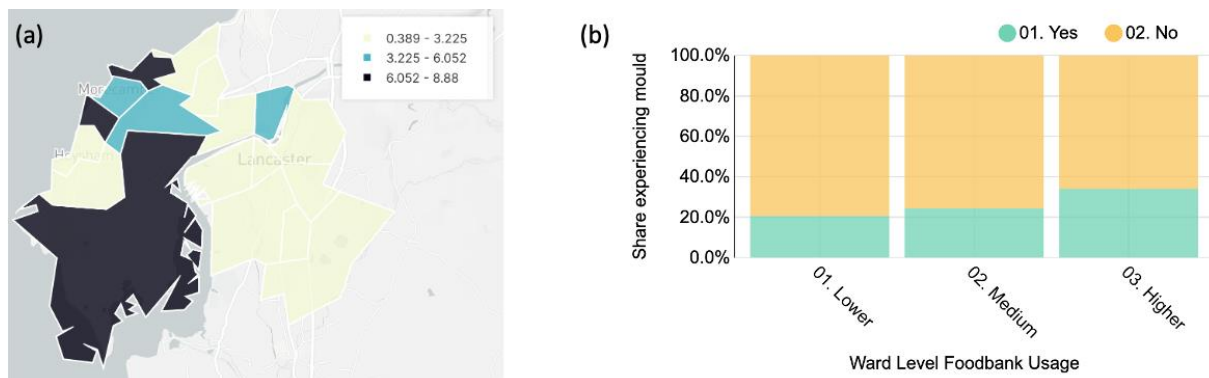


Figure 4: (a) Total number of foodbank vouchers used per ward per 1,000 residents over April 20 to March 21 period in the region that is close to the Morecambe Bay Foodbank. The ranges of this usage metric, shown in the legend, were categorised as lower, medium and higher foodbank usage. (b) The corresponding share of Life Survey participants that experience mould during the winter months, grouped by the foodbank usage in their wards of residence. The participants were asked if they had mould in rooms other than their bathrooms and toilets, to which they responded "Yes" or "No".

## Outlook

This case study investigated food insecurity in Lancaster by combining the Life Survey with a data extract from Morecambe Bay Foodbank. The key results have been presented here, but further exploration and analysis of the data is possible with the accompanying dashboard. The time dependence of the data extract has provided an interesting perspective, and this would also enrich the Life Survey. In the future it would be valuable to



explore further back in time to understand if the current foodbank usage has returned to its pre-Covid levels. Another extension to this work would be to implement the FIES Rasch model, which would provide an additional statistical basis to the food insecurity measurements. This case study has demonstrated how the Life Survey can be combined with additional data sources to discover new insights, and future work could explore and extend this methodology to new datasets. Finally, extending the survey to more respondents would increase the statistical sample size, improving segment-based and geospatial analysis, such as demographic groups at the ward level.



## Partners & Funding

### **ImaginationLancaster**

Imagination is Lancaster University's cross-disciplinary design research lab. In 2019 ImaginationLancaster was awarded £13.2m for a multi-year project titled Beyond Imagination. Funded by UKRI Research England and led by Professor Leon Cruickshank, Director of Research at ImaginationLancaster, Beyond Imagination explores and demonstrates how cutting-edge design research can create a healthier, more prosperous and sustainable world. <http://imagination.lancaster.ac.uk>

### **Data Science Institute**

Lancaster University's Data Science Institute (DSI) supports interdisciplinary data intensive research across the University, with core themes of: foundations, health, environment, society. It has 155 academic members from 19 depts and works with business, government and third sector partners. Current member activities include work understanding the needs of looked after children, links between the quality of the urban environment and health as well as projects in cyber security. <https://www.lancaster.ac.uk/dsi/>

### **Blackburn with Darwen Council**

Blackburn with Darwen is a semi-rural unitary borough located in the south east of Lancashire. It has compact urban areas predominately located around the towns of Blackburn and Darwen, surrounded by countryside. These contrasting areas include some of most and least deprived in England. The current corporate plan has the aim of enabling borough residents to achieve a good quality of life in a vibrant and thriving place, with strong community values, in an inclusive society. <https://blackburn.gov.uk>

### **Lancaster City Council**

The Lancaster district includes diverse and attractive city, coast and countryside locales. Lancaster City Council's vision is for the district to thrive as a vibrant regional centre in the north west of England. In December 2021 the council set out its four priorities for 2030, along with strategies for how these can be achieved: A Sustainable District, An Inclusive and Prosperous Local Economy, Healthy and Happy Communities and A Co-operative, Kind and Responsible Council. <https://www.lancaster.gov.uk>

### **Connected Places Catapult**

Connected Places Catapult is the UK's Innovation Accelerator for cities, transport and places. We provide impartial 'innovation as a service' for mobility and built environment businesses, infrastructure providers and public institutions to catalyse step-change improvements in the way people live, work and travel. We help develop, implement and commercialise the latest technology and innovation for existing markets, as well as create demand and grow new markets in the UK and globally. <https://cp.catapult.org.uk>

### **BMG Research**

Established since 1988, we have more than 30 years' experience of working with our clients to build and deepen our understanding of changing and ever more complex markets, people and society. We work with our clients to fully understand the challenges faced by their organisations, identify priorities for action, and evaluate the impact of change. <https://www.bmgresearch.co.uk/>

### **Research England**

We are responsible for funding and engaging with English higher education providers to create and sustain the conditions for a healthy and dynamic research and knowledge exchange system in the higher education sector. <https://www.ukri.org/councils/research-england/>



## Appendix

### Data sets used

Data Set	Source
Life Survey	Imagination Lancaster
Foodbank Usage – Morecambe Bay Foodbank	Lancaster City Council
Ordnance Survey / Office for National Statistics census and administrative boundaries and postcode lookups	Open Geography Portal
Ward-level population estimates	Office for National Statistics

### Life Survey questions used

Number	Description	# Interviewed	# Answered
44	Food Insecurity Experience Scale	1,644	1,464-1,474 (multi-question)
67	Household income brackets	1,644	1,097
21	Mould in winter (in Morecambe Bay area)	1,242	1,214

### Further details

For the food insecurity question, the number of respondents per ward in Lancaster ranged from 109-13. These per ward sample sizes are too low to be statistically reliable. Respondents that did not answer the Life Survey questions were excluded from the analysis. The foodbank usage data was provided at lower super output area level and was converted to ward level using the Office for National Statistics best fit lookup table.

The Morecambe Bay Foodbank data does not account for all foodbank usage across Lancaster. For this reason, the analysis was restricted to the following wards: Bare, Bulk, Castle, Harbour, Heysham Central, Heysham North, Heysham South, John O'Gaunt, Marsh, Overton, Poulton, Scotforth East, Scotforth West, Skerton East, Skerton West, Torrisholme, University & Scotforth Rural, and Westgate.

## Data Access Statement

### Beyond Imagination Life Survey Dataset

Due to ethical issues, data underpinning this publication cannot be made openly available. Access to the Beyond Imagination Life Survey dataset is restricted to Lancaster University researchers and officers within Lancaster City Council and Blackburn with Darwen Council. Further information about the data and conditions for access are available from Lancaster University's Institutional Repository at: <https://doi.org/10.17635/lancaster/researchdata/540>

### Beyond Imagination Life Survey: Topline Reports and Case Studies

Topline Reports of the Life Survey findings and six case studies created in collaboration with Connected Places Catapult are openly available from Lancaster University's Institutional Repository at: <https://doi.org/10.17635/lancaster/researchdata/542>

### Beyond Imagination Life Survey: Data Dashboard

Due to participant consent obtained for the Life Survey access to the data dashboard is restricted to Lancaster University researchers, officers in Lancaster City Council and Blackburn with Darwen Council. Lancaster University host and manage the data dashboard with access granted on a role-based basis. A password protected log on to the Life Survey data dashboard can be requested by emailing: [imagination@lancaster.ac.uk](mailto:imagination@lancaster.ac.uk)



# Acknowledgements

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