

# The SPACE Project: The impact of place on cognitive health

**Ruth Hunter**

Professor of Public Health and  
Planetary Health

Centre for Public Health,  
Queen's University Belfast

Email: [ruth.hunter@qub.ac.uk](mailto:ruth.hunter@qub.ac.uk)

<https://www.qub.ac.uk/sites/space/>



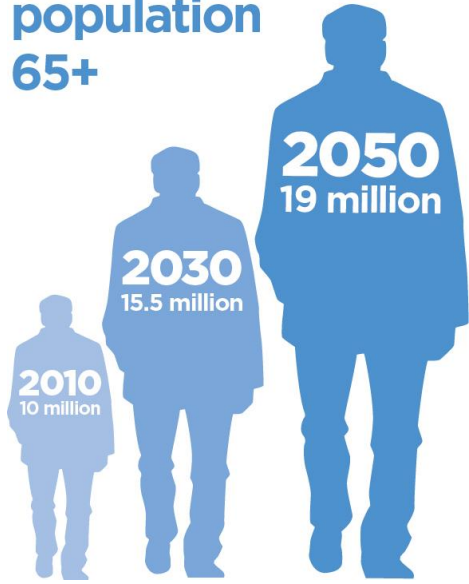
# SPACE

SUPPORTIVE ENVIRONMENTS FOR  
PHYSICAL & SOCIAL ACTIVITY,  
HEALTHY AGEING & COGNITIVE HEALTH

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UK  
population  
65+



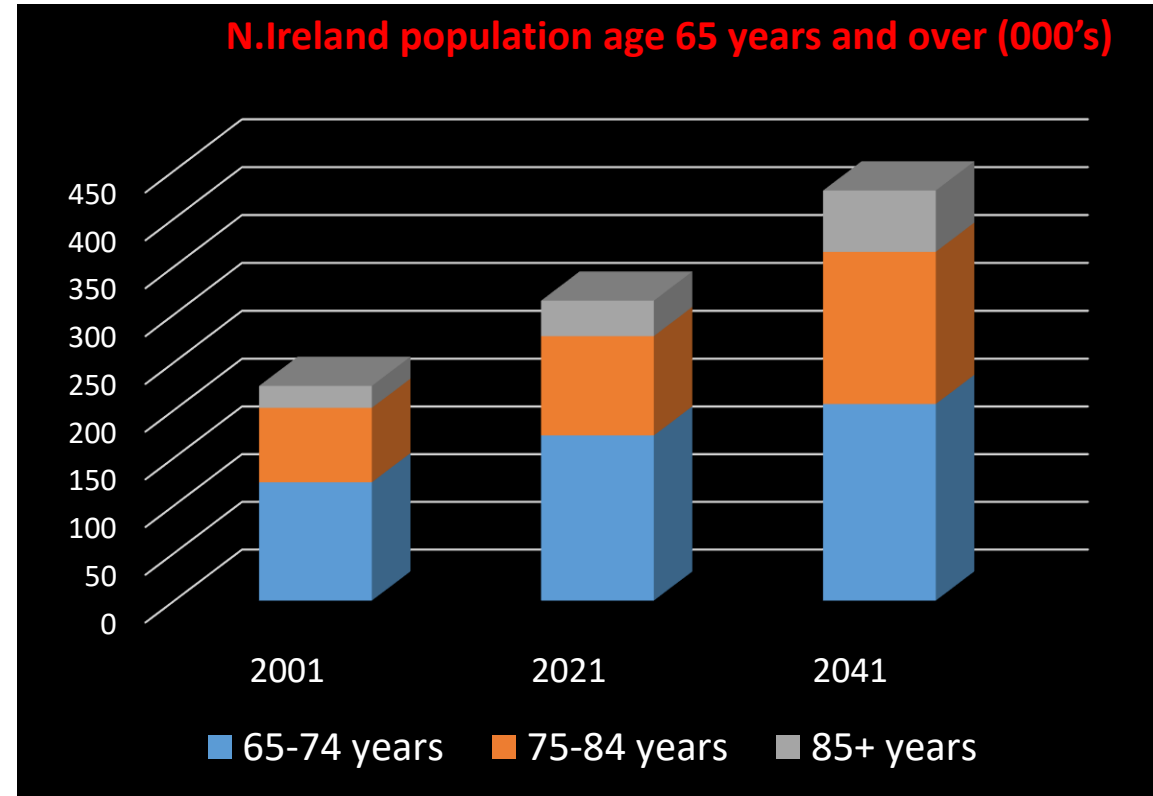
# Societal Transformation

Third of UK babies 'will live to 100'

© 26 March 2012



N.Ireland population age 65 years and over (000's)



Source: NISRA

2001: 200,000 → 2021: 300,000 → 2041: 400,000



# Cognitive Health

- Globally, about 47 million people were living with dementia in 2015
- Projected to triple by 2050
- 40% of dementia cases could be prevented or delayed by targeting 12 risk factors throughout life
- Air pollution
- Hearing and vision – new factors in 2024

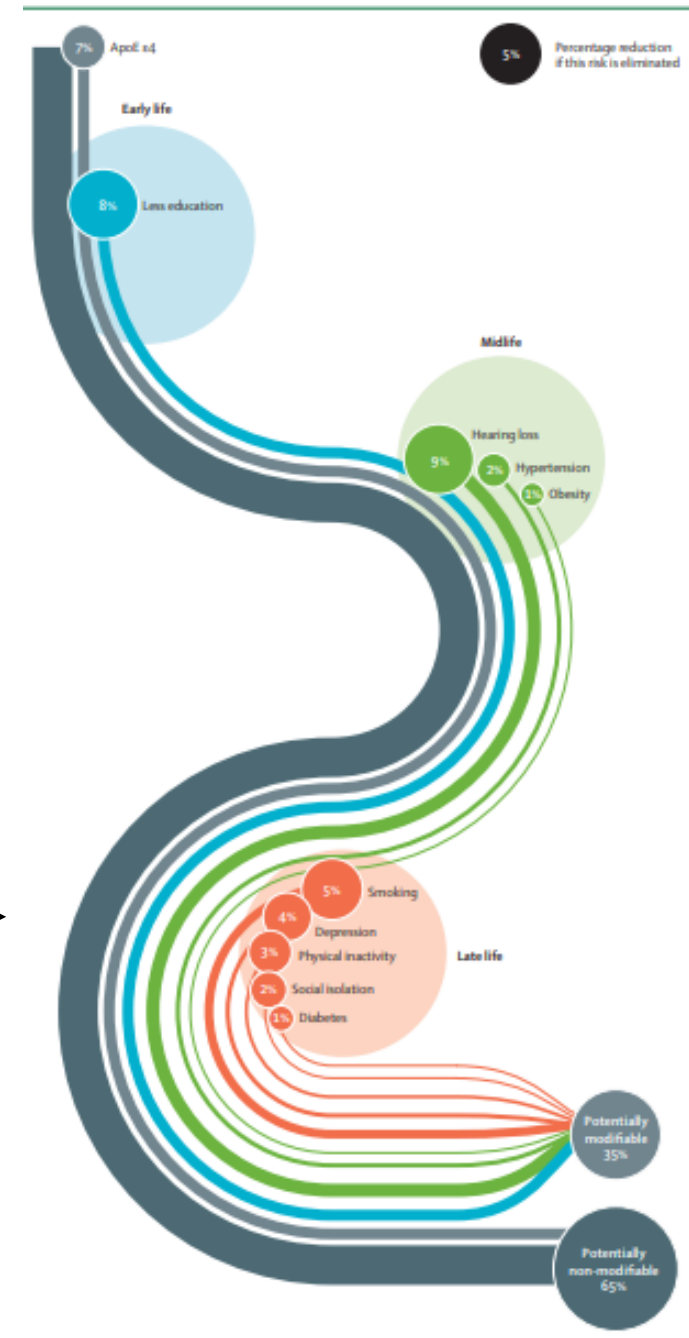


Figure 4: Life-course model of contribution of modifiable risk factors to dementia. Numbers are rounded to nearest integer. Figure shows potentially modifiable or non-modifiable risk factors.



## OUR HEALTH IS LINKED TO THE ENVIRONMENT where we are born, live, and work

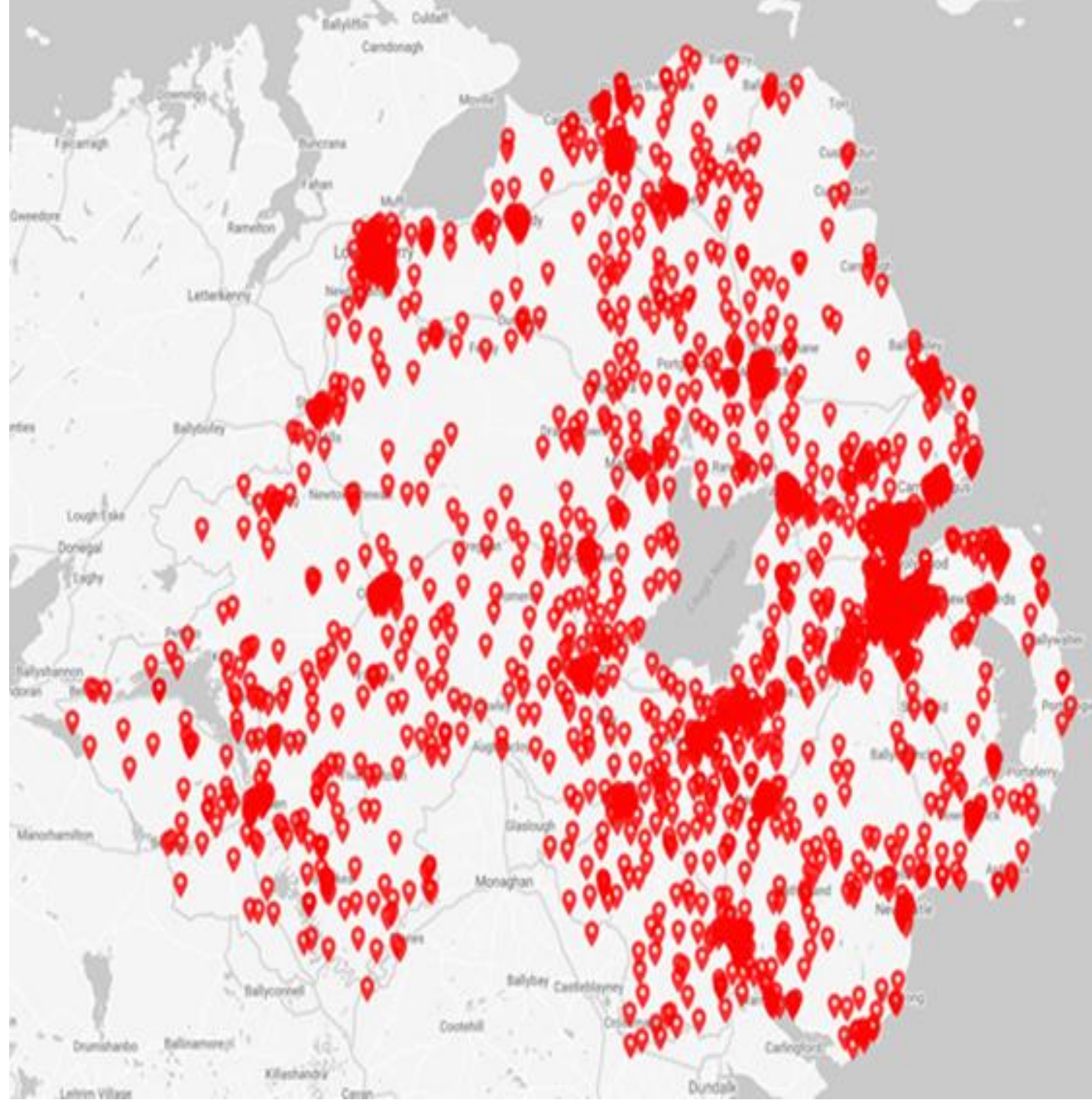
- *Key research questions:*
  - What environmental factors influence healthy ageing and cognitive health?
  - What are the best policies and interventions for promoting healthy ageing and cognitive health?
- *Aim:* Integration of:
  - environmental exposures
  - health behaviours
  - biological data





## **NICOLA**

- ***Northern Ireland Cohort for the Longitudinal Study of Ageing***
- ***~8500 over 50's***
- ***3 waves***





**Air pollution**

**Natural environments**

**Noise and light pollution**

**Soil pollution**

**Public Transport**

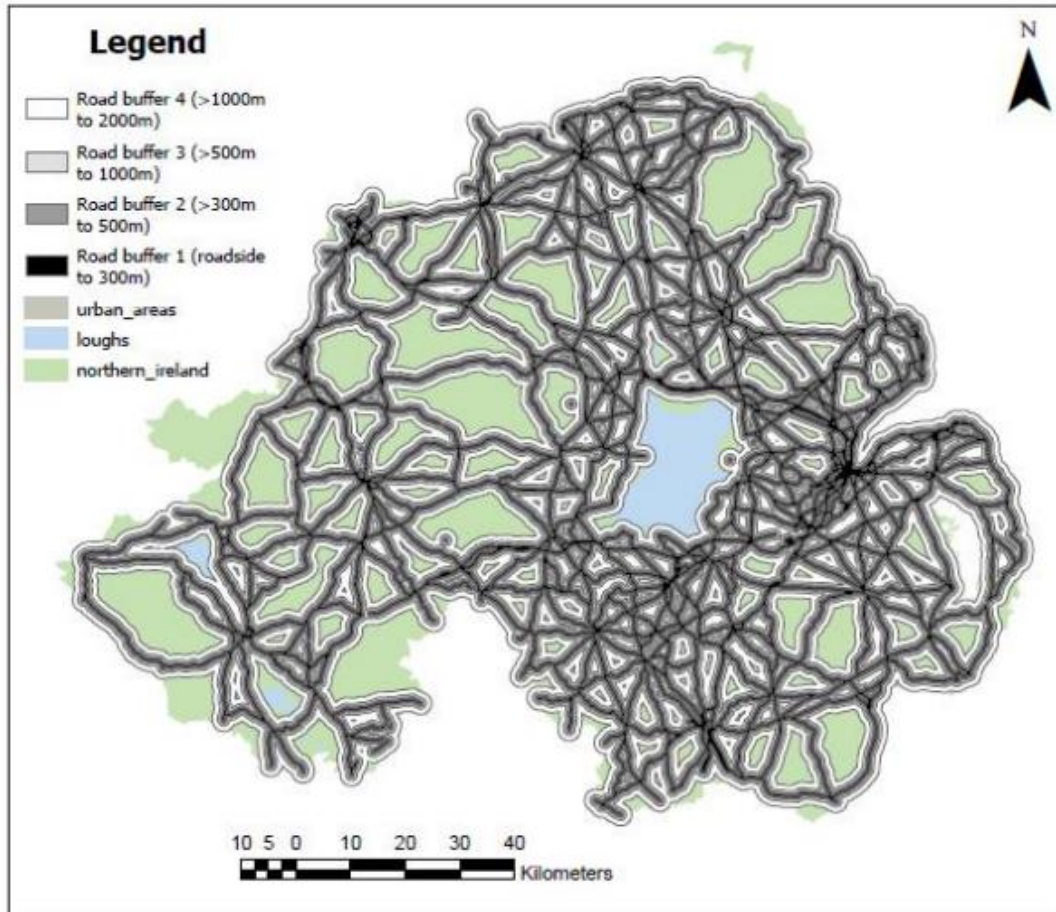
**Road networks**

**Climate change (heat, precipitation)**

**Climate resilient infrastructure**

**Epigenetics/ biological impact**

# Impact of traffic emissions



- **Soil and air pollution**
- Increased **Zinc**
- Increased **Molybdenum**
- Increased **Lead**
- Increased **Mercury**

Health impacts for:

- cognitive health
- cardiovascular health
- respiratory health




**Living close  
to major  
roads**



**Accelerated  
biological  
ageing**

Original research

## Inequality in green space distribution and its association with preventable deaths across urban neighbourhoods in the UK, stratified by Index of Multiple Deprivation

 Tran Thu Ngan<sup>1</sup>, Ruoyu Wang<sup>1, 2</sup>, Christopher Tate<sup>1</sup>,  Mark Green<sup>3</sup>, Richard Mitchell<sup>4</sup>,  Ruth F Hunter<sup>1</sup>, Ciaran O'Neill<sup>1</sup>

**With every 1% increase of greenspace in a geographic area, the annual count of preventable deaths among the most deprived neighbourhoods was lower by 37-41%.**





# Factsheets

Green and blue space	Noise pollution	Light pollution	Soil pollution	Epigenetics	Air pollution	Urban planning	Planetary health and climate change
<p>Green space is any natural space that contains trees, grass or any other green vegetation. Blue space is any natural space that contains water, rivers, lakes, and the sea.</p>	<p>1 in 5 people in Europe are exposed to high noise levels considered harmful to their health.</p>	<p>Over 80% of the world's population is living under light-polluted night skies.</p>	<p>Soil pollutants play a role in the environment and can impact how we live and age. Inputs from potentially toxic elements can impact cognitive health, such as mercury and lead.</p> <p>Hg Pb</p>	<p>Our genes carry information. Environmental factors affect how our genes are expressed. Epigenetics is the study of the environment's effect on gene expression. For example, in two people with the same genetic code, one may be affected by an environmental factor.</p>	<p>Air pollution is the biggest environmental health crisis. 99% of global population breathe air that contains high levels of pollutants and is estimated to cause 6.7 million premature deaths each year.</p>	<p>Urban design has been historically important for public health. Cities with a compact and walkable design, with a mix of services available in shorter distances, can have lower levels of air pollution and better health outcomes.</p>	<p>Human health depends on flourishing natural systems. By harming our natural systems, we harm ourselves and future generations.</p> <p>Climate change is a context that creates unprecedented situations.</p>
<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"When you're out there walking, you feel a sense of freedom"</p> <p>"Outdoor space is the best place to be"</p>	<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"People in cities don't notice the noise anymore"</p> <p>"Places are so noisy and noise reflects in the way you don't have a good night's sleep"</p>	<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"Recently, I haven't been able to see as many stars"</p> <p>"I always sleep better when I'm somewhere that doesn't have light pollution"</p>	<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"I notice if there's something different with smells in the air or if the soil is contaminated, especially living on a coast you can see the dirt coming out of the water"</p>	<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"It's so interesting that we could be affected by disease and through interacting with the environment we could be switching something on or off"</p> <p>"There are so many factors at play when we approach behaviour change"</p>	<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"When traffic does build up, you feel the fumes from the cars affecting you, particularly when walking along a country road"</p>	<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"Sometimes we don't think about it, we just hop in our cars and go"</p> <p>"Traffic has gotten a lot more noticeable, even in the outskirts"</p>	<p>We asked members of our Healthy Ageing Advisory Group* what they thought...</p> <p>"I did notice this year has been warmer, and it can be a bit uncomfortable at times"</p> <p>"We should think about it - what are we doing to our lovely planet?"</p> <p>Our stakeholders said... Bringing together a range of bodies in partnership from across the public, private and third sector to raise awareness, guide good policymaking, and create actions is crucial.</p>
<p>A better environment for physical and social activities. A better environment for mental health and wellbeing.</p>	<p>A better environment for physical and social activities. A better environment for mental health and wellbeing.</p>	<p>A better environment for physical and social activities. A better environment for mental health and wellbeing.</p>	<p>A better environment for physical and social activities. A better environment for mental health and wellbeing.</p>	<p>A better environment for physical and social activities. A better environment for mental health and wellbeing.</p>	<p>A better environment for physical and social activities. A better environment for mental health and wellbeing.</p>	<p>A better environment for physical and social activities. A better environment for mental health and wellbeing.</p>	<p>Understanding how all planetary, environmental and health factors interact can help inform planners and citizens of the many components affecting how we live and age.</p>
							<p>The health of citizens and the planet is central to create conditions where everyone can live and age well.</p>
<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p>	<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p>	<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p>	<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p>	<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p>	<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p>	<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p>	<p>SPACE: SUPPORTIVE ENVIRONMENTS FOR PHYSICAL &amp; SOCIAL ACTIVITIES, HEALTHY AGEING &amp; COGNITIVE HEALTH</p> <p>qub.ac.uk/sites/space</p> <p><small>*Members of the public representing older persons who helped shape our research and ensured we considered their lived experiences, insights and opinions</small></p> <p><small>This work was supported by UK Research and Innovation [ES/V016075/1]</small></p> <p>Healthy Ageing Challenge Social, Behavioural and Design Research</p> <p>Economic and Social Research Council</p>





# Video series

## 5 themes:

1. Air & Soil pollution
2. Light & Noise pollution
3. Green & Blue space
4. Urban planning
5. Planetary health & Climate change

[qub.ac.uk/sites/space/VideosandFactsheets](http://qub.ac.uk/sites/space/VideosandFactsheets)



# SPACE geoportal

<https://space-geoportal-queensub.hub.arcgis.com/>

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## SPACE Geoportal

For Health and Environment Research, Policy and Action

Search catalogue

The SPACE project is investigating factors in the environment that may influence health as we age. This hub is a platform for exploring and downloading Geographic Information Systems (GIS) data relating to that research. In this portal, you can search the catalogue of available data, visualise it and download it.

### Explore the Data

The below categories below relate to environmental variables which influence health and healthy ageing in our environment. These factors include, for example, light pollution, noise pollution, air pollution and soil pollution, as well as built infrastructure and availability of 'green space' and 'blue space'.

- Land Cover
- Climate
- Air and Emissions
- Noise and Light
- Geology
- Health
- Statistics
- Infrastructure
- Boundaries
- SPACE Outputs

SPACE Test Site About SPACE Q&A Training Resources Related Studies Urban Environ

Search

All (69) Data (42) Documents (8) Apps & Maps (10)

Filters Reset 1 - 12 of 69 Relevance

Type Filter options

- Feature Service (42)
- Map Service (10)
- Web Map (7)
- Hub Page (6)
- Image (1)

Show 3 More

Tag Filter options

- Space (32)
- Osni (15)
- Air Pollution (8)
- Opendata (8)
- Geology (7)

Show 97 More

Category

- Road Infrastructure - Space (11)
- >  Pollution - Space (7)

Dataset Admin Boundaries Gemma.McNickle\_ QueensUB OSNI Administrative boundaries

Dataset HealthSocialcare Centre for Geographical Information and Geomatics ... Health social care data gathered by OSNI for use in EPG

Dataset Particulate Matter 10 Centre for Geographical Information and Geomatics ... Air Pollution - Particulate Matter 10 - DEFRA

Dataset Regional CO2 Emissions by Year

Dataset Light at Night

Dataset NI Traffic Count Data

Land & Property Services

The SPACE project explores the important role that the environment plays in supporting healthy ageing and cognitive health. Over the past year, in collaboration with Land & Property Services, we have been developing a platform for exploring and accessing geospatial data across Northern Ireland. Our geoportal can be used to search the catalogue of available data, visualise it, and download it.





# Policy and Practice

- Cognitive health lacking on the policy agenda
- Addressing the root causes of poor-quality environments will have benefits across a range of policy areas

Addressing:

Poor transport infrastructure,  
absence of good-quality  
green space, poor housing



Will impact:

Ageing, health, cognitive  
decline, liveable communities,  
environment, climate crisis

**Leadership for  
healthy people  
and planet**

An invitation to  
accelerate integrated  
policy and action  
on health and  
environment

