

## Improving the health of a nation

## Public Health Scotland

**The Challenge**

- Optimise the use of historical and real-time data to make better decisions and communicate clearly

**The Benefits**

- Clear communication in a public health crisis
- Improved management of disease outbreaks
- Healthcare where healthcare is needed most
- More accessible public health information

Geospatial data is now being used in diverse ways to raise awareness of public health issues and inform key decisions about life-saving NHS services in Scotland. Public Health Scotland is using a suite of tools from Esri's ArcGIS system to help it manage the COVID-19 public health crisis, as well as ensure that healthcare services are located where they are most needed to improve patient outcomes.

**The Challenge**

For nearly 100 years, vast amounts of data have been collected and stored about medical conditions, healthcare services and facilities in Scotland. Yet, until recently, the location aspect of this huge reservoir of information was hidden away in databases and unused. Public Health Scotland set out to optimise the use of Scotland's historical medical data, as well as new data on current healthcare concerns, to help it make well-informed decisions about the delivery of healthcare services in Scotland.

**The Solution**

Using a suite of tools from Esri's ArcGIS system, Public Health Scotland began to analyse data spatially to uncover regional healthcare issues and plan local healthcare interventions. This focus on geospatial analysis couldn't have come at a more critical time; when COVID-19 emerged in early 2020, Public Health Scotland had the data, the skills and the GIS technology it needed to better monitor and understand the spread of the disease and respond effectively.

At the outset of the coronavirus pandemic, Public Health Scotland used ArcGIS Dashboards to create a COVID-19 dashboard for its website, providing the general public with an accurate picture of the spread of COVID-19 both within the community and in hospitals. Anyone could view the dashboard and use the embedded interactive ArcGIS maps to zoom into specific regions and see the cumulative number of cases by local authority area.

Subsequently, Public Health Scotland used ArcGIS Insights to develop a sophisticated track and trace solution, the Connections tool, which highlights the locations of clusters of COVID-19 cases. Highly secure and for internal use only, this solution allows incident management teams to visualise and analyse near real-time data, in ways that weren't possible before. Public Health Scotland also worked in collaboration with the Scottish Government and other public sector bodies, using ArcGIS to find the best locations for over 2,000 vaccination centres, taking into account population densities, drive times and candidate facilities.

Public Health Scotland has used the advanced spatial analysis capabilities of ArcGIS in numerous projects to improve understanding of health concerns. In one initiative, the organisation analysed data on secondary schools and fast food outlets, revealing that a large percentage of pupils have access to unhealthy meals within just a five minute walk of their schools. This research is now being used to help develop greater understanding of childhood obesity and inform strategies to promote healthier lifestyles.

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Andrew Gasiorowski, Principal Information Development Manager and GIS Lead, Public Health Scotland



Public Health Scotland's Geospatial Connections Tool

In several projects, Public Health Scotland has used ArcGIS to develop interactive map-based web apps that make public health information more accessible to the public. By taking advantage of the Sweet for ArcGIS web editing solution, for example, the organisation is managing an up-to-date map, showing the boundaries for all 942 GP surgeries in Scotland.

All this is just the tip of the iceberg. “We are starting to develop further ambitions around the use of spatial and exploring how we can use ArcGIS to underpin even more of what we do,” says Andrew Gasiorowski, Principal Information Development Manager and GIS Lead at Public Health Scotland.

#### The Benefits

##### ***Clear communication in a public health crisis***

Public Health Scotland was able to use ArcGIS Dashboards to make authoritative and up-to-date data about COVID-19 cases available to the general public in a format that was clear and easy to understand. “Displaying information on a map helps people to understand it without large amounts of explanation,” Gasiorowski says. “People could use the maps on the dashboard to understand the implications of the virus in their own localities and see differences between local authority areas in Scotland.”

##### ***Improved management of disease outbreaks***

The Connections tool developed using ArcGIS Insights makes it far easier for Public Health Scotland to monitor the spread of COVID-19 and manage outbreaks. The solution is so significant to the success of the battle against COVID-19 that it was presented to the Scottish Health Minister soon after it was launched. “Our ArcGIS Insights tool for track and trace allows us to analyse data that is incredibly complex and show change over time, which is proving so useful for the effective management of coronavirus clusters,” Gasiorowski explains.

##### ***Healthcare where healthcare is needed most***

Critically, Public Health Scotland is using ArcGIS to help NHS Scotland make better informed decisions about where to base new services to deliver good patient outcomes. For example, it analysed historical information on the journeys that gastroenterology patients in Grampian made to access medical care. It is now using this information to understand how many miles of travel could potentially be saved for patients by using tele-health services or relocating services. “If we know where people are and where the health issues are, we can better target health interventions to improve patients’ health and wellbeing,” Gasiorowski says.

##### ***More accessible public health information***

Through a variety of projects, Public Health Scotland is improving access to public health information for healthcare professionals and the general public. For example, Public Health Scotland is developing a web app to provide live information on where in the world infections like malaria and yellow fever are prevalent. This solution will save so much time for GP practices, as they will have instant access to the latest advice about which vaccinations people need when visiting countries around the world.

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