

# REPORT

## **Communication of Air Quality Data and Information: Operational Report for February to April 2002**

A report produced for the Department for Environment, Food and Rural Affairs, the Scottish Executive, the National Assembly for Wales and the Department of the Environment for Northern Ireland

AEAT/ENV/R/1113 Issue 1  
June 2002



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<b>Title</b>	Communication of Air Quality Data and Information: Operational Report for February to April 2002
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# Executive Summary

The objective of the Air Quality Communications project is to collate and disseminate air quality information and data in line with the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, and the EC Directive on Air Quality Management and Assessment and associated Daughter Directives. This second quarterly report details the project progress made from 1<sup>st</sup> February to 30<sup>th</sup> April 2002.

Development of a new air quality database for the world-wide-web commenced in mid-October 2001 following agreement of the specification set out in the report AEAT/ENV/R0813/Issue1. The main developments during this current reporting period were as follows:

- Upload of historical measurement data to the on-line database.
- Upload of reports and contracts to the new contracts and reports databases.
- Design and development of the user-interface for the web site.
- Development of the user-interface and management software for Frequently Asked Questions.
- Preparing text and links for the web pages.
- Uploading information on air quality management areas to the LAQM database.
- Development of the data and statistics selection screens.

This development of the new web has been carried out according to the project specification and the requirements of the government e-guidelines.

In addition to development of the web site, the new zones and agglomerations scripts which will be used for the updating the Teletext pages, Freephone messages and e-mail bulletins when the new system is launched have also been prepared.

During this period the existing Air Quality Communications systems continued to deliver data to a high success rate:

Freephone 0800 556677	– 100% transmission success rate.
TELETEXT page 155	– 91% transmission success rate.
E-mail bulletins	- 100% transmission success rate.

The number of monthly averaged hits per day on the air quality archive web site varied between 9,096 (in March) and 17,126 (in February) during this period. We dealt with 362 enquiries to the [aqinfo@aeat.co.uk](mailto:aqinfo@aeat.co.uk) e-mail address for further help with the Web site.

An average 66 people per day called the Freephone number for air quality information for their area, whilst an average 150 callers per day requested information for another area of the UK.

There were several breakdowns in the service which took longer than the specified time for repair:

- **3<sup>rd</sup> – 5<sup>th</sup> March 2002** – Charts on the web site were not updating automatically for 43 hours during this period. The fault was rectified as soon as it was noticed and subsequently this is monitored more closely.
- **1<sup>st</sup> – 23<sup>rd</sup> April 2002** – Problems with the map server occasionally prevented people from accessing the interactive UK concentration and exceedence maps. These were minor intermittent problems that were all corrected within 6 hours. The source of these problems was eventually traced to corrupted zones and agglomerations data and the problem was permanently resolved.
- **27<sup>th</sup> – 28<sup>th</sup> April 2002** – The update of TELETEXT pages from Saturday 27<sup>th</sup> until 08.00 on the Sunday 28<sup>th</sup> April was caused by a technical difficulty at TELETEXT. The problem lasted 23 hours, outside the specified time for correction, because the problem was beyond the control of AEA Technology.

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# 1 Introduction

Air pollution and its impacts on human health and the natural environment continue to be a major policy issue for the Department for Environment, Food and Rural Affairs, The Scottish Executive, The National Assembly for Wales and DoE Northern Ireland. This is the second operational report on the Communication of Air Quality Data and Information contract which these organisations have let to **netcen**.

The objective of this project is to collate and disseminate air quality information and data in line with the Air Quality Strategy for England, Scotland, Wales and Northern Ireland, and the EC Directive on Air Quality Management and Assessment and associated Daughter Directives. This report details the progress of the project made from 1<sup>st</sup> February to 30<sup>th</sup> April 2002.

The objective of the project involves 4 principal elements:

1. Management of air quality data from monitoring networks
2. Dissemination of air quality data from monitoring networks
3. Provisional statistical summaries of air quality data
4. Maintenance and development of the National Air Quality Archive

The dissemination of air quality information will be achieved through the use of the Air Quality Information System (figure 1.1) which is able to present a large volume of wide-ranging and regularly updated information to the end user via a number of different media:

1. *Freephone 0800 556677.*  
This service is updated hourly via the bulletin dissemination system and is widely available to members of the public.
2. *Teletext page 155*  
This is updated hourly by the bulletin dissemination system and provides air quality information via the television making it widely accessible from people's homes.
3. *Email bulletin*  
Emails are currently dispatched daily to over 100 recipients. The service is available on request and bulletins can be tailored the specific needs of the recipient.
4. *Web based access to archive*  
The web site is updated hourly via the bulletin dissemination system and is a very effective mechanism for providing both large data volumes and more meaningful summaries and statistics. A wide variety of data can be stored here allowing the end user to select the information most appropriate to them in a number of formats (graphical, numerical)

This provides a diverse range of people with access to up to date air quality information that is most appropriate to their individual needs. The AQ Information System contains back up servers and systems to allow for full fault tolerance. The result is a highly reliable information dissemination system.

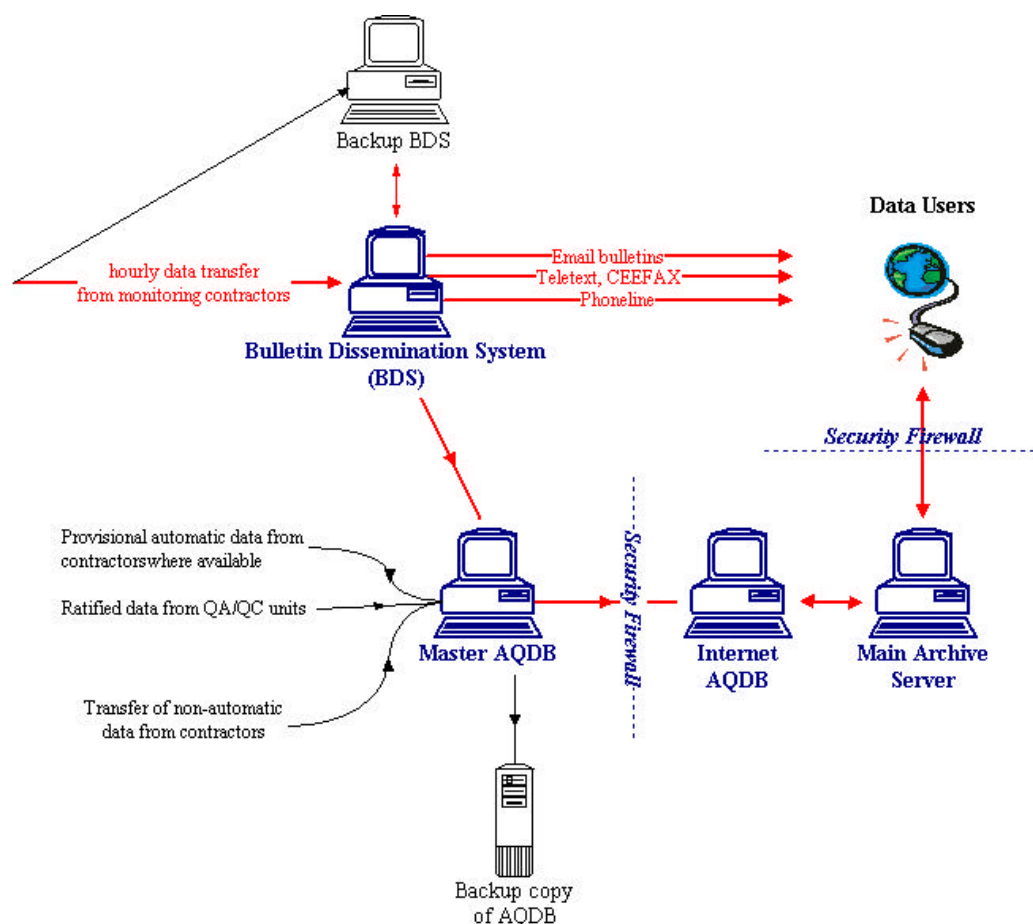


Figure 1.1 - Air Quality Information System

## 2 New developments during this period

A major task within the project is to upgrade the way in which the air quality data are stored on the internet server. Since its inception, the Archive has used "flat files" of simple text to store all the values. These are now to be replaced by a relational database which will make the user interface more flexible and also improve the efficiency and reliability of the whole system.

The first step in the development of the new database was the delivery of the specification – AEAT/ENV/R0813/Issue1. This dealt with the definition of the database structure:

- The pollutants, site details, networks, to be included.
- The data selection options.
- The reporting of raw data including units
- The reporting of standard summary data
- The reporting of exceedance statistics.

The document was circulated for comment and the development of the core database structure commenced at this stage.

The last quarterly report summarised progress on developing the back-end of the new air quality database. This had involved setting up all the data fields, writing and testing the scripts for data input, and setting up the systems for managing the new system. It also reported work on designing the new reports and contracts databases, reviewing the content of the old web site, and on some initial designs for the new web site pages.

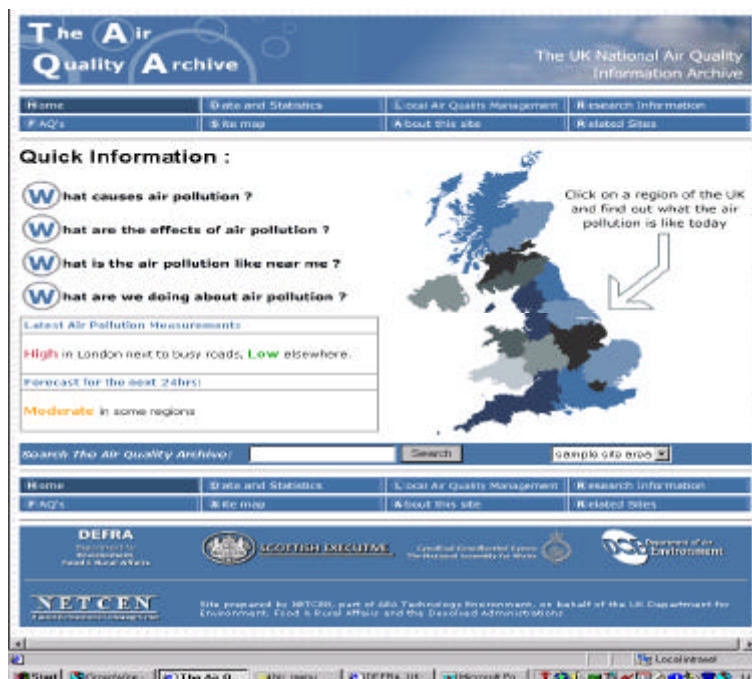
During the February to April 2002 period there was more substantial progress in terms of the web site and database beginning to take shape. The progress was presented at meetings with DEFRA and the devolved administrations on January 16<sup>th</sup>, February 19<sup>th</sup>, February 25<sup>th</sup> and April 8<sup>th</sup>, and is summarised below.

## 2.1 DATA UPLOAD

- During this period 80 million rows of data from the automatic monitoring networks, 1972 to 2002, were uploaded to the database.
- Another 4 million rows of data from the smoke/SO<sub>2</sub> monitoring networks, 1960 to 2001 were uploaded to the database.
- Monitoring data from the NO<sub>2</sub> diffusion tube survey, 1992 to 2001 were passed to the database. (~130,000 rows of data).
- Acid deposition monitoring data were uploaded.

## 2.2 WEB SITE HOME PAGE

The design of the web site home page was discussed and agreed at the project review meetings with DEFRA and the devolved administrations on January 16<sup>th</sup> and February 19<sup>th</sup> 2002. The idea of the design (shown in figure 2.1 below) was to attract both casual and technical users into the site. The left-hand side of the home page presents the answers to simple questions about air pollution to which the general public may wish to find answers. The map on the right hand-side allows users to “pop-up” the latest air quality bulletin for each of 16 regions of the UK, and to find out more about the automatic air monitoring stations in each region. The buttons at the top and bottom of the page allow technical users to access the more detailed areas of the site.



## 2.3 BASIC STATISTICS AND EXCEEDENCES

Scripts for the statistical calculations to be performed by the database were written and validated.

Over 90 million statistics were then calculated and uploaded to the database. These included:

- The appropriate running means, daily means, annual means etc. for each of the pollutants.
- Exceedence statistics for the air quality strategy objectives.
- The list of percentile values as agreed in the specification.
- The data and statistics selection menus were added to the development web site.

The screenshot shows the 'The Air Quality Archive' website. The header includes the site logo and the text 'The UK National Air Quality Information Archive'. Below the header is a navigation menu with the following items: Home, Data and Statistics, Local Air Quality Management, Research Information, FAQ's, Site map, About this site, and Related Sites.

The main content area features a 'helpdesk:' section with the text 'HELPDESK INSTRUCTIONS GOES HERE'. To the right, there is a prompt: 'Please complete the following steps to select the data and statistics you require:'. Below this prompt are two selection steps:

- Select a Region:** A dropdown menu currently showing 'Local Authority'.
- Select a Parameter:** A list box showing the following options: 'bs', 'SO2-S', 'SO3', 'NO', and 'NO2'.

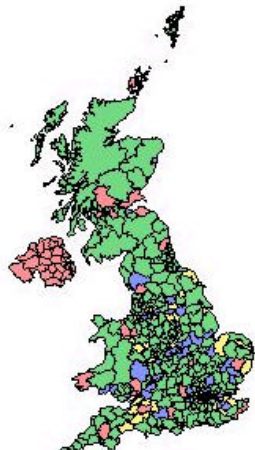
Below the parameter list is a 'Step 2' button. At the bottom of the page, there is a search bar with the text 'Search The Air Quality Archive:', a search button, and a dropdown menu for 'sample site area'.

## 2.4 LAQM

- The draft local air quality management section of the web site was re-designed and improved (in association with DEFRA's other contractors) to incorporate AQMA maps and LA Action Plans.
- A drop-down local authority selector option was added to the LAQM home page to supplement the existing clickable map.
- The LAQM home page was set up with buttons linking directly to "LAQM tools", "LAQM

# Local Air Quality Management

<a href="#">▶ LAQM home</a>	<a href="#">▶ LAQM tools</a>	<a href="#">▶ LAQM reports</a>	<a href="#">▶ LAQM helplines</a>
<a href="#">▶ The Air Quality Archive</a>	<a href="#">▶ Data and Statistics</a>	<a href="#">▶ FAQ's</a>	<a href="#">▶ Site map</a>



## ▶ Air Quality Management Areas

**Click on the map to zoom in to individual local authorities.**

Over the past 2 years, local authorities in the UK have been carrying out a review and assessment of air quality in their area. The aim of the review is to make sure that the national air quality objectives will be achieved. If a local authority finds any places where the objectives are not likely to be achieved, it must declare an Air Quality Management Area there.

[Tell me more about Air Quality Management Areas](#)

[What are the national air quality objectives?](#)

[List all local authorities that have declared an Air Quality Management Area](#)

## 2.5 TEXT FOR STATIC PAGES ON THE WEB SITE

During this period we compiled the majority of the text for the static pages on the web site. This included draft text to go beneath the three main questions for public information on the home page, as well as all the supplementary text for the data and statistics, LAQM and Research Information sections of the site.

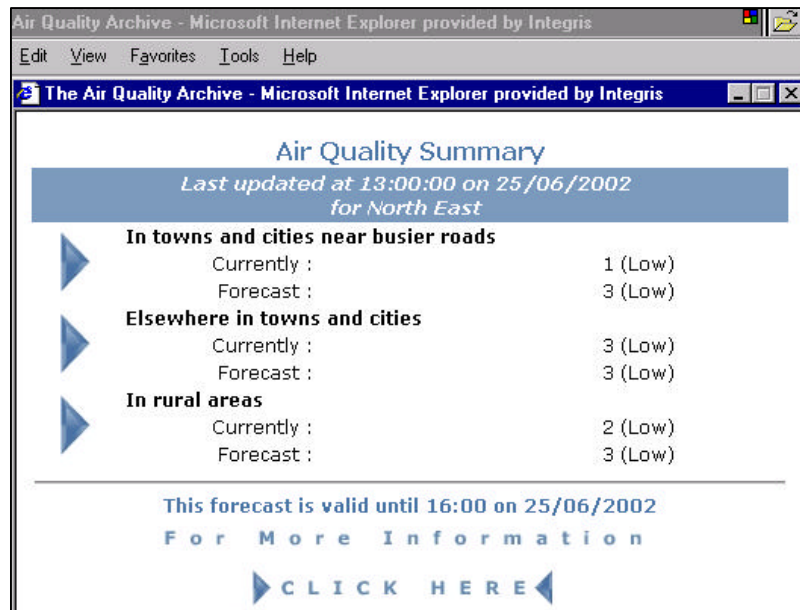
## 2.6 RESEARCH INFORMATION

Following the agreement on the style and functionality of this section of the web site in January 2002, several hundred documents were uploaded to the database. The documents which were expected to be useful to the public were uploaded in both HTML and PDF format.

## 2.7 WEB SITE HOURLY BULLETINS AND DRILL-DOWN REGIONAL INFORMATION

Following the project review meeting on April 8<sup>th</sup> 2002 at **netcen**, it was agreed to design an improved graphical interface for accessing latest monitoring data, graphs and site information for the automatic monitoring networks. The design below was presented to DEFRA with the meeting minutes, agreed and implemented as part of the ongoing development work. The idea was that from the regional bulletins accessed by clicking on the map on the right-hand-side of the home page, users could then click to access further information on the monitoring sites which report the data forming the bulletins.

The design of the regional hourly updated bulletins which pop-up from the map on the home page is illustrated in figure 2.4 below.



**Figure 2.4 – Draft design of “pop-up” bulletins for automatic monitoring data**

From the “click-here” button users will be able to access further information on the monitoring sites in the selected region, as illustrated below.

	<p>For more information about a monitoring site, select one of the options here and click a site name on the map:</p> <ul style="list-style-type: none"> <li><input type="radio"/> Last Hour's Data</li> <li><input type="radio"/> Weekly Graphs</li> <li><input type="radio"/> Summary Statistics for this year</li> <li><input type="radio"/> Summary Statistics for last year</li> <li><input type="radio"/> Site Information (description, location, photos)</li> <li><input type="radio"/> UK Background Concentration Map</li> </ul> <p>Click here for an explanation of <a href="#">Air Pollution Bands and Index</a></p>
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**Figure 2.5 – Draft Interface for accessing latest monitoring data, graphs and site information for the automatic monitoring networks**

## 2.8 PREPARATION FOR LAUNCH OF THE NEW SERVICES ON TELETEXT, FREEPHONE AND E-MAIL

At the same time as launching the new Air Quality Archive web site, updated services to Teletext, freephone 0800 556677 and e-mail bulletins will be launched to incorporate the new detailed air quality bulletins for 16 zones and agglomerations.

The Teletext designs are illustrated in figure 2.6 below and were presented to DEFRA at the project review meeting on April 8<sup>th</sup> 2002.

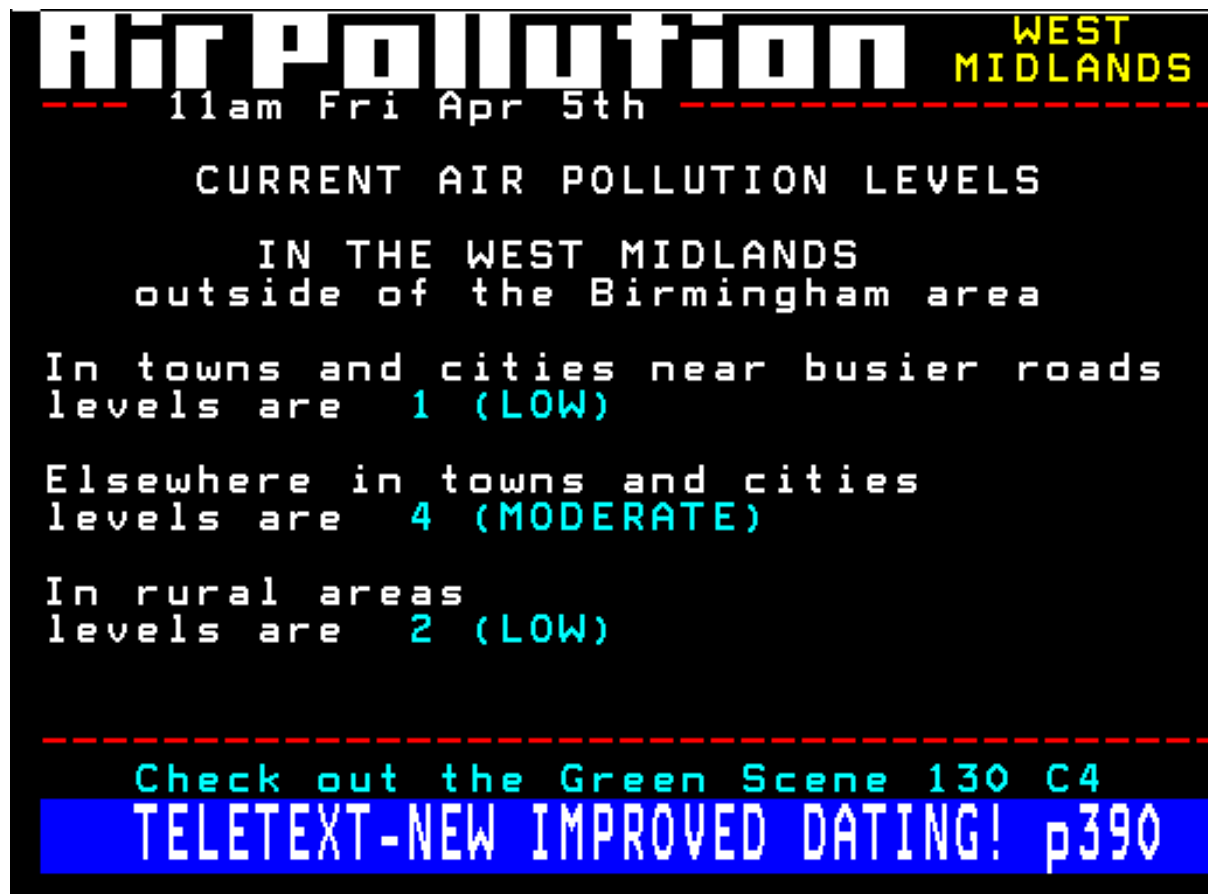


Figure 2.6 – Draft design of new Teletext pages.

At around the same time our subcontractors, IMS Media Ltd. completed development work on the scripts which produce the updated telephone information messages on 0800 556677. On April 11<sup>th</sup> 2002 the new system was moved onto a test number which was given to DEFRA for comments. We also began to send the updated hourly data files through to the test service to check that they were being processed and disseminated correctly. This system was then ready to be launched.

## 2.9 CONSULTATION ON THE NEW AIR QUALITY ARCHIVE WEB SITE

On March 11<sup>th</sup> 2002 **netcen** drafted a letter to send out to expert groups, local authorities and other organisations, inviting them to comment on the draft of the Air Quality Archive which had been placed onto a password protected preview site.

Unfortunately there were some technical difficulties with the security access which meant that the site was not available for preview for around a further week after the letter was drafted. Also, not

all the organisations were able to get through the firewall due to restrictions imposed by their own IT security systems and web browsers.

However, the feedback which we did receive was generally positive in terms of the overall design of the site. In particular, its ability to provide simple, rapidly updated information to the general public was seen to be much more user friendly than the previous version.

There was some concern over the design and functionality of the data and statistics section of the site which operated in a completely different manner to the old web site. This was to be expected with such a major change in the way that the data were to be made available. Also, the functionality of this area of the site was most difficult to design and will need further work in order to make it more user-friendly.

## 2.10 SITE MAP FOR THE AIR QUALITY ARCHIVE

A draft site map for the new Air Quality Archive web site was prepared and part of this is presented in figure 2.7 below.

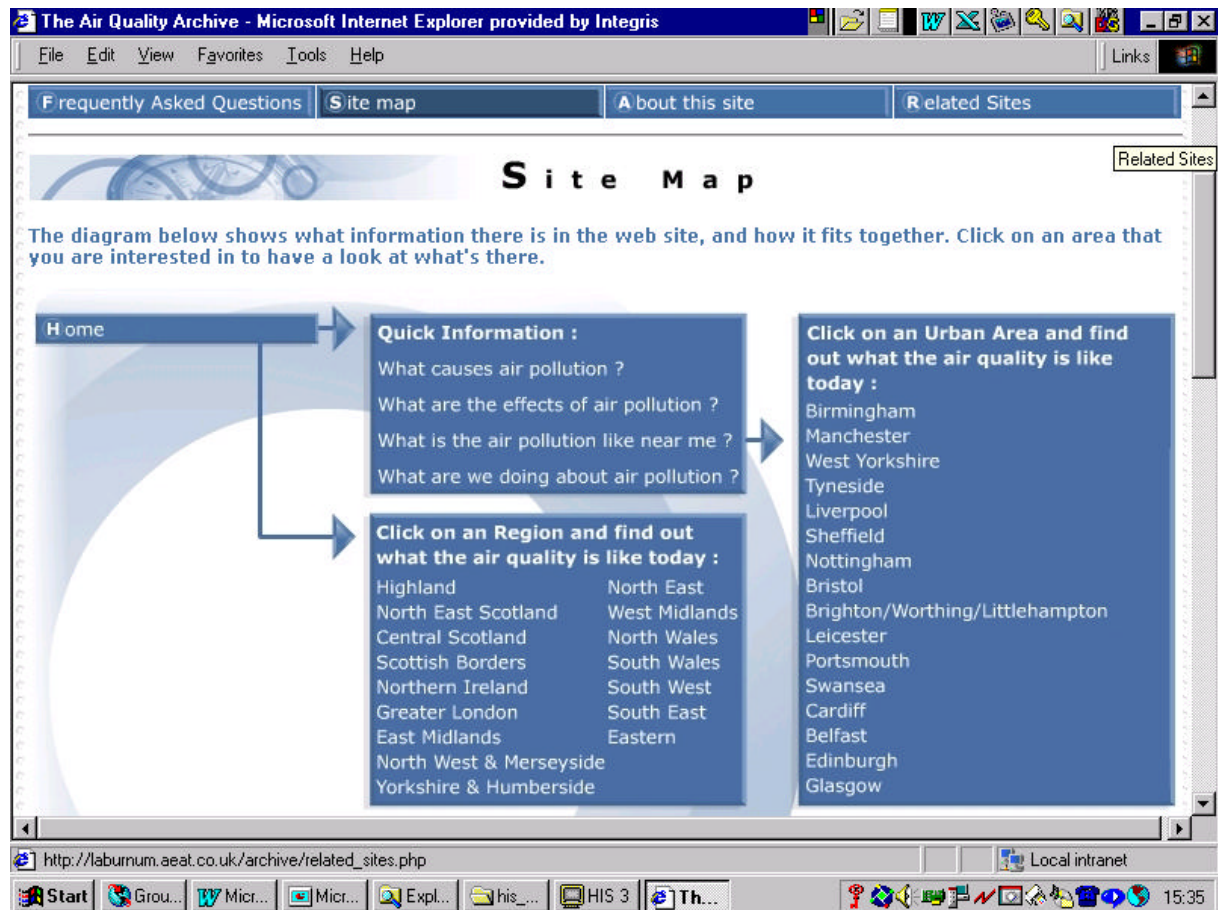


Figure 2.7 – Site Map for the new Air Quality Archive Web Site



## 2.11 GOVERNMENT E-GUIDELINES

The re-design of the web site takes account of these, and a number of issues were discussed at the review meetings. These include:

- On-line help
- Policy on the use of cookies on the site
- HTML vs. PDF format
- Requirements for the home page content
- Content disclaimer
- Copyright notices
- Disability Discrimination Act
- Welsh Language
- Public Records Act
- Links to non-Government sites

Although they are not prescriptive, our interpretation of the e-guidelines leads us to believe that the look of the new site should be kept as “clean” as possible. This is reflected in the draft designs which we presented to the Department. Features of the designs which will meet the requirements of the e-guidelines are as follows:

- A fairly simple home page using a white background to make it easily legible.
- Minimal use of features such as flash-graphics, Java script and frames throughout the site, so that it is easily negotiable and compatible with a basic web browser.
- Minimal use of colours and font changes to indicate key areas of the site, thus not discriminating against the disabled or visually impaired.
- Information on copyright and content accessible from the home page.
- The use of on-line help throughout the site, and a specific help section accessible from the home page.
- Where cookies are to be used, a warning will be made to users that information will be left on the hard disk of their computer.

## 3 Usage statistics for current web site and freephone services

The updated statistics on hits on the Air Quality Archive Web site are available from the home page of this service and are updated monthly. The summary for the February to April 2002 period was as follows:

### Monthly average hits per day:

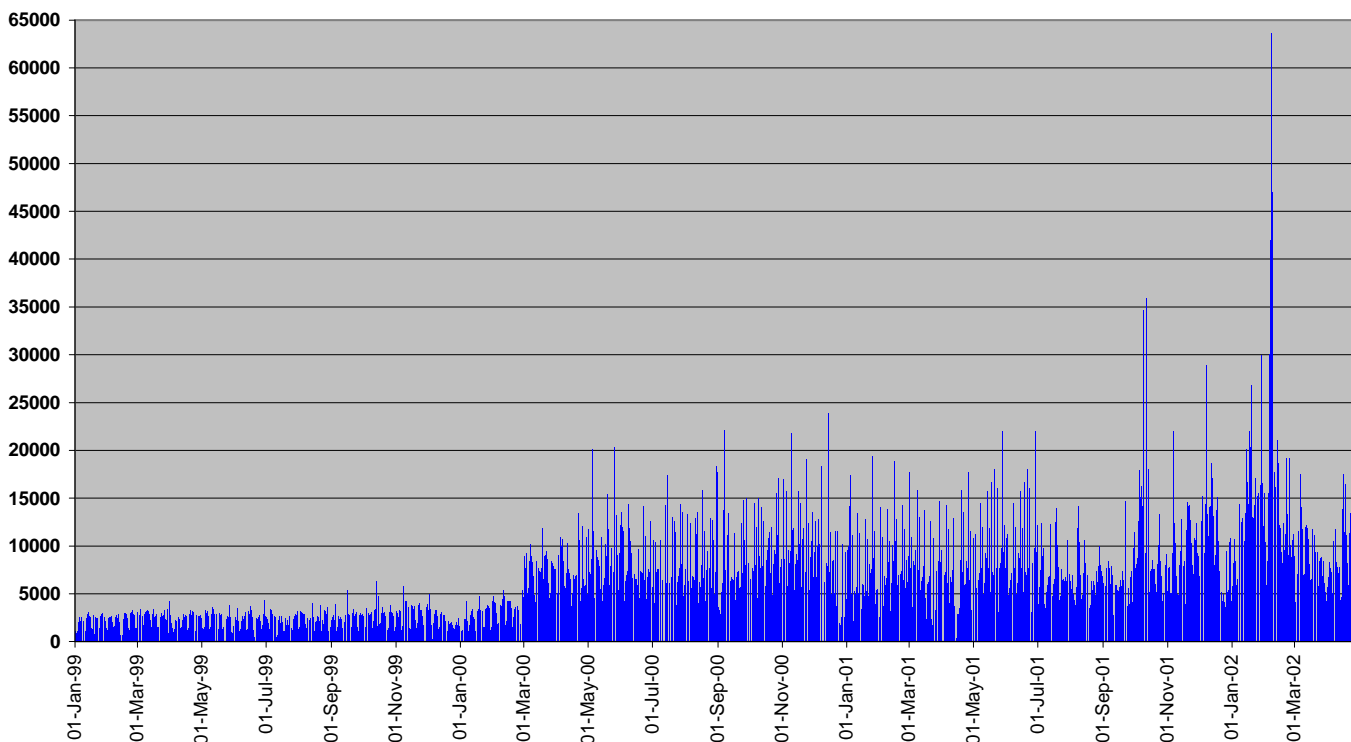
Feb:	17126
Mar:	9096
Apr:	9773

**Total from 1 Jan 99: 8,335,952**

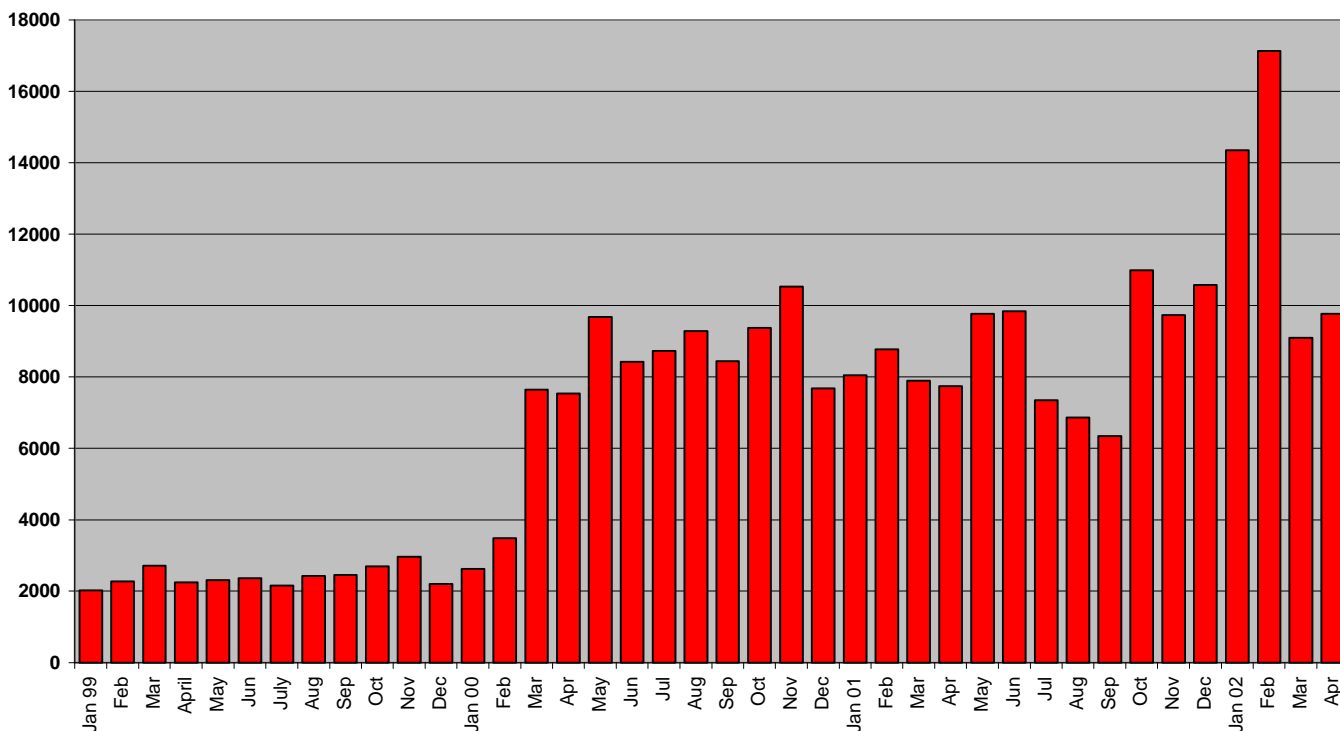
As figure 3.1 (below) shows, this quarter again showed increased public use of the Air Quality Archive web site. The peak number of daily hits was 63,646, which occurred on February 7<sup>th</sup>. This was almost double the previous highest daily web hit count of 35,948 (12<sup>th</sup> October 2001). February was the busiest month for web activity, with average daily hits of 17,126, almost double the average daily hits of either March or April, which recorded figures between nine and ten thousand.

The full daily and monthly statistics are presented in Figures 3.1 and 3.2 below.

**Figure 3.1 - Hits Per Day, 1999-2002**



**Figure 3.2 - Monthly Average Hits per day, 1999-2001**



During the February to April 2002 period we dealt with a total of 362 enquiries to the [aqinfo@aeat.co.uk](mailto:aqinfo@aeat.co.uk) e-mail information point, by which we provide further help on the Web site content.

The number of calls to the Freephone service is shown graphically in the Appendix to this report. The figures track a call through the system, so do not give a true representation of the number of individual callers entering the system. The number of calls to the Freephone service has continued to expand over the quarter with corresponding increases in each category. In summary the figures for this quarter show;

- On average during this quarter, 66 calls per day accessed the air quality bulletin for their area.
- On average 150 callers requested information for another region. The graph (in appendix 1) interestingly shows a strong weekly cycle. More callers used the service during the week than at the weekends.
- 10 calls per day during this quarter accessed the full national air quality forecasts and 8 calls access the health information.
- Around 5 calls per day requested leaflets during this period, and 7 calls per day accessed the section with details on other sources of information.
- There were 202 calls a day on average, of which an average of 89 were hang-ups
- The average call duration over the period was 78 seconds.

## 4 Breakdowns in the service

### 4.1 LIST OF ALL DETECTED FAULTS

**3<sup>rd</sup> – 5<sup>th</sup> March 2002** – From 21.00 on March 3<sup>rd</sup> until 16.00 on March 5<sup>th</sup>, the charts on the web site were not updating automatically.

**1<sup>st</sup> – 23<sup>rd</sup> April 2002** – During this time intermittent problems with the map server occasionally prevented people from accessing the interactive UK concentration and exceedance maps. This was eventually traced to corrupted zones and agglomerations data and subsequently corrected.

**22<sup>nd</sup> April 2002** – It was discovered that some parameters in the email bulletins were reported as 'N/M' rather than 'N/A'. This was corrected on April 23<sup>rd</sup>.

**27<sup>th</sup> – 28<sup>th</sup> April 2002** – A technical fault at TELETEXT prevented the update of TELETEXT pages from 09.00 on Saturday 27<sup>th</sup> until 08.00 on the Sunday 28<sup>th</sup> April.

## 4.2 FAULTS WHICH LED TO NON-COMPLIANCE WITH SERVICE LEVEL AGREEMENTS FOR THE REPAIR OF SYSTEMS

During normal working hours any faults with the Air Quality Communications systems should be fixed within 6 hours, or within 18 hours at any other time.

Many of the faults detected during this period were rectified within the specified period. Faults which only affect a minority of users or a small section of the Web site are often difficult to diagnose and, as listed in section 4.1, a number of these took longer than the specified time to correct.

There were however two major faults which took longer than the required 18 hours to be corrected, the explanations for these are as follows:

- **3<sup>rd</sup> – 5<sup>th</sup> March 2002** – Charts on the web site were not updating automatically for 43 hours during this period. The fault was rectified as soon as it was noticed and subsequently this is monitored more closely.
- **1<sup>st</sup> – 23<sup>rd</sup> April 2002** – Problems with the map server occasionally prevented people from accessing the interactive UK concentration and exceedance maps. These were minor intermittent problems that were all corrected within 6 hours. The source of these problems was eventually traced to corrupted zones and agglomerations data and the problem was permanently resolved.
- **27<sup>th</sup> – 28<sup>th</sup> April 2002** – The update of TELETEXT pages from Saturday 27<sup>th</sup> until 08.00 on the Sunday 28<sup>th</sup> April was caused by a technical difficulty at TELETEXT. The problem lasted 23 hours, outside the specified time for correction, because the problem was beyond the control of AEA Technology.

# 5 Performance statistics for the air quality archive systems

## 5.1 FREEPHONE SERVICE, 0800 556677

There was a 100% success rate for delivering bulletins to IMS for publication during this period. There were no known faults in the freephone service from February to April 2002.

## 5.2 TELETEXT PAGE 155

Around 90% of hourly updates were successfully transmitted to TELETEXT during February to April. The majority of these failures were due to technical problems at TELETEXT.

## 5.3 E-MAIL BULLETINS

The e-mail bulletin service operated to a 100% success rate during February to April 2002.

## 6 Provision of Air Quality Indicator Statistics

The final air quality indicator statistics for 2001 were provided during April 2002, as required.

## 7 Ad-hoc services provided

During this quarter a number of services were prepared under the ad-hoc section of the contract. These were typically Parliamentary Questions and queries and are listed here:

- Air Quality and Health Brochure Maps provided to DEFRA, February 2002
- Scottish Environment statistics for Harvey Snowling (Scottish Executive), completed April 12<sup>th</sup> 2002.
- Ozone statistics/ analysis for DEFRA, completed 19<sup>th</sup> April 2002.
- PQ5581 – Monitoring sites in Teeside, completed 25<sup>th</sup> April 2002.
- PQ – Levels of emissions at Teeside, completed 26<sup>th</sup> April 2002.

## 8 Forward work plan for May to July 2002

As well as the routine air quality data dissemination activities during this period, we are expecting to carry out the following tasks:

- Ongoing development of the new air quality database and air quality archive webs site, proposed to be launched in May 2002.
- Ongoing development and population of the new Research Reports and Research Contracts databases.
- Launch of the new data dissemination services for Teletext, Freephone and e-mail in May 2002.
- Publish the August to October, November to January and February to April quarterly reports on the Air Quality Archive Web Site.
- Provide 2001 data for the EC Directive questionnaire.
- Ad-hoc data analysis as required.
- Presentation on "What's New on the Air Quality Archive" at the IAPSC conference in June 2002.
- Presentations at other meetings or seminars as required.
- Monthly or quarterly progress meetings with DEFRA as required.

## 9 Annual timetable for data submissions

As discussed at a recent project review meeting, we are working to the following annual timetable for submission of UK data to government and the European Commission.

### Submission of UK data to government and the European Commission

Annual Time Table of Work Program

Time Specific Objectives	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Headline indicator statistics												
Provision of Ozone data to EC												
Provision of Ozone data to EC - Annual stats												
Provision of NO <sub>2</sub> data to EC												
EC Questionnaire completion												
Provision of data to AIRBASE												

## 10 Hardware and software inventory

The Department will own two UNIX database servers at the end of this contract. These are being acquired on a lease-purchase agreement.

All the software developed as part of the Air Quality Communications contract will be owned by the Department.

The software for the New Air Quality Archive will be fully documented, and design and operational manuals made available to the Department.



# Appendix 1

## Air Quality Freephone Statistics

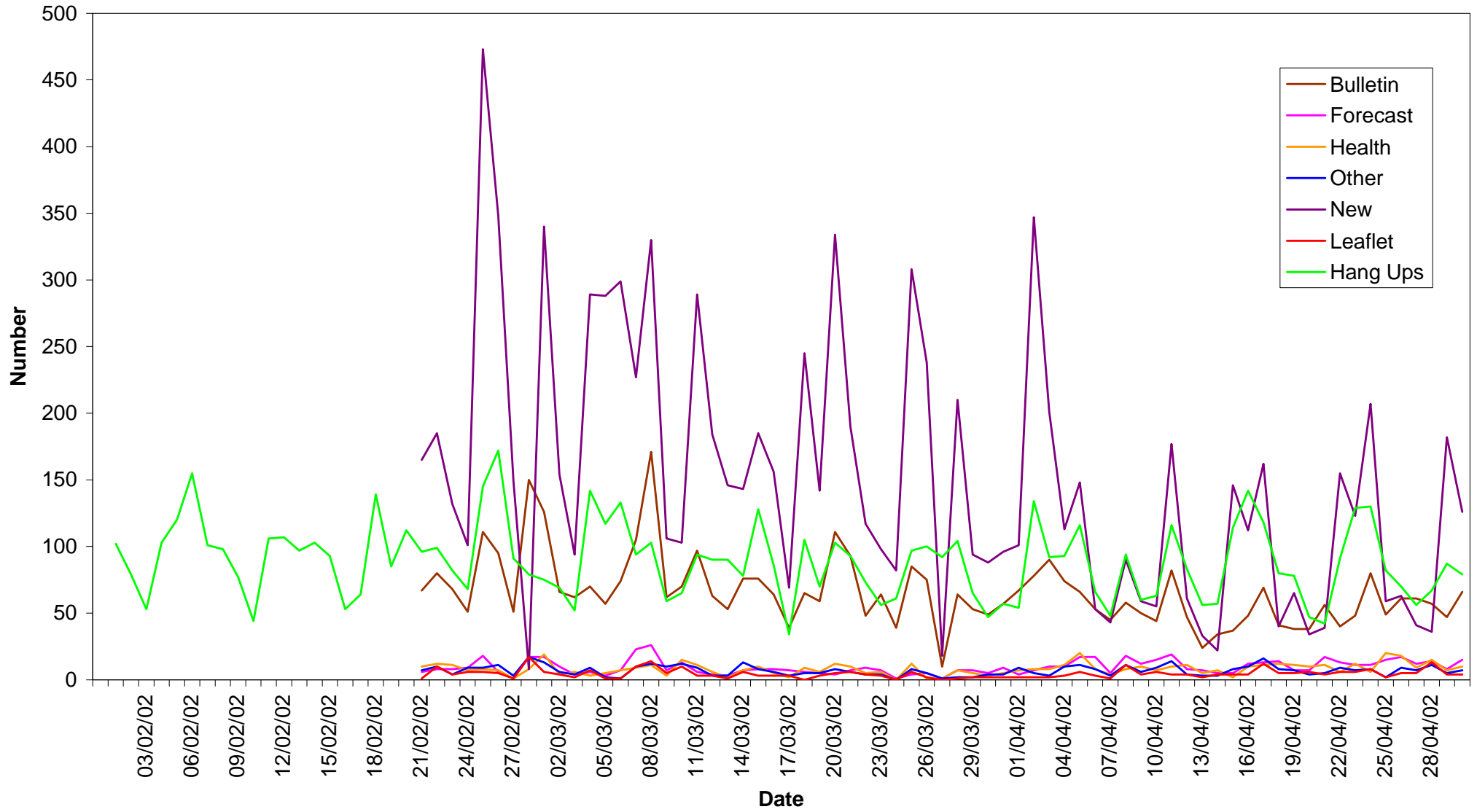
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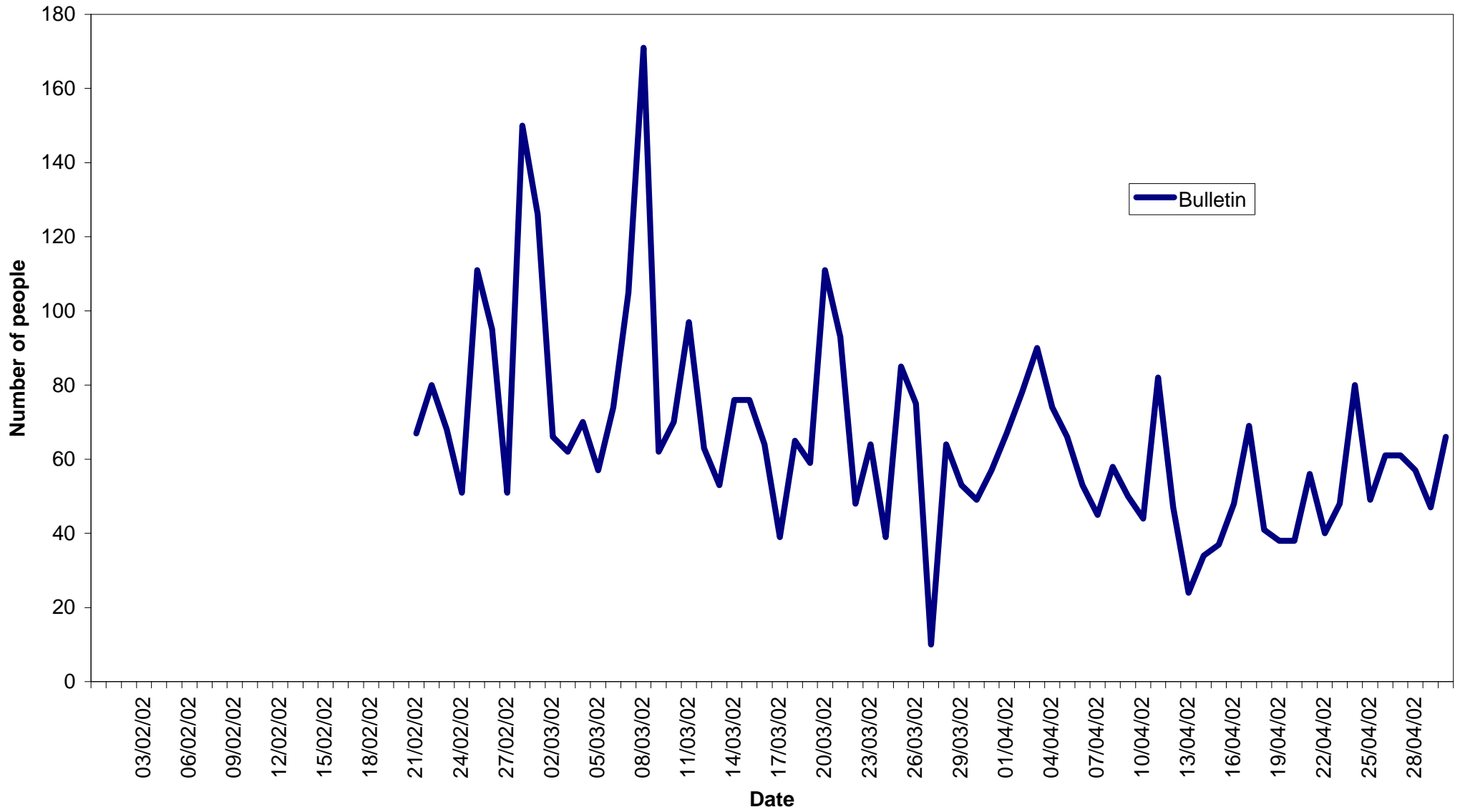
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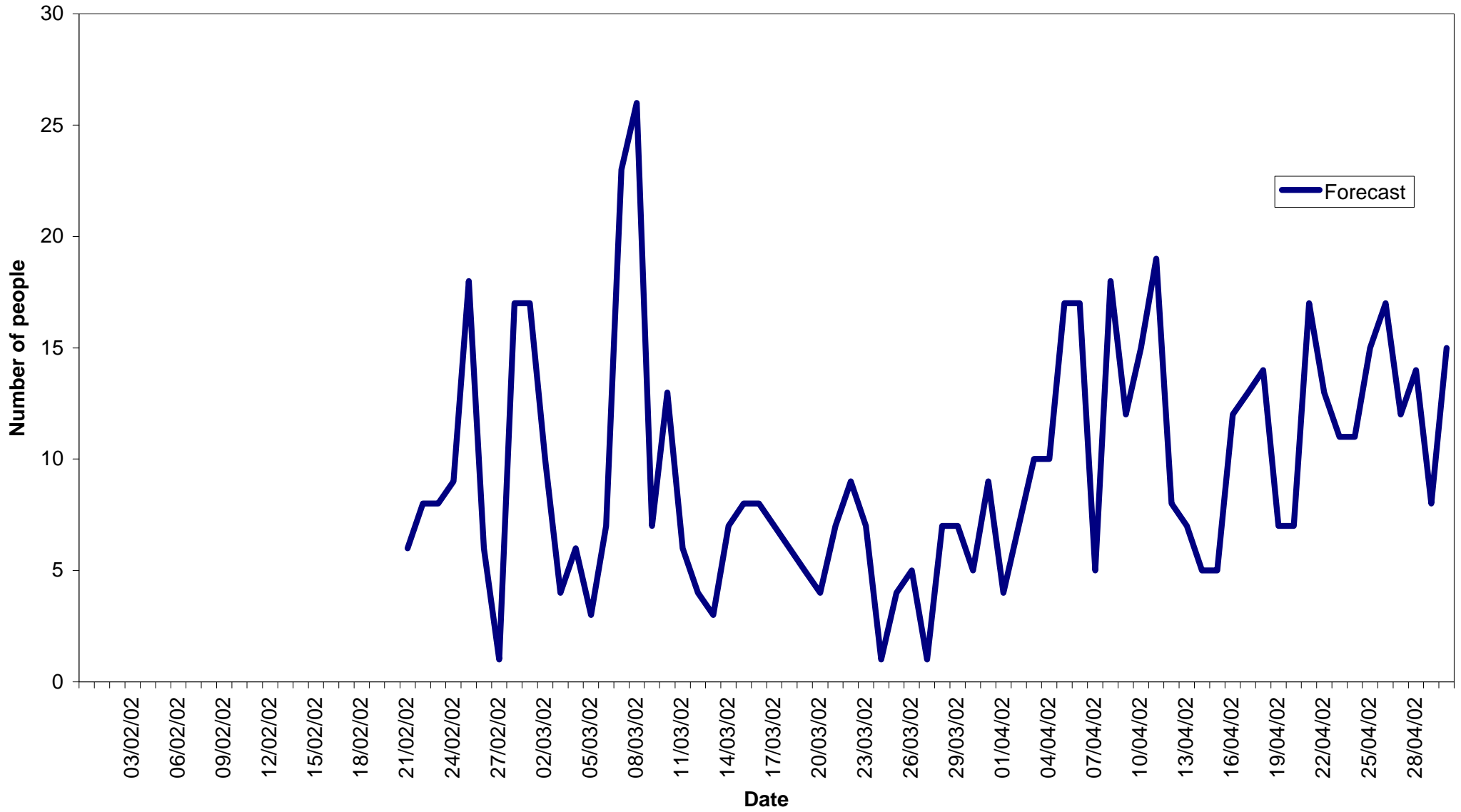
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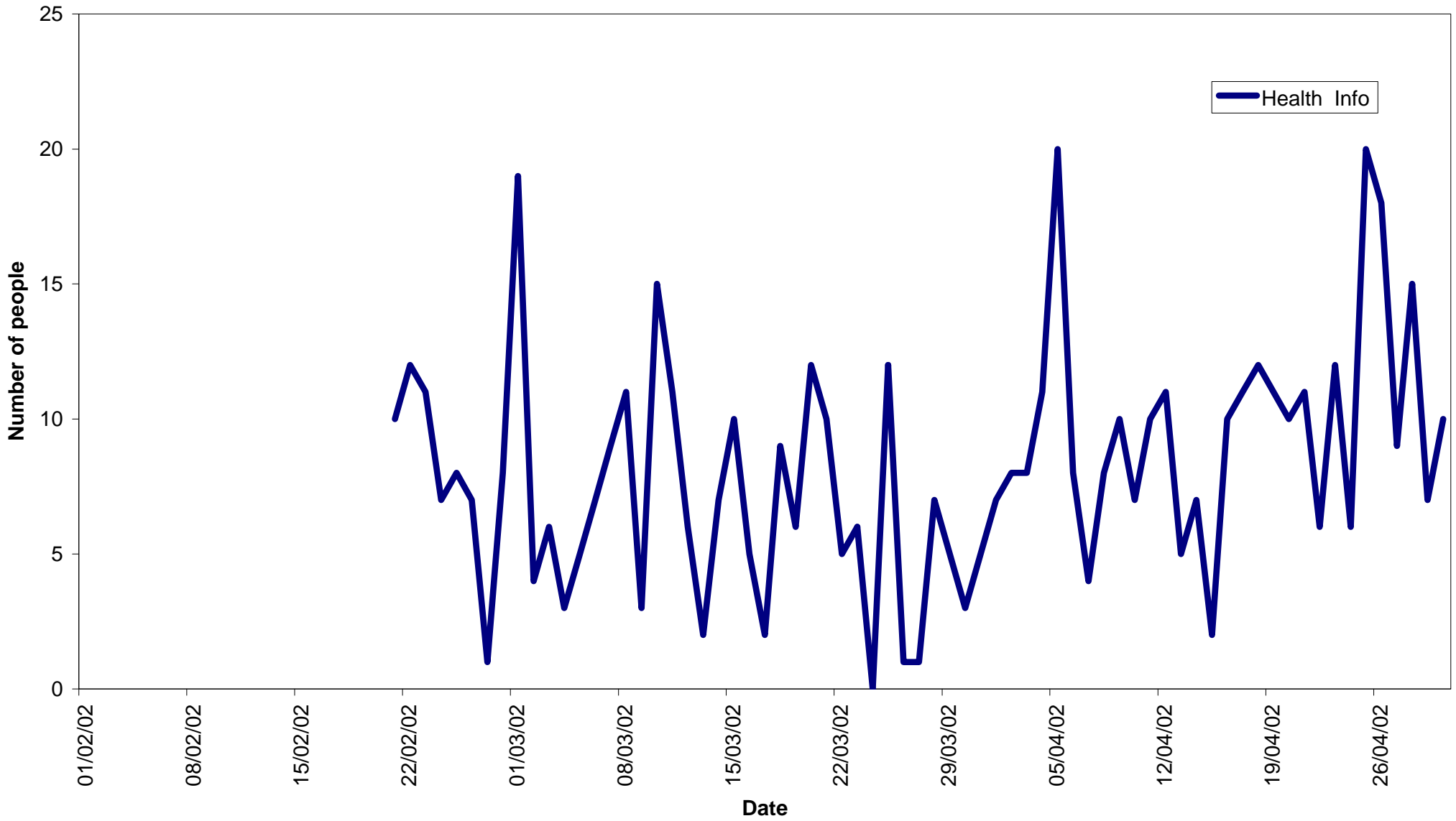
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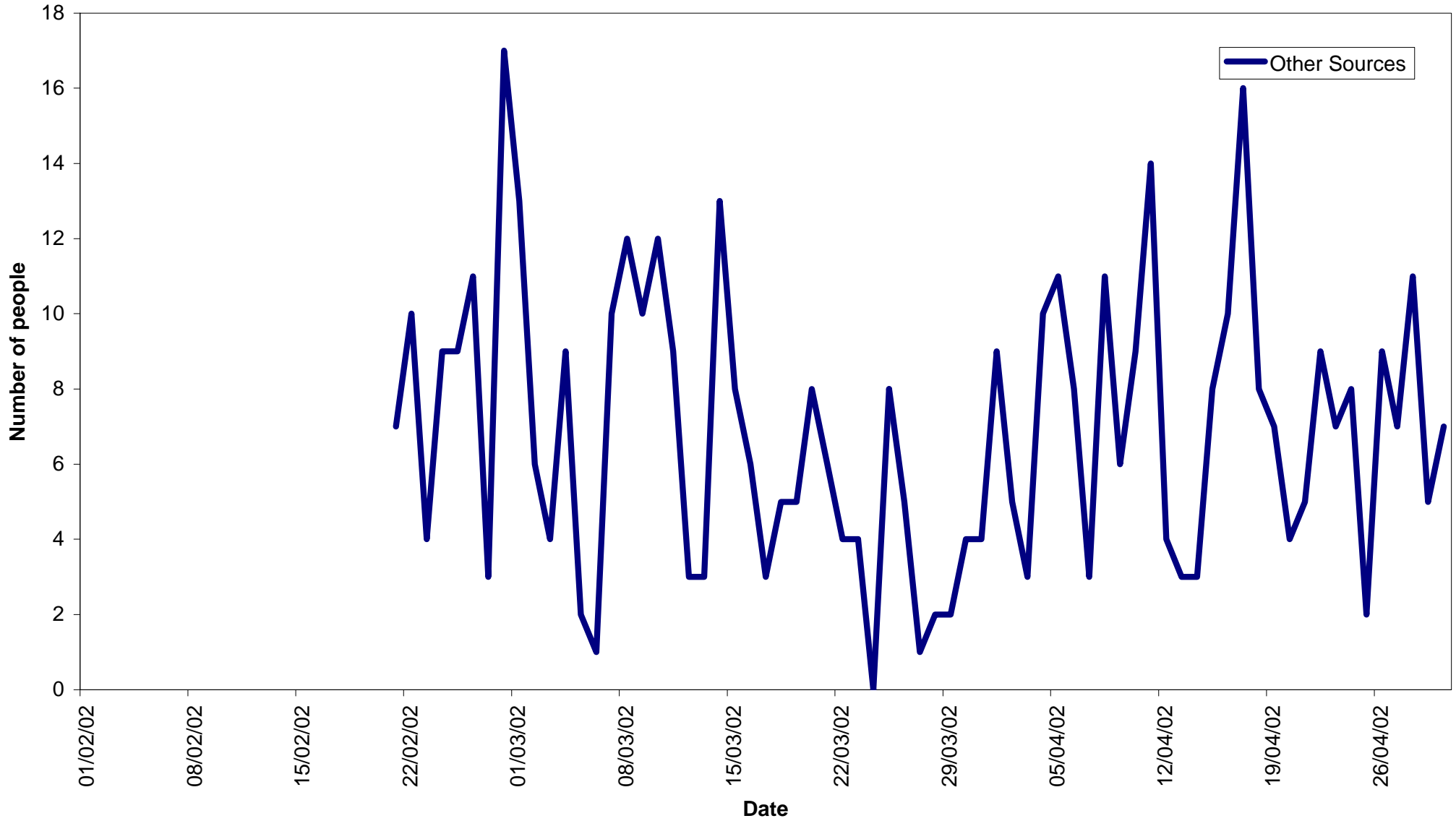
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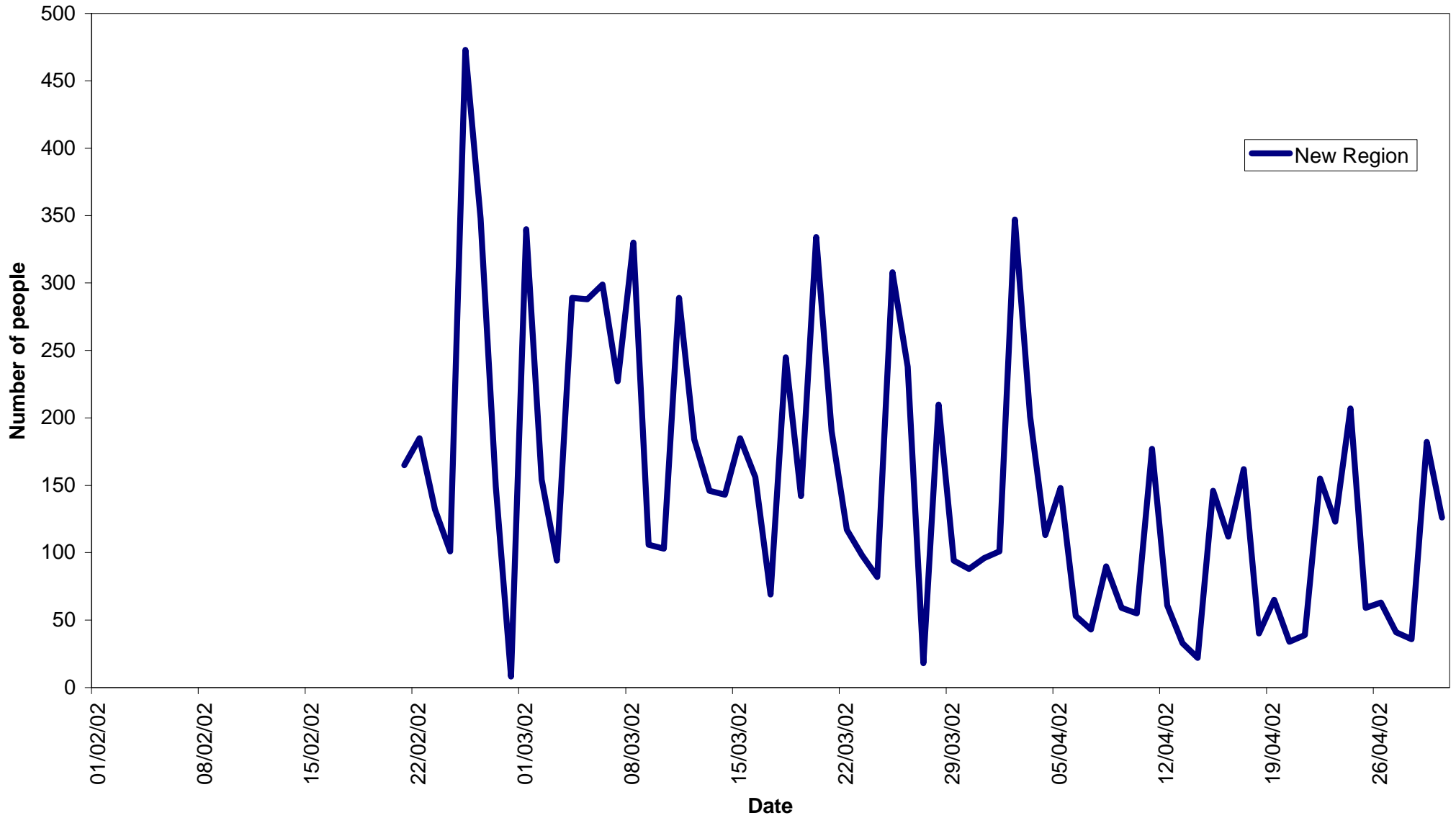
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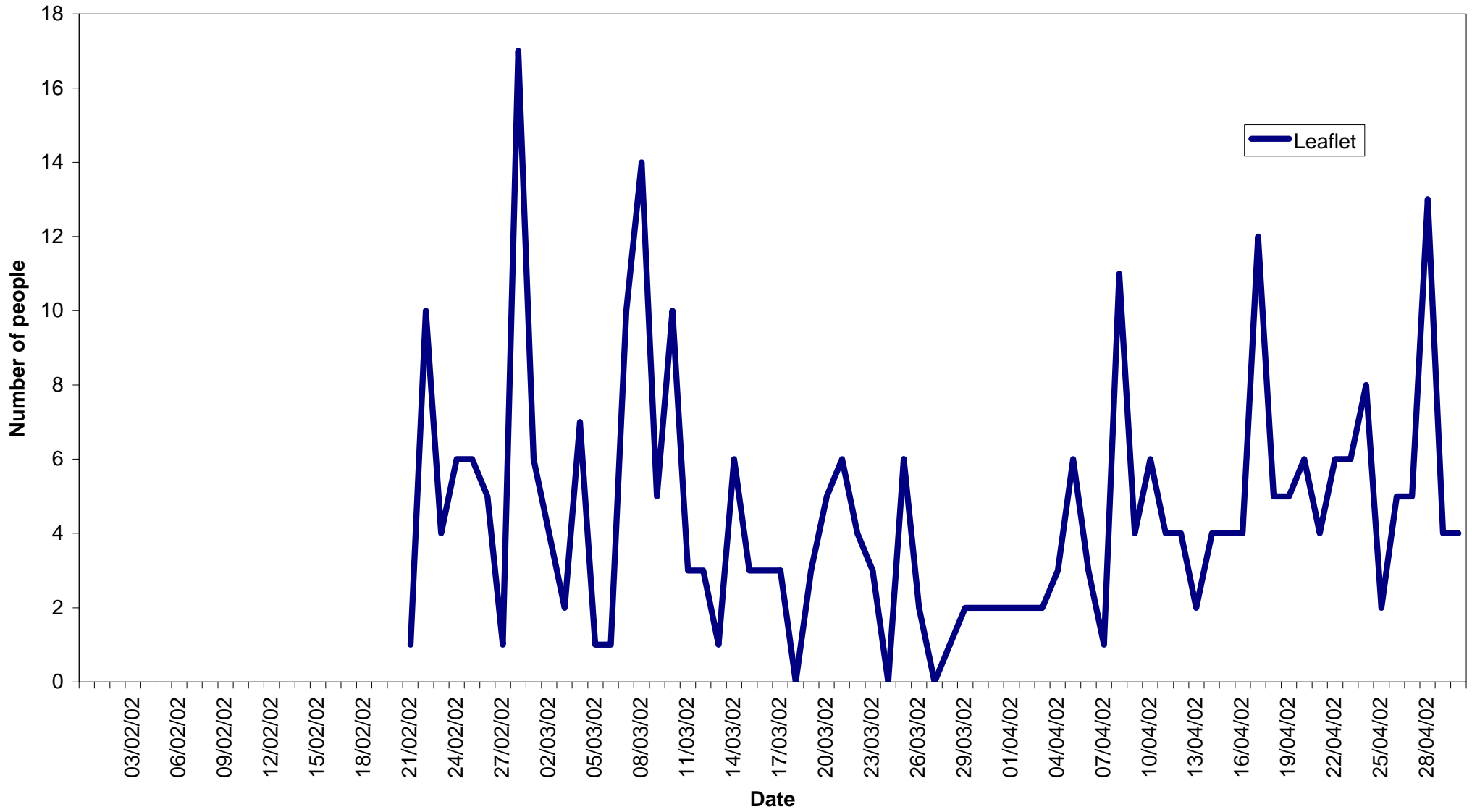
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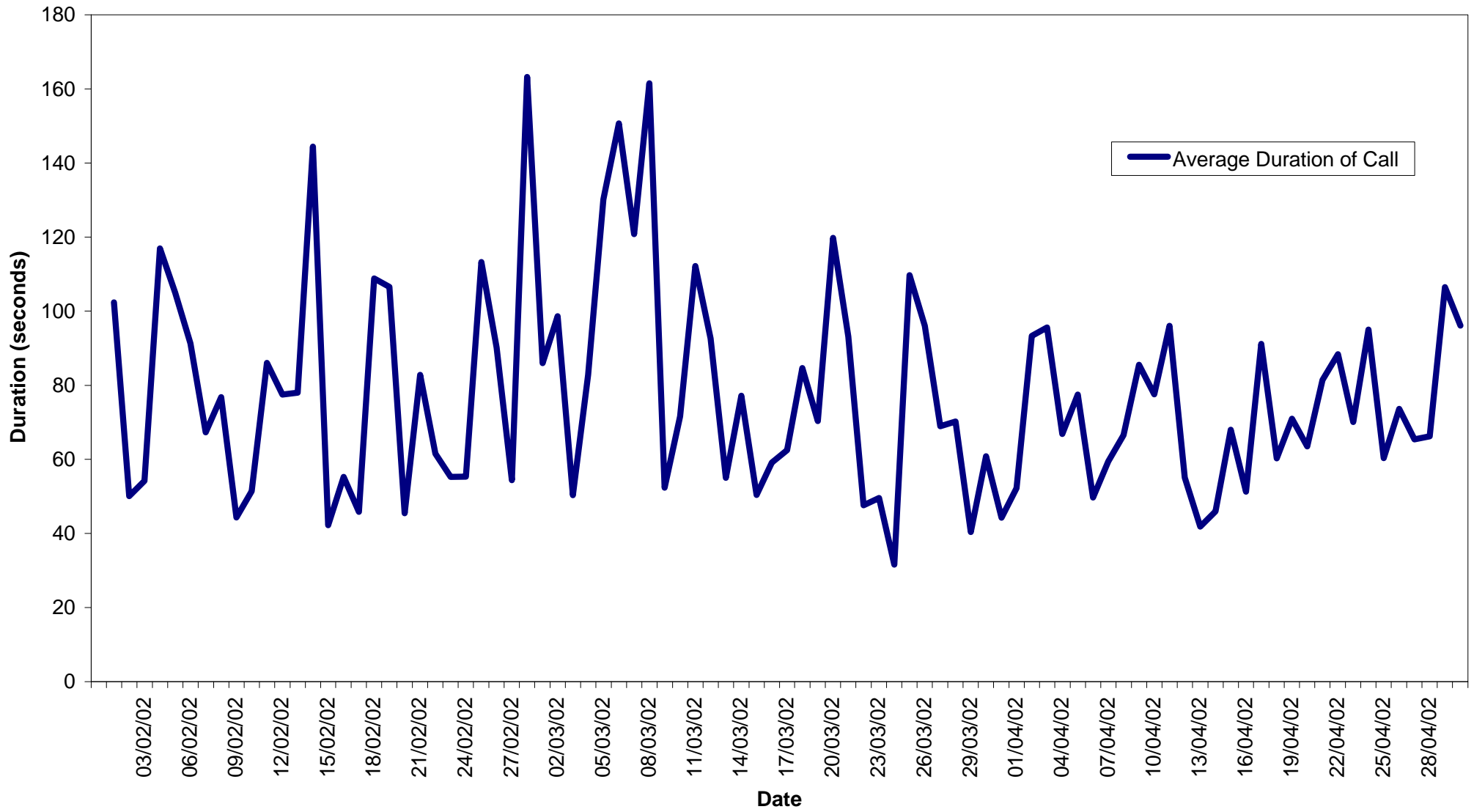
### Number of People Accessing Data for Different Regions



### Number of People Requesting Leaflets



### Average Duration of Call





### Number of 'Hang Ups'

