

Behavioural change during the swine flu pandemic

Eames, K.T.D.* (Research Fellow; corresponding author: email
Ken.Eames@lshtm.ac.uk)

Tilston, N.* (Research Assistant)

Paolotti, D. ISI Foundation, Viale Settimio Severo, 65 10133 Torino, Italy (Research
Scientist)

Ealden, T. 214a Victoria Road, Alexandra Park, London, N22 7XQ (Software
Engineer)

Edmunds, W.J.* (Professor)

* London School of Hygiene and Tropical Medicine, Keppel Street, London, WC1E
7HT.

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Abstract

Objectives: to measure possible changes in the behavioural response of individuals with flu like symptoms over the course of the swine flu pandemic in the UK.

Design: data were collected using a web-based questionnaire; participants were enrolled and prompted each week to record details of their symptoms and behaviour.

Setting: a web-based volunteer study, recruiting participants from throughout the UK.

Participants: approximately 5500 participants registered for the study.

Interventions: N/A

Main outcome measures: behavioural response of participants reporting symptoms; seeking medical assistance, making use of medication, taking time off work. Changes in this response over the course of the pandemic.

Results: we measured significant behavioural changes since the beginning of the swine flu pandemic in the UK. Individuals whose reported symptoms appeared later in the pandemic were less likely to contact their GP or other medical professional, either in person or by the telephone/internet. They were also less likely to use antiviral medication, and less likely to take extended time off work. We observed similar changes in treatment-seeking behaviour in all countries of the UK.

Conclusions: the response of individuals with flu-like symptoms has changed markedly, with symptomatic individuals being less likely to seek and make use of treatments later in the pandemic. Changes in treatment-seeking behaviour, both consulting with GPs and taking antiviral drugs, have implications for making use of official numbers of consultations and antiviral prescriptions to estimate the number of cases. Our data suggest that incidence later in the pandemic is likely to have been relatively underestimated as a result of the reduced response of individuals to infection.

Trial registration: N/A

What this paper adds

What is already known on this subject

There is no information currently available to describe possible changes over the course of the swine flu pandemic in the treatment-seeking behaviour of individuals with influenza-like-illness.

What this study adds

Our study suggests that individuals infected later in the pandemic are less likely to consult their GP or to seek medical assistance elsewhere; they are less likely to take antiviral medication, and are absent from work for a shorter period of time. The data provided by this study will enable more accurate case estimates (based on GP consultation rates and antiviral prescriptions) to be made.

Introduction

Surveillance of influenza-like-illness is essential for assessing how many cases may have occurred, and how many may be expected in future waves of the current influenza A H1N1 epidemic. A range of techniques has been used to estimate the progress of the infection based on reports collected via a number of sources, for instance the number of consultations with GPs (REF: RCGP, QSurveillance), or the number of prescriptions for antivirals. However, all these surveillance schemes require individuals to access health services and the propensity of individuals to consult may have changed as evidence has emerged about the severity of the virus.

The situation was further complicated by the launch, on 23rd July 2009, of the National Pandemic Flu Service (NPFS) in England; the NPFS was designed to reduce the burden on GPs by allowing patients to obtain a diagnosis and antiviral prescription via the phone or internet. The launch of the NPFS coincided with the start of the school holidays in much of the UK. As a large fraction of cases have been in school-aged children, it was expected that the school holidays would have resulted in a drop in incidence. Although GP consultations decreased from the end of July 2009, it was unclear to what extent this was caused by a reduction in incidence or a change in treatment-seeking behaviour. We report on the findings of a novel cohort, set up to help disentangle these factors.

Methods

Flusurvey (www.flusurvey.org.uk) is an internet based cohort which provides information on influenza like illness in the community in real-time. Recruitment began in mid July 2009, with a large press launch, and there are currently almost 5,500 registered participants. Here we look for the first time at the data provided by this survey.

On registering, participants complete a short background questionnaire. Thereafter, registered participants receive by e-mail a weekly newsletter prompting them to log in to the survey and complete a brief questionnaire about their recent symptoms (if any). Individuals are asked whether they have had any of the following symptoms: blocked/runny nose, cough, sore throat, headache, muscle and/or joint pain, chest pain, stomach ache, diarrhoea, nausea, chills, weakness, eye irritation, fever. Those who report any of these symptoms are asked a series of follow-up questions, including whether and when they sought medical assistance, whether they took any medication, and whether they changed their daily routine.

Here, we look at the behaviour of individuals who reported symptoms. In particular, we investigate changes in behaviour since the launch of the NPFS. Data up to 20th October 2009 are used in this analysis.

Sample population

Registered participants are not a random sample of the UK population. All are, by necessity, computer literate and motivated to participate. Approximately 2/3 of participants are female, and 70% are aged between 20 and 50.

Results

We investigate the behaviour of those with symptoms, and explore differences in behaviour depending on symptom severity. We divide symptomatic individuals into two groups, roughly corresponding to those with influenza-like-illness (ILI) and those with milder symptoms. We cannot make a definite diagnosis of influenza – the variation in influenza symptoms between different individuals makes this impossible; instead, we use the following definitions:

“ILI”=individuals who reported symptoms including fever.

“Other symptoms”=individuals who reported any other symptoms.

We have split results according to whether symptoms were reported to have started before or since the launch of the NPFS.

There were 1208 instances of ILI reported with symptoms starting before the launch of the NPFS, and 601 instances since. There were 2403 and 2778 instances of other symptoms before and since the launch of the NPFS respectively.

1. Treatment seeking behaviour

In all cases, we see a marked drop-off in treatment-seeking since the launch of the NPFS, whether by telephone or in person, whether through a GP or elsewhere (Table 1). Those with ILI are consistently more likely than those with other symptoms to seek medical assistance (e.g. telephone GP: ILI before=39%, after=10%; other before=7%, after=3%).

Table 1: treatment seeking behaviour

		Before NPFS (n)	After NPFS (n)
ILI	telephone anyone*	570 (1201)	138 (599)
	telephone GP	469 (1201)	62 (599)
	visit anyone*	176 (1196)	56 (599)
	visit GP	131 (1196)	42 (599)
Other symptoms	telephone anyone*	214 (2373)	116 (2753)
	telephone GP	162 (2373)	77 (2753)
	visit anyone*	138 (2371)	107 (2744)
	visit GP	109 (2371)	77 (2744)

* Participants were asked about their contact with medical professionals, and could select any from a list of: GP, NHS direct, NPFS, other (phone) and GP, admitted to hospital, hospital A&E etc, other (visit).

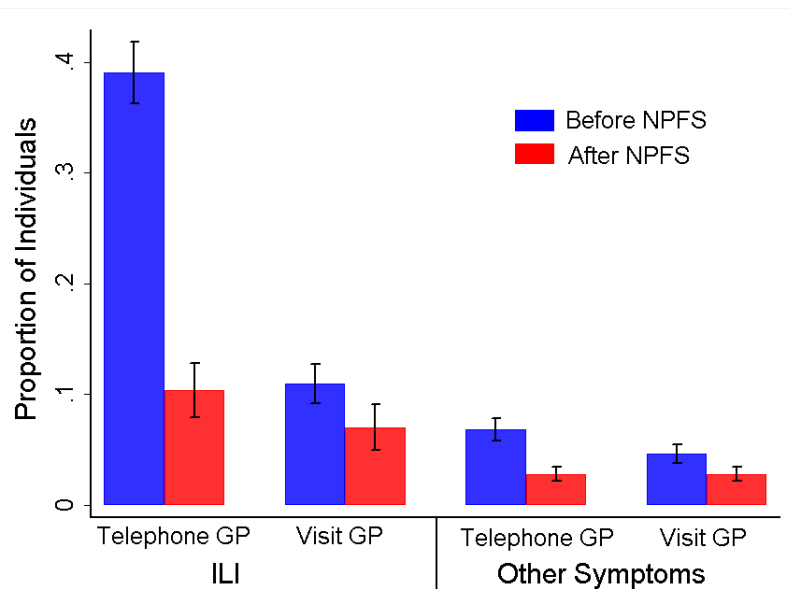


Fig 1: Proportion of individuals contacting a GP, either by phone or in person. The fraction contacting their GP before the launch of the NPFS is shown in blue, that after in red.

Those in risk groups also appear to have changed the way they access care, though the numbers are much smaller. For instance, before the peak of the epidemic 16% (46/289) of those in risk groups reporting fever and other symptoms (defined here as ILI) consulted their GP. This dropped to 8% (12/143) after the peak (difference in proportions 0.075, 95% CI (0.013 0.137)). Those in risk groups who reported symptoms without fever did not change their behaviour (6% and 5% consulted their GP before and after NPFS respectively), which probably reflects the background consultation rate for respiratory episodes in this group.

2. Medication

Individuals reporting symptoms were asked whether they took any medication for their episode, and could select from a list including antivirals (Tamiflu or Relenza), “Painkillers (e.g. aspirin, paracetamol, Nurofen)”, and expectorants. Around 80-85% of cases of ILI took analgesics, and about 12% took expectorants. These proportions did not change over the course of the epidemic (analgesics 95% CI (-0.005, 0.069); expectorants 95% CI (-0.007, 0.057)). Similarly, about half of those with respiratory symptoms without fever took analgesics, and about 5% took expectorants – again, with no change over the course of the epidemic. However, there was a large change in the fraction taking antivirals. In the early part of the epidemic (before NPFS) 21% of ILI cases reported taking antivirals declining to 8% after NPFS was introduced (confidence interval on difference in proportions 0.126, 95% CI (0.093, 0.158)). Cases without fever were very unlikely to take antivirals.

Table 2: Medication taken by individuals reporting symptoms.

	None	Antivirals	Analgesics	Expectorants	Sample size
ILI before NPFS	144	250	1010	158	1188
ILI since NPFS	93	50	485	64	593
Other symptoms before NPFS	1027	30	1251	124	2318
Other symptoms since NPFS	1378	12	1299	135	2721

	Antivirals	Analgesics	Expectorants
ILI before NPFS	21%	85%	13%
ILI since NPFS	8%	82%	11%
Other symptoms before NPFS	1%	54%	5%
Other symptoms since NPFS	0%	48%	5%

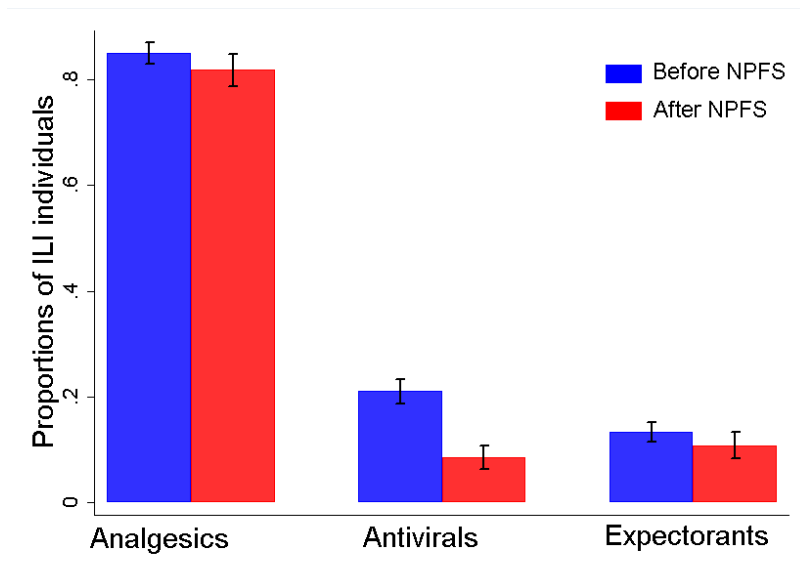


Fig 2: Changes in medication taken by ILI individuals since the launch of the NPFS.

This fall can partially be explained by the observed reduction in treatment-seeking, and partially by a reduction in the prescription of antiviral drugs – of those with ILI who sought medical assistance, the fraction taking antiviral medication fell from 42% to 32%. In particular, of those who contacted only their GP the fraction taking antivirals fell from 38% (44/117) to 12% (4/34)

Of those who took antiviral drugs, most began their treatment within a few days of experiencing symptoms (median delay 1 day), with little change since the launch of the NPFS.

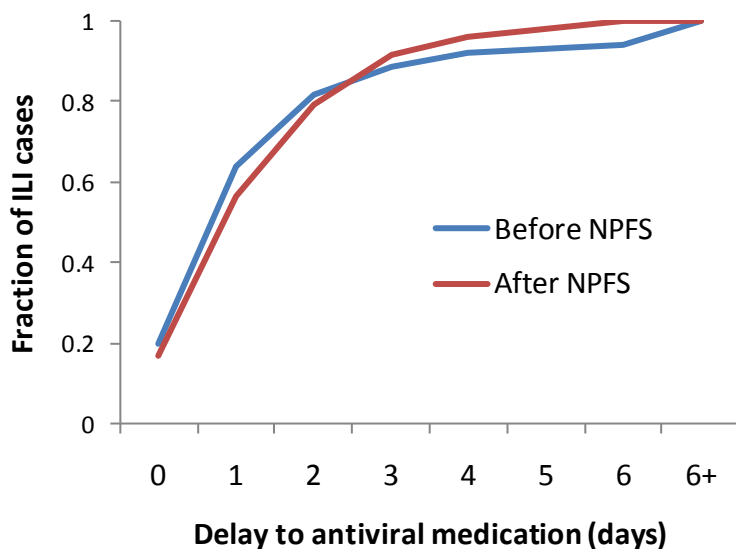
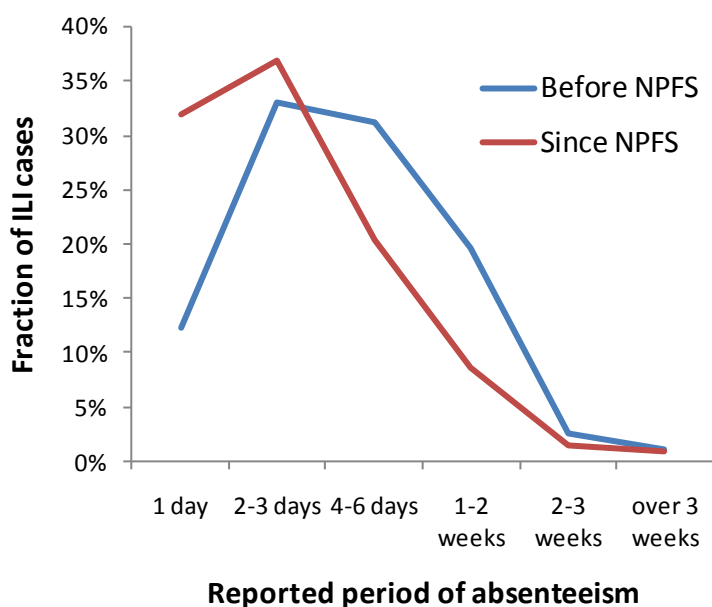


Fig 3: time between the onset of symptoms and taking antiviral medication.

Absenteeism

Around 55-60% of individuals reporting ILI take time off work/school as a result of their illness. This proportion has fallen somewhat (from 72% to 63% difference -0.096, 95% CI (-0.142, -0.049)). There, there has been a large shift in the duration of absence (Figure). For instance, in the early part of the epidemic 55% (403/738) took at least 4 days of absence, which contrasts with 31% (102/326) after the peak (difference in proportion 0.23, 95% CI (0.171, 0.295)).



Discussion

We observe very clearly a number of behavioural changes since the peak of the epidemic in July (when the NPFS was launched). First, individuals experiencing symptoms are far less likely to seek medical assistance from their GP or from other sources. Symptomatic individuals are less likely to take antivirals, but continue to take analgesics and expectorants at the same rate as before (as do those without fever). Since the peak of the epidemic the per-case period of absenteeism appears to have reduced dramatically. These observations are consistent both with the NPFS reducing the burden on GPs and also with wider behavioural changes, such as a reduction in concern amongst the public as to the severity of the infection and the need for antiviral medication.

The main strength of this study is that the results are not affected by health seeking behaviour (unlike all other surveillance systems), and they allow insight into the hidden part of the epidemic (the fraction of cases that do not seek care), and how this has changed over time. To our knowledge this is the only such survey in the UK.

The main weakness is the biased nature of the sample. Due to the voluntary and internet-based nature of the survey, it is not possible to claim that the results are representative of individuals in the country as a whole. Obtaining a representative population-based sample would clearly be preferable, but would be expensive and very difficult to set-up during the epidemic. A further weakness is the inability to

confirm cases. However, similar internet-based surveys appear to show a good correlation between physician-based recording of seasonal ILI incidence and self-reported incidence {refs, including recent one in vaccine}. Furthermore, as the main wave of the H1N1 epidemic in the UK occurred over the summer, it is likely that a high proportion of the reported ILI cases were true influenza cases. Finally, it seems apparent that individuals in the survey are more likely to report symptoms than to provide a null-report (i.e. no symptoms). This means that estimating incidence is unreliable from this sample, and we have therefore avoided doing this. On the other hand, this tendency has resulted in a large sample size of acute respiratory infections.

The data reported in this study will allow a better assessment of the impact of the swine flu pandemic to be made. In particular, combined with figures describing the number of GP consultations and antiviral prescriptions issued, they can be used to provide better estimates of the true number of influenza cases, and provide a more complete picture of the epidemiology of influenza in the UK. The most likely explanation for the change in behaviour is a reduction in concern among the population; in the early stages of the pandemic, people were worried about the possible seriousness of the virus; this, combined with its novelty, led many to seek medical support. As the pandemic has continued, however, and better information has become available, it has become clear that, in most cases, symptoms resemble those of seasonal flu, and the most sensible response to infection is to take paracetamol and a few days in bed.

References:

HPA reports

RCGP

QSurveillance

Competing interest statement: All authors declare that the answer to the questions on your competing interest form are all No and therefore have nothing to declare.

Details of contributors: the survey was set up by DP, TE, KE, and WJE, and maintained by KE, WJE, and NT. Data analysis was carried out by KE, WJE, and NT. The first draft of the manuscript was written by KE. Additional contributions to the manuscript were made by WJE.

The survey obtained ethics approval from the Research Ethics Committee at the London School of Hygiene and Tropical Medicine. Signed consent from participants was not obtained; participants gave their consent by volunteering to take part in the survey.

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All authors had full access to all of the data in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis.

Data sharing: no additional information available