

POSITIVITY RATES FROM VIROLOGICAL SAMPLING

Seasonal flu

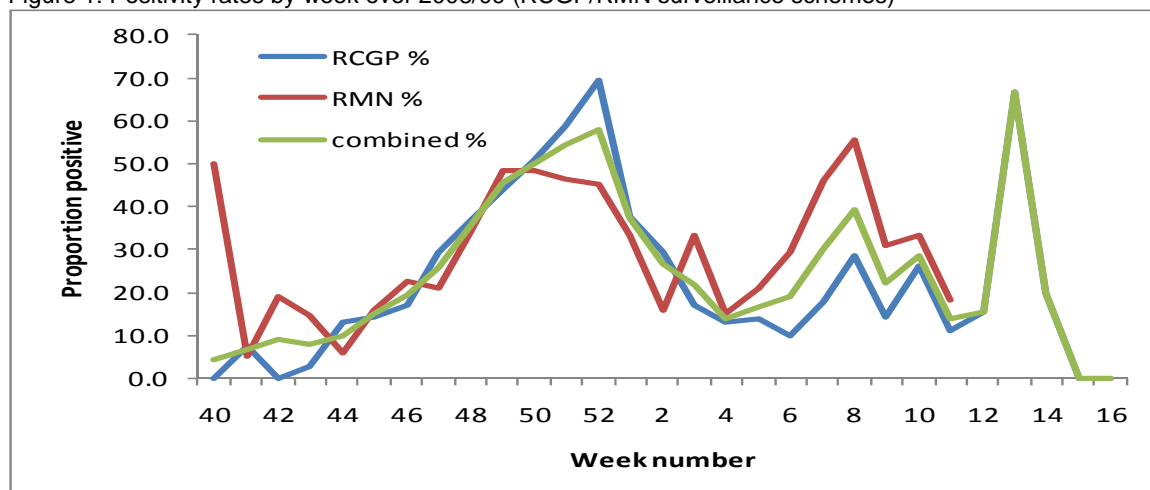
The surveillance of flu using the Royal College of General Practitioners spotter practice scheme and the Health Protection Agency (HPA) Regional Microbiology Network scheme provides important information on flu activity in the community each year. Throughout each flu season GPs in the schemes collect weekly information on the consultations in their practices where a flu-like illness is the presenting condition. However, a flu-like illness can be a feature of several respiratory illnesses and other conditions and it is important to establish how much of this flu-like illness is actually flu. For this reason, a swab is taken from these patients and sent for testing. This testing then enables HPA to determine the proportion of patients who have confirmed flu; often referred to as the positivity rate.

The reliability of the test in detecting true flu virus infection (sensitivity and specificity) is dependent on a suitable sample being available for testing. Although the test is fairly easy to carry out, there are certain factors that can affect the quality of a clinical specimen: the timing of the specimen in relation to the onset of symptoms (the earlier in the illness the more likely virus is to be present on the swab) and the time between the sample being taken and tested (the longer the delay the more likely the sample may be unsuitable). However, even when these factors are taken into account, the overall sensitivity of the test is considered to be very high – in the region of 85-90%.

The importance of virological testing is the data it yields in relation to the percentage of samples that are positive for flu. This allows us to monitor trends over a period of time and gives an indication of the degree of agreement between clinical diagnoses and laboratory confirmations. Weekly positivity rates are also used in the calculations to estimate the numbers of new flu cases each week.

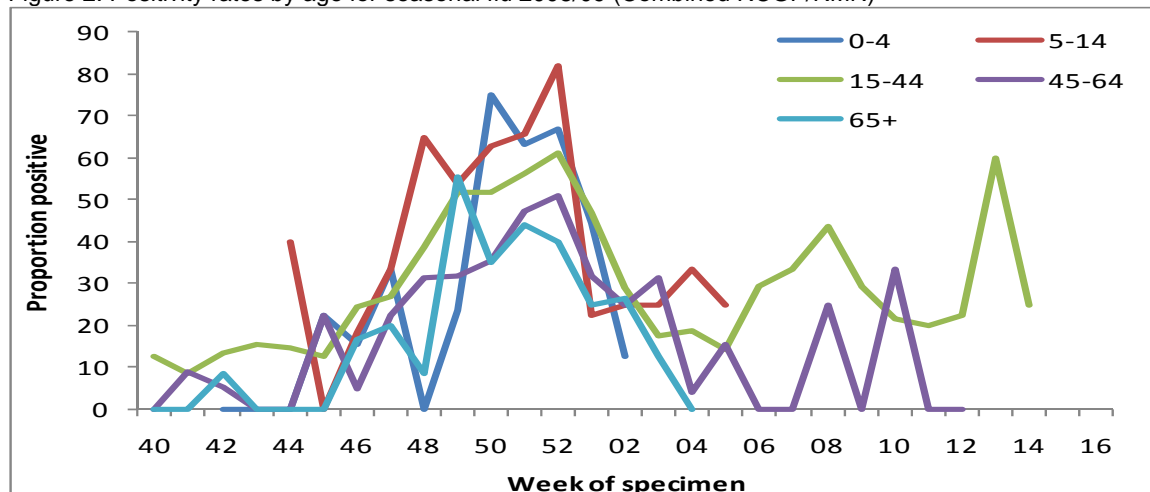
We know from experience over a number of years that generally the positivity rate is low at the beginning of the season and increases as the amount of circulating virus increases. Figure 1 shows how the positivity rates can vary over a typical flu season. It needs to be stressed that the positivity rate is only one element of surveillance data that is used to interpret the extent of flu activity within the population and to monitor trends over the season.

Figure 1: Positivity rates by week over 2008/09 (RCGP/RMN surveillance schemes)



The proportion positive also varies by age group. During 2008/09, as an example of a typical season (Figure 2), the peak levels of positivity in the 5-14 year old age group was 82% and in the 0-4 year olds 75%.

Figure 2: Positivity rates by age for seasonal flu 2008/09 (Combined RCGP/RMN)



NB. Proportion positive omitted if three or fewer specimens were taken.

Pandemic flu

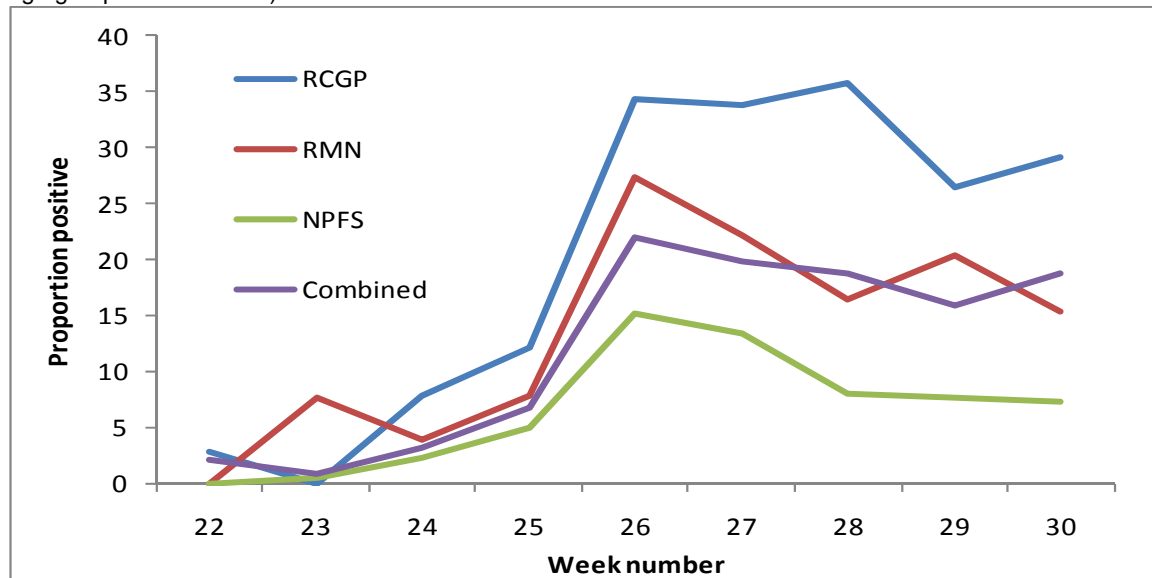
It is likely that people exhibit a different attitude to using health services during a pandemic and it is crucial for planning purposes to take this into account when trying to estimate the likely numbers of people who have had a clinical illness caused by the pandemic virus. Therefore the principle used for monitoring seasonal flu over the years has been adapted for use in the current pandemic to help estimate the numbers of people likely to have a clinical illness caused by the pandemic virus¹.

During the current pandemic HPA strengthened its virological surveillance. In addition to using positivity rates from HPA's primary care surveillance schemes, the agency used virological sampling first from a random selection of patients calling NHS Direct and, since its launch, from those completing self-care through the government's National Pandemic Flu Service (NPFs).

Obtaining samples for testing from patients using these services involves a slightly different approach and requires patients to take their own sample for testing. However, the principle of self sampling and the feasibility of using this for surveillance purposes was demonstrated sometime ago in a project in which the Health Protection Agency had been involved². Since shortly after the pandemic began, each day a representative sample of patients who have been diagnosed with flu and who have collected their antiviral medication are sent a sampling kit in the post. The patients are asked to complete their details, self sample and return the kit in the post. This is then tested and the results used in combination with the primary care surveillance schemes to estimate the likely numbers of people with a clinical illness caused by the pandemic virus.

Figure 3 shows the positivity rates of the RCGP, RMN and NHS Direct/NPFs schemes for the first wave of the current flu pandemic. The peak week is week 26 (week commencing Monday June 22); the four weeks before and after are included.

Figure 3: Positivity rates by week in England over the peak of the first wave of the current pandemic (all age groups consolidated)



The range and variation in the proportion of specimens positive in the first wave of the pandemic are shown in Table 2 for the peak week and various points around the peak week, as estimated by the virological surveillance schemes separately and also when results are combined for all three schemes.

For all these schemes combined (and all age groups combined) the peak level of positivity was observed in week 26 (week commencing Monday June 22) at 22%. Within the RCGP scheme, the level of positivity that week was 34.4%. By contrast, at the beginning of the 9 week period around the peak, the positivity level for all schemes was 2.1% (week 22 – week commencing Monday May 25).

Table2: Proportion positive in peak week and surrounding eight weeks (overall) - NB No NHS Direct data in week 22 (started in week 23).

	RCGP			RMN			NHSDirect			Combined		
	Total	n	%	Total	n	%	Total	n	%	Total	n	%
Peak week (26)	163	56	34.4	62	17	27.4	349	53	15.2	574	126	22.0
Total week 22 - 30	1238	332	26.8	430	71	16.5	2534	200	7.9	4202	603	14.4
Week 22 - 25	248	19	7.7	115	7	6.1	956	29	3.0	1319	55	4.2
Week 27 - 30	827	257	31.1	253	47	18.6	1229	118	9.6	2309	422	18.3
Week 22	36	1	2.8	12	0	0.0	0	0	0.0	48	1	2.1
Week 30	206	60	29.1	59	9	15.3	167	12	7.2	432	81	18.8

As with seasonal flu some variation in the positivity rates by age was detected in the first wave. The highest positivity rate was detected in the 5-15 year old age group at 54% (Table 3).

Table 3: Positivity rate for the peak week (26) by age group - GP schemes combined and NHS Direct

Age group	RCGP/RMN			NHS Direct		
	Total	n	%	Total	n	%
0-4	26	5	19.2	–	–	–
5-15	74	40	54.1	–	–	–
16-24	37	15	40.5	75	24	32.0
25-34	17	3	17.6	98	14	14.3
35-44	35	6	17.1	84	7	8.3
44-54	15	2	13.3	51	6	11.8
55-64	13	2	15.4	28	2	7.1
65+	7		0.0	13	0	0.0
Grand Total	224	73	32.6	349	53	15.2

A similar picture has been seen in the second wave (table 4) but the positivity rates across all schemes in the second wave have generally been higher than the first wave. The average positivity rate in the 5-14 age group during weeks 42 to 46 peaked at 69%. This general increase may reflect a difference in public perception and use of health services between the first and second waves.

Table 4: Total number of samples tested and positive for pandemic flu from community enhanced virological schemes by age group in the four weeks from week 43 to 46 for England (GP and NPFS schemes)

Age group	England (GP schemes)			England (GP schemes)		
	n	Pan (H1N1)2009		n	Pan (H1N1) 2009	
		+ve	%		+ve	%
<5	133	57	42.9	---	---	---
5-14	212	146	68.9	---	---	---
15-24*	195	95	48.7	303	104	34.3
25-44	326	120	36.8	1023	326	31.9
45-64	161	42	26.1	621	147	23.7
65+	53	5	9.4	72	10	13.9

* For NPFS this age group includes only 16-24 year-olds.

Summary

- The percentage of samples testing positive for flu, together with information on GP consultation rates for flu-like illness, are good ways to monitor trends and provide a picture of the level of flu circulating.
- We have observed over a number of years a correlation between positivity rates from GP consultations and the levels of flu circulating in the community.
- The test used to detect flu virus is highly sensitive even when the samples are taken by patients in their home.

The Health Protection Agency routinely publishes the latest positivity rates within its weekly national influenza report. To view the latest report visit www.hpa.org.uk/swineflu/surveillance&epidemiology. It is important to note that latest



weekly figures should be treated with caution as samples taken in recent weeks may still be awaiting processing.

References

1. Method used to estimate the new pandemic (H1N1) 2009 influenza cases in England at http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1250150839845
2. Cooper DL, Smith GE, Chinemana F, Joseph CA, Loveridge P, Sebastianpillai P, Gerard E, Zambon M (2007) . Linking syndromic surveillance with virological self sampling. *Epidemiol Infect.* 136(2):222-4