

**Online supplement: Change in viral bronchiolitis management in primary care in the UK after the publication of NICE guideline**

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**ADDITIONAL METHODS**

The electronic, structured questionnaire was designed to collect demographic information and also included five research questions [1] to investigate the management of infants with bronchiolitis in both years, with six further questions included in the 2016 questionnaire to investigate any change in practice related to the 2015 NICE guideline (Box 1).

**BOX 1: THE SIX ADDITIONAL QUESTIONS ASKED IN THE 2016 QUESTIONNAIRE.**

Q6 - Which, if any, of the reasons given below describe why you routinely prescribe medications for viral bronchiolitis?

- Prescriptions can cover treatable differential diagnoses (e.g. pneumonia, viral wheeze)
- There is good evidence that the prescribed medication helps the infant
- Parents expect a prescription for their child
- The placebo effect can be beneficial in some situations
- Issuing a prescription reduces the likelihood that the patient will re-attend with the same problem
- It takes away the need for a discussion with parents about supportive management only
- Other (please specify)

Q7 - NICE published a guideline for the management of infants with viral bronchiolitis in June 2015.

- Not previously heard of it
- Aware of it but not read anything about it
- Aware of it and have read a summary of it
- Aware of it and have read some of it
- Aware of it and have read all of it

Q8 - Which of the following best describes how your practice has changed, if at all, regarding the management of infants with viral bronchiolitis in the last year or so?

- Not changed in the last year
- Changed recently, but this was not related to guidelines
- Changed recently, in accordance with local guidelines
- Changed recently, as a direct result of the NICE guideline

Q9 - You indicated that you have changed your practice regarding the management of infants with viral bronchiolitis in the last year or so.

- I have changed my practice, and I no longer routinely prescribe the medications that I would have prescribed a year ago
- I have changed my practice, and I now routinely monitor the oxygen saturations of infants with viral bronchiolitis
- I have changed my practice, and I now routinely provide written viral bronchiolitis advice for parents
- Other (please specify)

Q10 - And focusing on the factors that could lead to you referring an infant to hospital, have any of the thresholds that you use changed in the last year?

The respiratory rate threshold for which I refer infants to hospital:

- Threshold has decreased
- Threshold has stayed the same
- Threshold has increased

The threshold for reduced feeding for which I refer infants to hospital:

- Threshold has decreased
- Threshold has stayed the same
- Threshold has increased

The threshold for oxygen saturation for which I refer infants to hospital:

- Threshold has decreased
- Threshold has stayed the same
- Threshold has increased

Q11 - Thinking specifically about infants with viral bronchiolitis, has your referral pattern to hospital changed in the last year or so?

- I now refer fewer infants to hospital, but this is not related to guidelines
- I now refer fewer infants to hospital, in accordance with local guidelines
- I now refer fewer infants to hospital, as a direct result of the NICE guideline
- My hospital referral pattern has not changed
- I now refer more infants to hospital, but this is not related to guidelines
- I now refer more infants to hospital, in accordance with local guidelines
- I now refer more infants to hospital, as a direct result of the NICE guideline

How many of the same GPs completed the survey in both years is not known as the survey was completed anonymously.

#### *Statistical analysis*

Proportions were compared using the Chi squared or Fisher's exact test and 95% confidence intervals (95% CI) were calculated. Continuous variables were tested for normality using the Shapiro-Wilk test and data were analysed using either the independent T-test or the Mann-Whitney U test as appropriate.

Statistical analysis was carried out with IBM SPSS Statistics (Version 24, New York, USA).

## **ADDITIONAL RESULTS**

Online Table 1: Demographic data in 2015 and 2016. Data presented as n (%), 95% CI) or median (range).

	<b>2015</b>	<b>2016</b>	<b>P value</b>
N	1001	1009	
Male	552 (52%, 52-58%)	572 (57%, 54-60%)	0.27
<b>Seniority of GP</b>			
GP Principals	629 (63%, 60-66%)	621 (62%, 59-65%)	0.07*
Salaried GPs	252 (25%, 23-28%)	228 (23%, 20-25%)	
Locum GPs	119 (12%, 10-14%)	158 (16%, 14-18%)	
GP Registrars	1 (0.1%, 0-0.5%)	2 (0.2%, 0-0.7%)	
<b>Year qualified</b>			
1979 or earlier	89 (9%, 7-11%)	65 (6%, 5-8%)	0.046*
1980 – 1989	219 (22%, 19-25%)	211 (21%, 19-24%)	
1990 – 1999	330 (33%, 30-36%)	332 (33%, 30-36%)	

2000 – 2009	363 (36%, 33-39%)	394 (39%, 36-39%)	
2010 or later	0 (0%, 0-0%)	7 (0.7%, 0.3-1.4%)	
<b>Size and type of GP practice</b>			
Number of GPs (median, range)	6 (1 - 30)	6 (1 - 30)	0.62
GP practice size (median, range)	8100 (500 – 36,000)	8600 (500 – 45,000)	0.06
Dispensing practice	187 (19%, 16-21%)	190 (19%, 17-21%)	0.79
<b>Country of GP practice</b>			
England	825 (82%, 80-85%)	842 (83%, 81-86%)	0.90*
Scotland	100 (10%, 8-12%)	91 (9%, 7-11%)	
Wales	49 (5%, 4-6%)	48 (5%, 4-6%)	
Northern Ireland	27 (3%, 2-4%)	28 (3%, 2-4%)	
<b>Region of GP practice</b>			
Urban	399 (40%, 37-43%)	418 (41%, 38-45%)	0.35*
Suburban	254 (25%, 23-28%)	272 (27%, 24-30%)	
Semi-rural	238 (24%, 21-27%)	227 (22%, 20-25%)	
Rural	102 (10%, 8-12%)	89 (9%, 7-11%)	
"Other"	8 (1%, 0-2%)	3 (0.3%, 0-1%)	

\*The P value compares all the groups across the two years.

Online Table 2: Guidelines used by GPs in 2015 and 2016. Data presented as n (%), 95% CI).

Guidelines used	2015	2016
Locally developed (e.g. local GP practice, CCG, local hospital)	290 (29%, 26-32%)	342 (34%, 31-37%)
Commercial (e.g. GP notebook, other, similar internet guidance)	248 (25%, 22-28%)	298 (30%, 27-32%)
National (e.g. SIGN, AAP)	227 (23%, 20-25%)	308 (31%, 28-33%)
None of the above (I do not use a guideline)	390 (39%, 36-42%)	275 (27%, 25-30%)
<b>Total</b>	<b>1001 (100%)</b>	<b>1009 (100%)</b>

Online Table 3: Written guidance provided by GPs in 2015 and 2016. Data presented as n (%), 95% CI).

<b>Written guidance</b>	<b>2015</b>	<b>2016</b>
Locally developed (e.g. local GP practice, CCG, local hospital)	124 (12%, 10-15%)	167 (17%, 14-19%)
National (e.g. SIGN leaflet)?	99 (10%, 8-12%)	150 (15%, 13-17%)
Other (please specify)	156 (16%, 13-18%)	144 (14%, 12-17%)
I do not routinely provide written guidance for viral bronchiolitis	622 (62%, 60-65%)	548 (54%, 51-57%)
<b>Total</b>	<b>1001 (100%)</b>	<b>1009 (100%)</b>

Online Table 4: Oxygen saturations used by GPs to refer to hospital in 2015 and 2016. Data presented as n (%), 95% CI).

<b>Level of oxygen saturation</b>	<b>2015</b>	<b>2016</b>
≤ 88% (i.e. if oxygen saturations are 88% or less I would refer to hospital)	4 (0%, 0-1%)	7 (1%, 0-1%)
≤ 90% (i.e. if oxygen saturations are 90% or less I would refer to hospital)	60 (6%, 5-8%)	70 (7%, 5-9%)
≤ 92% (i.e. if oxygen saturations are 92% or less I would refer to hospital)	250 (25%, 22-28%)	279 (28%, 25-30%)
≤ 94% (i.e. if oxygen saturations are 94% or less I would refer to hospital)	360 (36%, 33-39%)	364 (36%, 33-39%)
I do not test oxygen saturation on infants with viral bronchiolitis	327 (33%, 30-36%)	289 (29%, 26-32%)
<b>Total</b>	<b>1001 (100%)</b>	<b>1009 (100%)</b>

Online Table 5: Level of feeding used by GPs to refer to hospital in 2015 and 2016. Data presented as n (%), 95% CI).

<b>Level of feeding</b>	<b>2015</b>	<b>2016</b>
<33% (i.e. if feeding less than a third of normal I would refer to hospital)	145 (14%, 12-17%)	136 (13%, 12-16%)
<50% (i.e. if feeding less than half of normal I would refer to hospital)	564 (56%, 53-59%)	558 (55%, 52-58%)
<66% (i.e. if feeding less than two thirds of normal I would refer to hospital)	190 (19%, 17-22%)	210 (21%, 18-23%)

<75% (i.e. if feeding less than three quarters of normal I would refer to hospital)	88 (9%, 7-11%)	88 (9%, 7-11%)
<100% (i.e. if feeding anything less than normal I would refer to hospital)	14 (1%, 1-2%)	17 (2%, 1-3%)
<b>Total</b>	<b>1001 (100%)</b>	<b>1009 (100%)</b>

*Change in practice after the publication of the NICE guideline*

In 2016, 390 (39%, 95% CI 36-42%) GPs were not aware of the recently published NICE guideline, 268 (27%, 24-29%) were aware of it but had not read it, 229 (23%, 20-25%) were aware of it and had read a summary of it, 103 (10%, 8-12%) were aware of it and had read some of it, and 19 (2%, 1-3%) were aware of it and had read all of it. Since the publication of the NICE guideline, 753 (75%, 72-77%) GPs had not changed their practice of the management of viral bronchiolitis, 113 (11%, 9-13%) had changed their practice, in accordance with local guidelines, 74 (7%, 6-9%) had changed their practice, but this was not related to the NICE guidance and 69 (7%, 5-9%) had changed their practice as a direct result of the NICE guideline.

Of the 256 GPs who responded that they had changed their practice, 129 (50%, 44-56%) now routinely monitor oxygen saturations, 119 (46%, 40-53%) no longer routinely prescribe the medications that they would have previously prescribed, 79 (31%, 26-37%) now routinely provide written advice for parents and 14 (5%, 3-9%) had changed their practice in other ways.

One hundred sixty-four (64%, 58-70%) GPs who had changed their practice responded that their threshold for referring children to hospital based on their respiratory rate had remained the same, 74 (29%, 24-35%) decreased their

respiratory rate threshold for hospital referral and 18 (7%, 5-11%) increased their respiratory rate threshold for hospital referral. 151 (59%, 53-65%) GPs feeding threshold for referring infants to hospital remained the same, 79 (31%, 26-37%) decreased their threshold and 26 (10%, 7-14%) increased their threshold. 150 (59%, 52-64%) GPs oxygen saturation hospital referral threshold remained the same, 80 (31%, 26-37%) decreased their threshold and 26 (10%, 7-14%) increased their threshold.

Overall, 848 (84%, 82-86%) GPs had not changed their referral pattern to hospital since the publication of the NICE guideline, 79 (8%, 6-10%) reported that they now referred fewer infants, although only 16 (1.6%, 1-3%) as a direct result of the NICE guideline and 82 (8%, 7-10%) referred more, although only 19 (2%, 1-3%) as a direct result of the NICE guideline.

## REFERENCES

- 1 Nickless A, Galiza EP, Pollard AJ et al. Benchmarking of viral bronchiolitis management by General Practitioners in the United Kingdom. *Pediatr Allergy Immunol Pulmonol* 2017;30:69–73.