NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Health and social care directorate

Quality standards and indicators

Briefing paper

Quality standard topic: Bronchiolitis

Output: Prioritised quality improvement areas for development.

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1 Introduction

This briefing paper presents a structured overview of potential quality improvement areas in the care of children with bronchiolitis. It provides the Committee with a basis for discussing and prioritising quality improvement areas for development into draft quality statements and measures for public consultation.

1.1 Structure

This briefing paper includes a brief description of the topic, a summary of each of the suggested quality improvement areas and supporting information.

If relevant, recommendations selected from the key development source below are included to help the Committee in considering potential statements and measures.

1.2 Development source

The key development source referenced in this briefing paper is:

Bronchiolitis in children (2015) NICE guideline NG9

2 Overview[1]

2.1 Focus of quality standard

This quality standard will cover the assessment, diagnosis and management of bronchiolitis in children. It may also cover prevention of bronchiolitis through RSV immunisation.

2.2 Definition

Bronchiolitis is the most common disease of the lower respiratory tract during the first year of life. It usually presents with cough with increased work of breathing, and it often affects a child's ability to feed. In primary care, the condition may often be confused with a common cold, though the presence of lower respiratory tract signs (wheeze and/or crackles on auscultation) in an infant in mid‑winter would be consistent with this clinical diagnosis. The symptoms are usually mild and may only last for a few days, but in some cases the disease can cause severe illness.

There are several individual and environmental risk factors that can put children with bronchiolitis at increased risk of severe illness. These include congenital heart disease, neuromuscular disorders, immunodeficiency and chronic lung disease.

[1] Unless otherwise referenced, sections 2.2 to 2.4 are adapted from NICE guideline NG9 bronchiolitis in children (2015).

2.3 Incidence and prevalence

Approximately 1 in 3 infants will develop clinical bronchiolitis in the first year of life and 2–3% of all infants require hospitalization. In 2013/14 in England, there were 35,236 hospital admissions with a primary diagnosis of acute bronchiolitis[2].

It is uncommon for bronchiolitis to cause death. In 2013, bronchiolitis was recorded as the underlying cause of 24 deaths in England and Wales[3].

2.4 Management

Usually, children with bronchiolitis can be managed at home by parents or carers. In most children bronchiolitis is mild and breathing and feeding get better within 5 days, though their cough may take longer to go (usually by around 3 weeks, but sometimes it can be longer).

There are no medicines that can cure bronchiolitis, but the normal medicines given for a cold (like paracetamol or ibuprofen) can help make the symptoms better.

Children admitted to hospital may be given supplementary oxygen or considered for continuous positive airway pressure to ease symptoms.

[2] Hospital Episode Statistics, Admitted Patient Care 2013-14
[3] Office of National Statistics, Mortality Statistics 2013

2.5 National Outcome Frameworks

Tables 1 and 2 show the outcomes, overarching indicators and improvement areas from the frameworks that the quality standard could contribute to achieving.

Table 1 NHS Outcomes Framework 2015–16

Domain	Overarching indicators and improvement areas
1 Preventing people from dying prematurely	***Overarching indicators*** 1a Potential Years of Life Lost (PYLL) from causes considered amenable to healthcare** ii Children and young people 1c Neonatal mortality and stillbirths **Reducing mortality in children** 1.6 i Infant mortality* ii Neonatal mortality and stillbirths
3 Helping people to recover from episodes of ill health or following injury	***Overarching indicators*** 3a Emergency admissions for acute conditions that should not usually require hospital admission 3b Emergency readmissions within 30 days of discharge from hospital* **Preventing lower respiratory tract infections (LRTI) in children from becoming serious** 3.2 Emergency admissions for children with LRTI
4 Ensuring that people have a positive experience of care	***Overarching indicators*** 4a Patient experience of primary care i GP services ii GP Out-of-hours services 4b Patient experience of hospital care 4c *Friends and family test* *4d Patient experience characterised as poor or worse* *I Primary care ii Hospital care* ***Improvement areas*** **Improving people's experience of outpatient care** 4.1 Patient experience of outpatient services **Improving hospitals' responsiveness to personal needs** 4.2 Responsiveness to inpatients' personal needs **Improving people's experience of accident and emergency services** 4.3 Patient experience of A&E services **Improving access to primary care services** 4.4 Access to i GP services
Alignment with the Public Health Outcomes Framework * Indicator is shared ** Indicator is complementary Indicators in italics in development	

Table 2 Public health outcomes framework for England, 2013–2016

Domain	Objectives and indicators
4 Healthcare public health and preventing premature mortality	***Objective*** Reduced numbers of people living with preventable ill health and people dying prematurely, whilst reducing the gap between communities ***Indicators*** 4.1 Infant mortality* 4.3 Mortality rate from causes considered preventable** 4.11 Emergency readmissions within 30 days of discharge from hospital*
Alignment with the NHS Outcomes Framework * Indicator is shared ** Indicator is complementary	

3 Summary of suggestions

3.1 Responses

In total 9 stakeholders responded to the 2-week engagement exercise 24 September 2015 to 8 October 2015.

Stakeholders were asked to suggest up to 5 areas for quality improvement. Specialist committee members were also invited to provide suggestions. The responses have been merged and summarised in table 3 for further consideration by the Committee.

Full details of all the suggestions provided are given in appendix 3 for information.

Table 3 Summary of suggested quality improvement areas

Suggested area for improvement	Stakeholders
Assessment and diagnosis	SCM, Ab
Admission to hospital	SCM
Safety information	SCM
Use of antibiotics	SCM
Respiratory support	SCM
Hydration and feeding support	SCM
Discharge from hospital	SCM
Prevention	SCM, Ab, RCPCH
Ab, Abbvie RCPCH, Royal College of Paediatrics and Child Health SCM, Specialist Committee Member	

3.2 Identification of current practice evidence

Bibliographic databases were searched to identify examples of current practice in UK health and social care settings; 91 papers were identified related to bronchiolitis. In addition, 9 papers were suggested by stakeholders at topic engagement and 8 papers internally at project scoping. Additionally, 1 paper was identified from reference lists.

Of these papers, 6 have been included in this report and are included in the current practice sections where relevant. Appendix 2 outlines the search process.

4 Suggested improvement areas

4.1 Assessment and diagnosis

4.1.1 Summary of suggestions

Diagnosis criteria

Stakeholders highlighted the importance of accurate assessment and diagnosis to ensure subsequent management is appropriate. It will reduce misdiagnosis, unnecessary testing and prescription of inappropriate medication to children who do not require it. Resources can then be focussed on children at greatest risk.

It was also suggested that a Red Amber Green (RAG) system may help practitioners make decisions about treatment or referral.

Oxygen saturation in primary care

Stakeholders highlighted that oxygen saturation is a key indicator of severity and informs the decision of whether to refer to secondary care. However, it was suggested that primary care centres do not have access to pulse oximetry and therefore appropriate onward referral may not be made.

4.1.2 Selected recommendations from development source

Table 4 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 4 to help inform the Committee's discussion.

Table 4 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Diagnosis criteria	**Assessment and diagnosis** NICE NG9 recommendations 1.1.3 to 1.1.5 (KPIs) and 1.1.8
Oxygen saturation in primary care	**Research recommendation** NICE NG9 research recommendation 2.1

Assessment and diagnosis

NICE NG9 – Recommendation 1.1.3

Diagnose bronchiolitis if the child has a coryzal prodrome lasting 1 to 3 days, followed by:

- persistent cough and

- either tachypnoea or chest recession (or both) and
- either wheeze or crackles on chest auscultation (or both).

NICE NG9 – Recommendation 1.1.4

When diagnosing bronchiolitis, take into account that the following symptoms are common in children with this disease:

- fever (in around 30% of cases, usually of less than 39°C)
- poor feeding (typically after 3 to 5 days of illness).

NICE NG9 recommendation 1.1.8

Measure oxygen saturation in every child presenting with suspected bronchiolitis, including those presenting to primary care if pulse oximetry is available.

Research recommendation

NICE NG9 research recommendation 2.1

What is the clinical and cost effectiveness of oxygen saturation (SpO2) measurement in primary care in children with bronchiolitis?

There are no studies to inform the use of SpO2 measurement in primary care. SpO2 is used routinely in secondary care to help decide on the need for admission to hospital. The clinical and cost effectiveness of SpO2 measurement in primary care is also important. SpO2 is not routinely measured in infants and young children with bronchiolitis in primary care. The value of SpO2 measurement to help identify those who need admission to hospital should be assessed. Possible outcomes might be fewer or more infants being referred to hospital, or admitted.

4.1.3 Current UK practice

No current practice data has been identified describing diagnostic practice related to bronchiolitis or the availability of pulse oximetry in primary care. However, a 2008 survey of GP practices in Oxford aimed to describe how GPs measure vital signs to assess children under 5 years with any suspected acute infection[4]. 162 of 210 GPs responded to a postal survey (77% response rate). 20% of GPs reported that they used pulse oximetry to assess respiratory status in general when taking vital signs and 9% reported using oxygen saturation to assess severity of respiratory illnesses.

[4] Thompson M, Mayon-White R, Harnden A et al (2008) Using vital signs to assess children with acute infections: a survey of current practice *Br J Gen Pract* 58: 236-241

4.2 Admission to hospital

4.2.1 Summary of suggestions

Admission criteria

Stakeholders highlighted that admission criteria should be applied to ensure that children are being cared for in the most appropriate environment. This will reduce inappropriate admission yet also help identify children at greatest risk who need inpatient care. In particular chest x-rays should not be performed without specific indication as they can lead to greater use of antibiotics because changes may mimic pneumonia. This unnecessary treatment has adverse impacts on side effects, length of stay, cost and antimicrobial resistance.

4.2.2 Selected recommendations from development source

Table 5 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 5 to help inform the Committee's discussion.

Table 5 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Admission criteria	**When to admit** NICE NG9 recommendations 1.3.2, 1.3.3, 1.3.7 (KPI) and 1.3.8.

When to admit

NICE NG9 recommendation 1.3.2

When assessing a child in a secondary care setting, admit them to hospital if they have any of the following:

- apnoea (observed or reported)
- persistent oxygen saturation of less than 92% when breathing air
- inadequate oral fluid intake (50–75% of usual volume, taking account of risk factors [see recommendation 1.3.3] and using clinical judgement)
- persisting severe respiratory distress, for example grunting, marked chest recession, or a respiratory rate of over 70 breaths/minute.

NICE NG9 recommendation 1.3.3

When deciding whether to admit a child with bronchiolitis, take account of the following risk factors for more severe bronchiolitis:

- chronic lung disease (including bronchopulmonary dysplasia)
- haemodynamically significant congenital heart disease
- age in young infants (under 3 months)
- premature birth, particularly under 32 weeks
- neuromuscular disorders
- immunodeficiency.

NICE NG9 recommendation 1.3.7

Do not routinely perform a chest X‑ray in children with bronchiolitis, because changes on X‑ray may mimic pneumonia and should not be used to determine the need for antibiotics.

NICE NG9 recommendation 1.3.8

Consider performing a chest X‑ray if intensive care is being proposed for a child.

4.2.3 Current UK practice

A 2013 analysis of UK HES data on admissions for bronchiolitis found a15-fold variation across 152 PCTs (351–5140 admissions per 100,000 children; figure 1)[5]. Some correlation was found between admission rates and socioeconomic deprivation (figure 2), but this did not alone account for the magnitude of variation. Variation existed amongst PCTs of similar socioeconomic profile and authors suggest clinical management (eg admission criteria) is likely to be an additional cause. The study examined 75,318 admissions between 2007 and 2010, however it did report limitations in the consistency of the data coding.

[5] Cheung CR, Smith H, Thurland K, et al. (2013) Population variation in admission rates and duration of inpatient stay for bronchiolitis in England *Archives of Disease in Childhood* 98 (1): 57-59.

Figure 1: Admissions for bronchiolitis in children per 100,000 by Primary Care Trust

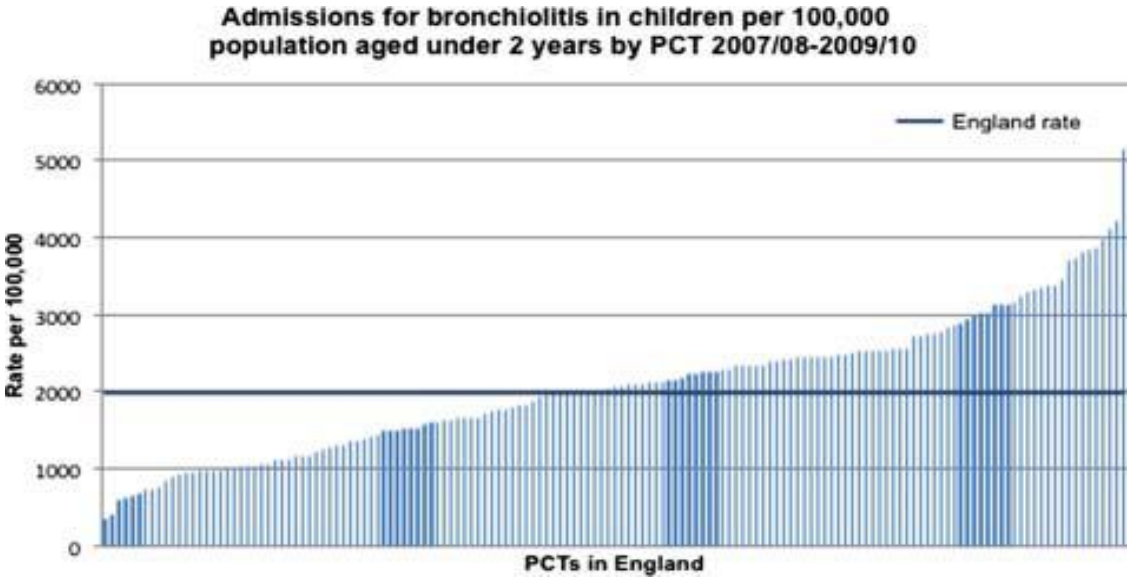
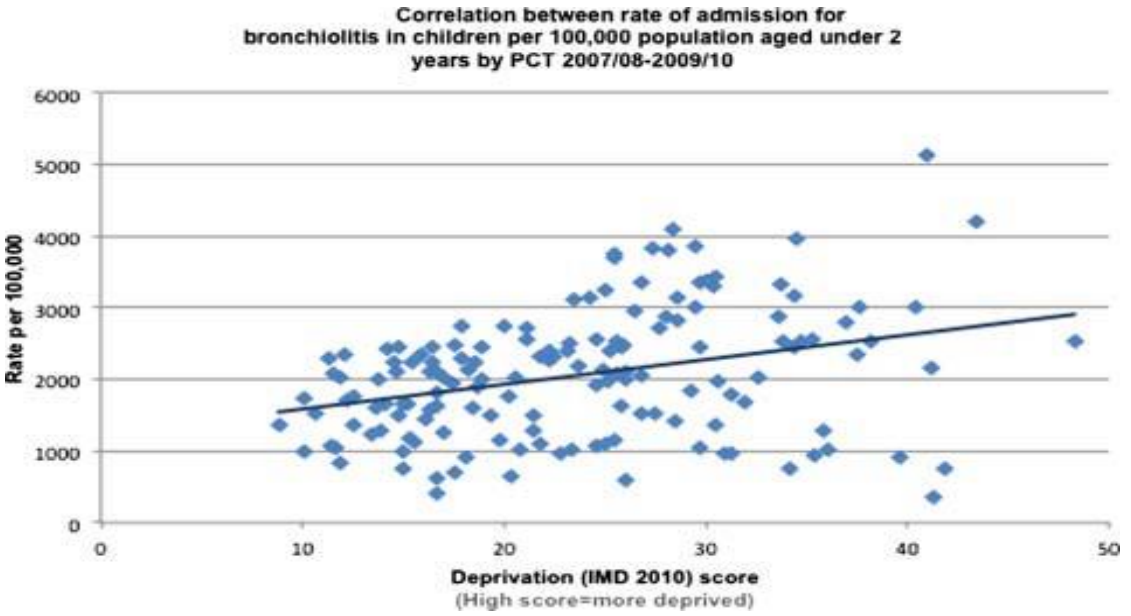


Figure 2: Correlation between rate of admission for bronchiolitis and deprivation score



A two-month prospective audit in Wales[6] assessed compliance with SIGN bronchiolitis guidelines in the 13 acute paediatrics centres. Data was examined on 752 children aged 2 weeks to 12 months old. There was wide variability in the management of bronchiolitis. Use of chest x-ray ranged 6-36% across centres, and in those receiving chest x-ray provision of antibiotics ranged 0-100%.

[6] Oakley J, Murch H, Pierrepoint M, et al. (2014) Bronchiolitis 12: A nationwide audit Archives of Disease in Childhood.99 A84.

4.3 Safety information

4.3.1 Summary of suggestions

Stakeholders highlighted that when children are not admitted to hospital, parents and carers should be given safety information on how to recognise red flag symptoms and how to get help if needed.

4.3.2 Selected recommendations from development source

Table 6 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 6 to help inform the Committee's discussion.

Table 6 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Safety information	**Key safety information for looking after a child at home** NICE NG9 recommendation 1.6.1 (KPI)

Key safety information for looking after a child at home

NICE NG9 recommendation 1.6.1

Provide key safety information for parents and carers to take away for reference for children who will be looked after at home. This should cover:

- how to recognise developing 'red flag' symptoms:
    - worsening work of breathing (for example grunting, nasal flaring, marked chest recession)
    - fluid intake is 50–75% of normal or no wet nappy for 12 hours
    - apnoea or cyanosis
    - exhaustion (for example, not responding normally to social cues, wakes only with prolonged stimulation).
- that people should not smoke in the child's home because it increases the risk of more severe symptoms in bronchiolitis
- how to get immediate help from an appropriate professional if any red flag symptoms develop
- arrangements for follow‑up if necessary.

4.3.3 Current UK practice

No published studies on current practice were found specifically related to bronchiolitis.

A 2010 Royal College of Paediatrics and Child Health report aimed to describe the patterns of care for children presenting with feverish illness and the experiences of the parents[7]. This study included examination of 194 clinical records of children who attended urgent care services, 220 telephone questionnaires with parents or carers and 29 formal interviews parents or carers. When a child was sent or stayed homed, 81% of parents reported being given safety net information compared to 89% with a record in the clinical notes. On 57% occasions, there was documentation that the parent was given advice about what to look for to indicate deterioration and on 74% occasions given advice about who to contact in such an event. This varied considerably by service type, but overall documentation of this component was better in primary care than secondary care.

The NICE shared learning database contains one audit from an acute trust on the provision of safety net advice to parents of children with any feverish illness[8]. It aimed to assess the impact of an induction programme for new medical staff. Figures from 2009 relate to 293 A&E attendances and showed a reduction in the provision of advice from July (70.5%) to August (55.9%). The 2010 figures relate to 457 attendances and show an increase in the provision of advice from July (76.0%) to August (89.5%).

[7] Royal College of Paediatrics and Child Health (2010) To understand and improve the experience of parents and carers who need advice when a child has a fever (high temperature)
[8] NICE shared learning database (2011) The provision of safety net advice to parents of feverish children: Interventions at induction can improve adherence

4.4 Use of antibiotics

4.4.1 Summary of suggestions

Use of antibiotics

Stakeholders highlighted that the unnecessary use of antibiotics has adverse impact on side effects, length of stay, cost and antimicrobial resistance. Antibiotics should only be used if there are specific indications of bacterial pneumonia.

4.4.2 Selected recommendations from development source

Table 7 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 7 to help inform the Committee's discussion.

Table 7 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Use of antibiotics	**Management of bronchiolitis** NICE NG9 recommendation 1.4.3

Management of bronchiolitis

NICE NG9 recommendation 1.4.3

Do not use any of the following to treat bronchiolitis in children:

- antibiotics
- hypertonic saline
- adrenaline (nebulised)
- salbutamol
- montelukast
- ipratropium bromide
- systemic or inhaled corticosteroids
- a combination of systemic corticosteroids and nebulised adrenaline.

4.4.3 Current UK practice

A prospective observational study undertaken in one UK hospital examined medication charts on paediatric wards over a five month period[9]. The aim was to analyse utilisation of antibiotics and their indications. Data from prescriptions for 500 admitted children was collected and showed 229 (46%) received antibiotics. Respiratory disease was the most common indication (86/229; 38%) and bronchiolitis was the most common form of respiratory disease treated with antibiotics (27/86; 31%).

A two-month prospective audit in Wales[10] assessed compliance with SIGN bronchiolitis guidelines in the 13 acute paediatrics centres. Data was examined for 752 children aged 2 weeks to 12 months old. There was wide variability in the management of bronchiolitis. Use of chest x-ray ranged 6-36% across centres, and in those receiving chest x-ray provision of antibiotics ranged 0-100%.

[9] Alosaily Y, Conroy S,Choonara I (2014) Antibiotic utilisation for hospitalised paediatric patients Archives of Disease in Childhood 99:e3

[10] Oakley J, Murch H, Pierrepoint M, et al. (2014) Bronchiolitis 12: A nationwide audit Archives of Disease in Childhood.99 A84.

4.5 Respiratory support

4.5.1 Summary of suggestions

Oxygen levels

Stakeholders highlighted that assessment and management of oxygen levels can help reduce deterioration and improve safety.

Non-invasive ventilation

Stakeholders noted a research recommendation in NICE NG9 focussing on the use of high flow humidified oxygen. This intervention may prevent further deterioration but there is currently no guidance available.

4.5.2 Selected recommendations from development source

Table 8 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 8 to help inform the Committee's discussion.

Table 8 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Oxygen levels	**Management of bronchiolitis** NICE NG9 recommendation 1.4.4
Non-invasive ventilation	**Management of bronchiolitis** NICE NG9 recommendation 1.4.5 **Research recommendation** NICE NG9 research recommendation 2.4

Management of bronchiolitis

NICE NG9 recommendation 1.4.4

Give oxygen supplementation to children with bronchiolitis if their oxygen saturation is persistently less than 92%.

NICE NG9 recommendation 1.4.5

Consider continuous positive airway pressure (CPAP) in children with bronchiolitis who have impending respiratory failure.

Research recommendation

NICE NG9 research recommendation 2.4

What is the clinical and cost effectiveness of high‑flow humidified oxygen versus standard supplemental oxygen?

Why this is important

Providing oxygen (typically by nasal cannula) is standard care for bronchiolitis. Newly‑developed medical devices can now deliver high‑flow humidified oxygen that is thought to provide more comfortable and effective delivery of gases while retaining airway humidity. The use of this medical device is becoming widespread without demonstration of additional efficacy. A multicentre RCT comparing high‑flow humidified oxygen and standard supplemental oxygen would be of benefit, as would including weaning strategies for high‑flow humidified oxygen.

4.5.3 Current UK practice

A 2015 survey of UK hospitals aimed to establish current practice relating to high flow nasal cannulas (HFNC) and nasal continuous positive airway pressure (nCPAP)[11]. 109 of the 191 hospitals with paediatric inpatient services responded to an online survey. 93% could deliver nCPAP to children with bronchiolitis and 71% could deliver HFNC. The main indications for use of HFNC were:

- Escalation of therapy from low flow oxygen (74%)
- As an alternative to CPAP (69%)
- Weaning from CPAP (57%)

The authors report that the majority of clinicians (71%) stated a preference for HFNC over nCPAP in a deteriorating child; but despite this 76% were prepared to randomise infants between the two in a clinical trial.

[11] Turnham H, Agbeko R, Furness J, et al. (2015) Use of non-invasive respiratory support in bronchiolitis: A national survey Archives of Disease in Childhood. 100: A159

4.6 Hydration and feeding support

4.6.1 Summary of suggestions

Hydration

Stakeholders highlighted that assessment and management of hydration can help reduce deterioration and improve patient outcomes and safety.

Nasogastric or orogastric feeding support

Stakeholders highlighted that nasogastric or orogastric feeding support should be first line in preference to intravenous fluids to support infants with bronchiolitis. They state that enteral feeding is safer than intravenous fluids at no greater cost.

4.6.2 Selected recommendations from development source

Table 9 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 9 to help inform the Committee's discussion.

Table 9 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Hydration	No recommendations identified in NICE accredited guidance
Nasogastric or orogastric feeding support	**Management of bronchiolitis** NICE NG9 recommendation 1.4.11 (KPI) and 1.4.12

Management of bronchiolitis

NICE NG9 recommendation 1.4.11

Give fluids by nasogastric or orogastric tube in children with bronchiolitis if they cannot take enough fluid by mouth.

NICE NG9 recommendation 1.4.12

Give intravenous isotonic fluids (see NPSA guidance) to children who:

- do not tolerate nasogastric or orogastric fluids or
- have impending respiratory failure.

4.6.3 Current UK practice

A two-month prospective audit in Wales assessed compliance with SIGN bronchiolitis guidelines in the 13 acute paediatrics centres[12]. Data was examined on 752 children aged 2 weeks to 12 months old. There was wide variability in the management of bronchiolitis. Provision of NG feeding ranged 0-47% across centres, and provision of IV fluids ranged 0-27%.

[12] Oakley J, Murch H, Pierrepoint M, et al. (2014) Bronchiolitis 12: A nationwide audit Archives of Disease in Childhood.99 A84.

4.7 Discharge from hospital

4.7.1 Summary of suggestions

Stakeholders highlighted that admission to hospital can have an impact on the child and the family. Children should be assessed to see if they have improved and can be cared for safely at home. Measurement of oxygen saturation was highlighted as a particularly useful test, that if done poorly can extend length of stay inappropriately.

4.7.2 Selected recommendations from development source

Table 10 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 10 to help inform the Committee's discussion.

Table 10 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Discharge from hospital	**When to discharge** NICE NG9 recommendations 1.5.1 and 1.5.2

When to discharge

NICE NG9 recommendation 1.5.1

When deciding on the timing of discharge for children admitted to hospital, make sure that the child:

- is clinically stable
- is taking adequate oral fluids
- has maintained oxygen saturation over 92% in air for 4 hours, including a period of sleep.

NICE NG9 recommendation 1.5.2

When deciding whether to discharge a child, take into account factors that might affect a carer's ability to look after a child with bronchiolitis, for example:

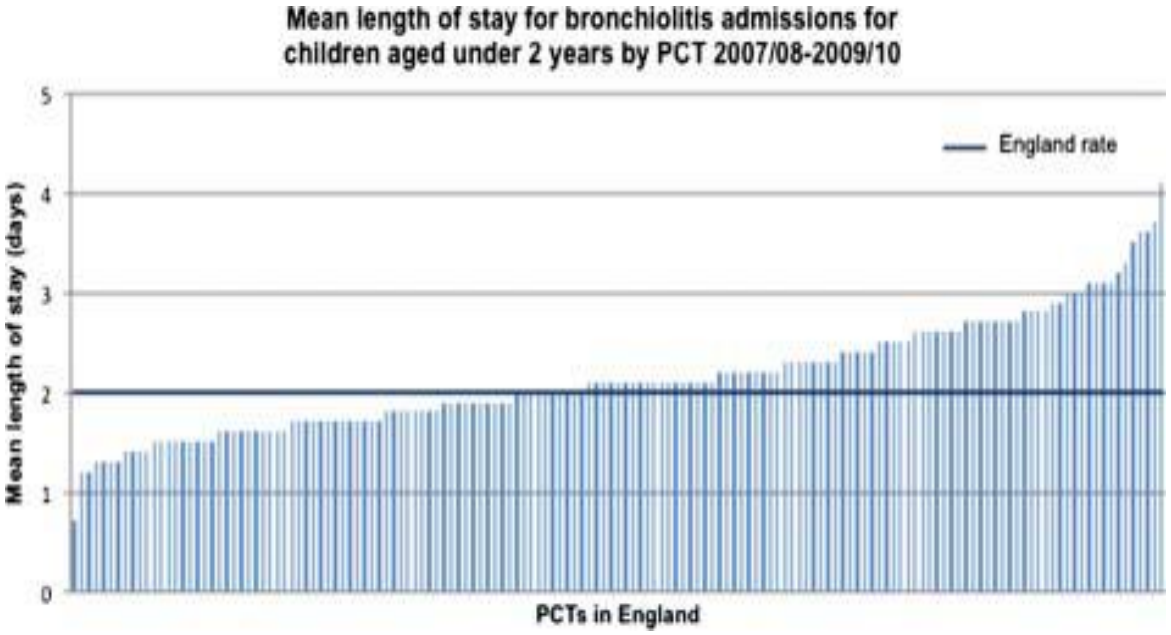
- social circumstances
- the skill and confidence of the carer in looking after a child with bronchiolitis at home
- confidence in being able to spot red flag symptoms (see recommendation 1.6.1)

- distance to healthcare in case of deterioration.

4.7.3 Current UK practice

A 2013 analysis of UK HES data on admissions for bronchiolitis found a 6-fold variation in the mean length of stay in hospital (0.7–4.1 days; figure 3)[13]. No correlation was found between length of stay and socioeconomic deprivation. Authors suggest that variation in thresholds for oxygen supplementation and discharge criteria are likely to be contributory causes to differing lengths of stay.

This study examined 75,318 admissions between 2007 and 2010, however it did report limitations in the consistency of the data coding.



[13] Cheung CR, Smith H, Thurland K, et al. (2013) Population variation in admission rates and duration of inpatient stay for bronchiolitis in England *Archives of Disease in Childhood* 98 (1) : 57-59.

4.8 Prevention

4.8.1 Summary of suggestions

Active RSV vaccine

Stakeholders highlighted work in developing an active RSV vaccine that could help prevent severe cases of bronchiolitis. However it was noted this was out of scope of NICE guideline 9.

Risk factors and prognostic markers

Stakeholders also highlight risk factors and prognostic markers for increased risk of severe infection.

4.8.2 Selected recommendations from development source

Table 11 below highlights recommendations that have been provisionally selected from the development source(s) that may support potential statement development. These are presented in full after table 11 to help inform the Committee's discussion.

Table 11 Specific areas for quality improvement

Suggested quality improvement area	Suggested source guidance recommendations
Active RSV vaccine	No recommendations identified in NICE accredited guidance
Risk factors and prognostic markers	No recommendations identified in NICE accredited guidance

4.8.3 Current UK practice

No published studies on current practice were highlighted for this suggested area for quality improvement; this area is based on stakeholder's knowledge and experience.

Public Health England's Green Book[14] recommends passive immunisation with Synagis solution (Palivizumab) to protect at risk- infants for whom RSV infection is likely to cause serious illness or death and all childen less than 24 months with severe combined immune-deficiency syndrome.

[14] Public Health England (2013) Green Book chapter 27a: Respiratory Syncytial Virus.

4.9 Additional areas

Summary of suggestions

The improvement areas below were suggested as part of the stakeholder engagement exercise. However they were felt to be either unsuitable for development as quality statements, outside the remit of this particular quality standard referral or require further discussion by the Committee to establish potential for statement development.

There will be an opportunity for the QSAC to discuss these areas at the end of the session on 18th November 2015.

Data collection

Stakeholders stated that data collection on bronchiolitis is insufficiently detailed to allow commissioners and providers to monitor current practice and outcomes. Robust data collection is needed to allow measurement against NICE quality standards however it would not itself be the focus of a quality statement. Quality statements should focus on the actions and outcomes for which the data should be collected.

Appendix 1: Key priorities for implementation (NICE NG9)

Recommendations that are key priorities for implementation in NICE NG9 and that have been referred to in the main body of this report are highlighted in grey.

1.1.3. Diagnose bronchiolitis if the child has a coryzal prodrome lasting 1 to 3 days, followed by:

- persistent cough and
- either tachypnoea or chest recession (or both) and
- either wheeze or crackles on chest auscultation (or both).

1.1.5 When diagnosing bronchiolitis, take into account that young infants with this disease (in particular those under 6 weeks of age) may present with apnoea without other clinical signs.

1.2.1. Immediately refer children with bronchiolitis for emergency hospital care (usually by 999 ambulance) if they have any of the following:

- apnoea (observed or reported)
- child looks seriously unwell to a healthcare professional
- severe respiratory distress, for example grunting, marked chest recession, or a respiratory rate of over 70 breaths/minute
- central cyanosis
- persistent oxygen saturation of less than 92% when breathing air.

1.2.2. Consider referring children with bronchiolitis to hospital if they have any of the following:

- a respiratory rate of over 60 breaths/minute
- difficulty with breastfeeding or inadequate oral fluid intake (50–75% of usual volume, taking account of risk factors [see recommendation 1.3.3] and using clinical judgement)
- clinical dehydration.

1.3.2 When assessing a child in a secondary care setting, admit them to hospital if they have any of the following:

- apnoea (observed or reported)
- persistent oxygen saturation of less than 92% when breathing air

- inadequate oral fluid intake (50–75% of usual volume, taking account of risk factors [see recommendation 1.3.3] and using clinical judgement)
- persisting severe respiratory distress, for example grunting, marked chest recession, or a respiratory rate of over 70 breaths/minute.

1.3.7 Do not routinely perform a chest X‑ray in children with bronchiolitis, because changes on X‑ray may mimic pneumonia and should not be used to determine the need for antibiotics.

1.4.3 Do not use any of the following to treat bronchiolitis in children:

- antibiotics
- hypertonic saline
- adrenaline (nebulised)
- salbutamol
- montelukast
- ipratropium bromide
- systemic or inhaled corticosteroids
- a combination of systemic corticosteroids and nebulised adrenaline.

1.4.4. Give oxygen supplementation to children with bronchiolitis if their oxygen saturation is persistently less than 92%.

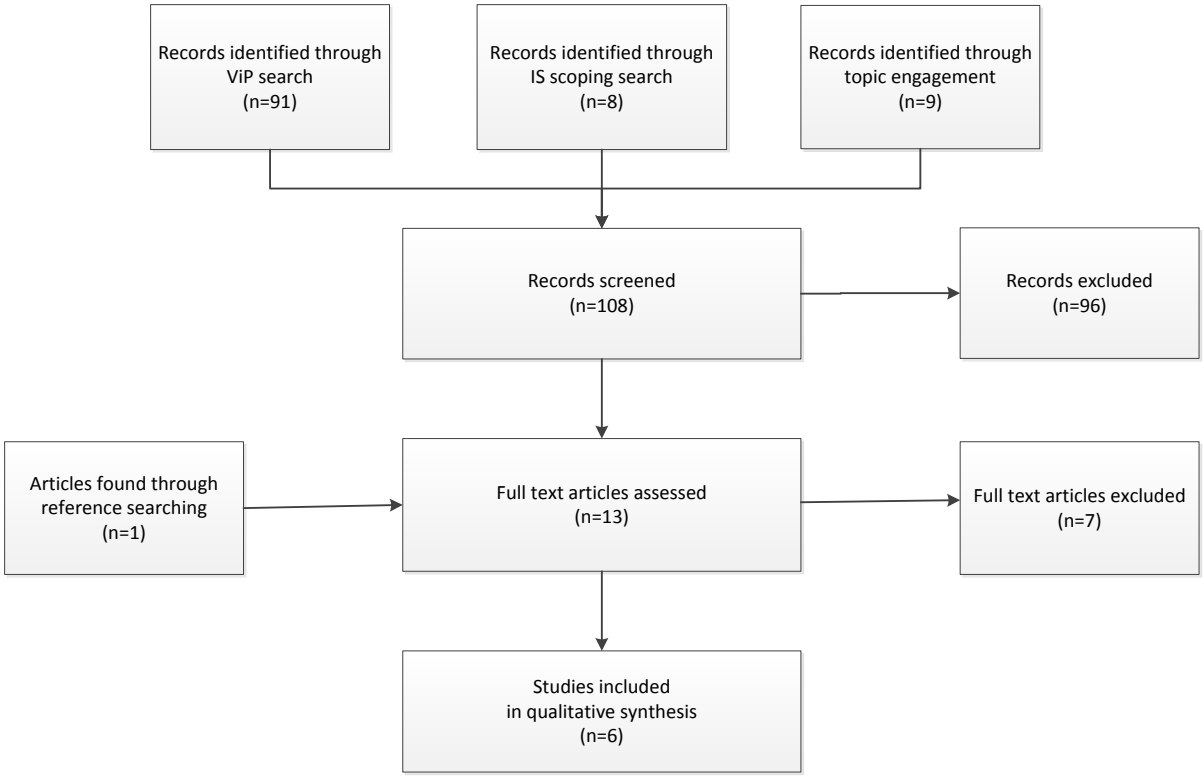
1.4.11. Give fluids by nasogastric or orogastric tube in children with bronchiolitis if they cannot take enough fluid by mouth.

1.6.1. Provide key safety information for parents to take away for reference for children who will be looked after at home. This should cover:

- how to recognise developing 'red flag' symptoms:
- worsening work of breathing (for example grunting, nasal flaring, marked chest recession)
- fluid intake is 50–75% of normal or no wet nappy for 12 hours
- apnoea or cyanosis
- exhaustion (for example, not responding normally to social cues, wakes only with prolonged stimulation)
- that people should not smoke in the child's home because it increases the risk of more severe symptoms in bronchiolitis

- how to get immediate help from an appropriate professional if any red flag symptoms develop
- arrangements for follow‑up if necessary.

Appendix 2: Review flowchart



Appendix 3: Suggestions from stakeholder engagement exercise – registered stakeholders

ID	Related section	Stakeholder	Key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
1	4.1	SCM1	Key area for quality improvement 1 Diagnosis and assessment of bronchiolitis in children.	It is important to correctly diagnose children with bronchiolitis to ensure the child receives the correct management (eg child will not be incorrectly prescribed medication). Assessment of the child with bronchiolitis is an important component of clinical decision making especially in the deteriorating child (eg referral to hospital, admission or discharge from hospital, increased need for supportive therapies). Diagnosis and assessment is a recommendation of the NICE bronchiolitis guideline.	There is evidence of wide variation in terms of hospital admission, length of stay treatment and investigations. Prompt diagnosis and assessment may: • Reduce inappropriate prescribing of medication and other treatment therapies • Reduce unplanned admissions to both hospital and critical care • Reduce delays in treatment • Improve patient outcomes/safety • Reduce unnecessary investigations	Please see NICE Bronchiolitis Guideline 2015 Cheung et al (2013) Population variation in admission rates and duration of inpatient stay for bronchiolitis in England. Archives of Disease in Childhood 98 (1): 57-9 Children and young people's health outcomes forum: report by the acutely ill themed group (2012) Welsh Paediatric Society (2013) Bronchiolitis-12: An all-Wales audit
2	4.1	AbbVie	Development of Red Amber Green (RAG) system	Development of RAG system in primary care for management of bronchiolitis	This could help give better clarity to primary care practitioners on patients that would be most at risk but also provide criteria for when to manage within primary care & when to admit to A&E. This could also include a 'red flag' for patients who are ill & continue to be at risk of further respiratory infections, highlighting whether or not preventative measures such as Synagis or further education is being offered.	
3	4.1	SCM2	Key area for quality	Promotion of Oxygen saturation	In bronchiolitis, oxygen saturation is a key	Bronchiolitis guideline

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			improvement 1	measurement in children, in primary care	indicator of severity, and of need for referral/ specialist intervention	
4	4.1	SCM3	Referral of children with bronchiolitis from primary to secondary care	Parents often present to primary care initially with a child who is unwell and it is the sole decision of the primary care physician as to whether the child is referred on to secondary care. If a timely and appropriate referral does not occur there can be serious repercussions for the child	Many primary care centres do not have access to equipment to monitor sp02 levels and from personal experience when this has not been available a referral has not been made when it was necessary	Personal experience of referral from primary care and through paediatric A&E
5	4.2	SCM1	Key area for quality improvement 2 Hospital admission criteria	It is important to assess the child to see if they meet the hospital admission criteria so they can be managed in an appropriate environment. Admission criteria is a recommendation of the NICE bronchiolitis guideline	Hospital admission criteria may: Reduce inappropriate admissions Identify those children who require increased management interventions Reduce treatment delays Reduce unplanned admissions Improve patient outcomes/safety	Cheung et al (2013) Population variation in admission rates and duration of inpatient stay for bronchiolitis in England. Archives of Disease in Childhood 98 (1): 57-9 Children and young people's health outcomes forum: report by the acutely ill themed group (2012) Welsh Paediatric Society (2013) Bronchiolitis-12: An all-Wales audit
6	4.3	SCM4	Not performing chest x-rays in the absence of specific indications	Performing chest x-rays without specific indication leads to greater use of antibiotics. Antibiotics are of no benefit in bronchiolitis unless there are specific indications to suggest there is also bacterial	Previous audits at several hospitals have demonstrated that x-rays are performed with no clear indication. Evidence exists that minor changes are interpreted as indicative of bacterial infection warranting antibiotic therapy.	There is published evidence that x-rays are performed up to 36% of the time despite being recommended against

ID	Related section	Stakeholder	Key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				pneumonia (NICE Guideline NG9). This unnecessary treatment has adverse impact in terms of side effects, length of stay, cost, and antimicrobial resistance.		in the 2006 SIGN Guideline (Welsh Paed J 2013;38:56).
7	4.3	SCM1	Key area for quality improvement 5 Key safety information for parents	Parents need to be provided with key safety information to appropriately manage an infant in the home environment. Key safety information criteria is a recommendation of the NICE bronchiolitis guideline	Information should be given to parents on bronchiolitis and what red flag signs and symptoms to look out for in a deteriorating child. This information will: Prevent delays in treatment Empower parents to access health care appropriately Improve patient outcomes/safety	Children and young people's health outcomes forum: report by the acutely ill themed group (2012)
8	4.3	SCM3	Red flag symptom information for parents/carers	Children who are not admitted to secondary care and will be cared for in the home environment may become more unwell and require admission to hospital at a later time	Parents/carers may have no experience of bronchiolitis and may not recognise when to get their child reassessed. They may feel reassured by their primary care physician and not want to "waste time" by presenting again only to be told their child is still well enough to be at home which could result in a child deteriorating to a dangerous level. There is generally very little knowledge about bronchiolitis in the general public.	Personal experience and discussion with other parents of children who have experienced bronchiolitis
9	4.4	SCM4	Not giving antibiotics in bronchiolitis without specific indications	Antibiotics are of no benefit in bronchiolitis unless there are specific indications to suggest there is also bacterial pneumonia (NICE Guideline NG9). This unnecessary treatment has adverse impact in terms of side effects, length of stay, cost, and antimicrobial resistance.	Antimicrobial stewardship is a key priority for the NHS. This is manifest as a Patient Safety Alert (http://www.england.nhs.uk/wp-content/uploads/2015/08/psa-amr-stewardship-prog.pdf) and reflected in NICE guidance (NG15)	There is published evidence that antibiotics are given despite being recommended against in the 2006 SIGN Guideline (Welsh Paed J 2013;38:56).

ID	Related section	Stakeholder	Key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
10	4.5 and 4.6	SCM1	Key area for quality improvement 3 Management: Children presenting with bronchiolitis should be assessed for hypoxaemia and dehydration	It is important to assess the child's level of oxygenation and hydration. If the child is found to be hypoxaemic or dehydrated then supplemental oxygen or fluids can be administered. Oxygen saturations should be measured using paediatric probes by appropriately trained health care professionals. Provision of appropriate management is a recommendation of the NICE bronchiolitis guideline	Providing supportive management therapies will: Help to prevent further deterioration Reduce inappropriate prescribing of medication and other treatment therapies Improve patient outcomes/safety	Children and young people's health outcomes forum: report by the acutely ill themed group (2012) Welsh Paediatric Society (2013) Bronchiolitis-12: An all-Wales audit
11	4.5	SCM1	Additional developmental areas of emergent practice	Non-invasive ventilation (nasal continuous positive airway pressure and high flow nasal cannula) Research recommendation in NICE bronchiolitis guideline	Early intervention may prevent further deterioration. There is currently a limited evidence base. May prolong length of stay if there are no strict weaning criteria.	
12	4.6	SCM4	Using nasogastric or orogastric feeding support first line in preference to intravenous fluids to support infants with bronchiolitis	Enteral feeding is more physiological and safer than intravenous fluids, with no greater cost (NICE Guideline NG9).	Many practitioners fear that tube feeding should be avoided as infants unable to feed due to bronchiolitis and prefer intravenous fluids as the first line choice.	
13	4.7	SCM1	Key area for quality improvement 4 Hospital Discharge Criteria	It is important to assess when the child has improved. Children can be discharged and safely managed at home.	Providing clear discharge criteria may: Reduce variation in length of stay Improve quality of life for family (eg hospital admission can impact on work, childcare for siblings etc)	Cheung et al (2013) Population variation in admission rates and duration of inpatient stay for bronchiolitis in England. Archives of

ID	Related section	Stakeholder	Key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				Discharge criteria is a recommendation of the NICE bronchiolitis guideline.	Will improve safety	Disease in Childhood 98 (1): 57-9 Children and young people's health outcomes forum: report by the acutely ill themed group (2012) Welsh Paediatric Society (2013) Bronchiolitis-12: An all-Wales audit
14	4.7	SCM3	Monitoring of sp02 in a secondary care environment	Decisions on when to discharge from hospital are made based on sp02 levels (amongst other clinical findings)	Sp02 monitoring can vary depending on the experience of the healthcare professional using the monitor. This can result in longer hospital stays which impact both on the hospital and the patient and their family members	Personal experience on numerous wards in different hospitals
15	4.8	Royal College of Paediatrics and Child Health	Key area for quality improvement 1 Active RSV vaccine	The sources mentioned in this document on bronchiolitis are very comprehensive. The new guideline should mention new developments regarding an active RSV vaccine. This is important because an active vaccine may be able to avoid hospitalisation of many patients.	A vaccine would improve the management of bronchiolitis by preventing the incidence of severe cases.	RCPCH recognises that the guideline did not cover prevention
16	4.8	AbbVie	At risk groups	AbbVie would like to see a Quality Standard include specific information on the infants and children and groups that are more likely to be at	In high risk populations such as infants with CHD, or those born prematurely with low birth weight and/or with BPD/CLD, bronchiolitis may result in a prolonged stay in	Simoes EAF. Respiratory syncytial virus infection. Lancet 1999; 354: 847–52

ID	Related section	Stakeholder	Key area for quality improvement	Why is this important?	Why is this a key area for quality improvement?	Supporting information
				risk of bronchiolitis.	hospital and supportive care on paediatric intensive care units, including ventilation. Tobacco smoke exposure and overcrowding of family homes have been shown to be socio-economic prognostic factors for increased risk of severe RSV infection requiring hospitalisation. These risk factors are indicators of social deprivation and more likely to be experienced by families on lower incomes, often living in poor housing conditions. Infants born into such families are thus more vulnerable to RSV infection. There are several documented risk factors for severe RSV infection requiring hospitalisation, including pollution/exposure to passive smoking, day care attendance, school age siblings, overcrowding in the family home, lack of breastfeeding and age at the start of the RSV season.	Figueras-Aloy J, Carbonell-Estrany X & Quero J. Case-Control Study of the Risk Factors Linked to Respiratory Syncytial Virus Infection Requiring Hospitalization in Premature Infants Born at a Gestational Age of 33–35 Weeks in Spain. Pediatric Infect Dis J 2004; 23: 815–820 Figueras-Aloy J, Carbonell-Estrany X, Quero-Jimenez J et al. Risk Factors Linked to Respiratory Syncytial Virus Infection Requiring Hospitalization in Premature Infants Born in Spain at a Gestational Age of 32 to 35 Weeks. Pediatric Infect Dis J 2008;27: 788–793 Holberg C, Wright A, Martinez F et al. Risk factors for respiratory syncytial virus-associated lower respiratory illnesses in the first year of life.

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						American J Epidemiology 1991, 133; 1135-1151
17	4.9	AbbVie	Data Collection	The data currently collected on bronchiolitis by the NHS are not sufficiently detailed to allow commissioners and service providers to monitor the outcomes of the prevention and management interventions they make available	For example, the data currently collected by the NHS do not capture the number of admissions for children at highest risk of bronchiolitis, such as premature babies, and cannot be interrogated to identify the cause of the admission, whether the patient has been admitted previously, what previous interventions have been provided, or what their outcomes were. As a result, good practice guidance based on NHS data has not been developed, and it is challenging for commissioners and service providers to assess the value of their interventions.	PICANet, 2013 annual report: Summary report, 2013. Available from http://www.picanet.org.uk/Audit/Annual-Reporting/PICANet_Annual_Report_2013_Summary.pdf. Accessed: 22 September 2014
18	General	British Society for Antimicrobial Chemotherapy	Members of The British Society for Antimicrobial Chemotherapy (BSAC) have no comments for this QUALITY STANDARD TOPIC ENGAGEMENT EXERCISE - Bronchiolitis.			
19	General	Royal College of Nursing	This is to let you know that the Royal College of Nursing have no comments to submit to inform on the above topic engagement at this time.			
20	General	NHS England	Thank you for the opportunity to comment on the above QS. I wish to confirm that NHS England has no substantive comments to make regarding this consultation.			