NICE National Institute for Health and Care Excellence

Putting NICE guidance into practice

Costing statement: Pneumonia – diagnosis and management of community- and hospital-acquired pneumonia in adults

Implementing the NICE guideline on pneumonia (CG191)

Published: December 2014

1 Introduction

1.1 This costing statement considers the cost implications of implementing the recommendations made in the NICE guideline on pneumonia: diagnosis and management of community- and hospital-acquired pneumonia in adults.

1.2 There is variation in current clinical practice across the country. Therefore, we encourage organisations to evaluate their own practices against the recommendations in the NICE guideline and assess the resource impact locally. Some of the resource effects to be considered locally are discussed in this statement.

1.3 Costs may be incurred recurrently from implementing the recommendations for C-reactive protein testing in primary care, urinary antigen testing in secondary care, and improving systems to allow for the timely diagnosis and targeted antibiotic treatment of community-acquired pneumonia in secondary care. In addition to ongoing costs, it is estimated that analysers for C-reactive protein testing may be needed by around 5,500 GP practices. This is estimated to be a one-off cost of £3.8 million in England.

1.4 Savings may be achieved because of more appropriate use of antibiotics, reduced repeat appointments in primary care and reduced length of stay in secondary care.

1.5 The commissioner for GP practices is NHS England; respiratory medicine in acute hospitals is commissioned by clinical commissioning groups (CCGs). GP practices and hospital trusts are providers of care for people with suspected or diagnosed pneumonia.

1.6 Improved targeting of antibiotics supports the Department of Health's Start smart, then focus antimicrobial stewardship guidance to help reduce the growing threat of antibiotic resistance. NICE is producing guidance on antimicrobial stewardship that is due for publication in May 2015.

2 Background

2.1 Pneumonia is an infection of the lung tissue. When a person has pneumonia, the air sacs in their lungs become filled with microorganisms, fluid and inflammatory cells, and their lungs are not able to work properly. Diagnosis of pneumonia is based on symptoms and signs of an acute lower respiratory tract infection, and can be confirmed by a chest X-ray showing new shadowing that is not due to any other cause (such as pulmonary oedema or infarction).

2.2 People's experience of pneumonia varies depending on how severe their illness is. Pneumonia is usually bacterial in origin and can be a severe illness, so for these reasons, once the diagnosis is made it is usual practice to prescribe an antibiotic. Others, with more severe pneumonia, may need hospital admission. Pneumonia represents a significant burden of illness for the patient and the NHS.

2.3 Pneumonia is categorised as either community-acquired or hospital-acquired, in the guideline.

2.4 Between 0.5% and 1.1% of adults have community-acquired pneumonia every year in the UK. This is equivalent to between 220,000 and 484,000 people in England. It is estimated that 22–42% of these people are admitted to hospital. Around 175,000 people were admitted to hospital with community-acquired pneumonia in 2013/14 based on Hospital Episode Statistics data. The mortality rate in hospital is between 5% and 14%. Between 1.2% and 10% of adults admitted to hospital with community-acquired pneumonia are managed in an intensive care unit, and for these patients the risk of dying is more than 30%.

2.5 At any time, 1.5% of hospital inpatients in England have a hospital-acquired respiratory infection. Of these people, more than half (at least 7,000 people) have hospital-acquired pneumonia; this does not include infection associated with intubation. Hospital-acquired pneumonia is estimated to increase hospital stay by about 8 days and has a reported

mortality rate of more than 30%. Variations in clinical management and outcome occur across England.

3 Recommendations with potential resource impact

Presentation with lower respiratory tract infection

Recommendation

3.1 For people presenting with symptoms of lower respiratory tract infection in primary care, consider a point of care C-reactive protein test if after clinical assessment a diagnosis of pneumonia has not been made and it is not clear whether antibiotics should be prescribed. Use the results of the C-reactive protein test to guide antibiotic prescribing in people without a clinical diagnosis of pneumonia as follows:

- Do not routinely offer antibiotic therapy if the C-reactive protein concentration is less than 20 mg/litre.
- Consider a delayed antibiotic prescription (a prescription for use at a later date if symptoms worsen) if the C-reactive protein concentration is between 20 mg/litre and 100 mg/litre.
- Offer antibiotic therapy if the C-reactive protein concentration is greater than 100 mg/litre. **[Recommendation 1.1.1]**

Background

3.2 C-reactive protein tests have several applications, including assessing the likelihood of bacterial infection. This stratification will reduce inappropriate prescribing of antibiotics to people who have lower respiratory tract infections that are not pneumonia.

3.3 Guideline Development Group (GDG) advised that currently, C-reactive protein tests are rarely used in primary care when clinical assessment is not clear about the need for antibiotic prescription.

Costs

3.4 As part of the NHS Health Check programme, data from the manufacturer indicates that around 2,500 GP practices have point of care analysers that would be able to process C-reactive protein tests. The remaining GP practices in England (around 5,500) would need to invest in analyser machines to be able to carry out point of care testing. There will be a one-off cost of around £700 to the GP practice for the purchase of the point of care test analyser (NHS Supply Chain). The total purchase cost for the around 5,500 GP practices in England is estimated to be £3.8 million.

3.5 The GDG advised that recurrent costs associated with testing are £13.50 per test. This includes staff time, reagents and calibration. It is not possible to calculate the total cost for testing, as people presenting in primary care with lower respiratory tract infections, would require C-reactive protein testing only if, they could not be categorised by clinical assessment. These ongoing costs should be considered locally.

3.6 Practice staff may need training to use the equipment and interpret the results. The resource impact of this will depend on local circumstances.

Savings and benefits

3.7 Improved targeting of antibiotics supports the Department of Health's Start smart, then focus antimicrobial stewardship guidance to help reduce the growing threat of antibiotic resistance. NICE is producing guidance on antimicrobial stewardship that is due for publication in May 2015. A podcast addressing the benefits of C-reactive protein testing and antimicrobial stewardship has been recorded to support the implementation of this guideline.

3.8 There may be savings in prescribing budgets. The GDG advised that improvement in identifying appropriate treatment regimens could lead to a reduced use of antibiotics. It is estimated that the average cost of a 7-day course of oral antibiotics for moderate to severe pneumonia is £5.00 (average cost of co-amoxiclav and amoxicillin taken from appendix L of the pneumonia full guideline).

3.9 Appropriate use of delayed antibiotic prescriptions should reduce unnecessary use of antibiotics in people with lower respiratory tract infections where a clinical diagnosis of pneumonia has not been made. And there may also be efficiency savings in primary care because of reduced numbers of repeat appointments.

3.10 The point of care test analyser needed for C-reactive protein testing can be used for other tests including lipids and glycated haemoglobin. GPs might consider the overall benefit of having the capability to carry out these tests on a point of care basis to be beneficial.

Community-acquired pneumonia

Recommendations

3.11 For patients with moderate- or high-severity community-acquired pneumonia:

- take blood and sputum cultures **and**
- consider pneumococcal and legionella urinary antigen tests. **[Recommendation 1.2.7]**

3.12 Put in place processes to allow diagnosis (including X-rays) and treatment of community-acquired pneumonia within 4 hours of presentation to hospital. **[Recommendation 1.2.8]**

Background

3.13 The GDG advised that pneumococcal and legionella urinary antigen tests are currently unlikely to be carried out appropriately for people in hospital with community-acquired pneumonia, although the current level of urinary antigen testing is not known. If these tests were carried out, then timely and appropriate treatment with antibiotics could target the specific cause of the pneumonia. This should improve outcomes for people, help to reduce length of stay in hospital and help to achieve the Department of Health's Start smart, then focus antimicrobial stewardship targets.

3.14 It is estimated that 22–42% of people with community-acquired pneumonia are admitted to hospital. Around 175,000 people were admitted to hospital with community-acquired pneumonia in 2013/14 based on Hospital Episode Statistics data.

Costs

3.15 The GDG advised that pneumococcal and legionella urinary antigen tests are performed by pathology departments in hospitals and cost around £40. The current level of urinary antigen testing is not known. The GDG advised that these tests are not currently performed widely. This is thought to be due to the high cost of urinary antigen tests when compared with blood and sputum cultures.

3.16 Chest X-ray can be used to confirm a diagnosis of community-acquired pneumonia at hospital. This should be performed within 4 hours of people arriving at hospital and before starting treatment. It is not anticipated that there will be an increase in the number of chest X-rays performed but providers will need to review local systems to ensure that clinicians have access to the appropriate radiology services in a timely manner. This may require additional resource to be available and it will need to be assessed locally.

Savings and benefits

3.17 Timely diagnosis and targeted treatment of community-acquired pneumonia, after urinary antigen testing, may reduce length of stay in hospital. The saving for each bed day avoided, as shown in table 1, is £192 (2014/15 tariff – Annex 5A – Admitted patient care and outpatient procedures). This may lead to more efficient use of beds for providers, depending on local circumstances. Reduced length of stay beyond the national tariff trim point[1] may represent savings for commissioners.

[1] Trim point: a nationally set length of stay beyond which excess bed days are charged to commissioners.

Table 1 National tariff prices for hospital admissions for treatment of pneumonia

Tariff code	Description	Cost[a] £	Non-elective, long-stay trim point (days)	Per day long-stay payment (for days exceeding trim point) (£)
DZ11A	Lobar, atypical or viral pneumonia with major complications and comorbidities	4,107	32	192
DZ11B	Lobar, atypical or viral pneumonia with complications and comorbidities	2,401	20	192
DZ11C	Lobar, atypical or viral pneumonia without complications and comorbidities	1,650	9	192

[a] 2014/15 tariff – Annex 5A – Admitted patient care and outpatient procedures

3.18 Prices should be agreed locally by commissioners and providers. Reference costs for critical care are in the range of £619–£1,867 per bed day (2012/13 Reference costs national schedule), depending on the number of organs supported. Adult critical care is excluded from the 2014/15 national tariff payment system (Annex 7A – Specified services for acute services for local pricing).

3.19 Improved speed of diagnosis and targeted treatment are likely to improve outcomes for the patient, including time for recovery.

4 Other considerations

4.1 Information should be given to people on the length of time that it might take to recover from the effects of pneumonia. This can be provided at a low cost and it is expected to lead to a reduction in the number of repeat appointments at GP practices.

4.2 There may be training costs for GP practice staff and GPs in using and interpreting C-reactive protein tests. This needs to be assessed locally.

5 Conclusion

5.1 NHS organisations are advised to assess the resource implications of this guidance locally. Potential areas for additional costs locally are:

- C-reactive protein testing in primary care, including the one-off cost of analysers at £3.8 million, and recurring costs (such as reagents and maintenance costs) of around £13.50 per test.
- More timely diagnosis and targeted treatment of community-acquired pneumonia on presentation at hospital.

Potential areas for savings locally are:

- Reduced use of antibiotics because of more accurate assessment of lower respiratory tract infections in primary care for people with community-acquired pneumonia.
- Reduced number of repeat appointments with GPs.
- Reduced length of stay in hospital when community-acquired pneumonia needs treating in hospital.

About this costing statement

This costing statement accompanies Pneumonia: diagnosis and management of community- and hospital-acquired pneumonia in adults (NICE guideline CG191).

Issue date: December 2014

This statement is written in the following context

This statement represents the view of NICE, which was arrived at after careful consideration of the available data and through consulting healthcare professionals. It should be read in conjunction with the NICE guideline. The statement is an implementation tool and focuses on those areas that were considered to have potential impact on resource utilisation.

The cost and activity assessments in the statement are estimates based on a number of assumptions. They provide an indication of the potential impact of the principal recommendations and are not absolute figures.

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