NATIONAL INSTITUTE FOR HEALTH AND CARE EXCELLENCE

Guideline

Pneumonia: diagnosis and management (update)

Draft for consultation, April 2025

This guideline covers diagnosing, assessing, and treating community-acquired and hospital-acquired pneumonia, including bacterial pneumonia secondary to COVID-19, in babies over 1 month (corrected gestational age), children, young people and adults. It aims to optimise antibiotic use and reduce antibiotic resistance.

It does not cover ventilator associated pneumonia or COVID-19 pneumonia. For recommendations on managing suspected or confirmed COVID-19 pneumonia, see NICE's guideline on managing COVID-19.

For bacterial infection in healthy babies up to and including 28 days (corrected gestational age), see NICE's guideline on neonatal infection: antibiotics for prevention and treatment.

This guideline will update NICE guideline CG191 (published December 2014). It will also incorporate recommendations from NG138 and NG139 (published September 2019).

Who is it for?

- Healthcare professionals
- People who have suspected or confirmed pneumonia (except ventilator-associated and COVID-19 pneumonia), their families and carers

What does it include?

- the recommendations
- recommendations for research
- rationale and impact sections that explain why the committee made the 2025 recommendations and how they might affect practice
- the guideline context.

Information about how the guideline was developed is on the guideline's webpage. This includes the evidence reviews, the scope, details of the committee and any declarations of interest.

New and updated recommendations

We have reviewed the evidence on the diagnosis, assessment and treatment of community-acquired and hospital-acquired pneumonia. You are invited to comment on the new and updated recommendations. These are marked as **[2025]**.

You are also invited to comment on recommendations that we propose to delete from the 2014 guideline.

We have not reviewed the evidence for the recommendations shaded in grey, and cannot accept comments on them. In some cases, we have made minor wording changes for clarification.

See update information for a full explanation of what is being updated.

Full details of the evidence and the committee's discussion on the 2025 recommendations are in the evidence reviews. Evidence for the 2014 recommendations is in the full version of CG191. Evidence for the 2019

recommendations about community-acquired pneumonia is on the webpage for NG138. Evidence for the 2019 recommendations about hospital-acquired pneumonia is on the webpage for NG139.

1

Contents

Recommendations

People have the right to be involved in discussions and make informed decisions about their care, as described in NICE's information on making decisions about your care.

Making decisions using NICE guidelines explains how we use words to show the strength (or certainty) of our recommendations, and has information about prescribing medicines (including off-label use), professional guidelines, standards and laws (including on consent and mental capacity), and safeguarding.

Healthcare professionals should follow our general guidelines for people delivering care:

- Patient experience in adult NHS services
- Babies, children and young people's experience of healthcare
- Service user experience in adult mental health
- People's experience in adult social care services
- Shared decision making
- Medicines adherence
- Medicines optimisation
- Multimorbidity
- Transition from children's to adults' services

If sepsis is suspected, assess and manage the person in line with NICE's guideline on sepsis: recognition, diagnosis and early management.

For babies or children under 5 with fever with no obvious cause, see NICE's guideline on fever in under 5s: assessment and initial management for recommendations about diagnosing pneumonia.

1.1 First contact with NHS services, remote or in-person

1.1.1 For people aged 16 and over presenting with suspected lower respiratory tract infection, see NICE's guideline on suspected

respiratory infection in over 16s: assessment at first presentation and initial management. **[2014, amended 2023]**

1.2 Assessing community-acquired pneumonia

Assessment of adults in primary care and deciding place of care

1.2.1 If a clinical diagnosis of community-acquired pneumonia has been made, determine whether adults are at low, intermediate or high risk of death using the CRB65 scoring system (see box 1). **[2014]**

1.2.2 Use clinical judgement together with the CRB65 score (see box 1) to stratify adults with community-acquired pneumonia into those with low-, moderate- or high-severity disease. The disease severity will usually correspond to the risk of death. **[2014]**

Box 1 CRB65 score for mortality risk assessment in primary care

CRB65 score is calculated by giving 1 point for each of the following prognostic features:

- confusion (abbreviated Mental Test score 8 or less, or new disorientation in person, place or time). For guidance on delirium, see NICE's guideline on delirium.
- raised respiratory rate (30 breaths per minute or more)
- low blood pressure (diastolic 60 mmHg or less, or systolic less than 90 mmHg)
- age 65 years or more.

Adults are stratified for risk of death (within 30 days) as follows:

- 0: low risk (less than 1% mortality risk)
- 1 or 2: intermediate risk (1 to 10% mortality risk)
- 3 or 4: high risk (more than 10% mortality risk).

1.2.3 Use clinical judgement together with the CRB65 score (bearing in mind this can be affected by other factors, for example,

comorbidities or pregnancy) to inform shared decisions about place of care. Consider:

- referral to hospital for adults with a CRB65 score of 2 or more
- GP-led care, referral to hospital or hospital at home service or same day emergency care (SDEC) unit for adults with a CRB65 score of 1
- GP-led care with safety netting advice for adults with a CRB65 score of 0. **[2025]**

1.2.4 Refer adults to hospital if they have any symptoms or signs suggesting a more serious illness or condition (for example, cardiorespiratory failure or sepsis). **[2019, amended 2021]**

1.2.5 Consider referring adults with community-acquired pneumonia to hospital, or seek specialist advice, if they cannot take oral medicines (exploring locally available options for giving intravenous antibiotics at home or in the community, rather than in hospital, if this is appropriate). **[2019]**

Children and young people presenting to primary care

1.2.6 Consider referring children and young people with community-acquired pneumonia to hospital or seek specialist paediatric advice on further investigation and management. **[2019]**

Assessment of adults in hospital and deciding place of care

1.2.7 If a clinical diagnosis of community-acquired pneumonia has been made in hospital, determine whether adults are at low, intermediate or high risk of death using the CURB65 scoring system (see box 2). **[2014]**

1.2.8 Use clinical judgement together with the CURB65 score (see box 2) to stratify adults with community-acquired pneumonia into those with low-, moderate- or high-severity disease. The disease severity will usually correspond to the risk of death. **[2014]**

Box 2 CURB65 score for mortality risk assessment in hospital

CURB65 score is calculated by giving 1 point for each of the following prognostic features:

- confusion (abbreviated Mental Test score 8 or less, or new disorientation in person, place or time). For guidance on delirium, see NICE's guideline on delirium
- raised blood urea nitrogen (over 7 mmol/litre)
- raised respiratory rate (30 breaths per minute or more)
- low blood pressure (diastolic 60 mmHg or less, or systolic less than 90 mmHg)
- age 65 years or more.

Adults are stratified for risk of death as follows:

- 0 or 1: low risk (less than 3% mortality risk)
- 2: intermediate risk (3 to 15% mortality risk)
- 3 to 5: high risk (more than 15% mortality risk).

1.2.9 Use clinical judgement together with the CURB65 score (bearing in mind this can be affected by other factors, for example, comorbidities or pregnancy) to inform shared decisions about place of care. Consider:

- inpatient care for adults with a CURB65 score of 3 or more, with referral to critical care services where appropriate
- inpatient care or hospital at home service or same day emergency care (SDEC) unit for adults with a CURB65 score of 2
- discharge home, GP-led care with safety netting advice for adults with a CURB65 score of 0 or 1. **[2025]**

1.2.10 Consider early discharge to a hospital at home service for adults on an inpatient ward whose clinical condition is improving but require ongoing monitoring or treatment. **[2025]**

Shared decision-making regarding place of care

1.2.11 When considering referral to a hospital at home service or same day emergency care (SDEC) unit, make a shared decision with the person (and their family or carers, where appropriate) about the most appropriate place of care, taking into account:

- the person's preferences
- clinical risks, including any comorbidities or frailty
- the safety and suitability of their home environment
- their support network. **[2025]**

For a short explanation of why the committee made the 2025 recommendations and how they might affect practice, see the rationale and impact section on hospital at home.

Full details of the evidence and the committee's discussion are in evidence review B: hospital at home.

Prediction tools for under 18s in primary care

NICE has made a recommendation for research on prediction tools for under 18s in primary care.

For a short explanation of why the committee made no recommendations, see the rationale and impact section on prediction tools for under 18s in primary care.

Full details of the evidence and the committee's discussion are in evidence review J: prediction tools for babies, children and young people.

1.3 Assessment tools for hospital-acquired pneumonia

NICE has made a recommendation for research on assessment tools for hospital-acquired pneumonia.

For a short explanation of why the committee made no recommendations, see the rationale and impact section on assessment tools for hospital-acquired pneumonia.

Full details of the evidence and the committee's discussion are in evidence review K: early warning scores for hospital-acquired pneumonia.

1.4 Investigations in hospital

Imaging

1.4.1 Put in place processes to allow diagnosis (including chest X-ray) and treatment of community-acquired pneumonia in adults within 4 hours of presentation to hospital. **[2014]**

1.4.2 Be aware that lung ultrasound can be used in the diagnosis of pneumonia in hospital, for example:

- for rapid point-of-care diagnosis in a sick or deteriorating person
- where there is a possible alternative diagnosis, for example, heart failure
- for investigating associated complications such as pleural disease. **[2025]**

For a short explanation of why the committee made the 2025 recommendation and how it might affect practice, see the rationale and impact section on lung ultrasound.

Full details of the evidence and the committee's discussion are in evidence review A: lung ultrasound.

C-reactive protein for adults with community-acquired pneumonia on admission

1.4.3 Consider measuring a baseline C-reactive protein (CRP) in adults with community-acquired pneumonia on admission to hospital. **[2025]**

For a short explanation of why the committee made this recommendation and how it might affect practice, see the rationale and impact section on biomarkers.

Full details of the evidence and the committee's discussion are in evidence review H: biomarkers.

Microbiological tests

1.4.4 For people with hospital-acquired pneumonia, send a sample (for example, sputum sample, nasopharyngeal swab or tracheal aspirate) for microbiological testing. **[2025]**

1.4.5 Do not routinely offer microbiological tests to adults with low-severity community-acquired pneumonia or children with non-severe community-acquired pneumonia. **[2025]**

1.4.6 For adults with moderate- or high-severity community-acquired pneumonia, consider:

- blood cultures if there are additional clinical indications such as suspected sepsis (see NICE's guideline on sepsis)
- sputum cultures, taking into account the person's history of antibiotic treatment, their clinical trajectory, the presence of any comorbidities, any recent hospitalisation and the likelihood of getting a good quality sputum sample
- pneumococcal urinary antigen tests to support de-escalation to a narrower spectrum antibiotic

- legionella urinary antigen tests if the person has risk factors for legionella infection. **[2025]**

1.4.7 For children and young people with severe community-acquired pneumonia:

- consider blood cultures if there are additional clinical indications such as suspected sepsis (see NICE's guideline on sepsis) **and**
- consider sputum cultures, if possible and age appropriate, taking into account their history of antibiotic treatment, their clinical trajectory, the presence of any comorbidities, any recent hospitalisation and the likelihood of getting a good quality sputum sample
- do not routinely use urinary antigen tests. **[2025]**

For a short explanation of why the committee made the 2025 recommendations and how they might affect practice, see the rationale and impact section on microbiological tests.

Full details of the evidence and the committee's discussion are in evidence review C: microbiological tests.

1.5 Starting and reviewing antibiotics

1.5.1 Start antibiotic treatment as soon as possible after establishing a diagnosis of pneumonia, and within 4 hours (if the person has suspected sepsis, see NICE's guideline on sepsis). **[2019]**

1.5.2 Give oral antibiotics first line if the person can take oral medicines, and the severity of their condition does not require intravenous antibiotics. **[2019]**

1.5.3 If intravenous antibiotics are given, review by 48 hours and, if possible, consider switching to oral antibiotics to complete the course. **[2019]**

1.5.4 If a sample has been sent for microbiological testing:

- review the choice of antibiotic(s) when results are available **and**
- consider changing the antibiotic(s) according to results, using a narrower-spectrum antibiotic, if appropriate. **[2019]**

1.6 Antibiotic treatment for community-acquired pneumonia

Factors to take into account when offering antibiotics

1.6.1 Offer an antibiotic(s) for people with community-acquired pneumonia. When choosing an antibiotic, take account of:

- the assessment of disease severity for adults, based on clinical judgement together with the CRB65 score (see box 1) or CURB65 score (see box 2)
- the severity of symptoms or signs for children and young people, based on clinical judgement
- the risk of developing complications, for example, if the person has relevant comorbidity such as severe lung disease or immunosuppression

- local antimicrobial resistance and surveillance data (such as influenza and Mycoplasma pneumoniae infection rates)
- recent antibiotic use
- recent microbiological results, including colonisation with multidrug-resistant bacteria. **[2019]**

Choice, dosage and duration of antibiotic

1.6.2 When prescribing an antibiotic(s) for community-acquired pneumonia, see the following tables for antibiotic choice, dosage and course length:

- table 1 for adults **[2019]**
- table 2 for children and young people. **[2025]**.

1.6.3 For adults with community-acquired pneumonia, stop antibiotic treatment after 5 days unless:

- microbiological results suggest a longer course is needed **or**
- the person is not clinically stable, for example, if they have had a fever in the past 48 hours or have more than 1 of the following signs of clinical instability:
  - systolic blood pressure less than 90 mmHg
  - heart rate more than 100 beats per minute
  - respiratory rate more than 24 breaths per minute
  - arterial oxygen saturation less than 90% or partial pressure of oxygen of more than 60 mmHg in room air. **[2019]**

1.6.4 Offer a 3-day course of antibiotics for babies and children aged 3 months (corrected gestational age) to 11 years with non-severe community-acquired pneumonia without complications or

underlying disease. See recommendations 1.10.2 to 1.10.4 for information and advice for parents and carers. **[2025]**

1.6.5 Consider extending use of antibiotics beyond 3 days for babies and children aged 3 months (corrected gestational age) to 11 years if they are not clinically stable, for example, if they are in respiratory distress, or their oxygen saturation levels have not improved as expected. **[2025]**

1.6.6 For all children and young people with community-acquired pneumonia, stop antibiotic treatment after 5 days unless microbiological results suggest a longer course is needed or the child or young person is not clinically stable. **[2019, amended February 2025]**

For a short explanation of why the committee made the 2025 recommendations and how they might affect practice, see the rationale and impact section on antibiotic duration for children.

Full details of the evidence and the committee's discussion are in evidence review D: antibiotic duration.

Table 1 Antibiotics for treating community-acquired pneumonia in adults

Treatment based on disease severity and suitability	Antibiotic, dosage and course length
Low-severity disease: first-line oral antibiotic	**Amoxicillin**: 500 mg three times a day (higher doses can be used; see the BNF) for 5 days
Low-severity disease: alternative oral antibiotics for penicillin allergy or if amoxicillin unsuitable (for example, if atypical pathogens suspected)	**Doxycycline**: 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total) **Clarithromycin**: 500 mg twice a day for 5 days **Erythromycin** (in pregnancy): 500 mg four times a day for 5 days

Moderate-severity disease: first-line oral antibiotics	**Amoxicillin**: 500 mg three times a day (higher doses can be used; see the BNF) for 5 days **With (if atypical pathogens suspected)** **Clarithromycin**: 500 mg twice a day for 5 days **Or** **Erythromycin** (in pregnancy): 500 mg four times a day for 5 days
Moderate-severity disease: alternative oral antibiotics for penicillin allergy	**Doxycycline**: 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total) **Clarithromycin**: 500 mg twice a day for 5 days
High-severity disease: first-line antibiotics	**Co-amoxiclav**: 500/125 mg three times a day orally or 1.2 g three times a day intravenously for 5 days **With** **Clarithromycin**: 500 mg twice a day orally or intravenously for 5 days **Or** **Erythromycin** (in pregnancy): 500 mg four times a day orally for 5 days
High-severity disease: alternative antibiotic for penicillin allergy (consult a local microbiologist if fluoroquinolone not appropriate)	**Levofloxacin**: 500 mg twice a day orally or intravenously for 5 days See the MHRA January 2024 advice on restrictions and precautions for using fluoroquinolone antibiotics because of the risk of disabling and potentially long-lasting or irreversible side effects

Notes for table 1

See the BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and

breastfeeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics.

Table 2 Antibiotics for treating community-acquired pneumonia in babies, children and young people

Treatment based on severity of symptoms or signs and suitability	Antibiotic, dosage and course length
Non-severe symptoms or signs: first-line oral antibiotic	**Amoxicillin**: 1 month to 2 months, 125 mg three times a day for 5 days 3 months to 11 months, 125 mg three times a day for 3 days 1 year to 4 years, 250 mg three times a day for 3 days 5 years to 11 years, 500 mg three times a day for 3 days 12 years to 17 years, 500 mg three times a day for 5 days (higher doses can be used for all ages; see BNF for children)
Non-severe symptoms or signs: alternative oral antibiotics for penicillin allergy or if amoxicillin is unsuitable (for example, atypical pathogens suspected)	**Clarithromycin**: 1 month to 2 months: Under 8 kg, 7.5 mg/kg twice a day for 5 days 3 months to 11 years: Under 8 kg, 7.5 mg/kg twice a day for 3 days 8 kg to 11 kg, 62.5 mg twice a day for 3 days 12 kg to 19 kg, 125 mg twice a day for 3 days 20 kg to 29 kg, 187.5 mg twice a day for 3 days 30 kg to 40 kg, 250 mg twice a day for 3 days 12 years to 17 years: 250 mg to 500 mg twice a day for 5 days **Erythromycin** (in pregnancy): 8 years to 11 years, 250 mg to 500 mg four times a day for 3 days 12 years to 17 years, 250 mg to 500 mg four times a day for 5 days **Doxycycline**:

	12 years to 17 years, 200 mg on first day, then 100 mg once a day for 4 days (5-day course in total) See BNF for children for use of doxycycline in children under 12
Severe symptoms or signs: first-line antibiotic(s)	**Co-amoxiclav**: Oral doses: 1 month to 11 months, 0.5 ml/kg of 125/31 suspension three times a day for 5 days 1 years to 5 years, 10 ml of 125/31 suspension three times a day or 0.5 ml/kg of 125/31 suspension three times a day for 5 days (or 5 ml of 250/62 suspension) 6 years to 11 years, 10 ml of 250/62 suspension three times a day or 0.3 ml/kg of 250/62 suspension three times a day for 5 days 12 years to 17 years, 500/125 mg three times a day for 5 days Intravenous doses: 1 month to 2 months, 30 mg/kg twice a day 3 months to 17 years, 30 mg/kg three times a day (maximum 1.2 g per dose three times a day) **With (if atypical pathogen suspected)** **Clarithromycin**: Oral doses: 1 month to 11 years: Under 8 kg, 7.5 mg/kg twice a day for 5 days 8 kg to 11 kg, 62.5 mg twice a day for 5 days 12 kg to 19 kg, 125 mg twice a day for 5 days 20 kg to 29 kg, 187.5 mg twice a day for 5 days 30 kg to 40 kg, 250 mg twice a day for 5 days 12 years to 17 years: 250 mg to 500 mg twice a day for 5 days Intravenous doses: 1 month to 11 years, 7.5 mg/kg twice a day (maximum 500 mg per dose) 12 years to 17 years, 500 mg twice a day **Or** **Erythromycin** (in pregnancy): 8 years to 17 years, 250 mg to 500 mg four times a day orally for 5 days
Severe symptoms or signs: alternative	Consult local microbiologist

antibiotics for penicillin allergy	

Notes for table 2

See the BNF for children for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breastfeeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics.

The age bands apply to children of average size and, in practice, the prescriber will use the age bands in conjunction with other factors such as the severity of the condition being treated and the child's size in relation to the average size of children of the same age.

Notes for tables 1 and 2

Mycoplasma pneumoniae infection occurs in outbreaks approximately every 4 years and is more common in school-aged children.

Erythromycin is preferred if a macrolide is needed in pregnancy, for example, if there is true penicillin allergy and the benefits of antibiotic treatment outweigh the harms. See the Medicines and Healthcare products Regulatory Agency (MHRA) Public Assessment Report on the safety of macrolide antibiotics in pregnancy.

Safe discharge from hospital

1.6.7 Do not routinely discharge adults with community-acquired pneumonia if in the past 24 hours they have had 2 or more of the following findings:

- temperature more than 37.5°C
- respiratory rate 24 breaths per minute or more
- heart rate more than 100 beats per minute
- systolic blood pressure 90 mmHg or less
- oxygen saturation less than 90% on room air
- abnormal mental status
- inability to eat without assistance. **[2014]**

1.7 Antibiotic treatment for hospital-acquired pneumonia

Factors to take into account when offering antibiotics

1.7.1 For people with symptoms or signs of pneumonia starting within 48 hours of hospital admission, follow the section on antibiotic treatment for community-acquired pneumonia. **[2019]**

1.7.2 Offer an antibiotic(s) for people with hospital-acquired pneumonia. When choosing an antibiotic(s), take account of:

- disease severity (based on clinical judgement)
- the number of days in hospital before onset of symptoms
- the risk of developing complications, for example, if the person has a relevant comorbidity such as severe lung disease or immunosuppression
- local hospital and ward-based antimicrobial resistance data
- recent antibiotic use
- recent microbiological results, including colonisation with multidrug-resistant bacteria
- recent contact with a health or social care setting before current admission

- the risk of adverse effects with broad-spectrum antibiotics, such as *Clostridium difficile* infection. **[2019]**

Choice, duration and dose of antibiotic

1.7.3 When prescribing an antibiotic(s) for hospital-acquired pneumonia, see the following tables for antibiotic choice, dosage and course length:

- table 3 for adults
- table 4 for children and young people. **[2019]**

1.7.4 Consider following the antibiotic recommendations (recommendation 1.6.2) for community-acquired pneumonia for people with symptoms or signs of pneumonia starting within days 3 to 5 of hospital admission who are not at higher risk of resistance. Higher risk of resistance includes relevant comorbidity (such as severe lung disease or immunosuppression), recent use of broad-spectrum antibiotics, colonisation with multidrug-resistant bacteria, and recent contact with health and social care settings before current admission. **[2019]**

1.7.5 For hospital-acquired pneumonia, review treatment after a total of 5 days of antibiotics and consider stopping antibiotics if clinically stable. **[2019]**

Table 3 Antibiotics for treating hospital-acquired pneumonia in adults

Treatment based on severity of symptoms or signs, risk of resistance and suitability	**Antibiotic, dosage and course length**
Non-severe symptoms or signs and not at higher risk of resistance: first-line oral antibiotic	**Co-amoxiclav**: 500/125 mg three times a day for 5 days then review
Non-severe symptoms or signs and not at higher risk of	**Options include:** **Doxycycline**:

resistance: alternative oral antibiotics for penicillin allergy or if co-amoxiclav unsuitable (antibiotic choice should be based on specialist microbiological advice and local resistance data)	200 mg on first day, then 100 mg once a day for 4 days (5-day course) then review **Cefalexin** (caution in penicillin allergy): 500 mg twice or three times a day (can be increased to 1 g to 1.5 g three or four times a day) for 5 days then review **Co-trimoxazole** (off-label use): 960 mg twice a day for 5 days then review (see BNF for information on monitoring) **Levofloxacin** (**only if** other first-line antibiotics are unsuitable; off-label use): 500 mg once or twice a day for 5 days then review See the MHRA January 2024 advice on restrictions and precautions for using fluoroquinolone antibiotics because of the risk of disabling and potentially long-lasting or irreversible side effects. Fluoroquinolones must now only be prescribed when other commonly recommended antibiotics are inappropriate
Severe symptoms or signs (for example, symptoms or signs of sepsis) **or at higher risk of resistance: first-line intravenous antibiotics** (antibiotic choice should be based on specialist microbiological advice and local resistance data)	**Options include:** **Piperacillin with tazobactam**: 4.5 g three times a day (increased to 4.5 g four times a day if severe infection) **Ceftazidime**: 2 g three times a day **Ceftriaxone**: 2 g once a day **Cefuroxime**: 750 mg three times a day (increased to 750 mg four times a day or 1.5 g three or four times a day if severe infection) **[2019 amended October 2020]** **Meropenem**: 0.5 g to 1 g three times a day **Ceftazidime with avibactam**: 2/0.5 g three times a day

	Levofloxacin (**only if** other first-line antibiotics are unsuitable; off-label use): 500 mg once or twice a day (use higher dosage if severe infection) See the MHRA January 2024 advice on restrictions and precautions for using fluoroquinolone antibiotics because of the risk of disabling and potentially long-lasting or irreversible side effects. Fluoroquinolones must now only be prescribed when other commonly recommended antibiotics are inappropriate
Suspected or confirmed methicillin-resistant Staphylococcus aureus infection: dual therapy with a first-line intravenous antibiotic	**Vancomycin**: 15 mg/kg to 20 mg/kg two or three times a day intravenously, adjusted according to serum vancomycin concentration (a loading dose of 25 mg/kg to 30 mg/kg can be used in seriously ill people); maximum 2 g per dose (see BNF for information on monitoring) **Teicoplanin**: Initially 6 mg/kg every 12 hours for 3 doses, then 6 mg/kg once a day intravenously (see BNF for information on monitoring) **Linezolid** (if vancomycin cannot be used; specialist advice only): 600 mg twice a day orally or intravenously (see BNF for information on monitoring)

Notes for table 3

See the BNF for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breastfeeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics.

Table 4 Antibiotics for treating hospital-acquired pneumonia in babies aged 1 month and over, children and young people

Treatment based on severity of symptoms or	Antibiotic, dosage and course length

signs, risk of resistance and suitability	
Non-severe symptoms or signs and not at higher risk of resistance: first-line oral antibiotic	**Co-amoxiclav**: 1 month to 11 months, 0.5 ml/kg of 125/31 suspension three times a day for 5 days, then review 1 year to 5 years, 10 ml of 125/31 suspension (or 5 ml of 250/62 suspension) three times a day, or 0.5 ml/kg of 125/31 suspension three times a day for 5 days, then review 6 years to 11 years, 10 ml of 250/62 suspension three times a day or 0.3 ml/kg of 250/62 suspension three times a day for 5 days, then review 12 years to 17 years, 500/125 mg three times a day for 5 days, then review
Non-severe symptoms or signs and not at higher risk of resistance: alternative oral antibiotic for penicillin allergy or if co-amoxiclav unsuitable (other options may be suitable based on specialist microbiological advice and local resistance data)	**Clarithromycin**: 1 month to 11 years: Under 8 kg, 7.5 mg/kg twice a day for 5 days, then review 8 kg to 11 kg, 62.5 mg twice a day for 5 days, then review 12 kg to 19 kg, 125 mg twice a day for 5 days, then review 20 kg to 29 kg, 187.5 mg twice a day for 5 days, then review 30 kg to 40 kg, 250 mg twice a day for 5 days, then review 12 years to 17 years, 500 mg twice a day for 5 days, then review
Severe symptoms or signs (for example, symptoms or signs of sepsis) **or at higher risk of resistance: first-line intravenous antibiotics** (antibiotic choice should be based on specialist microbiological advice and local resistance data)	**Options include**: **Piperacillin with tazobactam**: 1 month to 11 years, 90 mg/kg three or four times a day (maximum 4.5 g per dose four times a day) 12 years to 17 years, 4.5 g three times a day (increased to 4.5 g four times a day if severe infection) **Ceftazidime**: 1 month to 17 years, 25 mg/kg three times a day (50 mg/kg three times a day if severe infection; maximum 6 g per day)

	Ceftriaxone: 1 month to 11 years (up to 50 kg), 50 mg/kg to 80 mg/kg once a day (use dose at higher end of range if severe infection; maximum 4 g per day) 9 years to 11 years (50 kg and above), 2 g once a day 12 years to 17 years, 2 g once a day

1

Suspected or confirmed methicillin-resistant Staphylococcus aureus infection: dual therapy with a first-line intravenous antibiotic	**Teicoplanin**: 1 month, initially 16 mg/kg for 1 dose, then 8 mg/kg once daily, subsequent dose to be given 24 hours after initial dose (doses given by intravenous infusion) 2 months to 11 years, initially 10 mg/kg every 12 hours intravenously for 3 doses, then 6 mg/kg to 10 mg/kg once daily intravenously 12 years to 17 years, initially 6 mg/kg every 12 hours intravenously for 3 doses, then 6 mg/kg once daily intravenously (see BNF for children for information on monitoring) **Vancomycin**: 1 month to 11 years, 10 mg/kg to 15 mg/kg four times a day intravenously, adjusted according to serum-vancomycin concentration 12 years to 17 years, 15 mg/kg to 20 mg/kg two or three times a day intravenously, adjusted according to serum vancomycin concentration (a loading dose of 25 mg/kg to 30 mg/kg can be used in seriously ill people); maximum 2 g per dose (see BNF for children for information on monitoring) **Linezolid** (if vancomycin cannot be used; off-label use; specialist advice only): 3 months to 11 years, 10 mg/kg three times a day orally or intravenously (maximum 600 mg per dose) 12 years to 17 years, 600 mg twice a day orally or intravenously (see BNF for children for information on monitoring)

2

Notes for table 4

See the BNF for children for appropriate use and dosing in specific populations, for example, hepatic impairment, renal impairment, pregnancy and breastfeeding, and administering intravenous (or, where appropriate, intramuscular) antibiotics.

The age bands apply to children of average size and, in practice, the prescriber will use the age bands in conjunction with other factors such as the severity of the condition being treated and the child's size in relation to the average size of children of the same age.

Notes for tables 3 and 4

Higher risk of resistance includes symptoms or signs starting more than 5 days after hospital admission, relevant comorbidity such as severe lung disease or immunosuppression, recent use of broad-spectrum antibiotics, colonisation with multidrug-resistant bacteria, and recent contact with a health or social care setting before current admission.

For off-label use, the prescriber should follow relevant professional guidance, taking full responsibility for the decision. Informed consent should be obtained and documented. See the General Medical Council's good practice in prescribing and managing medicines and devices for further information.

1.8 Corticosteroid treatment in hospital

1.8.1 For adults with high severity community-acquired pneumonia in hospital, offer a corticosteroid, in addition to antibiotics, for 4 to 7 days or until discharge, if sooner. **[2025]**

1.8.2 When choosing a corticosteroid, consider starting treatment with IV hydrocortisone. If hydrocortisone is not suitable, consider an

alternative corticosteroid such as dexamethasone. **[2025]**

Note: Not all treatments are licensed for this indication, so use would be off label.

Note: the Medicines and Healthcare products Regulatory Agency (MHRA) advice for restrictions and precautions on the coadministration of fluoroquinolone antibiotics and corticosteroids.

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on corticosteroids.

Full details of the evidence and the committee's discussion are in evidence review E: corticosteroids.

1.9 Non-invasive respiratory support

1.9.1 For people with respiratory failure in whom standard oxygen therapy is insufficient to meet target saturation levels, consider a trial of high flow nasal oxygen, based on multidisciplinary consensus, clinical trajectory and the person's preferences and ability to tolerate it. **[2025]**

1.9.2 When deciding the best location in the hospital for delivering non-invasive respiratory support, take into account:

- any advanced directives or established treatment escalation plan **and**
- the person's clinical trajectory **and**
- the risk of failure and potential need for invasive mechanical ventilation. **[2025]**

1.9.3 Be aware that people with certain co-existing conditions may benefit from a trial of non-invasive ventilation or continuous positive airways pressure. **[2025]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on non-invasive respiratory support.

Full details of the evidence and the committee's discussion are in evidence review F: non-invasive ventilation.

1.10 Information about treatment and recovery for community-acquired pneumonia

1.10.1 Explain to adults with community-acquired pneumonia that after starting treatment their symptoms should steadily improve, although the rate of improvement will vary with the severity of the pneumonia. Most adults can expect that by:

- 1 week: fever should have resolved
- 4 weeks: chest pain and sputum production should have substantially reduced
- 6 weeks: cough and breathlessness should have substantially reduced
- 3 months: most symptoms should have resolved but fatigue may still be present
- 6 months: they will feel back to normal. **[2014]**

1.10.2 Explain to parents or carers of children with community-acquired pneumonia that after starting treatment their child's symptoms should steadily improve, although the rate of improvement will vary

with the severity of the pneumonia and some symptoms will persist after stopping antibiotics. For most children:

- fever (without use of antipyretics) and difficulty breathing should have resolved within 3 to 4 days
- cough should gradually improve but may persist for up to 4 weeks after discharge and does not usually require further review if the child is otherwise well. **[2025]**

1.10.3 Give advice to people with community-acquired pneumonia (or their parents or carers, if appropriate) about:

- possible adverse effects of the antibiotic(s)
- seeking further advice (if the person is receiving treatment in the community or via hospital at home) if:
  - symptoms worsen rapidly or significantly **or**
  - symptoms do not start to improve within 3 days **or**
- the person becomes systemically unwell. **[2019, amended 2025]**

1.10.4 Advise parents or carers of children with community-acquired pneumonia to seek further advice if there is persisting fever combined with:

- increased work of breathing **or**
- reduced fluid intake for children or poor feeding for infants **or**
- unresolving fatigue. **[2025]**

For a short explanation of why the committee made the 2025 recommendations and how they might affect practice, see the rationale and impact section on information for parents or carers of children with community-acquired pneumonia.

Full details of the evidence and the committee's discussion are in evidence review G: patient information.

1.11 Reassessment

When to reassess

1.11.1 Reassess people with pneumonia if symptoms or signs do not improve as expected or worsen rapidly or significantly. **[2019]**

Community-acquired pneumonia

1.11.2 When reassessing people with community-acquired pneumonia, be aware of possible non-bacterial causes, such as influenza. **[2019]**

1.11.3 Refer adults with community-acquired pneumonia to hospital if they have symptoms that are not improving as expected with antibiotics. **[2019 amended 2021]**

1.11.4 Consider referring adults with community-acquired pneumonia to hospital, or seek specialist advice, if microbiological samples have identified bacteria that are resistant to oral antibiotics. **[2019]**

1.11.5 Send a sample (for example, a sputum sample) for microbiological testing if symptoms or signs have not improved following antibiotic treatment, and this has not been done already. **[2019]**

Hospital-acquired pneumonia

1.11.6 Seek specialist advice from a microbiologist for people with hospital-acquired pneumonia if they have:

- symptoms that are not improving as expected with antibiotics **or**
- multidrug-resistant bacteria. **[2019]**

Use of biomarkers after starting treatment

1.11.7 For people in hospital with pneumonia, consider measuring C-reactive protein (CRP) or procalcitonin (PCT) 3 or 4 days after

starting treatment if there is clinical concern about treatment failure. **[2025]**

1.11.8 Be aware that high levels of CRP or PCT, or levels that do not significantly improve with treatment, are associated with treatment failure and the person may need senior clinical review. **[2025]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on biomarkers.

Full details of the evidence and the committee's discussion are in evidence review H: biomarkers.

1.12 Follow-up chest X-rays

1.12.1 Do not routinely offer follow-up chest X-rays to people discharged from inpatient care after an episode of pneumonia. **[2025]**

1.12.2 Consider follow-up chest X-rays at 6 weeks following discharge for people with:

- risk factors for lung cancer or other underlying respiratory disease, for example, people who smoke or are over 50 years **or**
- persisting or deteriorating symptoms **or**
- unexplained weight loss. **[2025]**

1.12.3 If a follow-up chest X-ray is being considered, make a shared decision with the person taking into account:

- any recent imaging
- the presence of any comorbidities or frailty
- the person's prognosis and treatment options
- their preferences. **[2025]**

For a short explanation of why the committee made these recommendations and how they might affect practice, see the rationale and impact section on follow-up chest X-rays.

Full details of the evidence and the committee's discussion are in evidence review I: chest X-ray.

Terms used in this guideline

Assessment of disease severity of community-acquired pneumonia in adults

A judgement by the managing clinician as to the likelihood of adverse outcomes in a person. This is based on a combination of clinical understanding and knowledge in addition to a mortality risk score. The difference between categories of severity and mortality risk can be important. Typically, the mortality risk score will match the severity assessment. However, there may be situations where the mortality score does not accurately predict mortality risk and clinical judgement is needed. An example might be a person with a low mortality risk score who has an unusually low oxygen level, pleural complications or multiple comorbidities who would be considered to have a severe illness.

Clinical diagnosis of community-acquired pneumonia

Diagnosis based on symptoms and signs of lower respiratory tract infection in a patient who, in the opinion of the healthcare professional and in the absence of a chest X-ray, is likely to have community-acquired pneumonia. This might be because of the presence of focal chest signs, illness severity or other features.

Community-acquired pneumonia

Pneumonia that is acquired outside hospital, or within 48 hours of admission. Pneumonia that develops in a nursing home resident is included in this

definition. When managed in hospital the diagnosis is usually confirmed by chest X-ray.

Hospital-acquired pneumonia

Pneumonia that develops 48 hours or more after hospital admission and that was not incubating at hospital admission, or patients who present to hospital with pneumonia but who have been discharged within the last 7-10 days. When managed in hospital, the diagnosis is usually confirmed by chest Xray. For the purpose of this guideline, ventilator associated pneumonia is excluded from the definition (this is pneumonia that occurs in someone on mechanical ventilation 48 hours or more after intubation).

Lower respiratory tract infection

An acute illness (present for 21 days or less), usually with cough as the main symptom, and with at least 1 other lower respiratory tract symptom (such as fever, sputum production, breathlessness, wheeze or chest discomfort or pain) and no alternative explanation (such as sinusitis or asthma). Pneumonia, acute bronchitis and exacerbation of chronic obstructive airways disease are included in this definition.

Pneumonia

Pneumonia refers to both community-acquired pneumonia and hospital-acquired pneumonia.

Severe community-acquired pneumonia in children and young people

Severe community acquired pneumonia in babies, children and young people is a diagnosis made by the treating physician. Features of this may include difficulty breathing, oxygen saturation less than 90% (percutaneous oxygen saturation monitors may be in accurate in people with pigmented skin), raised heart rate, grunting, severe chest indrawing, inability to breastfeed or drink, lethargy and a reduced level of consciousness.

Same day emergency care (SDEC)

Patients are well enough and ambulatory enough to attend hospital each day and have a review in a rapid clinic setting. More suitable for younger people who are more mobile and can easily attend clinics.

Recommendations for research

Key recommendations for research

1 Microbiological tests

Which microbiological test, or group of tests, can aid decision making around safely reducing inappropriate antibiotic prescribing in people with suspected pneumonia, community or hospital-acquired?

For a short explanation of why the committee made this recommendation for research, see the rationale and impact section on microbiological tests

Full details of the evidence and the committee's discussion are in evidence review C: microbiological tests.

2 Follow-up chest imaging

What is the clinical and cost-effectiveness of follow-up chest imaging (chest X-ray) for adults discharged from hospital after treatment for pneumonia? Which people should be offered follow-up chest imaging and when should it be done?

For a short explanation of why the committee made this recommendation for research, see the rationale and impact section on follow-up chest imaging

Full details of the evidence and the committee's discussion are in evidence review I: chest X-ray.

3 Adjunctive corticosteroids

In people hospitalised with community-acquired pneumonia (CAP) or hospital acquired pneumonia (HAP), what is the most effective and cost-effective corticosteroid treatment (as an adjunct to antibiotics), including dose, duration, and route of administration, and does the pathogen involved have an impact on efficacy?

For a short explanation of why the committee made this recommendation for research, see the rationale and impact section on corticosteroids

Full details of the evidence and the committee's discussion are in evidence review E: corticosteroids.

4 Prediction tools for under 18s in primary care

In children and young people presenting to primary care with signs and symptoms of pneumonia, what is the most accurate and cost-effective clinical prediction tool to identify under 18s who require referral to secondary care for assessment, treatment and admission?

For a short explanation of why the committee made this recommendation for research, see the rationale and impact section on prediction tools for under 18s in primary care.

Full details of the evidence and the committee's discussion are in evidence review J: prediction tools for under 18s in primary care.

5 Assessment tools for hospital-acquired pneumonia

In people with hospital-acquired pneumonia, what is the most clinically effective and cost-effective assessment tool or method for stratifying disease severity?

For a short explanation of why the committee made this recommendation for research, see the rationale and impact section on assessment tools for hospital-acquired pneumonia.

Full details of the evidence and the committee's discussion are in evidence review K: early warning scores.

Rationale and impact

These sections briefly explain why the committee made the recommendations and how they might affect practice.

Hospital at home

Recommendations 1.2.3 and 1.2.9 to 1.2.11

Why the committee made the recommendations

The evidence compared home-based care with inpatient care for people with low- to moderate-severity community-acquired pneumonia. The committee agreed that home-based care covers a variety of different care models, such as hospital at home, virtual wards and same day emergency care units. They noted that the evidence was limited to hospital at home models but agreed that the findings could be extrapolated to other types of home-based care. It was noted that 'hospital at home' is used as an umbrella term to include virtual wards and other models of home-based care, so this terminology was used in the recommendations.

The studies were small, had methodological limitations and included participants not considered to be representative of those who would potentially use virtual wards in practice. It showed that people treated at home tended to do no worse than people treated as inpatients in hospital in terms of hospital readmission, antibiotic duration, symptom improvement and adverse events. There was insufficient evidence to determine the impact of home-based care on mortality or length of stay.

People treated at home were more satisfied with the quality and location of their care. The committee agreed other potential benefits of home-based care such as avoiding deconditioning, reducing the risk of hospital-acquired infection, freeing up hospital beds and reducing demand on acute inpatient services. They noted that home-based care could help avoid hospital admission for people attending primary care or emergency departments.

The committee discussed the existing recommendations on using CBR65 or CURB65 scores, together with clinical judgement, to inform decisions about place of care. They also identified a list of factors that would need to be discussed with the person when making a shared decision about using these models of care. They noted that family and carers should be consulted, where appropriate, for example, if they will be involved in supporting the person at home.

There was no evidence for children, so the committee was not able to make any recommendations about hospital at home for children and young people.

How the recommendations might affect practice

Most trusts now have established hospital at home services, so where those services already exist, the recommendations are likely to have a positive impact on reducing hospital admissions and length of hospital stay. This would reduce pressure on hospital inpatient care and potentially free up beds for more severely unwell patients who require hospital admission. Early discharge of people who are improving could also improve inpatient capacity.

Return to recommendations

Prediction tools for under 18s in primary care

Why the committee made the recommendation for research

The evidence was reviewed on risk assessment tools and clinical prediction tools for identifying children and young people attending primary care who may be at risk of deterioration. Recommendations were unable to be developed in this area.

Many children and young people presenting to primary care with respiratory tract infection symptoms will not require antibiotics and can be safely cared for at home. A small number can deteriorate and require secondary care. Identifying those most at risk is important to ensure quick and appropriate referral as well as preventing over-referral to secondary care, so the committee made a recommendation for research on prediction tools for assessing under 18s in primary care with suspected pneumonia.

Assessment tools for hospital-acquired pneumonia

Why the committee made the recommendation for research

The evidence was reviewed on the prognostic accuracy of the national early warning score 2 (NEWS2) and paediatric early warning system (PEWS) for people with pneumonia. Recommendations were unable to be developed in this area.

The committee noted that CURB65 is a validated tool that can be used, alongside clinical judgement, to assess the severity of community-acquired pneumonia in hospital. The committee made a recommendation for research to identify or develop tools or methods for stratifying people with hospital-acquired pneumonia according to disease severity. This could include validating an existing model.

Lung ultrasound

Recommendation 1.4.2

Why the committee made the recommendation

Evidence showed that lung ultrasound is a good diagnostic tool for people with suspected community-acquired pneumonia, showing high accuracy for both ruling in and ruling out the diagnosis in symptomatic people. The accuracy of lung ultrasound did not depend on the setting within the hospital where it was used.

The committee discussed the benefits of lung ultrasound compared to chest X-ray, particularly that it avoids radiation exposure and can be used to rapidly consider diagnosis of pneumonia and promptly start antibiotic treatment if pneumonia is confirmed. Lung ultrasound can be performed at the bedside or point-of-care during other clinical examinations, which in some situations may be more efficient and less time-consuming than transporting someone to the X-ray department and subsequently accessing the images. As such the committee agreed lung ultrasound may be particularly helpful when assessing a sick or deteriorating person with suspected pneumonia or where several possible causes are being considered for the presenting symptoms.

Lung ultrasound can take longer to perform than chest X-ray and it can be more difficult to visualise the entire lungs, particularly in people who are lying down or in unwell children who are not able to sit still for the time required to complete the examination. Chest X-ray may detect other potential illnesses or problems with the lungs, such as tumours or mediastinal abnormalities. The committee was also concerned about storage and audit of lung ultrasound images and the current lack of trained operators with sufficient experience to perform diagnostic lung ultrasound for pneumonia.

The committee agreed that lung ultrasound can be used for those with suspected pneumonia and gave some examples of how it might be used.

How the recommendation might affect practice

The recommendations may increase the use of lung ultrasound beyond current levels, particularly point-of-care use in emergency departments or critical care areas to help confirm diagnosis of community-acquired pneumonia and promptly start antibiotic treatment. This may mean a quicker diagnosis, starting treatment earlier and enable assessment of complications.

In cases where lung ultrasound clearly supports a diagnosis of pneumonia, it may reduce the need for a chest X-ray or CT, although in cases where a diagnosis cannot be confirmed using lung ultrasound, further chest imaging

will still be required. This has the potential to increase resource use although this is not anticipated.

To respond to the potential increased use of lung ultrasound, more clinicians will require training and accreditation in this procedure and time to build up experience of this imaging method, which is potentially an implementation issue.

Return to recommendation

Biomarkers

Recommendations 1.4.3 and 1.11.7 to 1.11.8

Why the committee made the recommendations

The evidence showed a link between elevated biomarker levels (C-reactive protein (CRP), procalcitonin (PCT) and neutrophil to lymphocyte ratio (NLR)) and adverse outcomes in people with pneumonia. The evidence also showed that people treated for pneumonia in hospital whose CRP, PCT or NLR levels remained high or increased between admission and day 3 or 4 were more likely to experience adverse clinical outcomes than people whose biomarkers decreased. Though NLR showed a similar pattern of findings, there was less evidence on NLR than CRP or PCT, it is not routinely used (despite being easily obtained through routine blood samples) and so the committee agreed to focus on the use of CRP and PCT.

The committee considered extending the existing recommendation on measuring CRP on admission to hospital to also include PCT, but they concluded that adding PCT would not give substantially more information than CRP alone so this would be an unnecessary extra test. There was insufficient evidence to support a switch from routine CRP testing on admission to routine PCT testing on admission, and this would be a significant change in practice without clear justification.

The committee agreed that CRP or PCT should be measured 3 to 4 days after starting treatment where there is concern about treatment failure. This will

allow clinicians to monitor the person's CRP or PCT levels at this time and any changes to their levels if a baseline level has been taken. Low or decreasing levels may help to rule out complications or poor prognosis, while levels that remain high may help to identify when senior clinical review is needed. The committee noted that CRP levels that fail to halve in 3 days are a cause for concern. They agreed that people who are responding well to treatment and whose clinical condition is improving are unlikely to need follow-up biomarker testing.

Additional evidence compared antibiotic treatment using a PCT-guided algorithm with standard antibiotic treatment and showed that people treated using the PCT-guided approach took antibiotics for a shorter time and experienced fewer side effects. The reduction in duration of antibiotic treatment did not affect rates of pneumonia recurrence, re-hospitalisation, intensive care unit (ICU) admission or mortality. However, the committee was concerned that the average standard duration of antibiotic treatment used in the trials of 10 to 12 days was much longer than UK current recommended practice of 5 days. Furthermore, the trials did not give the committee any information on whether it was safe or effective to use PCT levels to reduce antibiotic treatment below 5 days, so they were not able to make a recommendation about this.

There was no evidence linking biomarkers to other aspects of de-escalating care such as discharge from ICU or discharge home, so the committee was unable to make any recommendations about these aspects of care for people with pneumonia.

How the recommendations might affect practice

The recommendations could increase the use of CRP and PCT testing in people in hospital with pneumonia who are not responding to treatment after 3 or 4 days, but this could help to identify complications or allow clinicians to amend the treatment plan to be more effective. CRP and to a lesser extent PCT testing is widely available in most hospitals so although there may be an increase in testing, it would not require significant changes in procedures.

Return to recommendations

Microbiological tests

Recommendations 1.4.4 to 1.4.7

Why the committee made the recommendations

The existing recommendation to not routinely offer microbiological tests to adults with low-severity community-acquired pneumonia was deemed to be appropriate and reflect current practice, so the committee chose to retain it. They agreed to add children with non-severe community-acquired pneumonia to this recommendation.

Noting the lack of evidence identified in this area, the committee discussed when to consider blood cultures for adults and children with severe community-acquired pneumonia if there are additional clinical indications such as suspected sepsis. Where sepsis is suspected, clinicians are advised to follow the NICE guideline on sepsis. No evidence was identified for hospital-acquired pneumonia. The committee noted the existing recommendation on sending microbiological samples for those with hospital-acquired pneumonia. They noted that this would mean a difference in the approaches for community-acquired pneumonia and hospital-acquired pneumonia but agreed that possible differing microbiology findings for community-acquired pneumonia and hospital-acquired pneumonia makes differences in the approaches reasonable.

Noting the lack of evidence identified in this area, and the existing recommendations, the committee discussed and agreed a recommendation to consider sputum culture for adults, and for children if age appropriate as they acknowledged that sputum samples from younger children may be difficult to obtain.

The committee agreed that legionella infection is a relatively rare cause of pneumonia. It is mostly seen in people who have been exposed to stagnant water. Exposure to legionella can also occur at the workplace, for example

among people who frequently work on air conditioning units. Therefore, they recommended that legionella urinary antigen tests should only be considered if there are risk factors for legionella infection.

For adults assessed via clinical judgement and CURB65 score as having moderate- or high-severity community-acquired pneumonia there was evidence to support the use of pneumococcal urinary antigen tests to support decision-making around the selection of the most appropriate antibiotic. This will benefit patients, contribute to reducing antimicrobial resistance and would support de-escalation to a narrower antibiotic spectrum.

The evidence on pneumococcal urinary antigen tests for babies and children was very limited and mostly not directly applicable to the UK. Based on their expertise, the committee discussed the implications in using urinary antigen tests in babies and children. They made a consensus recommendation not to routinely use these tests for this population as, in their experience, they are not useful in practice.

The committee acknowledged that overuse of antibiotics is associated with antimicrobial resistance and is a national and global priority. However, the evidence on how microbiological tests, including blood and sputum cultures may help reduce rates of empirical prescribing and support more directed antibiotic therapy remains limited. Therefore, they made a recommendation for research into which tests could safely reduce inappropriate antibiotic prescribing in people with suspected pneumonia.

How the recommendations might affect practice

Blood and sputum cultures and urinary antigen tests were previously recommended and therefore will not require additional resource to implement. Therefore, the new recommendations have the potential to reduce the number of these cultures taken, potentially leading to cost-savings for the NHS. Overall, streamlining the testing process to only using urinary antigen tests where needed, is likely to be cost saving strategy without detrimental impact on patient outcomes.

Similarly, urinary antigen tests are occasionally used in babies and children. With the new recommendation, their use will potentially decrease, leading to fewer negative outcomes and potential cost savings for the NHS.

Return to recommendations

Antibiotic duration for children

Recommendations 1.6.4 to 1.6.5

Why the committee made the recommendations

There was evidence that for babies and children (up to 11) with community-acquired pneumonia, a 3-day course of antibiotics was as effective as a 5-day course. There were overall limitations to the evidence found, particularly around the applicability of the populations included, with only 1 UK-based study identified. A difference was not identified in the adverse effects outcomes between the shorter or longer duration courses, this included with the frequency of readmission for further antibiotics. The committee discussed the lower age and agreed that for a child under 3 months they would have concerns about reducing the duration of antibiotics and agreed to keep this as 5 days for this age group. The committee further noted that shorter courses of antibiotics are important as part of antimicrobial stewardship.

The committee discussed that antibiotics are usually less effective or may be ineffective in children with a cough or lower respiratory tract infection not caused by pneumonia, so it is important that the diagnosis is community-acquired pneumonia.

The committee noted that not all community-acquired pneumonia resolves as expected, and longer courses of antibiotics may be needed in some babies and children. This should be guided by clinical judgement.

Symptoms of pneumonia can last a long time and having symptoms after stopping antibiotics does not mean that the antibiotics have not worked. The committee agreed that this was an important point to convey to parents and carers, this is reflected in the recommendations in this area.

How the recommendations might affect practice

The recommendations will reduce duration of antibiotic use for treating community-acquired pneumonia in babies and children. They should contribute to antimicrobial stewardship aims.

Return to recommendations

Corticosteroids

Recommendations 1.8.1 to 1.8.2

Why the committee made the recommendations

The evidence on use of antibiotics plus corticosteroids, compared to antibiotics alone, for treating community-acquired pneumonia in adults showed it reduced mortality rates and time spent in hospital and ICU, particularly for adults with high severity pneumonia.

The evidence showed an increased risk of hyperglycaemia with use of corticosteroids and, for less severe pneumonia, an increase in the risk of secondary infections. The committee noted that these risks are not specific to pneumonia but are amongst the known side effects of corticosteroids. They concluded that benefit in terms of reduced mortality outweighed the risk of adverse effects for people with high severity pneumonia, but not for low and moderate severity pneumonia. The evidence suggested that intravenous hydrocortisone may be more effective than other corticosteroids, though a direct comparison was not available. The committee discussed this and agreed that a recommendation without any indication of the type of steroid to use would not be helpful to clinicians and therefore made an additional recommendation to consider starting treatment with hydrocortisone, based on the available evidence, ability to prescribe intravenously and potential issues with oral administration in patients with severe illness.

There was a study in the evidence for children, this study did not report the main outcomes of interest, except for adverse events. The committee reflected on the evidence for the use of corticosteroids in adults and

discussed the implications of any extrapolation to children. However, given the weak evidence base and limited applicability of the included trials, the committee agreed that this did not currently support a recommendation on the use of corticosteroids for children with pneumonia.

The committee agreed that further research was needed on of adjunctive corticosteroids antibiotics in people hospitalised with community-acquired pneumonia or hospital-acquired pneumonia including for babies, children and young people. They made a recommendation for research on the effectiveness of corticosteroids including which type, dose and route of administration is most effective and whether effectiveness varied depending on the type of pathogen being treated.

How the recommendations might affect practice

The evidence suggests use of corticosteroids is likely to improve outcomes for adults with community-acquired pneumonia. The additional use of corticosteroids incurs a small cost, but this is likely to be outweighed by the potential benefits such as reduced stay in ICU or overall time spent in hospital, freeing up resources and service capacity.

Return to recommendations

Non-invasive respiratory support

Recommendations 1.9.1 to 1.9.3

Why the committee made the recommendations

The evidence on use of high flow nasal oxygen, continuous positive airways pressure (CPAP) and non-invasive ventilation (NIV) compared to standard oxygen therapy for people with pneumonia was limited. The committee noted that the populations studied were small and only partially applicable with not all participants having pneumonia. They also noted the evidence showed lack of adverse effects and no impact on mortality at 30 days.

Based on the evidence and their expertise and experience, the committee agreed that high flow nasal oxygen was their preferred option because it is

less invasive and better tolerated than NIV and CPAP, has fewer safety concerns, and allows the person to eat and drink.

The committee also agreed the importance of considering the person's clinical trajectory in multidisciplinary team decisions about trialling high flow nasal oxygen. Lay members emphasised the importance of respecting people's preferences, describing the discomfort of CPAP compared to high flow nasal oxygen.

The ability of different locations within the hospital to deliver CPAP or non-invasive ventilation was discussed, and a number of factors were identified that should be taken into account when making decisions around this, including the possible need for escalation of care.

The committee agreed that some people with pneumonia and a co-existing condition, such as type 2 respiratory failure in a person with chronic obstructive pulmonary disease or acute pulmonary oedema in a patient with heart failure, may benefit from a trial of NIV or CPAP for respiratory support.

How the recommendations might affect practice

The recommendations align with current practice in the UK. No cost implications are expected as hospitals are likely to already have the resources to deliver non-invasive ventilation or CPAP and will already routinely use high flow nasal oxygen in acute care areas.

Return to recommendations

Information for parents or carers of children with community-acquired pneumonia

Recommendations 1.10.2 and 1.10.4

Why the committee made the recommendations

The committee agreed that it is important to give parents and carers of children with community-acquired pneumonia advice and information on the usual timeframe for symptom improvement. They agreed that although there

can be variation in the time to symptom resolution, for most otherwise healthy children, their symptoms will steadily improve after starting treatment. The committee acknowledged that some symptoms take longer to resolve than parents or carers may expect, particularly cough, which can contribute to unnecessary repeat visits to the GP, so they wanted to reassure parents and carers that cough may persist for up to 4 weeks.

The committee discussed symptoms that may indicate more serious illnesses or complications. These symptoms include persistent fever, increased work of breathing, and reduced fluid intake or fatigue. They agreed parents or carers should seek further advice if their child continued to present with those symptoms.

Given the frequency and severity of hospital-acquired pneumonia it would be useful to be able to offer patients and their families similarly informed advice. However, searches revealed no evidence to support advice on recovery trajectories in hospital-acquired pneumonia and so no recommendation was made for hospital-acquired pneumonia for parents and carers.

How the recommendations might affect practice

The committee agreed that providing parents and carers with information about expected symptom duration in children could reduce unnecessary visits to GPs and other services about symptoms that will resolve with time without the need for further treatment or testing. They also noted that by outlining symptoms that may indicate complications or a deterioration in their child's condition, parents and carers may be better able to identify when they should reconsult a healthcare professional and this may mean their child is seen earlier. This could reduce downstream costs of treatment and resource use.

Return to recommendations

Follow-up chest X-rays

Recommendations 1.12.1 to 1.12.3

Why the committee made the recommendations

The evidence looked at follow-up chest X-rays following discharge from hospital for detecting cancers and other lung conditions and to check whether the pneumonia has resolved. The X-rays took place 4 to 8 weeks after discharge from inpatient care. The evidence showed a cancer detection rate of around 2% and moderate to high rates of pneumonia resolution.

The committee agreed that some radiological changes may persist after symptoms of pneumonia have resolved and these do not always indicate a need for further investigation or treatment. As such offering routine follow-up chest X-rays to all people hospitalised with pneumonia is not always useful for checking if pneumonia has resolved. It was also unclear if it would provide timeliness of cancer detection. The committee noted that the severity of HAP and the frequent association with comorbidities implied that follow-up radiological assessment may be beneficial however no evidence was available.

The evidence suggested that people whose follow-up chest X-ray detected cancer were older and had a history of smoking. The committee agreed that smoking or being aged over 50 years are risk factors for lung cancer and other underlying respiratory disease, so follow-up chest imaging should be considered. They agreed that clinicians should also consider follow-up chest X-rays for people with unresolved symptoms or who have unexplained weight loss because these can also be indications of cancer or other underlying conditions.

The committee discussed that people with hospital-acquired pneumonia may have had recent chest imaging during their admission for non-pneumonia reasons, so there may not be a requirement to perform further chest imaging in this group. The committee agreed that the result of recent chest imaging should be considered when deciding whether to request a follow-up chest X-ray.

The committee acknowledged that some people may not want to attend for further investigations. The committee agreed that people's preferences and medical factors should be discussed so a shared decision can be made about follow-up chest X-ray.

The evidence only looked at cancer detection in people who received a follow-up chest X-ray at 6 weeks, so the committee made a recommendation for research to compare follow-up chest X-rays with standard care for detecting cancer. The committee noted that information on long-term survival rates of people diagnosed with cancer as a result of routine follow-up chest X-rays and stage of cancer detected would allow better understanding of the benefits of cancer detection using this method. The committee agreed that this research should focus on adult populations only, because the evidence showed that follow-up chest X-rays are not clinically useful for children and young people.

How the recommendations might affect practice

These recommendations should reduce the number of chest X-rays required, although a large proportion of people with pneumonia will have the risk factors listed. This would prevent unnecessary investigations and reduce demand on imaging services and associated administration.

Return to recommendations

Context

In 2022 a NICE surveillance report identified areas that required updating in CG191, particularly around the inclusion of guidance for those under 18 who had been excluded from CG191. There are also 2 related NICE antimicrobial prescribing guidelines for both under and over 18s, NG138 (pneumonia (community-acquired): antimicrobial prescribing and NG139 (pneumonia (hospital-acquired): antimicrobial prescribing. This update amalgamates the antimicrobial prescribing guidelines with a partial update of CG191 to provide consolidated pneumonia recommendations.

The recommendations for pneumonia in children and adults provide guidance on a common respiratory infection that can have a considerable impact both on the individual and on healthcare provision and resources.

Community-acquired pneumonia has an annual incidence of 5 to 10 per 1000 adult population, and accounts for 5 to 12% of all lower respiratory tract infections managed by GPs in the community. Between 22% and 42% of people with community-acquired pneumonia will require hospital-based care.

Hospital-acquired pneumonia occurs in around 0.5 to 2% of hospitalised patients and is a common cause of morbidity and mortality. The presence of hospital-acquired pneumonia increases hospital stays by an average of 7 to 9 days per patient and accounts for a large number of antibiotics prescribed.

Pneumonia accounts for 29,000 deaths per year in the UK, and 5 to 15% of people hospitalised with community-acquired pneumonia die within 30 days of admission, rising to 30% for those admitted to an intensive care unit.

Finding more information and committee details

To find NICE guidance on related topics, including guidance in development, see the NICE topic page on infections.

For full details of the evidence and the guideline committee's discussions, see the full guideline. You can also find information about how the guideline was developed, including details of the committee.

NICE has produced tools and resources to help you put this guideline into practice. For general help and advice on putting our guidelines into practice, see resources to help you put NICE guidance into practice.

Update information

This update amalgamates the NICE antimicrobial prescribing guidelines on community-acquired pneumonia NG138 and hospital-acquired pneumonia NG139 (both published September 2019) with a partial update of NICE guideline CG191 (published 2014).

Recommendations are marked **[2025]** if the evidence has been reviewed.

Recommendations that have been deleted, or changed without an evidence review

We propose to delete some recommendations from the 2014 guideline. Table 1 sets out these recommendations and includes details of replacement recommendations. If there is no replacement recommendation, an explanation for the proposed deletion is given.

For the recommendation shaded in grey and ending **[2019, amended 2025]**, we have made changes that could affect the intent without reviewing the evidence. The reasons for the changes are given in table 2.

For other recommendations shaded in grey, we have not reviewed the evidence. In some cases minor changes have been made – for example, to update links, or bring the language and style up to date – without changing the intent of the recommendation. Minor changes are listed in table 3.

See also the previous NICE guideline and supporting documents.

Table 1 Recommendations that have been deleted

Recommendation in 2014 guideline	Comment
1.2.20 Consider delaying discharge for people with community-acquired pneumonia if their temperature is higher than 37.5 C.	This recommendation has been deleted because this area has been updated within the shared decision-making recommendations around place of care.
1.2.22 Advise people with community-acquired pneumonia to consult their healthcare professional if they feel that their condition is deteriorating or not improving as expected.	Replaced by recommendation 1.1.7 from NG138.

Table 2 Amended recommendation wording (change to intent) without an evidence review

Recommendation in NG138	Recommendation in current guideline	Reason for change

1.1.7 Give advice to adults, young people and children with community-acquired pneumonia about: possible adverse effects of the antibiotic(s) how long symptoms are likely to last seeking medical help (if the person is receiving treatment in the community or via hospital at home) if: symptoms worsen rapidly or significantly or symptoms do not start to improve within 3 days or the person becomes systemically unwell.	1.10.3 Give advice to people with community-acquired pneumonia (or their parents or carers, if appropriate) about: possible adverse effects of the antibiotic(s) seeking further advice (if the person is receiving treatment in the community or via hospital at home) if: symptoms worsen rapidly or significantly or symptoms do not start to improve within 3 days or the person becomes systemically unwell.	Removed the reference to how long symptoms are likely to last as covered by recommendations 1.10.1 and 1.10.2. Changed 'medical help' to 'further advice' because advice may be sought from doctors or other healthcare professionals.

Table 3 Minor changes to recommendation wording (no change to intent)

Recommendation numbers in 2014 guideline	**Comment**
1.1.1	Wording amended for clarity
1.2.1 and 1.2.3	Wording amended for consistency.
1.2.5	Recommendation replicated for primary care as supported by NG138.
NG138 and NG139	**Comment**
Recommendations, tables and footnotes to tables	Information has been combined and consolidated to remove repetition and taking into account that the recommendations from these guidelines now appear alongside the recommendations from CG191.