NICE National Institute for Health and Care Excellence

NICE guideline

Pneumonia: diagnosis and management

NICE guideline
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Your responsibility

The recommendations in this guideline represent the view of NICE, arrived at after careful consideration of the evidence available. When exercising their judgement, professionals and practitioners are expected to take this guideline fully into account, alongside the individual needs, preferences and values of their patients or the people using their service. It is not mandatory to apply the recommendations, and the guideline does not override the responsibility to make decisions appropriate to the circumstances of the individual, in consultation with them and their families and carers or guardian.

All problems (adverse events) related to a medicine or medical device used for treatment or in a procedure should be reported to the Medicines and Healthcare products Regulatory Agency using the Yellow Card Scheme.

Local commissioners and providers of healthcare have a responsibility to enable the guideline to be applied when individual professionals and people using services wish to use it. They should do so in the context of local and national priorities for funding and developing services, and in light of their duties to have due regard to the need to eliminate unlawful discrimination, to advance equality of opportunity and to reduce health inequalities. Nothing in this guideline should be interpreted in a way that would be inconsistent with complying with those duties.

Commissioners and providers have a responsibility to promote an environmentally sustainable health and care system and should assess and reduce the environmental impact of implementing NICE recommendations wherever possible.

Contents

This guideline replaces NG139 and NG138.

This guideline partially replaces CG191.

This guideline is the basis of QS110 and QS210.

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

Related guidance

If sepsis is suspected, assess and manage the person in line with NICE's guidelines on suspected sepsis in people aged 16 or over, suspected sepsis in under 16s and suspected sepsis in people who are or have recently been pregnant.

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.

For support to stop smoking, or to reduce harm from smoking, see NICE's guideline on tobacco: preventing uptake, promoting quitting and treating dependence.

For information about vaccination uptake, see NICE's guideline on vaccine uptake in the general population.

For guidance on the health impacts of poor indoor air quality, see NICE's guideline on indoor air quality at home.

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 (see recommendation 1.2.11 for further details). Consider:

- referral to hospital for adults with a CRB65 score of 2 or more
- one of the following options for adults with a CRB65 score of 1:
  - primary care-led services with safety netting advice or referral to:
    - a virtual ward **or**
    - same-day emergency care (SDEC) unit **or**
    - hospital at home service **or**
    - hospital

- primary care-led services 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 (see recommendation 1.2.11 for further details). Consider:

- inpatient care for adults with a CURB65 score of 3 or more, with referral to critical care services if appropriate
- one of the following options for adults with a CURB65 score of 2:
  - virtual ward or
  - SDEC unit or
  - hospital at home service or

  - inpatient care

- discharge home, with referral to primary care-led services and safety netting advice for adults with a CURB65 score of 0 or 1. **[2025]**

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

Shared decision making regarding place of care

1.2.11 When considering referral to a virtual ward, SDEC unit or hospital at home service, 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
- any advance care plan or treatment escalation plan
- 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 service and virtual wards.

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 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 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.

1.4 Investigations in hospital

Imaging

1.4.1 Put in place processes to allow diagnosis (including chest X-ray) of community-acquired pneumonia in adults within 4 hours of presentation to hospital. **[2014, amended 2025]**

1.4.2 Recognise 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. See also the section on use of biomarkers after starting treatment. **[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 guidelines on suspected sepsis in people aged 16 or over

and suspected sepsis in people who are or have recently been pregnant)

- 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 guidelines on suspected sepsis in under 16s, suspected sepsis in people aged 16 or over and suspected sepsis in people who are or have recently been pregnant) **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 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

community-acquired pneumonia, and within 4 hours of presentation to hospital. **[2019, amended 2025]**

1.5.2 Start antibiotic treatment as soon as possible after establishing a diagnosis of hospital-acquired pneumonia, and within 4 hours of clinical suspicion if symptoms start in hospital or within 4 hours of presentation to hospital. **[2019, amended 2025]**

1.5.3 If the person has suspected sepsis, see antibiotic treatment recommendations in NICE's guidelines on suspected sepsis in people aged 16 or over, suspected sepsis in under 16s and suspected sepsis in people who are or have recently been pregnant. **[2019]**

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

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

1.5.6 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
  - oxygen saturations of less than 90% on room air (or failure to meet long-term baseline oxygen requirements); note that oxygen saturation monitors may be inaccurate in people with pigmented skin. **[2019,**

amended 2025]

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

Treatment based on disease severity and suitability	Antibiotic, dosage and course length
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

Treatment based on disease severity and suitability	Antibiotic, dosage and course length
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 Medicines and Healthcare products Regulatory Agency (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)

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

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

Treatment based on severity of symptoms or signs and suitability	Antibiotic, dosage and course length
	• 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 antibiotics for penicillin allergy	Consult local microbiologist

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 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 of less than 90% on room air (or failure to meet long-term baseline oxygen requirements); note that oxygen saturation monitors may be

inaccurate in people with pigmented skin

- abnormal mental status
- inability to eat without assistance. **[2014, amended 2025]**

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 Consider following the section on choice, dosage and duration of antibiotics 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]**

1.7.3 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

1.7.4 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]**

1.7.5 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

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: alternative oral antibiotics for penicillin allergy or if co-amoxiclav unsuitable (antibiotic choice should be based on specialist microbiological advice and local resistance data)	**Options include:** **Doxycycline**: 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 switching from intravenous levofloxacin; off-label use): 500 mg once or twice a day for 5 days then review See the Medicines and Healthcare products Regulatory Agency (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

Treatment based on severity of symptoms or signs, risk of resistance and suitability	Antibiotic, dosage and course length
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

Treatment based on severity of symptoms or signs, risk of resistance and suitability	Antibiotic, dosage and course length
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 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**: 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

Treatment based on severity of symptoms or signs, risk of resistance and suitability	Antibiotic, dosage and course length
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

Treatment based on severity of symptoms or signs, risk of resistance and suitability	Antibiotic, dosage and course length
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)

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, consider 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 intravenous hydrocortisone. If hydrocortisone is not suitable, consider an alternative corticosteroid such as dexamethasone by the most appropriate route of administration.

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

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

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

1.9.3 Be aware that people with certain coexisting 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 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 service) 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 people with community-acquired pneumonia to hospital if they have symptoms that are not improving as expected with antibiotics. **[2019, amended 2025]**

1.11.4 Consider referring people with community-acquired pneumonia to hospital, or seek specialist advice, if microbiological samples have identified bacteria that are resistant to oral antibiotics. **[2019 amended, 2025]**

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 CRP or procalcitonin (PCT) 3 or 4 days after starting treatment if there is clinical concern about treatment failure. (See recommendation 1.4.3 for advice on taking a baseline CRP for adults with community-acquired pneumonia on admission to hospital.) **[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 the 2025 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 (including death, development of complications or need for invasive respiratory or circulatory support) in a person. This is based on a combination of clinical understanding and knowledge and is informed by a mortality risk score. The difference between the assessment of disease severity and mortality risk score can be important. This guideline uses 3 categories of disease severity: low, moderate and high. Often, but not always, these will match the mortality risk score. Clinical judgement should always be used, as there may be situations when the mortality risk score does not align with the assessment of disease severity. For example, a person with a low mortality risk score who has an unusually low oxygen saturation level, pleural complications or multiple comorbidities may be assessed as having moderate- or high-severity disease.

Clinical diagnosis of community-acquired pneumonia

Diagnosis based on symptoms and signs of lower respiratory tract infection in a person 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, increased respiratory rate, low oxygen saturations, 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. For further information on symptoms and signs of community-acquired pneumonia, see the section on assessment in NICE's clinical knowledge summary on chest infections in adults.

Hospital at home service and virtual wards

Models of care that enable people to be cared for in their own home, avoiding the need for hospital admission. Sometimes the terms 'hospital at home' and 'virtual ward' are used interchangeably. People are cared for by a multidisciplinary team who can provide a range of tests and treatments. Regular reviews by the clinical team may involve a home visit or use of video technology. Other devices such as apps or wearable technologies can support remote monitoring.

Hospital-acquired pneumonia

Pneumonia that develops 48 hours or more after hospital admission and that was not incubating at hospital admission, or people who present to hospital with pneumonia but who have been discharged within the last 7 to 10 days. When managed in hospital, the diagnosis is usually confirmed by chest X-ray. 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 inaccurate 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)

People are well enough and ambulatory enough to attend hospital each day and have a review in a rapid clinic setting. Also suitable for people where hospital admission poses a higher risk of hospital-acquired infection or deconditioning such as in people who are frail or immunocompromised. This is a rapidly evolving model of care with multiple local variations.

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 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 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 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 or hospital-acquired pneumonia, 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 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 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.

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 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 service and virtual wards

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 service, virtual wards and same-day emergency care (SDEC) 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.

The studies were small, had methodological limitations and included participants not considered to be representative of those who would potentially use virtual wards or hospital at home services. It showed that patients treated at home tended to do no worse than patients treated as inpatients in hospital in terms of hospital re-admission, 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.

Patients 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 shared decisions about place of care. They agreed they should be retained but added the option to refer to a virtual ward or SDEC unit or hospital at home service. They also identified a list of factors that would need

to be discussed with the person when making a shared decision about using home-based 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 home-based models of care for children and young people.

How the recommendations might affect practice

Most trusts now have established virtual wards or 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 people 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 evidence was limited to people with community-acquired pneumonia, but the committee agreed that it could be extrapolated to people with hospital-acquired pneumonia.

The committee discussed the benefits of lung ultrasound compared with chest X-ray, particularly that it avoids radiation exposure and can be used to rapidly consider diagnosis of pneumonia and promptly start antibiotic treatment. 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 for initial assessment of 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 the storage and audit of lung ultrasound images, specifically that it may not be possible to save diagnostic images for later review by other healthcare professionals or for monitoring changes. There was also a discussion about 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 as a diagnostic tool but should not replace chest X-ray for confirming a diagnosis of pneumonia.

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 inform a diagnosis of pneumonia and promptly start antibiotic treatment. This may mean a quicker diagnosis, starting treatment earlier and enabling assessment of complications.

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

Recommendation 1.4.3 and recommendations 1.11.7 and 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 patients 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. Although NLR showed a similar pattern of findings to CRP

and PCT, there was less evidence on NLR than CRP or PCT and it is not routinely used (despite being easily obtained through routine blood samples), 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 for adults with community-acquired pneumonia to also include PCT. They concluded that adding admission PCT would not give substantially more information than CRP alone so this would be an unnecessary extra test, with additional cost.

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 rule out complications or poor prognosis, while high levels, or levels that remain elevated, may help identify when senior clinical review is needed. The committee noted that CRP levels that fail to halve in 3 to 4 days are a cause for concern. They highlighted that both the absolute level of CRP or PCT, as well as any change in levels from baseline to repeat assessment, can be useful. They agreed that patients 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 patients 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 the 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 identify complications or allow clinicians to amend the treatment plan to be more effective. Although there may be an increase in testing, it would not require significant changes in procedures.

Return to recommendation 1.4.3

Return to recommendations 1.11.7 and 1.11.8

Microbiological tests

Recommendations 1.4.4 to 1.4.7

Why the committee made the recommendations

The committee discussed the evidence on use of microbiological tests for people presenting to secondary care with suspected community-acquired pneumonia. They agreed that the evidence supported the existing recommendation to not routinely offer microbiological tests to adults with low-severity community-acquired pneumonia, so chose to retain it. They also 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 with moderate- and high-severity community-acquired pneumonia 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 NICE's guidelines on suspected sepsis.

The committee noted that blood samples should ideally be taken before starting antibiotics because antibiotics may impact blood culture results.

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 recognised that this would mean a different approach when compared with community-acquired pneumonia but agreed this was reasonable given the possible differing microbiology findings for community-acquired pneumonia and hospital-acquired pneumonia.

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 infection with Legionella pneumophila 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 aid decision making around the selection of the most appropriate antibiotic. This will benefit people with the condition, help improve antimicrobial stewardship and could 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 of 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.

There was no evidence identified on mycoplasma testing. The committee discussed this and noted there is limited demand for this test and a positive result may not impact usual antibiotic prescribing decisions, so they did not make a recommendation about this.

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 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.

The new recommendations have the potential to reduce the number of blood and sputum cultures taken in adults with moderate- and high-severity community-acquired pneumonia, potentially leading to cost savings for the NHS. Only using legionella urinary antigen tests for adults where needed may also be a cost-saving strategy.

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 and 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 re-admission 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, so 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 and 1.8.2

Why the committee made the recommendations

The evidence on use of antibiotics plus corticosteroids, compared with 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 among the known side effects of corticosteroids. They concluded that the 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 committee agreed high-severity community-acquired pneumonia in hospital to mean a CURB65 score of 3 to 5 combined with clinician judgement of high disease severity, which may include physiological instability, shock, profound hypoxia, or need for mechanical ventilation.

The evidence suggested that intravenous (IV) 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. Therefore, they included in the recommendation to consider starting treatment with IV hydrocortisone. The committee did not review any evidence on the most effective dose, so were not able to include this in the recommendation.

The committee was made aware of evidence from a newly published trial (REMAP-CAP) after completion of the evidence review. The trial was stopped early because the results did not show a pre-specified large mortality benefit of steroids for people with severe community-acquired pneumonia. The committee agreed that this did not rule out the possibility of there being a smaller effect of steroids on mortality in line with that suggested by the evidence review, and noted methodological approaches with the trial that led them to be cautious about the findings. Further results on the use of steroids for community-acquired pneumonia are expected in ongoing studies.

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 use of adjunctive corticosteroid 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 high-severity 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 (HFNO), continuous positive airways pressure (CPAP) and non-invasive ventilation (NIV) compared with 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 HFNO 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 HFNO. Lay members emphasised the importance of respecting people's preferences, describing the discomfort of NIV and CPAP compared with HFNO.

The ability of different locations within the hospital to deliver HFNO, CPAP or NIV was discussed. 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 coexisting condition, such as type 2 respiratory failure in a person with chronic obstructive pulmonary disease or acute pulmonary oedema in a person 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 HFNO 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 people and their families similarly informed advice. However, searches revealed no evidence to support advice on recovery trajectories in hospital-acquired pneumonia, 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 the evidence suggested that 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 hospital-acquired pneumonia and the frequent association with comorbidities implied that follow-up radiological assessment may be beneficial, but 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; there was no information on the cancer detection rate in people who did not receive a follow-up chest X-ray, so the committee made a recommendation for research on the clinical and cost effectiveness of follow-up chest imaging for adults discharged from hospital after treatment for pneumonia.

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 NICE's guideline on pneumonia in adults (CG191), particularly around the inclusion of guidance for those under 18 who had been excluded. There were also 2 related NICE antimicrobial prescribing guidelines for both under and over 18s, on community-acquired and hospital-acquired pneumonia. 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 1,000 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 hospitalisations 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 person 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 evidence reviews and 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

September 2025: This update amalgamates and replaces the NICE antimicrobial prescribing guidelines on community-acquired pneumonia and hospital-acquired pneumonia (both published September 2019), and partially updates and replaces NICE guideline CG191 (published 2014).

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

We have also made some changes without an evidence review. These are marked **[2019, amended 2025]** or **[2014, amended 2025]**.

Recommendations labelled **[2019]** or **[2014]** last had an evidence review in 2019 or 2014, respectively.

Minor updates since publication

November 2025: We updated links throughout to the NICE's guidelines on suspected sepsis in people aged 16 or over, suspected sepsis in under 16s and suspected sepsis in people who are or have recently been pregnant, which have replaced the previous NICE guideline on suspected sepsis.

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