Whittington Health NHS

Community Acquired Pneumonia (CAP) in children Diagnosis and management

Subject:	Diagnosis and management of Community Acquired Pneumonia in children.
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Policy Executive Owner:	Clinical Director, CYP ICSU
Designation of Author:	Dr T Polychronakis (Paediatric Speciality Trainee) Prof C Fertleman (Consultant Paediatrician)
Name of Assurance Committee:	As above
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Version Control Sheet

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1.0	April 2015	T.Polychronakis	Off line	Ratified at CGC April 22, 2015
2.0	Feb 2019	Prof C Fertleman	Live	Reviewed. No change required

➢ Criteria for use

These guidelines were created to assist the clinician in the care of a child ≤16 years old with community-acquired pneumonia.

➢ Background/ introduction

Community-acquired pneumonia (CAP) is defined as an **acute infection of the pulmonary parenchyma** in a patient who has acquired the infection in the community, as distinguished from hospital-acquired (nosocomial) pneumonia. CAP is a common and potentially serious illness with considerable morbidity.

The World Health Organization (WHO) estimates there are 156 million cases of pneumonia each year in children younger than five years, with as many as 20 million cases severe enough to require hospital admission [1]. In the developed world, the annual incidence of pneumonia is estimated to be 33 per 10,000 in children younger than five years and 14.5 per 10,000 in children 0 to 16 year [2]. Approximately one-half of children younger than five years of age with CAP require hospitalisation[3]. Hospitalisation rates for pneumonia (all causes) among children younger than two years in the United States decreased after introduction of the pneumococcal conjugate vaccine to the routine childhood immunisation schedule in 2000 (from 12 to 14 per 1000 population to 8 to 10 per 1000 population) [4].

➢ Inclusion/ exclusion criteria

Community-acquired pneumonia should be considered in children when there is **persistent or repetitive fever**>38.5°C together with **chest recession and a raised respiratory rate.**

➢ Clinical management

Clinical presentation:

The clinical presentation of pneumonia varies depending upon the **age** of the infant or child, the **responsible pathogen**, the **particular host**, and the **severity**. The presenting signs and symptoms are nonspecific; no single symptom or sign is pathognomonic for pneumonia in children.

Symptoms and signs of pneumonia may be subtle, particularly in infants and young children. The combination of **fever and cough is suggestive of pneumonia**; other respiratory findings (eg, tachypnea, increased work of breathing) may precede cough. **Cough may not be a feature initially** since the alveoli have few cough receptors. Young infants may present with difficulty feeding, restlessness, or fussiness. Young children (between 5 and 10 years of age) may present with fever and leukocytosis. Older children may complain of **pleuritic chest pain** (pain with respiration), but this is an inconsistent finding. Occasionally, the predominant manifestation may be **abdominal pain** (because of referred pain from the lower lobes) or **neck stiffness** (because of referred pain from the upper lobes).

Clinical features classically taught to be characteristic of bacterial pneumonia, atypical bacterial pneumonia, or viral pneumonia frequently overlap and cannot be used reliably to distinguish between the various aetiologies [5,6]. In addition, as many as 50 per cent of infections may be mixed bacterial/viral infections.

Management:

An assessment of pneumonia severity is necessary to determine the need for laboratory and imaging studies and the appropriate treatment setting. The severity of pneumonia is assessed by the child's overall clinical appearance and behaviour, including an assessment of degree of awareness and willingness to eat or drink [7]. Criteria for hospital admission are shown on table 1.

- **Infants <6 months** of age with suspected bacterial CAP are likely to benefit from hospitalisation.
- **Chest radiography** should not be undertaking routinely in children thought to have CAP. Children with signs and symptoms of pneumonia who are not admitted to hospital should not have a AP chest x-ray.
- **Acute phase reactants** are not of clinical utility in distinguishing viral from bacterial infections and should not be tested routinely. C reactive protein is not useful in the management of uncomplicated pneumonia and should not be measured routinely.

- **Microbiological investigations** should not be considered routinely in those with milder disease or those treated in the community [2]. Microbiological diagnosis should be attempted in children with severe pneumonia sufficient to require paediatric high dependency care admission, or those with complications of CAP.

Table 1. Discuss with the on-call Paediatric Registrar and consider admission to hospital when there is any of the following:

Hypoxemia (oxygen saturation [SpO_2] <92 percent in room air at sea level) **Dehydration**, or **inability to maintain hydration** orally; inability to feed in an infant	Moderate to severe **respiratory distress**: Respiratory rate >70 breaths/minute for infants <12 months of age and >50 breaths per minute for older children; intercostal and/or subcostal recession; nasal flaring; difficulty breathing; apnea; grunting
Toxic appearance (more common in bacterial pneumonia and may suggest a more severe course)	**Underlying conditions** that may predispose to a more serious course of pneumonia (eg, cardiopulmonary disease, genetic syndromes, neurocognitive disorders), may be worsened by pneumonia (eg, metabolic disorder) or may adversely affect response to treatment (eg, immunocompromised host)
Complications (eg, effusion/empyema) Suspicion or confirmation that CAP is due to a pathogen with increased virulence, such *as* ***Staphylococcus aureus*** **or group A** ***streptococcus***	**Failure of outpatient therapy** (worsening or no response in 48 to 72 hours)

Treatment:

All children with a clear clinical diagnosis of pneumonia **should receive antibiotics** as bacterial and viral pneumonia cannot reliably be distinguished from each other.

Children aged <2 years presenting with mild symptoms of lower respiratory tract infection do not usually have pneumonia and need not be treated with antibiotics but should be reviewed if symptoms persist. A history of conjugate pneumococcal vaccination gives greater confidence to this decision. Families of children who are well enough to be cared for at home should be given information on managing fever, preventing dehydration and identifying any deterioration.

Antibiotics administered orally are safe and effective for children presenting with even severe CAP and are recommended. **Amoxicillin** is recommended as first

choice for oral antibiotic therapy in all children because it is effective against the majority of pathogens which cause CAP in this group, is well tolerated and cost-effective. When there is a clinical suspicion of Mycoplasma infection, Azithromycin should be added. For penicillin allergic patients Azithromycin is the antibiotic of choice for the oral route as monotherapy in patients > 6months of age.

Intravenous antibiotics should be used in the treatment of pneumonia in children when the child is unable to tolerate oral fluids or absorb oral antibiotics (eg, because of vomiting) or presents with signs of septicaemia or complicated pneumonia. **Co-amoxiclav** is the first choice for IV treatment. In children > 5years old, use Co-amoxiclav combined with **Clarithromycin**. For penicillin allergic patients **Ceftriaxone** and **Clarithromycin** are the antibiotics of choice.

For details on antibiotic dosage and treatment please refer to the Whittington Guideline: Antibiotic Protocols for children seen in General Paediatrics"

	Antibiotic Protocols for Children seen in General Paediatrics

➢ Contacts (inside and outside the Trust including out-of-hours contacts)

- Paediatric or Emergency Department Registrar via bleep 3111
- Paediatric Consultant on call or attending Emergency Medicine Consultant via Cencom

➢ Further information

For further information please refer to the British Thoracic Society guidelines for the management of CAP in children: update 2011 [2]

➢ References (evidence upon which the guideline is based)

1. Rudan I, Boschi-Pinto C, Biloglav Z, et al. Epidemiology and etiology of childhood pneumonia. Bull World Health Organ 2008; 86:408.
2. Harris M, Clark J, Coote N, et al. British Thoracic Society guidelines for the management of community acquired pneumonia in children: update 2011. Thorax 2011; 66 Suppl 2:ii1.

3. Margolis P, Gadomski A. The rational clinical examination. Does this infant have pneumonia? JAMA 1998; 279:308.

4. Fiore AE, Shay DK, Broder K, et al. Prevention and control of seasonal influenza with vaccines: recommendations of the Advisory Committee on Immunization Practices (ACIP), 2009. MMWR Recomm Rep 2009; 58:1.

5. The value of clinical features in differentiating between viral, pneumococcal and atypical bacterial pneumonia in children. Korppi M, Don M, Valent F, Canciani M. Acta Paediatr. 2008;97(7):943.

6. Clinical symptoms and signs for the diagnosis of Mycoplasma pneumoniae in children and adolescents with community-acquired pneumonia. Wang K, Gill P, Perera R, Thomson A, Mant D, Harnden A.Cochrane Database Syst Rev. 2012;10:CD009175

7. Community acquired pneumonia guideline team, Cincinnati Children's Hospital Medical Center. Evidence-based care guidelines for medical management of community acquired pneumonia in children 60 days to 17 years of age. Guideline 14

➢ **Compliance with this guideline (how and when the guideline will be monitored e.g. audit and which committee the results will be reported to) Please use the tool provided at the end of this template**

Compliance will be monitored annually via audit and results will be presented to nurses and doctors of the Paediatric and Emergency Medicine Department.

To be completed and attached to any procedural document when submitted to the appropriate committee for consideration and approval

		Yes/No	Comments
1.	**Does the procedural document affect one group less or more favourably than another on the basis of:**		
	• Race	No	
	• Ethnic origins (including gypsies and travellers)	No	
	• Nationality	No	
	• Gender	No	
	• Culture	No	
	• Religion or belief	No	
	• Sexual orientation including lesbian, gay and bisexual people	No	
	• Age	No	
	• Disability - learning disabilities, physical disability, sensory impairment and mental health problems	No	
2.	**Is there any evidence that some groups are affected differently?**	No	
3.	**If you have identified potential discrimination, are any exceptions valid, legal and/or justifiable?**	No	
4.	**Is the impact of the procedural document likely to be negative?**	No	
5.	**If so can the impact be avoided?**	N/A	
6.	**What alternatives are there to achieving the procedural document without the impact?**	N/A	

		Yes/No	Comments
7.	**Can we reduce the impact by taking different action?**	N/A	

If you have identified a potential discriminatory impact of this procedural document, please refer it to the Director of Human Resources, together with any suggestions as to the action required to avoid/reduce this impact.

For advice in respect of answering the above questions, please contact the Director of Human Resources.

Checklist for the Review and Approval of Procedural Document

To be completed and attached to any procedural document when submitted to the relevant committee for consideration and approval.

	Title of document being reviewed:	**Yes/No**	**Comments**
1.	**Title**		
	Is the title clear and unambiguous?	Yes	
	Is it clear whether the document is a guideline, policy, protocol or standard?	Yes	
2.	**Rationale**		
	Are reasons for development of the document stated?	Yes	
3.	**Development Process**		
	Is it clear that the relevant people/groups have been involved in the development of the document?	Yes	
	Are people involved in the development?	Yes	
	Is there evidence of consultation with stakeholders and users?	Yes	
4.	**Content**		
	Is the objective of the document clear?	Yes	

	Title of document being reviewed:	Yes/No	Comments
	Is the target population clear and unambiguous?	Yes	
	Are the intended outcomes described?	Yes	
5.	**Evidence Base**		
	Are key references cited in full?	N/A	
	Are supporting documents referenced?	N/A	
6.	**Approval**		
	Does the document identify which committee/ group will approve it?	Yes	
7.	**Dissemination and Implementation**		
	Is there an outline/plan to identify how this will be done?	Yes	
8.	**Document Control**		
	Does the document identify where it will be held?	Yes	
9.	**Process to Monitor Compliance and Effectiveness**		
	Are there measurable standards or KPIs to support the monitoring of compliance with and effectiveness of the document?	Yes	
	Is there a plan to review or audit compliance with the document?	Yes	
10.	**Review Date**		
	Is the review date identified?	Yes	
	Is the frequency of review identified? If so is it acceptable?	Yes	
11.	**Overall Responsibility for the Document**		

	Title of document being reviewed:	Yes/No	Comments
	Is it clear who will be responsible for co-ordinating the dissemination, implementation and review of the document?	Yes	

Executive Sponsor Approval			
If you approve the document, please sign and date it and forward to the author. Procedural documents will not be forwarded for ratification without Executive Sponsor Approval			
Name		Date	
Signature			
Relevant Committee Approval			
The Director of Nursing and Patient Experience's signature below confirms that this procedural document was ratified by the appropriate Governance Committee.			
Name		Date	
Signature			
Responsible Committee Approval – only applies to reviewed procedural documents with minor changes			
The Committee Chair's signature below confirms that this procedural document was ratified by the responsible Committee			
Name		Date	
Name of Committee		Name & role of Committee Chair	
Signature			

Tool to Develop Monitoring Arrangements for Policies and guidelines

What key element(s) need(s) monitoring as per local approved policy or guidance?	Who will lead on this aspect of monitoring? Name the lead and what is the role of the multidisciplinary team or others if any.	What tool will be used to monitor/check/observe/Assess/inspect/ authenticate that everything is working according to this key element from the approved policy?	How often is the need to monitor each element? How often is the need complete a report ? How often is the need to share the report?	What committee will the completed report go to?
Element to be monitored	**Lead**	**Tool**	**Frequency**	**Reporting arrangements**
Diagnosis and management of Community Acquired Pneumonia in children.	Attending Paediatric and emergency Medicine Consultant.	Monitor compliance via A&E electronic records (Medway), patient's medical notes and via electronic prescribing (JAC).	Monitor compliance with guidelines annually via audit.	Paediatric Guidelines Committee.