CLINICAL GUIDELINE FOR HOSPITAL MANAGEMENT OF COMMUNITY ACQUIRED PNEUMONIA

1. Aim/Purpose of this Guideline
   1.1. To provide guidance on the diagnosis and management of community acquired pneumonia.

2. The Guidance

2.1. Hospital Management of Community Acquired Pneumonia
   2.2. Pneumonia is diagnosed clinically on the basis of suggestive signs and symptoms plus new unexplained chest x-ray shadowing.

2.3. Symptoms and Signs
   - Malaise, fever, rigors
   - Vomiting, diarrhoea
   - Confusion (especially in the elderly)
   - Dyspnoea, cough
   - Sputum (there may be no sputum. It may be blood stained and it may be viscid and difficult to expectorate.
   - Pleuritic pain
   - High fever (often absent in the elderly)
   - Tachycardia
   - Tachypnoea
   - Localised crackles on auscultation
   - Bronchial breathing (in about one third of hospital admissions)
   - Chest signs may be absent or masked by other respiratory signs e.g. chronic obstructive pulmonary disease
   - Always enquire about pet birds (psittacosis) and recent hotel residence away from home (Legionella infection)

2.4. Severity of pneumonia
   2.5. Management is based on an assessment of the severity of the pneumonia. This should be determined by clinical judgement.
   2.6. The CURB-65 score is an aid to clinical judgement. It is based on a 6 point score, 1 point for each of:
      - Confusion of recent onset
      - Urea > 7 mmol/l
      - Respiratory rate =/> 30 per minute
      - Low systolic blood pressure (< 90mmHg) or low diastolic blood pressure =/< 60mmHg)
      - Age 65 or over
   2.7. In a prospective trial in which patients were stratified according to their
CURB 65 score at admission, the risk of mortality or need for intensive care was:

- Score 0 – 0.7%
- Score 1 – 3.2%
- Score 2 – 13%
- Score 3 – 17%
- Score 4 – 41.5%
- Score 5 – 57%

2.8. Patients with a CURB 65 score of 0 and no other co-existing chronic illnesses could be considered for outpatient management.

2.9. Patients with a CURB 65 score of 3 or more should be managed in hospital as cases of severe community acquired pneumonia.

2.10. Cases with CURB 65 scores of 1 or 2 will require clinical judgement in deciding where best to manage them i.e. in hospital or at home and the level of treatment that is appropriate.

2.11. **Investigations**

- Chest x-ray
- Oximetry – if oxygen saturations are < 92% or there are features of severe pneumonia, measure arterial blood gases.
- FBC, Urea and electrolytes, liver function tests, CRP
- Microbiology
  - sputum – inspection, microscopy, culture and sensitivity
  - blood cultures
- in severe pneumonia, serology for atypical organisms (Influenza A and B, Coxiella burnetii, Chlamydia psittaci, Mycoplasma pneumonae Legionella pneumophila). Indicate date of onset of infection on the request form.
- In the seriously ill test urine for Legionella and pneumococcal antigen.

2.12. **Treatment**

2.13. **Supportive measures**

- Oxygen should be prescribed according to the Trust Policy for the prescription and administration of emergency oxygen in adults
- Maintain fluid balance
- Give adequate analgesia for pleuritic pain
- Physiotherapy is only helpful in patients with copious sputum production

2.14. **Antibiotics**

2.15. Antibiotics should be prescribed according to the Trust’s antibiotic policy. The current recommendations (October 2013) are set out below. These may change from time to time and it is recommended that you refer to the current version which can be found on the Trust Intranet.

2.16. **Antibiotic Prescribing in JAC EPMA**
2.17. To ensure that you are prescribing the antibiotics recommended by the most recent Antibiotic guidance, protocols have been set up in the JAC EPMA system that is updated when the antibiotic guidance is changed.

2.18. To use the protocols:

On the drug selection screen select ‘Treatment Protocols’ and search for ‘INFECTION’ (or the 1st few letters)
To see what drugs are contained in the protocol you can ‘Right’ click on it

**INFECTION-CAP-NON SEVERE (IV ROUTE)**

- **BENZYLPCENICILLIN 600 mg Injection**
- **CLARITHROMYCIN 500 mg Injection**

You will then be presented with the drugs in the protocol where you can make and necessary adjustments, however, none should be needed.

Then press ‘Ok’ to prescribe. By using the protocols it is not necessary to add an indication note to the drug detailing the reason it has been prescribed. However, you should add an indication note to indicate a review date for intravenous antibiotics.

- All prescribing of antibiotics that is not carried out via one of these protocols must have an ‘Indication’ note added to it which includes the reason for prescribing and a review/stop date
- If a ‘Restricted’ antibiotic is prescribed an authorisation code must be sought from a Consultant Microbiologist and this code must be included in the ‘indication’ note along with the reason for prescribing and stop/review date.
<table>
<thead>
<tr>
<th>Condition</th>
<th>Treatment</th>
</tr>
</thead>
</table>
| Non severe community acquired pneumonia       | Oral amoxicillin 500mg tds  
If atypical cover is required add doxycycline 200mg stat then 100mg od  
Or if allergic to penicillin clarithromycin 500mg bd  
If iv needed use iv benzyl penicillin 1.2g qds + iv clarithromycin 500mg bd  
If allergic to penicillin use iv clarithromycin alone |
| Severe community acquired pneumonia           | iv Piperacillin/tazobactam 4.5 g tds + clarithromycin 500mg bd orally or by infusion if the oral route is not available  
If allergic to penicillin use iv levofloxacin 500mg bd |
| Non severe hospital acquired pneumonia        | Amoxicillin 500mg tds + doxycycline 200mg stat then 100mg od  
If allergic to penicillin use clarithromycin 500mg bd or doxycycline 200mg stat followed by 100mg od |
| Non severe aspiration pneumonia               | Amoxicillin 500mg tds + metronidazole 400mg tds  
If allergic to penicillin use metronidazole 400mg tds plus one of clarithromycin 500mg bd OR doxycycline 200mg stat followed by 100mg od |
| Severe hospital acquired pneumonia or severe aspiration pneumonia | iv Piperacillin/tazobactam 4.5g tds (+ clarithromycin 500mg bd orally if *Legionella* is suspected)  
If allergic to penicillin use iv levofloxacin 500mg bd (add metronidazole for aspiration pneumonia) |

2.19. Antibiotics in pneumonia where the causative organism has been identified:

<table>
<thead>
<tr>
<th>Organism</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Streptococcus pneumoniae</em></td>
<td>iv Benzyl penicillin 1.2-1.8g tds</td>
</tr>
<tr>
<td><em>Staphlococcus aureus</em> (Methicillin sensitive)</td>
<td>iv Flucloxacillin 1-2g qds +/- a second agent after discussion with microbiology</td>
</tr>
<tr>
<td>MRSA</td>
<td>Contact microbiology</td>
</tr>
<tr>
<td>Atypical organisms</td>
<td>Oral doxycycline 200mg stat then 100mg od or oral clarithromycin 500mg bd</td>
</tr>
<tr>
<td><strong>Legionella sp</strong></td>
<td>Clarithromycin 500mg bd + rifampicin 600mg bd (iv if severely unwell)</td>
</tr>
<tr>
<td>-------------------</td>
<td>-------------------------------------------------</td>
</tr>
<tr>
<td><strong>Pneumocystis jiroveci</strong>&lt;br&gt;PCP pneumonia</td>
<td>Co-trimoxazole 120mg/kg iv or orally in 2-4 divided doses for 21 days&lt;br&gt;In severe cases (PaO2&lt;70mm Hg breathing air or alveolar-arterial gradient &gt;35mm Hg) add prednisolone 80mg daily orally for 5 days then 40mg daily for 5 days then 20mg daily for the remainder of treatment</td>
</tr>
</tbody>
</table>

2.20. **Duration of antibiotics**

2.21. Oral antibiotics should be used for those with non-severe pneumonias unless there is a contraindication.

2.22. Patients requiring intravenous antibiotics should have the route of administration changed to oral once they are improving. The following features may be helpful in making this decision:

- Resolution of fever for more than 24 hours
- Pulse rate < 100 beats per minute
- Resolution of tachypnoea
- Clinically hydrated and taking oral fluids
- Absence of hypotension
- Absence of hypoxia
- Improving white cell count
- Non bacteraemic infection
- No microbiological evidence of legionella, staphylococcal or gram negative enteric bacilli infection
- No concerns over gastro-intestinal absorption

2.23. For patients managed in the community and most of those admitted to hospital with non-severe and uncomplicated pneumonia treatment with antibiotics for seven days is recommended.

2.24. For patients with severe microbiologically undefined pneumonia, ten days of treatment is recommended. This should be extended to 14 to 21 days where Legionella, staphylococcal or gram negative enteric bacilli are suspected or confirmed as the cause of a pneumonia.

2.25. **Requirement for HDU/ITU**

2.26. The ITU Outreach Team should be aware of all cases of severe pneumonia in the hospital.

2.27. Features suggesting that management in ITU may be appropriate include:

- MEWS>=5
- Arterial PAO2 =/< 8 kPa with inspired oxygen =/> 60%
- Severe acidosis pH < 7.25
- Exhausted drowsy or unconscious
- Respiratory or cardiac arrest
2.28. **Monitoring**

2.29. Monitoring treatment – clinical assessment of patients with severe pneumonia should occur at least every 12 hours until the patient is improving.

2.30. Pulse, blood pressure, temperature, respiratory rate and oxygen saturations with FiO2 at least four hourly until the patient is stable.

2.31. Biochemical screen every 24 – 48 hours whilst significant abnormalities persist.

2.32. Chest x-ray should be repeated if the patient is not improving after 72 hours despite adequate therapy.

2.33. **Failure to respond to treatment**

- Arrange review by respiratory physician
- Consider incorrect diagnosis
- Consider resistant organisms
- Consider recognised pulmonary tuberculosis
- Consider recognised immuno-deficiency e.g. HIV infection leading to pneumocystis pneumonia.
- Consider complications
  - Para-pneumonic effusion or empyema
  - Lung abscess
  - Bronchial obstruction
  - Drug related fever

2.34. **Discharge**

2.35. Patients being considered for discharge should not have more than one of the following characteristics unless they represent the usual base line for that patient. These clinical “instabilities” are:-

- Temperature > 37.8
- Heart rate > 100 beats per minute
- Respiratory rate > 24 per minute
- Systolic blood pressure < 90mmHg
- Oxygen saturation < 90%
- Inability to maintain oral intake
- Abnormal mental status

2.36. In a recent prospective study 46% of patients who were discharged home with two of these instabilities died or were re-admitted within 30 days. Only 11% of patients with no instabilities died or were re-admitted within 30 days.

2.37. **Follow up**

2.38. All patients who have persistent symptoms or physical signs or who are at
risk of underlying malignancy, because of their smoking history or their age, should be reviewed in outpatients with a chest x-ray about six weeks following discharge.

3. Monitoring compliance and effectiveness

<table>
<thead>
<tr>
<th>Element to be monitored</th>
<th>The process of care will be monitored. Antibiotic use will be monitored. Pneumonia mortality will be monitored</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lead</td>
<td>I.i.Coutts and J.D.Myers</td>
</tr>
<tr>
<td>Tool</td>
<td>The British Thoracic Society pneumonia admission bundle is being piloted within the Royal Cornwall Hospital. Data is submitted to the periodic British Thoracic Society pneumonia audit database. Mortality data is obtained from Dr Foster.</td>
</tr>
<tr>
<td>Frequency</td>
<td>The admission bundle project is ongoing. The BTS national audit occurs annually. Mortality data is produced continuously.</td>
</tr>
<tr>
<td>Reporting arrangements</td>
<td>Reports go to the audit committee The respiratory physicians meet and examine all audit data monthly at our governance meeting and the meeting is minuted.</td>
</tr>
<tr>
<td>Acting on recommendations and Lead(s)</td>
<td>Recommendations will be reported to relevant managers and clinicians for implementation.</td>
</tr>
<tr>
<td>Change in practice and lessons to be shared</td>
<td>The pneumonia admission bundle project requires constant monitoring and the implementation of any changes that are required to improve performance. Changes in antibiotic treatment are widely publicized when they occur.</td>
</tr>
</tbody>
</table>

4. Equality and Diversity

4.1. This document complies with the Royal Cornwall Hospitals NHS Trust service Equality and Diversity statement.

4.2. Equality Impact Assessment

The Initial Equality Impact Assessment Screening Form is at Appendix 2.
Appendix 1. Pathway Process
The CAP pathway has been published separately – available via Document Library (search for ‘pneumonia’ or click here)
### Appendix 2. Governance Information

<table>
<thead>
<tr>
<th>Document Title</th>
<th>Hospital management of community acquired pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date Issued/Approved:</td>
<td>14 Oct 13</td>
</tr>
<tr>
<td>Date Valid From:</td>
<td>14 Oct 13</td>
</tr>
<tr>
<td>Date Valid To:</td>
<td>14 Oct 16</td>
</tr>
<tr>
<td>Directorate / Department responsible (author/owner):</td>
<td>Respiratory Medicine – Ian Coutts, Chest Physician</td>
</tr>
<tr>
<td>Contact details:</td>
<td>01872 252721</td>
</tr>
<tr>
<td>Brief summary of contents</td>
<td>Advice on the diagnosis and management of community acquired pneumonia.</td>
</tr>
<tr>
<td>Suggested Keywords:</td>
<td>Pneumonia, CURB65 score, antibiotics</td>
</tr>
<tr>
<td>Target Audience</td>
<td>RCHT</td>
</tr>
<tr>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Executive Director responsible for Policy:</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Date revised:</td>
<td>14 Oct 13</td>
</tr>
<tr>
<td>This document replaces (exact title of previous version):</td>
<td>Hospital management of community acquired pneumonia</td>
</tr>
<tr>
<td>Approval route (names of committees)/consultation:</td>
<td>Reviewed by all five chest physicians, microbiology, senior nursing staff on Wellington Ward and pharmacists concerned with antibiotic policy and electronic prescribing.</td>
</tr>
<tr>
<td>Divisional Manager confirming approval processes</td>
<td>Stella Ellis</td>
</tr>
<tr>
<td>Name and Post Title of additional signatories</td>
<td>Not Required</td>
</tr>
<tr>
<td>Signature of Executive Director giving approval</td>
<td>{Original Copy Signed}</td>
</tr>
<tr>
<td>Publication Location (refer to Policy on Policies – Approvals and Ratification):</td>
<td>Internet &amp; Intranet</td>
</tr>
<tr>
<td>Document Library Folder/Sub Folder</td>
<td>Clinical/Respiratory</td>
</tr>
<tr>
<td>Links to key external standards</td>
<td>None</td>
</tr>
<tr>
<td>Related Documents:</td>
<td>None</td>
</tr>
</tbody>
</table>
**Training Need Identified?**  No

**Version Control Table**

<table>
<thead>
<tr>
<th>Date</th>
<th>Version No</th>
<th>Summary of Changes</th>
<th>Changes Made by (Name and Job Title)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Jun 10</td>
<td>V1.0</td>
<td>Initial Issue</td>
<td></td>
</tr>
<tr>
<td>14 Oct 13</td>
<td>V2.0</td>
<td>JAC EPMA detail added. Reformat.</td>
<td>Ian Coutts, Chest Physician</td>
</tr>
</tbody>
</table>

**All or part of this document can be released under the Freedom of Information Act 2000**

**This document is to be retained for 10 years from the date of expiry.**

**This document is only valid on the day of printing**

**Controlled Document**

This document has been created following the Royal Cornwall Hospitals NHS Trust Policy on Document Production. It should not be altered in any way without the express permission of the author or their Line Manager.
Appendix 3. Initial Equality Impact Assessment Form

<table>
<thead>
<tr>
<th>Name of the strategy / policy / proposal / service function to be assessed (hereafter referred to as policy)</th>
<th>Provide brief description: Hospital management of community acquired pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Directorate and service area:</td>
<td>Respiratory</td>
</tr>
<tr>
<td>Name of individual completing assessment:</td>
<td>Ian Coutts</td>
</tr>
<tr>
<td>Telephone:</td>
<td>01872 252721</td>
</tr>
</tbody>
</table>

1. Policy Aim*
   Who is the strategy / policy / proposal / service function aimed at? Clinical staff involved in the diagnosis and management of pneumonia in hospital.

2. Policy Objectives*
   To ensure that the diagnosis of pneumonia is considered when appropriate and properly confirmed and to improve the care of patients in whom the diagnosis is made.

3. Policy – intended Outcomes*
   Improved diagnosis and care.

4. *How will you measure the outcome? By audit

5. Who is intended to benefit from the policy? Hospital staff who use the guideline and patients with pneumonia.

6a) Is consultation required with the workforce, equality groups, local interest groups etc. around this policy? No

b) If yes, have these *groups been consulted?

C). Please list any groups who have been consulted about this procedure.

7. The Impact
   Please complete the following table.

<table>
<thead>
<tr>
<th>Equality Strands:</th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td>No</td>
</tr>
</tbody>
</table>

Are there concerns that the policy could have differential impact on:

<p>| Rationale for Assessment / Existing Evidence |
|---|---|---|
| Age | No |</p>
<table>
<thead>
<tr>
<th></th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex (male, female, transgender / gender reassignment)</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Race / Ethnic communities /groups</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Disability - learning disability, physical disability, sensory impairment and mental health problems</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Religion / other beliefs</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Marriage and civil partnership</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Pregnancy and maternity</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Sexual Orientation, Bisexual, Gay, heterosexual, Lesbian</strong></td>
<td>No</td>
</tr>
</tbody>
</table>

You will need to continue to a full Equality Impact Assessment if the following have been highlighted:
- You have ticked “Yes” in any column above and
- No consultation or evidence of there being consultation- this excludes any policies which have been identified as not requiring consultation. or
- Major service redesign or development

8. Please indicate if a full equality analysis is recommended. No

9. If you are not recommending a Full Impact assessment please explain why.

Signature of policy developer / lead manager / director

Date of completion and submission

Names and signatures of members carrying out the Screening Assessment

1. Ian Coutts

2. Keep one copy and send a copy to the Human Rights, Equality and Inclusion Lead, c/o Royal Cornwall Hospitals NHS Trust, Human Resources Department, Knowledge Spa, Truro, Cornwall, TR1 3HD

A summary of the results will be published on the Trust’s web site.

Signed __________________________

Date __________________________