Considered judgement on quality of evidence

Key question: Can low risk patients be discharged safely on the day of presentation?

1. Volume of evidence

Comment here on any issues concerning the quantity of evidence available on this topic and its methodological quality.

Up to end of 2006

BTS 2004 recommended use of CURB-65 or PSI to identify low risk patients to be managed at home based on one large cluster RCT (Marrie 2000).

Intervention studies

Three additional clinical trials and one prospective, observational, controlled cohort study have been published:

Two patient level RCTs of discharge of low risk patients with 279 patients

1. Carratala (Spain; 2 hospitals, randomised 224 of 427 low risk patients (PSI I-III) from a total sample of 948 patients with CAP)
2. Richards (New Zealand, 1 hospital, randomised 55 low risk (CURB-65 0-2) from a total sample of 540 patients with CAP. Inclusion criteria were living in the metropolitan area, adequate housing and not living alone.

One cluster RCT

- Yealy (USA, randomised 32 hospitals. The trial included 3219 patients of whom 1901 were low risk, PSI I-III)

One prospective, observational, controlled cohort study

- Renaud (France) observed outcomes in 16 hospitals, of which 8 used PSI to identify low risk patients and 8 did not. The study included 925 patients.

Observational studies

Seven studies provide information about the characteristics of low risk patients admitted to 44 hospitals in Canada (Marrie), Spain (Espana, Ortega) and the USA (Aliyu, Arnold, Goss and Labarere), with a total of 6333 patients in the 7 studies.

2007-10

A secondary propensity adjusted analysis of data from RCT (Laberere, USA) showed that outpatient treatment was associated with a more rapid return to usual activities and to work, and with no increased risk of mortality.

A retrospective observational study (Seymann, USA) of patients presenting with CAP and low risk scores (PSI I-III) showed that low-risk inpatients who were admitted had a significant length of stay, suggesting that clinical judgment appropriately superseded the PSI in these cases.

2. Applicability

Comment here on the extent to which the evidence is directly applicable to the NHS in Scotland.

Richards included an outreach team from the hospital who cared for the patients discharged. Equivalent resources may not be available throughout NHS Scotland.

Studies in 2010 update from USA where PSI is used rather than CURB-65, however there is evidence that these scores have similar accuracy in identifying low risk patients.

3. Generalisability

Comment here on how reasonable it is to generalise from the results of the studies used as evidence to the target population for this guideline.

The method of identification of low risk patients was either CURB-65 or PSI, which has been shown to be equivalent to CURB-65 (see Severity Assessment Considered Judgement). The populations in the studies are the same as our target population.

4. Consistency

Comment here on the degree of consistency demonstrated by the available of evidence. Where there are conflicting results, indicate how the group formed a judgement as to the overall direction of the evidence

Intervention studies

The two patient level RCTs both showed no difference in clinical outcome between patients managed at home or in hospital. However, both trials indicated that patients had a strong preference for management at home. Carratala provides strong evidence to support management of low risk patients in the community. The trial included 224 patients, which was 52% of the 427 patients who presented with low risk pneumonia. Only 45 (10%) patients refused to participate, the remaining patients were excluded based on pre-specified co-morbidity and social criteria. The 30 day readmission rates were 6.3% for patients managed at home *versus* 7.0% for patients managed in the hospital (risk difference -0.7%, 95% CI from -7.2% to +5.9%, p>0.2). The study by Richards was very small (55 patients) and only included 10% of patients that presented with pneumonia.

Both the cluster randomised trial and the multicentre controlled cohort study show that use of a guideline for identification of low risk patients is associated with discharge of a higher proportion of patients with no change in risk of readmission. In the cluster randomised trial (Yealy) the intervention was associated with an increase in discharge of low risk patients, from 37% in the control hospitals to 61% in the intervention hospitals. However, there was no significant difference in clinical outcomes between the hospitals, readmission within 30 days occurred in 6.6% of patients from the control hospitals and 6.1% of patients from the intervention hospitals (p=0.99).

In the prospective, observational, controlled cohort study (Renaud) the 8 hospitals that used PSI discharged 43% of low risk patients, in comparison with 24% for the 8 hospitals that did not use PSI. Readmission within 30 days occurred in 10.1% of patients discharged from the PSI hospitals *versus* 12.3% discharged from the other hospitals (adjusted OR 0.83, 95%CI 0.22-3.10)

Observational studies

There were marked differences between the populations in the seven studies, in part because of differing exclusion criteria. Only one study (Arnold) had no exclusion criteria. Only two studies (Labarere, Marrie 2005) used multivariate analysis to identify factors that were independently associated with hospital admission. Some of the findings are probably specific to the healthcare system and setting, for example in two studies from the USA hospitalised patients were more likely to have health insurance (Aliyu and Labarere), whereas in a study from a public hospital in the USA admitted patients were more likely to be homeless (Arnold)

Despite these differences there are some consistent findings between the studies:

1. Age was not an independent risk factor for hospital admission in either of the multivariate analyses
2. There are six factors that may be present in patients classified as low risk by CURB65 or PSI and may justify hospital admission (Table 1)
    a. Decompensated co-existing illness
    b. Unmet social needs
    c. Lack of response to appropriate antibiotic therapy in the community
    d. Inability to maintain oral intake
    e. Hypoxia or hypotension
    f. Pleural effusion or bilateral infiltrates on CXR

One study (Espana) used eight pre-defined criteria to assess the presence of these additional factors. Patients who were in the PSI low risk group and had one or more of these additional factors had lower mortality than patients in the PSI high risk group (2% *versus* 15%). However, complication rates in survivors were similar (13% *versus* 11%). In contrast there were no deaths or complications amongst 72 patients who were admitted despite being low risk according to PSI and having none of the additional factors to justify admission. These 72 patients accounted for 40% of admissions with

low risk CAP.
In one study (Goss) admissions for low risk CAP accounted for 45% of all CAP bed days and 35% of total CAP costs.
Both observational studies published since 2006 (Labarere, Seymann) suggests that physician judgement does identify patients at risk of worse outcome despite being "low risk" according to PSI and that this judgement is not just confined to hypoxic patients

5. Clinical impact

Comment here on the potential clinical impact that the intervention in question might have – e.g. size of patient population; magnitude of effect; relative benefit over other management options; resource implications; balance of risk and benefit.

Tayside recorded 6 avoidable admissions and 30 avoidable bed days per winter month due to admission of patients with low risk CAP and no other factor to justify hospital admission. This extrapolates to 100 avoidable admissions and 500 bed days per month in Scotland.

Nothing new to add.

6. Other factors

Indicate here any other factors that you took into account when assessing the evidence base.

None

7. Evidence statement *Please summarise the development group's synthesis of the evidence relating to this key question, taking all the above factors into account, and indicate the evidence level which applies.*	**Evidence level**
The evidence suggests that CURB65 or PSI cannot be used alone in identifying low risk patients who can be managed safely at home and that several factors in addition to hypoxia need to be taken into consideration in the decision to admit patients.	1^{++} 2^{+}
8. Recommendation *What recommendation(s) does the guideline development group draw from this evidence? Please indicate the grade of recommendation(s) and any dissenting opinion within the group.*	**Grade of recommendation**
2010 update – Patients with CURB-65 0–1 should be considered for treatment at home taking into account co-morbidities and psychosocial factors. However, discharge of low risk patients should not be part of the care bundle because there are currently no reliable objective criteria for identification of low risk patients.	**C**

Table: Summary of exclusion criteria and characteristics of hospitalised patients in studies of factors influencing of patients with low risk CAP.

Determinant	**Exclusion criteria**	**Hospitalised patients were more likely to have:**
Age	>50 years old or nursing home resident (Aliyu)	No age effect after adjusting for other variables (Labarere, Marrie 2005)
Immunocompromised	HIV (Aliyu, Goss), any immunocompromising condition (Espana, Labarere, Ortega, Marrie 2005), corticosteroid therapy (Espana, Marrie 2005, Ortega)	Therapy with corticosteroids (Labarere)
Medical condition other than CAP requiring hospitalisation	Admitted for diagnostic workup or treatment of a concomitant medical condition (Espana). Major renal, hepatic, cardiac or malignant condition (Aliyu). Lung cancer (Ortega)	One or more conditions not included in the PSI e.g. prior history of coronary artery disease (Arnold, Goss, Labarere). Evidence of decompensated coexisting illnesses (Espana)
Unmet social needs	Illicit drug use within the past 30 days or social problems incompatible with outpatient treatment (Labarere)	Medical insurance (Aliyu, Labarere) homelessness (Goss), live in a poor area (Marrie 2005) substance abuse or alcoholism (Goss) or social problems (Espana)
Previous hospitalisation	Within 7 days (Goss, Ortega), 14 days (Espana) or 30 days (Aliyu)	
Previous antibiotic therapy	Failed outpatient therapy (Aliyu)	More likely to have had previous antibiotics (Arnold, Espana, Goss and Labarere)
Oral intake	Poor oral intake or persistent nausea (Aliyu)	Nausea or diarrhoea (Marrie 2005), inability to maintain oral intake (Espana)
Hypoxaemia		SaO_2 <90% (Arnold, Espana and Goss) or receiving oxygen (Labarere).
Other vital signs		Pyrexia or tachycardia (Aliyu), tachypnoea (Marrie 2005)
Complications of pneumonia		Bilateral involvement (Espana), pleural effusion (Arnold, Espana) or multilobar involvement (Labarere)
Cognitive or psychiatric impairment	Laberere: excluded patients with stupor, coma, severe dementia, delirium, psychiatric illness, acute confusion or disorientation that may affect compliance with oral antibiotic regimen or other outpatient treatments.	Goss and Marrie 2005 included altered mental status as a variable. Other studies did not provide information about mental status.