市中肺炎の予後（PORT スタディと CURB-65 スコア）（080126）

市中肺炎 community acquired pneumonia (CAP)の予後に関しての論文で有名なのは PORT スタディである。ただし、結構細かく評価しなければならないので面倒くさい。そもそも、予後の推定といっても、重症そうな患者は点数が高いし、軽症そうな患者は点数が低い。実際に PORT スタディのスコアがとても役に立っているという実感は無い・・・。私の診療所では入院させたくても入院施設までは数十キロはあるので、そう気軽に入院も勧められないし・・・。バイタルが安定していれば外来で治療を開始して、数日後の反応を見て入院の判断を行うことが多い。困ったことに、バイタルが悪くても、「死んでもいいからここで何とかしてくれ！」という患者もいる・・・。

今回は、PORT スタディを復習して、CURB-65 というより簡便な予後評価スコアに関する論文も読んでみた。

●PORT スタディ

PORT スタディに関しては肺炎の予後評価の有名なスケールなので、耳にすることは多いと思う。。まず、以下の項目（Step1）をチェック。どれも当てはまらなければ Class I となるが、一つでも当てはまるものがあれば Step2にすすんでポイントを計算することになる。まあ、診療所に来る肺炎患者はほぼすべて Step2へすすむことになる・・・・。

□ more than 50 years of age（50 歳以上）
□ Neoplastic disease（悪性腫瘍）
□ Congestive heart failure（心不全）
□ Cerebrovascular disease（脳血管障害）
□ Renal disease（腎疾患）
□ Liver disease（肝疾患）
□ Altered mental status（精神状態の異常）
□ Pulse≧125/minute（脈拍 125 以上）
□ Respiratory rate≧30/minute（呼吸数 30 以上）
□ Systolic blood pressure＜90 mm Hg（血圧 90 未満）
□ Temperature＜35℃ or≧40℃（体温 35℃未満、または 40℃以上）

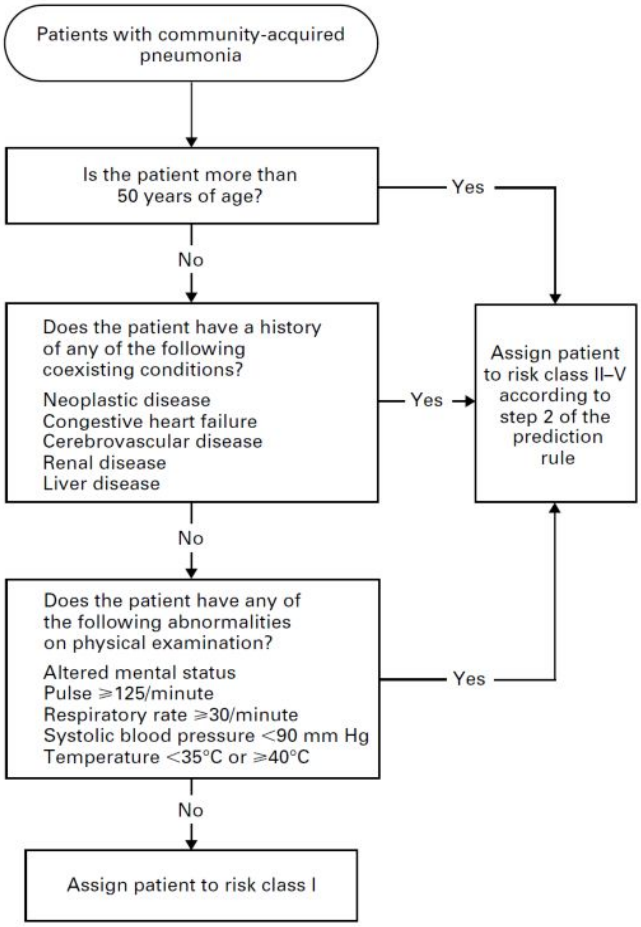

Figure 1. Identifying Patients in Risk Class I in the Derivation of the Prediction Rule.
In step 1 of the prediction rule, the following were independently associated with mortality: an age of more than 50 years, five coexisting illnesses (neoplastic disease, congestive heart failure, cerebrovascular disease, renal disease, and liver disease), and five physical-examination findings (altered mental status; pulse, ≥125 per minute; respiratory rate, ≥30 per minute; systolic blood pressure, <90 mm Hg; and temperature, <35°C or ≥40°C). In the derivation cohort, 1372 patients (9.7 percent) with none of these 11 risk factors were assigned to risk class I. All 12,827 remaining patients were assigned to risk class II, III, IV, or V according to the sum of the points assigned in step 2 of the prediction rule (see Tables 2 and 3).

（参考文献 1 より引用）

Step2では以下の各項目に関して点数をつけ、その点数で予後が推定できるという仕組みになっている。

Demographic factor 背景 身体所見

Age 年齢 Men 男性(50 歳こえた)	年齢数
Women 女性(〃)	年齢数 －10
Nursing home resident ナーシングホーム居住者	＋10
体温 35℃未満または 40℃以上	＋15

Coexisting illnesses 合併症

☐ Neoplastic disease 悪性腫瘍 ＋30
☐ Liver disease 肝疾患 ＋20
☐ Congestive heart failure うっ血性心不全 ＋10
☐ Cerebrovascular disease 脳血管障害 ＋10
☐ Renal disease 腎疾患 ＋10

Physical-examination findings 身体所見

☐ Altered mental status 精神状態の変化 ＋20
☐ Respiratory rate ≧30/min 呼吸数 30/分以上 ＋20
☐ Systolic blood pressure ＜90 mm Hg 収縮期血圧 90mmHg 未満 ＋20
☐ Temperature＜35° C or ≧40° C 体温 35℃未満または 40℃以上 ＋15
☐ Pulse ≧125/min 脈拍数 125/分以上 ＋10

Laboratory and radiographic findings 検査値

☐ Arterial pH _7.35 pH 7.35 未満 ＋30
☐ Blood urea nitrogen≧30 mg/dl BUN 10.7mmol/L 以上 ＋20
☐ Sodium＜130 mmol/liter Na 130 mEq/L 未満 ＋20
☐ Glucose≧250 mg/dl (14 mmol/liter)グルコース 13.9mmol/L 以上 ＋10
☐ Hematocrit ＜30% Ht 30%未満 ＋10
☐ Partial pressure of arterial oxygen＜60 mm Hg § PaO2 60Torr 未満（SpO2 90%未満） ＋10
☐ Pleural effusion 胸水 ＋10

TABLE 2. POINT SCORING SYSTEM FOR STEP 2 OF THE PREDICTION RULE FOR ASSIGNMENT TO RISK CLASSES II, III, IV, AND V.

CHARACTERISTIC	POINTS ASSIGNED*
Demographic factor	
Age	
Men	Age (yr)
Women	Age (yr) − 10
Nursing home resident	+10
Coexisting illnesses†	
Neoplastic disease	+30
Liver disease	+20
Congestive heart failure	+10
Cerebrovascular disease	+10
Renal disease	+10
Physical-examination findings	
Altered mental status‡	+20
Respiratory rate ≥30/min	+20
Systolic blood pressure <90 mm Hg	+20
Temperature <35°C or ≥40°C	+15
Pulse ≥125/min	+10
Laboratory and radiographic findings	
Arterial pH <7.35	+30
Blood urea nitrogen ≥30 mg/dl (11 mmol/liter)	+20
Sodium <130 mmol/liter	+20
Glucose ≥250 mg/dl (14 mmol/liter)	+10
Hematocrit <30%	+10
Partial pressure of arterial oxygen <60 mm Hg§	+10
Pleural effusion	+10

*A total point score for a given patient is obtained by summing the patient's age in years (age minus 10 for women) and the points for each applicable characteristic. The points assigned to each predictor variable were based on coefficients obtained from the logistic-regression model used in step 2 of the prediction rule (see the Methods section).

†Neoplastic disease is defined as any cancer except basal- or squamous-cell cancer of the skin that was active at the time of presentation or diagnosed within one year of presentation. Liver disease is defined as a clinical or histologic diagnosis of cirrhosis or another form of chronic liver disease, such as chronic active hepatitis. Congestive heart failure is defined as systolic or diastolic ventricular dysfunction documented by history, physical examination, and chest radiograph, echocardiogram, multiple gated acquisition scan, or left ventriculogram. Cerebrovascular disease is defined as a clinical diagnosis of stroke or transient ischemic attack or stroke documented by magnetic resonance imaging or computed tomography. Renal disease is defined as a history of chronic renal disease or abnormal blood urea nitrogen and creatinine concentrations documented in the medical record.

‡Altered mental status is defined as disorientation with respect to person, place, or time that is not known to be chronic, stupor, or coma.

§In the Pneumonia PORT cohort study, an oxygen saturation of less than 90 percent on pulse oximetry or intubation before admission was also considered abnormal.

（参考文献 1 より引用）

Step2で計算された点数でⅠ～ⅤのClass分けを行う。死亡率と推奨される治療場所は以下のようになっている。

クラス	点数	死亡率	治療場所
I		0.1%	外来
II	70 点以下	0.6%	外来
III	71-90	2.8%	入院（短期）
IV	91-130	8.2%	入院
V	131 以上	29.2	入院

TABLE 3. COMPARISON OF RISK-CLASS–SPECIFIC MORTALITY RATES IN THE DERIVATION AND VALIDATION COHORTS.*

RISK CLASS (NO. OF POINTS)†	MEDISGROUPS DERIVATION COHORT		MEDISGROUPS VALIDATION COHORT		PNEUMONIA PORT VALIDATION COHORT					
					INPATIENTS		OUTPATIENTS		ALL PATIENTS	
	no. of patients	% who died	no. of patients	% who died	no. of patients	% who died	no. of patients	% who died	no. of patients	% who died
I	1,372	0.4	3,034	0.1	185	0.5	587	0.0	772	0.1
II (≤70)	2,412	0.7	5,778	0.6	233	0.9	244	0.4	477	0.6
III (71–90)	2,632	2.8	6,790	2.8	254	1.2	72	0.0	326	0.9
IV (91–130)	4,697	8.5	13,104	8.2	446	9.0	40	12.5	486	9.3
V (>130)	3,086	31.1	9,333	29.2	225	27.1	1	0.0	226	27.0
Total	14,199	10.2	38,039	10.6	1343	8.0	944	0.6	2287	5.2

*There were no statistically significant differences in overall mortality or mortality within risk class among patients in the MedisGroups derivation, MedisGroups validation, or overall Pneumonia PORT validation cohort. The P values for the comparisons of mortality across risk classes are as follows: class I, P = 0.22; class II, P = 0.67; class III, P = 0.12; class IV, P = 0.69; and class V, P = 0.09.

†Inclusion in risk class I was determined by the absence of all predictors identified in step 1 of the prediction rule. Inclusion in risk classes II, III, IV, and V was determined by a patient's total risk score, which was computed according to the scoring system shown in Table 2.

（参考文献 1 より引用）

●CURB-65 score

CURB-65 score は以下の略である。5 項目だけチェックするといいので非常に簡単。簡便さに関しては PORT スタディとは雲泥の差がある。U の尿素は検査をしないと不明だが、それを抜いた評価も紹介されている（CRB-65 score）。これなら忙しい外来でも気軽に評価できる。

□ **C**onfusion（意識混濁：メンタルテストの点数が 8 点以下もしくは失見当識障害）
□ **U**rea >7 mmol/l（BUN）
□ **R**espiratory rate >30/min, low（呼吸数）
□ systolic(<90 mm Hg) or diastolic (<60 mm Hg) **B**lood pressure)（血圧）
□ age >**65** years （年齢）

抄録には死亡率は以下のように紹介されている。

score 0	0.7%
score 1	3.2%
score 2	3%
score 3	17%
score 4	41.5%
score 5	57%

Table 4 Relationship between number of core adverse prognostic features, age ≥65 years, and risk of mortality

		Derivation cohort (n=718)		Validation cohort (n=214)	
Features	No. present	Total	Died (%)	Total	Died (%)
CURB	0	217	3 (1.4)	55	0
	1	247	14 (5.4)	86	5 (5.8)
	2	162	23 (14.2)	46	8 (17.4)
	3	85	28 (32.9)	23	6 (26)
	4	7	1 (14.3)	4	1 (25)
CURB-65	0	137	1 (0.7)	36	0
	1	187	4 (2.1)	54	0
	2	184	17 (9.2)	60	5 (8.3)
	3	138	20 (14.5)	42	9 (21.4)
	4	65	26 (40)	19	5 (26.3)
	5	7	1 (14)	3	1 (33.3)
CRB-65	0	167	2 (1.2)	45	0
	1	266	14 (5.3)	78	4 (5.1)
	2	189	23 (12.2)	62	7 (11.3)
	3	85	28 (32.9)	26	8 (30.8)
	4	11	2 (18.2)	3	1 (33.3)

CURB = **C**onfusion, **U**rea >7 mmol/l, **R**espiratory rate ≥30/min, low **B**lood pressure (systolic <90 mm Hg or diastolic ≤60 mm Hg).
CRB-65 does not include urea and uses only clinical parameters available for patient assessment in the community.

（参考文献 2 より引用）

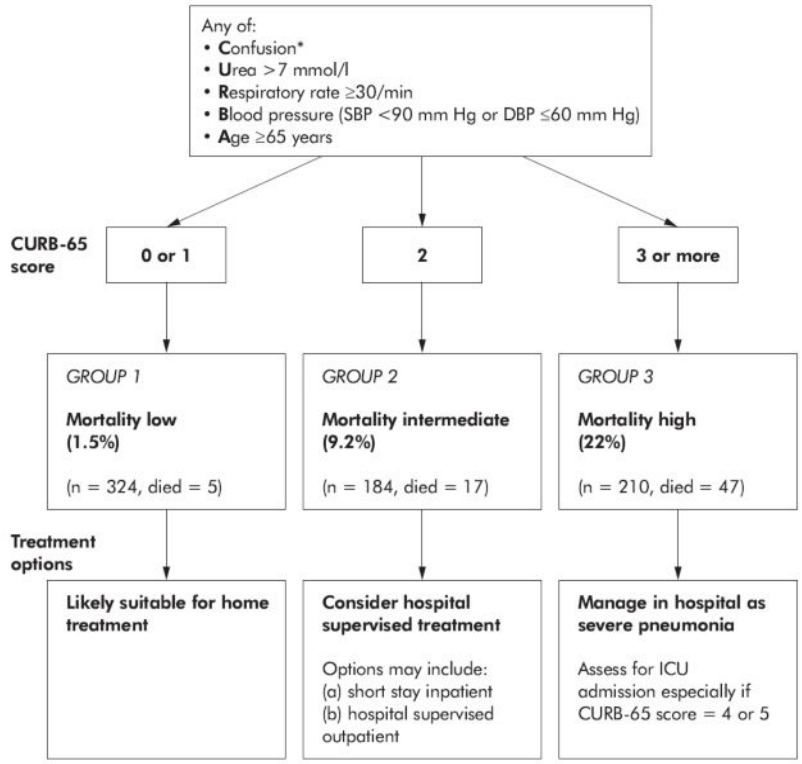

Figure 2 Severity assessment in a hospital setting: the CURB-65 score. One step strategy for stratifying patients with CAP into risk group according to risk of mortality at 30 days when the results of blood urea are available.

（参考文献 2 より引用）

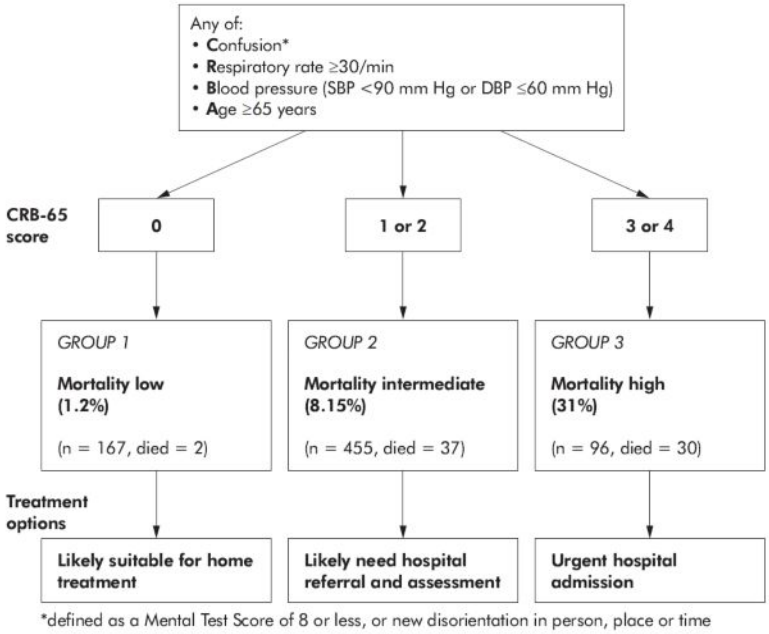

Figure 3 Clinical severity assessment in the community setting: the CRB-65 score. Strategy for stratifying patients with CAP into risk groups in the community using only clinical observations (when blood urea results not available).

（参考文献 2 より引用）

AAFP のホームページには以下のようにまとまったシートが紹介されているので、このようなものを利用してもいいと思う。http://www.aafp.org/fpm/20060400/CURB65.pdf

CURB-65 AND CRB-65 SEVERITY SCORES FOR COMMUNITY-ACQUIRED PNEUMONIA

Clinical factor	Points
Confusion	1
Blood urea nitrogen > 19 mg per dL	1
Respiratory rate ≥ 30 breaths per minute	1
Systolic blood pressure < 90 mm Hg or Diastolic blood pressure ≤ 60 mm Hg	1
Age ≥ 65 years	1
Total points:	

CURB-65 score	Deaths/total (%)*	Recommendation†
0	7/1,223 (0.6)	Low risk; consider home treatment
1	31/1,142 (2.7)	
2	69/1,019 (6.8)	Short inpatient hospitalization or closely supervised outpatient treatment
3	79/563 (14.0)	Severe pneumonia; hospitalize and consider admitting to intensive care
4 or 5	44/158 (27.8)	

CRB-65 score‡	Deaths/total (%)*	Recommendation†
0	2/212 (0.9)	Very low risk of death; usually does not require hospitalization
1	18/344 (5.2)	Increased risk of death; consider hospitalization
2	30/251 (12.0)	
3 or 4	39/125 (31.2)	High risk of death; urgent hospitalization

CURB-65 = Confusion, Urea nitrogen, Respiratory rate, Blood pressure, 65 years of age and older.

CRB-65 = Confusion, Respiratory rate, Blood pressure, 65 years of age and older.

*—Data are weighted averages from validation studies.[1,2]

†—Recommendations are consistent with British Thoracic Society guidelines.[3] Clinical judgment may overrule the guideline recommendation.

‡—A CRB-65 score can be calculated by omitting the blood urea nitrogen value, which gives it a point range from 0 to 4. This score is useful when blood tests are not readily available.

1. Aujesky D, Auble TE, Yealy DM, Stone RA, Obrosky DS, Meehan TP, et al. Prospective comparison of three validated prediction rules for prognosis in community-acquired pneumonia. *Am J Med.* 2005;118:384-392.

2. Lim WS, van der Eerden MM, Laing R, Boersma WG, Karalus N, Town GI, et al. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. *Thorax.* 2003;58:377-382.

3. British Thoracic Society Pneumonia Guidelines Committee. BTS guidelines for the management of community-acquired pneumonia in adults - 2004 update. Available at http://www.brit-thoracic.org.uk/c2/uploads/MACAPrevisedApr04.pdf. Accessed March 20, 2006.

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1. Fine MJ et al. A prediction rule to identify low-risk patients with community-acquired pneumonia. N Engl J Med. 1997 Jan 23;336(4):243-50.
2. Lim WS et al. Defining community acquired pneumonia severity on presentation to hospital: an international derivation and validation study. Thorax. 2003 May;58(5):377-82.