

Appendix

Outcomes defined

1. Hospitalisation: if clinical admission occurred on the day of the start of the pneumonia registration code or the day after the start of the pneumonia registration code. Calculated as a percentage of the total number of included patients.
2. ICU admission: if a patient spent any amount of time at the ICU during the total time of admission. Calculated as a percentage of the total number of included patients.
3. 30-day mortality: if a patient died within 30 days of the opening of the pneumonia registration code. Calculated as a percentage of the total number of included patients.
4. Readmission: if a patient was discharged from the hospital and readmitted later on. There had to be a minimum of 1 day and a maximum of 7 days between the discharge date and readmission date. Only readmissions linked to the initial pneumonia registration code were included. Calculated as a percentage of the total number of (delayed) admissions.
5. Delayed admission: if a patient was initially discharged from the ED but still admitted to the hospital later on, between the 2nd day and the 7th day after the opening of the pneumonia registration code. Only delayed admissions linked to the initial pneumonia registration code were included. Calculated as a percentage of the total number of initial outpatients.
6. Length of stay: adding up all days the patient was admitted, including possible ICU admission. Days spent in the hospital during readmission were not included in calculating the length of stay.

Comorbidities

Registration codes that were started within 5 years prior to the start of the pneumonia registration code were included. For patients with a pneumonia registration code started in 2018, other registration codes were included from 2013 onward and for patients with a pneumonia registration code started in 2019, other registration codes were included from 2014 onward.

Neoplastic disease

Malignant tumors ear

Malignant tumor cavum oris stage I&II

Malignant tumor cavum oris stage III&IV

Malignant tumor oropharynx stage I&II

Malignant tumor oropharynx stage III&IV

Malignant tumor hypopharynx stage I&II

Malignant tumor hypopharynx stage III&IV

Malignant tumor larynx stage I&II

Malignant tumor larynx stage III&IV

Malignant tumor nasopharynx stage I&II

Malignant tumor nasopharynx stage III&IV

Malignant tumor salivary glands

Malignant tumor neck

Malignant neoplasm thyroid

Malignant neoplasm salivary glands

Malignant mammary neoplasm

Malignant neoplasm esophagus/cardia

Malignant neoplasm gallbladder

Malignant neoplasm pancreas/bile ducts

Malignant neoplasm colon
 Malignant neoplasm recto-sigmoid
 Malignant neoplasm rectum
 Malignant neoplasm stomach, except cardia
 Peritoneal carcinomatosis (HIPEC)
 Other malignant neoplasm abdomen
 Malignant melanoma of the skin
 Malignant neoplasm soft tissue
 Hodgkin's Disease, non-Hodgkin
 Germ cell tumor
 Neuroblastoma
 Metastasis bone
 Malignant neoplasm bone (except metastasis)
 Malignant neopl liver (including metastasis)
 Wilm's tumor
 Metastasis in bone
 Malignant bone
 Malignant soft tissue
 Renal/adrenal tumor
 Lymphnode renal tumor
 Ureteral tumor
 Bladder tumor
 Prostate carcinoma
 Lymph node prostate carcinoma
 Prostate carcinoma (orchidectomy)
 Penis carcinoma
 Testicular tumor
 Lymph node testicular tumor
 Urethral tumor
 Lymph node urethral tumor
 Lymph node bladder tumor
 Lymph node penis carcinoma
 Malignancy vulva
 Malignancy vagina
 Malignancy cervix
 Malignancy endometrium
 Malignancy myometrium
 Malignancy ovary / fallopian tubes
 Malignancy other
 Malignancy thyroid
 Malignancy adrenal gland
 Malignancy, small-cell carcinoma bronchus
 Malignancy, non-small cell carcinoma
 bronchus
 Malignancy thymoma
 Malignancy pleura
 Other malignancy thorax
 Hodgkin lymphoma
 Non-Hodgkin lymphoma low-grade
 Non-Hodgkin lymphoma intermediary/high-
 grade
 Multiple myeloma/primary amyloidosis

Acute lymphatic leukemia
 Chronic lymphatic leukemia, Waldenström's,
 Hairycell
 Acute myeloid leukemia/RAEB-t
 Chronic myeloid leukemia
 Malignancy head-neck
 Malignancy central nervous system (primary)
 Malignancy breast
 Malignancy ovary
 Malignancy cervix
 Malignancy endometrium
 Malignancy testicle
 Malignancy prostate
 Malignancy urinary tract
 Malignancy kidney/renal cell carcinoma
 Other malignancies urogenital tract
 Malignancy bone and joint cartilage
 Malignancy skin/melanoma
 Malignancy soft tissue
 Malignancy other
 Malignancy esophagus/cardia
 Malignancy stomach (except cardia)
 Malignancy pancreas
 Other malignancies digestive tracts
 Esophagus/cardia malignancy
 Stomach carcinoma, except carcinoma of the
 cardia
 Lymphoma
 Colorectal malignancy
 Malignancy in liver
 Cholangiocarcinoma
 Tumors non-small cell lung cancer
 Tumors small cell lung cancer
 Mesothelioma
 Mediastinal tumors
 Metastases of malignancy elsewhere
 Primary malignant neoplasm intracerebral
 Secondary malignant neoplasm intracerebral
 Secondary neoplasm extracerebral
 (metastasis)
 Secondary neoplasm intraspinal (metastasis)
 Secondary neoplasm
 extraspinal/epidural/spine (metastasis)
 Primary leptomas malignant
 Secondary leptomas malignant

Liver disease
 Viral hepatitis (except hepatitis B)
 Alcoholic liver disease
 Drug-induced hepatitis
 Autoimmune hepatitis
 Hepatitis B/C

Liver cirrhosis compensated
Liver cirrhosis decompensated
Hepatitis general
Hepatitis B/C with antiviral therapy
Primary biliary cholangitis, primary sclerosing
cholangitis and autoimmune hepatitis
Cirrhosis compensated
Cirrhosis decompensated
Metabolic liverdisease
Acute liverfailure

Diabetes

DM without secondary complications
DM with secondary complications
DM chronical pump therapy
Diabetes mellitus
Diabetes Mellitus

Pulmonary disease

COPD
Asthma, COPD, emphysema
Asthma
COPD
Cystic Fibrosis
COPD

Congestive heartfailure

Congestive heartfailure
Acute heartfailure
Chronic heartfailure
Congestive heartfailure

Cerebrovascular disease

Cerebrovascular accident/transient ischemic
attack
Intracerebral bleeding
Ischemic stroke
TIA (including amaurosis fugax)
CVA/TIA

Chronic renal disease

Chronic renal insufficiency eGFR 30-60ml/min
Chronic renal insufficiency eGFR<30ml/min
Continuous ambulatory peritoneal dial (CAPD)
Automatic peritoneal dialysis (APD)
Chronic hemodialysis home
Chronic hemodialysis in healthcare institution

Neurologic disease

Parkinson's Disease
ALS
Multiple sclerosis

Myasthenia gravis + myasthenic syndromes
Other neuromuscular disease
Parkinson's / Parkinsonism

Impaired immunity

Intestine transplantation procedure recipient
Islet cell transplantation procedure recipient
Liver transplantation procedure recipient
Partial liver transplantation procedure
recipient
Kidney transplantation procedure recipient
Kidney-pancreas transplantation procedure
recipient
Pancreas transplantation procedure recipient
Liver-kidney transplantation procedure
recipient
Liver-pancreas transplantation procedure
recipient
Liver-pancreas-intestine transplantation
procedure recipient
Intestine transplantation procedure recipient
Islet cell transplantation procedure recipient
Liver transplantation procedure recipient
Partial liver transplantation procedure
recipient
Kidney transplantation procedure recipient
Kidney-pancreas transplantation procedure
recipient
Pancreas transplantation procedure recipient
Liver-kidney transplantation procedure
recipient
Liver-pancreas transplantation procedure
recipient
Liver-pancreas-intestine transplantation
procedure recipient
Intestine transplantation procedure recipient
Liver transplantation procedure recipient
Partial liver transplantation procedure
recipient
Liver-kidney transplantation procedure
recipient
Liver-pancreas transplantation procedure
recipient
Liver-pancreas-intestine transplantation
procedure recipient
Heart transplantation
Lung transplantation
Heart-lung transplantation
Ulcerative colitis
Crohn's Disease (enteritis regionalis)
Ankylosing spondylitis
Sarcoidosis

Behcet's disease
 Psoriatic arthritis
 Ankylosing spondylitis
 Reumatoid arthritis
 SLE/MCTD
 (dermato)Myositis
 Sjögren's syndrome
 Scleroderma, CREST syndrome
 Systemic vasculitis
 Allergic, IgA vasculitis
 Crohn's Disease
 Ulcerative colitis
 Crohn's Disease
 Ulcerative colitis
 Reumatoid arthritis
 Psoriatic arthritis (mainly peripheral)
 Still's disease, Adult onset
 Ankylosing spondylitis
 Psoriatic arthritis (mainly axial)
 SLE
 Cutaneous LE
 CREST syndrome
 Scleroderma
 MCTD
 Poly- / Dermatomyositis
 PAN / microscopic polyangiitis
 Granulomatosis with polyangiitis
 Sarcoidosis
 Amyloidosis (primary/secondary)
 Polychondritis, recurring
 Behcet's disease
 Takayasu's arteritis
 Eosinophilic granulomatosis with polyangiitis

Atherosclerosis limbs/peripheral artery disease
 Chronic care patient cardiovascular risk factors
 Angina pectoris, stable
 Angina pectoris, unstable
 ST elevation myocardial infarction
 Non-ST elevation myocardial infarction
 Arterial abnormality / stenosis
 Follow-up after acute coronary syndrome
 Follow-up after PCI and/or CABG
 Follow-up after pacemaker implantation
 Follow-up ICD after implantation/external defibrillator
 Pacemaker implantation
 AICD implantation
 CABG, venous graft, maximum 1 arterial graft
 CABG (>=2 arterial grafts)
 CABG (1 art) + MVR
 CABG (1 art) + AVR
 Left ventricle plasty+CABG
 CABG + MPL +/- TPL
 CABG (2 art) + MVR
 CABG (1art) + AVR + MVR
 CABG (2 art) + AVR
 CABG + HOCCM
 VT + CABG
 Maze + CABG
 VSR + CABG
 MPL + AVR + CABG
 MPL + CABG (2 art)
 AVR + CABG + HOCCM
 Aortic root + CABG
 Aortic dissection +/- CABG
 Ascending aorta + CABG
 Aortic root + CABG + MPL/MVR
 Maze+CABG of AVR+MPL +/- TPL
 Implantation LVAD
 Carotid endarterectomy (CEA)
 CEA bilateral

Cardiovascular disease

PAOD arm
 PAOD 2, intermittend claudication
 PAOD 3, rest pain
 PAOD 4, gangrene

Medication

The use of medication was included if a patient was issued at least two gifts within a year prior to the start of their pneumonia registration code, in order to only include chronic users.

Diabetes medication

Insulin (human)	Insulin lispro
Insulin lispro	Insulin aspart
Insulin aspart	Insulin degludec with insulin aspart
Insulin glulisine	Insulin glargine
Insulin (human)	Insulin detemir
Insulin (human)	Insulin degludec

Insulin glargine with lixisenatide
Insulin degludec with liraglutide
Insulin (human)
Metformin
Glibenclamide
Tolbutamide
Gliclazide
Glimepiride
Metformin with sulfonylureas
Metformin with pioglitazone
Metformin with sitagliptin
Metformin with vildagliptin
Metformin with saxagliptin
Metformin with linagliptin
Metformin with dapagliflozin
Metformin with canagliflozin
Metformin with empagliflozin
Metformin with ertugliflozin

Acarbose
Pioglitazone
Sitagliptin
Vildagliptin
Saxagliptin
Linagliptin
Exenatide
Liraglutide
Lixisenatide
Dulaglutide
Semaglutide
Dapagliflozin
Canagliflozin
Empagliflozin
Ertugliflozin
Repaglinide
Other blood glucose lowering medication,
excluding insulins

Immunosuppressants

Mycophenolic acid (Cellcept[®])
Sirolimus (Rapamune[®])
Leflunomide (Arava[®])
Everolimus (Certican[®])
Fingolimod (Gilenya[®])
Teriflunomide (Aubagio[®])
Ozanimod (Zeposia[®])
Cladribine (Mavenclad[®])
Daclizumab
Ciclosporin (Neoral[®])
Tacrolimus (Prograft[®])
Azathioprine (Imuran[®])
Methotrexate (Injexate[®])
Pirfenidone (Esbriet[®])
Dimethyl fumarate (Tecfidera[®])
Dupilumab
Everolimus
Natalizumab
Abatacept
Eculizumab
Belimumab
Belatacept
Tofacitinib
Apremilast
Vedolizumab
Alemtuzumab
Ocrelizumab
Baricitinib
Upadacitinib
Etanercept
Infliximab

Adalimumab
Certolizumab pegol
Golimumab
Anakinra
Ustekinumab
Tocilizumab
Canakinumab
Secukinumab
Siltuximab
Brodalumab
Ixekizumab
Sarilumab
Guselkumab
Tildrakizumab
Interleukine inhibitors
Pimecrolimus
Mercaptopurine
Tioguanine
Fludarabine
Clofarabine
Nelarabine
Thymocytoglobulin
Filgotinib
Pomalidomide
Rituximab
Basiliximab
Prednisone
Dexamethasone
Methylprednisolone

Supplementary table 1. Multilevel analysis of outcomes of patients with community-acquired pneumonia using CURB-65 versus PSI, including academic hospitals

	CURB-65 (N = 22877)	PSI (N = 17279)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Admission, N (%)	17,307 (75.7)	13,807 (79.9)	0.67 (0.51-0.89)	0.80 (0.64-1.01)
Readmission ^a , N (%)	439 (2.5)	329 (2.3)	1.05 (0.88-1.25)	1.03 (0.86-1.23)
Delayed admission ^b , % N (%)	404 (7.3)	275 (7.9)	0.90 (0.73-1.11)	0.97 (0.79-1.19)
ICU admission ^c , N (%)	2,053 (9.0)	1,395 (8.1)	1.14 (0.97-1.35)	1.14 (0.97-1.35)
30-day mortality ^c , % N (%)	1,955 (8.5)	1,682 (9.7)	0.87 (0.80-0.95)	0.89 (0.82-0.96)

a. Percentage out of the total number of (delayed) admissions

b. Percentage out of the total number of initial outpatients

c. Percentage out of the total number of patients

Readmission was defined as patients who were discharged from the hospital but readmitted within 7 days. Delayed admission was defined as ED pneumonia patients initially treated as outpatients, but who were admitted to the hospital within 7 days. PSI: Pneumonia Severity Index

Supplementary table 2. Multilevel analysis of outcomes of patients with community-acquired pneumonia using either CURB-65 or PSI versus no-consensus hospitals, including academic hospitals

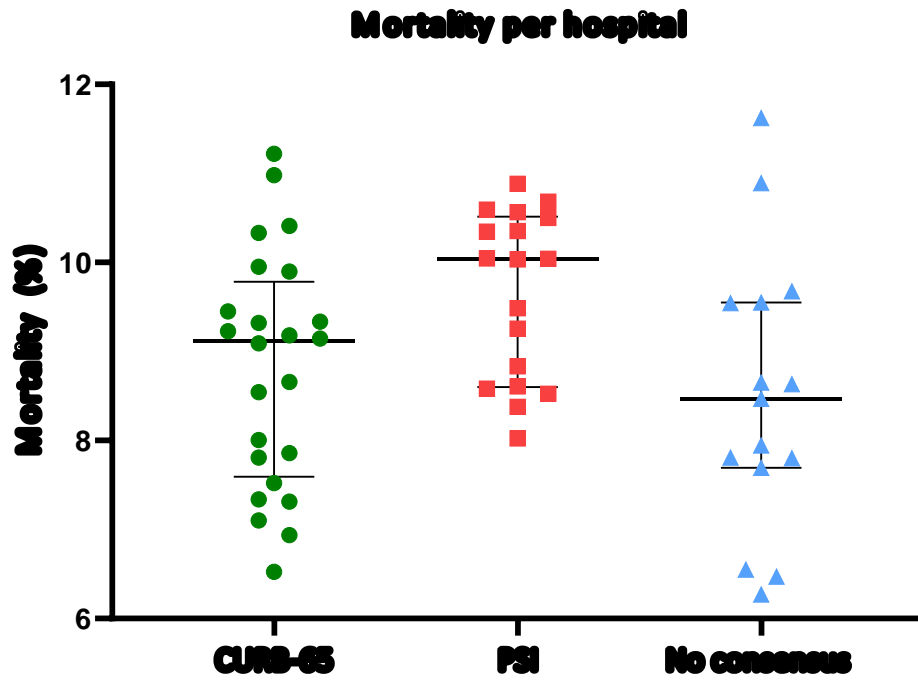
	Consensus (PSI or CURB-65) (N = 40,156)	No consensus (N = 13476)	Unadjusted OR (95% CI)	Adjusted OR (95% CI)
Admission, N (%)	31,114 (77.5)	10,944 (81.2)	0.73 (0.55-0.96)	0.73 (0.59-0.91)
Readmission ^a , N (%)	768 (2.4)	253 (2.3)	1.07 (0.90-1.27)	1.07 (0.90-1.27)
Delayed admission ^b , N (%)	679 (7.5)	204 (8.1)	0.93 (0.75-1.14)	0.94 (0.77-1.15)
ICU admission ^c , N (%)	3,448 (8.6)	1,168 (8.7)	0.96 (0.82-1.13)	0.97 (0.83-1.13)
30-day mortality ^c , N (%)	3,637 (9.1)	1,217 (9.0)	1.02 (0.93-1.12)	1.05 (0.96-1.13)

a. Percentage out of the total number of (delayed) admissions

b. Percentage out of the total number of outpatients

c. Percentage out of the total number of patients

Consensus was defined as a hospital where both the internal and pulmonology department reported the use of the same prognostic score (Either PSI or CURB-65). Readmission was defined as patients who were discharged from the hospital but readmitted within 7 days. Delayed admission was defined as patients initially treated as outpatients, but who were admitted to the hospital within 7 days.



Supplementary figure 1. 30-day mortality with median and interquartile range for all individual hospitals that treated at least 200 individual CAP patients (n=57), grouped by use of prognostic score.

