Table S1 Readcode defining community-acquired pneumonia

Readcode	Medical description
A022200	Salmonella pneumonia
A116.00	Tuberculous pneumonia
A3BX400	Streptococ pneumon/cause/disease classified/oth chapters*
A3BXA00	Mycoplasma pneumoniae [PPLO] cause/dis classifd/oth chaptr*
A3BXB00	Klebsiella pneumoniae/cause/disease classifd/oth chapters
A3By400	Pleuropneumonia-like organism (PPLO) infection
A521.00	Varicella pneumonitis
A54x400	Herpes simplex pneumonia
A551.00	Postmeasles pneumonia
A730.00	Ornithosis with pneumonia
A785000	Cytomegaloviral pneumonitis
A789300	HIV disease resulting in Pneumocystis carinii pneumonia
A789311	HIV disease resulting in Pneumocystis jirovecii pneumonia
AB24.11	Pneumonia - candidal
AB40500	Histoplasma capsulatum with pneumonia
AB41500	Histoplasma duboisii with pneumonia
AyuK900	[X]Mycoplasma pneumoniae [PPLO]cause/dis classifd/oth chaptr*
43n1.00	Mycoplasma pneumoniae antibody level
AyuKA00	[X]Klebsiella pneumoniae/cause/disease classifd/oth chapters*
H062.00	Acute lower respiratory tract infection*
H06z000	Chest infection NOS*
H06z011	Chest infection*
H06z112	Acute lower respiratory tract infection*
H06z200	Recurrent chest infection*
H2...00	Pneumonia and influenza
H20..00	Viral pneumonia
H20..11	Chest infection - viral pneumonia
H200.00	Pneumonia due to adenovirus
H201.00	Pneumonia due to respiratory syncytial virus
H202.00	Pneumonia due to parainfluenza virus
H203.00	Pneumonia due to human metapneumovirus
H20y.00	Viral pneumonia NEC
H20z.00	Viral pneumonia NOS
H21..00	Lobar (pneumococcal) pneumonia
H21..11	Chest infection - pneumococcal pneumonia
H22..00	Other bacterial pneumonia
H22..11	Chest infection - other bacterial pneumonia
H220.00	Pneumonia due to klebsiella pneumoniae
H221.00	Pneumonia due to pseudomonas
H222.00	Pneumonia due to haemophilus influenzae
H222.11	Pneumonia due to haemophilus influenzae
H223.00	Pneumonia due to streptococcus

H223000	Pneumonia due to streptococcus, group B
H224.00	Pneumonia due to staphylococcus
H22y.00	Pneumonia due to other specified bacteria
H22y000	Pneumonia due to escherichia coli
H22y011	E.coli pneumonia
H22y100	Pneumonia due to proteus
H22y200	Pneumonia - Legionella
H22yX00	Pneumonia due to other aerobic gram-negative bacteria
H22yz00	Pneumonia due to bacteria NOS
H22z.00	Bacterial pneumonia NOS
H23..00	Pneumonia due to other specified organisms
H23..11	Chest infection - pneumonia organism OS
H231.00	Pneumonia due to mycoplasma pneumoniae
H232.00	Pneumonia due to pleuropneumonia like organisms
H233.00	Chlamydial pneumonia
H23z.00	Pneumonia due to specified organism NOS
H24..00	Pneumonia with infectious diseases EC
H24..11	Chest infection with infectious disease EC
H240.00	Pneumonia with measles
H241.00	Pneumonia with cytomegalic inclusion disease
H242.00	Pneumonia with ornithosis
H243.00	Pneumonia with whooping cough
H244.00	Pneumonia with tularaemia
H246.00	Pneumonia with aspergillosis
H247000	Pneumonia with candidiasis
H247100	Pneumonia with coccidioidomycosis
H247z00	Pneumonia with systemic mycosis NOS
H24y.00	Pneumonia with other infectious diseases EC
H24y000	Pneumonia with actinomycosis
H24y100	Pneumonia with nocardiasis
H24y200	Pneumonia with pneumocystis carinii
H24y300	Pneumonia with Q-fever
H24y400	Pneumonia with salmonellosis
H24y500	Pneumonia with toxoplasmosis
H24y600	Pneumonia with typhoid fever
H24y700	Pneumonia with varicella
H24yz00	Pneumonia with other infectious diseases EC NOS
H24z.00	Pneumonia with infectious diseases EC NOS
H25..00	Bronchopneumonia due to unspecified organism
H25..11	Chest infection - unspecified bronchopneumonia*
H26..00	Pneumonia due to unspecified organism
H26..11	Chest infection - pnemonia due to unspecified organism
H260.00	Lobar pneumonia due to unspecified organism
H260000	Lung consolidation

H261.00	Basal pneumonia due to unspecified organism
H270.00	Influenza with pneumonia
H270.11	Chest infection - influenza with pneumonia
H270000	Influenza with bronchopneumonia
H270100	Influenza with pneumonia, influenza virus identified
H270z00	Influenza with pneumonia NOS
H28..00	Atypical pneumonia
H2B..00	Community acquired pneumonia
H2y..00	Other specified pneumonia or influenza
H2z..00	Pneumonia or influenza NOS
H530300	Abscess of lung with pneumonia
Hyu0800	[X]Other viral pneumonia
Hyu0A00	[X]Other bacterial pneumonia
Hyu0B00	[X]Pneumonia due to other specified infectious organisms
Hyu0D00	[X]Pneumonia in viral diseases classified elsewhere
Hyu0H00	[X]Other pneumonia, organism unspecified
Hyu1.00	[X]Other acute lower respiratory infections*

Table S2. Subgroup analysis was stratified by age, preexisting chronic pulmonary disease status, and recent use of corticosteroids.

Exposure	Number of patients, n	Number of events, n	Person-Years	Crude incident rate (95% CI)*	HR (95% CI)
Subgroup analysis 1：stratified by age					
Age <75					
Alendronate	1,665	198	3,324	59.6 (51.6 to 68.5)	Reference
Denosumab	340	42	699	60.1 (43.3 to 81.3)	0.99 (0.78 to 1.26)
Age >= 75					
Alendronate	2,987	440	5,171	85.1 (77.3 to 93.4)	Reference
Denosumab	593	86	1,078	79.8 (63.8 to 98.5)	0.96 (0.81 to 1.13)
Subgroup analysis 2：stratified by preexisting chronic pulmonary disease					
Patients who had preexisting chronic pulmonary disease					
Alendronate	860	167	1,476	113.0 (96.6 to 132.0)	Reference
Denosumab	165	37	290	127.0 (89.7 to 176.0)	1.08 (0.84 to 1.39)
Patients did not have preexisting chronic pulmonary disease					
Alendronate	3,792	471	7,018	67.1 (61.2 to 73.5)	Reference
Denosumab	768	91	1,486	61.2 (49.3 to 75.2)	0.94 (0.80 to 1.10)
Subgroup analysis 3：stratified by corticosteroids use in the prior two years before cohort entry					
Patients who had corticosteroid use in the prior two years					
Alendronate	917	177	1,537	115.0 (98.9 to 133.0)	Reference
Denosumab	181	35	350	100.0 (69.7 to 139.0)	0.90 (0.70 to 1.17)
Patients did not have corticosteroid use in the prior two years					
Alendronate	3,735	461	6,958	66.3 (60.3 to 72.6)	Reference
Denosumab	752	93	1,427	65.2 (52.6 to 79.9)	0.99 (0.85 to 1.16)

Note * per 1000 person-years.

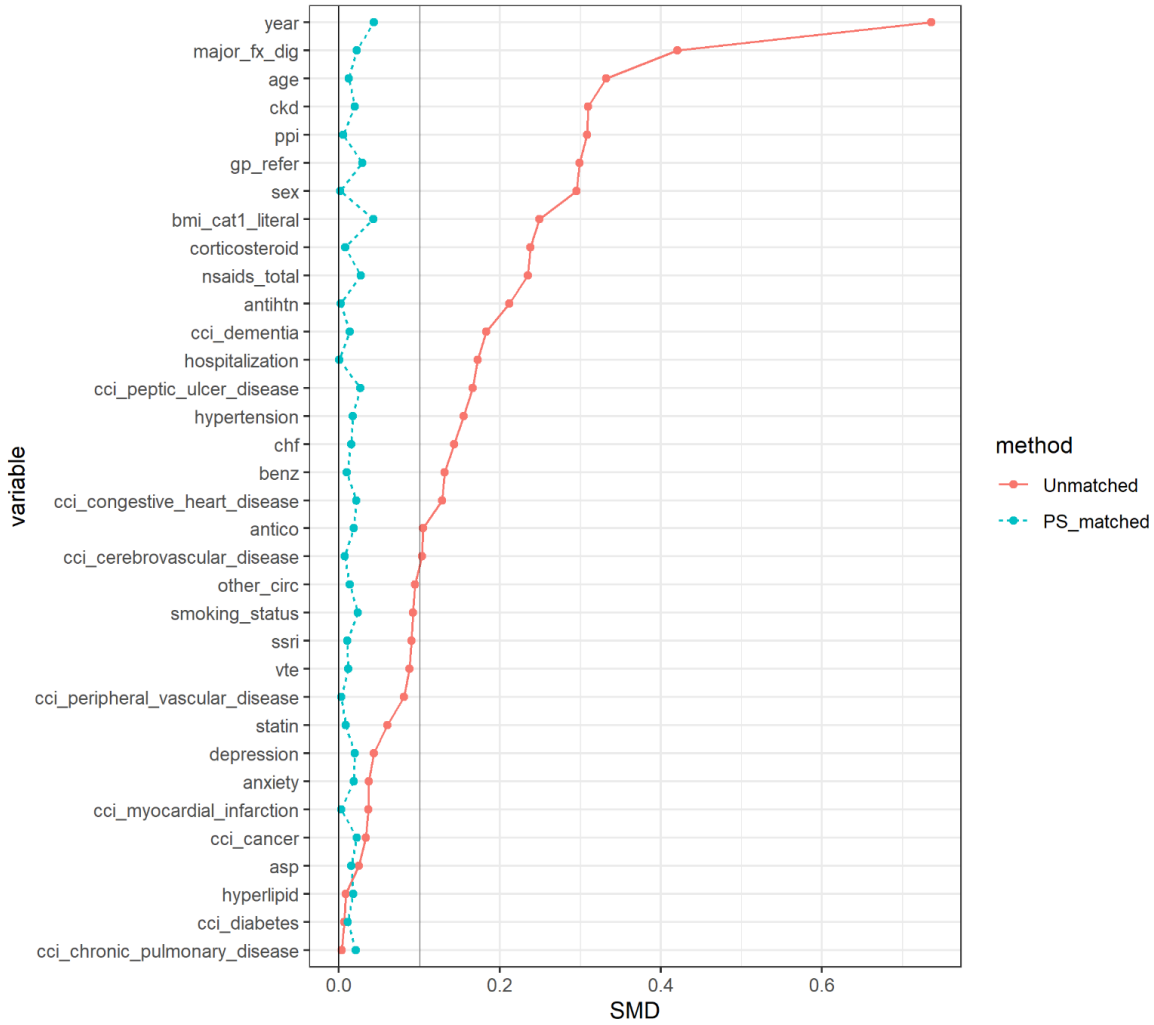

Figure S1 Baseline characteristics difference of the two cohorts before and after propensity score matching