

Supplementary Files

Search Strategy

On PubMed, the search used (**pneumocystis jirovecii**[Title/Abstract] OR **p.jirovecii**[Title/Abstract]) combined, using AND term, with criteria terms including (mortality[MeSH Terms]) OR (morbidity[MeSH Terms]) OR (hospitalisation[MeSH Terms]) OR (disability[All Fields]) OR (drug resistance, fungal[MeSH Terms]) OR (prevention and control[MeSH Subheading]) OR (disease transmission, infectious[MeSH Terms]) OR (diagnostic[Title/Abstract]) OR (antifungal agents[MeSH Terms]) OR (epidemiology[MeSH Terms]) OR (surveillance [Title/Abstract]).

On Web of Science, MeSH terms are not available and therefore topic search (TS), title (TI) or abstract (AB) search was used. The final search used [TI=(**Pneumocystis jirovecii**) OR TI=(**p.jirovecii**)] combined, using AND term, with criteria terms each as topic search, including (mortality) OR (case fatality) OR (morbidity) OR (hospitali*ation) OR (disability) OR (drug resistance) OR (prevention and control) OR (disease transmission) OR (diagnostic) OR (antifungal agents) OR (epidemiology) OR (surveillance). Symbol * allows a truncation search for variations of the term (e.g., hospitalisation or hospitalization).

Table S1 Studies describing risk factors for *Pneumocystis jirovecii*

Author	Year	Study design	Study period	Country	Level of care	Population description	No. of patients	Risk factors
Attia et al.	2015	RCS MC	1996 – 2009	USA	Tertiary	National registry of veterans with HIV-AIDS	Total: 41993	COPD is an independent risk factor for PJP requiring hospitalization IRR: 1.48 (95% CI 1.10 - 2.01)
Azoulay et al.	2018	PCS MC	01/2000 – 02/2015	France	Tertiary	ICU patients with haematological malignancies in acute respiratory failure	Total: 1338 PJP: 134 (10.0%)	Lymphoproliferative disease OR 2.79 (95% CI 1.86-4.19) No PJP prophylaxis OR 1.50 (95% CI 0.95-2.37) >3 days between respiratory symptom onset and ICU admission OR 4.35 (95% CI 2.53-7.49) Chest radiograph pattern OR 3.31 (95% CI 1.55-7.06)

Barreto et al.	2016	RCS SC	01/2006 – 04/2014	USA	Tertiary	Patients aged ≥ 18 years with B-cell lymphoma receiving R-CHOP	Total: 689 PJP: 10 (1.51%)	Bone marrow involvement with lymphoma HR 5.05 (95% CI 1.46-17.44) Lower ECOG performance status score HR 2.34 (1.05-5.20) per each level Reduced creatinine clearance HR 0.28 (95% CI 0.12-0.69) per eGFR stage
Coyle et al.	2012	RCS MC	07/2008 – 07/2011	Northern Ireland	Multiple	Patients with laboratory confirmed PJP	Total: 53 Clinically significant PJP: 51 (96.2%)	HIV-AIDS n = 13/53 (24.5%) Chemotherapy n = 13/53 (24.5%) Autoimmune conditions on steroids n = 12/53 (22.6%) Transplant n = 11/53 (20.8%)
de Boer et al.	2011	CCS SC	01/1983 – 07/2008	Germany	Tertiary	Cases: clinically significant PJP after kidney or kidney-pancreas transplant Controls: kidney or kidney-pancreas transplant recipients	Total: 151 Cases: 52 (34.4%) Controls: 99 (65.6%)	CMV infection aOR 3.0 (95% CI 1.2 - 7.9) Rejection treatment aOR 5.8 (95% CI 1.9 - 18)

Evernden et al.	2020	RCS SC	01/2008 – 06/2017	Canada	Tertiary	Adult allogenic HSCT patients receiving anti-thymocyte globulin for GVHD prophylaxis	Total receiving PJP prophylaxis: 649 PJP: 21 (3.24%)	CD4 T-cell count <200/ μ L (P < 0.001)
Garg et al.	2018	CCS SC	01/1994 – 12/2016	USA	Tertiary	Adult kidney or kidney-pancreas transplant recipients	Total: 112 Cases: 28 Controls: 84	CMV viraemia OR 6.27 (P = 0.002)
Haeusler et al.	2013	RCS SC	03/2009 – 06/2012	Australia	Tertiary	Patients who received FCR	Total: 66 PJP: 8 (12.1%)	FCR without post-treatment prophylaxis n = 7/38 (18.4%, 95% CI 7.7–34.3)
Kim et al.	2019	RCS SC	2000 – 2017	South Korea	Tertiary	Kidney transplant recipients aged \geq 18 years	Total: 1502 PJP: 68 (4.53%)	CMV HR 4.48 (95% CI 2.58–7.79; P<0.001)
Kim et al.	2016	RCS MC	12/2006 – 07/2013	South Korea	Multiple	Patients aged >18 years with HIV-AIDS	Total: 1086 PJP: 121 (11.1%)	CD4 T cell count <50 cells/mm ³ n = 66.9%

Kim et al.	2015	RCS SC	05/2007 – 01/2013	South Korea	Tertiary	Hospitalised patients with laboratory confirmed PJP	Total: 95 Hospital-onset: 16 (16.8%) Community-onset: 79 (83.2%)	Haematological malignancy associated more with hospital- than community-onset PJP 43.8% vs. 20.3% (P = 0.058)
Lee et al.	2013	PCS SC	07/2009 – 03/2012	Taiwan	Tertiary	Patients aged ≥ 20 years with HIV-AIDS and respiratory disease	Total: 203 PJP: 106 (52.2%)	CD4 T cell count $< 200 \times 10^6$ cells/L n = 104/106 (98.1%)
Li et al.	2017	RCS SC	11/2003 – 06/2014	China	Tertiary	Patients with inflammatory or autoimmune disease receiving immunosuppressive therapy with suspected PJP	Total: 123 Confirmed PJP: 52 (42.3%) Possible but unconfirmed PJP: 22 (17.8%) Negative PJP: 49 (39.9%)	CD3+ cell count $< 625 \times 10^6/L$ Serum albumin < 28 g/L PaO ₂ /FiO ₂ < 210
Neofytos et al.	2018	RCS MC	2008 – 2016	Switzerland	Multiple	All patients within the national SOT registry of Switzerland	Total: 2842 Diagnosed with PJP: 41	Age ≥ 65 years (OR 2.4, P = 0.03) CMV in first 6 months post-SOT (OR 2.5, P = 0.006)

Özenci et al.	2019	CSS MC	2016	Sweden	Multiple	Patients with fungal infection	Total: 1,713,410	PJP cases 297
Panizo et al.	2020	Gov. report MC	01/2007 – 12/2012	Venezuela	Tertiary	Patients with HIV-AIDS with suspected PJP	76	CD4 T cell count <200 cells/mm ³ n = 80-85% of PJP patients
Park et al.	2020	CSS SC	1999 – 2015	South Korea	Tertiary	Cases: kidney or kidney-pancreas transplant recipients with PJP Controls: kidney or kidney-pancreas transplant recipients	Total: 161 Cases: 67 (41.6%) Controls: 94 (58.4%)	Graft rejection OR 3.9 (P = 0.01) CMV infection OR 2.4 (P = 0.05)
Rekhtman et al.	2019	RCS MC	12/2012 – 12/2017	USA	Multiple	Patients aged ≥18 years treated with immunosuppressive drugs or corticosteroids who had neither HIV-AIDS nor cancer	406	Combination immunosuppressive and corticosteroid therapy RR 122.5 (95% CI 100.9-148.8)

Schoffelen et al.	2013	RCS MC	06/1996 – 01/2011	The Netherlands	Multiple	Patients in a national HIV-AIDS registry who developed PJP	PJP in follow-up period: 1055	Older age (per year increment) aOR 1.01 per year (95% CI 1.00-1.02) CD4 T cell count <50 cells/ μ l at HIV diagnosis aOR 123.3 (95% CI 77.8-195.5) High plasma HIV-RNA (>100,000 copies/ml) at HIV diagnosis aOR 1.41 (95% CI 1.19-1.66)
Tanaka et al.	2015	RCS NS	NS	Japan	NS	Patients with RA treated with TNF inhibitors	Total: 316 PJP: 51 (16.1%) No PJP: 265 (83.9%)	Older age (per 10-yr increment) HR 1.8 (95% CI 1.4–2.5) Comorbid pulmonary disease HR 3.1 (95% CI 1.8–5.3) Comorbid DM HR 2.9 (95% CI 1.5–5.8) Daily dose prednisolone \geq 5 mg HR 2.7 (95% CI 1.5–5.0)
Wei et al.	2018	RCS MC	01/2006 – 12/2013	Taiwan	Multiple	HIV-negative patients receiving chemotherapy in a national database	Total: 12158 Treated with rituximab: 7554 (62.1%) Not treated with rituximab: 4604 (37.9%)	Rituximab therapy HR 2.47 (95% CI 1.84-3.3; P<0.0001) Male sex HR 1.51 (95% CI 1.18–1.94; P=0.001)

Yanagisawa et al.	2020	RCS SC	07/2000 – 10/2002	Japan	Tertiary	ART naïve patients aged ≥ 18 years with HIV-AIDS	632	Deficient mannose-binding lectin genotype aHR 7.93 (95% CI 2.19-28.67; P = 0.002)
								CD4 count <200/μL aHR 3.57 (95% CI 1.51-8.45; P = 0.004)
Yukawa et al.	2018	CCS SC	01/2010 – 02/2014	Japan	Tertiary	Patients treated for RA who did not receive TMP-SMX	Total: 2640 PJP: 19 (0.7%)	Age ≥65 years aOR 3.7 (95% CI 1.18-11.4; P = 0.02)
								MTX dose >6mg/week aOR 4.5 (95% CI 1.26-16.3; P = 0.02)
								PSL>5mg/day aOR 12.4 (95%CI 4.40-34.9; P<0.01)
								ISP>2 aOR 3.7 (95% CI 1.37-10.1; P=0.01)

aHR: adjusted hazard ratio, **ART:** antiretroviral therapy, **aOR:** adjusted odds ratio, **CCS:** case control study, **CI:** confidence interval, **CMV:** cytomegalovirus, **COPD:** chronic obstructive pulmonary disease, **DM:** diabetes mellitus, **GVHD:** graft versus host disease, **FCR:** fludarabine/cyclophosphamide/rituximab, **HAART:** highly active antiretroviral therapy, **HIV:** human immunodeficiency virus, **HR:** hazard ratio, **HSCT:** haematopoietic stem cell transplant, **ISP:** immunosuppressants, **IV:** intravenous, **MC:** multicentre, **MTX:** methotrexate, **NPS:** national prevalence study, **NS:** not stated (by authors), **OR:** odds ratio, **PCS:** prospective cohort study, **PJP:** *Pneumocystis jirovecii* pneumonia, **PSL:** prednisolone, **R-CHOP:** rituximab/cyclophosphamide/hydroxydaunorubicin/prednisone, **RA:** rheumatoid arthritis, **RCS:** retrospective cohort study, **RR:** risk ratio, **SC:** single centre, **SOT:** solid organ transplant, **TMP-SMX:** trimethoprim-sulfamethoxazole, **TNF:** tumour necrosis factor.