

**Supplementary Table S1: Study Characteristics**

Name	Year	Country	Participants	Design	Mean FVC (% predicted)	Mean DLCO (% predicted)
Abdelghani et al.	2019	USA	40	Prospective	71.5	54.3
Aburto et al.	2020	Spain	257	Prospective	87	64.5
Almeida et al.	2017	Portugal	100	Retrospective	.	.
Babiak et al.	2009	Germany	41	Retrospective	.	.
Bango-Alvarez et al.	2017	Spain	106	Prospective	76.4	66.7
Barata et al.	2020	Portugal	45	Retrospective	.	52
Bondue et al.	2021	Belgium	96	Prospective	72	51
Cascante et al.	2016	Spain	55	Prospective	79.7	52.2
Casoni et al.	2014	Italy	69	Prospective	.	.
Castellani et al.	2022	USA	77	Prospective	68	60
Chen et al.	2021	China	373	Prospective	71.1	53.5
Cho et al.	2019	USA	40	Retrospective	68.5	64.4
Cirak et al.	2020	Turkey	82	Retrospective	.	.
Cooley et al.	2018	USA	159	Retrospective	70	60
Daidsen et al.	2021	Denmark	141	Prospective	.	.
Deasy et al.	2021	Ireland	25	Retrospective	.	.
Dhooia et al.	2018	India	128	Retrospective	.	.
Echevarria-Uraga et al.	2016	Spain	100	Retrospective	85	66
Fruchter et al.	2014	Israel	75	Retrospective	.	.
Gnass et al.	2020	Poland	114	Prospective	.	.
Goel et al.	2021	India	326	Retrospective	.	.
Griff et al.	2014	Germany	52	Retrospective	.	.
Hackner et al.	2022	Austria	75	Prospective	85.8	67
Hagmeyer et al.	2019	Germany	61	Prospective	81	63
Han et al.	2021	China	70	Prospective	71.8	47.2
Harari et al.	2019	Italy	73	Retrospective	80.6	53.5
Hernandez-Gonzalez et al.	2015	Spain	33	Retrospective	69	50
Hostettler et al.	2021	Switzerland	100	Retrospective	84	61
Hussein et al.	2020	Egypt	23	Prospective	.	.
Ikeda et al.	2021	Japan	38	Prospective	.	.
Inomata et al.	2020	Japan	87	Prospective	90.2	73.1
Jacob et al.	2019	Portugal	32	Retrospective	98.3	76.3
Kheir et al.	2020	USA	24	Retrospective	64.6	49.1
Koslow et al.	2020	USA	120	Retrospective	75	51
Kronborg-White et al. (a)	2021	Denmark	18	Prospective	88	69
Kronborg-White et al. (b)	2021	Denmark	250	Prospective	91	59
Kropski et al.	2013	USA	25	Retrospective	75.3	66.2

Kuse et al.	2019	Japan	50	Retrospective	.	.
Lentz et al.	2018	USA	104	Retrospective	70.2	59.1
Lim et al.	2018	Singapore	22	Prospective	.	.
Li et al.	2022	China	60	Retrospective	.	.
Marcoa et al.	2017	Portugal	90	Prospective	.	.
Matta et al.	2021	USA	17	Retrospective	.	.
Menezes et al.	2021	Canada	32	Retrospective	.	.
O'Mahony et al.	2021	Ireland	85	Retrospective	.	.
Pajares et al.	2020	Spain	124	Prospective	79	57.7
Pajares et al.	2014	Spain	39	Prospective	78.2	67.5
Ramaswamy et al.	2016	USA	56	Retrospective	.	.
Ravaglia et al.	2019	Italy	699	Retrospective	85.4	61.2
Riviere et al.	2022	France	23	Retrospective	.	.
Romagnoli et al.	2019	France & Italy	21	Prospective	80.1	52.2
Samitas et al.	2019	Greece	50	Retrospective	70	63
Serra et al.	2022	Spain	60	Retrospective	77	65
Shafiek et al.	2019	Egypt	12	Prospective	.	.
She et al.	2020	Australia	121	Retrospective	83	60
Shkeiri et al.	2020	Israel	97	Retrospective	.	.
Sriprasart et al.	2017	USA	74	Retrospective	.	.
Steinfort et al.	2018	Australia	4	Prospective	.	.
Tomassetti et al.	2016	Italy	58	Retrospective	.	.
Troy et al.	2020	Australia	65	Prospective	83.7	63.4
Turan et al.	2021	Turkey	147	Retrospective	82.4	59
Ussavarungsi et al.	2017	USA	74	Retrospective	.	.
Wahidi et al.	2022	USA	16	Prospective	.	.
Walscher et al.	2019	Germany	109	Retrospective	77	51
Wang et al.	2020	China	70	Prospective	.	.
Wijmans et al.	2019	Netherlands	14	Prospective	.	.
Wu et al.	2021	China	14	Retrospective	.	.
Zhang et al.	2021	China	8	Prospective	.	.
Zhao et al.	2022	China	12	Prospective	.	65.7
Zhou et al.	2021	China	216	Prospective	.	.

**Supplementary Table S2: Reporting of Procedural and Sampling Variables during Cryobiopsy**

Variable	No. of studies (%)	References
<b>BIOPSY CHARACTERISTICS</b>		
The target number of biopsies was described	35 studies (50%)	1 biopsy (23) 2 biopsies (34, 39, 46, 47, 57, 58, 64, 65, 66, 74) 3 biopsies (21, 25, 26, 30, 33, 61, 68, 75, 76, 77) 4 biopsies (22, 50, 54, 60, 67, 78) 5 or more biopsies (13, 37, 38, 44, 52, 56, 79, 80)
The lower lobes were targeted for biopsy over upper or middle lobes	18 studies (25.7%)	(24, 28, 33, 34, 37, 38, 40, 42, 52, 53, 56, 59, 64, 68, 73, 76, 81, 82)
Cryoprobe size was describes (for 1.9mm size and 2.4mm size, see Supplementary Figure )	67 studies (95.7%)	Variable size used between cases (12, 36, 40, 43, 45, 47, 48, 50, 58, 63, 65, 67, 69, 71, 72, 80, 83, 84, 85) Small cryoprobe (1.5, 1.7 or 1.8mm) (43, 45, 72)
An estimate of freezing time was described	58 studies (82.9%)	(12, 13, 21, 22, 23, 24, 25, 26, 28, 29, 30, 31, 33, 36, 37, 38, 39, 40, 42, 43, 46, 47, 48, 49, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 65, 66, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88)
<b>BLEEDING</b>		
An endobronchial balloon blocker was routinely used in all cases	39 studies (55.7%),	(12, 13, 14, 24, 25, 26, 28, 29, 30, 33, 34, 36, 40, 41, 42, 46, 47, 48, 50, 51, 53, 55, 56, 57, 58, 60, 61, 64, 65, 67, 71, 72, 74, 76, 77, 78, 82, 84, 86)
An endobronchial balloon blocker was used as required	9 studies (12.9%)	(22, 31, 37, 39, 43, 54, 73, 79, 81, 83)
A description was provided of bleeding score used by the study (any)	58 studies (82.9%)	(12, 13, 21, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 51, 52, 54, 55, 56, 57, 60, 61, 62, 63, 64, 67, 68, 69, 71, 72, 73, 74, 77, 78, 80, 81, 82, 83, 84, 85, 86, 87, 88)
Use of the British Thoracic Society bleeding score	7 studies (10%)	(27, 28, 29, 30, 31, 32, 33)
Routine administration of an agent to prevent bleeding	8 studies (11.4%)	Topical adrenaline/epinephrine (30, 37, 40) Intravenous tranexamic acid (39, 50) Topical tranexamic acid (86) Topical phenylephrine(45)
<b>ANAESTHETIC CHARACTERISTICS</b>		
A secure airway was reported	54 studies (77.1%)	Endotracheal tube (12, 13, 21, 22, 23, 25, 30, 31, 34, 36, 41, 42, 45, 46, 48, 50, 51, 56, 58, 59, 61, 62, 63, 64, 65, 66, 68, 69, 72, 73, 74, 78, 80, 82, 83, 84, 86, 89) Laryngeal mask airway (26, 36, 39, 43, 44, 49, 63, 64, 76, 80) Rigid bronchoscope (12, 14, 24, 26, 32, 36, 47, 48, 49, 54, 57, 60, 64, 72, 84, 85) Tracheoscope(29, 53, 55, 71, 90)
Variable anaesthesia modality (for general anaesthesia use vs sedation, see Supplementary Figure 5)	3 studies (4.3%)	(36, 76, 83)
<b>RADIOLOGIC ASSESSMENT</b>		
Routine post-procedure imaging was acquired	44 studies (62.9%)	Chest radiography (22, 23, 24, 28, 29, 30, 32, 33, 34, 38, 39, 42, 43, 45, 46, 48, 49, 50, 52, 53, 55, 56, 57, 58, 62, 63, 64, 65, 68, 69, 71, 72, 75, 76, 78, 79, 80, 81, 83, 85, 88) Fluoroscopy (12, 26, 50) Thoracic ultrasound (11, 50, 69) Cone beam computed tomography (47, 48)
Radiological features on computed tomography were described in relation to dominant radiological features	9 (12.9%)	(22, 29, 32, 48, 56, 63, 76, 80, 88)
Radiological features were described in relation to a dominant radiological pattern	10 studies (14.3%)	(21, 26, 27, 45, 50, 52, 53, 65, 73, 91)

<b>PRE-PROCEDURE PATIENT CHARACTERISTICS &amp; ASSESSMENT</b>		
Criteria were specified in relation to the use of antiplatelet and/or anticoagulant medication	27 studies (38.6%)	(11, 13, 21, 25, 26, 27, 34, 40, 42, 43, 44, 48, 49, 50, 52, 55, 56, 57, 61, 63, 64, 65, 66, 73, 83, 84, 85)
A description of patient comorbidities was reported	15 studies (21.4%)	(12, 22, 25, 27, 36, 40, 41, 44, 45, 49, 57, 63, 69, 78, 79)
A description of pre-procedural anaesthetic evaluation was reported (e.g. ASA score)	14 studies (20%)	(24, 27, 29, 30, 37, 39, 45, 53, 63, 64, 69, 80, 81, 88)
Lung function parameters were defined as contra-indication to cryobiopsy	22 studies (31.4%)	(12, 14, 21, 22, 26, 28, 29, 32, 39, 41, 43, 44, 50, 52, 53, 54, 55, 56, 57, 58, 60, 92)
A transthoracic echocardiogram was performed prior to cryobiopsy (routine or as required)	26 studies (37.1%)	(12, 14, 22, 23, 25, 26, 27, 28, 32, 37, 41, 45, 50, 52, 53, 56, 57, 58, 60, 61, 64, 67, 68, 76, 78, 85)
Echocardiographic parameters were described as a contra-indication to cryobiopsy e.g. RVSP or PAP cut-off >40-50 mmHg	14 studies (20%)	(12, 14, 22, 23, 28, 39, 41, 53, 56, 57, 58, 64, 67, 85)
INR cut-off (>1.5 international units)	16 studies (22.9%)	(9, 10, 13, 14, 18, 20, 27, 28, 29, 30, 38, 40, 43, 58, 60, 61)
INR cut-off (other or unspecified)	10 studies (14.3%)	(12, 23, 24, 29, 36, 52, 64, 76, 83, 85)
Platelet count cut-off (<50,000-100,000 per microlitre)	24 studies (34.3%)	(13, 14, 21, 22, 26, 27, 28, 30, 32, 34, 36, 37, 39, 41, 43, 45, 48, 49, 53, 57, 58, 64, 67, 79)
Platelet count cut-off (other or unspecified)	8 studies (11.4%)	(12, 23, 24, 29, 52, 76, 83, 85)
<b>GENERAL PROCEDURAL CHARACTERISTICS</b>		
Procedure duration was reported	15 studies (21.4%)	(23, 26, 30, 37, 38, 40, 52, 54, 64, 75, 76, 78, 80, 85, 88)
Length of stay was reported	11 studies (15.7%)	(12, 30, 33, 53, 65, 66, 78, 84, 85, 90, 93)
Cryobiopsy was performed as an outpatient procedure (some or all cases)	35 studies (50%)	(23, 24, 25, 29, 32, 33, 34, 37, 39, 41, 45, 46, 51, 53, 54, 56, 58, 59, 62, 63, 64, 65, 66, 68, 73, 75, 76, 78, 80, 81, 82, 83, 84, 86, 87)
A description of proceduralist training or qualifications was reported	27 studies (38.6%)	(12, 13, 24, 29, 30, 33, 34, 37, 38, 39, 41, 50, 52, 55, 56, 58, 59, 63, 64, 66, 69, 73, 79, 80, 81, 83, 86)
<b>PATHOLOGY CHARACTERISTICS</b>		
The number of reporting pathologists was specified	25 studies (35.7%)	(13, 14, 21, 29, 33, 34, 37, 38, 40, 41, 44, 50, 52, 53, 56, 63, 64, 67, 71, 73, 75, 78, 85, 87, 90)
A report of histologic diagnostic confidence was specified	13 studies (18.6%)	(12, 31, 40, 42, 50, 53, 54, 63, 67, 73, 74, 78, 90)
A report of histological patterns was specified	63 studies (90%)	(12, 13, 14, 21, 22, 23, 24, 25, 26, 28, 29, 30, 32, 33, 34, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 71, 72, 73, 74, 75, 76, 77, 78, 80, 82, 83, 84, 87, 88, 90)
A report of specimen quality assessment was specified	28 studies (40%)	(13, 14, 21, 22, 23, 28, 29, 32, 33, 37, 38, 39, 40, 42, 43, 50, 52, 53, 56, 66, 69, 73, 74, 75, 78, 80, 87, 90)
Any measurement of biopsy size (mean or median, diameter or area) was included	44 studies (62.9%)	(13, 14, 21, 22, 23, 28, 29, 30, 32, 33, 34, 36, 37, 39, 41, 43, 47, 50, 52, 53, 54, 55, 56, 57, 58, 59, 61, 62, 63, 66, 67, 69, 71, 72, 73, 75, 76, 77, 78, 80, 82, 85, 87, 88)
A definition was provided of diagnostic yield	39 studies (55.7%)	(14, 22, 24, 25, 28, 32, 33, 34, 36, 37, 38, 39, 40, 45, 46, 50, 53, 55, 56, 57, 58, 59, 60, 63, 64, 65, 66, 68, 69, 72, 73, 74, 78, 81, 82, 86, 87, 88, 90)