

Table SI. Database-specific search strategies.

Database and URL	Search field	Search strategy
PubMed/MEDLINE (https://pubmed.ncbi.nlm.nih.gov/)	Title/Abstract and related indexing terms	((("small cell lung cancer" OR "small-cell lung cancer" OR "small cell lung carcinoma" OR "small-cell lung carcinoma" OR "small-cell carcinoma of the lung" OR SCLC OR "oat cell carcinoma") AND ("immune checkpoint inhibitor" OR "immune checkpoint inhibitors" OR ICI OR ICIs OR immunotherapy OR "PD-1" OR PD1 OR "PD-L1" OR PDL1 OR "programmed death 1" OR "programmed cell death 1" OR "programmed death ligand 1" OR "programmed cell death ligand 1" OR atezolizumab OR durvalumab OR adebrelimab OR serplulimab OR pembrolizumab OR nivolumab OR camrelizumab OR sintilimab OR tislelizumab OR toripalimab OR sugemalimab) AND ("beyond progression" OR "treatment beyond progression" OR "after progression" OR post-progression OR postprogression OR "ICI continuation" OR "immunotherapy continuation" OR "continued immunotherapy" OR "continuing immunotherapy" OR "continuous immunotherapy" OR "ICI discontinuation" OR "immunotherapy discontinuation" OR "discontinuing immunotherapy" OR "stopped immunotherapy" OR rechallenge OR "re-challenge" OR retreatment OR "re-treatment" OR "ICI retreatment" OR "immunotherapy retreatment")) AND (comparative OR versus OR "control group" OR non-ICI OR non-immunotherapy OR "chemotherapy alone")) NOT ("systematic review" OR "meta-analysis" OR editorial OR letter OR "case reports")
Embase (https://www.embase.com/)	Database-specific search fields	((("small cell lung cancer" OR "small-cell lung cancer" OR "small cell lung carcinoma" OR "small-cell lung carcinoma" OR "small-cell carcinoma of the lung" OR SCLC OR "oat cell carcinoma") AND ("immune checkpoint inhibitor" OR "immune checkpoint inhibitors" OR ICI OR ICIs OR immunotherapy OR "PD-1" OR PD1 OR "PD-L1" OR PDL1 OR "programmed death 1" OR "programmed cell death 1" OR "programmed death ligand 1" OR "programmed cell death ligand 1" OR atezolizumab OR durvalumab OR adebrelimab OR serplulimab OR pembrolizumab OR nivolumab OR camrelizumab OR sintilimab OR tislelizumab OR toripalimab OR sugemalimab) AND ("beyond progression" OR "treatment beyond progression" OR "after progression" OR post-progression OR postprogression OR "ICI continuation" OR "immunotherapy continuation" OR "continued immunotherapy" OR "continuing immunotherapy" OR "continuous immunotherapy" OR "ICI discontinuation" OR "immunotherapy discontinuation" OR "discontinuing immunotherapy" OR "stopped immunotherapy" OR rechallenge OR "re-challenge" OR retreatment OR "re-treatment" OR "ICI retreatment" OR "immunotherapy retreatment")) AND (comparative OR versus OR "control group" OR non-ICI OR non-immunotherapy

OR "chemotherapy alone")) NOT ("systematic review" OR "meta analysis" OR "meta-analysis" OR editorial OR letter OR "case report")

Web of Science Core Topic (TS)
Collection
(<https://www.webofscience.com/>)

TS=((("small cell lung cancer" OR "small-cell lung cancer" OR "small cell lung carcinoma" OR "small-cell lung carcinoma" OR "small-cell carcinoma of the lung" OR SCLC OR "oat cell carcinoma") AND ("immune checkpoint inhibitor" OR "immune checkpoint inhibitors" OR ICI OR ICIs OR immunotherapy OR "PD-1" OR PD1 OR "PD-L1" OR PDL1 OR "programmed death 1" OR "programmed cell death 1" OR "programmed death ligand 1" OR "programmed cell death ligand 1" OR atezolizumab OR durvalumab OR adebrelimab OR serplulimab OR pembrolizumab OR nivolumab OR camrelizumab OR sintilimab OR tislelizumab OR toripalimab OR sugemalimab) AND ("beyond progression" OR "treatment beyond progression" OR "after progression" OR post-progression OR postprogression OR "ICI continuation" OR "immunotherapy continuation" OR "continued immunotherapy" OR "continuing immunotherapy" OR "continuous immunotherapy" OR "ICI discontinuation" OR "immunotherapy discontinuation" OR "discontinuing immunotherapy" OR "stopped immunotherapy" OR rechallenge OR "re-challenge" OR retreatment OR "re-treatment" OR "ICI retreatment" OR "immunotherapy retreatment")) AND (comparative OR versus OR "control group" OR "non-ICI" OR "non-immunotherapy" OR "chemotherapy alone")) NOT TS=("systematic review" OR "meta analysis" OR "meta-analysis" OR editorial OR letter OR "case report")

Scopus (https://www.scopus.com/)	TITLE-ABS-KEY	TITLE-ABS-KEY((("small cell lung cancer" OR "small-cell lung cancer" OR "small cell lung carcinoma" OR "small-cell lung carcinoma" OR "small-cell carcinoma of the lung" OR SCLC OR "oat cell carcinoma") AND ("immune checkpoint inhibitor" OR "immune checkpoint inhibitors" OR ICI OR ICIs OR immunotherapy OR "PD-1" OR PD1 OR "PD-L1" OR PDL1 OR "programmed death 1" OR "programmed cell death 1" OR "programmed death ligand 1" OR "programmed cell death ligand 1" OR atezolizumab OR durvalumab OR adebrelimab OR serplulimab OR pembrolizumab OR nivolumab OR camrelizumab OR sintilimab OR tislelizumab OR toripalimab OR sugemalimab) AND ("beyond progression" OR "treatment beyond progression" OR "after progression" OR post-progression OR postprogression OR "ICI continuation" OR "immunotherapy continuation" OR "continued immunotherapy" OR "continuing immunotherapy" OR "continuous immunotherapy" OR "ICI discontinuation" OR "immunotherapy discontinuation" OR "discontinuing immunotherapy" OR "stopped immunotherapy" OR rechallenge OR "re-challenge" OR retreatment OR "re-treatment" OR "ICI retreatment" OR "immunotherapy retreatment") AND (comparative OR versus OR "control group" OR "non-ICI" OR "non-immunotherapy" OR "chemotherapy alone"))))
Cochrane Library (https://www.cochranelibrary.com/)	Database-specific search fields	(("small cell lung cancer" OR "small-cell lung cancer" OR "small cell lung carcinoma" OR "small-cell lung carcinoma" OR "small-cell carcinoma of the lung" OR SCLC OR "oat cell carcinoma") AND ("immune checkpoint inhibitor" OR "immune checkpoint inhibitors" OR ICI OR ICIs OR immunotherapy OR "PD-1" OR PD1 OR "PD-L1" OR PDL1 OR "programmed death 1" OR "programmed cell death 1" OR "programmed death ligand 1" OR "programmed cell death ligand 1" OR atezolizumab OR durvalumab OR adebrelimab OR serplulimab OR pembrolizumab OR nivolumab OR camrelizumab OR sintilimab OR tislelizumab OR toripalimab OR sugemalimab) AND ("beyond progression" OR "treatment beyond progression" OR "after progression" OR post-progression OR postprogression OR "ICI continuation" OR "immunotherapy continuation" OR "continued immunotherapy" OR "continuing immunotherapy" OR "continuous immunotherapy" OR "ICI discontinuation" OR "immunotherapy discontinuation" OR "discontinuing immunotherapy" OR "stopped immunotherapy" OR rechallenge OR "re-challenge" OR retreatment OR "re-treatment" OR "ICI retreatment" OR "immunotherapy retreatment") AND (comparative OR versus OR "control group" OR "non-ICI" OR "non-immunotherapy" OR "chemotherapy alone"))

Table SII. Extracted comparative efficacy and safety outcomes.

First author, year	Analysis population	Comparison	Outcome	Effect/value in ICI-based group	Effect/value in non-immunotherapy group	Effect measure	Estimate	95% CI ^a	P-value	Analysis/pooling note	(Refs.)
Cheng <i>et al</i> , 2025	SCLC subgroup	IBP vs. NIBP	PFS	mPFS 3.9 months	mPFS 2.1 months	HR	0.38	0.16-0.87	0.016	SCLC subgroup estimate and text reports P=0.02, whereas Fig. 4 reports P=0.016	(16)
			OS	mOS 9.28 months	mOS 2.27 months	HR	0.23	0.08-0.64	0.0023	SCLC subgroup estimate and use Fig. 4 CI and exact P-value. Text reports P<0.01	
			ORR	12/31 (38.7%)	1/8 (12.5%)	RR/OR extractable ^b	NR	NR	0.161	Event counts extractable and not an HR outcome	
			DCR	25/31 (80.6%)	5/8 (62.5%)	RR/OR extractable	NR	NR	0.277	Event counts extractable and not an HR outcome	
			Grade 1-2 TRAEs	24/31 (77.4%)	4/8 (50.0%)	RR/OR extractable	NR	NR	0.12	Safety outcome and event counts extractable	
			Grade 3-4 TRAEs	3/31 (9.7%)	3/8 (37.5%)	RR/OR extractable	NR	NR	0.05	Safety outcome, event counts extractable and no grade 5 TRAEs reported	
Li <i>et al</i> , 2022	Total cohort	RIBP vs. DIBP	PFS	mPFS 4.8 months	mPFS 2.4 months	HR	0.4	0.24-0.67	0.002	Weighted total cohort and not strict 1L only	(17)
			OS	mOS 17.4 months	mOS 8.0 months	HR	0.55	0.29-1.04	0.098	Weighted total cohort and not strict 1L only	
	1L initial immunotherapy subgroup	RIBP vs. DIBP	PFS	mPFS 4.5 months	mPFS 2.8 months	HR	0.45	0.24-0.84	0.017	Weighted 1L subgroup and preferred for PICO-specific survival pooling	
			OS	mOS 11.6 months	mOS 5.4 months	HR	0.39	0.16-0.92	0.028	Weighted 1L subgroup and preferred for	

										PICO-specific survival pooling	
Peng <i>et al</i> , 2025	Total cohort	RIBP vs. DIBP	ORR	12/45 (26.7%)	7/55 (12.7%)	RR/OR extractable	NR	NR	0.123	Unweighted event counts and after weighting: 29.9 vs. 13.6%, P=0.118	(18)
			DCR	36/45 (80.0%)	29/55 (52.7%)	RR/OR extractable	NR	NR	0.006	Unweighted event counts and after weighting: 79.7 vs. 55.7%, P=0.027	
			DCB	17/45 (37.8%)	10/55 (18.2%)	RR/OR extractable	NR	NR	0.037	Unweighted event counts and after weighting: 40.7 vs 20.7%, P=0.025	
	ES-SCLC	IBP vs. non-IBP	PFS	mPFS 4.1 months	mPFS 2.4 months	HR	0.46	0.32-0.66	<0.001	Directly poolable	
			OS	mOS 11.2 months	mOS 9.0 months	HR	0.68	0.47-0.98	0.042	Directly poolable	
			ORR	29/86 (33.7%)	10/64 (15.6%)	RR/OR extractable	NR	NR	0.012	Directly poolable	
			DCR	59/86 (68.6%)	21/64 (32.8%)	RR/OR extractable	NR	NR	<0.001	Directly poolable.	
			Any-grade TRAEs	55/86 (63.9%)	43/64 (67.2%)	RR/OR extractable	NR	NR	0.577	Safety outcome and post-PD TRAEs	
			Grade ≥ 3 TRAEs	16/86 (18.6%)	14/64 (21.9%)	RR/OR extractable	NR	NR	NR	Safety poolable if same AE definition is used and separate P-value for grade ≥ 3 TRAEs not clearly reported	
Shang <i>et al</i> , 2024	IMpower133 cohort	Atezolizumab vs. non-atezolizumab after first PD	OS	NR	NR	Log-rank P-value only	NR	NR	0.08	All-cohort HR not reported/extractable and not directly poolable	(19)
	Shandong cohort	ICI retreatment	OS	NR	NR	Log-rank P-value only	NR	NR	0.013	All-cohort HR not reported/extractable	

	<4 metastatic sites subgroup	vs. non-ICI after first PD Atezolizumab vs. non-atezolizumab after first PD	OS	NR	NR	HR	0.457	0.256-0.817	0.008	and not directly poolable Adjusted subgroup estimate, not main all-cohort HR and should be used only for subgroup/sensitivity analysis	
Sun <i>et al</i> , 2026	ES-SCLC	Continuing IO vs. control	PFS2	mPFS2 4.13 months	mPFS2 3.77 months	HR	0.82	0.68-0.99	0.04	Directly poolable, and HR and 95% CI from Fig. 2	(20)
			OS	mOS 18.82 months	mOS 16.43 months	HR	0.74	0.59-0.92	0.008	Directly poolable, and HR and 95% CI from Fig. 2	
			Immune-related pneumonia 2L PFS	42/298 (14.1%)	19/191 (9.9%)	RR/OR extractable	NR	NR	0.23	No grade ≥3 immune-related pneumonia reported	
Wang <i>et al</i> , 2026	ICI + ChT vs. ChT subgroup	ICI + ChT vs. ChT	mPFS	mPFS 3.50 months (95% CI, 3.07-3.93)	mPFS 2.33 months (95% CI, 1.66-3.01)	HR, reported Cox estimate	1.234	0.861-1.768	0.252	KM P=0.249 and reported Cox HR direction/reference is not ideal for direct pooling as conventional ICI vs. non-ICI HR	(21)
			OS	mOS 19.53 months (95% CI, 16.81-22.26)	mOS 20.03 months (95% CI, 16.22-23.85)	Adjusted HR	0.595	0.384-0.923	0.02	Adjusted Cox estimate, KM comparison was not significant, P=0.070 and pool only in sensitivity analysis if adjusted HRs are allowed	
			Any-grade AEs	120/122 (98.4%)	40/40 (100.0%)	RR/OR extractable	NR	NR	NR	Safety outcome and overall P-value not clearly reported for total any-grade AEs	

Wang <i>et al</i> , 2026	ES-SCLC	ICI rechallenge vs. non-ICI	Grade ≥ 3 AEs	78/122 (63.9%)	28/40 (70.0%)	RR/OR extractable	NR	NR	NR	Safety outcome and overall P-value not clearly reported for total grade ≥ 3 AEs	(22)
			Immune- related pneumonia	10/122 (8.2%)	5/40 (12.5%)	RR/OR extractable	NR	NR	0.52 9	irAE safety outcome	
			Grade ≥ 3 immune- related pneumonia	6/122 (4.9%)	2/40 (5.0%)	RR/OR extractable	NR	NR	1	Grade ≥ 3 irAE safety outcome	
			PFS2	mPFS2 3.98 months	mPFS2 2.43 months	HR	0.38	0.26- 0.55	<0.0 01	Directly poolable	
			OS	mOS 9.43 months	mOS 6.23 months	HR	0.44	0.30- 0.62	<0.0 01	Directly poolable	
			ORR	26/100 (26.0%)	6/51 (11.8%)	RR/OR extractable	NR	NR	0.04 3	Directly poolable	
			DCR	75/100 (75.0%)	24/51 (47.1%)	RR/OR extractable	NR	NR	<0.0 01	Directly poolable	
			Any-grade TRAEs	84/100 (84.0%)	44/51 (86.3%)	RR/OR extractable	NR	NR	0.71 3	Safety outcome and no significant increase with ICI rechallenge	
			Grade ≥ 3 TRAEs	20/100 (20.0%)	11/51 (21.6%)	RR/OR extractable	NR	NR	0.82 1	Safety outcome and no significant increase with ICI rechallenge	
Zhang <i>et al</i> , 2025	Entire cohort	ICI continuation vs. discontinuation	PFS	mPFS 3.92 months	mPFS 2.15 months	HR	0.53	0.39- 0.73	<0.0 01	Available for sensitivity analysis when replacing the PSM estimate ^c with the unmatched entire- cohort estimate	(23)
			OS	mOS 8.66 months	mOS 7.90 months	HR	0.7	0.52- 0.94	0.01 6	Available for sensitivity analysis when replacing the PSM estimate with the unmatched entire- cohort estimate	

PSM cohort	ICI continuation vs. discontinuation	PFS	mPFS 4.22 months	mPFS 2.12 months	HR	0.52	0.37-0.74	<0.001	Used in the primary survival meta-analysis because the PSM estimate was prioritized
		OS	mOS 10.31 months	mOS 8.95 months	HR	0.67	0.48-0.95	0.027	Used in the primary survival meta-analysis because the PSM estimate was prioritized
Entire cohort	ICI continuation vs. discontinuation	ORR	34/118 (28.8%)	11/93 (11.8%)	RR/OR extractable	NR	NR	0.003	Available but not used in the primary pooled response analysis because the PSM dataset was prioritized
		DCR	77/118 (65.3%)	41/93 (44.1%)	RR/OR extractable	NR	NR	0.002	Available but not used in the primary pooled response analysis because the PSM dataset was prioritized
PSM cohort	ICI continuation vs. discontinuation	ORR	24/75 (32.0%)	8/75 (10.7%)	RR/OR extractable	NR	NR	0.001	Available but not used in the primary pooled response analysis because the PSM dataset was prioritized
	ICI continuation	DCR	49/75 (65.3%)	32/75 (42.7%)	RR/OR extractable	NR	NR	0.005	Available but not used in the primary pooled response analysis because the PSM dataset was prioritized
Entire cohort	ICI continuation vs. discontinuation	Grade 3/4 hematological toxicities	21/118 (17.8%)	17/93 (18.3%)	RR/OR extractable	NR	NR	0.928	Safety outcome and comparable between groups
		Hypothyroidism	9/118 (7.6%)	0/93 (0%)	RR/OR extractable	NR	NR	0.005	Immune-related AE; incidence was higher with ICI continuation

Zhang <i>et al</i> , 2025	ES-SCLC	2L-ICIs vs. 2L-non-ICIs	Rash	8/118 (6.8%)	0/93 (0%)	RR/OR extractable	NR	NR	0.01	Immune-related AE; incidence was higher with ICI continuation	(24)
			Pneumonitis	2/118 (1.7%)	0/93 (0%)	RR/OR extractable	NR	NR	0.505	Immune-related AE and rare event	
			2L-PFS	mPFS 4.4 months	mPFS 3.9 months	HR	0.45	0.28-0.71	0.001	Directly poolable.	
			OS	mOS 10.0 months	mOS 6.9 months	HR	0.56	0.35-0.89	0.015	Directly poolable.	
			ORR	17/53 (32.1%)	8/50 (16.0%)	RR/OR extractable	NR	NR	NR	Event counts available and P-value not reported	
			DCR	42/53 (79.2%)	35/50 (70.0%)	RR/OR extractable	NR	NR	NR	Event counts available and P-value not reported	
Zhang <i>et al</i> , 2025	All 2L cohort	ICI + A vs. ChT	PFS	mPFS 7.2 months	mPFS 3.4 months	Median comparison	NR	NR	<0.001	Not strict PICO because 1L ICI was mixed and no HR for direct pooling	(25)
		ICI + ChT vs. ChT	PFS	mPFS 4.6 months	mPFS 3.4 months	Median comparison	NR	NR	0.065	Not strict PICO and ICI + ChT did not significantly improve PFS vs. ChT	
		ICI + A vs. ChT	OS	mOS 33.5 months	mOS 18.3 months	Median comparison	NR	NR	0.083	Not aligned with the strict PICO framework; the P-value was reported in the abstract/Fig. 2F, and no HR was available for direct pooling	
		ICI + ChT vs. ChT	OS	mOS 19.0 months	mOS 18.3 months	Median comparison	NR	NR	0.485	Not strict PICO and no clear OS benefit vs. ChT	
		ICI + A vs. ICI + ChT vs. ChT	ORR	ICI + A: 26/86 (30.2%) and	ChT: 32/178 (18.0%)	Rate comparison	NR	NR	<0.05	Three-arm comparison and ICI + A numerically higher	

DCR	ICI + ChT: 22/125 (17.6%) ICI + A: 71/86 (82.6%) and ICI + ChT: 86/125 (68.8%)	ChT: 96/178 (53.9%)	Rate comparison	NR	NR	<0.0 01	than ChT and ICI + ChT Three-arm comparison and ICI + A showed highest DCR
Grade 3-4 myelosuppres sion	ICI + A: 3/86 (3.5%) and ICI + ChT: 14/125 (11.2%)	ChT: 29/178 (16.3%)	RR/OR extractable	NR	NR	<0.0 1	Safety outcome and three-arm comparison
Grade 3-4 immune- related pneumonia	ICI + A: 2/86 (2.3%) and ICI + ChT: 0/125 (0%)	ChT: 0/178 (0%)	RR/OR extractable	NR	NR	<0.0 5	Safety outcome and rare event
Grade 3-4 hemoptysis	ICI + A: 3/86 (3.5%) and ICI + ChT: 0/125 (0%)	ChT: 1/178 (0.6%)	RR/OR extractable	NR	NR	<0.0 5	Safety outcome and rare event

^aRows with NR for 95% CI were not included in HR pooling unless the CI was obtained from the full text, reconstructed from Kaplan-Meier curves or provided by the study authors.

^bFor binary outcomes, event counts could be used to calculate RRs or ORs where appropriate. ^cWhen multiple estimates were available from the same study, adjusted or PSM estimates were prioritized; when both matched and unmatched estimates were reported, the PSM estimate was used in the primary analysis and the unmatched estimate in sensitivity analysis. A, anti-angiogenic therapy; AE, adverse event; CI, confidence interval; DCB, durable clinical benefit; DCR, disease control rate; DIBP, discontinuation of immunotherapy beyond progression; ES-SCLC, extensive-stage small cell lung cancer; HR, hazard ratio; IBP, immunotherapy beyond progression; ICI, immune checkpoint inhibitor; IO, immunotherapy; KM, Kaplan-Meier; mOS, median overall survival; mPFS, median progression-free survival; NIBP, non-immunotherapy beyond progression; NR, not reported; OR, odds ratio; ORR, objective response rate; OS, overall survival; PD, progressive disease; PFS, progression-free survival; PICO, population, intervention, comparator and outcomes; PSM, propensity score matching; RIBP, rechallenge of immunotherapy beyond progression; RR, risk ratio; irAEs, immune-related adverse events; TRAE, treatment-related adverse event; 1L, first line; 2L, second line.

Table SIII. Study eligibility, cohort characteristics and cohort-overlap assessment.

First author, year	Eligible cohort	Strict PICO fit ^a	Analyzed, n	ICI-based subsequent treatment	Non-immunotherapy subsequent treatment	Follow-up/cutoff	Reported participating centers/data source	Study period/enrollment window	Overlap ^b assessment based on available study-level information	Restriction/interpretation note	(Refs.)
Cheng <i>et al</i> , 2025	Advanced NSCLC/SC LC with PD after 1L ICI-based therapy and SCLC subgroup extractable	Partial ^c	39	IBP: IO + ChT (12), IO + ChT + A (9), IO + A (8), IO alone (2)	NIBP: ChT (3), A alone (5)	31 May 2024	Nanjing Jinling Hospital, Affiliated Hospital of Medical School, Nanjing University; single-center cohort	Jan 2020 - Dec 2023 and final follow-up 31 May 2024	Single-center cohort outside the main Shandong/Tianjin/Guangdong multicenter networks; no definite overlap with other included analytic cohorts was identified from reported center and study-period information; patient-level ^d overlap could not be independently verified	Mixed NSCLC/SCLC single-center study, advanced SCLC subgroup used and not a strict ES-SCLC-only 1L chemoimmunotherapy cohort	(16)
Li <i>et al</i> , 2022	ES-SCLC with PD after PD-1/PD-L1 inhibitor + ChT	Partial	100 (total cohort); 53 (1L subgroup)	RIBP (n=45): ICI + ChT (31), ICI + A (8), ICI + ChT + A (6)	DIBP (n=55): ChT (34), A (12) and ChT + A (9)	25 Jan 2022	Chinese People's Liberation Army General Hospital, Chinese PLA 304 Hospital, and Chinese PLA 307 Hospital	Jan 2017-Oct 2021 and cutoff 25 Jan 2022	Military/PLA hospital network with no reported participating center shared with the Shandong, Hunan, Tianjin/Ningxia/Inner Mongolia or Guangdong multicenter cohorts; no definite duplicate analytic cohort was identified from available study-level information	Initial immunotherapy was not exclusively 1L; 1L subgroup preferred for PICO-specific survival analysis	(17)

Peng <i>et al</i> , 2025	ES-SCLC with PD after 1L PD-L1 inhibitor + ChT	Yes	150	IBP: IO + ChT, durvalumab (49), atezolizumab (24), or adebrelimab (13) + ChT	Non-IBP: ChT alone	Aug 2024	Shandong Cancer Hospital affiliated to Shandong First Medical University, Shandong Provincial Hospital Affiliated to Shandong First Medical University and First Affiliated Hospital of Jinzhou Medical University.	Jul 2021-Dec 2023 and final follow-up Aug 2024	Overlaps in time and partly in Shandong regional centers with other Shandong real-world datasets, particularly Sun <i>et al</i> (20), Wang <i>et al</i> (21), the Shandong component of Shang <i>et al</i> (19), and Zhang <i>et al</i> (25). No definite duplicate analytic cohort was identifiable from study-level information, but unrecognized partial overlap cannot be excluded	Directly aligned with main PICO and all 1L ICIs were PD-L1 inhibitors	(18)
Shang <i>et al</i> , 2024	ES-SCLC after 1L ICI in IMpower133 and Shandong cohorts	Partial	125 and 161	Atezolizumab/ICI retreatment after first PD	Non-atezolizumab/non-ICI anticancer therapy	NR	Two data sources: Published IMpower133 trial data and Shandong Cancer Hospital and Institute ('Shanzhong' cohort)	Calendar period for the Shandong cohort not clearly reported and publication follow-up/cutoff NR in extracted table	The IMpower133 component is a distinct trial dataset. The Shandong real-world component may overlap with other Shandong Cancer Hospital datasets if calendar periods intersect. Because the present study mainly contributed translational/subgroup	Translational secondary analysis, all-cohort HR not fully extractable and subgroup data emphasized	(19)

p evidence rather than the strict primary pooled OS/PFS estimates, potential overlap was considered during interpretation

Sun <i>et al</i> , 2026	ES-SCLC with PD after 1L PD-1/PD-L1 inhibitor + ChT	Yes	489	Continuing IO: IO + ChT (194), IO + A (32), IO + ChT + A (40) and IO alone (32)	Control: ChT (133), A (16) and ChT + A (42)	15 Jan 2025	Shandong Cancer Hospital, Shanghai Chest Hospital, and Tianjin Cancer Hospital.	Mar 2019-Dec 2023 and final follow-up 15 Jan 2025	Large multicenter dataset with potential temporal/regional overlap with Shandong-based cohorts and possible overlap with Tianjin cancer-center data reported by Zhang <i>et al</i> (23). No definite duplicate analytic cohort was confirmed from available study-level information. Because this was a large influential cohort, leave-one-out sensitivity analyses were used to examine its influence	Large multicenter real-world dataset, directly aligned with main PICO and potential overlap with Shandong/Tianjin real-world cohorts should be considered	(20)
Wang <i>et al</i> , 2026	ES-SCLC with PD after 1L anti-PD-1/PD-L1 + ChT and 1L PFS ≥ 3 months was required for	Yes	206, ICI + ChT vs. ChT subgroup 162	Continuous ICI: ICI + ChT (122), ICI + A (11) and ICI + ChT + A (16)	Non-ICI: ChT (40) and ChT + A (17)	1 May 2025	Qilu Hospital of Shandong University (Jinan), Qilu Hospital (Qingdao) and	Jan 2020-Dec 2024 and final follow-up 1 May 2025	Shares Shandong Cancer Hospital and/or Shandong regional network with Peng <i>et al</i> (18), Sun <i>et al</i> (20), the Shandong component of Shang <i>et al</i> (19) and Zhang <i>et al</i> (25).	Five-arm design; primary immune resistance excluded and ICI + ChT vs. ChT is the cleanest direct comparison, but all-continuing- IO vs. all-non-ICI HR was not reported	(21)

	2L comparison						Shandong Cancer Hospital		The study used a five-arm design and excluded primary immune resistance. No definite duplicate analytic cohort was identified, but partial overlap across Shandong real-world datasets cannot be excluded		
Wang <i>et al</i> , 2026	ES-SCLC after PD on 1L immunothera- py and ≥1 efficacy assessment after PD	Yes	151	ICI + ChT (64), ICI + A (23) and ICI + ChT + A (13)	Single-agent ChT with irinotecan, topotecan, or nab-paclitaxel	30 Aug 2025	Second Departmen- t of Thoracic Oncology, Hunan Cancer Hospital/T he Affiliated Cancer Hospital of Xiangya School of Medicine, Central South University and single- center cohort	Sep 2019- Apr 2025 and final follow-up 30 Aug 2025	Single-center Hunan cohort with no reported participating center shared with the Shandong, PLA, Guangdong or Tianjin/Ningxia/Inner Mongolia datasets. No definite cohort overlap identified from available study- level information	Single-center real-world cohort; rechallenge included immediate ICI retreatment and ICI resensitization	(22)

Zhang <i>et al</i> , 2025	ES-SCLC with PD after 1L chemoimmunotherapy	Yes	211, PSM cohort 150	ICI continuation in 2L treatment; same ICI (105) or switched ICI (13)	ICI discontinuation in 2L treatment	1 Mar 2025	Tianjin Medical University Cancer Institute and Hospital and General Hospital of Ningxia Medical University and Affiliated Hospital of Inner Mongolia Medical University	Mar 2019-Dec 2023 and final follow-up 1 Mar 2025	Potential overlap with Sun <i>et al</i> (20) cannot be excluded if Tianjin Cancer Hospital corresponds to the same Tianjin cancer-center network. Other centers were in Ningxia and Inner Mongolia and were not shared with the Shandong/Guangdong/Hunan datasets. No definite duplicate analytic cohort was confirmed from study-level information	Directly aligned with main PICO and PSM analysis available	(23)
Zhang <i>et al</i> , 2025	ES-SCLC receiving 2L therapy after progression on 1L chemoimmunotherapy	Yes	103	2L-ICIs: ChT + ICI ± A	2L-non-ICIs: ChT, A or ChT + A	30 Oct 2023	Sun Yat-Sen University Cancer Center, Nanfang Hospital, Southern Medical University and Panyu Central Hospital	Jan 2020-Jun 2022 and final follow-up 30 Oct 2023	Guangdong multicenter cohort with no reported participating center shared with the Shandong, Hunan, PLA or Tianjin/Ningxia/Inner Mongolia cohorts. No definite overlap identified from available study-level information	Directly aligned with main PICO and 2L regimens were heterogeneous	(24)

Zhang <i>et al</i> , 2025	ES-SCLC receiving 2L ICI + A, ICI + ChT, or ChT after progression on 1L EP ± PD-L1 inhibitor	Partial	389	ICI + A (86) and ICI + ChT (125)	ChT (178)	Median follow-up 19.33 months and cutoff NR	Shandong Cancer Hospital and Institute and Shandong Provincial Hospital and Qilu Hospital of Shandong University	Jan 2018-Jan 2023, median follow-up 19.33 months and cutoff NR	Shares Shandong Cancer Hospital/Provincial Hospital/Qilu regional network with Peng <i>et al</i> (18), Sun <i>et al</i> (20), Wang <i>et al</i> (21) and the Shandong component of Shang <i>et al</i> (19). Because 1L ICI exposure was mixed and only 110/389 patients received 1L ICIs, this dataset was not treated as a strict main-PICO cohort and unrecognized partial overlap cannot be excluded	1L ICI was mixed and only 110/389 received 1L ICIs; use mainly for sensitivity/strategy discussion, not strict main PICO pooling	(25)
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^aStrict PICO fit was marked as ‘Yes’ when the cohort specifically included patients with ES-SCLC progressing after 1L chemoimmunotherapy and compared ICI-based versus non-immunotherapy subsequent treatment. ^bOverlap assessment was based on reported study-level information, including participating institutions or centers, study period, cohort size, eligibility criteria, 1L exposure, subsequent-treatment definitions and outcome datasets. ^cPartial indicates a mixed tumor cohort, mixed 1L immunotherapy exposure or subgroup-only extraction. ^dNo patient-level identifiers were available; therefore, absence of a definite duplicate analytic cohort does not prove complete mutual exclusivity. A, anti-angiogenic therapy; ChT, chemotherapy; DIBP, discontinuation of immunotherapy beyond progression; ECOG PS, Eastern Cooperative Oncology Group performance status; EP, etoposide plus platinum; ES-SCLC, extensive-stage small cell lung cancer; HR, hazard ratio; IBP, immunotherapy beyond progression; ICI, immune checkpoint inhibitor; IO, immunotherapy; NIBP, non-immunotherapy beyond progression; NR, not reported; NSCLC, non-small cell lung cancer; PD, progressive disease; PD-1, programmed cell death protein 1; PD-L1, programmed cell death ligand 1; PFS, progression-free survival; PICO, population, intervention, comparator and outcomes; PSM, propensity score matching; RIBP, rechallenge of immunotherapy beyond progression; 1L, first line; 2L, second line.

Table SIV. Leave-one-out sensitivity analyses for OS and PFS.

Omitted study (first author, year)	Outcome	Studies included, n	Pooled HR (95% CI)	P-value	I ² (%)	τ^2	Interpretation	(Refs.)
Li <i>et al</i> , 2022	OS	5	0.63 (0.52-0.76)	<0.001	36	0.02	Direction unchanged and statistically significant	(17)
Peng <i>et al</i> , 2025	OS	5	0.59 (0.47-0.75)	<0.001	45	0.03	Direction unchanged and statistically significant	(18)
Sun <i>et al</i> , 2026	OS	5	0.57 (0.47-0.70)	<0.001	10	0.00	Direction unchanged and statistically significant	(20)
Wang <i>et al</i> , 2026	OS	5	0.68 (0.58-0.79)	<0.001	0	0.00	Direction unchanged and statistically significant	(22)
Zhang <i>et al</i> , 2025 (PSM cohort)	OS	5	0.59 (0.47-0.75)	<0.001	46	0.03	Direction unchanged and statistically significant	(23)
Zhang <i>et al</i> , 2025	OS	5	0.62 (0.50-0.77)	<0.001	44	0.03	Direction unchanged and statistically significant	(24)
Li <i>et al</i> , 2022	PFS	5	0.52 (0.37-0.72)	<0.001	80	0.11	Direction unchanged and statistically significant	(17)
Peng <i>et al</i> , 2025	PFS	5	0.52 (0.37-0.74)	<0.001	79	0.12	Direction unchanged and statistically significant	(18)
Sun <i>et al</i> , 2026	PFS	5	0.45 (0.38-0.54)	<0.001	0	0.00	Direction unchanged and heterogeneity markedly reduced	(20)
Wang <i>et al</i> , 2026	PFS	5	0.55 (0.40-0.75)	<0.001	73	0.08	Direction unchanged and statistically significant	(22)

Zhang <i>et al</i> , 2025 (PSM cohort)	PFS	5	0.51 (0.35-0.73)	<0.001	81	0.14	Direction unchanged and statistically significant	(23)
Zhang <i>et al</i> , 2025	PFS	5	0.52 (0.37-0.73)	<0.001	80	0.11	Direction unchanged and statistically significant	(24)

CI, confidence interval; HR, hazard ratio; OS, overall survival; PFS, progression-free survival; PSM, propensity score matching.
