

P3.025: Incidence of Second Primary Lung Cancer Following Stereotactic Body Radiation Therapy (SBRT) for Early-Stage NSCLC: A Systematic Review

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INTRODUCTION

Patients with lung cancer develop second primary lung cancer (SPLC) at approximately 3-4% per year after surgical resection¹⁴. Less is known about SPLC rates following stereotactic body radiation therapy (SBRT), an increasingly preferred treatment for early-stage non-small-cell lung cancer.

SPLC Criteria (Martini & Melamed 1975)

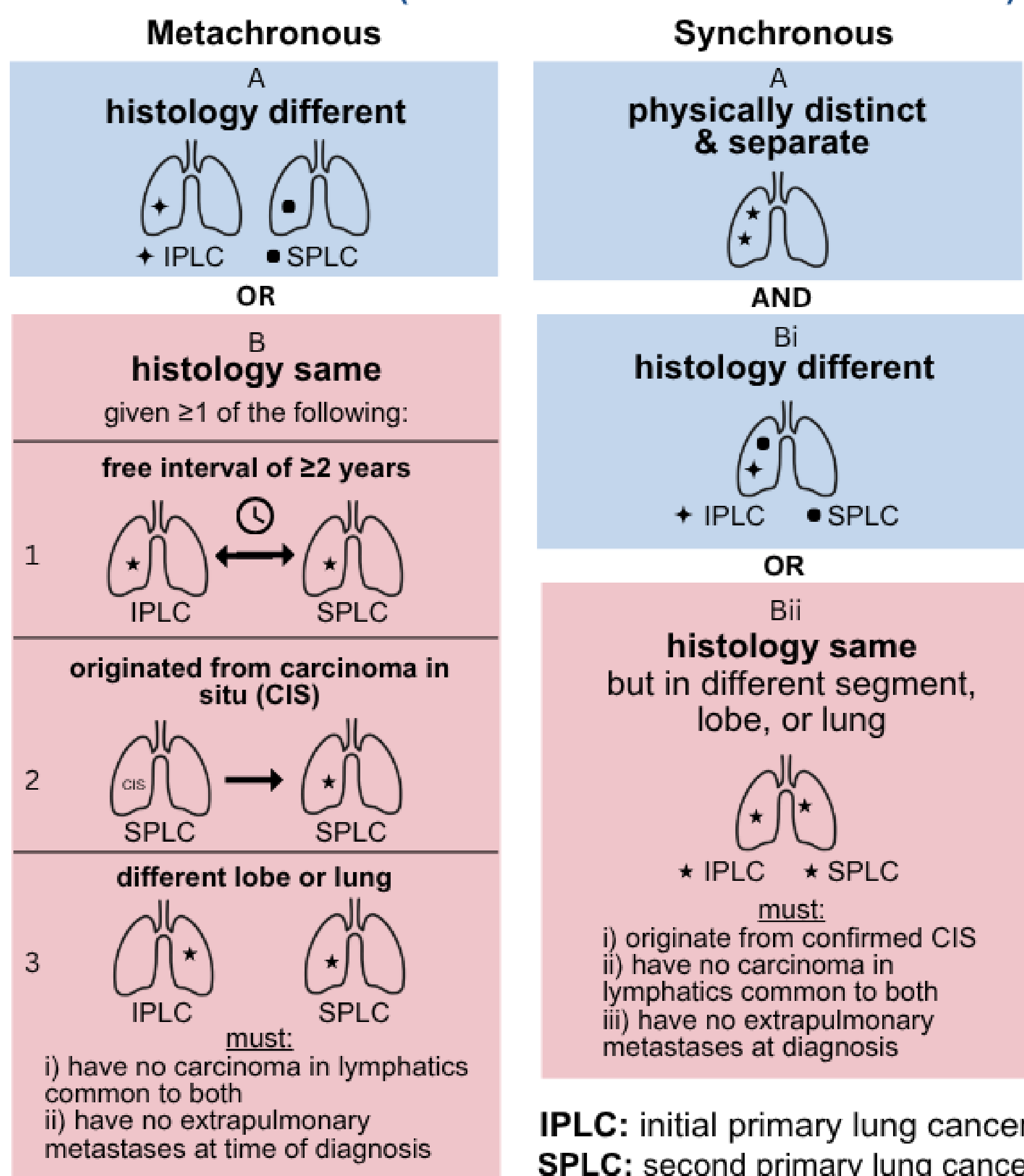


Figure 1: SPLC definitions based on diagnostic criteria adapted from Martini N, Melamed MR (1975).¹

METHODS

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guideline was used to identify eligible studies reporting SPLC rates after lung SBRT. Between-study variance (τ^2) was estimated with the Restricted Maximum Likelihood (REML) method, and risk of bias was evaluated with RoBANS 2. Weighted least-squares linear regression was used to generate a best-fit line to estimate annual SPLC incidence post-SBRT.

RESULTS

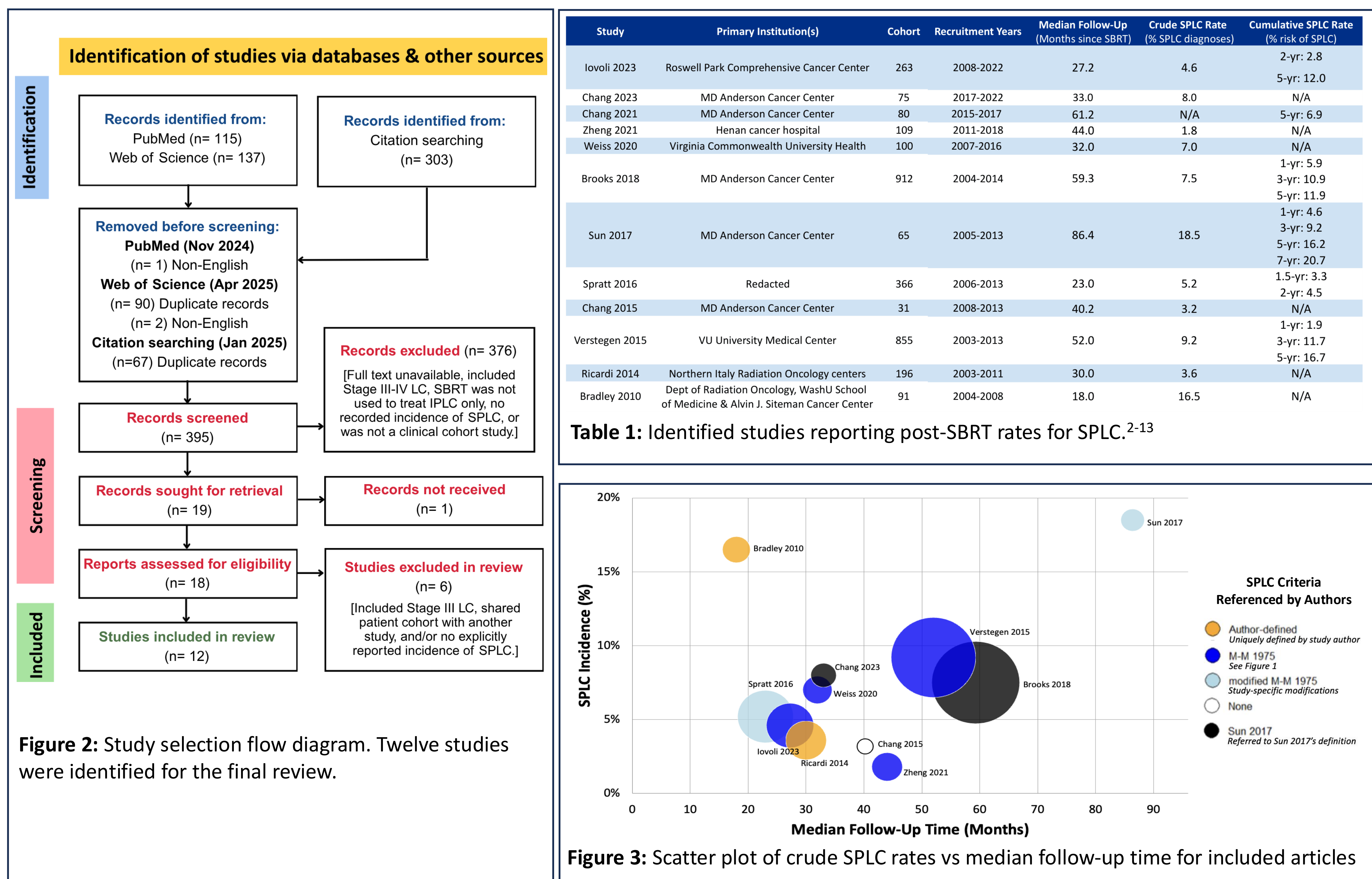


Figure 2: Study selection flow diagram. Twelve studies were identified for the final review.

Figure 3: Scatter plot of crude SPLC rates vs median follow-up time for included articles

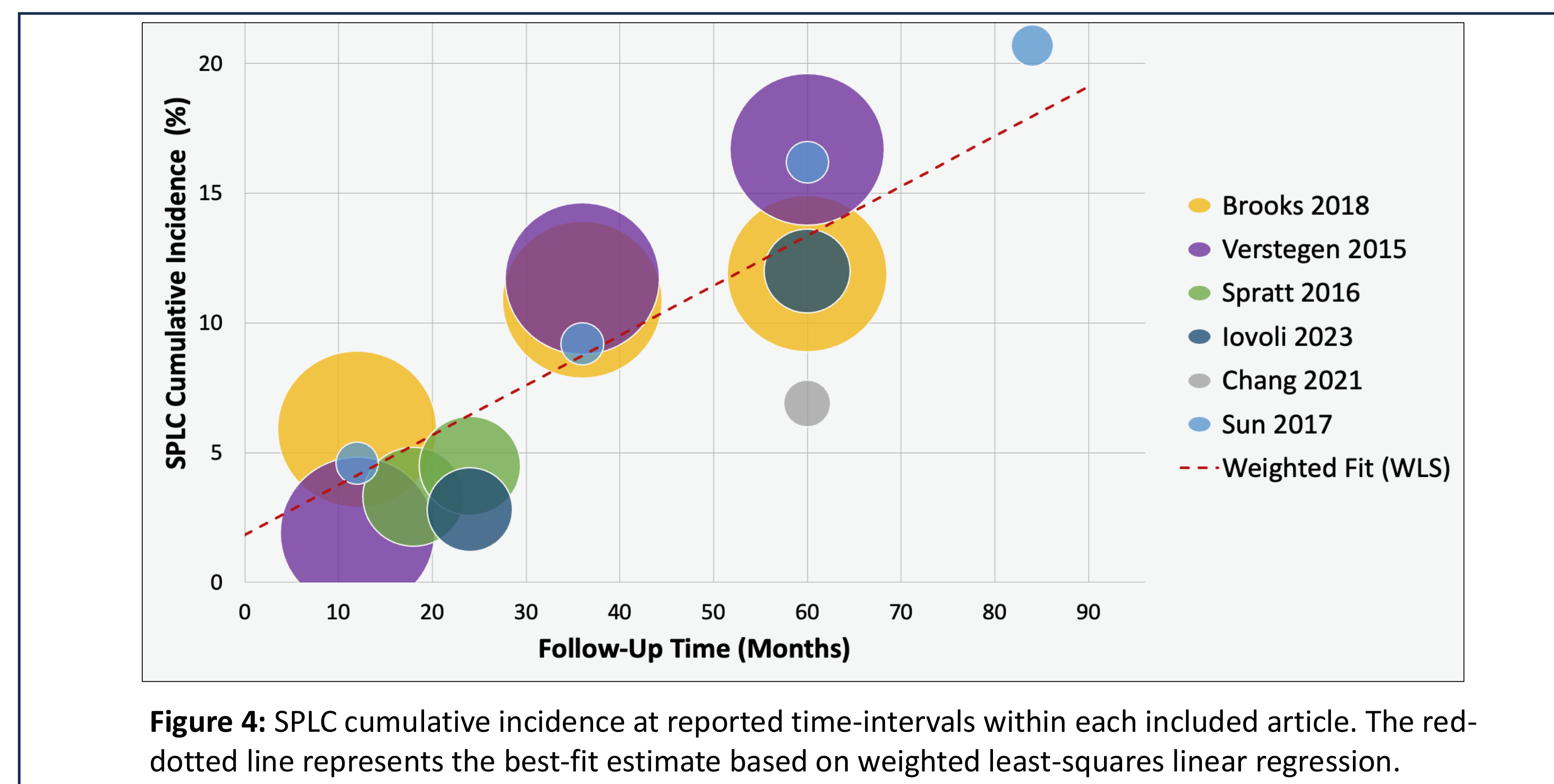


Figure 4: SPLC cumulative incidence at reported time-intervals within each included article. The red-dotted line represents the best-fit estimate based on weighted least-squares linear regression.

DISCUSSION & CONCLUSION

SPLC rates following SBRT appear similar to those following surgery. This is demonstrated in an unadjusted comparison of this study's results with the post-hoc analysis from the CALGB 140503 study reported by Stinchcombe et al.

	Post-surgery Stinchcombe et al., 2024 3.4% incidence per pt per yr	Post-SBRT This review
Crude Rate	16.1% (112/697)	7.3% (228/3143)
Median FU	84.0 months 0.19% per FU month	Avg: 40.5 months Avg 0.18% per FU month
Cumulative Incidence Rate(s)	1-yr: 4.0% 2-yr: 8.0% 3-yr: 11.0% 5-yr: 15.9% 7-yr: 22.0%	Avg 1-yr: 4.1% Avg 2-yr: 3.7% Avg 3-yr: 10.6% Avg 5-yr: 12.7% 7-yr (Sun 2017): 20.7%

Table 2: SPLC rates compared to the CALGB 140503 cohort.

There are substantial limitations with this comparison, given variable SPLC criteria were used in post-SBRT articles and because patients treated with surgery in a prospective clinical trial undergo more rigorous staging.

To our knowledge, this is the first systematic review evaluating SPLC rates after SBRT for stage I NSCLC. Future research utilizing matched cohorts with harmonized SPLC criteria can better determine if there are measurable differences.

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