# Single- vs Multi-Fraction Lung SBRT in Rural Vermont: Treatment Selection, Outcomes, and Travel Burden

University of Vermont
Larner College of Medicine

Jacob Henderson[1], Nataniel Lester-Coll, MD[1,2,3]

[1]Larner College of Medicine at the University of Vermont • Burlington, VT
[2]University of Vermont Cancer Center • Burlington, VT
[3]Department of Radiation Oncology • Burlington, VT

University of Vermont
Cancer Center
Radiation Oncology

## Background

- SBRT is a standard treatment for medically inoperable early-stage non-small cell lung cancer[1]
- Single-fraction SBRT (34 Gy × 1) produced outcomes similar to multi-fraction SBRT in RTOG 0915[2] and has been adopted at high-volume centers[3], yet it remains a minority of SBRT courses nationally[4]
- One treatment visit instead of 3–5 may matter most where patients travel far for care
- Aim: compare treatment selection, toxicity, survival, and travel burden for SF- vs MF-SBRT in a rural academic network

## Methods

- Retrospective cohort of patients treated with lung SBRT, 2022–2026 (N = 71)
- SF-SBRT (n = 24): 34 Gy × 1 (n = 19), 30 Gy × 1 (n = 3), 24 Gy × 1 (n = 2)
- MF-SBRT (n = 47): 50–55 Gy in 3–5 fractions (n = 46); 33 Gy (n = 1)
- Travel: one-way driving / straight-line distance from home to treating center; round-trip miles per course = 2 × distance × fractions
- Outcomes: baseline characteristics, CTCAE toxicity, overall survival (OS) from last fraction
- Statistics: Fisher exact, Wilcoxon rank-sum, Kaplan–Meier/log-rank, Cox regression

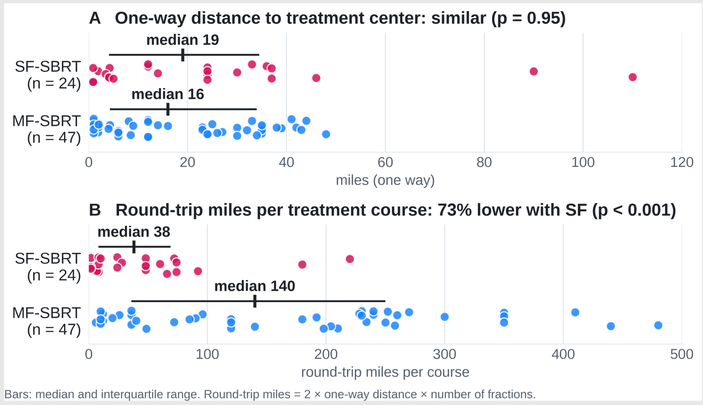
Table 1: Baseline characteristics by fractionation

| | SF-SBRT (n = 24) | MF-SBRT (n = 47) | p |
|---|---|---|---|
| Age, years, median (IQR) | 66.5 (63–69.5) | 71 (67–78) | 0.002 |
| Female | 10 (42%) | 21 (45%) | 1.00 |
| ECOG 2–3 | 7 (32%) | 6 (13%) | 0.10 |
| Stage IA1–IB | 20 (83%) | 41 (93%) | 0.23 |
| Histology | | | 0.04 |
| Adenocarcinoma | 9 (38%) | 33 (70%) | |
| Squamous cell | 5 (21%) | 3 (6%) | |
| Other, incl. small cell | 2 (8%) | 4 (9%) | |
| No pathologic confirmation | 8 (33%) | 7 (15%) | |
| Commercial insurance | 5 (21%) | 10 (21%) | 1.00 |
| Distance, miles, median (IQR) | 19 (4.1–34.5) | 16 (4.3–34.0) | 0.95 |
| Lives >25 miles away | 8 (33%) | 18 (38%) | 0.80 |
| Documented transportation need | 7 (29%) | 10 (22%) | 0.57 |

Distance: one-way, home to treating center. Percentages exclude missing values (ECOG: 2 SF; stage: 3 MF; transportation: 2 MF). p: Wilcoxon rank-sum or Fisher exact.

## Results

Figure 1: Travel burden by SBRT fractionation




Bars: median and interquartile range. Round-trip miles = 2 × one-way distance × number of fractions.

**73%**

**less round-trip travel per treatment course with SF-SBRT**

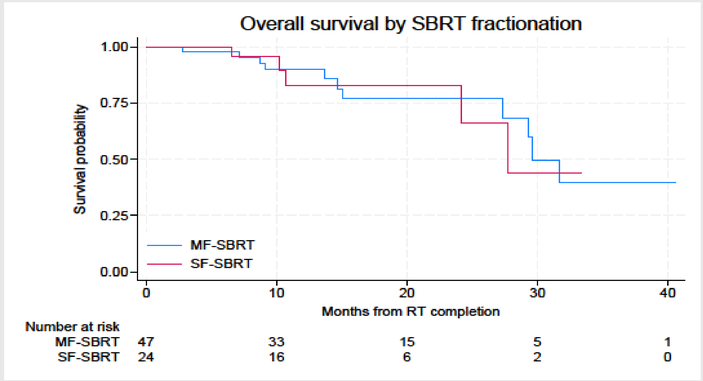
Median 38 vs 140 miles. Compared with a 5-fraction course, the 24 SF patients avoided 96 treatment visits and ~4,600 miles (48 visits and ~2,300 miles vs 3 fractions).

Table 2: Toxicity by fractionation (CTCAE)

| | SF-SBRT (n = 24) | MF-SBRT (n = 46) | p |
|---|---|---|---|
| Any toxicity, any grade | 14 (58%) | 18 (39%) | 0.14 |
| Grade ≥2 toxicity | 2 (8%) | 3 (7%) | 1.00 |
| Pneumonitis, any grade | 4 (17%) | 7 (15%) | 1.00 |
| Chest wall, any grade | 4 (17%) | 5 (11%) | 0.48 |
| Fatigue, any grade | 8 (33%) | 9 (20%) | 0.25 |

Toxicity data unavailable for 1 MF patient. No grade ≥4 events. p: Fisher exact.

Figure 2: Overall survival by fractionation




12-month OS 83% (SF) vs 90% (MF); 24-month 83% vs 77%; log-rank p = 0.86. HR for death with SF 1.10 (95% CI 0.38–3.18); adjusted* 0.76 (0.20–2.81). ECOG 2–3 was associated with death (HR 3.92, 1.30–11.81).

*Adjusted for age ≥65, ECOG, and stage (n = 66 with complete data; 15 deaths).

## Conclusions

- SF-SBRT cut round-trip travel per treatment course by 73% (median 38 vs 140 miles)
- Grade ≥2 toxicity was uncommon and similar (8% vs 7%), and OS did not differ; the study was not powered to show equivalence
- SF patients were younger and more often treated without pathologic confirmation, but did not live farther away: an opportunity to offer SF preferentially to patients with the greatest travel burden

## Limitations

- Retrospective, single network, small sample; median follow-up 13 months
- Fractionation was not randomized; patient selection may confound outcome comparisons
- Local control not reported; abstraction for the SF cohort is ongoing
- Travel counts treatment visits only (excludes simulation and follow-up)

## Future Directions

- Complete local control abstraction and report local failure by fractionation
- Measure patient-reported travel time, cost, and caregiver burden
- Evaluate a network pathway offering SF-SBRT to eligible patients who live farthest from treatment

## References

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