

BEYOND THE LINAC: THE SOCIOECONOMIC BENEFITS OF HYPOFRACTIONATED BREAST RADIOTHERAPY

Mitigating Financial Toxicity, Closing Disparity Gaps, and Maximizing
System Efficiency in Adjuvant Care

Hayley Beacher Stowe, MD MSCI

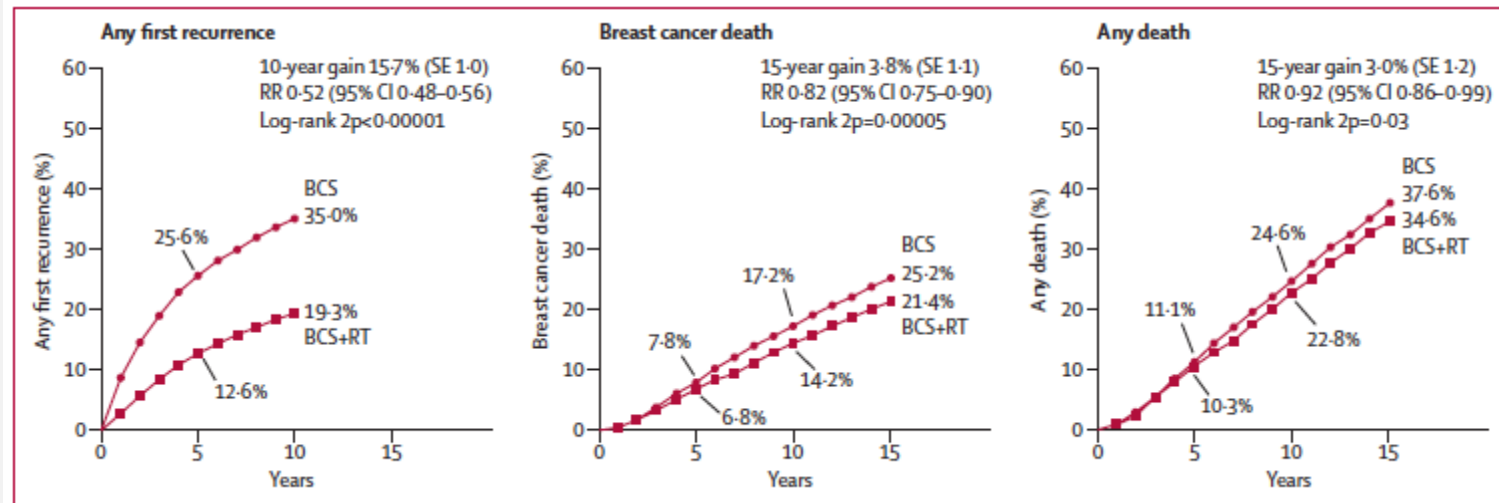
Radiation Oncology

Vandalia Health - CAMC

“WHY DO I NEED YOU?”

- For early stage breast cancer, numerous clinical trials have demonstrated no difference in overall survival between mastectomy and the breast conservation therapy (BCT)
- BCT = breast conserving surgery + adjuvant radiation therapy (RT) +/- systemic agents
- Adjuvant RT = local insurance policy

EBCTCG META-ANALYSIS



CONVENTIONAL FRACTIONATION

- Historically for early stage breast cancer, conventionally fractionated whole breast irradiation (CF-WBI) was the standard of care
- CF-WBI = 1.8-2.0 Gy fractions to the whole breast for a total of 25-50 Gy +/- sequential boost to the tumor bed
 - i.e. 5-7 weeks worth of daily treatments
- Direct and indirect cost (i.e. travel/lodging, loss of productivity, caregiver costs etc) = **HIGH**

PARADIGM SHIFT

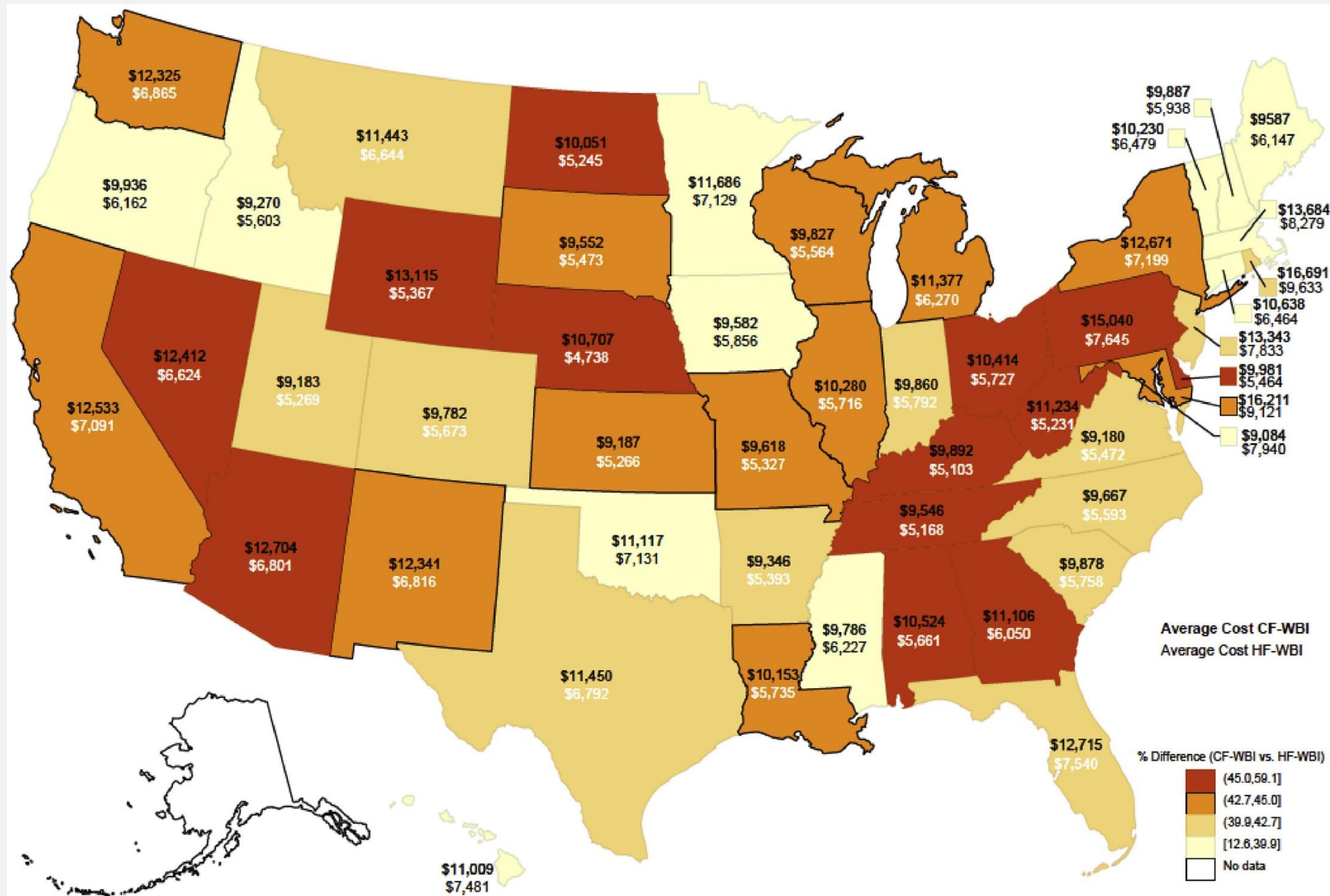
- **Hypofractionated = >2 Gy per treatment**
 - Moderately hypofractionated whole breast irradiation (moderate HF-WBI)
 - 15-16 daily treatments over the course of three weeks
 - Canadian trial and START B trial
 - Ultra hypofractionated whole breast irradiation (ultra HF-WBI)
 - 5 whole breast treatments either once a day for 5 consecutive days (1 week) or one weekly treatment x 5 weeks
 - UK FAST-Forward and UK FAST
 - Accelerated Partial Breast Irradiation (APBI)
 - 5 daily treatments delivered to the lumpectomy cavity alone

ADJUVANT RT REGIMENS

Regimen	Patient Criteria	# of Treatments	Total Duration of Regimen	Target	When did it become “known” as equivalent
CF-WBI	All breast cancer patients	25-35 daily	5-7 weeks	Whole breast	Historic, traditional regimen
Moderate-HF WBI	pT1-3, pN0-1	15-16 daily	3 weeks	Whole breast	2010-2013
Ultra-HF WBI #1	pT1-2, pN0	5 once weekly	5 weeks	Whole breast	2020
Ultra-HF WBI #2	pT1-3, pN0-1	5 daily	1 week	Whole breast	2020
APBI	pT1c, pN0 G1-2, 40+ y.o	5 daily	1 week	Lumpectomy site	2015

THE UNDERUTILIZED REGIMENS

- By 2013, the moderate HF-VBI regimen had already been adopted in around 80% and 71% of appropriate patients in the UK and Canada, respectively, and only in 15.6% of patients in the US.
- Estimates suggest that a US hospital-based practice's adoption of a 70% moderate HF-VBI rate would result in annual reductions of \$300,790 in technical revenues and 731 professional RVUs with the reimbursement policies of US Health Care in 2016
- In 2016, the estimated per-case reduction in technical revenue was \$1,777



Avg cost in 2017 US dollars of CF-WBI relative to moderate HF-WBI in women with breast cancer by state from 2008-2017

TREATMENT COSTS

- C-WBI (25-35 treatments) = \$11,013
- Moderate HF-WBI (15-16 treatments)= \$6,458
- Ultra HF-WBI (5 treatments)= \$2,289

THE BUSINESS PERSPECTIVE

- Argument: adoption of hypofractionation in the US healthcare system will make it difficult to “keep the lights on”
- Rebuttal:
 - Shorter treatment courses also result in the ability to treat more patients.
 - Reduction in annual operating/department cost with hypofractionation
 - One center found the estimated cost for treating all patients with:
 - C-WBI = \$163,296,318
 - Moderately HF-WBI= \$104,735,512
 - Ultra HF-WBI = \$56,883,916

THE PATIENT PERSPECTIVE

- Direct out of pocket savings between C-WBI and moderate HF-WBI = \$139-\$426
- This does not take into account the indirect socioeconomic cost reductions with the use of hypofractionation
 - Travel and lodging
 - Loss of productivity
 - Caregiving costs

Type of costs	Radiation therapy type		
	CF-WBI	HF-WBI	Differences, US dollars [†]
*2009-2017 (adjusted mean [95% CI], US dollars [†])			
Total costs	11,013 (10,948-11,078)	6458 (6403-6513)	4555 (4467-4643)
Insurers paid	9869 (9807-9931)	5755 (5703-5808)	4113 (4030-4197)
Patient OOP costs	1,096 (1080-1111)	669 (657-682)	426 (406-447)

CLOSING THE EQUITY GAP AND NARROWING DISPARITIES

- Socioeconomically disadvantaged cohorts historically experience much lower treatment compliance and completion rates when C-WBI is recommended
- The adoption of moderate HF-WBI resulted in an increase in RT completion rates from 52 to 75% when compared to the 5-7 week C-WBI course
- Leveling mortality ratio

CONCLUSION

- Hypofractionation in breast cancer radiation treatment realizes the six goals of high-quality care as defined by the Institute of Medicine: safety, effectiveness, patient centeredness, timeliness, efficiency, and equity.
- Hypofractionation serves as a critical systemic mechanism to reduce social inequity and ease financial strain on both the patient and society
- Provider education and active patient advocacy is key to a more uniform adoption of these shorter, oncologically equivalent treatment regimens.