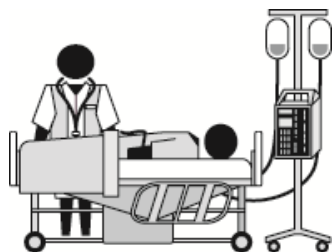


High-Dose Rate Brachytherapy

High-Dose Rate Brachytherapy



Technology In Brief

What Is It:

- High-dose rate brachytherapy (HDR-B) involves the use of remote afterloaders to deliver radiation through catheters and applicators implanted directly within the tumor site or tumor bed

How Does it Work:

- Typically, catheters (interstitial) or applicators (intracavitary) are inserted into the treatment site
- After treatment planning, the applicators are connected to an HDR remote afterloader, which delivers the radioactive sources to the tumor sites

Adoption Status:

- Over 1,000 sites in the U.S.; obsolescence risk is low

FDA Status:

- Nucletron microSelectron approved in 2004; Nucletron Flexitron approved in 2007; Varian GammaMedplus and Varisource approved in 2007

Major Vendors:

- Nucletron (acquired by Elekta in 2011); Varian Medical Systems

Competing Products:

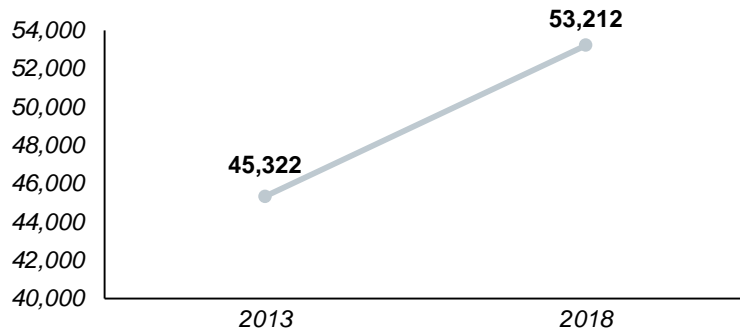
- External Beam Radiation Therapy, surgery, LDR brachytherapy

Consideration	Service Line Strategy Advisor's Take
Clinical	<ul style="list-style-type: none"> • Primary sites treated: prostate, gynecologic, breast, head and neck, lung, and esophagus • HDR brachytherapy can be delivered through three techniques: interstitial, intracavitary, or intraluminal. The choice of technique depends on the tumor site
Reimbursement	<ul style="list-style-type: none"> • In 2012 and 2013, Medicare reimbursement for HDR-B increased slightly, after 4 to 5 percent drop in reimbursement rates– depending on tumor site – in 2011 • Reimbursement for HDR-B is complex because the number of billable procedures is great and varies by tumor site
Cost	<ul style="list-style-type: none"> • \$250K-\$500K afterloader • \$500K-\$1M vault (if necessary) • \$30K annual source replacement • \$200-\$300 for applicators and imaging
Payer Coverage	<ul style="list-style-type: none"> • HDR-B is a longstanding and clinically proven treatment modality. That said, payer coverage decisions may vary with tumor site application, especially with the recent proliferation of advanced and noninvasive EBRT modalities
Market Potential	<ul style="list-style-type: none"> • HDR-B fits in well with a comprehensive treatment offering, especially given a focus on tumor sites such as breast, prostate, gynecologic, and even lung
Operational Needs	<ul style="list-style-type: none"> • Usually outpatient procedure • Each treatment session 30-60 minutes • Multidisciplinary care requires presence of specialists such as radiation oncologists and surgical specialists and experienced physicists
Impact in Accountable Care	<ul style="list-style-type: none"> • Payers likely to scrutinize utilization of advanced RT modalities • Emerging comparative clinical studies of effectiveness of different RT modalities will dictate impact on coverage and reimbursement
Competitive Take	<ul style="list-style-type: none"> • With newer imaging modalities and sophisticated treatment planning, clinicians at AMCs and community hospitals are employing HDR-B not only as a boost to EBRT but also as a monotherapy • HDR-B offers a number of advantages over LDR-B, including significantly reduced treatment times, reduced radiation exposure for attending clinicians and improved treatment dosimetry due to computerized treatment planning and precise afterloader manipulation
Position on the Adoption Curve	<ul style="list-style-type: none"> • Late Majority

HDR-B: Strategic Component of Comprehensive Cancer Treatment Offering

Market & Financial Overview

National Outpatient Market Estimates



17%
Overall Market Growth

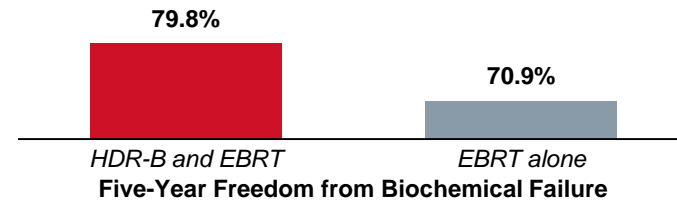
Reimbursement Rates

Application	2013 Final Rate	2014 Final Rate	Percent Change
HDR-B Breast	\$17,325	\$16,462	(5.0%)
HDR-B Cervical	\$4,649	\$4,001	(13.9%)
HDR-B Lung	\$8,246	\$8,030	(2.6%)
HDR-B Prostate	\$9,106	\$8,146	(10.5%)
HDR-B Vaginal	\$4,649	\$4,001	(13.9%)

Clinical Considerations

HDR Brachytherapy Boost vs. EBRT Alone for Prostate Cancer

n= 688, Median biochemical follow-up of 60.5 months



This study assessed outcomes for patients treated for intermediate- and high-risk prostate cancer with either a schedule of external beam radiation therapy (EBRT) with a high dose rate brachytherapy (HDR-B) boost or EBRT alone. The cohort receiving EBRT and HDR-B showed a statistically significant improvement in five-year freedom from biochemical failure compared to the group receiving EBRT alone, providing additional evidence of HDR-B's utility as a clinically effective treatment method for prostate cancer.



Keys for Investment Success

- HDR-B programs often leverage existing staff: a physicist, surgeon, radiation oncologist, and nurse. The physicist is especially crucial because he/she is responsible for monitoring and adjusting the radiation dosage throughout the procedure. Both the physicist and physicians require significant training before achieving proficiency, however
- The facility requirements for an HDR-B program depend on the existing available space in a hospital. HDR-B treatments may be performed in an existing shielded space or the construction of a new vault may be necessary, adding significantly to the upfront capital costs