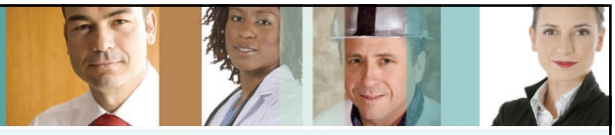
CANCER CENTER BUSINESS SUMMIT



Economic Implications of Advancements in Radiation Technology

Sponsored by: OTN

Anthony M. Berson, M.D.
Radiation Oncology, St. Vincent's Comprehensive Cancer Center

Richard Emery
Vice President, Aptium Oncology

Executive Director, Trinitas Comprehensive Cancer Center

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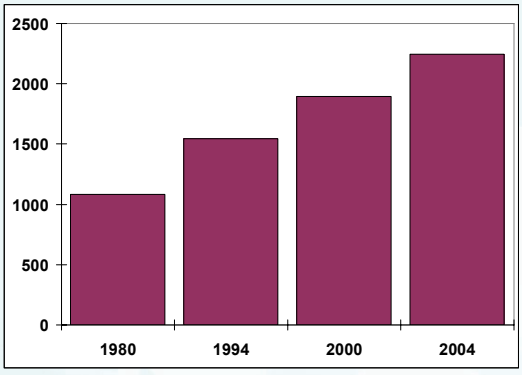
Dramatic Growth of RT Capacity in the US

- 2,246 Radiation Therapy Facilities in the US in 2004-2005.[1]



[1] **Elkin,EB, et al, "Radiation therapy facilities in the United States"** *International Journal of Radiation Oncology*Biology*Physics, Volume 66, Issue 4, 15 November 2006, Pages 1204-1211*

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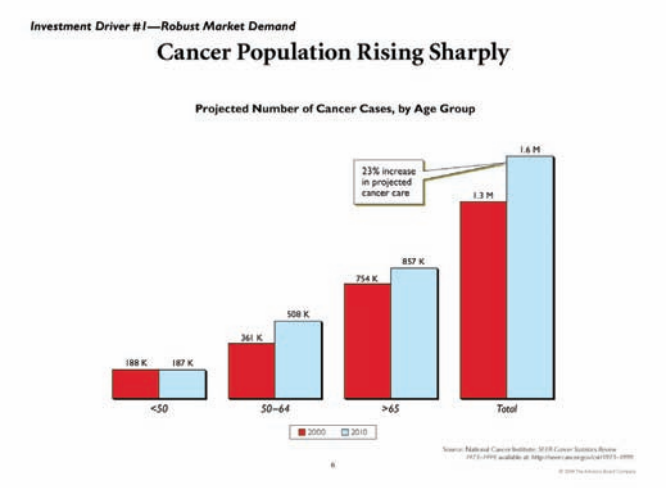
Predicted Growth of Cancer Cases in the US



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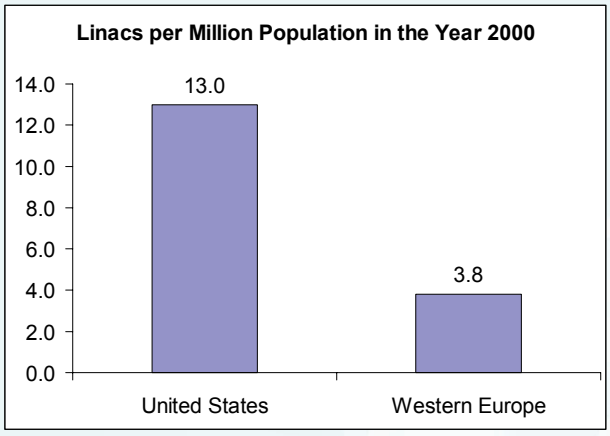
US RT Capacity High vs. Europe



What the market will bear vs. Government sanctioned

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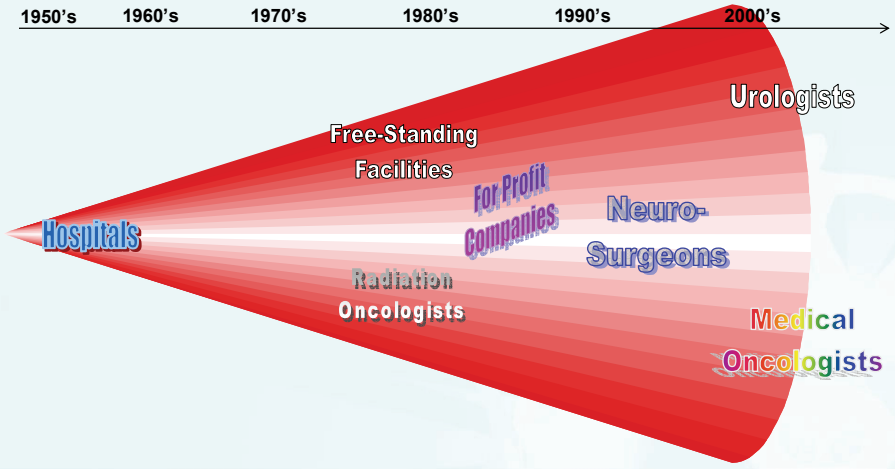
RT Technology Buyers Grow More Diverse



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Who are the Stakeholders in RT and What do They Need?

Stakeholder	Need	Costs
Patients	Better Outcomes	↑
Providers	Profit, Differentiation, Quality	↑
Manufacturers	Profit, Market Share	↑
Payers	Value	↓

New Technology in RT satisfies all these needs
→ These stakeholders drive New Technology

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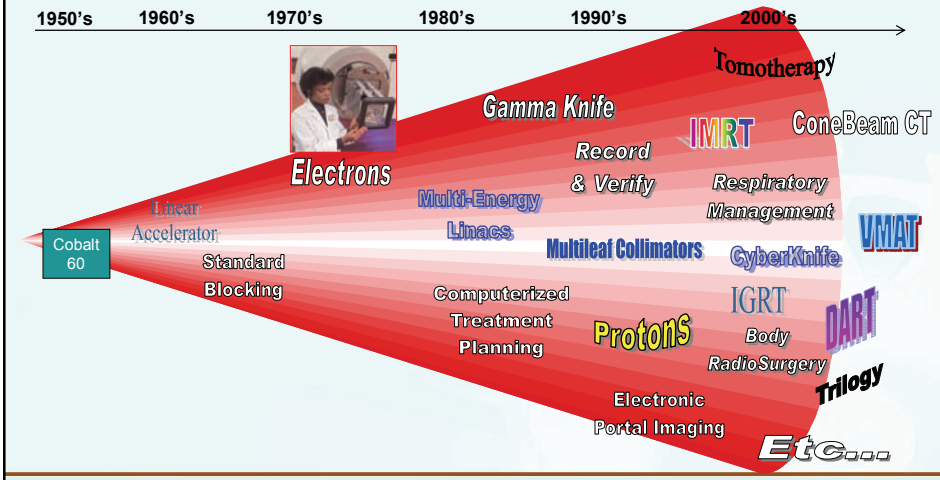
The Expanding Variety of New RT Technologies



The Goal of Radiation Therapy

- Maximize tumor cell death while minimizing damage to healthy cells
- This goal hasn't changed in over 50 years!

Increased Competition *within* RT

- Hospital-based Centers
  - Academic models
  - Community Hospital models
- Free-standing Centers
  - Physician owned
    - Radiation Oncologists
    - Medical Oncologists
    - Urologists
    - Surgeons

Using many different RT technologies

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Increased Competition *to* RT

- Targeted Chemotherapy Agents
- Robotic Surgery (DaVinci)
- Traditional Surgery
- Interventional Oncology
- Cryotherapy
- Watchful waiting (economic and clinical drivers)
  - When will CMS implement clinical restrictions on the treatment of prostate cancer?
- Lower costs outside of US
  - E.g. cosmetic surgery

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What are the Motivators Driving the Purchase of New RT Technologies?

- Clinical
- Financial
- Strategic / Competitive / Emotional

New Technology Purchasing Considerations: Clinical Issues

- Is there clinical research supporting the new technology?
- Is there an expectation of improved clinical outcomes?

New Technology Purchasing Considerations: Financial Issues

- Will payers reimburse for this new technology?
- Will we realize sufficient patient volume?
- What is reimbursement likely to be in the future?
- What is my ROI?

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New Technology Purchasing Considerations: Emotional/Strategic Issues

- Is the technology appealing to the consumer?
- Does it differentiate us from competitors?
- Does it provide an ego-boost?

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New Technology Economic Decision Formula:

Clinical Benefits
+ Financial Gain
+ Strategic and
Emotional Gain

> Costs

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New Technology Purchasing Considerations: Timing Issues

Adoption	Early	Middle	Late
Clinical Value	Presumed	Limited Support	Known
Cost	High	High	Reduced
Reimbursement	Limited to None	Maximum	Reduced
Marketing Value	High	Significant	Limited
Safety Risk	High	Moderate	Low

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Cyberknife (Accuray)

- Stereotactic Radiosurgery (SRS)
- Competes with Linear Accelerator
- Market Share
  - ~70 units in the US (1.6%)
  - 34 International Sites
    - 15 of 34 in Japan
- IPO in February 2007

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Cyberknife (Accuray)

- Is there Clinical Justification?
  - Well published for Cranial applications
  - Less documented for extra-cranial sites
- Is it Financially Viable?
  - List Price: $4.1 Million
  - Minimal US presence
  - Medicare Payments ↓ 25-29% in 2007
    - $5,520 ↓ $3,896 and $3,750 ↓ $2,645
    - Lost “New Technology” classification by CMS in 2007
  - Future downward pressure likely

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Cyberknife (Accuray)

- Are there Strategic/Emotional Rationale?
  - Provides noticeable differentiation among healthcare providers
  - Provides a degree of prestige
  - Markets itself well

Tomotherapy

- Intensity Modulated Arc Radiotherapy
- Market Share
  - ~96 units in the US (2.2%)
  - >150 units worldwide
- Reimbursed at IMRT rate
- IPO in May 2007

Tomotherapy

- Is there Clinical Justification?
- Is it Financially Viable?
  - Likely to see decreases in reimbursement
  - Potential patient throughput limitations
- Are there Strategic/Emotional Rationale?
  - Market Differentiation
  - Provides a degree of prestige

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Proton Therapy

- Traditional Design
  - ~$150 Million
    - ~100,000 Square Feet
    - Multi (4) Gantry System and Fixed Beam
    - Large Staffing Requirements
  - 6 Facilities in operation in US
  - Loma Linda has the largest patient volume
  - Implementation timeline is ~3 years, which increases risk

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Emerging Proton Therapy

- Compact Design
  - ~$60 Million
    - 2 Gantry System and 1 Fixed Beam
  - Smaller space requirements
  - No facilities in operation yet
  - Potential to bring Proton Therapy to the Community Setting

Proton Therapy

- Is there Clinical Justification?
  - Prostate
    - Lots of competition for this disease site
      - IMRT, 3D, Seed Implants, HDR, Cryotherapy, Surgery, Robotic Surgery, etc…
    - No proof protons superior to alternatives
  - Pediatrics & Ocular Tumors
    - Well supported but insufficient patient volumes to justify wide-spread adoption

Proton Therapy

- Is it Financially Viable?
  - Maybe, if more patients are eligible (i.e. prostate)
    - Estimates up to 20% of all patients eligible for protons
  - However, Konski, et al, concluded that with prostate cancer:
    - "…proton beam therapy is not cost effective for most patients..."*
  - Also, greater implementation will likely put negatively pressure on reimbursement in the future and…
  - Implementation timelines are 3+ years

*Konski A., et al, *Journal of Clinical Oncology*, Vol 25, No 24 (August 20), 2007: pp. 3603-3608

Proton Therapy

- Although Proton Therapy may satisfy Strategic/Emotional Needs:
  - Market differentiation
  - Patient demand
  - Ego boost
- There is little clinical or financial rationale for widespread adoption of Proton Therapy into a US system with overcapacity

Volumetric Intensity Modulated Arc Therapy

- Linear Accelerator–based technology
- Complete Treatment in one 360 rotation of gantry
- Potential for more precise treatment
- Reduction of Treatment time
  - From 20 Minutes
  - Down to 2 Minutes
- With Conebeam CT Capability it Competes with Tomotherapy

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Implications of Volumetric Arc Therapy

- Improved Clinical Outcomes
- Faster & More Accurate Treatment
- Greater Machine Throughput
- Fewer Machines per Center
- Reduced Staffing Costs Possible

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Volumetric Intensity Modulated Arc Therapy

- Is there Clinical Justification?
  - VMAT is an extension of existing technology
  - Dose modeling predicts positive clinical results
  - Very few patients treated to date
- Is it Financially Viable?
  - Purchase price is incrementally modest
  - However, there will be reimbursement challenges

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Volumetric Intensity Modulated Arc Therapy

- Are there Strategic/Emotional Rationale?
  - Limited marketing appeal to consumers
    - Major advantage will be decrease in treatment time
  - Provides market differentiation but it may be difficult to get the message across
  - Ego-boost limited to peers

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Centralized Treatment Planning

- Ability to transfer CT data sets over the internet securely
- Physician draws target contours on CT images
- CT data set is transferred to centralized planning office
- Physicist optimizes plan
- Completed plan is returned to original site for QA and treatment delivery
- D3 Model

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D3 Model of Centralized Treatment Planning

- Benefits
  - Higher and consistent quality of care
  - Faster implementation of new technology
  - Peer review
  - Cost savings
  - Higher efficiency in treatment planning
- Disadvantages
  - Resistance to adoption

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Where Does All of This Leave Us?

- RT in the US is an environment of:
  - Historically Favorable Reimbursements in RT, which have led to overcapacity, which spurs:
    - Competition
    - Differentiation
    - Rapid Implementation and Adoption of New Technology
  - In Future, Decreasing Reimbursement, Clinical Outcomes, and Capacity Gains may force consolidation

Contact Us

Anthony M. Berson, M.D.
Radiation Oncology
St. Vincent's Comprehensive Cancer Center
325 W. 15th St.
New York, NY 10011
Tel: 212.604.6081
berson@nyc.rr.com

Richard Emery
Vice President, Aptium Oncology
Executive Director, Trinitas Comprehensive Cancer Center
225 Williamson St.
Elizabeth, NJ 07207
Tel: 908-994-8000
remery@aptiumoncology.com