THE UNIVERSITY OF KANSAS
CANCER CENTER

Current Landscape of Proton Therapy

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NCI Designated Cancer Center

Disclosures

- Consultant for Myovant, Janssen, Seagen – not related to this presentation

Opened May 23, 2022

Our Facility


WILKERSON


THE UNIVERSITY OF KANSAS
CANCER CENTER
PROTON THERAPY CENTER

Making Proton Possible: No Small Undertaking

9.3 million pounds
OF CONCRETE, OR 4,600+ TONS

2,347 cubic yards
OF CONCRETE IN THE VAULT

367,000+ pounds
OF REBAR, OR 183 TONS

2.25+ miles of conduit
EMBEDDED IN THE CONCRETE

19+ miles of conduit
IN THE ENTIRE JOB

1,600 individual conduit runs
EACH ONE MODELED TO *EXACT* POSITION PRIOR TO INSTALLATION

75 tons
Gantry = 30 Ford F-150s

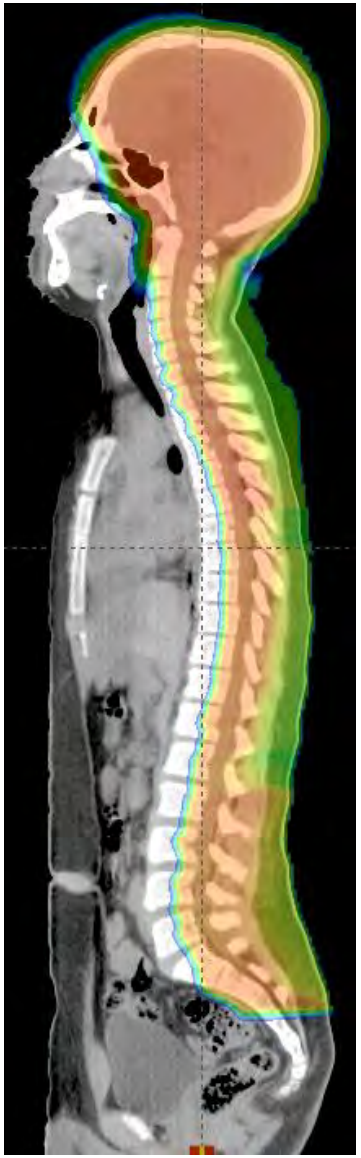
55 tons
Cyclotron

World-Class Clinical Team Makes the Difference

Medulloblastoma
a common type of childhood cancer

- Heart disease
- Secondary cancer (breast cancer, lung cancer….)
- Organ damage

Photon



Proton

Advantages of Proton Therapy

- ~50% dose reduction to healthy tissue
- Protons deposit much of their energy at the tumor site (i.e. more radiation delivered to the tumor)
- There is no exit dose

Is Proton Therapy Better?

- Less radiation dose to surrounding organs can lead to reduced side effects

Review of Clinical Trials

- **The Reality of Randomized Controlled Trials for Assessing the Benefit of Proton Therapy: Critically Examining the Intent-to-Treat Principle in the Presence of Insurance Denial**
- PMID 33732960

- **Toxicity and Survival after Intensity-Modulated Proton Therapy (IMPT) versus Passive Scattering Proton Therapy (PSPT) for Non-Small Cell Lung Cancer**
- PMID 34756850

- **A prospective phase II randomized trial of proton radiotherapy vs intensity-modulated radiotherapy for patients with newly diagnosed glioblastoma**
- PMID 33647972

- **Randomized Phase IIB Trial of Proton Beam Therapy Versus Intensity-Modulated Radiation Therapy for Locally Advanced Esophageal Cancer**
- PMID 32160096

- **Randomized Phase II Trial of Proton Craniospinal Irradiation Versus Photon Involved-Field Radiotherapy for Patients With Solid Tumor Leptomeningeal Metastasis**
- PMID 3582849

- **Bayesian Adaptive Randomization Trial of Passive Scattering Proton Therapy and Intensity-Modulated Photon Radiotherapy for Locally Advanced Non-Small-Cell Lung Cancer**
- PMID 29293386

Cost

Proton Therapy

Study from University of Pennsylvania

- 1483 cancer patients
  - Chemotherapy with photon radiation therapy
  - Chemotherapy with proton radiation therapy

- Patients treated with proton therapy:
  - Less side effects
  - Less hospitalizations

Baumann BC, JAMA Oncol, 2019.

- **Health Care Resource Utilization for Esophageal Cancer Using Proton versus Photon Radiation Therapy**
- PMID 35774487

Value-based Pilot with Texas System

- Third party administrators (TPA) often cite overutilization and cost as justifications for restrictive proton beam therapy (PBT) coverage policies.
- We collaborated with a state-wide self-funded employer, The University of Texas System (UTS), to implement a PBT coverage pilot ensuring appropriate access to care without increasing cost.
- This pilot conducts a value-based assessment of PBT through evaluation of utilization trends and comprehensive charge analysis of medical claims.

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Pilot Projections

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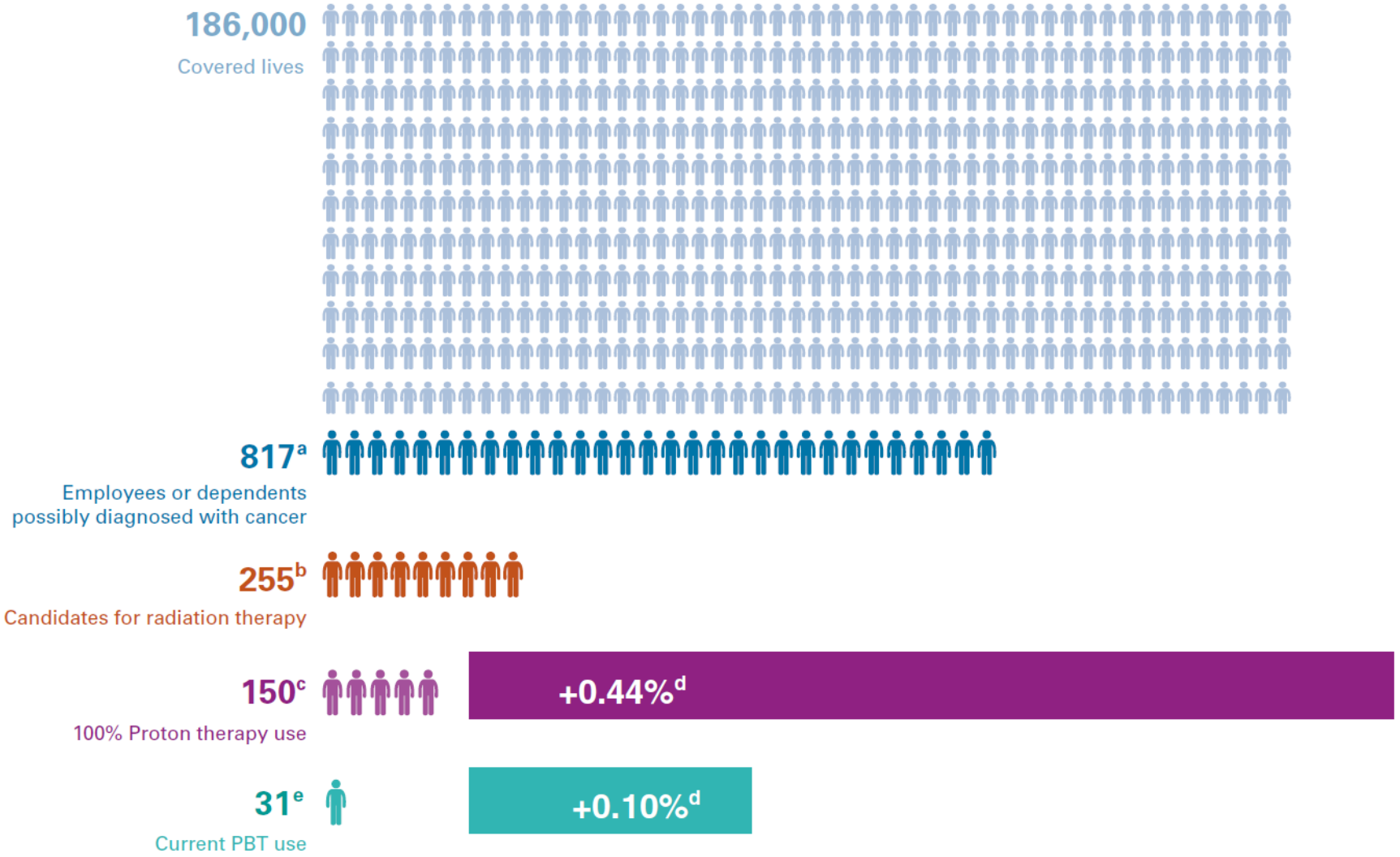


Ning et al, J Oncol Pract 16:600, 2020.

Pilot Structure & Endpoint

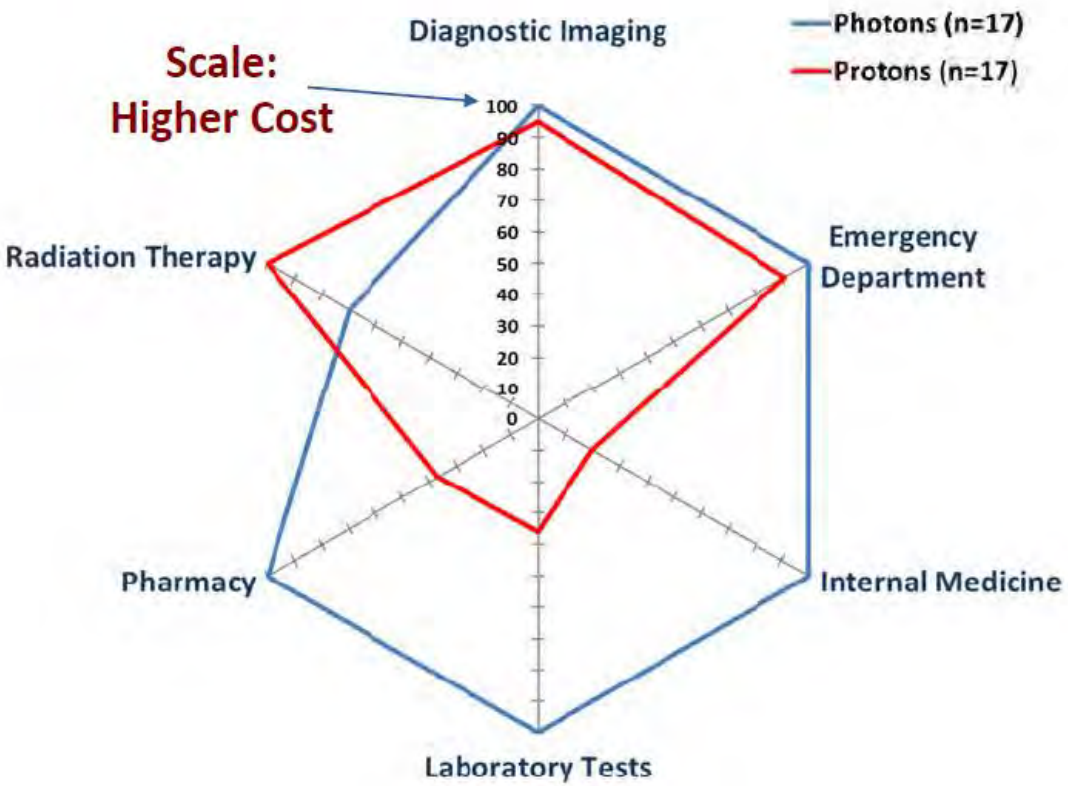
- The pilot obtained Institutional IRB approval.
- All patients enrolled on a IRB approved prospective clinical trial.
- Coverage for head and neck, esophageal, breast, lung, prostate, and randomized clinical trials.
- Value based analysis
  - Patient satisfaction (PROs)
  - Clinical outcomes and toxicities
  - Total net charges (cost of care)
- A primary endpoint was cost of care
  - Claims = 1 month pre-treatment, treatment, and ≥ 6 months post-treatment.
- UT System provides administrative override to BCBS-TX and payment at contracted in-network rate.

Pilot Data and Analysis

- Average prior authorization time was reduced to <1 business day (BD) vs. 17 BDs (prior to pilot)
- 9 HN, 8 GU, 3 BRST, & 2 THOR (22 PBT total)
- 22 additional patients who met pilot eligibility were treated w/ X-Rays during same timeframe
- Out of these, 17 were case-matched to 17 photon patients with ≥6 month follow-up
- PBT claims were compared with case-matched photon patients (enrollment period, employer, site, indication, & stage)

Outcomes – Cost Comparison

(Normalized Relative Average Cost Ratios)



PBT Pilot Total Cost of Care Analysis

Summary

Cost	Cost per Covered Life	% of Claims
$748,819 Projected	$2.38 Projected	0.10% Projected
-$426,522 Actual	-$2.29 Actual	-0.06% Actual
-$1,175,341 Total Difference	-$4.68 Total Difference	-0.16% Total Difference

Conclusions

- The UT System and MD Anderson have demonstrated that a successful proton therapy coverage pilot is feasible
- Collaboration with employers can improve access & reduce cost
- The UT System has committed to the expansion of proton therapy
- Comprehensive PBT coverage for all UT System policy holders

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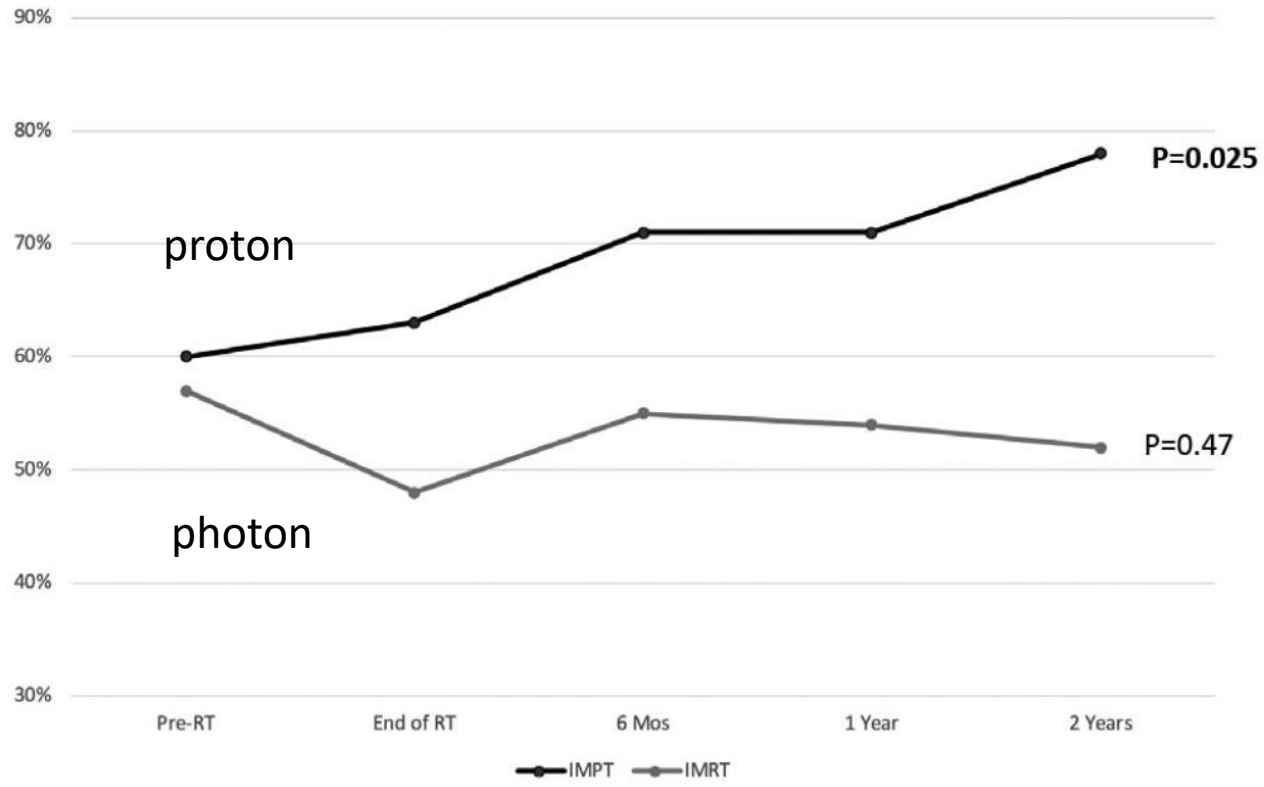
FOURTEEN INSTITUTIONS. UNLIMITED POSSIBILITIES.

Another "Cost" – return to work

- Randomized trial of proton vs photon radiation



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