Proton Therapy

Nice - 25.04.2016

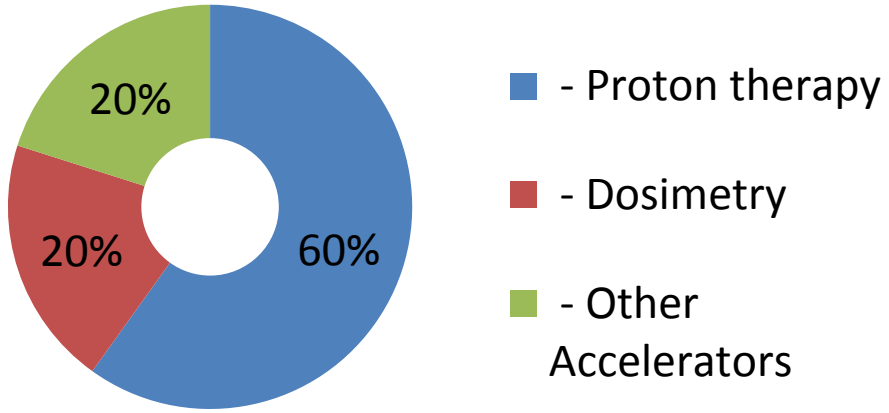
Olivier Legrain (CEO) and Jean-Marc Bothy (CFO)

IBA Group

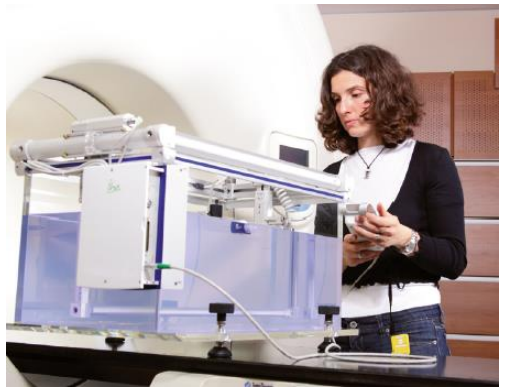
investorrelations@iba-group.com

Introduction to IBA

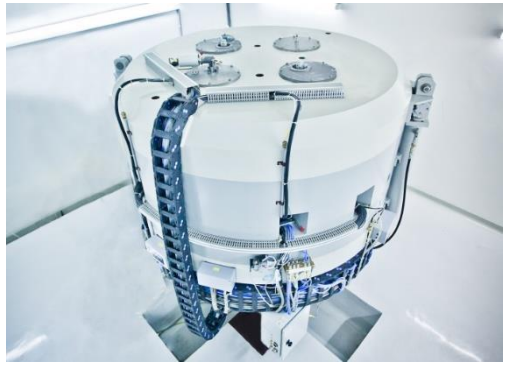
- IBA is a worldwide technology leader in the field of proton therapy
  - Most advanced form of radiation therapy today
  - Complete offering (ProteusPLUS and ProteusONE)
- Global leader in dosimetry and particle accelerators
- Four activities with significant market share



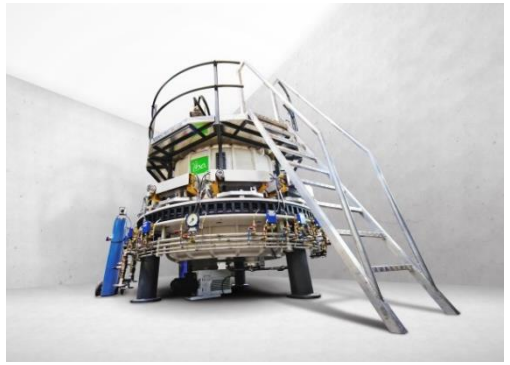
Proton Therapy



Dosimetry



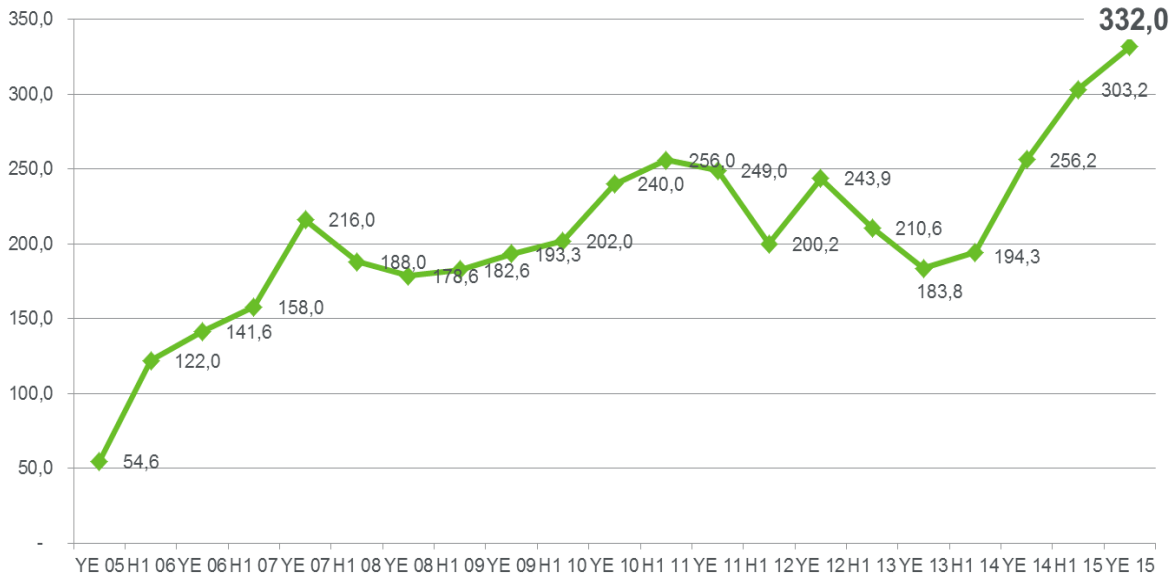
RadioPharma Solutions



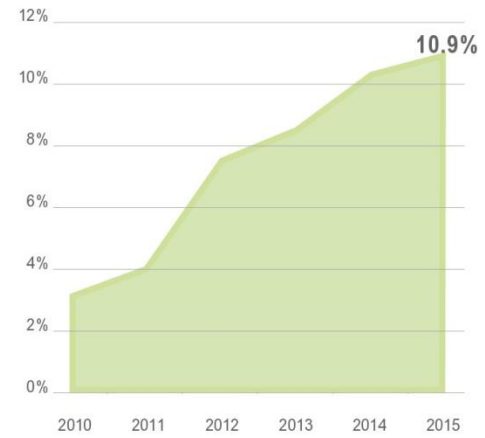
Industrial

Key financials

- 2015 sales of EUR 270 million (+ 22.6%)
- REBIT margin 2015 : 10.9%
- Backlog of EUR 332 million (+30%)



Equipment backlog

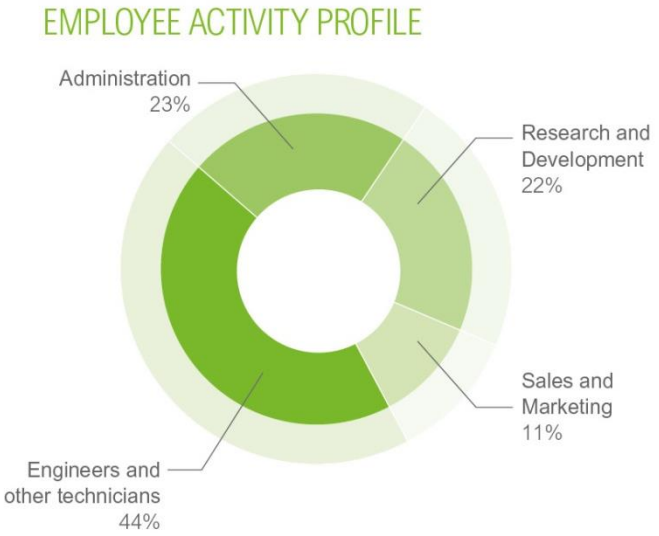


REBIT / Sales and services trends

PT service backlog

IBA – preparing for the future

- IBA is growing to capitalize on PT market growth
- >1,200 employees worldwide
- Highly qualified staff
- Recruitment of 400 engineers
  - of which 200 in Belgium
  - to grow headcount from 1,200 to 1,600 in the next 12 months



PROTON THERAPY

YTD 2016 update

2016 update

- 3 PT solutions sold already in 2016, globally
  - 2 ProteusONE (Belgium & US)
  - 1 ProteusPLUS (India)
- Upgrade of older IBA systems is a growing trend and becoming a key competitive advantage
  - Massachusetts General Hospital PT center
  - University of Florida Health Proton Therapy Institute
- New data on installation track record giving IBA a comfortable advantage
  - IBA: 11 months
  - Hitachi & Varian: 20 – 24 months

2016 update

Systems

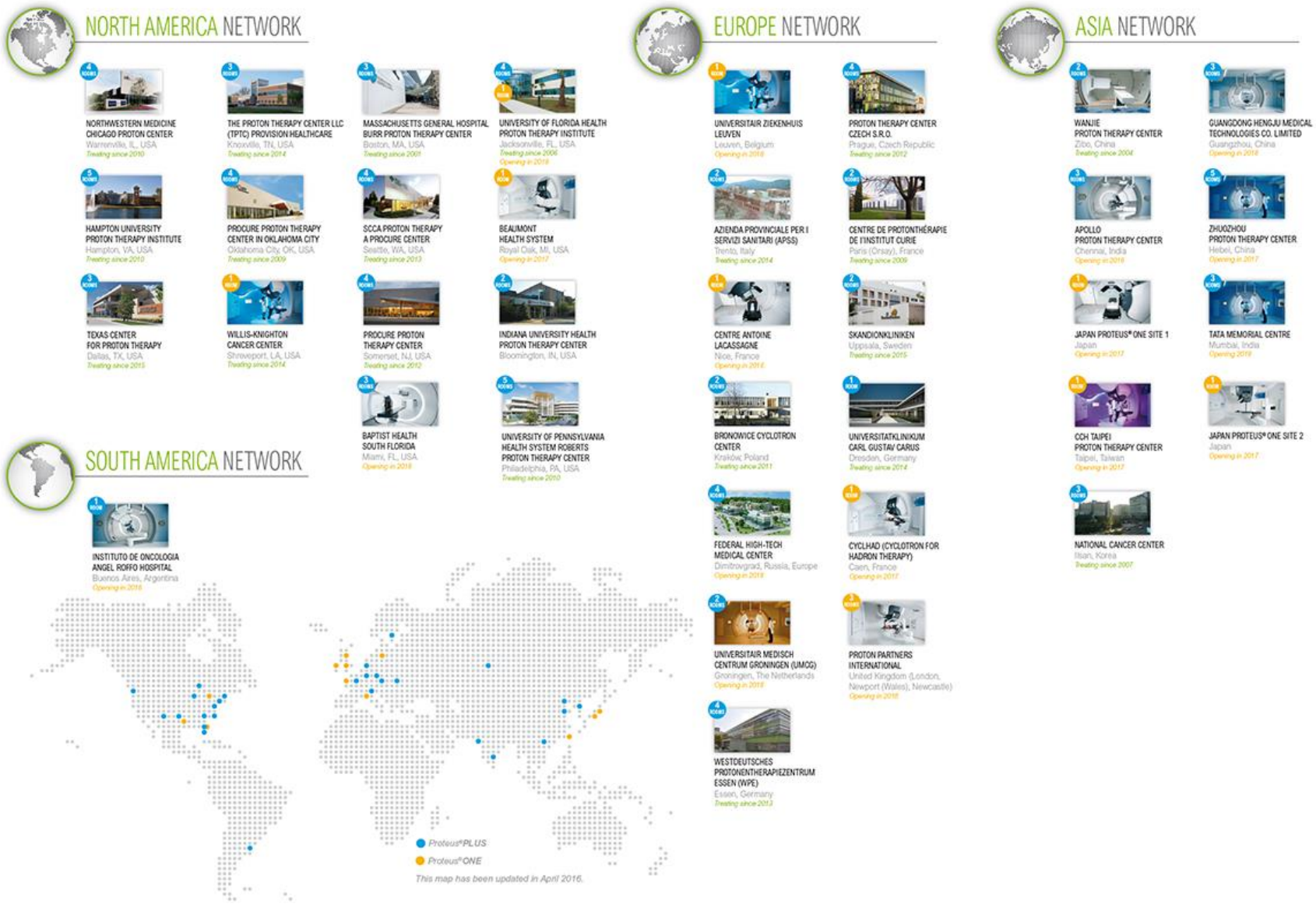
- 20 systems treating patients
- 21 systems in construction and installation

= 41 customers

Rooms

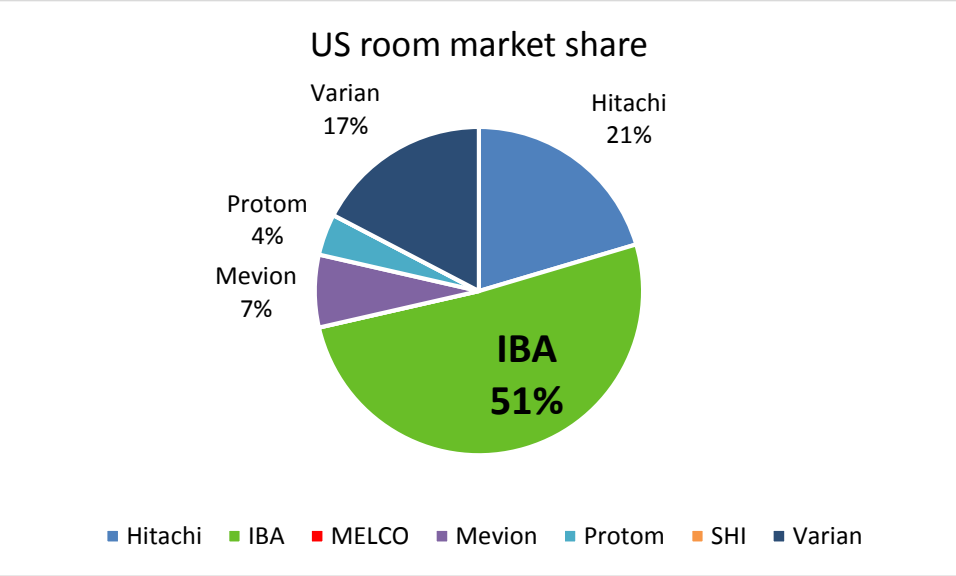
- 60 rooms treating patients
- 40 rooms in construction and installation

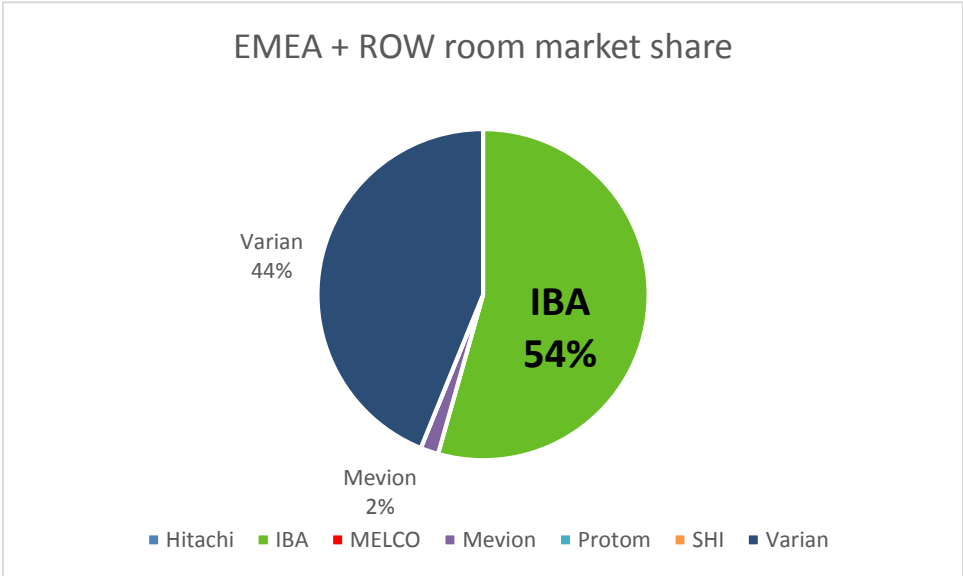
= 100 rooms

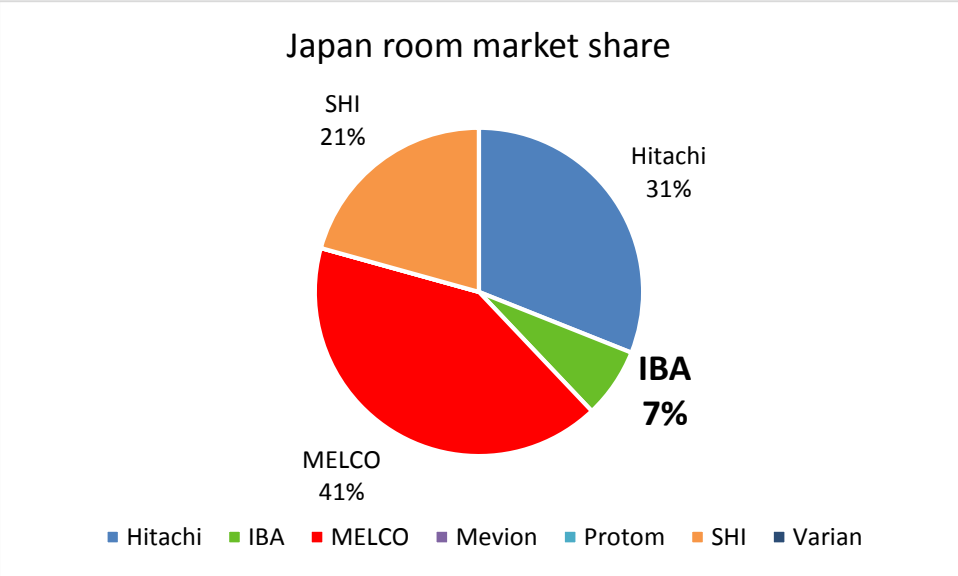


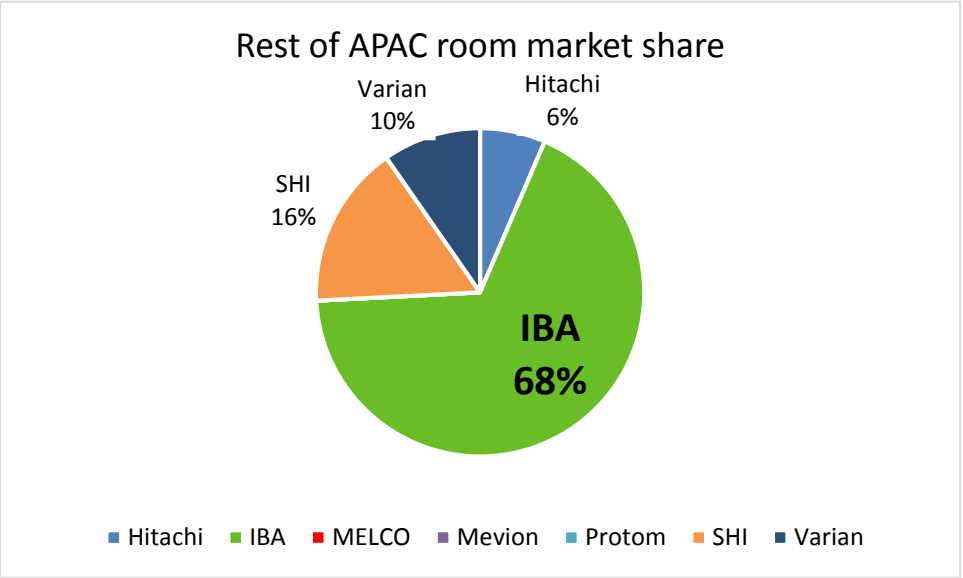
Market shares in rooms by geography

Rooms (YTD)









PROTON THERAPY

Key levers for 2016

PT – The 3 key levers for 2016

1 **Delivering our go-to-market strategy**

2 **Leadership in Clinically Relevant Innovation**

3 **Make PT more Affordable**

PT – Grow the PT market & dominate it

1

Delivering our go-to-market strategy

1. Proactive conversion with clinics with 3+ radiotherapy machines to potential sales targets for PT
2. Improve sales coverage & internal productivity
3. Differentiate IBA offering – “If its PT it has to be IBA”
4. Make use of upgrade sales potential

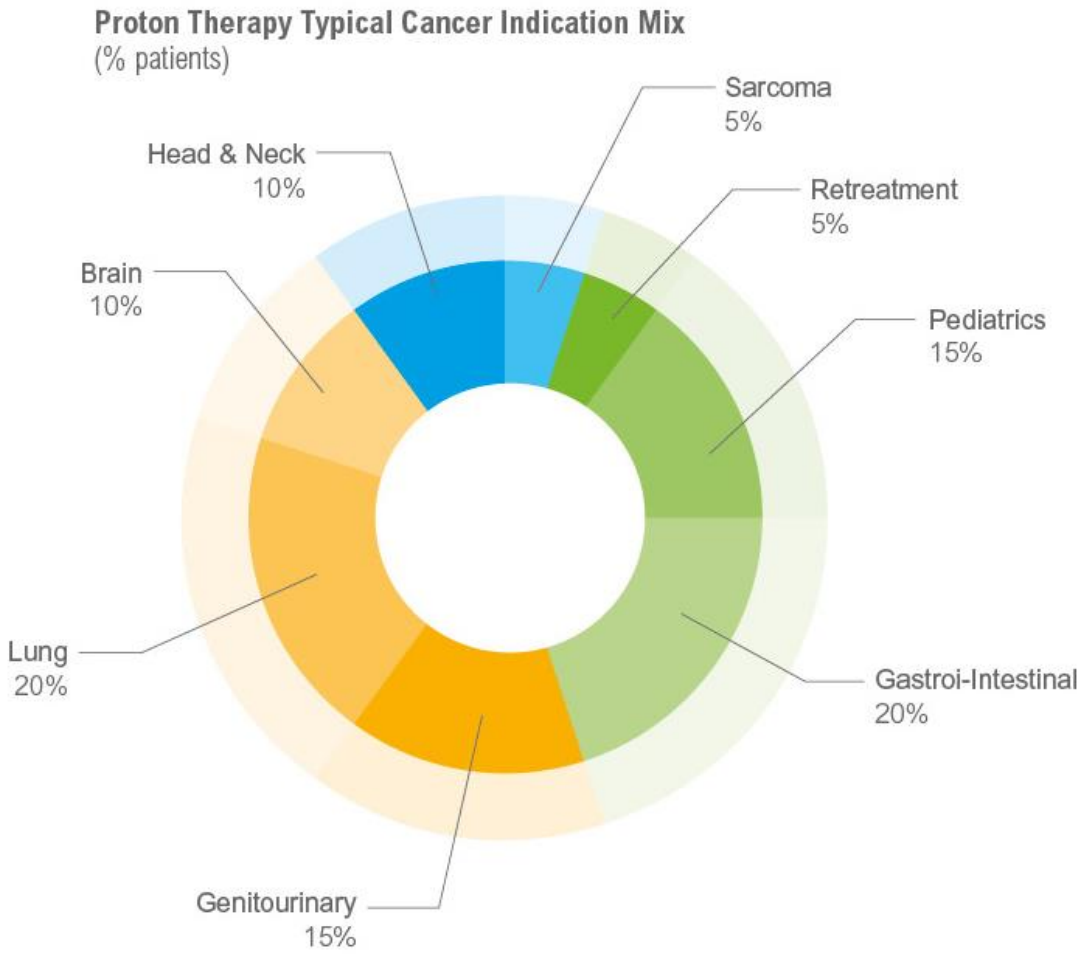
Growing recognition of proton therapy clinical advantages

PERSPECTIVE ON RADIATION THERAPY PATIENTS RECEIVING PROTON THERAPY AS PART OF THEIR TREATMENT

1%
Today

20%
Following reports & policies

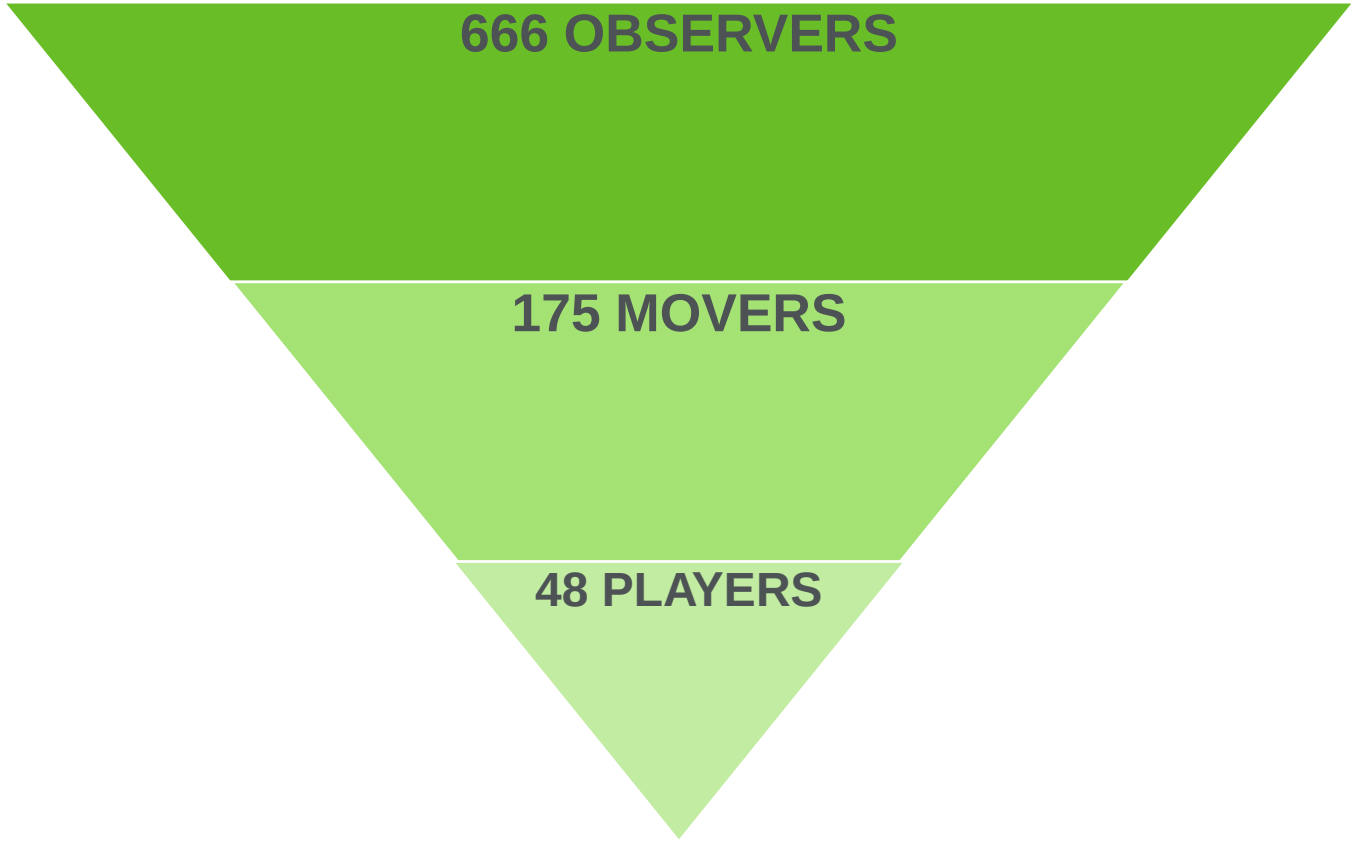
45%
Following clients' experiences



Commercial approach integrating sales & marketing

All RT centres narrowed down to list of RT centres with 3+ RT machines

- **OBSERVERS** : Accounts not on radar or not considering PT
- **MOVERS** : Accounts expected to close a PT deal in 2017-19
- **PLAYERS** : Accounts likely to close a PT deal in 2016



PT – Maintain product & service leadership

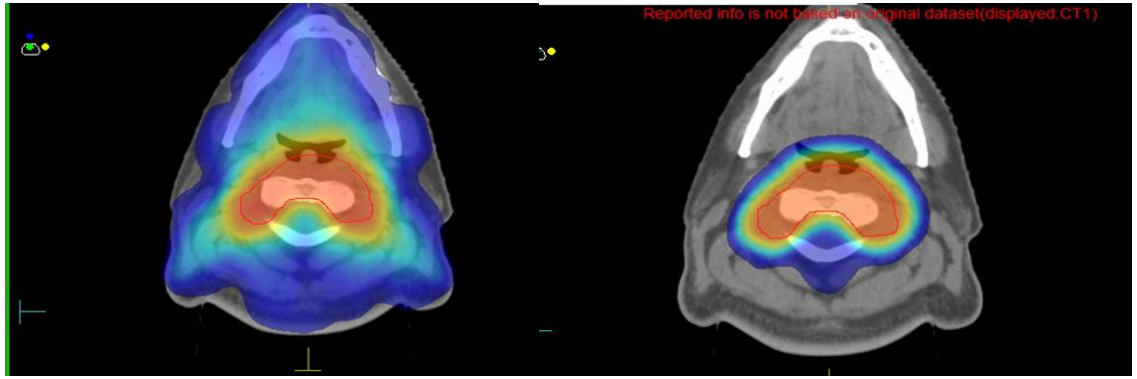
2

Leadership in Clinically Relevant Innovation

1. Enhance clinical relevance of PT

2. Robust TPS-OIS strategy
   (Treatment Planning System and Operational Information System)

3. Enhance R&D capacity



IM**RT** IM**PT**

PT – Reduce total cost & make PT more reliable

3

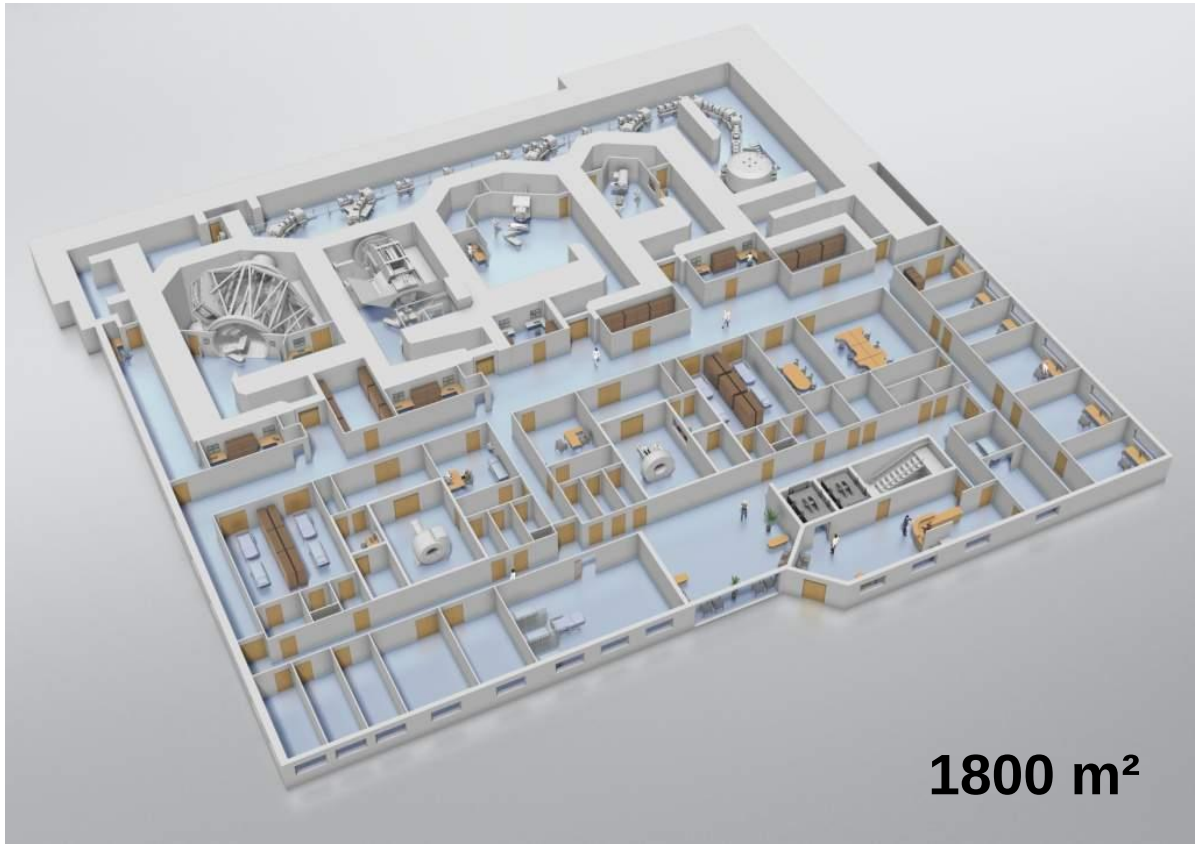
Make PT more Affordable

1. Deliver Proteus roadmap on cost reduction

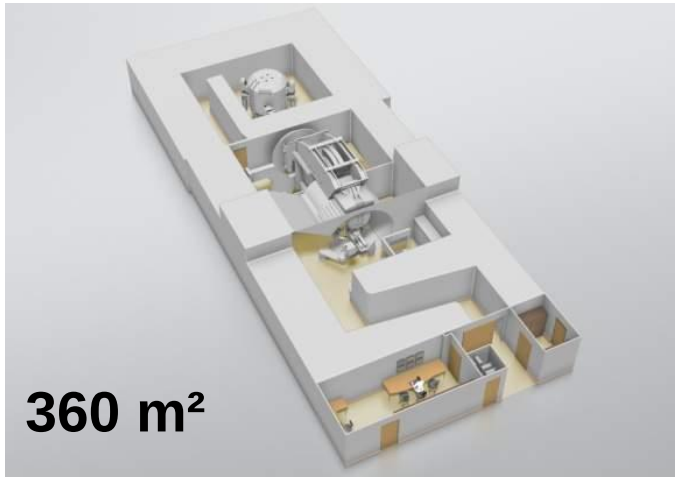
2. Continue to cut delivery times

IBA's unique PT solutions

*Proteus®**PLUS***



*Proteus®**ONE****



At comparable scope, it represents a saving of > 30% for the hospital

***Proteus®ONE & Proteus®Plus features PBS and Cone Beam CT**

Protect, Enhance and Save Lives

**Subject to review by Competent Authorities (FDA, European Notified Bodies, et al.) before being put on the market.*

New ProteusONE assembly line

- Today
  - 6 - 8 ProteusONE / year
- In the future
  - 20 - 30 ProteusONE / year

+/- 6000 m² warehouse and production + offices

PROTON THERAPY

IBA Roadmap Update

Disruptive innovation time line

2001
1st patient treated on ProteusPlus

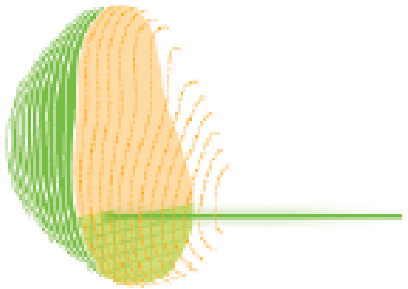
> 10 years

2014
1st patient treated on ProteusOne

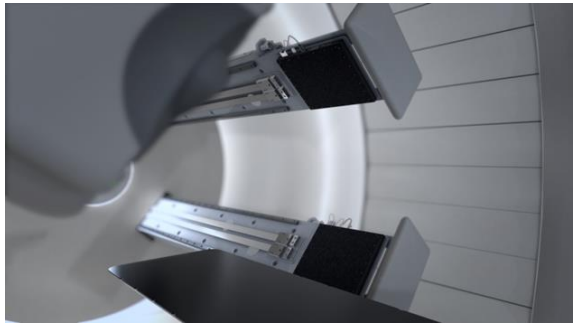
> 10 years

Alternative source of Protons? Carbon?

2001 2008 2014



PBS



CBCT

ProteusONE

At the forefront of Radiotherapy technology

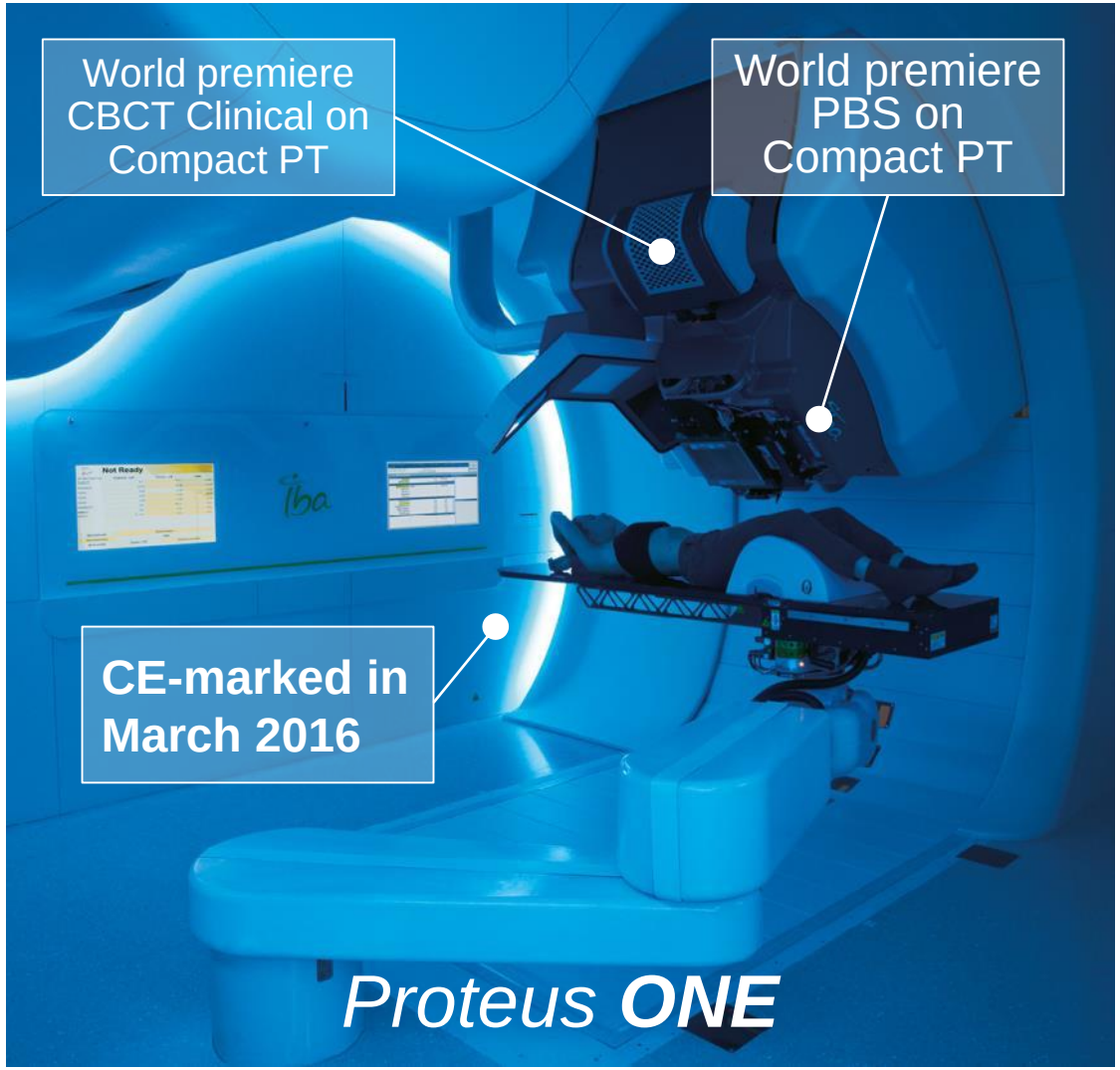
- Most Advanced Image Guided IMPT
- Organ Motion Management
- Adaptive Therapy

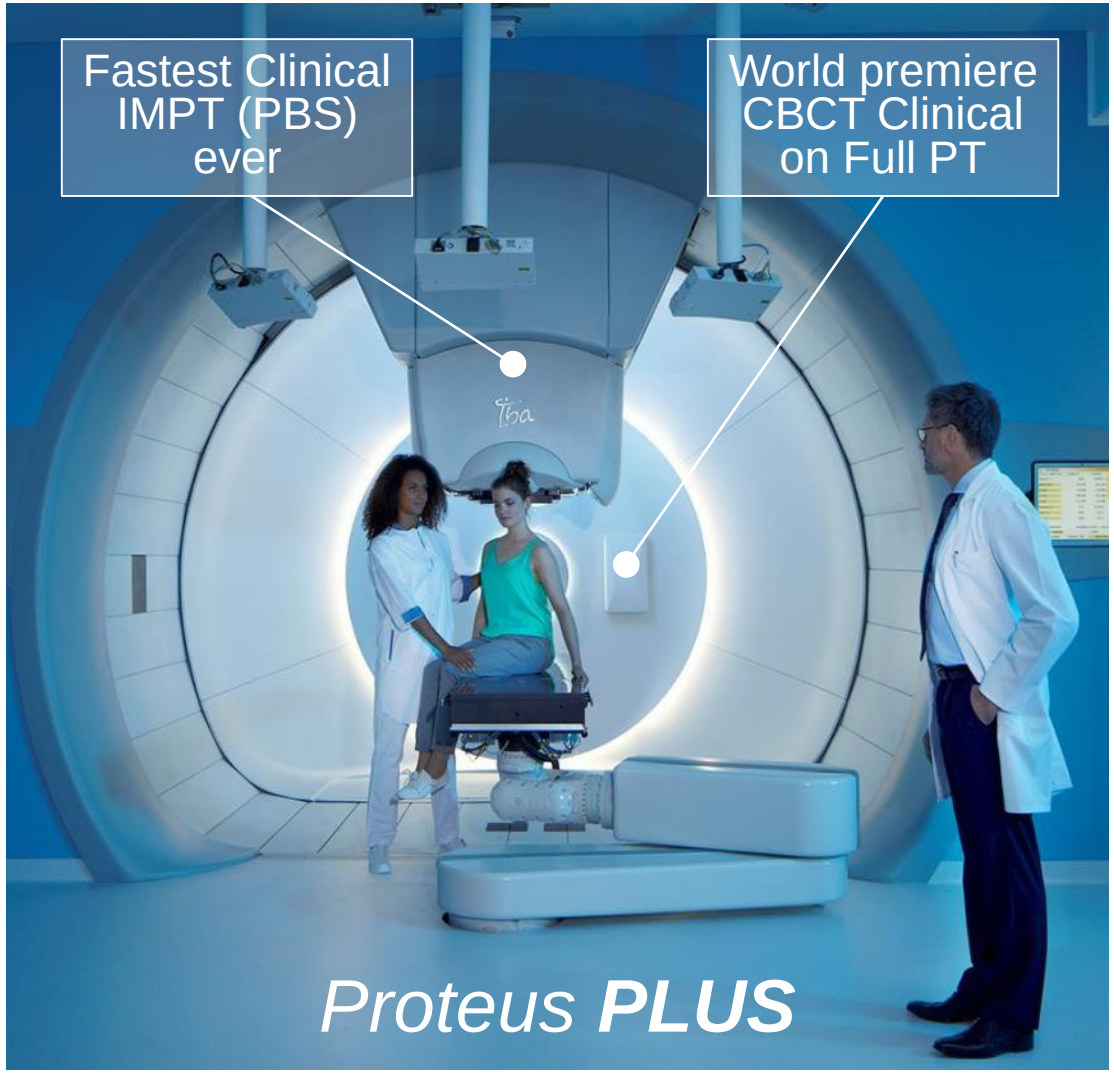
- Equipment and construction
- Maintenance and utilities
- Patient throughput – efficiency

*Proteus **ONE***

*Proteus **PLUS***

Most Advanced Integrated Image Guided IMPT





Full Integrated (adaPT suite) and compatible with all current and future TPS/OIS

Organ Motion Management

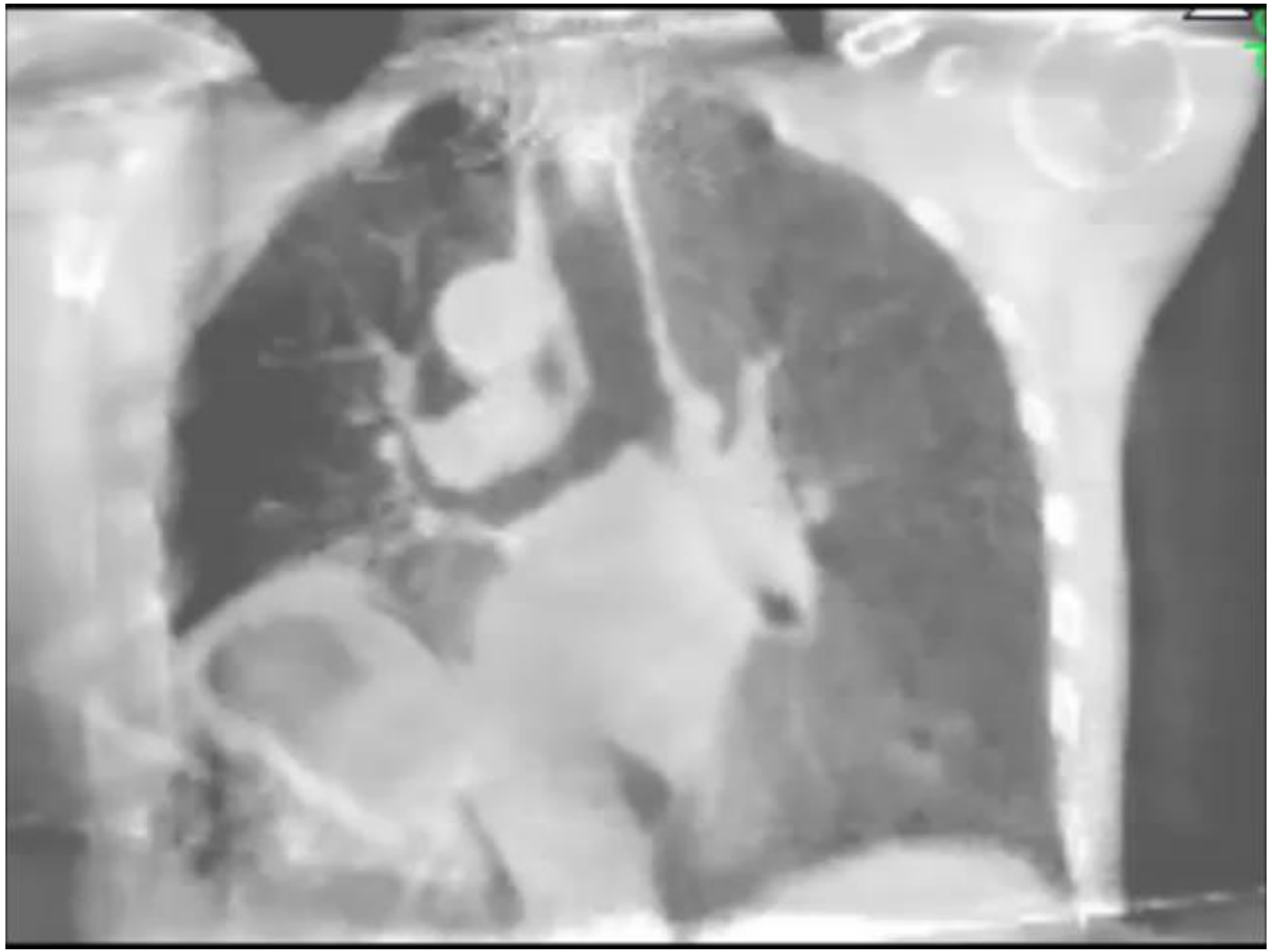
Available today

1. Clinical Ultra Fast Pencil Beam Scanning
2. Real Time Monitoring
3. Free and deep breath hold beam gating

Future

1. Organ motion simulation using real delivery machine data
2. 4D CBCT
3. Synchronisation of breathing with beam delivery

4D CBCT



Using

a) a regular 3D CBCT used for setup

b) in combination with 4D CT of diagnostic

Amazing image quality at no additional dose or time lost in treatment room

Adaptive Therapy

Available today

1. CBCT and CT On-rail based volumetric imaging
2. Immediate image availability on all the RT department workstations
3. adaPT treatment suite integration and programmable workflows

Future

1. Range management (Virtual CT and Prompt Gamma camera)
2. Software and Data as a service
   → SaaS & Daas
   → leverage the community
3. Dose accumulation based plan adaptation

CBCT and CT On-rail based volumetric imaging

CBCT Penn Medicine, USA

CT-on-Rails, Trento, Italy

Thank you

Nice - 25.04.2016

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Antoine Lacassagne
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Pr.Joël GUIGAY, MD
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Presentation

- Comprehensive Cancer Treatment Center set up in 1961

- Status
- Non profit association with a private status and a mission of public services in oncology

- Missions
- Healthcare : prevention, screening, treatment, reinsertion
- Research : fundamental, translational and clinical research
- Teaching : academic and post academic

Antoine Lacassagne Cancer center is a leading actor in oncology on a national and international scale. It provides equal access to innovative treatments and a top quality healthcare management

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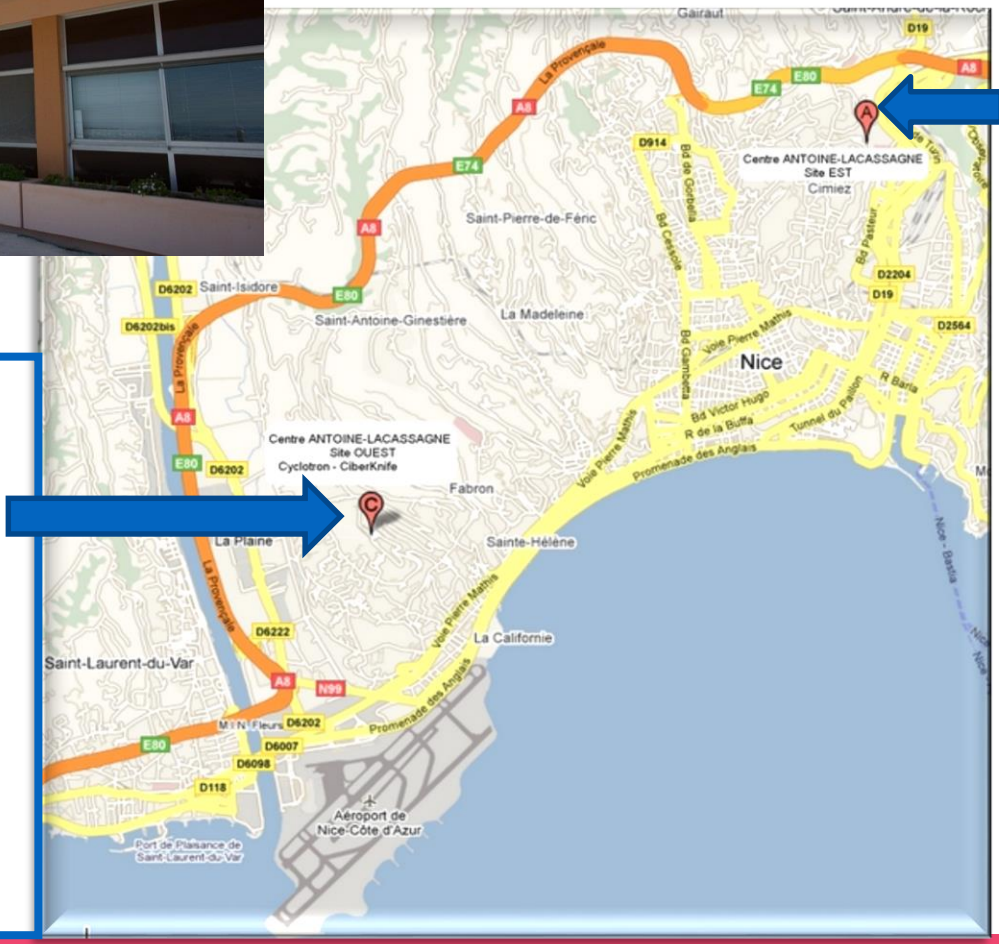
NICE CANCER INSTITUTE



West Site :

- **Cyberknife**
- **Protontherapy** (Cyclotron and Proteus One)
- **The Consolata accomodation** : to welcome patients during radiotherapy treatment

East site :

- **Medicine**
  - Hospitalization
  - Chemotherapy
  - Supportive care
- **Surgery**
  - Breast clinic - gynecology
  - Head and Neck Teaching Institute
- **Radiotherapy East side**
- **Technical Platform**
  - Surgical unit
  - Biological labs
  - Pharmacy
  - Imaging – Nuclear Medicine

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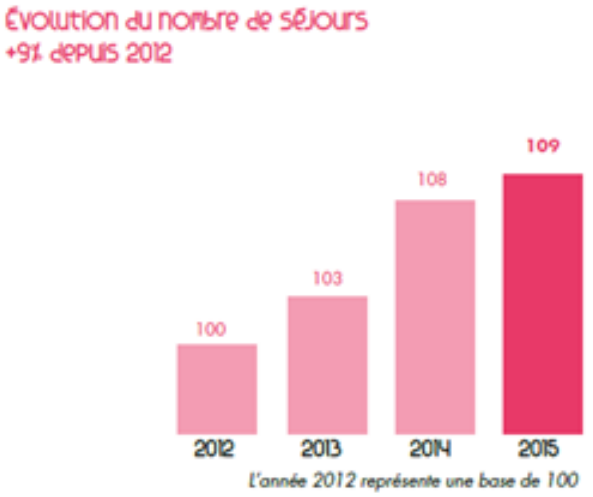
Healthcare activities

- Head and Neck cancer (including surgery)
- Breast and gynecological cancer (including surgery)
- Lung cancer
- Digestive Oncology
- Hematology
- Sarcoma
- Neuro-oncology
- Cancer of the elderly
- Pediatric radiotherapy

2015 key figures

- 174 beds
- 742 employees
- 58 546 medical consultations
- 59 049 hospital stays
- 5 772 patients treated
- 671 patients enrolled onto clinical trials



The 2014 – 2019 Medico-Scientific Project

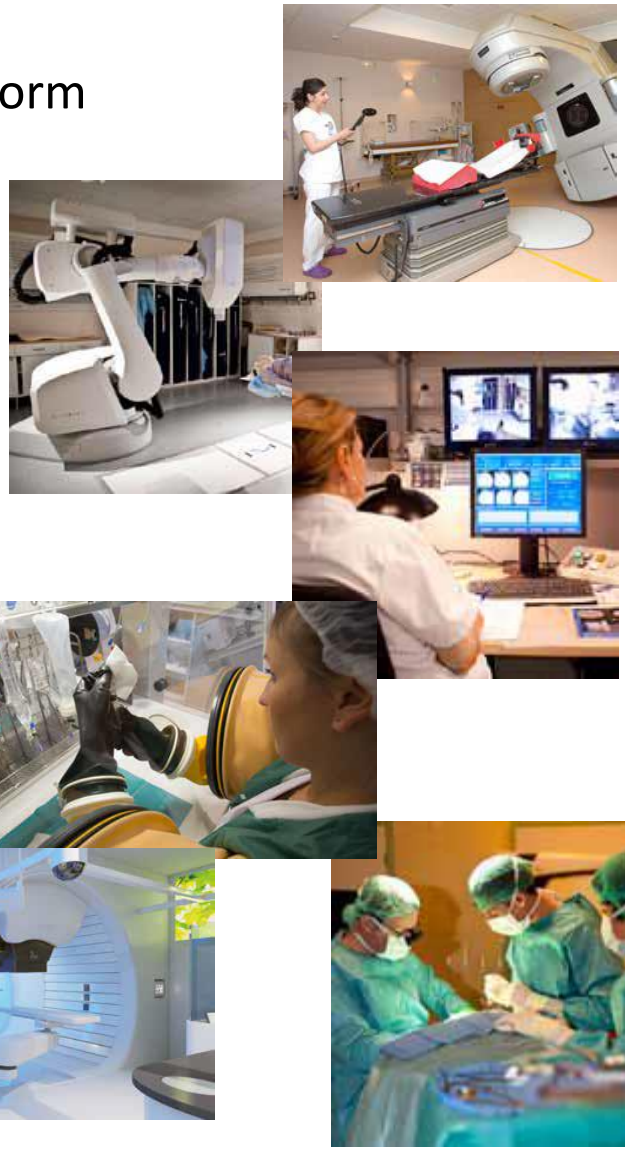
- Purpose : To be at the cutting edge of innovative treatments

- 6 axes:
  - ✓ To anticipate the patients' management
  - ✓ To innovate in diagnostic and therapeutic fields
  - ✓ To humanize and optimize healthcare trail for the patient and his relatives
  - ✓ To strengthen and dynamize the collaborations
  - ✓ To develop research activities and research clinical activities continuum
  - ✓ Teaching : « to train and to be trained »

A leading center in terms of innovation

- The most comprehensive radiotherapy technical platform in Europe
- Advanced surgical activities :
- ENT heavy cancers
- Pre op virtual modelization for mouth cancer reconstructions
- Cœlioscopy / 3D ultrasonography

- Access to innovative treatments :
  - Personalized medicine
  - Tumor molecular biology and bioguided therapies
  - Immunotherapy
  - Research– Clinical Trials phase 1



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Experience and Innovation in radiotherapy…

Lacassagne cancer treatment center is the only French hospital to offer the state of the art devices for all the treatments in radiotherapy

It is one of the best equipped center throughout Europe with 2 Accelerators, 1 Cyclotron for ocular tumors, 1 Cyberknife®, 2 TomoTherapy ™ devices, 1 contact therapy device.

… and protontherapy

1991 : First proton irradiation in France with the Cyclotron « Medicyc » in Lacassagne (West Site)

So far, Lacassagne has been performing over 5,500 treatments with low energy proton beams (65 MeV) for patients with ocular tumors


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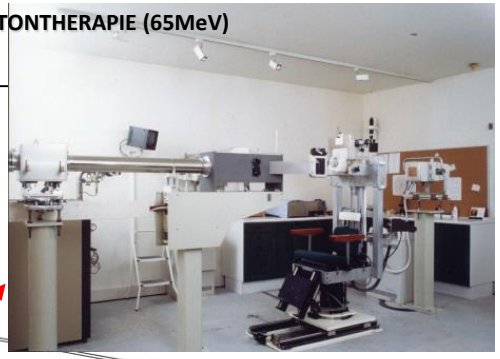
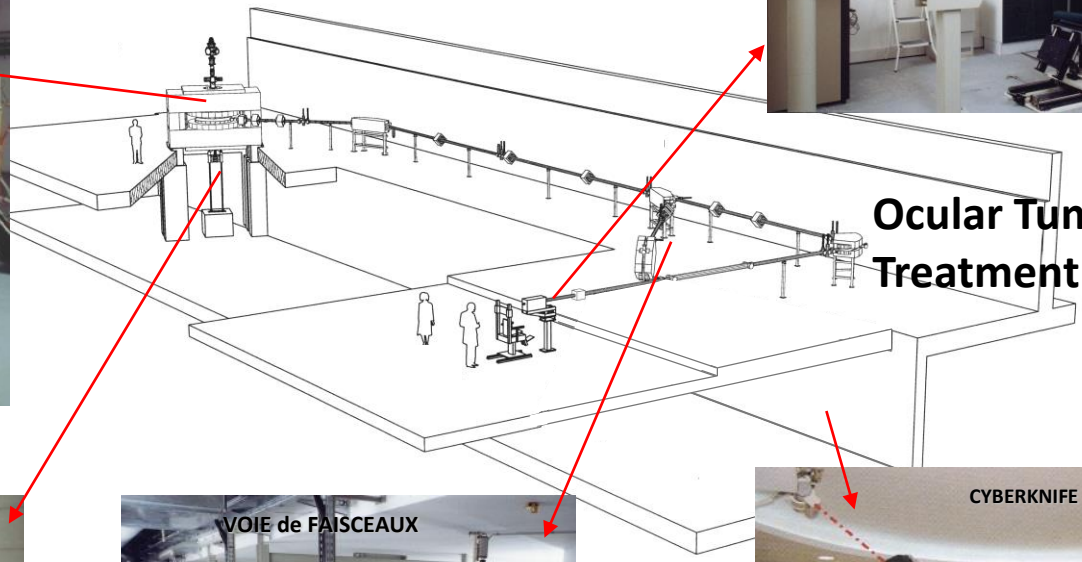
50 m

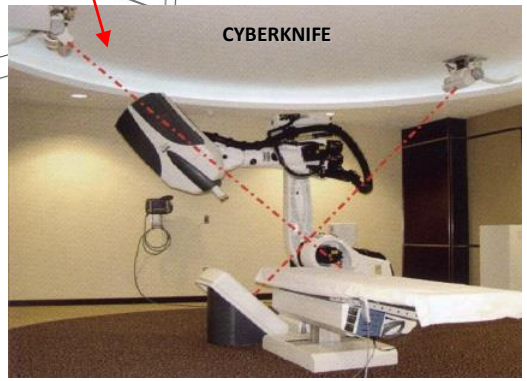
Existing Facilities (1991 – 2011)

PROTONTHERAPIE (65MeV)

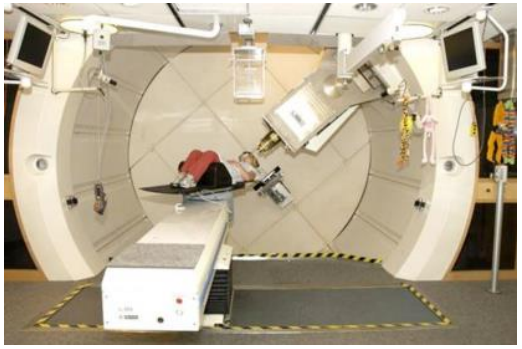




Ocular Tumor Treatment Room



A key challenge : the setting up of the high energy protontherapy device



- **2011 :** launching the project, agreement is delivered by the health authorities
- **2014 :** The Proteus one designed by IBA is arriving at Lacassagne ; teams start regulating the beams to get the EC label
- **1st semester 2016** : 1st patient treated in the Mediterranean Protontherapy Institute

Proteus One ® Nice Project

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Service de Radiothérapie -Centre Antoine-Lacassagne - Nice

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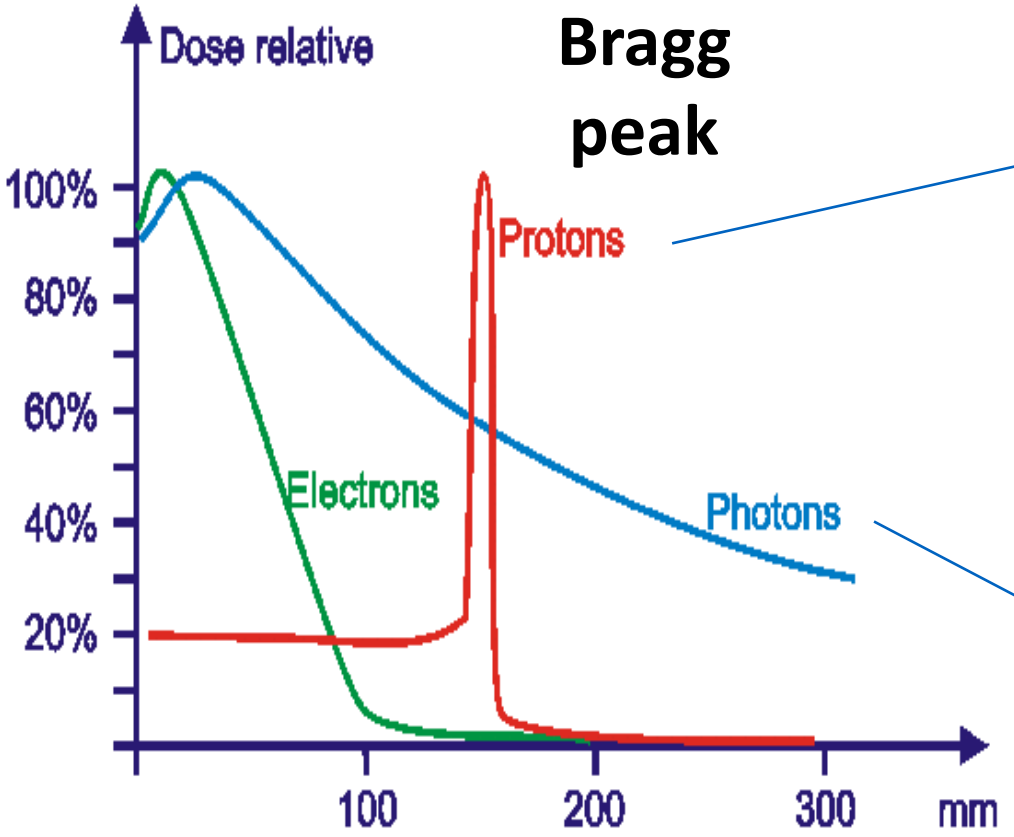
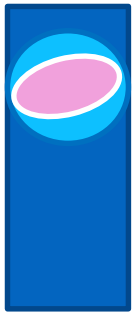
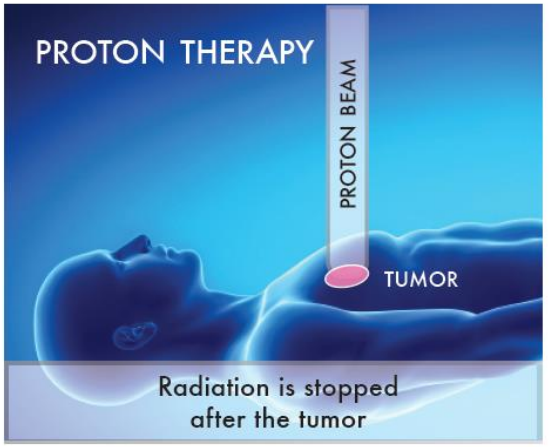
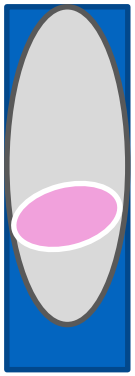
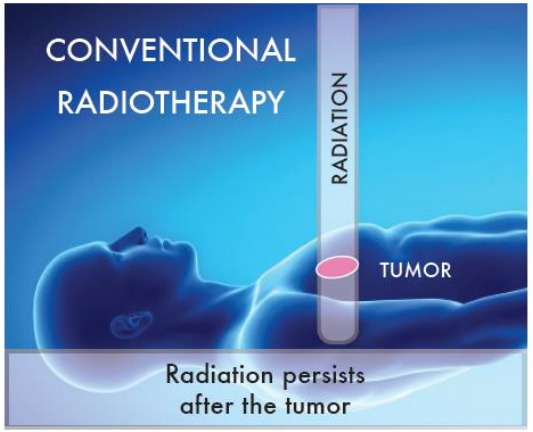
Bragg peak











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Indications of protontherapy in France

- Acte ZZNL045 (french health insurance):
  occular primitive tumors
  pediatric tumors
  skull based chordomas and chondrosarcomas

- Other indications treated by extension (skull based):
  nasopharyngeal tumors
  malignant sinus tumors
  paraspinal tumors

- **Classical tumors are not currently indications of protontherapy in France (lung, breast, prostate, …)**

Contents lists available at ScienceDirect

Cancer Treatment Reviews

journal homepage: www.elsevierhealth.com/journals/ctrv

Controversy

Proton beams in cancer treatments: Clinical outcomes and dosimetric comparisons with photon therapy

Jérôme Doyen, Alexander Tuan Falk, Vincent Floquet, Joël Hérault, Jean-Michel Hannoun-Lévi *

Department of Radiation Oncology, Antoine Lacassagne Cancer Center, University of Nice-Sophia, Nice, France

Potential indications of protontherapy

I) **When protontherapy can reduce toxicities**

Breast cancer and Hodgkin disease
when heart and/or a big volume of healthy tissue is irradiated (risk of radiation induced cancer)

Young adults
when life expectancy is high (> 5 years ?) and if big volume of healthy tissue is irradiated (risk of radiation induced cancer)

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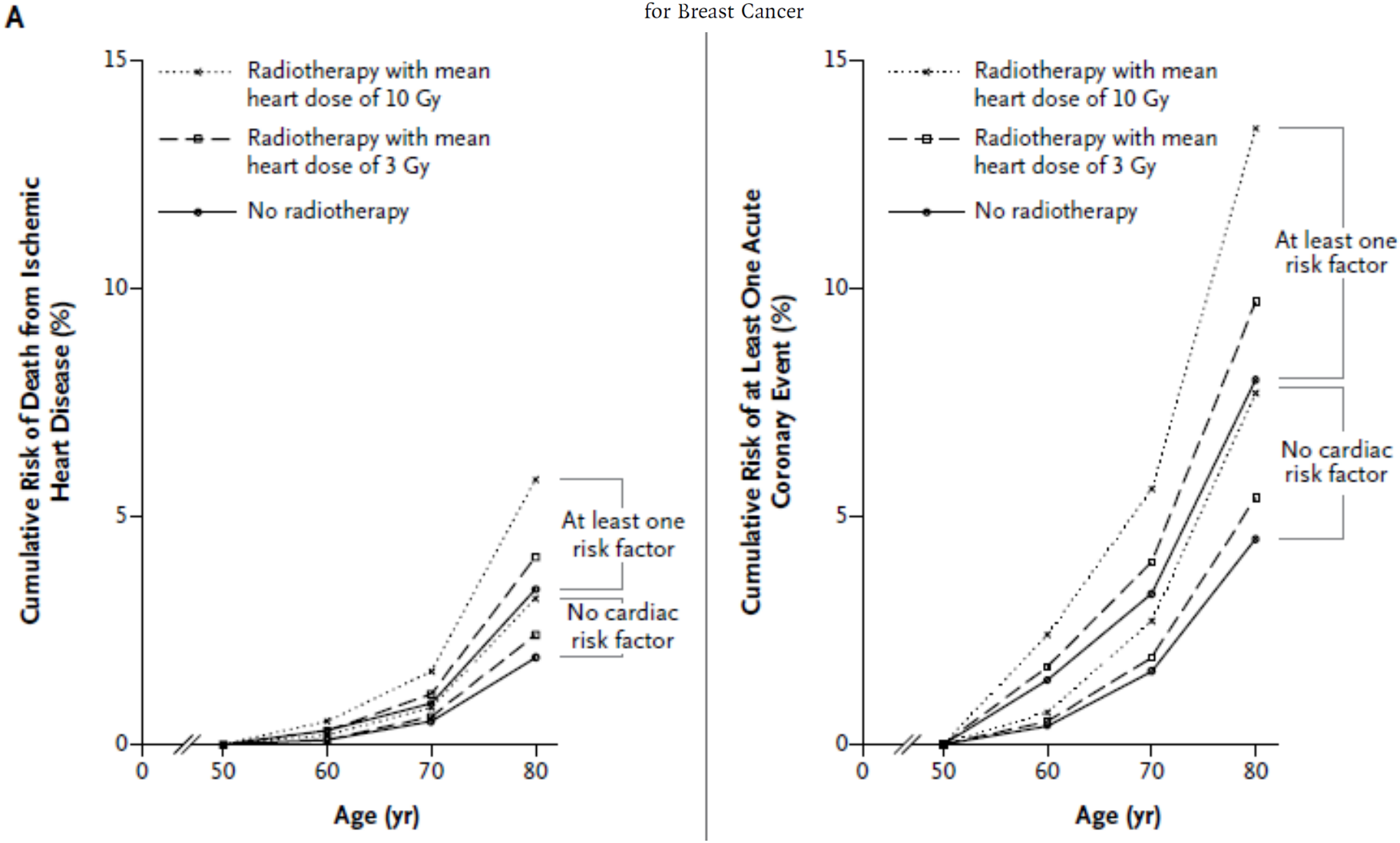
The NEW ENGLAND JOURNAL of MEDICINE
ESTABLISHED IN 1812 MARCH 14, 2013 VOL. 368 NO. 11

Risk of Ischemic Heart Disease in Women after Radiotherapy for Breast Cancer



Annals of Oncology 24: 2113–2118, 2013
doi:10.1093/annonc/mdt156
Published online 25 April 2013

Estimated risk of cardiovascular disease and secondary cancers with modern highly conformal radiotherapy for early-stage mediastinal Hodgkin lymphoma

M. V. Maraldo[1*], N. P. Brodin[1,2], M. C. Aznar[1], I. R. Vogelius[1], P. Munck af Rosenschöld[1,2], P. M. Petersen[1,3] & L. Specht[1,3]

	3D CRT		VMAT		PT		MF		*P* value[a]			
										Pair-wise comparisons		
	Median	Range	Median	Range	Median	Range	Median	Range	all	3D CRT versus VMAT	3D CRT versus PT	VMAT versus PT
Risk estimates (%)												
Cardiac mortality (CMort)	1.0	(0.2–2.7)	1.1	(0.3–2.1)	0.9	(0.1–1.9)	2.9	(2.2–3.4)	<0.0001	0.528	0.0003	<0.0001
Cardiac morbidity (CMorb)	1.3	(0.5–7.1)	1.3	(0.6–4.0)	1.1	(0.5–3.3)	8.6	(4.6–14.3)	<0.0001	0.854	0.012	0.0002
Myocardial infarction (MI)	5.5	(0.7–30.1)	5.9	(1.1–23.8)	4.7	(0.4–20.4)	19.8	(6.9–37.7)	<0.0001	0.843	0.001	<0.0001
Valvular disease (VD)	0	(0–0.2)	0	(0)	0	(0)	0.4	(0–3.7)	<0.0001	0.338	0.246	0.035
Radiation-induced lung cancer (LC)	4.4	(2.4–9.7)	6.0	(3.1–11.4)	3.3	(1.4–9.7)	10.5	(6.3–15.1)	<0.0001	<0.0001	0.0002	<0.0001
Radiation-induced breast cancer (BC)	3.7	(0.2–11.8)	8.0	(0.6–13.4)	1.4	(0–8.1)	23.0	(7.5–34.5)	<0.0001	0.003	0.002	<0.0001
Life years lost (LYL)												
Total LYL	0.9	(0.2–1.6)	1.1	(0.2–2.3)	0.7	(0.1–1.6)	2.1	(0.6–3.6)	<0.0001	<0.0001	<0.0001	<0.0001

Potential indications of protontherapy

II) To increase dose and tumoral control

PROBABLY NOT:

breast (photons are enough)

squamous cell carcinoma head an neck (potential toxicities)

digestive tumors (stomach, esophagus, pancreas, cholangiocarcinoma) and brain tumors (no proof of dose escalation sensitivity)

MAYBE

pelvic tumors: through dec

lung: through decrease of l

mesothelioma: maybe

retroperitoneal sarcoma: r

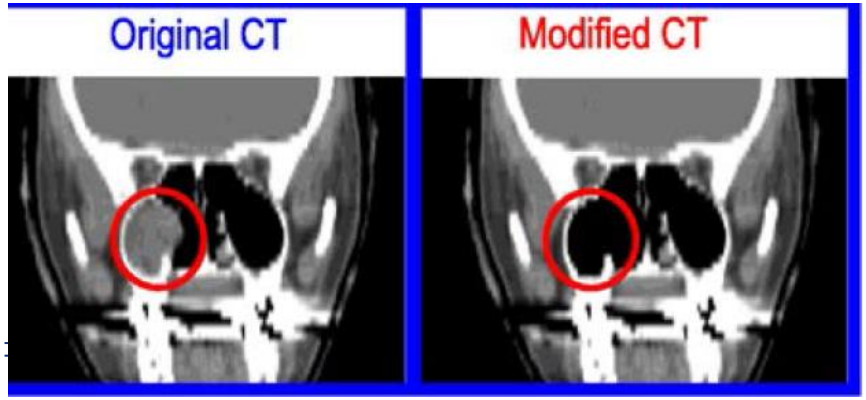
situations when classical dose cannot be delivered: maybe

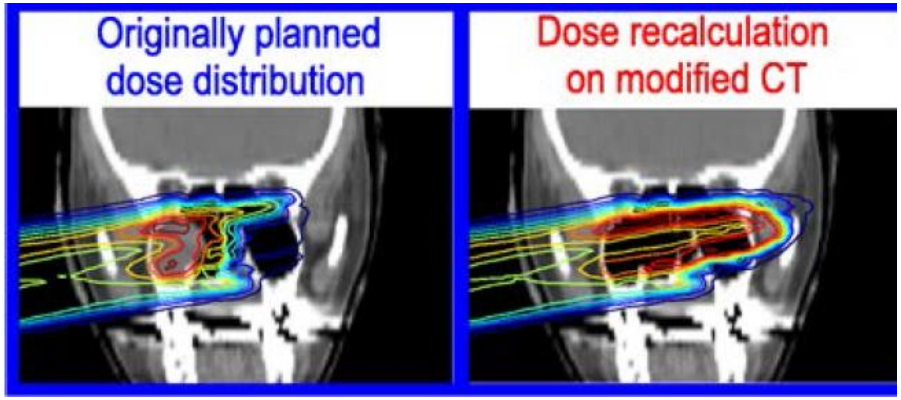
NEED OF CLINICAL TRIAL

+++++

Challenges with protons

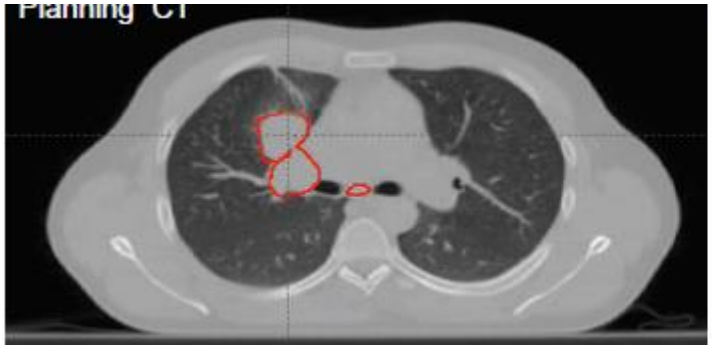
- **Variations ++ of protons properties as a function of tissue densities:**

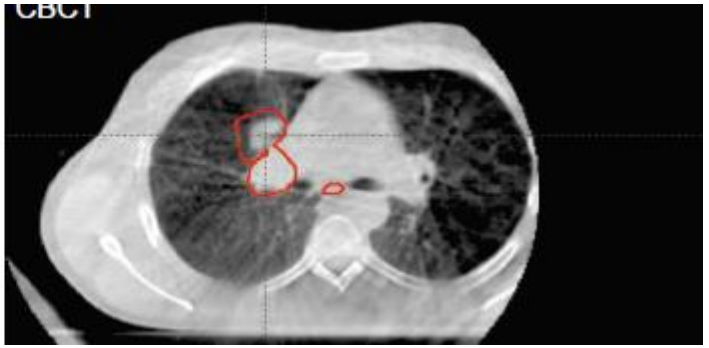




⇒Need to screen these variations at least once a week with a CT scanner if patient at risk

⇒CBCT scan every day (available on Proteus One)



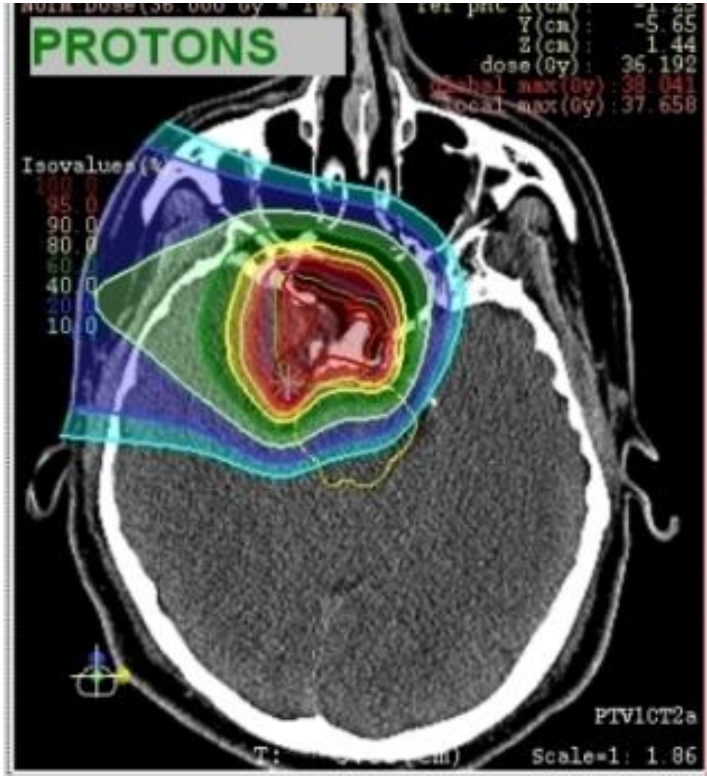


Challenges with protons

- Prescription of very high dose (74-76 Gy) next to high radiosensitive organ at risk/tissues

  ⇒ skull based nerves,
  ⇒ spinal cord,
  ⇒ optic chiasm, etc …

- So need of a high precision positioning (contentions, daily kv CBCT)
- If moving target need of gating



Challenges with protons

- **Moving targets:**

✓Modification of the distribution of protons during irradiation,

✓Possibility of repainting to dilute the movement error,

✓Draw according to 4D-CT scan to take into account the most precisely the movements

✓Use of gating, abdominal compression

✓To perform robust optimization ie doing dosimetry with worst case scenario

Antoine Lacassagne
NICE CANCER INSTITUTE

Recent studies are promising
(Lancet Oncology 2014)

Charged particle therapy versus photon therapy for paranasal sinus and nasal cavity malignant diseases: a systematic review and meta-analysis

Samir H Patel, Zhen Wang, William W Wong, Mohammad Hassan Murad, Courtney R Buckey, Khaled Mohammed, Fares Alahdab, Osama Altayar, Mohammed Nabhan, Steven E Schild, Robert L Foote

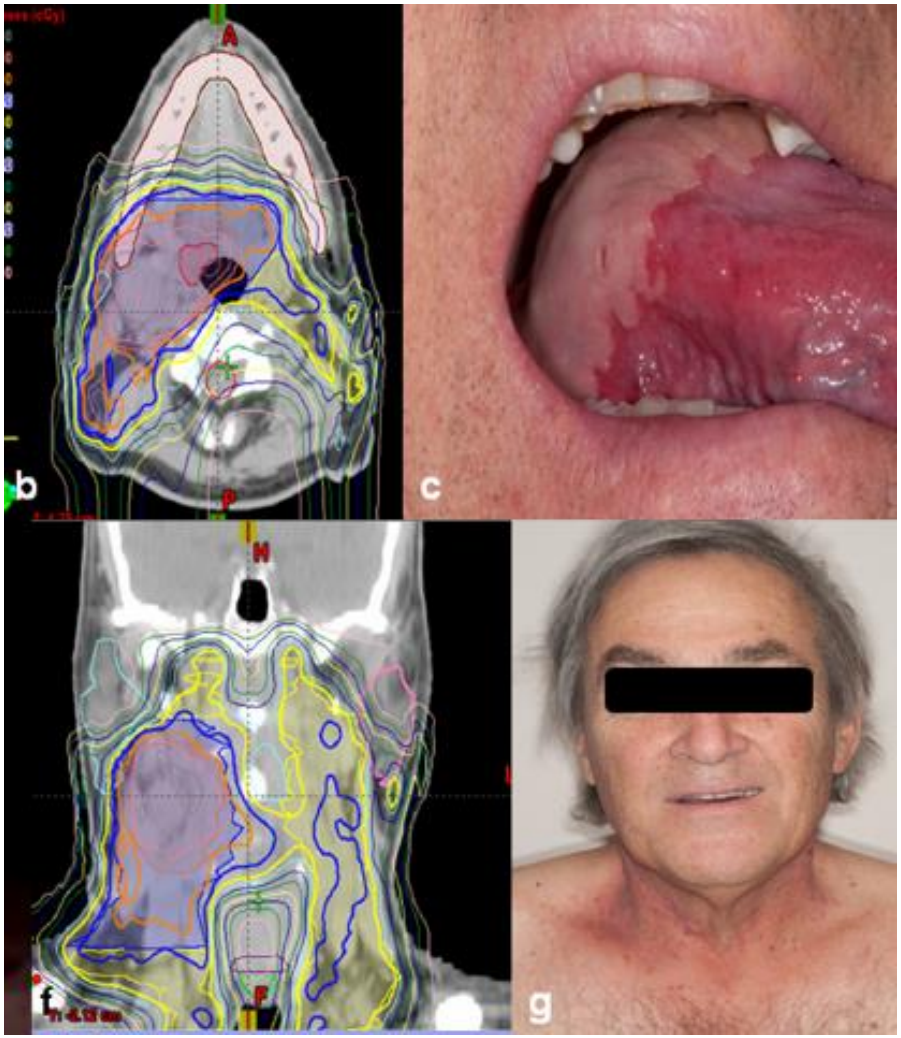
5-year disease-free survival						
PBT	1	36	0·72 (0·59–0·89)	--	1·44 (1·01–2·05)	0·045
IMRT	3	187	0·50 (0·38–0·67)	69·3%	--	--

International Journal of Radiation Oncology biology • physics
www.redjournal.org

Multifield Optimization Intensity Modulated Proton Therapy for Head and Neck Tumors: A Translation to Practice

Steven J. Frank, MD,* James D. Cox, MD,* Michael Gillin, PhD,†

2014



RT-CT 70 Gy
HNSCC

15 patients without pause, without hospitalisation
Clinical complete response rate= 93,3%

Antoine Lacassagne
NICE CANCER INSTITUTE

Medical Project

- First treated patient: June 2016

- **1st year:** 75 patients
- **2nd year:** 150 patients
- **3rd year:** 250 patients

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NICE CANCER INSTITUTE

Medical Project

- **Evolution of treatment location with time:**

First year: fixed tumors (head and neck, skull based)

Second year: tumor with reduced mobility (oesophagus, retroperitoneal tumors)

Third year: moving target (> 5-10 mm)

Antoine Lacassagne
NICE CANCER INSTITUTE

Conclusions

- **Very promising technique**
- **Numerous clinical trials on going**
- **Potential benefit in most of tumor location but not for every patient (20% of patients ?)**

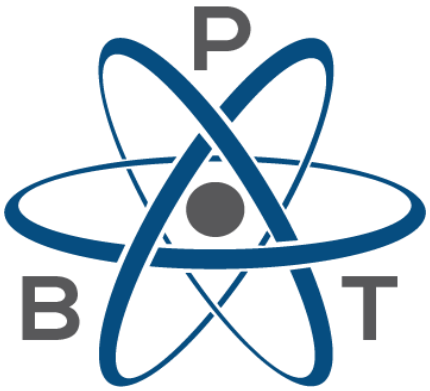
Thank you

Antoine Lacassagne
NICE CANCER INSTITUTE

Public interest association accredited to receive donations and legacies
To support Antoine Lacassagne Cancer Center : www.centreantoinelacassagne.org

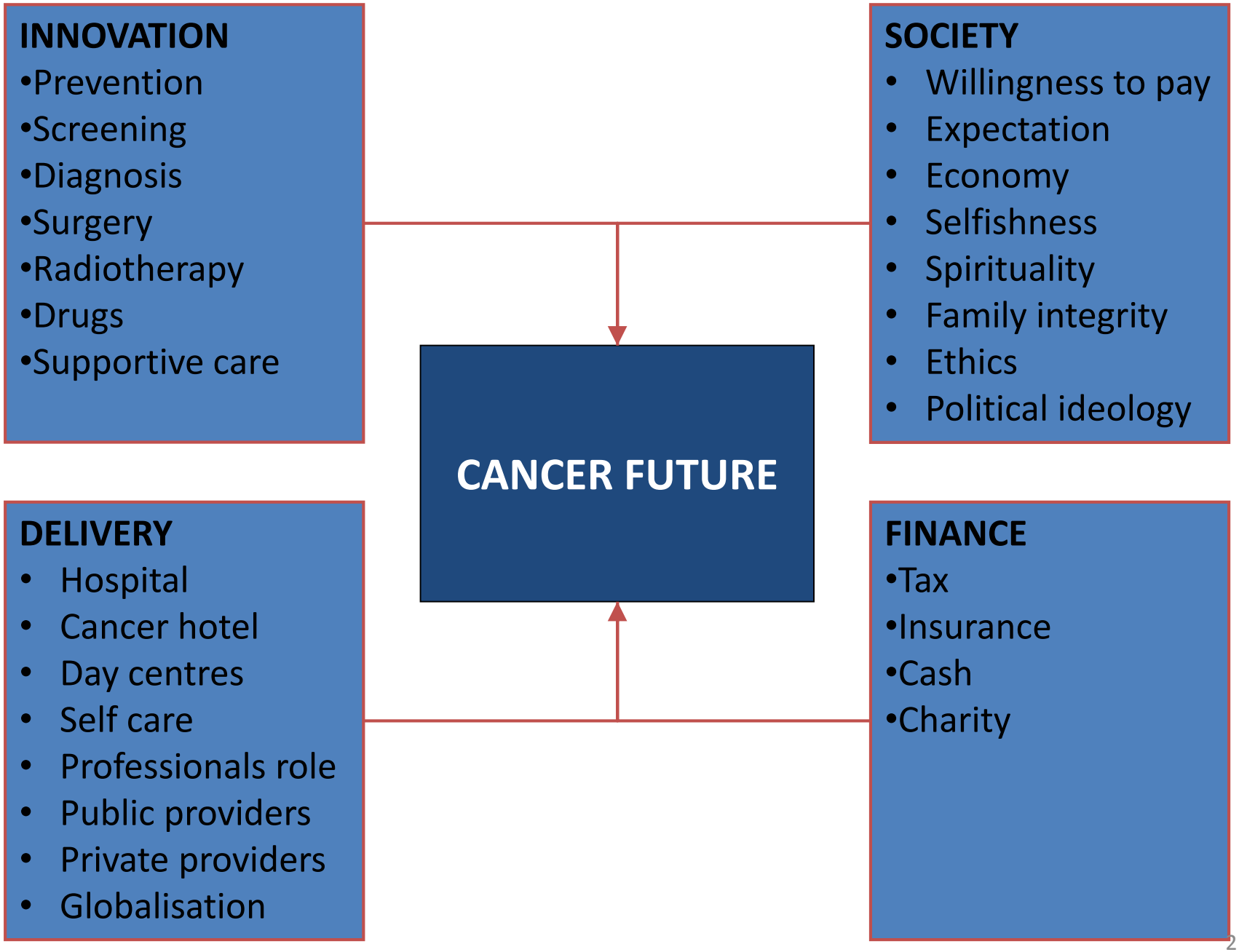
Member of UNICANCER

UNICANCER
Fédération Française des Centres de Lutte contre le Cancer



Proton Partners International

Professor Karol Sikora
Chief Medical Officer


INNOVATION
•Prevention
•Screening
•Diagnosis
•Surgery
•Radiotherapy
•Drugs
•Supportive care
SOCIETY
• Willingness to pay
• Expectation
• Economy
• Selfishness
• Spirituality
• Family integrity
• Ethics
• Political ideology
CANCER FUTURE
DELIVERY
• Hospital
• Cancer hotel
• Day centres
• Self care
• Professionals role
• Public providers
• Private providers
• Globalisation
FINANCE
•Tax
•Insurance
•Cash
•Charity

The evolution of precision RT

- 1960-70 Cobalt, hand planning
- 1970-80 Cobalt to LINAC, computerisation
- 1980-90 Set geometric volumes to conformal
- 1990-00 The MLC - refined conformal
- 2000-10 IMRT, IGRT, VMAT
- 2010-20 Protons, Auto-contouring, SABR, breath-hold, objective QA of plans

The next 3 years

	2015	2018
PBT centres	43	66
Treatment rooms	171	294
Global revenue US$	480	1,100
LINACS	13,000	15,000

Radiotherapy to 2030

Improving geometry - physics

- Multimedia imaging
- Understanding functional anatomy and differential sensitivity
- IMRT-IGRT – increase precision
- Particle therapy

Improving selectivity - biology

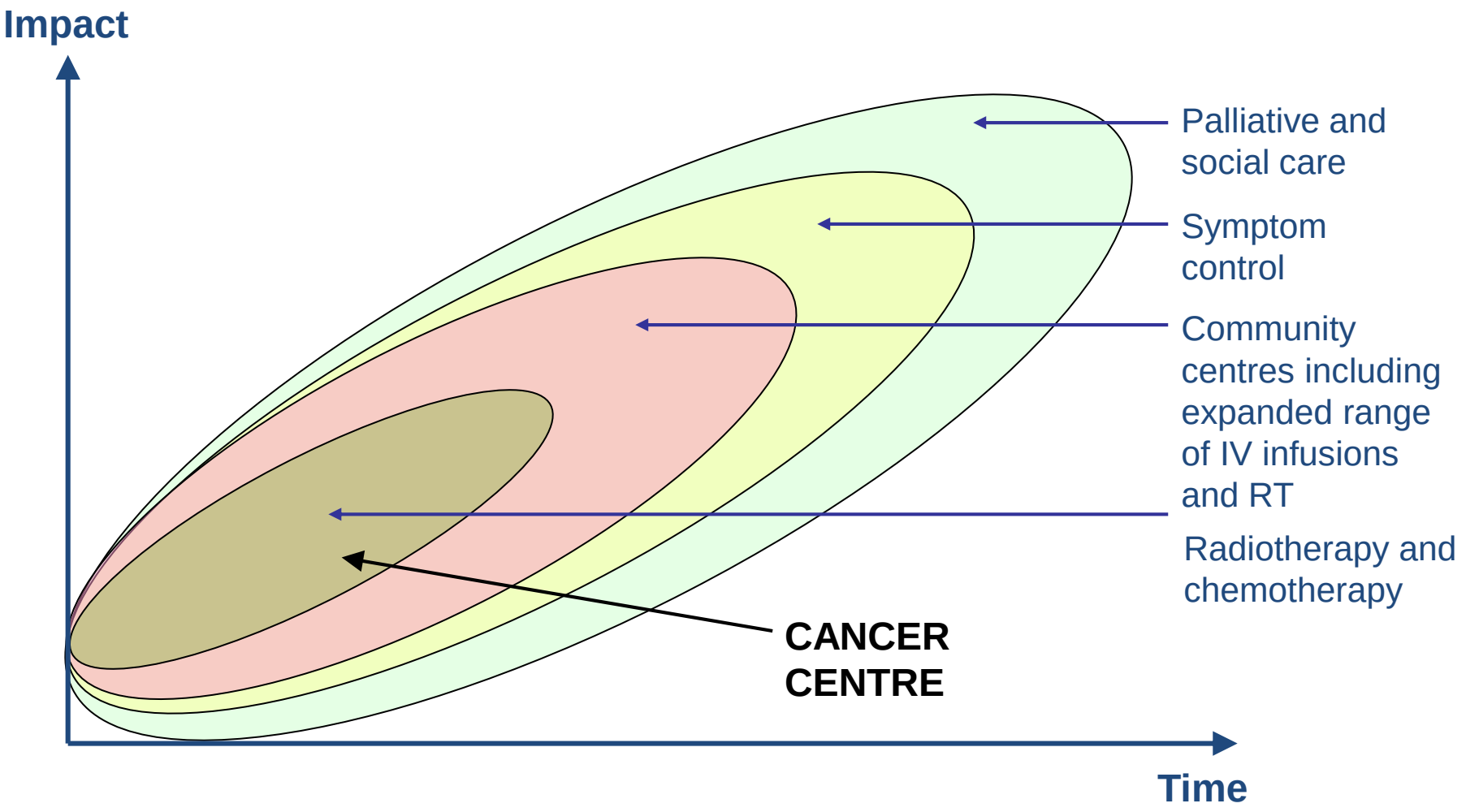
- Biological optimisation
- Designer fractionation
- Combination with systemic therapy

Increasing dose - reducing toxicity

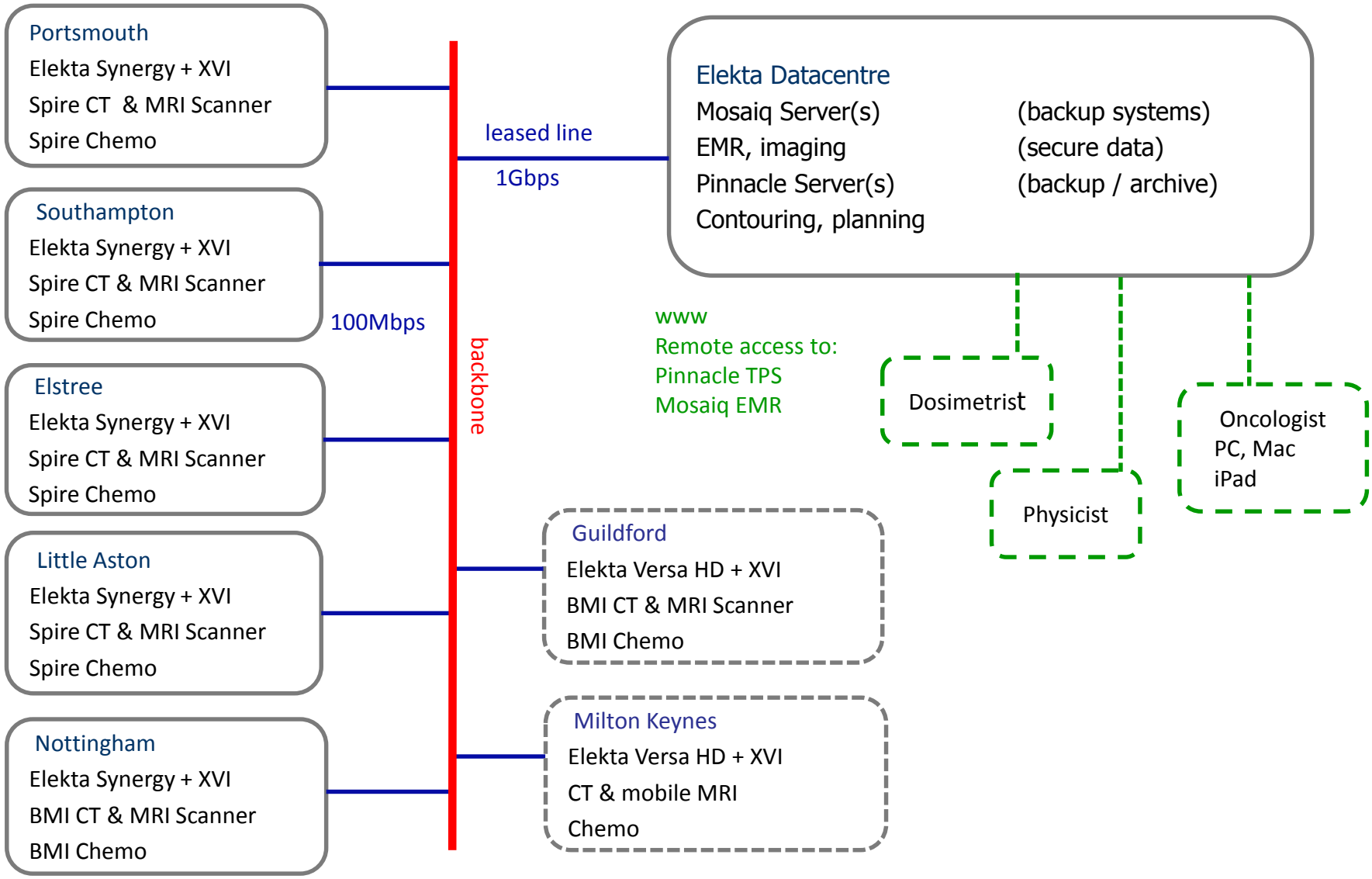
2060

- **Local therapy**
- **Single fraction**
- **Radiosurgery - SABR**
- **Tumour reduction prior or after CT**

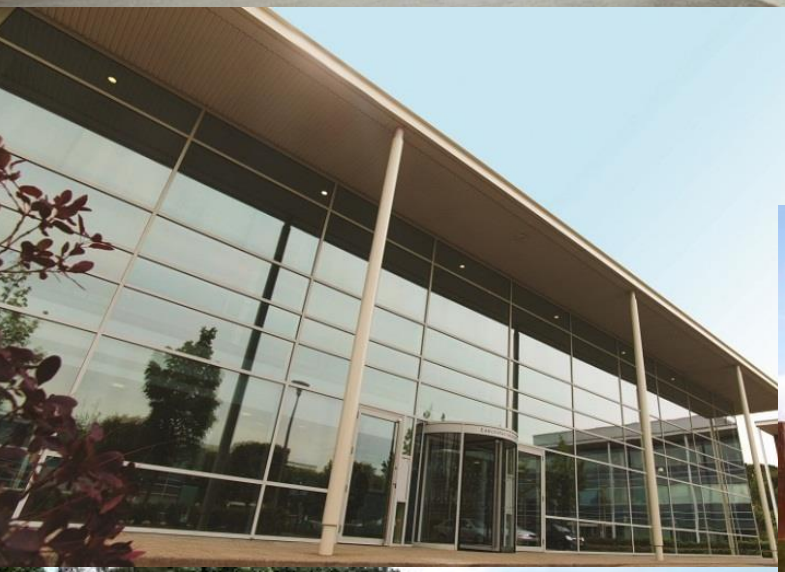
Extending the location of cancer services



Current network of Cancer partners UK centres



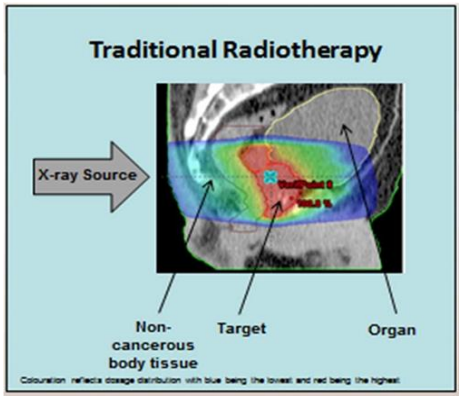

CANCERPARTNERSUK
Image Guided Radiotherapy Centre

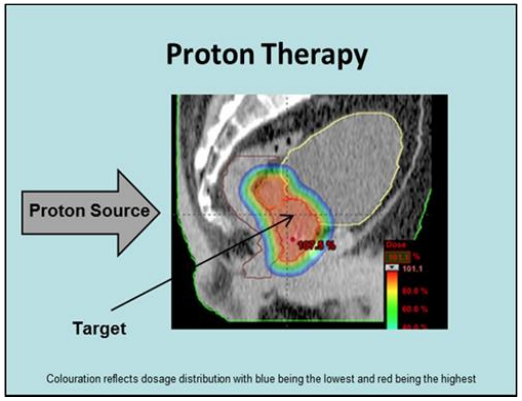


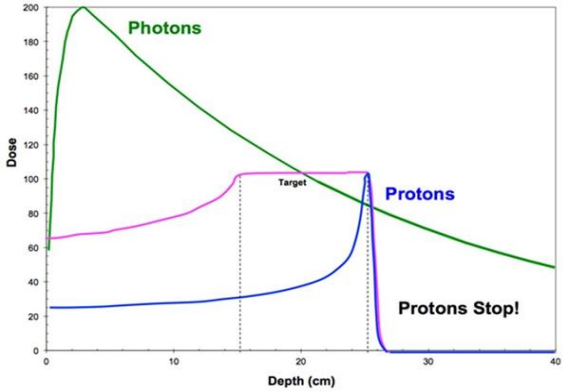

CANCERPARTNERSUK

The Case for Proton Therapy Globally

- Proton Beam Therapy began experimentally in the 1960s, and has been in clinical use since 1970.
- There are 40 Proton Beam Therapy centres globally, located in China, France, Germany, Japan, Korea, Russia, South Africa, Sweden and the USA[1].
- More than 95,124 patients have been treated.
- There is a considerable amount of published data on single institution series.
- New scanning beam technology allows for more delivery precision.
- Intensity Modulated Proton Therapy (IMPT) is now feasible; Image Guided Proton Therapy (IGPT) is available.
- There is a rapid expansion of global demand for Proton Beam Therapy treatment.







Proton therapy delivers heavily charged Protons in a more targeted manner to reduce damage to peripheral tissue and organs.

Note 1: Excludes low energy Proton beam sites used primarily for treatment of eye tumors (Source: Particle Therapy Cooperative Group, March 2012).

Proton Centres and Patient Numbers

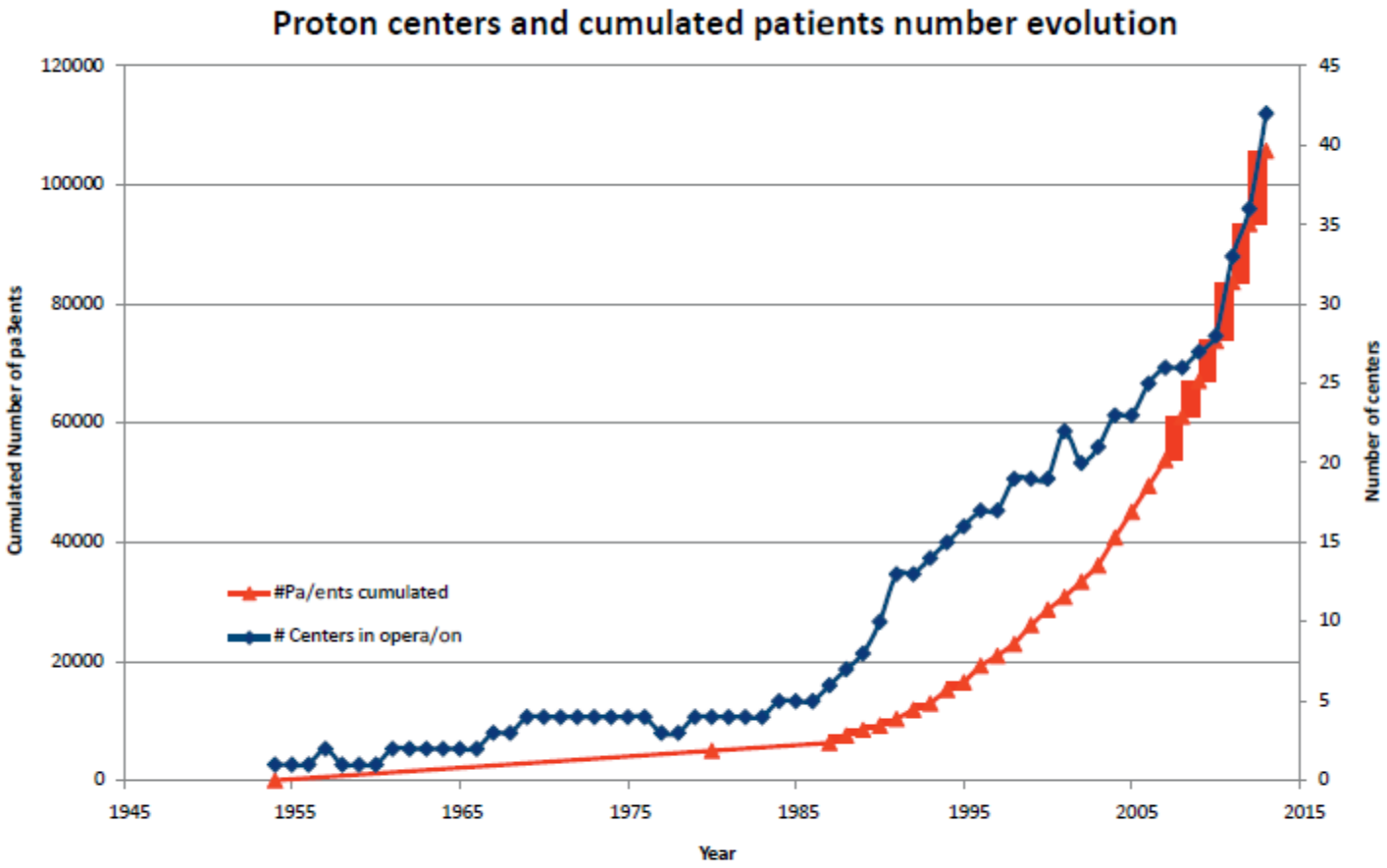
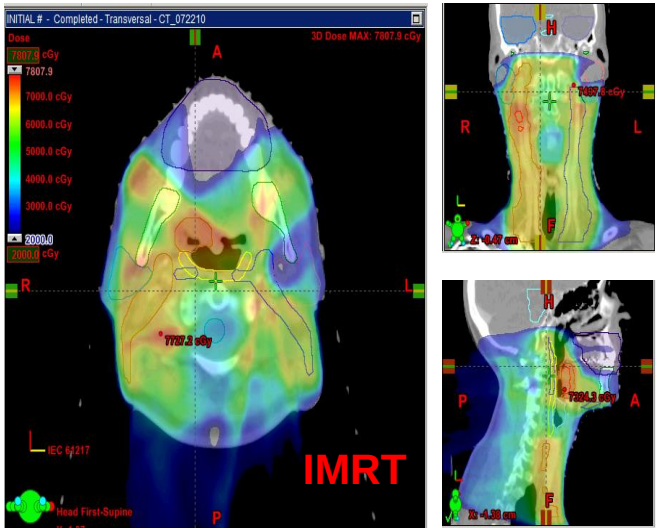


Figure 1.1: Graph representing the evolution of proton therapy centers under clinical operation and the cumulated number of patients treated using proton therapy (Source: PTCOG Website)

Head and neck cancer

Proton Therapy helps reduce Xerostomia and Dysphagia

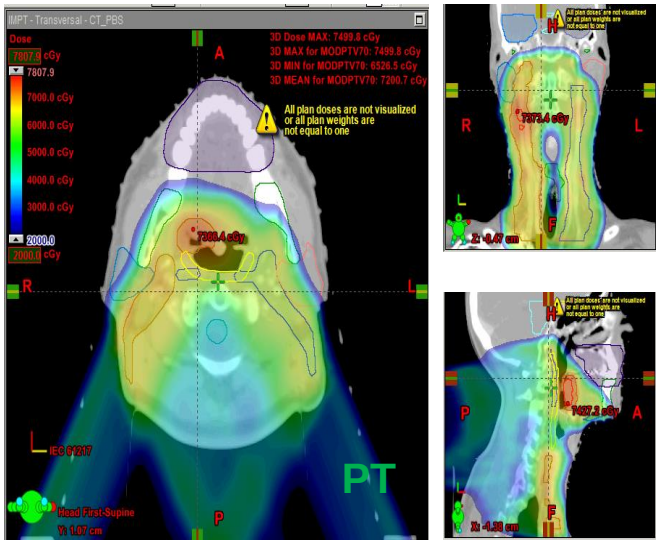
Clinical Reality



Side Effects

- Fatigue / Loss of taste / Loss of weight
- Feeding tube during treatment
- Long term swallowing issues

Solution with PT



Reduction of Side Effects

- Reduced Fatigue / Loss of taste / Loss of weight
- 50% less feeding tubes during treatment
- Reduced swallowing issues

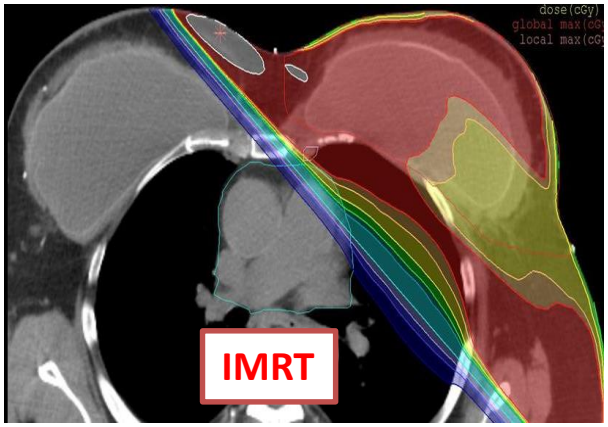
Phase II/III randomized trial on-going : NCT01893307

Images Courtesy of Dr. S. Both, Penn Med.

Breast cancer

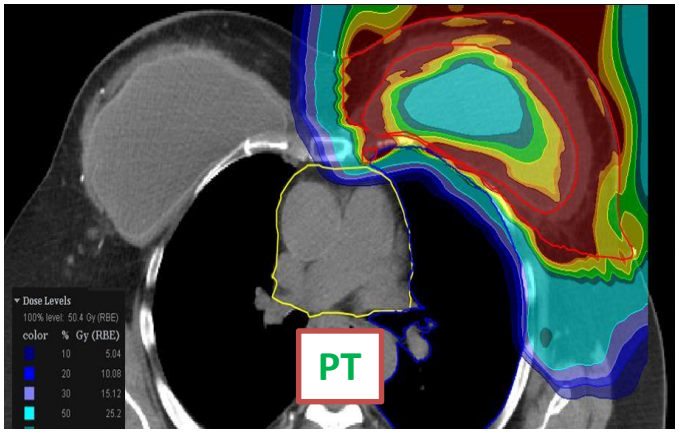
Proton Therapy could help reduce coronary ischaemia

Clinical Reality



Complication	Left Breast	Right Breast
Chest pain	**26%**	12%
Coronary art. dis.	**25%**	10%
Myocardial Infrac.	**15%**	5%
Cardiac Death	**6.4%**	3.6%

Solution with PT



Reduction of Side Effects

- Reduced dose to the heart
- Reduced dose to the lung
- Reduced dose to the left anterior descending artery

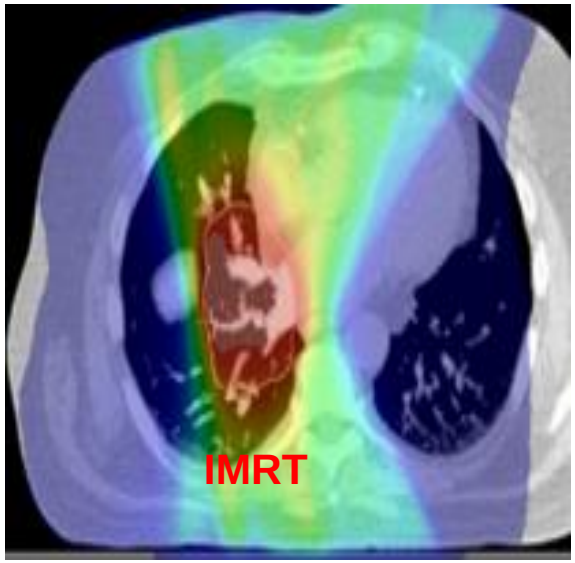
Post Mastectomy trial on-going : NCT01340495

Images Courtesy of Dr. S. Both, Penn Med.

Lung cancer

Proton Therapy could help reduce dose to heart and contra-lateral lung

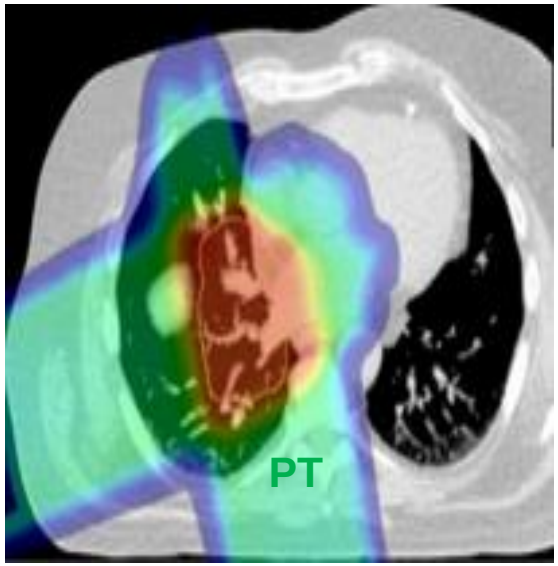
Clinical Reality



Side Effects

- Pneumonitis
- Heart diseases

Solution with PT



Reduction of Side Effects

- Reduced dose to (contra-lateral) lung
- Reduced dose to heart

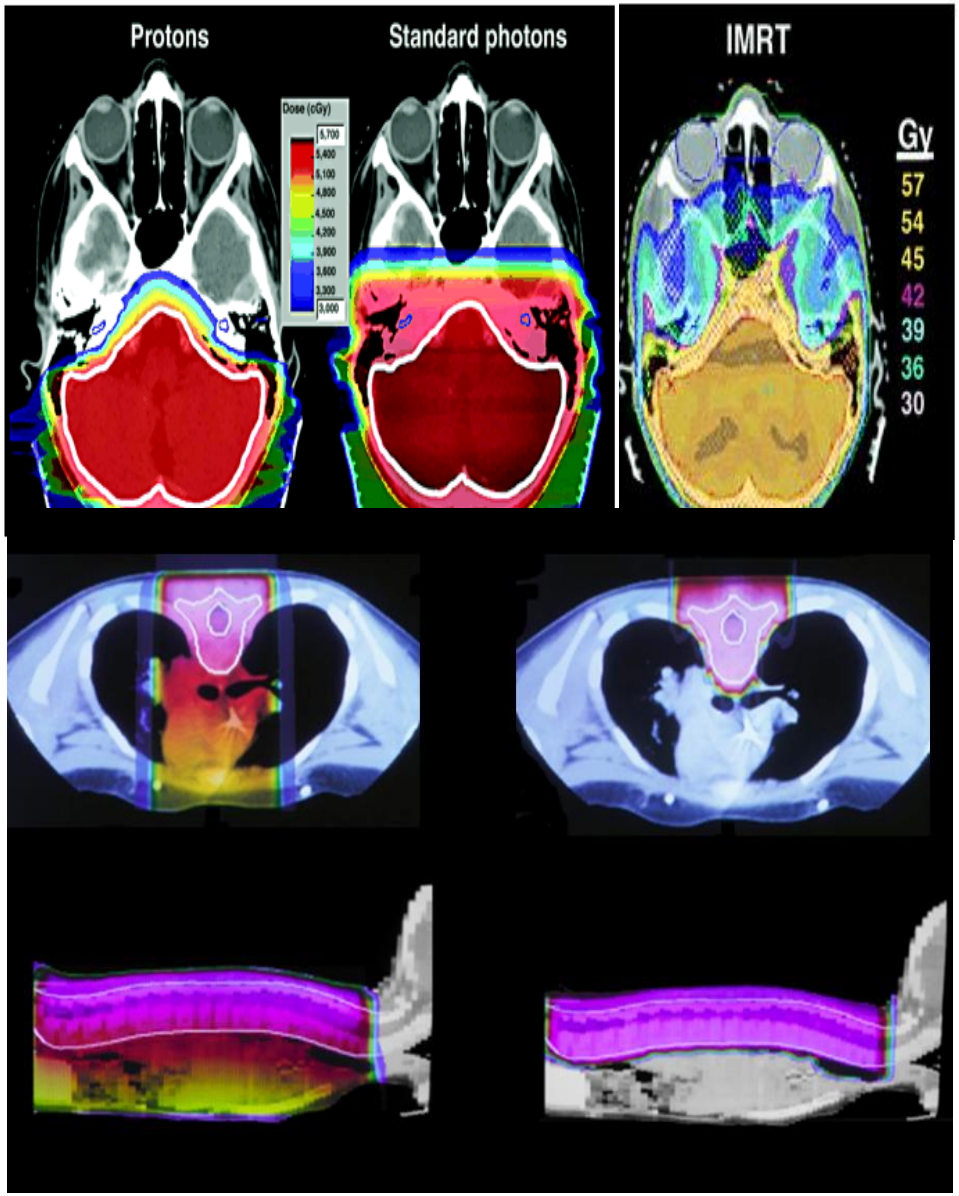
➔ Increased life expectancy (phase II MD Anderson)

Phase III randomized trial on-going : RTOG 1308

Images Courtesy of Dr. S. Both, Penn Med.

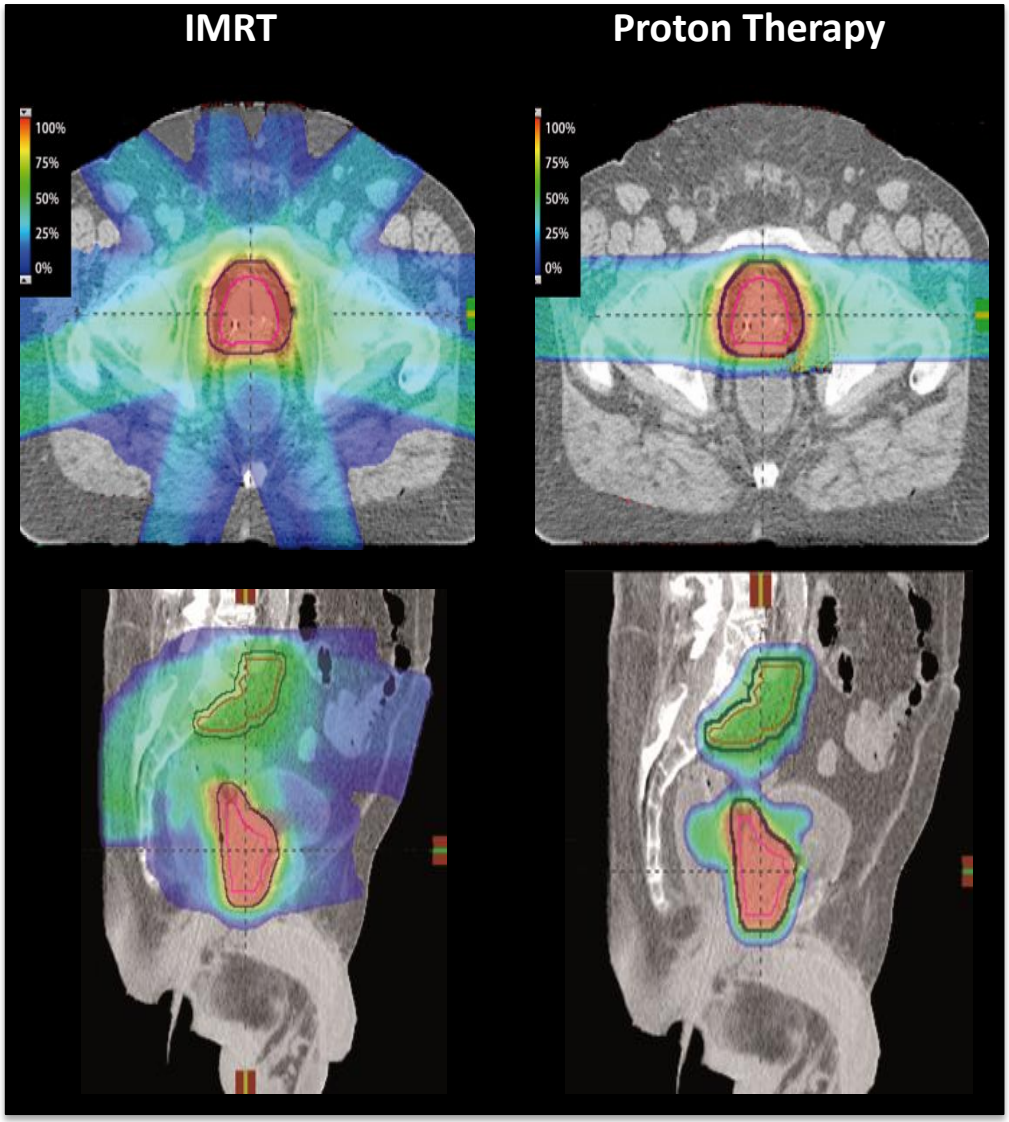
Paediatric medulloblastoma

Proton Therapy could reduce late treatment effects



Side Effects*	Protons	Photons
Restrictive Lung Disease	0%	60%
Reduced exercise capability	0%	75%
Abnormal EKGs	0%	31%
Growth abnormality	20%	100%
IQ drop of 10 points at 6 yrs	1.6%	28.5%
Risk of IQ score < 90	15%	25%

Prostate and nodes



Dose to critical Tissues (mean dose)	Photons	Protons
Rectum	20 Gy	6.5Gy
Bowel	18 Gy	10 Gy

"Early outcomes with image-guided proton therapy suggest high efficacy and minimal toxicity with **only 1.9% Grade 3 GU symptoms and <0.5% Grade 3 GI toxicities**" (*)

Images Courtesy of Stefan Both, Ph.D – (*) Mendenhall NP, et al. « Early outcomes from three prospective trials of image-guided proton therapy for prostate cancer" (low risk prostate trials); Int J Radiat Oncol Biol Phys. 2012 Jan 1;82(1):213-21. Epub 2010 Nov 17

Indications for PBT

- Hard indications, mainly paediatric
- Tumours where a significant proportion of patients may benefit
- Patients where the anatomy of tumour and OAR favour protons

$$\text{VALUE} = \frac{\text{CLINICAL GAIN (tumour control - toxicity)}}{\text{COST OF TREATMENT}}$$

Estimates of proton demand in the UK

Study	Population	Proton/year	Proton/ photon	Predicted proton UK	Machines UK
Georgia	10.2	5,737	20%	18,000	36
Sweden	9.7	2,220	14%	12,600	25
Italy	61.1	15,023	13%	11,700	23
Holland	16.8	7,000	10%	9,000	18
Rhode Island			10%	9,000	18
Lyon	6.2	5,270	12%	10,800	21
UK	64	1,500	1.5%	1,500	2

1: 150,000 total RT courses – 90,000 radical

2: 500 patients per machine annually 6 days, 12 hours a day, 20F per patient

Current NHSE PBT Overseas Programme

- Currently the NHSE pays treatment centres overseas to treat eligible patients
  - Referral to the USA (Oklahoma and Jacksonville) and Switzerland (Villigen)
  - Currently being reviewed and potentially expanded.

3.1 Adult

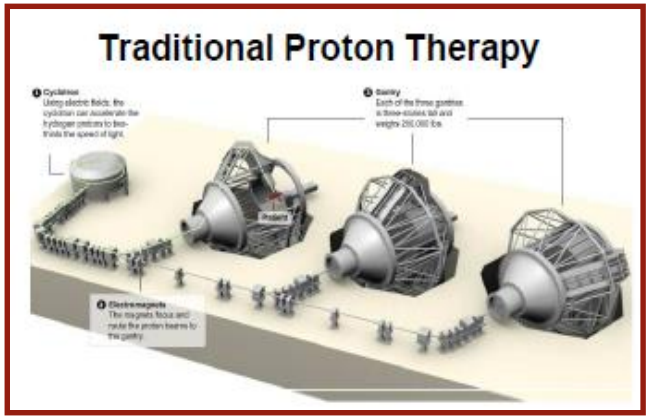
- 3.1.1 Base of Skull & Spinal Chordoma
- 3.1.2 Base of Skull Chondrosarcoma
- 3.1.3 Spinal & Paraspinal Bone and Soft Tissue Sarcomas (Non Ewing's)

3.2 Paediatric

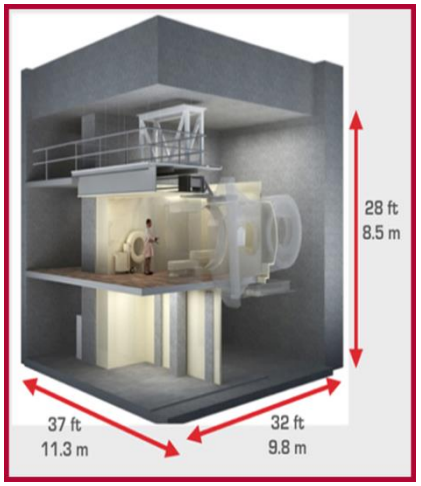
- 3.2.1 Base of Skull & Spinal Chordoma
- 3.2.2 Base of Skull Chondrosarcoma
- 3.2.3 Spinal & Paraspinal 'adult type' Bone and Soft Tissue Sarcomas
- 3.2.4 Rhabdomyosarcoma
  - 3.2.4.1 Orbit
  - 3.2.4.2 Parameningeal & Head & Neck
  - 3.2.4.3 Pelvis
- 3.2.5 Ependymoma
- 3.2.6 Ewing's Sarcoma
- 3.2.7 Retinoblastoma
- 3.2.8 Pelvic Sarcoma
- 3.2.9 Optic Pathway and other selected Low Grade Glioma
- 3.2.10 Craniopharyngioma
- 3.2.11 Pineal Parenchymal Tumours (not Pineoblastoma)
- 3.2.12 Esthesioneuroblastoma

Ref: https://www.england.nhs.uk/commissioning/spec-services/npc-crg/group-b/b01/

Proton Therapy Equipment



VS.



Legacy System

- £85m+
- 60K Sq FT + Footprint
- 50+ FTE Staffing requirements
- High Power Requirements

200+ tons	**Weight**	10 tons
60,000 sq. ft.+	**Footprint**	2,000 sq. ft.
150kW+	**Energy Requirements**	75-100kW
50+	**In-house Staffing Team**	7

IBA/Mevion Compact

- £20m
- 2K Sq FT Footprint
- 19 FTE Staffing requirements
- Lower Power Requirements

Irradiate patient

Welcome

Set-up

Prepare

Irradiation

Enhances Privacy and Staff Workflow

Site Requirements

Staffing

Similar to modern radiation therapy (i.e. Image Guided Radiation Therapy). No specialised technicians are required to be maintained onsite.

- Physicists - 2 FTE.
- Dosimetrists - 2 FTE (depending on volume).
- Radiographers - 6 FTE.
- Support Staff - 9 FTE.

Planning Permission

- D1 Medical office planning required. (No further requirements beyond existing radiotherapy centres).

Celtic Springs Cancer Centre

Celtic Springs Business Park, Newport, South Wales, with excellent public transport connections and adjacent to one of the key arterial routes out of Wales, through the South West and into Central London.

With a population of almost five million people across Wales and the South West, the Celtic Springs Cancer Centre is ideally situated with easy access off the M4, M5 & M48 motorways.

The 20,000 ft^2 building will be converted from its existing use and a 10,000 ft^2 extension will be built to house the proton beam therapy centre.

Programmed Completion:

Q3 2017

Footprint:

30,000 ft^2

Architect:

Atkins

Contractor:

Pravida & TBC

Construction Value:

£9m

Northumberland Cancer Centre

The Northumberland Cancer Centre will be situated in Bomarsund, Northumberland in an area of natural beauty close to Whitley Bay. Bomarsund has good road, sea and rail links from Scotland, Newcastle, Sunderland and as far South as Cumbria. Northumberland County Council has strategic plans to build a rail network from Newcastle Airport to a station close to the site.

The Cancer Centre will sit in the middle of a development on a green field site surrounded by rolling hills and man made lakes. The 30,000 ft^2 building will be the first PPI centre to be fully designed and will be a model for developments in UK and abroad.

Programmed Completion:

Q4 2017

Footprint :

30,000 ft^2

Architect:

JDDK

Contractor:

Pravida & TBC

Construction Value:

£9m

West London Cancer Centre

The Imperial West location, with excellent public transport connections and adjacent to one of the key arterial routes into Central London, is in close proximity to existing Imperial operations at Hammersmith Hospital and is an ideal location for a range of University and commercial partnering opportunities including research, post-graduate teaching and technical translation, combined with post-graduate and College Key Worker accommodation.

Imperial West is strategically located at the centre of the Greater London Authority's 1,000,000 mtr^2 White City OAPF Regeneration Area which is transforming the local area around Shepherds Bush.

Programmed Completion:

Q2 2019

Footprint :

30,000 ft^2

Architect:

TBC

Contractor:

Pravida & TBC

Construction Value:

£10m

Gulf International Cancer Centre

The Gulf International Cancer Centre (GICC) is an existing business with a well established patient flow and a healthy EBITDA. The business has recently been bought by local investors who want PPI to build a Proton Therapy Centre and collocate it with the GICC. The local investors will contract with PPI for management services to operate the PBT Centre and GICC as an integrated cancer care facility.

GICC is located in Abu Dhabi, United Arab Emirates with easy access to both Abu Dhabi and Dubai airports. The UAE is recognised as a Health Hub and the GICC will attract clients from across the Gulf States.

Programmed Completion:

Q1 2018

Footprint :

30,000 ft^2

Architect:

TBC

Contractor:

Pravida & TBC

Construction Value:

$20m

Centralised servers

NETWORK OF TREATMENT CENTRES

Clinical team across multiple sites:

- Site-based staff and central staff all using shared central system
- Standardised protocols and treatments – processes defined by Mosq/Pinn setup
- PCs on site access Mosaiq & Pinnacle servers in datacentre via citrix

One planning team across multiple sites :

- all planners/checkers can plan/check for any patient/any site
- each physicist & dosimetrist has own laptop (plug into large screens):
  - use citrix client to run Mosaiq, Pinnacle, other centralized software
  - Outlook, Office etc.
  - work in a centre, at home, anywhere
- Lync/Skype – calling & screen-sharing for planning, review, training

Centralised servers

NETWORK OF TREATMENT CENTRES

✓ **Oncologists can work remotely:**

- access via citrix client on PC, laptop, Macbook, iPad, tablet, broadband, 4G:
  - Pinnacle – contouring, plan review
  - Mosaiq – plan approval, IGRT review, documentation

✓ **Treat patients on any site**

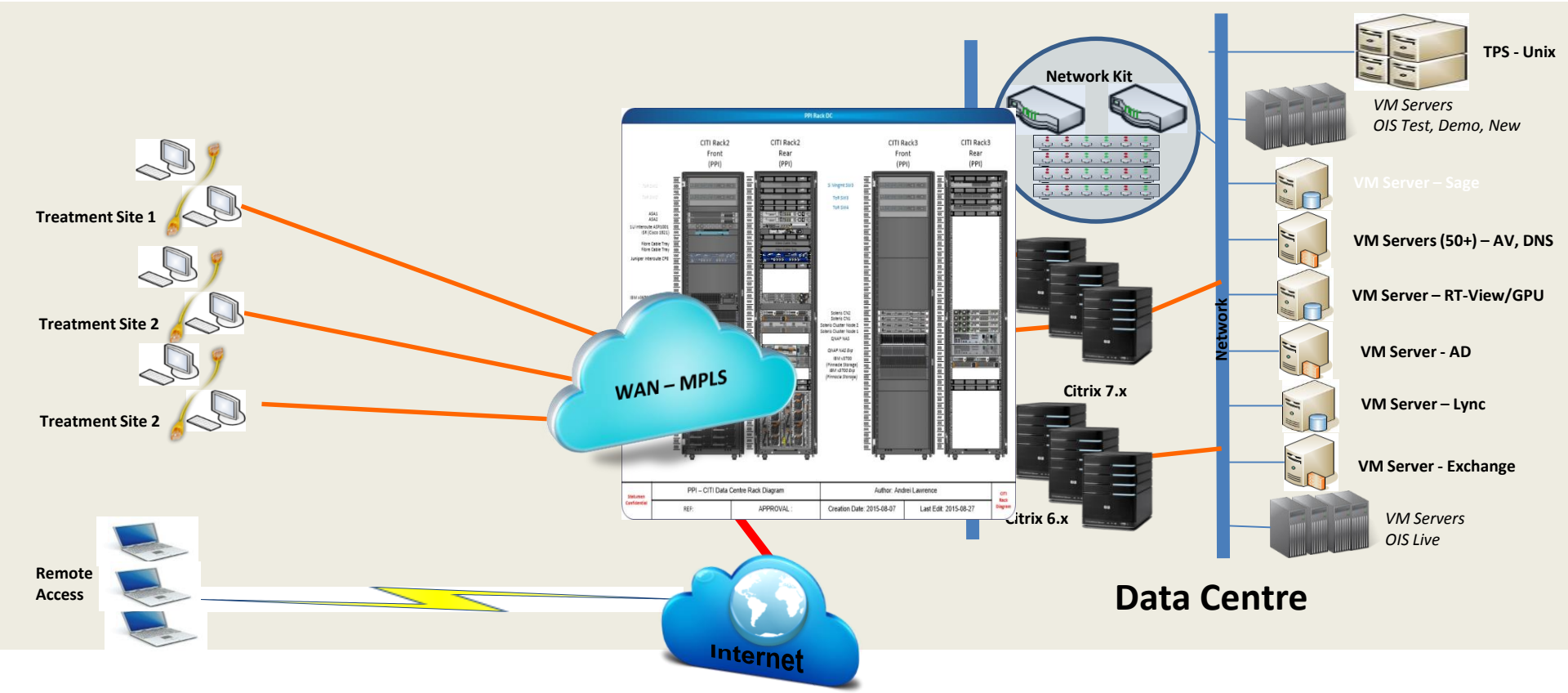
✓ **Shared resources for all sites:**

- benefits of upgrades, new functions immediately available to all staff/sites
- changes in process/setup apply to all

(paperless records)

- data from all sites stored and analysed in one location

Outline design



Proton Partners International - UK centres – 3 operational

Cities	S Wales	Newcastle	London
2016	£2,917,561	£2,230,672	£0
2017	£7,256,242	£5,103,603	£2,767,933
2018	£11,777,639	£8,943,180	£5,616,643
3 Year Total	**£21,951,442**	**£16,277,455**	**£8,384,576**
Economic Impact	**£87,805,768**	**£65,109,820**	**£33,538,304**

Economic Impact – Every £ invested, £.80 flips 5 times in local economy

Key
Centre under construction
Potential location
NHS centre

This slide does not include patient visitors to the locality of the PBT Centres or revenue from patients.