State of the Proton Therapy Market entering 2017

Scott Owens, Managing Director, Robust Insight Ltd
scott@robust-insight.co.uk
Proton Therapy Market Study

Method and Demographics
- Who wants Proton Therapy
- Benefits of Proton Therapy
- Barriers to Growth
- Believe in the Future
- Markets
- Conclusion
Methodology

- Robust Insight Ltd, an independent market research consultancy, was commissioned by IBA to undertake an online survey with 1,200 hospitals to better understand their use of and attitudes towards Proton Therapy.

- A total of 222 replies were received from 205 institutions in 29 countries – giving a response rate of 19%.

- The results of some questions have been compared with the last time the study was run in 2009.

- In the analysis, organizations not active in cancer treatment now have been removed.
A large proportion of the respondents are already familiar with Proton Therapy.
Proton Therapy Market Study

Method and Demographics

Who wants Proton Therapy

Benefits of Proton Therapy

Barriers to Growth

Believe in the Future

Markets

Conclusion
To what extent did the following groups support or oppose the decision to invest in Proton Therapy?

- **Radiation Physicists and Radiation Oncologists** were the most likely groups to support Proton Therapy.
- **Insurance Payers** were the only group seen to oppose Proton Therapy.

**Support for Proton Therapy**

- **Mean score**
  - Strongly opposed (-3)
  - Opposed (-1)
  - Neutral (0)
  - Supported (+1)
  - Strongly supported (+3)

Base size: n=146 (Actively considering, already purchased & decided no)
03

Proton Therapy Market Study

Method and Demographics
Who wants Proton Therapy
**Benefits of Proton Therapy**
Barriers to Growth
Believe in the Future
Markets
Conclusion
Awareness of the benefits of Proton Therapy versus traditional Radiation Therapy

Below is a list of potential advantages of Proton Therapy versus traditional Radiation Therapy. Which of the following were you aware of before this study?

- Lower risk of treatment induced disorders: 82%
- Potential for retreatment due to lower radiation dose in surrounding tissues: 79%
- Potential for Dose Escalation: 73%
- Precise dose delivery fewer side effects than IMRT: 72%
- Better quality of life during and after treatment: 69%
- Potential for Hypofractionation: 62%
- Lower cost of treatment for some indications: 14%

- Around four in five respondents were aware Proton Therapy had a lower risk of treatment induced disorders (82%) or had the potential for retreatment (79%) versus traditional Radiation Therapy.
- They were least likely to be aware that Proton Therapy was lower in cost for some indications.
- Benefits of Proton Therapy are well recognized even if the respondents are not considering Proton Therapy.

<table>
<thead>
<tr>
<th>Interest in Proton Therapy</th>
<th>Purchased / using n=72</th>
<th>Actively considering n=45</th>
<th>Decided no n=29</th>
<th>Not interested n=34</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower risk of treatment induced disorders</td>
<td>89%</td>
<td>69%</td>
<td>76%</td>
<td>82%</td>
</tr>
<tr>
<td>Potential for retreatment due to lower radiation dose in surrounding tissues</td>
<td>86%</td>
<td>67%</td>
<td>72%</td>
<td>82%</td>
</tr>
<tr>
<td>Potential for Dose Escalation</td>
<td>82%</td>
<td>69%</td>
<td>52%</td>
<td>79%</td>
</tr>
<tr>
<td>Precise dose delivery fewer side effects than IMRT</td>
<td>78%</td>
<td>56%</td>
<td>72%</td>
<td>68%</td>
</tr>
<tr>
<td>Better quality of life during and after treatment</td>
<td>83%</td>
<td>64%</td>
<td>59%</td>
<td>56%</td>
</tr>
<tr>
<td>Potential for Hypofractionation</td>
<td>69%</td>
<td>49%</td>
<td>62%</td>
<td>62%</td>
</tr>
<tr>
<td>Lower cost of treatment for some indications</td>
<td>19%</td>
<td>22%</td>
<td>7%</td>
<td>3%</td>
</tr>
</tbody>
</table>

Base size n=222
Proton Therapy benefits requiring further proof

Based on your knowledge of Radiation Therapy, which of the benefits would you like further proof of Proton Therapy efficacy?

- Lower cost of treatment for some indications: 70%
- Better quality of life during and after treatment: 57%
- Precise dose delivery fewer side effects than IMRT: 47%
- Lower risk of treatment induced disorders: 40%
- Potential for retreatment due to lower radiation dose in surrounding tissues: 36%
- Potential for Dose Escalation: 35%
- Potential for Hypofractionation: 35%

- Respondents were most likely to require further proof of lower cost of treatment for some indications when considering the benefits of Proton Therapy versus Radiation Therapy (70%)
- Only around a third required further proof of the potential for dose escalation (35%) or hypofractionation (35%)

<table>
<thead>
<tr>
<th>Interest in Proton Therapy</th>
<th>Purchased / using n=72</th>
<th>Actively considering n=45</th>
<th>Decided no n=29</th>
<th>Not interested n=34</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower cost of treatment for some indications</td>
<td>69%</td>
<td>64%</td>
<td>69%</td>
<td>86%</td>
</tr>
<tr>
<td>Better quality of life during and after treatment</td>
<td>54%</td>
<td>51%</td>
<td>55%</td>
<td>81%</td>
</tr>
<tr>
<td>Precise dose delivery fewer side effects than IMRT</td>
<td>49%</td>
<td>42%</td>
<td>31%</td>
<td>71%</td>
</tr>
<tr>
<td>Lower risk of treatment induced disorders</td>
<td>42%</td>
<td>44%</td>
<td>28%</td>
<td>48%</td>
</tr>
<tr>
<td>Potential for retreatment due to lower radiation dose in surrounding tissues</td>
<td>35%</td>
<td>51%</td>
<td>38%</td>
<td>43%</td>
</tr>
<tr>
<td>Potential for Dose Escalation</td>
<td>47%</td>
<td>40%</td>
<td>17%</td>
<td>33%</td>
</tr>
<tr>
<td>Potential for Hypofractionation</td>
<td>43%</td>
<td>40%</td>
<td>24%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Base size n=222
In your opinion, how efficacious do you think Proton Therapy would be in the treatment of the following cancers compared to conventional Radiation Therapies?

<table>
<thead>
<tr>
<th>Cancer</th>
<th>1 Efficacy demonstrated</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5 Efficacy NOT demonstrated</th>
<th>Don't know</th>
<th>BASE SIZE</th>
<th>EFFICACIOUS NET (1or2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pediatric Cancer</td>
<td>68</td>
<td></td>
<td></td>
<td></td>
<td>17</td>
<td>9</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Base of Skull Treatment</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
<td>28</td>
<td>9</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Central Nervous System</td>
<td>39</td>
<td></td>
<td></td>
<td></td>
<td>26</td>
<td>21</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Head and Neck Cancer</td>
<td>27</td>
<td></td>
<td></td>
<td></td>
<td>34</td>
<td>22</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>Prostate Cancer</td>
<td>20</td>
<td>20</td>
<td></td>
<td></td>
<td>8</td>
<td>20</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>Larger Sarcomas</td>
<td>15</td>
<td>25</td>
<td></td>
<td></td>
<td>8</td>
<td>20</td>
<td>11</td>
<td>11</td>
</tr>
<tr>
<td>Lung Cancer</td>
<td>10</td>
<td>26</td>
<td></td>
<td></td>
<td>31</td>
<td>7</td>
<td>12</td>
<td>9</td>
</tr>
<tr>
<td>Lymphomas</td>
<td>14</td>
<td>18</td>
<td></td>
<td></td>
<td>29</td>
<td>10</td>
<td>17</td>
<td>12</td>
</tr>
<tr>
<td>Gastrointestinal</td>
<td>9</td>
<td>21</td>
<td></td>
<td></td>
<td>37</td>
<td>9</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Gynecologic Cancer whole pelvis</td>
<td>7</td>
<td>13</td>
<td></td>
<td></td>
<td>41</td>
<td>11</td>
<td>18</td>
<td>10</td>
</tr>
</tbody>
</table>

- Proton Therapy was seen to be most efficacious for treating Pediatric Cancer and for Base of Skull Treatment.
- For lung and prostate cancers, 40 and 36% of the respondents believe that efficacy of Proton Therapy has been demonstrated.
- Proton Therapy was seen as least efficacious for Gastrointestinal and Gynecological Cancer.
Efficaciousness (2009 vs. 2016)

- Proton Therapy is seen as more efficacious in 2016 than in 2009 for certain types of cancer.

- In the 2009 study, there were 238 respondents with similar geographical distribution and degree of familiarity with Proton Therapy.

In your opinion, how efficacious do you think Proton Therapy would be in the treatment of the following cancers compared to conventional Radiation Therapies? % based on those who answered 1 or 2

Evolution from 2009 to 2016

- Pediatric Cancer: +19%
- Base of Skull Treatment: +11%
- Prostate Cancer: +11%
- Lung Cancer: +24%
Proton Therapy Market Study

Method and Demographics
Who wants Proton Therapy
Benefits of Proton Therapy
Barriers to Growth
Believe in the Future
Markets
Conclusion
Biggest barriers to the growth of Proton Therapy

- The biggest barriers impacting the growth of Proton Therapy were seen to be proof of efficacy (54%), adequate reimbursement (51%) and funding (48%)

- Return on Investment (19%) and land/space availability (17%) were less of a concern
Proton Therapy Market Study

Method and Demographics
Who wants Proton Therapy
Benefits of Proton Therapy
Barriers to Growth
Believe in the Future
Markets
Conclusion
Future of Proton Therapy

In your opinion how likely are the following?

- **Very unlikely**
- **Unlikely**
- **Neutral**
- **Likely**
- **Very likely**

![Likelihood Chart]

- **68%** of the respondents believe that Proton Therapy will continue to grow rapidly.
- **Around three quarters felt it was likely / very likely that there would be more evidence on the clinical benefits of Proton Therapy (77%) or the availability of Proton Therapy would have a growing impact on center reputations (73%).**
There will be more and more evidence on the clinical benefits of Proton Therapy.
The availability of Proton Therapy will have a growing impact on center reputations.
Proton Therapy will continue to grow rapidly.
Referrals from general oncologists/physicians will continue to grow sharply.

All groups are confident that Proton Therapy will continue to grow and have a growing impact on center reputations, even people that decided not to purchase.
Proton Therapy Solutions

Do you think one of these solutions might ever fit your needs?

- Almost two-thirds were interested in a compact system
- A compact system in this study is defined as a single-room Proton Therapy system

<table>
<thead>
<tr>
<th>Solution</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maybe a compact system</td>
<td>65%</td>
</tr>
<tr>
<td>Maybe a multi-room system</td>
<td>27%</td>
</tr>
<tr>
<td>Neither</td>
<td>8%</td>
</tr>
</tbody>
</table>

Base size n=108
Proton Therapy Solutions (by purchase group)

Among the group of respondents that decided no to Proton Therapy in the past, a compact system might fit the needs in the future for 68% of them.
Proton Therapy Market Study

Method and Demographics
Who wants Proton Therapy
Benefits of Proton Therapy
Barriers to Growth
Believe in the Future
Markets
Conclusion
Purchase of Proton Therapy system

- Around half purchased from IBA and a quarter from Varian
- “Other” means academic or research solutions developed in-house

<table>
<thead>
<tr>
<th>Company</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBA</td>
<td>49%</td>
</tr>
<tr>
<td>Varian Medical Systems</td>
<td>23%</td>
</tr>
<tr>
<td>Mevion Medical Systems</td>
<td>6%</td>
</tr>
<tr>
<td>Siemens</td>
<td>4%</td>
</tr>
<tr>
<td>Hitachi</td>
<td>3%</td>
</tr>
<tr>
<td>SHI</td>
<td>1%</td>
</tr>
<tr>
<td>Mitsubishi</td>
<td>0%</td>
</tr>
<tr>
<td>Protom International</td>
<td>0%</td>
</tr>
<tr>
<td>ProNova Solutions</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>11%</td>
</tr>
<tr>
<td>Don't know</td>
<td>3%</td>
</tr>
</tbody>
</table>

Base size n=72
Proton Therapy Market Study

Method and Demographics
Who wants Proton Therapy
Benefits of Proton Therapy
Barriers to Growth
Believe in the Future
Markets
Conclusion
Conclusion

- The majority felt Proton Therapy would continue to grow rapidly
- There was widespread awareness of the benefits of Proton Therapy versus traditional Radiation Therapy, although many wanted further proof of the lower cost of treatment for certain indications
- Proton Therapy is seen as more efficacious today than in 2009 for certain types of cancer
- Proton Therapy was considered highly efficacious for certain types of cancer like Pediatric and Base of Skull Treatment, efficaciousness for cancers like lung and prostate although many felt Proton Therapy’s efficacy had not been fully demonstrated for Gastrointestinal and Gynecological Cancer
- The biggest barriers impacting the growth of Proton Therapy were proof of efficacy, adequate reimbursement and funding, whilst return on investment and space availability were less of a concern
- Concerns about cost meant most were more interested in a compact system rather than a large-scale, multi-room system