Contents
Section One: Summary

The Finger Lakes Health Systems Agency (FLHSA) undertook a survey of the Finger Lakes region’s MRI services in 2014 in order to inventory the services available in the region, to monitor the effect of additions of capacity made in recent years, and to track the pace of MRI utilization. The majority of the information included in this report comes from responses from providers during the 2014 survey, and includes utilization data for calendar year 2014 and inventory data as of December 31st, 2014. To allow for consistent analysis, however, data from earlier surveys or estimates was used for the few non-responding facilities.

Number of Machines
Presently there are 38.5 MRI service sites in the 9-county Finger Lakes region, with the equivalent of 38.0 full-time machines. All hospital sites in the region except two subsidiary campuses have on-site MRI availability. One stationary machine was added in 2014.

Utilization
Based on the survey responses, MRI utilization increased by 4.9% in 2014 compared to 2013. This compares to the 2.6% increase in utilization between 2012 and 2013, and follows the general trend of slow growth since 2004.

As shown in tables 8 through 11, the region’s 38.0 full-time units experienced average utilization of 3,251 exams per unit in 2014; this is an increase from 2013. There is variation in average utilization rates based on the type of unit used (e.g. mobile, stationary). Hospital-based stationary units completed an average of 3,710 exams. An average of 1,179 exams was completed on mobile MRI units. Freestanding (but fixed) units completed an average of 3,286 exams per unit.

National Comparisons
With 95.8 MRI procedures per 1000 population in 2014, the Finger Lakes region is below the 2014 U.S. average of 109.4 scans per 1000 population. This may reflect both the effect of review of clinical appropriateness and the control of new MRI capacity in this region.

Regional Need
Based on the benchmark chosen and on current utilization (122,170 procedures in 2014) one could postulate a current regional demand for 22 to 30 full-time machines. This compares to the current 38.5 regional machine capacity.

Future Demand
Based on the projections below, the current stock of 38.5 MRI machines will accommodate up to a 15% increase in demand over the coming years. At this time, there is no need for additional machines. Table 1 provides projections using a consistent growth rate (e.g. 5%/year) in 2013 and 2014.

Table 1: Number of MRI Machines Needed in Finger Lakes Region at End of 2016

<table>
<thead>
<tr>
<th>Number of Machines Required</th>
<th>Projected Annual Utilization Increase*</th>
<th>Use Rate Per Machine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3625</td>
<td>4000</td>
</tr>
<tr>
<td>5%</td>
<td>35.3</td>
<td>32.0</td>
</tr>
<tr>
<td>7.5%</td>
<td>37.0</td>
<td>33.5</td>
</tr>
<tr>
<td>10%</td>
<td>38.8</td>
<td>35.1</td>
</tr>
<tr>
<td>12.5%</td>
<td>40.5</td>
<td>36.7</td>
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</table>

* Above the 2014 utilization of 122,170 procedures

Present resource = 38.0 FTE MRI Units
Section Two: Capacity

Table 2 lists the MRI sites in the region. Table 3 describes the manufacturer, magnet type, type of installation and magnet strength for the MRI units of each respondent.

Table 2: Inventory of MRI Machines in the Finger Lakes Region, End of Calendar Year 2014

<table>
<thead>
<tr>
<th>Machine Type</th>
<th>Facility</th>
<th>Units</th>
<th>Fixed/ Mobile</th>
<th>CON- Approved</th>
<th>Ownership</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital- Stationary</td>
<td>Arnot-Ogden</td>
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<td>X</td>
<td>Hospital</td>
</tr>
<tr>
<td></td>
<td>FF Thompson</td>
<td>1.0</td>
<td>F</td>
<td>X</td>
<td>Hospital</td>
</tr>
<tr>
<td></td>
<td>Geneva General</td>
<td>1.0</td>
<td>F</td>
<td>X</td>
<td>Finger Lakes Radiology</td>
</tr>
<tr>
<td></td>
<td>Guthrie Corning Hospital</td>
<td>1.0</td>
<td>F</td>
<td></td>
<td>Hospital</td>
</tr>
<tr>
<td></td>
<td>Highland</td>
<td>1.0</td>
<td>F</td>
<td>X</td>
<td>University Imaging</td>
</tr>
<tr>
<td></td>
<td>Newark-Wayne</td>
<td>1.0</td>
<td>F</td>
<td></td>
<td>Alliance Imaging</td>
</tr>
<tr>
<td></td>
<td>Rochester General</td>
<td>3.3*</td>
<td>F</td>
<td>X</td>
<td>Rochester Diagnostic Imaging &amp; Hospital</td>
</tr>
<tr>
<td></td>
<td>Rochester General</td>
<td>1.0</td>
<td>F</td>
<td>X</td>
<td>Hospital</td>
</tr>
<tr>
<td></td>
<td>St. Joseph’s</td>
<td>1.0</td>
<td>F</td>
<td>X</td>
<td>Hospital</td>
</tr>
<tr>
<td></td>
<td>Strong</td>
<td>4.0</td>
<td>F</td>
<td>X</td>
<td>Hospital</td>
</tr>
<tr>
<td></td>
<td>Unity (Long Pond)</td>
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<td>F</td>
<td></td>
<td>Borg &amp; Ide Imaging</td>
</tr>
<tr>
<td>Hospital- Mobile</td>
<td>Ira Davenport</td>
<td>1.0</td>
<td>M</td>
<td>X</td>
<td>King’s Medical Group</td>
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<tr>
<td></td>
<td>NH Noyes</td>
<td>1.0</td>
<td>M</td>
<td></td>
<td>Northern Lights Imaging</td>
</tr>
<tr>
<td></td>
<td>Strong West</td>
<td>1.0</td>
<td>M</td>
<td>X</td>
<td>InSight Health Corp.</td>
</tr>
<tr>
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<td>Clifton Springs*</td>
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<td>M</td>
<td>X</td>
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</tr>
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<td>E.W.B.C.</td>
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<tr>
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<td>Borg &amp; Ide Imaging</td>
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<td>Borg &amp; Ide Imaging</td>
</tr>
<tr>
<td></td>
<td>Nine Mile Point Rd</td>
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<td>F</td>
<td></td>
<td>URMC</td>
</tr>
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<td></td>
<td>Ridgeway Ave</td>
<td>1.0</td>
<td>F</td>
<td></td>
<td>Borg &amp; Ide Imaging</td>
</tr>
<tr>
<td></td>
<td>S. Clinton</td>
<td>1.0</td>
<td>F</td>
<td></td>
<td>University Medical Imaging</td>
</tr>
<tr>
<td></td>
<td>Science Park</td>
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<td>F</td>
<td></td>
<td>University Medical Imaging</td>
</tr>
<tr>
<td></td>
<td>Senator Keating Blvd</td>
<td>2.0</td>
<td>F</td>
<td></td>
<td>Borg &amp; Ide Imaging</td>
</tr>
<tr>
<td></td>
<td>White Spruce Blvd</td>
<td>1.0</td>
<td>F</td>
<td></td>
<td>Borg &amp; Ide Imaging</td>
</tr>
<tr>
<td></td>
<td>Open MRI of Elmira*</td>
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<td>F</td>
<td></td>
<td>Open MRI of Elmira</td>
</tr>
<tr>
<td>TOTAL</td>
<td>38.5</td>
<td>F= 32.3</td>
<td>M= 6.2</td>
<td>13 sites with CON approval</td>
<td>13 sites with CON approval</td>
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</table>

* Most recent information is from 2006

# one unit is used on a limited basis, for selected patients only
Table 3: MRI Equipment in the Finger Lakes Region, 2014

<table>
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<tr>
<th>Machine Type</th>
<th>Facility</th>
<th>Manufactur er</th>
<th>Magnet Type*</th>
<th>Stationary or Mobile</th>
<th>Power (Tesla)</th>
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<td>Hospital-Stationary</td>
<td>Arnot-Ogden</td>
<td>Philips</td>
<td>S</td>
<td>Stationary</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>FF Thompson</td>
<td>Philips</td>
<td>P</td>
<td>Stationary</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>Geneva General</td>
<td>Siemens</td>
<td>S</td>
<td>Stationary</td>
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</tr>
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<td>Stationary</td>
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<td>GE</td>
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<td>Stationary</td>
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<td>Hitachi</td>
<td>O</td>
<td>Stationary</td>
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<td>GE</td>
<td>P</td>
<td>Stationary</td>
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<td>Rochester General</td>
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<td>Stationary</td>
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<td>Mobile</td>
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<td>P</td>
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<td>NH Noyes</td>
<td>Siemens</td>
<td>P</td>
<td>Mobile</td>
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</tr>
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<td>S</td>
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<tr>
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<td>Mobile</td>
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<tr>
<td></td>
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<td>Philips</td>
<td>S</td>
<td>Mobile</td>
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<td>S</td>
<td>Stationary</td>
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<tr>
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<td>Stationary</td>
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<td>Mobile</td>
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</tr>
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<td>S</td>
<td>Stationary</td>
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<tr>
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<td>Lac de Ville Blvd</td>
<td>Siemens</td>
<td>S, O</td>
<td>Stationary</td>
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</tr>
<tr>
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<td>GE</td>
<td>S</td>
<td>Stationary</td>
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</tr>
<tr>
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<td>Lac de Ville Blvd</td>
<td>GE</td>
<td>S</td>
<td>Stationary</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Lattimore Rd</td>
<td>GE</td>
<td>S</td>
<td>Stationary</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Nine Mile Point Rd</td>
<td>GE</td>
<td>S, P</td>
<td>Stationary</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Ridgeway Ave</td>
<td>GE</td>
<td>S</td>
<td>Stationary</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>S. Clinton</td>
<td>Siemens</td>
<td>S</td>
<td>Stationary</td>
<td>3.0</td>
</tr>
<tr>
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<td>Science Park</td>
<td>GE</td>
<td>S, P</td>
<td>Stationary</td>
<td>3.0</td>
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<tr>
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<td>S</td>
<td>Stationary</td>
<td>3.0</td>
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<td>P, O</td>
<td>Stationary</td>
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</table>

S= Superconducting  O= Open Architecture  P= Permanent
*Data provided from previous years  **New in 2014
Staffing
Table 4 describes by respondent the total number of hours and days per week the equipment is staffed. With some expansion of capacity and minimal growth in volume, many units are still operating more hours per week than in previous years; total staffed hours increased by 10% between 2013 and 2014. Almost all units are operating more than 8 hours per day and approximately 50% are open on at least some weekend hours. Nationally less than 15% of hospital fixed sites were open over 13 hours per weekday (at an average of 10.0 scheduled hours), and about 50% did not have scheduled hours on weekends.

Table 4: MRI Service Staffing

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Days/Week</th>
<th>Hours/Week</th>
<th>Hours / Year</th>
</tr>
</thead>
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<td>Arnot-Ogden</td>
<td>7</td>
<td>82</td>
<td>4264</td>
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<tr>
<td>FF Thompson</td>
<td>6</td>
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<td>3458</td>
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<td>70</td>
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<td>4394</td>
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<td>Lattimore Rd</td>
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<td>2080</td>
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<td>2145</td>
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<tr>
<td>White Spruce Blvd</td>
<td>5</td>
<td>43</td>
<td>2210</td>
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<tr>
<td>Open MRI of Elmira*</td>
<td>5</td>
<td>60</td>
<td>3120</td>
</tr>
</tbody>
</table>

*Data were provided in surveys from previous years 137,358

November 2015
One measure of whether there is sufficient capacity to provide a medical care service is how long a potential patient must wait to obtain the service. The current survey provides information on wait time, both for urgent and routine service. Previous surveys expressed variability of waiting times, sometimes indicating an extended wait for service and at other times little or no wait. The current survey indicates there is a relatively short wait time for service, suggesting a relatively robust capacity compared to demand.

<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Emergent Cases (Hours)</th>
<th>Non-emergent cases (Hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital - Stationary</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arnot-Ogden</td>
<td>&lt;12</td>
<td>&gt;24</td>
</tr>
<tr>
<td>FF Thompson</td>
<td>&lt;12</td>
<td>&gt;72</td>
</tr>
<tr>
<td>Geneva General</td>
<td>&lt;12</td>
<td>&lt;24</td>
</tr>
<tr>
<td>Guthrie Corning Hospital</td>
<td>&lt;12</td>
<td>&gt;24</td>
</tr>
<tr>
<td>Highland</td>
<td>&lt;24</td>
<td>&gt;24</td>
</tr>
<tr>
<td>Newark-Wayne</td>
<td>&lt;12</td>
<td>&lt;24</td>
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<tr>
<td>RGH / RDIA 1</td>
<td>&lt;12</td>
<td>&gt;24</td>
</tr>
<tr>
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<td>&lt;12</td>
<td>&gt;24</td>
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<tr>
<td>Rochester General</td>
<td>&lt;12</td>
<td>&lt;24</td>
</tr>
<tr>
<td>St. Joseph’s</td>
<td>&lt;12</td>
<td>&gt;24</td>
</tr>
<tr>
<td>Strong 1</td>
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<td>&gt;120</td>
</tr>
<tr>
<td>Strong 2</td>
<td>&lt;12</td>
<td>&gt;120</td>
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<td>&lt;12</td>
</tr>
<tr>
<td>Hospital - Mobile</td>
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<td></td>
</tr>
<tr>
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<td>&lt;24</td>
</tr>
<tr>
<td>NH Noyes</td>
<td>&lt;12</td>
<td>&lt;12</td>
</tr>
<tr>
<td>Strong West</td>
<td>&lt;12</td>
<td>&gt;72</td>
</tr>
<tr>
<td>Clifton Springs*</td>
<td>&lt;12</td>
<td>&gt;24</td>
</tr>
<tr>
<td>St. James Mercy*</td>
<td>&lt;12</td>
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<td>Schuyler *</td>
<td>&lt;12</td>
<td>&lt;24</td>
</tr>
<tr>
<td>Freestanding</td>
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<td></td>
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<td>&lt;12</td>
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<tr>
<td>Elizabeth Wende B.C.</td>
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<td>&gt;120</td>
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<tr>
<td>Guthrie Clinic</td>
<td>&lt;12</td>
<td>&lt;12</td>
</tr>
<tr>
<td>Hagen Drive</td>
<td>&lt;12</td>
<td>&lt;12</td>
</tr>
<tr>
<td>Lac de Ville Blvd</td>
<td>&lt;12</td>
<td>&lt;24</td>
</tr>
<tr>
<td>Lac de Ville Blvd - 3.0T MRI only</td>
<td>&lt;12</td>
<td>&lt;24</td>
</tr>
<tr>
<td>Lattimore Rd</td>
<td>&lt;12</td>
<td>&lt;12</td>
</tr>
<tr>
<td>Nine Mile Point Rd</td>
<td>&lt;24</td>
<td>&lt;12</td>
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<tr>
<td>Ridgeway Ave</td>
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<td>&lt;12</td>
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<tr>
<td>S. Clinton</td>
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<td>&gt;24</td>
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<tr>
<td>Science Park</td>
<td>&lt;24</td>
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<tr>
<td>Senator Keating Blvd</td>
<td>&lt;12</td>
<td>&lt;12</td>
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<tr>
<td>Senator Keating Blvd</td>
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</tr>
<tr>
<td>White Spruce Blvd</td>
<td>&lt;12</td>
<td>&lt;12</td>
</tr>
<tr>
<td>Open MRI of Elmira*</td>
<td>&lt;12</td>
<td>&lt;24</td>
</tr>
</tbody>
</table>

*Data were provided in surveys from previous years
Table 6 provides each respondent’s estimate of the average number of minutes of machine time a patient spends per exam. Despite increasingly complex technique, exam times have remained stable over time.

Table 6: Average Number of Minutes per Exam

<table>
<thead>
<tr>
<th>Facility name</th>
<th>Minutes per Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Stationary</td>
<td></td>
</tr>
<tr>
<td>Arnot-Ogden</td>
<td>30</td>
</tr>
<tr>
<td>Guthrie Hospital Corning</td>
<td>40</td>
</tr>
<tr>
<td>FF Thompson</td>
<td>45</td>
</tr>
<tr>
<td>Geneva General</td>
<td>30</td>
</tr>
<tr>
<td>Highland</td>
<td>45</td>
</tr>
<tr>
<td>Unity</td>
<td>37</td>
</tr>
<tr>
<td>Newark-Wayne</td>
<td>38</td>
</tr>
<tr>
<td>Rochester General</td>
<td>45</td>
</tr>
<tr>
<td>St. Joseph’s</td>
<td>30</td>
</tr>
<tr>
<td>Strong 1</td>
<td>60</td>
</tr>
<tr>
<td>Strong 2</td>
<td>60</td>
</tr>
<tr>
<td>Strong 3</td>
<td>60</td>
</tr>
<tr>
<td>Strong 4</td>
<td>60</td>
</tr>
<tr>
<td>RGH / RDIA 1</td>
<td>45</td>
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<tr>
<td>RGH / RDIA 2</td>
<td>45</td>
</tr>
<tr>
<td>RGH / RDIA 3</td>
<td>60</td>
</tr>
<tr>
<td>Hospital Mobile</td>
<td></td>
</tr>
<tr>
<td>Ira Davenport</td>
<td>45</td>
</tr>
<tr>
<td>Strong West</td>
<td>60</td>
</tr>
<tr>
<td>NH Noyes</td>
<td>45</td>
</tr>
<tr>
<td>Clifton Springs*</td>
<td>45</td>
</tr>
<tr>
<td>St. James Mercy*</td>
<td>32</td>
</tr>
<tr>
<td>Schuyler*</td>
<td>30</td>
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<tr>
<td>Freestanding</td>
<td></td>
</tr>
<tr>
<td>Elizabeth Wende B.C.</td>
<td>17</td>
</tr>
<tr>
<td>Guthrie Clinic</td>
<td>30</td>
</tr>
<tr>
<td>Lac de Ville Blvd</td>
<td>60</td>
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<tr>
<td>Nine Mile Point Rd</td>
<td>45</td>
</tr>
<tr>
<td>S. Clinton</td>
<td>60</td>
</tr>
<tr>
<td>Culver Road*</td>
<td>37</td>
</tr>
<tr>
<td>Hagen Drive*</td>
<td>37</td>
</tr>
<tr>
<td>Lattimore Rd*</td>
<td>52</td>
</tr>
<tr>
<td>Science Park*</td>
<td>37</td>
</tr>
<tr>
<td>Senator Keating Blvd*</td>
<td>37</td>
</tr>
<tr>
<td>White Spruce Blvd*</td>
<td>37</td>
</tr>
<tr>
<td>Open MRI of Elmira*</td>
<td>52</td>
</tr>
</tbody>
</table>

*Data were provided in surveys from previous years
The information in Table 6, when used in conjunction with the staffing information in Table 4, can be used as a baseline for development of capacity estimates for MRI. For example:

<table>
<thead>
<tr>
<th>Operational Hours/Year</th>
<th>Average Hours/Week</th>
<th>Minutes / Exam</th>
</tr>
</thead>
<tbody>
<tr>
<td>116,058</td>
<td>2,231.9</td>
<td>4,691 3,402 2,669 2,196 1,821</td>
</tr>
<tr>
<td>117,621</td>
<td>2,261.9</td>
<td>4,754 3,448 2,705 2,225 1,845</td>
</tr>
<tr>
<td>119,184</td>
<td>2,292.0</td>
<td>4,818 3,494 2,741 2,255 1,870</td>
</tr>
<tr>
<td>120,747</td>
<td>2,322.1</td>
<td>4,881 3,540 2,777 2,284 1,894</td>
</tr>
<tr>
<td>122,310</td>
<td>2,352.1</td>
<td>4,944 3,586 2,813 2,314 1,919</td>
</tr>
<tr>
<td>124,566</td>
<td>2,395.5</td>
<td>5,031 3,699 2,925 2,373 1,965</td>
</tr>
</tbody>
</table>

Table 7: Potential Capacity Standard per MRI Unit

Section Three Utilization

Analysis

The largest relatively recent increase in total MRI procedures in the Finger Lakes region occurred between 2003 and 2004 when utilization increased 22.7% (77,407 procedures in 2003 to 94,961 procedures in 2004). Perhaps influenced by more stringent utilization review including health plan pre-authorization the rate of change remained relatively flat through 2013, increasing only 22.4% between 2004 and 2013. However, comparing the utilization in 2014 to that of 2004, there is a 28% increase, or 2.8% per year.

Figure 1: MRI Utilization in the Finger Lakes Region
In the 17 years between 1996 and 2014, MRI volume more than quadrupled, and as shown in the figure below, volume exhibited a compound growth rate of approximately 9.5% from 1990 to 2014. In 2001, clinical and financial restraints were put in place for HMOs in and around Monroe County, sharply reducing the growth of MRI use. There was concern at that point in time that growth might continue at the previously recorded rate. However, over the past 10 years growth rates have demonstrated slower annual growth (approximately 2.6% annually).

![MRI Volume Growth: Finger Lakes Region 1997-2014](image)

**Figure 2. Growth in MRI Utilization in the Finger Lakes Region**

**Utilization by Facility Type**
The growth of total MRI Volume in the region from 1996 through 2014 by MRI site type is presented in Figure 3.

![Total MRI Volume by Site Type Finger Lakes Region 1996-2014](image)

**Figure 3: Total MRI Procedure Volume by Site Type**
As seen in Tables 8, below, MRI procedures per unit have declined compared to the first half of this decade, coinciding with installation of a number of units in 2007 and expansion of days per mobile unit. Nationally, IMV reports average use per unit of 3,380 for multiple unit hospital-based facilities and 3,260 for non-hospital multiple unity facilities. As seen in Table 7, use of 3,215 per unit or higher is consistent with local use patterns of hours and time per MRI procedure. These data would suggest that there is no need for additional MRI capacity at this time in the region.

### Table 8: Average Number of Exams per MRI (Regional Total)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Utilization</th>
<th># of Units Reporting</th>
<th>Average exams/unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>26061</td>
<td>9.5</td>
<td>2743</td>
</tr>
<tr>
<td>1998</td>
<td>37229</td>
<td>10.1</td>
<td>3686</td>
</tr>
<tr>
<td>2000</td>
<td>64156</td>
<td>19.1</td>
<td>3359</td>
</tr>
<tr>
<td>2002</td>
<td>75729</td>
<td>22.3</td>
<td>3396</td>
</tr>
<tr>
<td>2004</td>
<td>94961</td>
<td>27.8</td>
<td>3416</td>
</tr>
<tr>
<td>2006</td>
<td>99114</td>
<td>28.0</td>
<td>3540</td>
</tr>
<tr>
<td>2008</td>
<td>102998</td>
<td>34.6</td>
<td>2977</td>
</tr>
<tr>
<td>2009</td>
<td>105384</td>
<td>36.7</td>
<td>2871</td>
</tr>
<tr>
<td>2010</td>
<td>106975</td>
<td>35.8</td>
<td>2988</td>
</tr>
<tr>
<td>2011</td>
<td>111092</td>
<td>35.8</td>
<td>3103</td>
</tr>
<tr>
<td>2012</td>
<td>112706</td>
<td>37.0</td>
<td>3046</td>
</tr>
<tr>
<td>2013</td>
<td>116114</td>
<td>38.0</td>
<td>3056</td>
</tr>
<tr>
<td>2014</td>
<td>122170</td>
<td>38.0</td>
<td>3215</td>
</tr>
</tbody>
</table>

* Excludes a freestanding unit which was said to be “mothballed.”

### Table 9: Average number of Exams per MRI (Hospital-Stationary)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Utilization</th>
<th># of Units Reporting</th>
<th>Average exams/unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
<td>20289</td>
<td>7.0</td>
<td>2898</td>
</tr>
<tr>
<td>1998</td>
<td>25303</td>
<td>7.0</td>
<td>3615</td>
</tr>
<tr>
<td>2000</td>
<td>35374</td>
<td>9.0</td>
<td>3930</td>
</tr>
<tr>
<td>2002</td>
<td>37448</td>
<td>10.0</td>
<td>3745</td>
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<tr>
<td>2004</td>
<td>40429</td>
<td>12.0</td>
<td>3369</td>
</tr>
<tr>
<td>2006</td>
<td>50596</td>
<td>14.3</td>
<td>3538</td>
</tr>
<tr>
<td>2008</td>
<td>55881</td>
<td>16.7</td>
<td>3346</td>
</tr>
<tr>
<td>2009</td>
<td>55281</td>
<td>16.8</td>
<td>3291</td>
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<tr>
<td>2010</td>
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<td>15.8</td>
<td>3634</td>
</tr>
<tr>
<td>2011</td>
<td>58768</td>
<td>15.8</td>
<td>3719</td>
</tr>
<tr>
<td>2012</td>
<td>56471</td>
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<td>3574</td>
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<tr>
<td>2013</td>
<td>57724</td>
<td>15.8</td>
<td>3653</td>
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<tr>
<td>2014</td>
<td>55655</td>
<td>15.0</td>
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</table>
Table 10: Average number of Exams per MRI (Hospital-Mobile)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Utilization</th>
<th># of Units Reporting</th>
<th>Average exams/unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
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<td>1141</td>
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<td>1998</td>
<td>5313</td>
<td>2.1</td>
<td>2530</td>
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<td>2000</td>
<td>11020</td>
<td>4.1</td>
<td>2688</td>
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<td>2002</td>
<td>14152</td>
<td>5.3</td>
<td>2670</td>
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<td>2004</td>
<td>13351</td>
<td>5.6</td>
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<td>8615</td>
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<td>2779</td>
</tr>
<tr>
<td>2008</td>
<td>8678</td>
<td>4.9</td>
<td>1771</td>
</tr>
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<td>8803</td>
<td>5.9</td>
<td>1492</td>
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<td>2010</td>
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<td>9725</td>
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<td>1621</td>
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<tr>
<td>2013</td>
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<tr>
<td>2014</td>
<td>7041</td>
<td>6.0</td>
<td>1174</td>
</tr>
</tbody>
</table>

Table 11: Average number of Exams per MRI (Freestanding)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Utilization</th>
<th># of Units Reporting</th>
<th>Average exams/unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>1996</td>
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<td>4060</td>
</tr>
<tr>
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<td>6613</td>
</tr>
<tr>
<td>2000</td>
<td>17762</td>
<td>6.0</td>
<td>2960</td>
</tr>
<tr>
<td>2002</td>
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<td>3447</td>
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<tr>
<td>2004</td>
<td>41181</td>
<td>10.2</td>
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</tr>
<tr>
<td>2006</td>
<td>39903</td>
<td>10.6</td>
<td>3764</td>
</tr>
<tr>
<td>2008</td>
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<td>40930</td>
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<td>14.0</td>
<td>3305</td>
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<td>2012</td>
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<td>3090</td>
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<tr>
<td>2013</td>
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<td>16.2</td>
<td>3092</td>
</tr>
<tr>
<td>2014</td>
<td>56525</td>
<td>17.2</td>
<td>3286</td>
</tr>
</tbody>
</table>

Utilization by body section

The utilization by body section reported in calendar year 2014 survey showed the following trends:

- A relatively steady volume of head and neck scans over the past three years
- A steady increase in spine and pelvis since 1997, but a slight decline in 2014
- Scans of upper extremities increases this year while lower extremity scans decline compared to 2013
- Abdominal scans continue a steady increase.

Figure 4 illustrates these findings.
The distribution of MRI procedures in the Finger Lakes region is similar to IMV's national findings. The largest proportion of scans was completed in the spine and pelvis categories, followed by the head and neck (including the brain). Procedures performed on the lower and upper extremities accounted for 11% and 10% of the procedures nationally.
Tables 12 through 14 present the total numbers of MRI procedures by body section, each section as a percentage of the total, and the growth rate for each body section. Note, in Table 12, the body section figures may not add to the Total due to missing respondent data.

**Table 12: Total Utilization by Body Section**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Head &amp; Neck</td>
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<td>11267</td>
<td>22561</td>
<td>25756</td>
<td>30875</td>
<td>33183</td>
<td>32722</td>
<td>33023</td>
<td>33606</td>
<td>34959</td>
<td>34907</td>
</tr>
<tr>
<td>Chest</td>
<td>178</td>
<td>5</td>
<td>604</td>
<td>702</td>
<td>677</td>
<td>735</td>
<td>670</td>
<td>930</td>
<td>835</td>
<td>861</td>
<td>1497</td>
</tr>
<tr>
<td>Spine &amp; Pelvis</td>
<td>7260</td>
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<td>21950</td>
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<td>31662</td>
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<td>34601</td>
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</tr>
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<td>9335</td>
<td>1071</td>
<td>11040</td>
<td>12519</td>
<td>10117</td>
<td>11368</td>
</tr>
<tr>
<td>Lower Exr.</td>
<td>2928</td>
<td>2173</td>
<td>10784</td>
<td>11970</td>
<td>15710</td>
<td>16384</td>
<td>17833</td>
<td>18627</td>
<td>19884</td>
<td>21606</td>
<td>19364</td>
</tr>
<tr>
<td>Abdomen</td>
<td>381</td>
<td>32</td>
<td>1768</td>
<td>2016</td>
<td>4062</td>
<td>4111</td>
<td>3853</td>
<td>4267</td>
<td>5080</td>
<td>5330</td>
<td>5036</td>
</tr>
<tr>
<td>Breast</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>391</td>
<td>761</td>
<td>1564</td>
<td>1872</td>
<td>2257</td>
<td>2599</td>
<td>2857</td>
</tr>
<tr>
<td>MR Spectro.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>230</td>
<td>331</td>
<td>293</td>
<td>113</td>
<td>56</td>
<td>88</td>
<td>116</td>
</tr>
<tr>
<td>Other</td>
<td>1122</td>
<td>681</td>
<td>678</td>
<td>1341</td>
<td>2395</td>
<td>5232</td>
<td>1086</td>
<td>990</td>
<td>770</td>
<td>765</td>
<td>951</td>
</tr>
<tr>
<td>Total</td>
<td>26061</td>
<td>37229</td>
<td>64156</td>
<td>75729</td>
<td>94961</td>
<td>99114</td>
<td>102998</td>
<td>106975</td>
<td>112706</td>
<td>116144</td>
<td>122170</td>
</tr>
</tbody>
</table>

**Table 13: Percent of Total Utilization by Body Section**

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Head &amp; Neck</td>
<td>30.9%</td>
<td>30.2%</td>
<td>35.2%</td>
<td>34.0%</td>
<td>32.5%</td>
<td>32.7%</td>
<td>33.9%</td>
<td>31.3%</td>
<td>29.9%</td>
<td>30.3%</td>
<td>28.6%</td>
</tr>
<tr>
<td>Chest</td>
<td>0.7%</td>
<td>0.8%</td>
<td>0.9%</td>
<td>0.9%</td>
<td>0.7%</td>
<td>0.8%</td>
<td>0.8%</td>
<td>0.8%</td>
<td>0.9%</td>
<td>0.7%</td>
<td>0.7%</td>
</tr>
<tr>
<td>Spine &amp; Pelvis</td>
<td>27.9%</td>
<td>29.5%</td>
<td>34.2%</td>
<td>35.5%</td>
<td>32.4%</td>
<td>32.2%</td>
<td>32.1%</td>
<td>32.8%</td>
<td>33.2%</td>
<td>33.8%</td>
<td>30.5%</td>
</tr>
<tr>
<td>Upper Exr.</td>
<td>5.6%</td>
<td>6.7%</td>
<td>9.1%</td>
<td>8.4%</td>
<td>9.6%</td>
<td>9.6%</td>
<td>9.7%</td>
<td>10.5%</td>
<td>11.1%</td>
<td>8.8%</td>
<td>9.3%</td>
</tr>
<tr>
<td>Lower Exr.</td>
<td>11.2%</td>
<td>13.2%</td>
<td>16.8%</td>
<td>15.8%</td>
<td>16.5%</td>
<td>17.1%</td>
<td>15.9%</td>
<td>17.7%</td>
<td>17.7%</td>
<td>18.7%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Abdomen</td>
<td>1.5%</td>
<td>1.8%</td>
<td>2.8%</td>
<td>2.7%</td>
<td>4.3%</td>
<td>4.4%</td>
<td>3.8%</td>
<td>4.0%</td>
<td>4.5%</td>
<td>4.6%</td>
<td>4.1%</td>
</tr>
<tr>
<td>Breast</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.4%</td>
<td>0.8%</td>
<td>1.5%</td>
<td>1.7%</td>
<td>2.0%</td>
<td>2.2%</td>
<td>2.3%</td>
<td>-</td>
</tr>
<tr>
<td>MR Spectro.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.2%</td>
<td>0.3%</td>
<td>0.3%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.0%</td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>4.3%</td>
<td>4.3%</td>
<td>1.1%</td>
<td>1.8%</td>
<td>2.5%</td>
<td>1.1%</td>
<td>2.8%</td>
<td>0.9%</td>
<td>0.7%</td>
<td>0.7%</td>
<td>0.0%</td>
</tr>
</tbody>
</table>

**Table 14: Total Utilization Annual Growth Rate by Body Section**

<table>
<thead>
<tr>
<th>Body Section</th>
<th>98-99</th>
<th>00-01</th>
<th>02-03</th>
<th>04-05</th>
<th>06-07</th>
<th>08-09</th>
<th>10-11</th>
<th>12-13</th>
<th>13-14</th>
<th>Total 97-14</th>
<th>Annual 96-14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head &amp; Neck</td>
<td>35.0%</td>
<td>4.0%</td>
<td>-3.6%</td>
<td>-1.3%</td>
<td>-2.9%</td>
<td>-3.7%</td>
<td>5.7%</td>
<td>4.0%</td>
<td>-0.1%</td>
<td>333%</td>
<td>5%</td>
</tr>
<tr>
<td>Chest</td>
<td>-3.4%</td>
<td>4.9%</td>
<td>-9.2%</td>
<td>21.5%</td>
<td>5.9%</td>
<td>4.6%</td>
<td>-58.5%</td>
<td>3.1%</td>
<td>73.9%</td>
<td>741%</td>
<td>9%</td>
</tr>
<tr>
<td>Spine &amp; Pelvis</td>
<td>28.0%</td>
<td>3.7%</td>
<td>-0.5%</td>
<td>2.5%</td>
<td>2.7%</td>
<td>4.8%</td>
<td>1.4%</td>
<td>4.3%</td>
<td>4.1%</td>
<td>413%</td>
<td>6%</td>
</tr>
<tr>
<td>Upper Exr.</td>
<td>33.1%</td>
<td>-0.4%</td>
<td>3.4%</td>
<td>-1.3%</td>
<td>14.0%</td>
<td>0.5%</td>
<td>5.7%</td>
<td>-19.2%</td>
<td>12.4%</td>
<td>681%</td>
<td>8%</td>
</tr>
<tr>
<td>Lower Exr.</td>
<td>33.1%</td>
<td>1.1%</td>
<td>16.9%</td>
<td>-0.2%</td>
<td>5.7%</td>
<td>0.5%</td>
<td>3.1%</td>
<td>8.7%</td>
<td>-10.4%</td>
<td>561%</td>
<td>7%</td>
</tr>
<tr>
<td>Abdomen</td>
<td>36.7%</td>
<td>-2.7%</td>
<td>24.6%</td>
<td>-2.8%</td>
<td>-12.4%</td>
<td>-1.4%</td>
<td>20.0%</td>
<td>4.9%</td>
<td>-5.5%</td>
<td>1222%</td>
<td>11%</td>
</tr>
<tr>
<td>Breast</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>66.0%</td>
<td>56.0%</td>
<td>23.9%</td>
<td>24.5%</td>
<td>15.1%</td>
<td>9.9%</td>
<td>630%</td>
<td>8%</td>
</tr>
<tr>
<td>MR Spectro.</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>6.2%</td>
<td>46.5%</td>
<td>-24.9%</td>
<td>-42.5%</td>
<td>57.1%</td>
<td>31.8%</td>
<td>-49.6%</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>-41.2%</td>
<td>69.4%</td>
<td>1.8%</td>
<td>26.4%</td>
<td>-78.7%</td>
<td>0.1%</td>
<td>1.0%</td>
<td>-0.6%</td>
<td>24.3%</td>
<td>--15.2%</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>19.4%</td>
<td>4.3%</td>
<td>2.2%</td>
<td>1.3%</td>
<td>1.7%</td>
<td>1.0%</td>
<td>3.8%</td>
<td>2.6%</td>
<td>5.2%</td>
<td>369%</td>
<td>6%</td>
</tr>
</tbody>
</table>

November 2015
Payer Analysis

Table 15 describes MRI utilization by payer by respondent type. Notably, both mobile and stationary hospital sites have a higher proportion of Medicaid-paid procedures than freestanding sites (12% for hospitals compared to 7% for hospitals (often due to insurance rules)

<table>
<thead>
<tr>
<th>Payer</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local Commercial</td>
<td>44%</td>
</tr>
<tr>
<td>Other Commercial</td>
<td>6%</td>
</tr>
<tr>
<td>Medicare Advantage</td>
<td>18%</td>
</tr>
<tr>
<td>Medicare</td>
<td>13%</td>
</tr>
<tr>
<td>Medicaid</td>
<td>9%</td>
</tr>
<tr>
<td>Medicaid (fee for service)</td>
<td>1%</td>
</tr>
<tr>
<td>Workman’s comp.</td>
<td>5%</td>
</tr>
<tr>
<td>Private Pay</td>
<td>1%</td>
</tr>
<tr>
<td>Others</td>
<td>1%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Table 16 provides information from the surveys on the proportion of MRI studies done on an outpatient basis. The overall proportion outpatient was near the lowest recorded, driven by continued declines in the use of hospital-based units for general outpatient exams. This may also reflect the effects of utilization management programs put in place by area insurance companies. These data are consistent with, and continually approaching national trends report by IMV that 78% of all MRI procedures are performed on an out-patient basis.

Table 16: Proportion of MRI Exams Performed on Outpatient Basis

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Fixed</td>
<td>84.8%</td>
<td>84.2%</td>
<td>81.8%</td>
<td>74.8%</td>
<td>80.7%</td>
<td>80.5%</td>
<td>77.3%</td>
<td>80.3%</td>
<td>77.3%</td>
<td>75.6%</td>
<td>74.4%</td>
<td>68.5%</td>
</tr>
<tr>
<td>Hospital Mobile</td>
<td>94.6%</td>
<td>94.1%</td>
<td>90.2%</td>
<td>94.2%</td>
<td>93.1%</td>
<td>92.1%</td>
<td>92.2%</td>
<td>88.9%</td>
<td>86.4%</td>
<td>93.9%</td>
<td>89.3%</td>
<td>97.7%</td>
</tr>
<tr>
<td>Freestanding</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>98.9%</td>
</tr>
<tr>
<td>Combined</td>
<td>89.7%</td>
<td>86.1%</td>
<td>91.5%</td>
<td>90.8%</td>
<td>89.6%</td>
<td>90.1%</td>
<td>87.7%</td>
<td>87.1%</td>
<td>86.8%</td>
<td>83.7%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the Finger Lakes Region, the percentage of MRI procedures done for Emergency Department patients accounted for 9% of the exams completed on stationary hospital units and approximately 1% of the exams completed on mobile hospital units. Overall, 4.5% of all MRI exams were completed on Emergency Department patients (data not shown). Only 15 hospital-based MRI units reported ED percentages (83% of responding hospital units).
Section Four: Capacity Analysis

Use Rate per Capita

The analysis presented in this report has been a “demand” analysis: Given the current use or demand for MRI studies, how many units of capacity are needed? This assumes that all current use is clinically appropriate. That question is a clinical one, not within the FLHSA’s jurisdiction, but perhaps addressed by the existing clinical and financial controls. We can get a glimpse, however, of whether the area’s population is using more or less MRI service than the U.S. by comparing our use rate per capita to that of the entire country.

The 2014 MRI Benchmark Report provides the needed data for this analysis. In its report, IMV uses the data from approximately 8,105 hospital and non-hospital sites to extrapolate nationwide utilization rates for procedures performed through 2014.

Since 2004, the Finger Lakes Region’s per capita rate has remained below the national utilization rate. With 95.7 MRI procedures per 1000 population in 2014, the Finger Lakes region is below the 2014 U.S. average of 109.4 scans per 1000 population.

In its 2014 report, IMV did not provide state-by-state estimates of MRI use. Thus, one can only compare regional use rates to national rates. While our regional rate has increased, it has done so more slowly than at the national level: Since 2008, our regional use rate has increased by 18%, while the national rate has increased by 21%.

MRI Utilization Rate
Finger Lakes & U.S.

<table>
<thead>
<tr>
<th>Year</th>
<th>U.S.</th>
<th>Finger Lakes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>90.15</td>
<td>80.85</td>
</tr>
<tr>
<td>2010</td>
<td>95.87</td>
<td>83.68</td>
</tr>
<tr>
<td>2012</td>
<td>101.58</td>
<td>88.16</td>
</tr>
<tr>
<td>2014</td>
<td>109.45</td>
<td>95.37</td>
</tr>
</tbody>
</table>

*Figure 6: MRI Use Rates Per Capita*
Need for MRI Capacity

Based on the current MRI utilization (122,170 total scans) within the Finger Lakes Region, it is possible to estimate future need for Monroe County, the Central Finger Lakes, and the Southern Tier.

Assuming various projected increases, MRI need for 2015 and 2016 would not surpass current operational and approved capacity for the 38.0 existing machines in the region. The current operational capacity and projected need for Monroe County, the Central Finger Lakes and the Southern Tier are presented in Figures 7-9. As illustrated in Figure 7, the only subarea that may approach current capacity is Monroe County: At standardized current capacity of 98,000 total scans, the 2016 maximum projection totals 93,924 scans assuming a highly unlikely annual growth rate of 12.5% per year from the 2014 total. The Central Finger Lakes is well within its current capacity in 2016, with a maximum of 15,720 projected scans versus a standardized current capacity of 21,000 scans. The Southern Tier is also projected to be within current capacity in 2016, with 24,477 scans projected as the maximum for 2015 and a capacity of 31,475 scans in the subarea. It is unlikely any additional capacity will be required in the next few years.

Figure 7: MRI Capacity and Projected Need: Monroe County
Figure 8: MRI Capacity and Projected Need: Central Finger Lakes

Figure 9: MRI Capacity and Projected Need: Southern Tier
Section 5: Claims Data

As part of the Agency’s ongoing effort to increase the amount of data available to the community, a multiple payer claims database has been developed with support of the primary commercial payers in the region. For the second year we are reporting aggregated claims data for MRI utilization. The aggregated claims account for approximately 50% of the Finger Lakes population and do not include data for Medicare and Medicaid Fee for Service patients.

"Est. Services" accounts for multiple claim lines associated with unbundled claims (professional and technical components billed separately).

Figure 10: Claims utilization for the Finger Lakes Region, 2010-2013
Generally, the utilization in the claims data has remained stable in the past several years (data prior to 2010 are not available). Variations in the trend may be due to the variation in patient demographics not represented in the claims data. Future work should incorporate claims data in order to increase the specificity of the analysis and assist in planning programs.

**Figure 11: Percent change in utilization, year-to-year, 2010-2013**

**Figure 12. MRI Util. by Product Type**
Section 6: High Field Strength and Ultra-High Field Strength MRI

Throughout the most recent decade, 3.0T MRI’s have become more pervasive and have demonstrated advantages to the 1.5T machines in numerous aspects, including better images and shorter scan durations. Most recently, 7T MRI are being researched to determine whether the increasing the strength of the magnet will have a significant clinical benefit.

High Field Strength – 3.0T

Any unit with magnet strength greater than 1.5T is considered a high frequency MRI Unit. The majority of commercially available units in this range are 3.0T. There are currently eight 3.0T MRIs operating in the Finger Lakes region. Utilization on these machines accounted was 28,000 scans in 2014 (22.9%). The breakdown of the scan location is in Figures 12 and 13. Of note, brain and head scans and MR spectroscopy represent slightly higher proportions of the 3.0T utilization than non-3.0T units.

3.0T magnets have demonstrated clinical advantages over lower strength units for both angiography and neurological applications due to the increase in resolution possible with the higher field strength. In general, the higher field strength allows for greater anatomic resolution which may result in the clinical benefit of identifying abnormal tissue that may go undifferentiated at lower field strengths.

![Non 3.0T Scan Clinical Target](image)

*Figure 13: Clinical location percentages of non-3.0T MRI utilization*
7.0 Tesla MRI scanners are being utilized in research capacities in an increasing number of academic institutions across the United States and worldwide. These machines are demonstrating some potential advantages over machines with weaker field strengths, specifically in the fields of neurology and cardiology. However, there are still numerous technical, safety and economic barriers to overcome. Any current utilization should be considered experimental pending FDA 510k approval of a 7.0T MRI. Should approval be granted, needed capacity should be determined based on only those indications where additional clinical advantage is proven over current, less powerful units.

Prudent healthcare planning involves balancing cost with patient experience and outcomes. Given that local capacity studies demonstrate system capacity to absorb additional scans over the next several years, even at aggressive trend rates, it does not seem efficient to increase the number of total MRI scanners within the region. However, as research continues on 7.0T machines, patients receiving scans that may have been performed at lower field intensities may be better served with a stronger field MRI.

Therefore it is the recommendation of this agency that pending FDA approval of a 7.0T MRI for clinical use, needed capacity should be determined based on only those indications where additional clinical advantage is proven over current, less powerful units. Once approved, because of the limited indications for 7.0T, it would be advised that CTAAB petition for requests to replace an existing 1.5T or 3.0T MRI with a 7.0T scanner. CTAAB would be provided with the opportunity to weigh the various merits and detractions from multiple applicants and provide the community with the most efficient placement of a 7.0T MRI, both in terms of cost and care quality.