It may be hard to imagine getting excited about data of any kind, but there is a relatively new type of market data that deserves your attention. Perhaps it would pique your interest to know that this data could help you gain insight into clinical outcomes for a procedure, before initiating clinical trials. Or would you be interested if this data could provide quantifiable insights on economic outcomes to share with providers and payers? What if it could help you see trends in procedure volume or utilization with only a few months’ time lag? This article will highlight some of the valuable insights you can achieve, while helping alert you to some potential issues as you take your first steps with patient-level data.

A new type of market data deserves your attention—for early insight into economic and clinical outcomes, as well as procedure utilization trends.

While the use of procedure data is common in the medical device industry, it is not always current or detailed enough to adequately answer the increasingly complex marketing and sales questions faced by these companies. Patient-level data has recently emerged with the potential to provide significant benefit to companies that know how to harness it. The complexity and the cost of the data, however, have the potential to create many headaches for companies that are not well prepared to take on the challenge.

Patient-level data captures the details of an individual patient’s experiences in a hospital or a healthcare system. This data is
provided by a variety of vendors in different formats and levels of granularity, and can include many of the details commonly captured in a medical claims form. This detail can include the patient’s diagnosis, procedures, prescriptions, physician visits, hospital visits/admissions and lab tests. Although patient identity is not provided, to ensure HIPAA compliance, a patient-specific ID allows individual patients to be tracked over time and across care settings.

The ability to track different patient populations over time can answer many questions for medical device companies (see Table 1). The most promising applications include early insight into economic and clinical outcomes, as well as procedure utilization trends. While patient-level data won’t replace randomized, double-blinded clinical trials or detailed clinical registry databases, it can be a powerful tool for economic value proposition development as well as planning and designing more appropriate clinical studies. Some of these applications are explored in more detail below.

**Economic and clinical outcomes**

Because patient-level data tracks many healthcare interventions associated with a given patient, companies can use this data to understand intervention costs as well as certain clinical outcomes associated with specific patient populations. Depending on the data source, this information can be tracked to a hospital visit (e.g., studying the length of stay, complication rate, and total costs associated with patients who receive different treatments/procedures for the same diagnosis) or across care settings (e.g., assessing the total costs and clinical outcomes associated with patient populations who receive a surgical intervention vs. drug treatment for a specific diagnosis).

This type of analysis can be expanded to assess which sub-populations of patients have better outcomes when receiving a specific procedure. Such insights can be used to help payers and providers target patients most likely to benefit from a specific procedure. Similar analysis can be implemented with patient-level data to identify appropriate customer segments for targeted sales force or marketing campaigns and clinical education programs.

**More timely and granular data**

Some common frustrations that companies have with account-level procedure data are the time lag, as it is often one to two years old, and its bias toward elderly patients, because it is primarily sourced from Medicare claims data (i.e., MEDPAR data). These data issues can create a marketing analysis challenge, especially for companies in rapidly growing or volatile markets, or for products focused on younger patients. With patient-level data, the time lag can be reduced to as little as one to two months, and there are fewer biases. This allows companies to get closer to real-time views of trends in procedure volumes, across a much wider spectrum of patients.

<table>
<thead>
<tr>
<th>Level</th>
<th>Outcomes</th>
<th>Across care settings</th>
<th>Utilization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account (hospital, physician office, etc.)</td>
<td>Do accounts using procedure XX for a patient group have a shorter length of stay?</td>
<td>Do accounts using procedure XX see fewer complications?</td>
<td>Is our procedure used in similar ways across different account segments and how has this evolved over time?</td>
</tr>
<tr>
<td>Physician specialty / department</td>
<td>Are costs or length of stay in department YY lower for patients using procedure XX?</td>
<td>Do patients receiving procedure XX by a YY physician have different outcomes?</td>
<td>What is the importance of different physician specialties for procedure XX and how is this evolving?</td>
</tr>
<tr>
<td>Patient</td>
<td>Is there lower mortality for patients using procedure XX?</td>
<td>Do patients receiving procedure XX require less follow-up medical intervention?</td>
<td>How is the patient population that receives this procedure evolving?</td>
</tr>
</tbody>
</table>

Table 1. Examples of typical patient-level data applications

![Figure 1](image-url) Confounding factors must be considered in patient-level analysis
Another frustration with account-level procedure data is that it lacks information to identify which physician specialties are driving procedure volumes. Patient-level data solves this problem because it tracks information such as the specialty of the physicians performing the procedures, thereby revealing a better understanding of which specialties are driving specific procedures.

### Challenges to consider

One challenge with patient-level data is that only some of the data sources identify the specific hospital or physician associated with a claim, making it sometimes more difficult to use for applications such as sales force deployment or targeting. However even when this information is not available, some data vendors maintain the raw underlying patient-level data, and can often process the data in advance to provide segment-level aggregated data for targeting or deployment analysis (e.g., procedure utilization for a company's customers vs. non-customers), while maintaining HIPAA compliance.

Another challenge is setting up the analysis to manage the complexity of the data. Without careful planning and statistical analysis, you run the risk of developing erroneous or misleading results. Figure 1 illustrates the difference in outcomes when an analysis was conducted with and without the control of confounding factors.

Once you commit to using patient-level data, you will need to navigate the various options available to determine the most appropriate vendor and type of data to use. Investigating the data currently available for purchase in this space can be overwhelming. There are many different patient-level data vendors and data options to explore, and compared to the relatively limited account-level procedure data offerings that many medical device companies currently pursue, the options are also far more complex.

One of the drivers of this complexity is the variety of options for sourcing the data. Claims and charge master data are the most common sources, each of which provides different levels of detail and perspectives to understand patient-level dynamics (see Table 2). For example, claims data can provide patient-level procedure and cost information across multiple care settings, but provides little information about details of a hospital stay, such as lab tests and ancillary services provided. Meanwhile, charge master data can provide itemized information about a patient’s entire hospital stay, but does not capture post-discharge activity in outpatient care settings.

Another source of complexity is the variety of data products that different vendors offer. Data can be provided for practically any time period (e.g., month, quarter or annual), different durations (e.g., last quarter or last two years), and can be rolled-up at different levels (e.g., patient type, physician specialty, hospital segment or geographic region). Before initiating discussions with a vendor, therefore, it is critical to have a good idea of the questions that need to be answered and the level of detail required. For example, investigating the general volume trend of a specific procedure among interventional cardiologists over the past few years can likely be accomplished with a limited extract of rolled-up specialty-level data, while investigating the clinical outcomes of a recently introduced product line may require purchasing a large volume of significantly more expensive raw patient-level data.

This leads us to a final important consideration regarding costs. Patient-level data can be significantly more expensive for companies to acquire than traditional account-level procedure data. Medical device companies

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Care Settings</th>
<th>Timeframe</th>
<th>Availability</th>
<th>Data Coverage</th>
<th>Highlights &amp; Possible Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical / Hospital claims (payer sourced)</td>
<td>All – retail Rx, offices, hospitals, other medical service providers</td>
<td>Multiple years</td>
<td>Monthly (3-6 month lag)</td>
<td>Moderate Rx, Mx &amp; Hx</td>
<td>Patient procedure and Rx information across care settings&lt;br&gt; • Product user profiles&lt;br&gt; • Possibly MD profiles&lt;br&gt; • Long-term economic and clinical outcomes&lt;br&gt; - Costs before/after product use&lt;br&gt; - Long-term complications&lt;br&gt; • Treatment pathways&lt;br&gt; • Payer demographics&lt;br&gt; • Patient compliance</td>
</tr>
<tr>
<td>Medical / Hospital claims (switch sourced)</td>
<td>All – retail Rx, offices, hospitals, other medical service providers</td>
<td>Multiple years</td>
<td>Monthly (1-2 month lag)</td>
<td>High Rx, Low Mx &amp; Hx</td>
<td>More recent data, but may not be complete for each patient&lt;br&gt; • Procedure utilization trends&lt;br&gt; • Possibly MD profiles</td>
</tr>
<tr>
<td>Charge master</td>
<td>Hospital – inpatient &amp; outpatient</td>
<td>Duration of patient hospital stay</td>
<td>Monthly (6 month lag)</td>
<td>High Rx, Mx &amp; Hx within member hospitals</td>
<td>Detailed patient information within a hospital stay&lt;br&gt; • Shorter-term clinical outcomes&lt;br&gt; • Hospital profiles (patient types, procedure types)</td>
</tr>
</tbody>
</table>

Note: Rx = Prescription claims, Mx = Medical (physician office) claims, Hx = Hospital claims

Table 2. Characteristics of patient-level data
that opt to purchase and analyze larger data sets in-house will also be burdened by additional internal expenses to support expanded computing power and disk space, as well as human capital (skills and experience) needed to capitalize on the value that this data can provide.

**Conclusion**

Despite the challenges, complexities and costs of patient-level data, there are many strong arguments in favor of its use. Although not a substitute for clinical studies, it is hard to overstate the potential value of patient-level data for identifying preliminary compelling clinical and/or economic outcome messages which may not otherwise have been identified, or that might have been significantly delayed. Similarly, tremendous value can be achieved from improving the efficiency of sales force and marketing campaigns by implementing better targeting strategies based on improved hospital, specialty and patient segmentation, as well as improved knowledge of patient flows. All of these outcomes can easily outweigh the costs and effort of taking the next step with patient-level data.

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