Five examples of Using Integrated Data to Understand Drug Performance

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Introduction

Life sciences companies face greater competition at every turn, with every new launch, label expansion and generic entrant to the market. Understanding where your product fits, and how it can best stand out in a crowded field, requires a clear picture of the market landscape. Equally important is the need to continue to understand patient outcomes, adherence trends and other research-related patterns once the drug is out in the market.

Real-world data that integrates claims and electronic health records (EHR) data can empower both commercial and research teams to uncover hidden intelligence and turn insights into action in today's crowded market.

And there's no better way to show the power of integrated data than to look more closely at the data itself. What follows are five examples of the types of analysis possible and the value they can offer for your next research project or market analysis.

Use Case 1: Improving medication adherence for your brand

Most medication adherence studies start by observing when a patient began taking a medication and if they take the medication correctly. However, the story actually begins earlier, in the provider's office, when the decision is made to prescribe a medication in the first place.

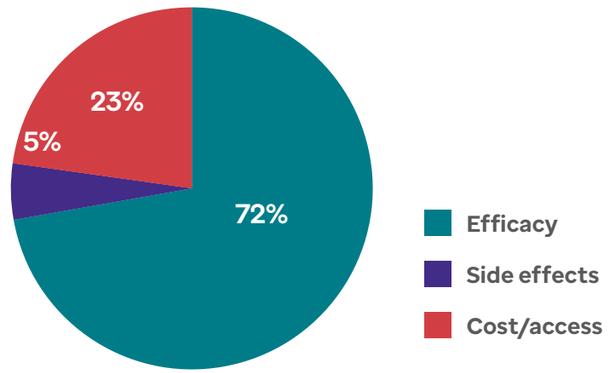
Real-world data allows you to look at both points in time. In the EHR data, you can see the written prescription, which provides insight into the physician's intent. And filled prescriptions can be seen via claims data, which confirms that the patient has the medication in their possession and it offers a more complete view into dosing and quantity metrics. This has been difficult to estimate at scale in the past due to limited data.

The graphic below *(Figure 1)* illustrates how integrated data allows us to see the pathway of a prescription from inception to adherence to switching or discontinuation, using psoriasis as an example.

Figure 1

HCP writes Rx	Rx presented at pharmacy	Utilization management (PA, SE, etc.)	Rx filled	Rx picked up by patient
Cosentyx 301	75%	12%	63%	62%
Stelara 432	82%	12%	70%	67%
Dupixent 119	77%	10%	67%	64%

Reasons for discontinuation – Biologic



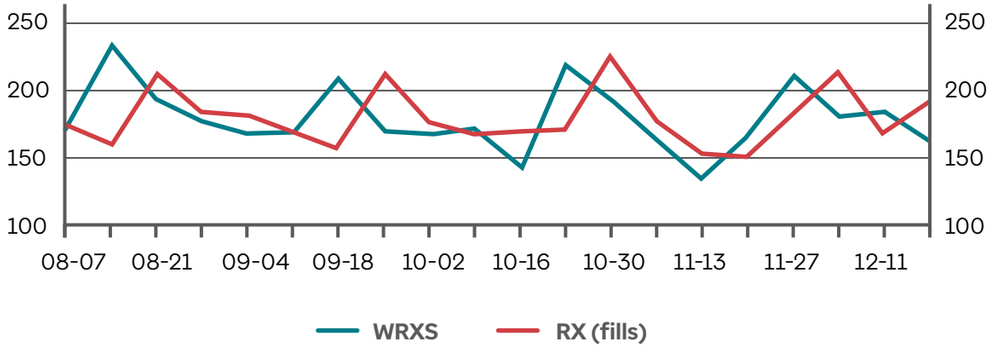
We can see the physician's intended treatment for that patient from the EHR data. Then the claims data allows us to cycle through the administrative process of filling the prescription from the point of presentation, utilization management programs and the fill and subsequent pickup by the patient.

The claims portion of the data then allows us to track subsequent adherence, and if treatment changes do occur, the EHR portion gives us reasons for change, such as the example in the lower right of the graphic.

Having insight along this pathway offers many opportunities for providers, payers and life science companies to develop and target programs to maximize the number of patients who fill their prescriptions and maintain adherence.

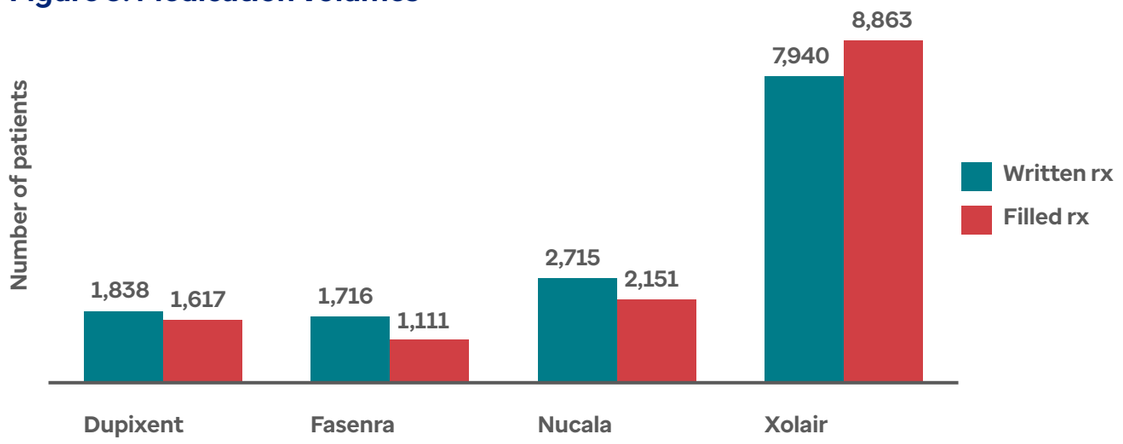
The example illustrated in *Figure 2* offers another perspective provided by integrated data. The lines represent both written prescriptions (WRx) and filled prescriptions for a diabetes drug. In this case, the gray line provides a five- to seven-day advanced view of the drug's performance.

Figure 2: Lead-lag effect for DPP-4 inhibitor



This same data allows researchers and marketers to confirm that patients are on the therapy prescribed as it applies to medication adherence. This is illustrated in *Figure 3*. It shows primary adherence. That is the number (or rate) of patients intended to be treated for a condition actually getting treated within a reasonable time of diagnosis, which has been difficult to estimate at scale in the past due to limited data availability.

Figure 3: Medication volumes



*Xolair was the first biologic to market, gaining FDA approval in 2003.

Use Case 2: Defining patient cohorts for clinical research

Another way to demonstrate the value of real-world data is to show how it can be used to create a patient cohort.

All research begins with an identification of the inclusion and exclusion criteria that will be used to draw conclusions and make sound decisions.

When using asthma as the therapeutic area, we can identify more than 4 million patients in the EHR data, with 3.2 million of them having linked claims data. As you can see in the following table, the data is very representative demographically of the data from the Centers for Disease Control (CDC). This is a direct result of claims data from all payer types being included in the data set.

	Optum EHR data	CDC national data*
Sex		
Male	37%	40%
Female	63%	60%
Age		
0–4 years	4%	3%
5–14 years	13%	14%
15–19 years	6%	9%
20–24 years	6%	7%
25–34 years	13%	12%
35–64 years	41%	39%
65+ years	17%	16%

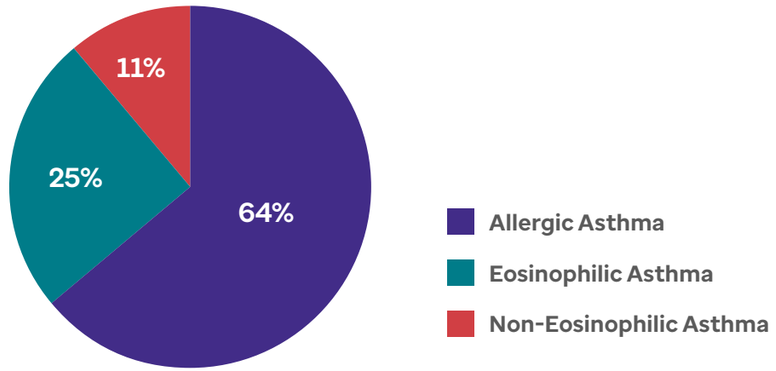
*https://www.cdc.gov/asthma/most_recent_national_asthma_data.html.

Drilling down even further, you can identify three kinds of severe asthma in the data: allergic, eosinophilic, and non-eosinophilic. See *Figure 4*.

These severity types are extracted from clinically rich and specific EHR data. For example, eosinophilic asthma is clinically defined as a patient who has an eosinophil lab greater than 3% or greater than 500 cells/mcL. In addition, allergic asthma can be identified by positive mentions found in the physician notes.

The clinical data in the EHR contains specificity needed to accurately segment and select the appropriate sub-group in a disease area. In many diseases, labs, clinical measures and the physician's notes contain the information needed to define patient cohorts. This richness of data allows researchers to have greater confidence in the patient cohorts they are studying and avoid delays caused by insufficient sample sizes at a study's inception.

Figure 4: Severe asthma sub-type

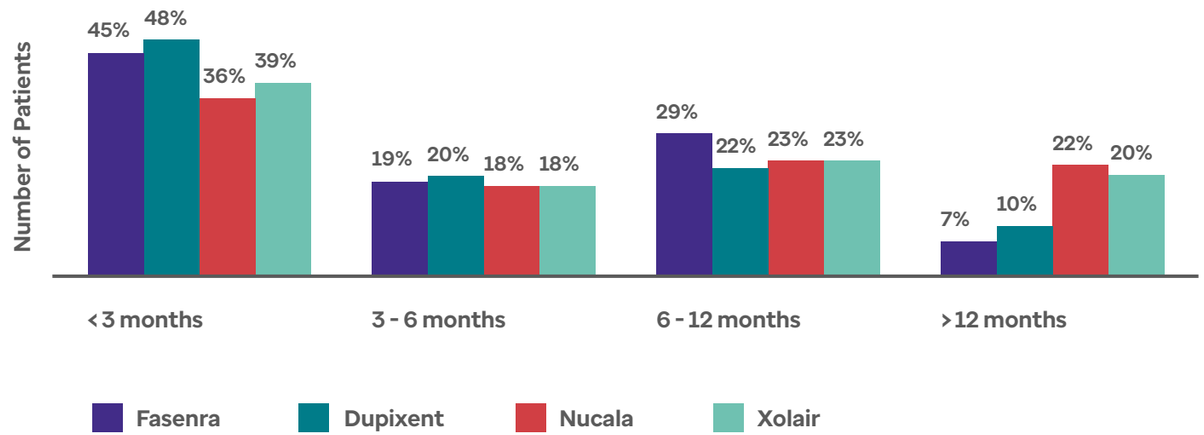


Use Case 3: Understanding the length of time on therapy and line of therapy patterns

Another example of the power of integrated data is the ability to calculate how long a patient has been on a particular therapy. See *Figure 5.* This is also an area where the longitudinality of this data and the benefit of eligibility controls become evident. Using eligibility controls ensures that you can be confident that the patient stopped the medication, rather than changed health plans by switching employers or moving across the country.

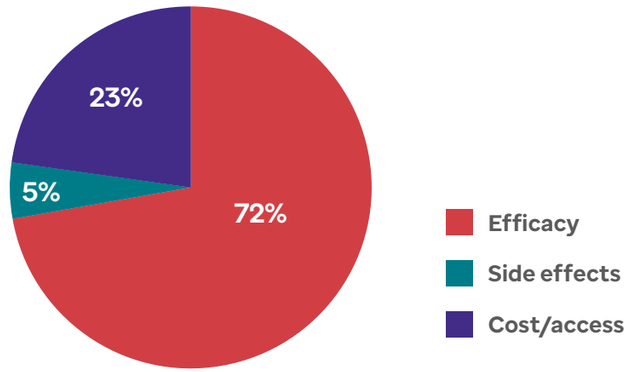
And by leveraging the claims data with the EHR data, researchers can determine the reasons for the switch from one drug or therapy to another. This would enable the development of strategies to minimize switching away from the medication or maximizing switches to the medication. Claims can tell us when the switch occurred while the EHR data can help us determine why the drug was discontinued.

Figure 5: Duration of time on therapy



What is clear is that the No. 1 reason is typically efficacy, followed by cost or access, and finally side effects *(Figure 6)*. Ultimately, the analysis leverages the combination of claims and EHR data that enables these discoveries. Claims data enables researchers to more accurately assess duration and frequency of treatments, while the physician notes provide insight into reasons for discontinuation/switching.

Figure 6: Reasons for discontinuation – Biologic



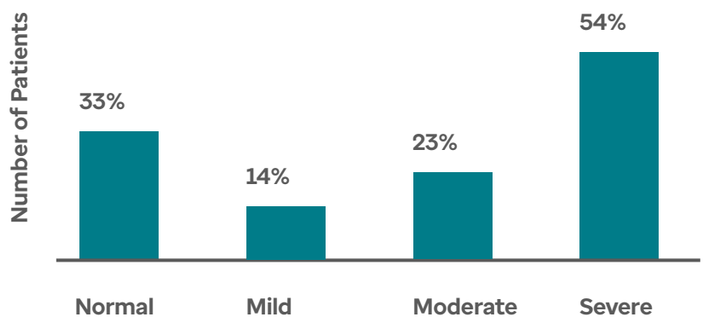
Use Case 4: Clinically profiling patients

Identifying what type of patient began therapy, and when they first began it, can also give researchers and marketers valuable insights. This is another area where eligibility controls in claims data can help identify the exact point in time when a patient initiated a therapy. Then EHR data can be leveraged to characterize the clinical status of the patient at initiation. For example, FEV1, a clinical measure used to assess clinical status for asthma patients, can be extracted from EHR data using a technology and expertise called natural language processing (NLP), as shown in *Figure 7.*

Here's how this works: FEV1 and other clinical measures are extracted from the physician notes, which provide a source of rich clinical information to assess condition severity.

This is an example of how researchers can use the combination of claims and EHR data to identify the severity levels of patients taking a particular brand. Now that we know this, it becomes possible to conduct comparative effectiveness studies that control for disease severity for a clearer picture of product impact.

Figure 7: FEV1 Category prior to biologic initiation

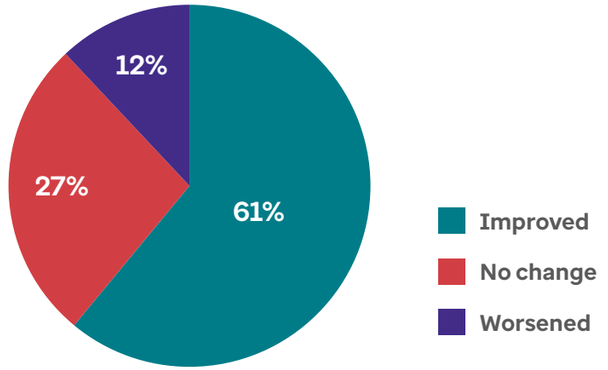


Now, let's explore how you can follow up with these patients to see patterns and track outcomes.

You can follow the same patients for 12 weeks after treatment began, looking for another FEV1 value that can be leveraged. And you can see the results here in *Figure 8*. This is only possible if the data you are working with is longitudinal in nature. It allows us to see the real-world effectiveness of a new treatment over time.

The potential exists with this data to publish a study showing very positive outcomes and even establish a new label claim. The potential also exists to do a comparative effectiveness analysis with competitor drugs for an even better story.

Figure 8: Change in FEV1 at 12 weeks post treatment initiation

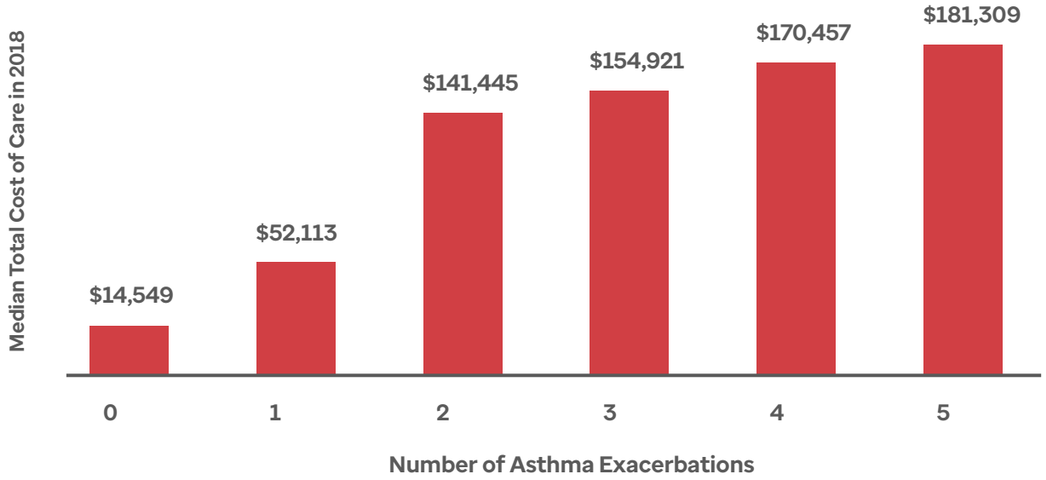


Use Case 5: Taking into consideration the total cost of care

One of the most valuable aspects of this kind of data is linking directly to the cost of care. Here, in *Figure 9,* you can track asthma exacerbations and follow disease burden or cost of care based on the number of exacerbations.

This shows how uncontrolled asthma impacts the health system, using both claims and EHR data points. Linking the two kinds of data allows for analyses that measure the cost impact segmented by a clinical category. In an uncontrolled setting, patients with uncontrolled eosinophilic asthma who have more asthma-related exacerbations tend to have a higher cost burden on the health care system.

Figure 9: Cost burden of asthma exacerbations in an uncontrolled eosinophilic asthma



Summary

These examples really just scratch the surface of what is possible with integrated claims and EHR data. It is clear that both marketers and researchers should be able to reap the benefits of this data in many different ways.

All were taken from the Optum® Market Clarity data set. Market Clarity brings together claims and clinical data, advanced analytics and expertise in one place. To learn more, reach out to your client executive directly or contact us at **optum.com/lifesciences** to start the conversation.

This table offers a quick summary of the data used in each use case:

	EHR	Claims	Integrated
Use Case 1: Improving medication adherence for your brand			●
Use Case 2: Defining patient cohorts for clinical research	●		
Use Case 3: Understanding the length of time patients stayed on therapy		●	
Use Case 4: Clinically profiling patients	●		
Use Case 5: Taking into consideration the total cost of care			●

Optum Market Clarity Data:

- Includes 150 national and local payers
- Allows for larger sample sizes with more than 60 million lives
- Spans all care settings
- Is longitudinal, with data back to 2007
- Is a closed system that is eligibility-controlled

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