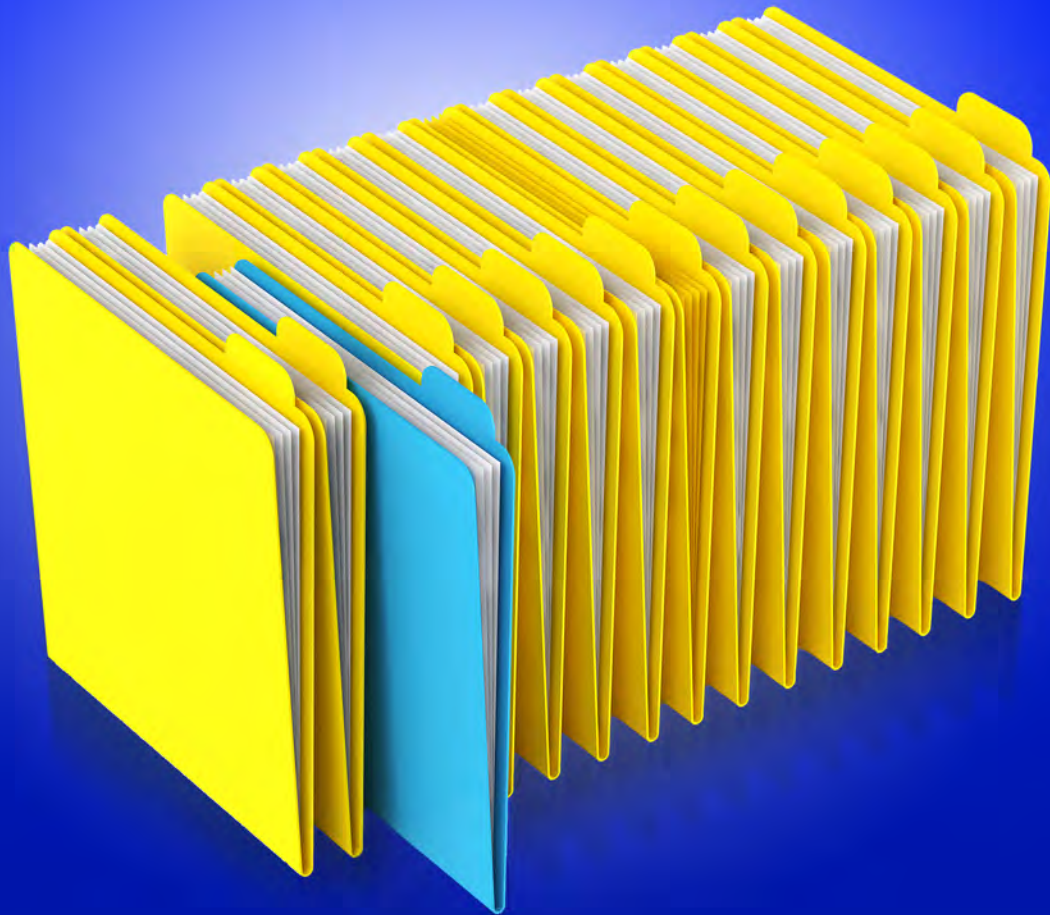


# Administrative Healthcare Data

A Guide to Its Origin, Content, and Application Using SAS®



Craig Dickstein and Renu Gehring



From *Administrative Healthcare Data*. Full book available for purchase [here](#).

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## Chapter 1: The U.S. Healthcare System

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### Introduction

The U.S. healthcare system is massive, multifaceted, and complex. So is the data that it produces. Your annual visit to the doctor generates data. If you are insured, a form of this data makes its way to your health insurance company, which reimburses your doctor for your care. When you pick up a prescription at your local pharmacy, another type of healthcare data is created. If you give birth at a hospital, the hospital produces yet more data. The insurer houses even more data—providers, benefit structures, and membership all contribute data content to the success of the total business operation.

This book focuses on healthcare data as experienced by a health insurance company. The data is the product of financial reimbursement for health care services. Commonly referred to as administrative healthcare data, it is the result of the relationships among providers, recipients, and payers of health care services. From birth to death, you are generating administrative healthcare data through your interactions with the provider community and your insurer. If you have ever been to a doctor’s office, admitted to a hospital, or covered by an employer healthcare plan, then you already have a rudimentary understanding of the material addressed by this book. A comprehensive understanding of this data is a prerequisite for any analytics.

This book explains the source and content of administrative healthcare data and its related management. It illustrates concepts with actual healthcare case studies. Sample data is created in such a way that it closely simulates real healthcare data. All applications are created with SAS Enterprise Guide and Base SAS, which is further described in Chapter 2. They can be lifted straight from the book and put to use immediately.

This book is intended for the programmer/analyst charged with the analysis of administrative healthcare data. You will learn about how the data originates, what it contains, and best practices for programmatically managing this data. This book will give you the solid foundational knowledge to be a successful healthcare data analyst. This book is not intended to teach healthcare data analytics or analytical programming; that would be the next step in the readers’ learning path.



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## Data and Programming Used in This Book

This book uses a fictitious insurance company, Healthy Living, Inc., to illustrate concepts of administrative healthcare data. The company's primary business is to pay medical claims to providers for services rendered to the company's insured members. As a result, Healthy Living, Inc., is the custodian of several large sources of post-adjudication data originating from institutional, professional, and ancillary providers.

Through the use of SAS Enterprise Guide, this book shows you how to build a number of analytical applications of Healthy Living, Inc.'s rich administrative healthcare data. Some key applications include:

- C-section rates across various hospitals
- Top reasons for emergency room (ER) utilization
- Outreach reports identifying children who miss their checkups
- Identifying patients who do not adhere to their medication regimes
- Reporting on key financial metrics

This book is intended for the healthcare analyst regardless of his or her level of proficiency with SAS Enterprise Guide or SAS programming. As a result, SAS code shown throughout the book is deliberately kept at an accessible level. This approach allows the healthcare analyst who is new to SAS to understand the programming techniques shown in the book. The advanced SAS programmer analyst also benefits from the simplified coding approach as they may add complexities and efficiencies to suit their purpose.

---

## Terminology

Language is so important. It is difficult to run a data analysis project if the team members are not speaking a common language, defining terms in the same way, or deriving information with agreed upon algorithms. Terminology and language are of the utmost importance in the discussion and analysis of administrative healthcare data.

Every project should start at the whiteboard and not on a keyboard. Begin by defining common goals, terminology, and methodology. If the goal is to arrive at utilization metrics for office visits per member per year, how are we to define an office visit, a member, a year? You would be surprised at the variety of possible results when everyone is not on the same page.

The importance of getting the terminology on a common plane cannot be underestimated. It is okay to define an office visit by Place of Service *or* by CPT® code (Common Procedural Terminology). But it is not okay to define it both ways in the same project. Spend the time to get it right among the project team.

Table 1.1 defines some terms that will be used synonymously in this book to describe certain concepts.

**Table 1.1: Synonymous Terminology**

<b>Concept</b>	<b>Synonymous term</b>
Beneficiary of medical services	patient, member, recipient
Supplier of medical services	provider, practitioner
Reimbursing of service cost	payer, insurer, managed care organization (MCO), health insurance plan
Medical claim	encounter, claim
Visit	episode of care, encounter

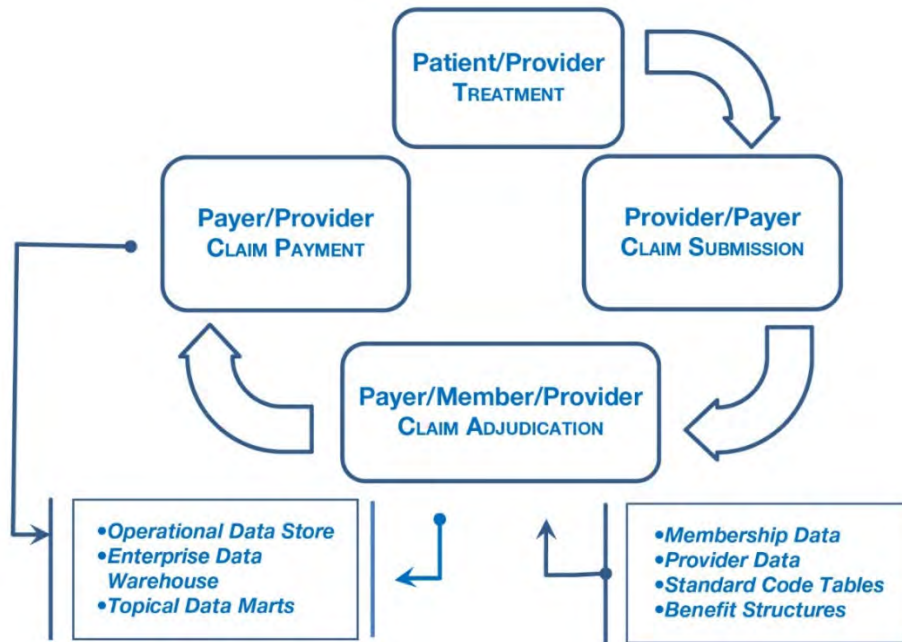
What is the difference between “health care” and “healthcare”? In this book, we will use the two-word phrase to describe the actions of the provider—a well-child checkup is health care. The phrase is an adjective modifying the noun. The single word we will use to describe the system as a whole—healthcare data, healthcare policy. It is generally used as an adjective.

## Flow of Administrative Healthcare Data

The U.S. healthcare system is rife with stakeholders and unique relationships among them. To understand the flow of administrative healthcare data you need to understand those relationships and the supply chain that results in the data available to healthcare analysts. If this sounds simple, apologies; it is not!

Think about the flow of data from a provider perspective. The provider interacts with a patient (the insured member), initiating the gathering of information that is needed for the accurate and timely reimbursement by the payer for the services rendered. In a fee-for-service (FFS) model, the provider submits a claim to the payer for reimbursement. In a capitation model, a “medical claim” is still submitted, but only for the purpose of data collection, not actual payment. The payer then adjudicates the claim based on additional information about the member and the provider, resultant data is moved to an operational data store, and the member is notified of any out-of-pocket expenses for which they are responsible. Figure 1.1 graphically describes these important relationships. Reimbursement models will be discussed in Chapter 3.

Figure 1.1: Industry Relationships Drive the Movement of Administrative Healthcare Data



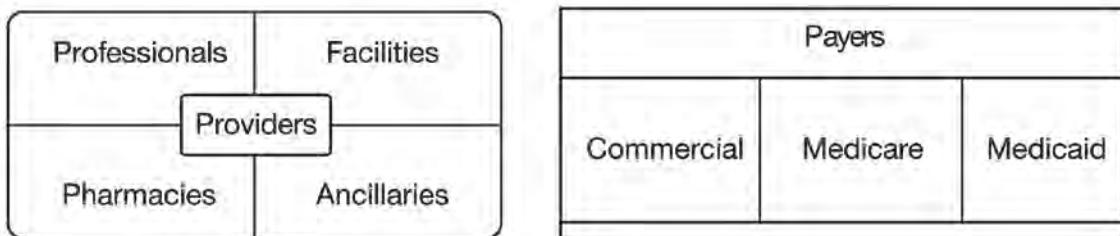
## Key Players

One way to conceptualize the data origin is from a provider orientation. They initiate the data flow and, depending upon the provider type, use different claim submission mechanisms and provide different data elements. As Figure 1.2 illustrates, there are only four provider types—Professionals, Facilities, Pharmacies, and Ancillaries. These will be discussed in detail in Chapter 4.

There are three types of payers—Commercial, Medicare, and Medicaid. More on these in Chapter 3.

Policy makers, legislators, and regulators have a significant impact on the behavior of the above mentioned key players. Their role, while very important, will not be discussed in this book.

Figure 1.2: Industry Payers and Providers



## Medical Claim Submission

The mechanism by which providers submit reimbursement information to payers has changed dramatically in the past few decades. Initially it was a paper-based system, with those forms and formats improving over time. Many commercial payers with tech-savvy decision makers then worked with their provider community to implement electronic data interchange (EDI) formats for the transmittal of medical claim information. These local initiatives to move away from paper-based instruments provided very efficient processes. With the

implementation of the Health Insurance Portability and Accountability Act of 1996 (HIPAA), yet greater strides were made in the efficient and effective submission of claims information. HIPAA mandated the use of clearly defined electronic formats under “Title II: Administrative Simplification,” reducing over 400 EDI formats to a standard set of less than a dozen that are used by all providers and payers.

The form and format of the data transmittal differ slightly depending upon provider type. Professional and Ancillary providers use the CMS-1500 paper form or its electronic counterpart, the 837P format. Facilities use the CMS-1450 paper form or its electronic counterpart, the 837I format. Pharmacists, who have been electronic seemingly forever, use the National Council for Prescription Drug Programs (NCPDP) electronic format.

Despite the HIPAA mandate driven by compliance dates, paper forms are still being used in a limited way. We need not discuss the reasons for this here, but suffice it to say that you may see reference to paper forms for the foreseeable future.

---

## Claim Processing

In Figure 1.1, consider the processes by which the payer receives, processes, and provisions administrative healthcare data. The figure suggests a complex relationship of data elements, both at the source and at the target. There are quite a few moving parts and pieces to consider. For analysts, the data source is typically the Enterprise Data Warehouse (EDW) and/or its many progeny, but for the payer enterprise it is a variety of claims and provider, member, and organizational policy information. Operational data sources reside (and are managed) in the EDW—membership, provider, and plan benefit data are all maintained as current by various departments within the health plan. It is this operational data that is necessary to accurately process inbound claims so that resultant adjudicated claim information is accurately stored in the EDW. The thoughtful analyst will understand how the data moves within the payer organization.

Adjudication, by definition, is “the act of pronouncing judgment based on the evidence presented.” Medical claims adjudication is the process by which claims for reimbursement, as submitted by the provider (or patient), are processed into a payment transaction. The “evidence presented” comes in the form of membership, enrollment, and eligibility information; provider enrollment and contractual information; and the submitted claim describing the services rendered. The “judgment pronounced” is the payment made to the provider on behalf of the insured member. The complexities of an adjudication system are not within the scope of this book, but grasping the concept, with its input and outputs, is a key building block in our foundational knowledge.

Also not within the scope of this book is the notion that there is a strong relationship between a benefits structure, service costs, and insurance premiums. At the risk of defending insurance companies, it is fair to say that, in a simple fee-for-service model, insurance companies are a pass-thru facilitator for reimbursement, from member funds, of incurred provider service cost. Having said that, the insurer does have to make a profit on its business investment and, at the same time, be a contending player in the marketplace. A managed care, performance-based, or negotiated fee-for-service model allows for increased efficiencies, which leads to profitability and product sales. Health plans utilize many programs (e.g., disease management programs, provider profiling) to improve the efficiency of the delivery system. Measuring these precise dynamics is what health plan analysts do. Understanding this building block will direct you into the important world of healthcare policy, legislation, actuarial modeling, and sales/marketing.

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## Recent Legislative Effects

Much attention has been paid to the healthcare industry at the local, state, and federal levels. Several recent legislative efforts bear mentioning, although they will not be discussed further.

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### HIPAA

The implementation of HIPAA was the “Y2K” problem of the healthcare industry—a major transitional effort that was very resource intensive but necessary and productive for the industry.

From a data perspective, Title II: Administrative Simplification is the most interesting. This component of HIPAA requires the Department of Health and Human Services (HHS) to adopt national standards for electronic healthcare transactions and national identifiers for providers, health plans, employers, and individuals. To date, several of the most important gains from a data perspective are:

- 837 electronic claim format for Institutional, Professional, and Dental providers
- Unique national identifiers
  - National Provider Identifier (NPI)
  - Employer Identification Number (EIN)
- Codification of standard code sets such as diagnostic and procedure codes

We will learn more about these concepts in subsequent chapters.

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### Affordable Care Act

The passage of the Patient Protection and Affordable Care Act of 2010 (PPACA or commonly ACA) is a monumental change for the industry that is yet to be understood in its totality. While it is primarily “insurance reform,” the effect on our data streams is not to be underestimated. At the time of writing this book not all provisions of the legislation have become effective. Political battles over its rollout are continuing while HHS continues to educate the public.

Provisions under the Affordable Care Act will further improve the issues around data that HIPAA initiated. These include requirements to adopt:

- operating rules for each transaction type
- a unique National Health Plan Identifier (HPID) and National Individual Identifier (NII)
- standard and operating rules for
  - electronic funds transfer (EFT)
  - electronic remittance advice (RA)
  - claims attachments

In addition, insurers will be required to certify their compliance with all rules and regulations. Substantial penalties for failures to certify or comply with the new standards and operating rules are provided for.

One concern to watch for as “improved” data streams and reimbursement models are defined is the possible loss of data granularity.

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### All Payer Claims Database

At the state level there has been much legislation surrounding the need for consolidated sources of claims information. At least twelve states have recently enacted legislation and/or started to collect healthcare claims data from commercial and public payers in an effort to establish an all-payer claims database (APCD).

While the contents of individual states’ APCDs vary, they usually include data elements from member files, provider files, and claims files. The medical claims files include healthcare-related data elements such as diagnosis codes, procedure codes, pharmacy codes, insurance product type, facility type, cost amounts, and

provider information. In essence, the effort is to build a statewide or regional database that would mimic the structure and combine the information that MCOs have in-house.

Policy makers and legislators have been looking for a data source to begin to understand patterns and trends of healthcare utilization and costs. This should prove to be an excellent resource in the coming years. Keep an eye out for how you can play in this space.

---

### Continuing Enhancements

While not directly related to legislative actions, it is important to note that the industry is frequently undergoing change as dictated, among other reasons, by changing business models and technology. Several examples will be discussed in later chapters—code sets are revised (e.g., moving from ICD-9 to ICD-10) and electronic transmission formats redefined (e.g., the 5010 version of the 837 electronic claim submission). It is mandatory that the analyst keep abreast of these changes and adjust business practices and programming as necessary.

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## Conclusion

Knowing the origin of every data element in any healthcare analytic project is of paramount importance. One cannot be the best analyst possible without an intimate knowledge of the data—from source to repository. From initiation, transformation, and relationship development to information and action, it is incumbent upon every analyst to understand the original source and content of administrative healthcare data.

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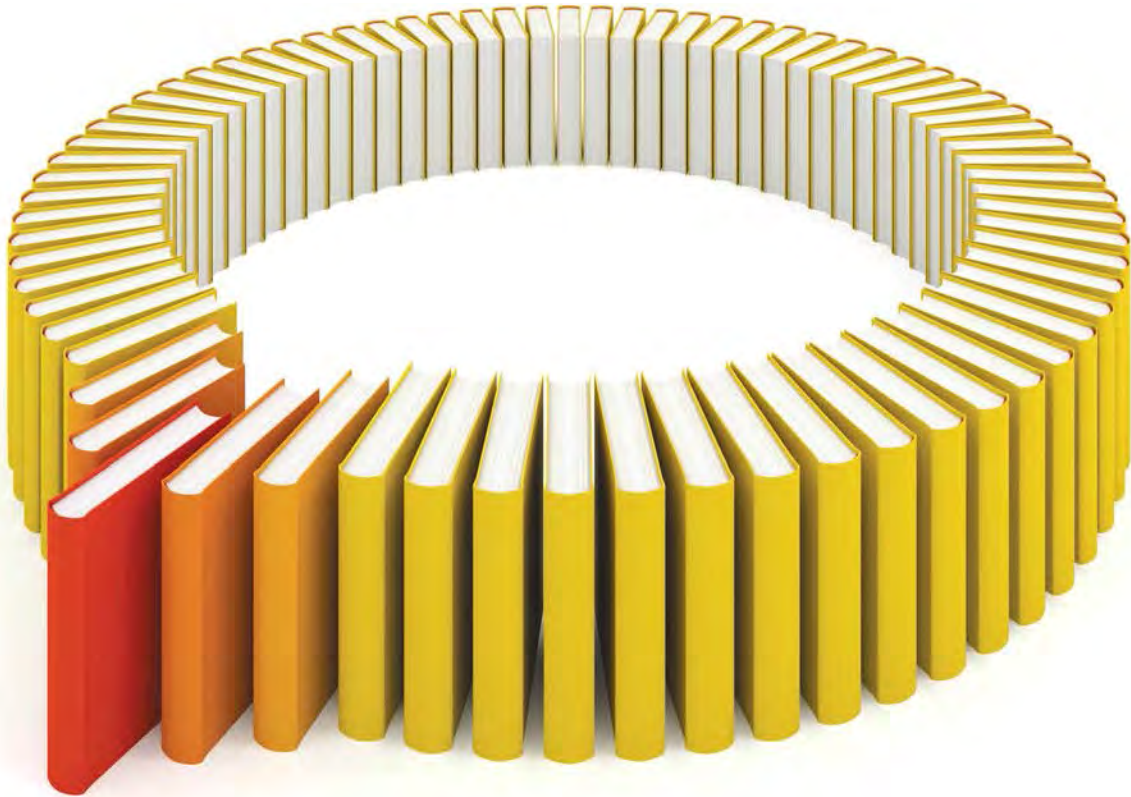
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