

**Medicaid Analytic Extract
Provider Characteristics
(MAXPC) Evaluation Report,
2009**

Final Report

November 30, 2012

Deo Bencio
Julie Sykes



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Policy Research

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ACRONYMS

CER	Comparative Effectiveness Research
CHIP	Children’s Health Insurance Program
CLIA	Clinical Laboratory Improvement Amendments
CMS	Centers for Medicare & Medicaid Services
CY	Calendar year
DEA	Drug Enforcement Administration
DME	Durable medical equipment
EIN	Employer Identification Number
FDA	Food and Drug Administration
FFS	Fee-for-service
FY	Federal fiscal year
HIPAA	Health Insurance Portability and Accountability Act
ID	Identification number or identifier
IP	Inpatient hospital
LPI	Legacy Provider ID
LT	Long-term care
MAX	Medicaid Analytic eXtract
MAXPC	Medicaid Analytic eXtract Provider Characteristics
MB	Megabytes
MMIS	Medicaid Management Information Systems
MPIER	Medicare Physician Identification and Eligibility Registry
MSIS	Medicaid Statistical Information System
NABP	National Association of Boards of Pharmacy
NCPDP	National Council of Prescription Drug Programs
NPI	National Provider Identifier

NPPES	National Plan and Provider Enumeration System
NSC	National Supplier Clearinghouse
OSCAR	Medicare Online Survey, Certification, and Reporting
OT	Other services
PECOS	Provider Enrollment, Chain, and Ownership System
PIN	Provider Identification Number
RX	Prescription drug
SSN	Social Security Number
STBK	MSIS state backup file
TIN	Tax Identification Number
T-MSIS	Transformed Medicaid Statistical Information System
UPIN	Unique Physician Identification Number
WPC	Washington Publishing Company

EXECUTIVE SUMMARY

The Medicaid Statistical Information System (MSIS) files, and the corresponding researcher-friendly Medicaid Analytic eXtract (MAX) data files, support a wide range of studies on Medicaid enrollment, service use, and expenditures. There is currently considerable interest at the Centers for Medicare & Medicaid Services (CMS) in examining health reform proposals, program integrity, and access-to-care issues among Medicaid providers by type of provider. However, it has not been possible to conduct provider-based research activities because the provider identification (ID) numbers collected in MSIS were largely unedited, undocumented, and state-specific.

Beginning in 2004, the Health Insurance Portability and Accountability Act (HIPAA) mandated covered entities such as health care providers, health plans, and health care clearinghouses to obtain and use a National Provider Identifier (NPI) in all administrative and financial HIPAA transactions (CMS 2010). The NPI is a unique, 10-digit, sequentially assigned, national identification number, unstructured so as not to carry in any way information such as the state or medical specialty of the health care provider who “owns” the identifier. Starting in February 2009, CMS required states to include NPIs on their MSIS claims.

The main limitation of NPIs is that certain classes of non-medical providers are not required to obtain NPIs. For example, the NPI requirement excludes adult day care, case management, personal care, non-emergency transportation, and many other services. Given that these so-called “wrap-around” (e.g., non-medical) services can represent a significant part of Medicaid’s package of services and are of particular interest to policymakers, their exclusion in the assignment of NPIs can be problematic for provider-related research. Nonetheless, the availability of the NPI on MSIS and MAX claims now makes it feasible to develop a uniform provider characteristics data set. Consequently, CMS contracted with Mathematica Policy Research to design and implement the Medicaid Analytic eXtract Provider Characteristics (MAXPC) file.

We considered several factors when designing MAXPC (Bencio et al. 2010). In summary, MAXPC is designed to supplement the MAX inpatient hospital (IP), long-term care (LT), prescription drug (RX), and other services (OT) claims files. It contains a record for every provider ID on every claim in MAX regardless of whether the claim is a fee-for-service (FFS) or managed care encounter claim. It contains one record for each unique provider ID that appears in any of the MAX provider data elements regardless of whether the provider ID is a legacy billing provider ID (IP, LT, OT, RX), a legacy servicing provider ID (OT only), a legacy prescribing provider ID (RX only), or an NPI. MAXPC is a set of annual, state-specific files rather than one national database. It is easy to link a provider ID in MAX to a provider ID in MAXPC and vice versa.

We also considered many data sources for the provider characteristics. For the current version of MAXPC, we concluded that the National Plan and Provider Enumeration System (NPPES) is the best data source for the characteristics of Medicaid providers. It is a CMS-designed and developed repository of provider-based information for health care providers that are assigned NPIs. It uses the NPI as the unique key and contains several data elements useful in provider-based research, such as provider name, business name, business address, primary

taxonomy, and entity type (individual versus organization). One limitation of the NPPES file, however, is that it may not contain information on non-medical providers; they were not required to obtain NPIs. Thus, non-medical providers may not link well to NPPES. When a large number of provider IDs in MAXPC do not link to NPPES, it is useful to obtain a provider file from the relevant state. The state-specific provider file most likely captures data on all Medicaid providers in that state, including non-medical providers. However, given that states do not have the resources to provide such information easily and that each state's file may differ from that of other states, state-specific provider files should be requested and used only as needed. The state provider file would augment, not replace, NPPES as the data source for provider characteristics. In the current version of MAXPC (MAXPC 2009), we augmented the NPPES file with three state-specific provider files obtained during the pilot test: Florida, Indiana, and North Carolina.

We examined the quality and completeness of each of the six types of provider IDs in MAX 2009 data for all 50 states and the District of Columbia:

1. IP billing provider IDs
2. LT billing provider IDs
3. OT servicing provider IDs
4. RX billing provider IDs
5. OT billing provider IDs
6. RX prescribing provider IDs

We then classified each type of ID in each state into one of three categories with respect to their potential use for research: good, fair (use with caution), and poor. Given that MSIS collects the legacy provider ID (LPI) *and* NPI for the first four types of IDs listed above, we were able to link the LPI and NPI for a provider and therefore link more IDs to NPPES. Unfortunately, MSIS does not collect an NPI for the latter two types of IDs, making the connection to NPPES more tenuous, more infrequent, and therefore more apt to receive a rating of poor.

In summary, data quality and completeness vary substantially by state and by type of ID. Among IP billing provider IDs, 29 states may be used for IP provider research owing to the good quality and completeness of their data. Among LT billing provider IDs, 41 states may be used for LT provider research. Among OT servicing provider IDs, 15 states may be used for OT servicing provider research. In contrast, among RX billing provider IDs, 32 states are good for research. Given that the MSIS design does not collect an NPI for OT billing providers and RX prescribing providers, it is not surprising that only 15 and 5 states, respectively, are good for provider research.

We believe that MAXPC provides high quality provider characteristics data to support Comparative Effectiveness Research (CER) and other research when NPIs are available for linkage to NPPES. It is highly likely that reporting of NPIs in MSIS claims will naturally improve as states become accustomed to reporting them. This, in turn, will improve the linkage rate to NPPES, which will increase the number of states that can be used for provider research.

In the meantime, CMS could take some additional steps to help improve the quality of MAXPC data:

- Request state-specific provider characteristic data sets from California, Maine, Michigan, Nebraska, New Hampshire, Ohio, Rhode Island, and South Carolina because the quality and completeness of the provider IDs reported in these states is poor
- Request reporting of the *billing* NPI (rather than the prescribing NPI) in Connecticut's RX file
- Offer technical assistance to the states for which reporting of provider IDs is incomplete or of poor quality
- Consider adding two data elements to the MSIS reporting requirements:
 - NPI billing provider ID for the OT file
 - NPI prescribing provider ID for the RX file

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I. INTRODUCTION

The Medicaid Statistical Information System (MSIS) files, and the corresponding researcher-friendly Medicaid Analytic eXtract (MAX) data files, support a wide range of studies on Medicaid enrollment, service use, and expenditures. There is currently considerable interest at the Centers for Medicare & Medicaid Services (CMS) in examining health reform proposals, program integrity, and access-to-care issues among Medicaid providers by type of provider. However, it has not been possible to conduct provider-based research activities because the provider identification (ID) numbers collected in MSIS were largely unedited, undocumented, and state-specific. When the current MSIS reporting system was implemented in 1999, the expectation was that all providers would soon be using the National Provider Identifier (NPI), an enumeration scheme intended to represent all billing providers nationally; therefore, it was decided that states did not need to submit uniform standardized provider characteristic data in MSIS. For a variety of reasons, however, the original plan to develop NPIs as a system to enumerate all types of billing providers across federal health programs underwent change. In addition, delays plagued implementation of the system. Therefore, national data on Medicaid provider characteristics have not been available to the research community. The purpose of this project is to create a Medicaid provider characteristics data set that may be used with other MAX data files for Comparative Effectiveness Research (CER), other research, and policy analysis. This report documents the development of the MAX Provider Characteristics (MAXPC) data for calendar year 2009, the first effort to identify provider characteristics for Medicaid providers.

Since the initial implementation of MSIS in 1999, states have been required to submit quarterly enrollment and claims data for individuals enrolled in Medicaid and the Children's Health Insurance Program (CHIP) (CMS 2012a). The data provide CMS with a large database

of enrollees and the Medicaid-financed services that they receive in the 50 states and District of Columbia (hereafter, referred to as states).

The MAX data are researcher-friendly calendar-year data files created directly from the MSIS data (CMS 2012b). The MAX system converts MSIS fiscal-year quarterly eligibility records into one record for each person enrolled in either Medicaid or CHIP in the MAX calendar year; uses retroactive and correction enrollment records to ensure retention of the most accurate enrollment; extracts MSIS inpatient claims¹, MSIS long-term care claims, MSIS other service claims, and MSIS prescription drug claims whose service ended in the MAX calendar year; adjusts the claims by using voids, resubmissions, credits, and debits; and augments the data with additional information about Medicare and Medicaid dual enrollment, dates of death, types of services, and prescription drug classifications. To allow adjustment records for enrollment and claims to be applied to MAX data, we typically use seven quarters of MSIS data for a given MAX calendar year.

Neither the MSIS nor MAX data, however, could support provider-based research because the claims data contained only state-specific “legacy” provider IDs. Unlike Medicare claims, Medicaid claims did not collect additional information about the provider other than the state-specific ID. Moreover, the IDs were not required to adhere to any specific formatting or validation check.

Beginning in 2004², the Health Insurance Portability and Accountability Act (HIPAA) mandated covered entities such as health care providers, health plans, and health care clearinghouses to obtain and use a National Provider Identifier (NPI) in all administrative and

¹ Throughout this paper, the term claims refers to both fee-for-service claims and prepaid plan health service encounter records.

² In a January 2004 final ruling, HIPAA adopted NPIs as the standard, national, and unique identification system for health care providers.

financial HIPAA transactions (CMS 2010). The NPI is a unique, 10-digit, sequentially assigned, national identification number, unstructured so as not to carry in any way information such as the state or medical specialty of the health care provider who “owns” the identifier.

Starting in February 2009, CMS required states to include NPIs on their MSIS claims. Most states complied with the requirement, but some have lagged in reporting NPIs in MSIS because of either budget and system constraints or slow progress in entering NPI data into their state data processing system. Nevertheless, the advent of NPIs on MSIS claims triggered a corresponding change to MAX claims.

The main limitation of NPIs is that certain classes of non-medical providers are not required to obtain NPIs³. For example, the NPI requirement excludes adult day care, case management, personal care, non-emergency transportation, and many other services. Given that these so-called “wrap-around” (e.g., non-medical) services can represent a significant part of Medicaid’s package of services and are of particular interest to policymakers, their exclusion in the assignment of NPIs can be problematic for provider-related research. Nonetheless, the availability of the NPI on MSIS and MAX claims makes it feasible to develop a uniform provider characteristics data set. Consequently, CMS contracted with Mathematica Policy Research to design and implement the Medicaid Analytic eXtract Provider Characteristics (MAXPC) data set.

In Chapter II, we provide an overview of the MAXPC design. In Chapter III, we describe the MAXPC documentation, which provides context for why the results are presented by type of provider ID. In Chapters IV through IX, we discuss the quality and completeness of each type of provider ID. In Chapter X, we summarize the results and identify which states should not yet be

³ Most of these providers could obtain an NPI but are not required to do so under HIPAA.

used for provider-based research at this time. Finally, in Chapter XI, we recommend how to improve the quality and completeness of the MAXPC data. We placed the report's tables at the end of each chapter.

II. MAXPC DESIGN

In this chapter, we briefly describe the MAXPC objectives and the rationale behind the MAXPC design, the potential data sources of provider characteristics, and the lessons learned from the implementation of the MAXPC prototype. We then conclude with an overview of the MAXPC 2009 data processing steps.

A. MAXPC Objectives

One of the most important issues in the MAXPC design was whether the NPI should be the unique ID for every provider in MAXPC or whether each provider ID—regardless of source—should be the unique ID. The main argument for an NPI-based file is that it generally reflects CMS’s emerging provider identification convention—a national, single identifier for all health care providers. The National Plan and Provider Enumeration System (NPPES), Transformed MSIS (T-MSIS), and Provider Enrollment, Chain and Ownership System (PECOS) are data sources recently designed by CMS to use the NPI as the standard, national provider ID. In addition, CMS issued mandates to wean states and providers from the use of state-specific legacy provider IDs (LPI). However, NPIs were not collected in MSIS (and therefore in MAX) before fiscal year (FY) 2009. FY 2009 was the first year that NPIs were collected on MSIS claims, but reporting is still not complete as of FY 2011. Until all the files include NPIs for all provider IDs, legacy IDs will continue to be important in provider-based research. Furthermore, by definition, non-medical providers will not have an NPI. Therefore, for now, the MAXPC file should include all provider IDs—NPIs and LPIs.

Another design issue was whether the MAXPC file should contain all certified Medicaid providers or perhaps all health care providers rather than just those provider IDs that are found in MSIS or MAX claims. Such a “master” database would definitely be the gold standard and extremely valuable to Medicaid provider researchers. However, the effort required to create

such a database is beyond the scope and resources of this contract. More importantly, CMS did not want MAXPC to replicate any existing CMS provider databases or compete with any other CMS provider-related efforts. Consequently, at present, the MAXPC file development plan focuses on supplementing the provider IDs in MAX with provider characteristics (such as provider name, business name, business location) obtained from other sources.

We also considered whether MAXPC should be constructed as a state-specific or national file. While a national file would be easier to use, it could generate false positives because many legacy provider IDs are state-specific. For example, a legacy ID for a provider in Idaho could erroneously link to a provider in Illinois with the same number, even though the providers differ. Consequently, the MAXPC file should be state-specific, resulting in one MAXPC file for each state. Each state-specific file contains provider records for provider IDs found in claims from the MAX claims files for that state. Those MAX claims are for beneficiaries who reside in the state, regardless of whether the provider had a business practice location within or outside the state. This is an important consideration because an individual provider may be authorized to serve Medicaid enrollees in more than one state. As a result, a particular NPI may be found in the MAXPC files for multiple states. Furthermore, a particular NPI may appear in more than one provider record in a single state. This is because the NPI will be on its own record (provider ID = NPI) and the NPI will be on the corresponding legacy provider ID record (provider ID = LPI). In the rare situation in which multiple legacy provider IDs are associated with the same NPI, the NPI will be on each one of the legacy provider ID records. This issue will be discussed further in later sections of this report.

Yet another design consideration was whether MAXPC should be an annual calendar year file or a longitudinal file spanning multiple years. Given that basic MAX data are created for individual calendar years, it was logical that MAXPC should also be created for individual

calendar years. This decision is supported by two important factors. First, creating a longitudinal MAXPC file would necessitate reprocessing all of the data in a previous file during the next MAXPC production cycle. Second, the size of individual MAXPC files for large states would grow substantially over time so as to make those files much less manageable for data users. Consequently, the MAXPC file for a particular calendar year is designed to be used with MAX claims files for the same year. Provider data from MAXPC are not likely to link well with data in MAX claims files if a user attempts to link different years for MAXPC and MAX claims (e.g. attempting to link MAXPC for 2009 to MAX claims for 2007).

In summary, MAXPC is a set of annual state-specific data sets that supplement the MAX inpatient hospital (IP), long-term care (LT), prescription drug (RX), and other services (OT) claims files. MAXPC files contain a record for every provider ID on every claim in MAX, regardless of whether the claim is a fee-for-service (FFS) or managed care encounter claim. The files contain one record for each unique provider ID that appears in any of the MAX provider data elements, regardless of whether the provider ID is a legacy billing provider ID (IP, LT, OT, RX), a legacy servicing provider ID (OT only), a legacy prescribing provider ID (RX only), or an NPI. It is easy to link a provider ID in MAX to a provider ID in MAXPC and vice versa.

B. Potential Data Sources of Provider Characteristics

In 2010, when we first evaluated potential data sources for provider characteristics, we considered six data sources: (1) Medicare Online Survey, Certification, and Reporting (OSCAR); (2) Medicare Physician Identification and Eligibility Registry (MPIER), (3) T-MSIS, (4) PECOS, (5) NPPES, and (6) state-specific provider files and/or crosswalks (Bencio et al. 2010). Because HIPAA and CMS were mandating that providers use NPIs rather than Medicare unique physician ID numbers (UPIN), provider ID numbers (PIN), OSCAR IDs (for institutional providers), and/or National Supplier Clearinghouse (NSC) IDs, we dismissed OSCAR and

MPIER from consideration. T-MSIS, PECOS, and NPPES, however, use the NPI as the unique provider ID.

As shown in Table II.1, T-MSIS, PECOS, and NPPES contain several data elements in common. The T-MSIS and PECOS provider files contain additional variables that are not in NPPES, such as the provider's date of birth. They also contain potentially useful provider information for facilities, such as facility size (number of beds).

At the time of this analysis, however, the T-MSIS provider files were still in the design/pilot phase. When they become available, we may recommend expanding the design of the MAXPC file to include additional data elements from T-MSIS. PECOS, on the other hand, was readily available and contains several data fields from the UPIN registry that could prove useful. While PECOS seemed promising at first, it focuses on providers of *Medicare* services and is unlikely to include information on providers that bill for *Medicaid* services, significantly limiting its usefulness.

Consequently, at this time, NPPES is the best data source for the characteristics of Medicaid providers. It is a CMS-designed and -developed repository of provider-based information for health care providers that have been assigned an NPI (CMS 2010). It uses the NPI as the unique key and contains several data elements useful in provider-based research, including:

- Provider name and credentials
- Organization type
- State of licensure and practice
- Provider taxonomy
- Other provider IDs and type of provider ID (e.g., Medicaid legacy ID, Medicare UPIN, Medicare PIN, OSCAR ID, NSC ID, and so forth)

One limitation of the NPPES file, however, is that it may not contain information on non-medical providers since they were not required to obtain NPIs. Our review of the data set, however, indicates a number of non-medical providers with assigned NPIs in NPPES.

When a large number of provider IDs in MAXPC do not link to NPPES, it would be useful to obtain a provider file from the relevant state. The state-specific provider file would most likely capture data on all Medicaid providers in that state, including non-medical providers. Given that states do not have the resources to provide such information easily and that each state's file may differ from that of other states, state-specific provider files should be requested and used only as needed. The state provider file would augment, not replace, NPPES as the data source for provider characteristics.

C. Lessons Learned from the MAXPC Prototype

Given that MAXPC was a new concept, CMS wanted to develop and test a prototype to demonstrate the usefulness of the design and results. We selected three states for the prototype—Florida, Indiana, and North Carolina—because they reported NPIs on almost all their claims and were able to provide a state-specific provider file. We used MAX 2006 data, which represented the latest file available at the time the prototype was undergoing development. The implementation report fully documented the prototype design and results (Bencio et al. 2010).

The primary lessons learned include the following:

- Neither the LPIs nor NPIs on the MSIS claims are subjected to rigorous data quality or validation checks such that MSIS claims may report invalid LPIs and NPIs. Indiana, for example, submitted the physician's name instead of the ID in one of the provider IDs.
- The linkage rate to NPPES is highly dependent on the NPI.
- The other provider IDs in NPPES, particularly the Medicaid provider ID and Medicare UPIN, can also provide a useful connection to NPPES.
- The state-specific provider files vary considerably in content, structure, and usefulness and do not necessarily provide a connection to all Medicaid provider IDs in MAXPC.

- The MAXPC results vary considerably by state.
- Within each state, the MAXPC results vary considerably by type of provider ID. For example, the IP billing provider might be good (complete and of high quality), but the RX billing provider might be poor (incomplete and of low quality).
- States may not fully understand the MSIS instructions regarding which NPI to submit on the OT claim. The reported NPI should be the *servicing* NPI, but evidence suggests that, in some instances, states reported the *billing* NPI.
- Similarly, states may not fully understand the MSIS instructions regarding which NPI to submit on the RX claim. The reported NPI should be the *billing* NPI, but evidence suggests that, in some instances, states reported the *prescribing* NPI.

D. MAXPC 2009 Data Processing Steps

For MAXPC 2009, we followed these six data processing steps:

1. Create the NPPES lookup file
2. Extract the provider IDs from each claims file
3. Create one record per unique provider ID
4. Create the state lookup files, where possible
5. Link the provider IDs from the claims files to NPPES and the state lookup files
6. Create the MAXPC files and prepare summary tabulations

First, we create the NPPES lookup file. We take the latest version of the NPPES file from the CMS website⁴ and split it into two files. The first file contains the NPI and provider characteristics, including provider name, business address, and so forth. The second file contains a crosswalk between the NPI, the provider's state, and the other provider IDs in NPPES (the Medicaid provider ID and Medicare UPIN). We include the provider's state because the Medicaid provider ID is state-specific.

⁴ CMS disseminates the latest updates of NPPES downloadable files at http://nppes.viva-it.com/NPI_Files.html. We used the latest version of NPPES during the production process. For most states, we used the May 2011 version. For a few states, we used the November 2011 version, and for the few states processed toward the end of the production cycle, we used the July 2012 version. The files were downloaded from the NPPES website on May 24, 2011, December 1, 2011, and August 22, 2012, respectively.

Second, we extract the provider IDs from each claims file⁵. From the IP and LT claims, we extract the billing LPI and NPI; from the OT claims, we extract the billing LPI, the servicing LPI, and the servicing NPI; and from the RX claims, we extract the prescribing LPI, the billing LPI, and the billing NPI. When the LPI and NPI appear on the same claim for the same type of provider, we assume that they describe the same provider and form a natural crosswalk between the two IDs. In other words, when we take the LPI and NPI from an IP claim, we assume that the NPI corresponds to that LPI. We need an association between the NPI and LPI in order to link the LPI—that provider—to an NPES record. If the state provides an incorrect NPI, it creates a false relationship between the LPI and NPI and affects the MAXPC results. We examine the issue of false relationships more closely in subsequent chapters but note that most states make correct assignments.

Third, we summarize the provider records into one record per unique provider ID. We first summarize within each claims file and then concatenate the four claims files into one file and summarize the records into one record per unique provider ID. In the event that an LPI does not have a corresponding NPI in one file (such as the IP file) but has a corresponding NPI in one of the other files (such as the LT file), the non-missing NPI prevails. In the event that two or more NPIs belong to the same LPI (either within or across claims files), we disassociate the NPI from the LPI on the LPI's record because we are not sure which NPI is correct (in other words, we

⁵ The MAX claims files were supposed to be the input files for MAXPC, ensuring an exact one-to-one correspondence between the two files. Due to MAX production delays, we used MSIS “Valid” files—the input files to MAX—as the input files for MAXPC. However, as we created the MAXPC files, we detected an error in the files. When we compared the MSIS “Valid” files to the MSIS “state backup” (STBK) files, which are the claims files submitted by the state to CMS, we confirmed that the NPI values were corrupted in the “Valid” files. To meet the contractual deadlines for MAXPC production, CMS asked us to use the STBK files as the input files to MAXPC. We extracted all provider IDs from all original claims in the STBK files, using the same seven quarters of MSIS data that MAX would use. Every provider ID in MAX is represented in MAXPC. Because MAX applies adjustment claims to the original claims but MAXPC does not, there can be more provider IDs, more claims per provider ID, and more beneficiaries per provider ID in MAXPC than in MAX.

recode the NPI to missing). By definition, the disassociation affects only the LPI record; the NPI record is not affected.

Fourth, we create the state lookup files for the states for which we have state-specific provider files: Florida, Indiana, and North Carolina. As with the process for NPPES, we create two files. The first file contains the provider ID (which may be either the NPI or LPI) and the provider characteristics, including provider name, business address, and so forth. The second file contains a crosswalk between the NPI and LPI. The contents of each state's provider files, however, can vary tremendously from state to state. North Carolina, for example, provided a comprehensive set of provider characteristics, whereas Florida provided only a small set.

Fifth, to identify provider characteristics, we link the provider IDs from the claims files to the NPPES and the state lookup files. This is the most complicated part of the process. It is important to remember that we use the NPI from the claims files as the primary means of linking to NPPES. We use the LPI and the state provider files only if needed. Specifically, among the provider IDs with no corresponding NPI, we link to the NPPES crosswalk file by using the state and legacy provider ID (which may link to either the Medicaid ID or Medicare UPIN in NPPES). If a link is made, we assign the NPI from that record. If the provider ID still lacks an NPI, we link to the state crosswalk file to obtain the NPI. Among the provider IDs with an NPI, we link to NPPES by using the NPI to identify provider characteristics. Among the provider IDs that do not link to NPPES, we link to the state provider file by using the NPI to obtain provider characteristics. If that fails, we link again to the state provider file by using the LPI to obtain provider characteristics⁶.

⁶ One of the provider characteristics that we obtain from NPPES is provider taxonomy. NPPES contains both a primary taxonomy classification and an additional 14 taxonomy classifications for each provider. We extract the primary taxonomy classification from NPPES for MAXPC. It should be noted that the primary or other taxonomy classifications can change from time to time for a given provider.

In the sixth and last step, we create the MAXPC files and prepare two sets of summary tabulations: validation tables and anomaly tables. The validation tables describe the MAXPC results across all providers and by type. The anomaly tables highlight issues or unusual results. In the next chapter, we describe both sets of tables as well as other important MAXPC documentation.

It is important to note that in the MAXPC processing steps, we did not conduct validity testing on the contents of NPI or LPI data elements. NPIs should have a length of 10 characters and begin with a leading “1” in the first position. However, there was nothing to prohibit individual states from having the same format for an LPI. For example the value = 1234567890 could be either an NPI or an LPI. Because of this, we were forced to assume that if a state reported a value in an NPI data element, it was, in fact, an NPI. Conversely, we assumed that values contained in LPI data elements were not NPIs unless otherwise noted. Therefore, if a value in an LPI data element had the same format as an NPI, we did not move the value to an NPI data element. Additionally, it is possible that an actual NPI from a claim may not have linked to an NPI in NPPES because it may have been a valid NPI for a provider that was removed from NPPES because the provider was no longer active.

Table II.1. Comparison of Data Elements in PECOS, T-MSIS, and NPPES

Data Element	T-MSIS	PECOS	NPPES
NPI	X	X	X
Provider name	X	X	X
Provider credentials	X	X	X
Provider organization name	X	X	X
Provider practice location	X	X	X
Provider mailing information	X	X	X
Provider billing information	X	X	X
Provider licensing information	X	X	X
Provider group information	X		
Provider SSN/EIN/TIN	X	X	
Medicaid provider number	X		X ^a
Medicare identification number/type	X	X	X ^a
Group/individual PIN		X	X ^a
PECOS IDs (provider, enrollment IDs)		X	
CLIA number/type/effective dates	X	X	X ^a
FDA mammography certificate number		X	X ^a
DEA number/effective dates	X		X ^a
NABP number/effective dates	X		X ^a
NCPDP number/effective dates	X		X ^a
Physician specialty	X	X	X ^b
Provider gender	X	X	X
Provider date of birth	X	X	
Provider date of death	X	X	
Provider taxonomy/indicators	X	X	X
Medical school name/number/graduation year		X	
Bed sizes	X	X	
Teaching indicator	X	X	
Provider type/supplier type	X	X	
Entity type, ownership	X		X
Urban/rural indicator	X	X	
Other UPIN registry fields (35+ fields)		X	

^a May be derivable from Other Provider ID 1 through 50 data elements. These data elements are optional, however, and may not have been reported by the service provider.

^b Derivable from Provider Taxonomy

III. MAXPC DOCUMENTATION

In this chapter, we describe the size of the MAXPC files, the MAXPC record layout, the MAXPC validation tables, and the MAXPC anomaly tables. Almost all of the results presented in subsequent chapters come directly from the MAXPC validation tables. All documents discussed in this chapter, in addition to the MAXPC data, are available on the MAX website (CMS 2012c).

We also describe the difference between provider IDs and providers. We need to stress that MAXPC focuses on provider IDs, *not* on providers. Given the nature of the medical profession, a provider may have more than one provider ID. To summarize by provider, we would need to associate all provider IDs for a given provider across all states before proceeding with the analysis. Such a task would pose several challenges.

A. Size of the MAXPC Files

There are 51 MAXPC files, one for each state and the District of Columbia⁷. Each file contains one record for each unique provider ID with at least one IP, LT, OT, and RX claim in calendar year (CY) 2009 in a given state. There are 5,337,423 provider IDs in MAXPC 2009. The overall size of each MAXPC file depends on the number of providers, as the record layout is fixed at 471 characters in length (Table III.1). The smallest file is Delaware at 5.2 megabytes (MB), and the largest is California at 524.0 MB. The overall size for all 51 states and the District of Columbia is 2,513.9 MB.

⁷ Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

B. MAXPC Record Layout

Before we review the MAXPC results in subsequent chapters, we outline the content of the MAXPC file. In Table III.2, we describe the MAXPC record layout. Below, we briefly describe each data element. Each data element was added to the record layout for a specific purpose.

The most important data element is the provider ID; it uniquely identifies each record within a state. However, if you decide to concatenate the 51 files into one file, you must use the state code *and* the provider ID to uniquely identify a provider ID. This is because the LPIs are state-specific. Thus, more than one state may assign the same provider ID to different providers. To be safe, users should always link the MAXPC file to claims by using the provider ID *and* the state code.

The provider ID is a randomly assigned number. To better understand the type of provider to which it belongs, we created 10 categorical variables, which correspond to the 10 provider ID data elements on the MSIS claims:

- IP claim—NPI *billing* provider
- IP claim—legacy *billing* provider
- LT claim—NPI *billing* provider
- LT claim—legacy *billing* provider
- OT claim—NPI *servicing* provider
- OT claim—legacy *servicing* provider
- RX claim—NPI *billing* provider
- RX claim—legacy *billing* provider
- OT claim—legacy *billing* provider
- RX claim—legacy *prescribing* provider

It is important to note that the MSIS (the source of the data elements) collects the NPI and LPI for the IP, LT, and RX *billing* providers as well as for the OT *servicing* providers. MSIS

does not collect an NPI for the OT *billing* providers and the RX *prescribing* providers. That design has a significant impact on the results, as described in subsequent chapters.

Where possible, we wanted each provider ID record to have an associated NPI in order to create an easy link between the record and NPPES. Thus, we added a data element to MAXPC specifically for the NPI. When the provider ID came directly from the NPI variable on an MSIS claim, the provider ID and NPI have the same value on the MAXPC record. When the provider ID from the MSIS claim was an LPI and was accompanied by a value in the corresponding NPI variable on the MSIS claim, we assumed that the LPI and NPI corresponded to the same provider; therefore, the NPI data element on the MSIS record was assigned to the NPI data element on the MAXPC record for that LPI.

For example, let us assume that an MSIS IP claim has the following IDs:

- LPI billing provider ID = 111 and NPI billing provider ID = 123

The MAXPC system would generate two MAXPC records:

- MAXPC record #1: Provider ID = 111 and NPI = 123
- MAXPC record #2: Provider ID = 123 and NPI = 123

In addition to knowing the value of the NPI, we wanted to know the source of the NPI. For most records, the source is the MSIS claims records. But, as described in the previous chapter, we may also obtain the NPI from the NPPES file (via the LPI) or from the state-specific provider file.

Among the records linked to NPPES, we wanted to know how they are linked. For most records, the linkage relies on the NPI. For some cases, however, the linkage is made via two IDs that are also contained in NPPES: the Medicaid LPI and the Medicare UPIN.

From the NPPES file, we wanted the provider's name, business name and address, primary taxonomy (the detailed value and summary classification value), entity type (organization versus

individual), sole proprietorship code, and organization subpart code. We used these data elements to assess the quality of the provider ID.

For each provider ID, we also wanted to tally the number of claims and beneficiaries associated with that provider ID by type of claim (IP, LT, OT, RX) and for all claims. We can use these data elements to examine utilization by provider ID.

Lastly, one final data element on the MAXPC file is an indicator variable identifying whether the provider is a non-medical provider. We had hoped that the state provider files would contain such information, indicating when a provider is a non-medical provider and is not required to obtain an NPI (and therefore would not be in NPPES). Among the states that submitted state-specific provider files, only North Carolina provided information about non-medical providers, but few were identified as non-medical. Thus, the non-medical provider data element on the MAXPC file is not very useful at this time.

C. Unique Provider IDs Versus Unique Providers

We should emphasize that MAXPC focuses on unique provider IDs within a state; it does not focus on an unique provider (e.g., neither Dr. Jones nor Hershey Family Health Center). MAXPC is *not* a master file of providers; it is a master file of provider IDs. There may be multiple records in MAXPC assigned to the same provider. For example, Dr. Jones could participate in two medical practices—one located in Hershey, Pennsylvania, and one in Annville, Pennsylvania. If he chooses to incorporate his practice at each location, he can elect to have two NPIs. If he serves Medicaid patients in both locations, he appears twice in MAXPC.

Each medical practice has an NPI. The NPI billing provider for the medical practice (Hershey Family Health Center) differs from the NPI servicing provider (Dr. Jones). If Dr. Jones operates as an independent practitioner, however, the NPI billing provider ID (Dr. Jones) will be the same as the NPI servicing provider (Dr. Jones). If the medical practice belongs to a wider

health care network (Healthcare Solutions) located in a different state, the NPI billing provider's state (Delaware) differs from the NPI servicing provider's state (Pennsylvania) in addition to having different billing and servicing IDs.

In addition, if Dr. Jones provides care to Medicaid patients in both Pennsylvania and Maryland, he has a record in the MAXPC files for both Pennsylvania and Maryland. *A claim is submitted to the Medicaid program in the beneficiary's state of residence, not to the state in which services were rendered.*

Thus, researchers should use caution if their goal is to summarize the information by *provider* within and across states.

D. MAXPC Validation Tables

After we produced the MAXPC files for each state, we generated the MAXPC cross-state validation tables⁸, which focus on a single year and include columns for each state. The tables are invaluable for detecting linkage issues or problems that are peculiar to a given state or set of states.

Of the five cross-state validation tables, the first four focus on provider IDs in each of the four claims files (IP, LT, OT, and RX). The fifth table presents data on all provider IDs across the four claim types. The design of the validation tables is similar across the five tables. With the exception of a few measures at the beginning of the tables that are specific to that file type, all other measures are identical.

The measures in the validation tables are grouped into seven sections, as denoted by the shaded rows. The first section describes the number of unique provider IDs; their location in the

⁸ In subsequent years, when we have more than one year of data, we will generate state-specific validation tables that show the MAXPC results for the current and two previous years. These multiyear state-specific validation tables are invaluable for detecting unexpected or unusually large changes from one year to the next.

claims file (billing provider variable, NPI billing provider variable, or both); whether the IDs appear in other claims files; whether the IDs were linked to an NPI, NPPES, or state provider files; the average number of service records from that file type for provider IDs; and the average number of beneficiaries with service records from that file type for provider IDs. The second section focuses on the source of the NPI (MSIS, NPPES, or state cross-reference file). The third section focuses on provider IDs that link to NPPES and describes how NPIs were linked, documents the extent to which NPPES data are non-missing, and describes provider entity type (individual or organization). The fourth section focuses on provider IDs that linked to state provider files. The fifth section focuses on the primary taxonomy of provider IDs that linked to NPPES records. Providers are classified into two groups: (1) individuals or groups of individuals and (2) non-individuals using the Washington Publishing Company's (WPC) taxonomy groupings (WPC 2009). We also reported the prevalence of non-medical providers. The sixth section focuses on individual providers—whether they are sole proprietorships. Finally, the last section focuses on provider organizations and whether providers were subparts of a larger organization.

We used the validation tables to measure the quality and completeness of each type of provider ID. The results appear in subsequent chapters.

E. MAXPC Anomaly Tables

Anomaly tables are useful for understanding both idiosyncratic differences in the data and data problems. The tables' rows represent states, and the columns contain issues that could be anomalous within each file type. When benchmarks were available for a particular issue, we compared each state's measure against the benchmark; when a measure fell outside the benchmark's range, we provided state-specific footnotes for each anomalous condition. In many

instances, we lacked or did not know the benchmarks for certain measures. In such cases, we compared measures across states to find any unusual patterns and added footnotes accordingly.

The information in the validation tables drives the anomaly tables. Each year, when we identify data issues in the validation tables, we will add entries to the corresponding anomaly tables. The tables will vary from year to year, depending on the data.

The anomaly tables reflect eight categories of measures:

- General issues—measures that could show potential problems with the linkage of individual provider IDs. Measures include the number of provider IDs, the percentage of provider IDs with NPIs, and the percentage of provider IDs that linked to NPPES records.
- Utilization-level issues—measures related to utilization levels that could show potential problems with the linkage of individual provider IDs. Measures include the average number of claims per provider and the average number of beneficiaries with claims per provider.
- Cross-provider issues—measures that pertain to the source of provider IDs. These include the percentage of providers that are billing providers in IP, LT, OT, and RX; servicing providers in OT; and prescribing providers in RX and whether provider IDs were billing NPIs in IP, LT, and RX or servicing NPIs in OT.
- NPI-related issues—measures that could indicate potential problems with the source of the NPI. Measures include the number of legacy provider IDs with NPIs, the percentage of NPIs from MSIS, the percentage of NPIs from the NPPES file, and the percentage of NPIs from the state-specific provider file.
- NPPES-linkage issues—measures that could indicate potential problems in the linkage process between provider IDs and NPPES. Measures include the number of provider IDs linked to NPPES, the percentage linked to NPPES based on NPIs, and the percentage of in-state providers.
- Provider taxonomy issues—measures that could indicate potential problems related to a provider’s primary taxonomy. Measures show the number and percentage of provider IDs with primary taxonomy, the percentage of providers that are individuals or groups of individuals, and the percentage of providers that are non-individuals.
- Individual provider entity issues—measures that could show potential problems related to provider type for an individual provider. Measures include the number and percentage of provider IDs with the type “individual” and, of these, the percentage that were sole proprietors.
- Organizational provider entity issues—measures that could show potential problems related to provider type for organizational providers. Measures include the number and percentage of provider IDs with the type “organization” and, of these, the percentage that were subparts of a larger organization.

It is up to individual researchers to determine the extent to which a certain anomaly may affect the design of their studies. Throughout the rest of this report, we focus on the quality and completeness of each type of provider ID and highlight issues that may limit the usefulness of MAXPC data for a given study.

F. SPECIAL NOTE TO MAXPC 2009 USERS

The following six states were processed without the full complement of seven quarters of data typically used when processing MAX files:

1. Hawaii: Excludes IP, LT, and OT claims with service dates in 2009 that were adjudicated in FY2010 Q2, Q3, and Q4 as well as RX claims with fill dates in 2009 that were adjudicated in FY2010
2. Idaho: Excludes OT claims with service dates in 2009 that were adjudicated in FY2010 Q2, Q3, and Q4; IP and LT claims with service dates in 2009 that were adjudicated in FY2010 Q3 and Q4; and RX claims with fill dates in 2009 that were adjudicated in FY2010 Q3 and Q4
3. New Hampshire: Excludes IP, LT, and OT claims with service dates in 2009 that were adjudicated in FY2010 Q4, and RX claims with fill dates in 2009 that were adjudicated in FY2010 Q4
4. Oklahoma: Excludes OT claims with service dates in 2009 that were adjudicated in FY2010 Q4
5. Utah: Excludes IP, LT, and OT claims with service dates in 2009 that were adjudicated in FY2010 Q2, Q3, and Q4 as well as RX claims with fill dates in 2009 that were adjudicated in FY2010 Q2, Q3, and Q4
6. Wisconsin: Excludes IP, LT, and OT claims with service dates in 2009 that were adjudicated in FY2010 Q4 as well as RX claims with fill dates in 2009 that were adjudicated in FY2010 Q4.

Table III.1. MAXPC Record Counts and File Sizes, 2009

State	Number of Records	File Size (in MB)
Alabama	64,321	30.3
Alaska	17,486	8.2
Arizona	78,708	37.1
Arkansas	50,371	23.7
California	1,112,427	524.0
Colorado	52,712	24.8
Connecticut	61,625	29.0
Delaware	11,059	5.2
District of Columbia	11,429	5.4
Florida	243,730	114.8
Georgia	105,009	49.5
Hawaii	14,679	6.9
Idaho	37,913	17.9
Illinois	243,893	114.9
Indiana	84,537	39.8
Iowa	78,250	36.9
Kansas	55,716	26.2
Kentucky	62,090	29.2
Louisiana	55,831	26.3
Maine	27,051	12.7
Maryland	93,884	44.2
Massachusetts	169,330	79.8
Michigan	289,361	136.3
Minnesota	177,640	83.7
Mississippi	46,193	21.8
Missouri	101,554	47.8
Montana	19,941	9.4
Nebraska	37,774	17.8
Nevada	32,125	15.1
New Hampshire	30,872	14.5
New Jersey	80,943	38.1
New Mexico	71,062	33.5
New York	311,362	146.7
North Carolina	113,214	53.3
North Dakota	15,637	7.4
Ohio	120,943	57.0
Oklahoma	65,157	30.7
Oregon	76,387	36.0
Pennsylvania	166,706	78.5
Rhode Island	21,362	10.1
South Carolina	64,253	30.3
South Dakota	21,205	10.0
Tennessee	135,392	63.8
Texas	186,001	87.6
Utah	28,033	13.2
Vermont	17,545	8.3
Virginia	97,526	45.9
Washington	130,650	61.5
West Virginia	53,001	25.0
Wisconsin	70,487	33.2
Wyoming	23,046	10.9
Total	5,337,423	2,513.9

Source: MAXPC Files, 2009.

Note: Record length is 471 characters for each file.

Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table III.2. MAXPC Record Layout

Element Name	Type	Length	Position Begin	Position End
Provider Identifier	Character	12	1	12
State Code	Character	2	13	14
IP Claim NPI Billing Provider	Character	1	15	15
IP Claim Legacy Billing Provider	Character	1	16	16
LT Claim NPI Billing Provider	Character	1	17	17
LT Claim Legacy Billing Provider	Character	1	18	18
OT Claim NPI Servicing Provider	Character	1	19	19
OT Claim Legacy Billing Provider	Character	1	20	20
OT Claim Legacy Servicing Provider	Character	1	21	21
RX Claim NPI Billing Provider	Character	1	22	22
RX Claim Legacy Billing Provider	Character	1	23	23
RX Claim Legacy Prescribing Provider	Character	1	24	24
National Provider Identifier (NPI)	Character	12	25	36
NPI Source	Character	1	37	37
NPES Type of Provider ID	Character	1	38	38
Name Prefix	Character	5	39	43
First Name	Character	20	44	63
Middle Name	Character	20	64	83
Last Name	Character	35	84	118
Name Suffix	Character	5	119	123
Gender	Character	1	124	124
Credential	Character	20	125	144
Business Name	Character	70	145	214
Business Practice Address Line 1	Character	55	215	269
Business Practice Address Line 2	Character	55	270	324
Business Practice City	Character	40	325	364
Business Practice State	Character	2	365	366
Business Practice Zipcode	Character	9	367	375
Primary Taxonomy Code	Character	10	376	385
Primary Taxonomy Classification	Character	2	386	387
Non-Medical Provider	Character	1	388	388
Provider Entity Type	Character	1	389	389
Sole Proprietor Code	Character	1	390	390
Organization Subpart Code	Character	1	391	391
Number of IP Claims for Provider	Zoned Decimal	8	392	399
Number of Beneficiaries with IP Claims for Provider	Zoned Decimal	8	400	407
Number of LT Claims for Provider	Zoned Decimal	8	408	415
Number of Beneficiaries with LT Claims for Provider	Zoned Decimal	8	416	423
Number of OT Claims for Provider	Zoned Decimal	8	424	431
Number of Beneficiaries with OT Claims for Provider	Zoned Decimal	8	432	439
Number of RX Claims for Provider	Zoned Decimal	8	440	447
Number of Beneficiaries with RX Claims for Provider	Zoned Decimal	8	448	455
Number of Any Claims for Provider	Zoned Decimal	8	456	463
Number of Beneficiaries with Any Claims for Provider	Zoned Decimal	8	464	471
Total		471		

Source: MAXPC Files, 2009.

Note: Record length is 471 characters for each file.

IV. IP BILLING PROVIDER IDs

In this chapter, we focus on the quality and completeness of the IP billing provider IDs. We first examine the completeness of the data and then examine the quality. We conclude by identifying which states have usable data and which states should not be included in IP provider research at this time.

A. Completeness of IP Billing Provider IDs

To measure the completeness of IP billing provider IDs, we examined the prevalence of provider IDs on IP claims, the extent to which an LPI may be associated with an NPI, and the linkage rate to the NPES file. To be complete, a state must demonstrate high percentages for all three measures.

1. Prevalence of Provider IDs on IP Claims

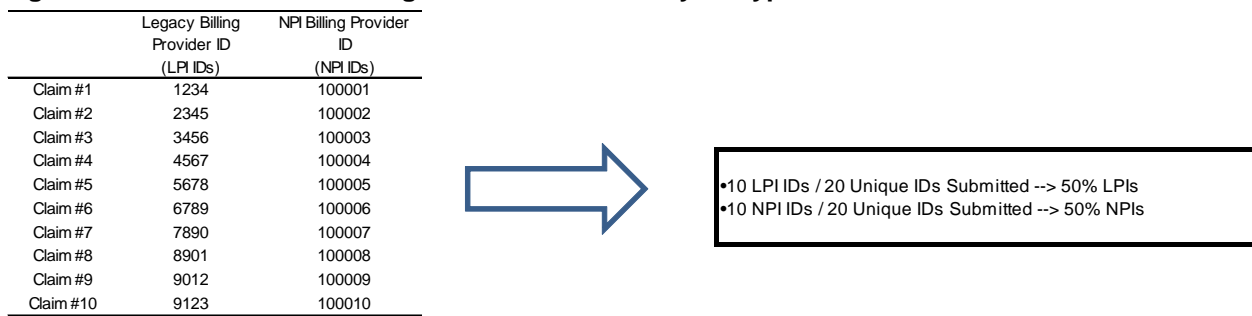
We begin the analysis by examining the extent to which provider IDs are present on the IP claims (Table IV.1). As of 2009, CMS revised the MSIS data dictionary specifications, requiring states to include NPIs in their file submissions for the IP file. CMS instructed states to submit NPIs that correspond with legacy provider IDs in the same claim for IP billing providers. Given that the billing provider IDs were the only IDs required to be reported in the IP files prior to February 2009, the new requirement was a natural extension of the reporting of IP legacy billing provider IDs. Except for Missouri, all states report either the NPI or LPI on more than 90 percent of claims. The 90 percent rate is not a surprise because provider information is essential if a provider is to be reimbursed under the FFS system.

2. NPIs Versus LPIs Among IP Billing Provider IDs

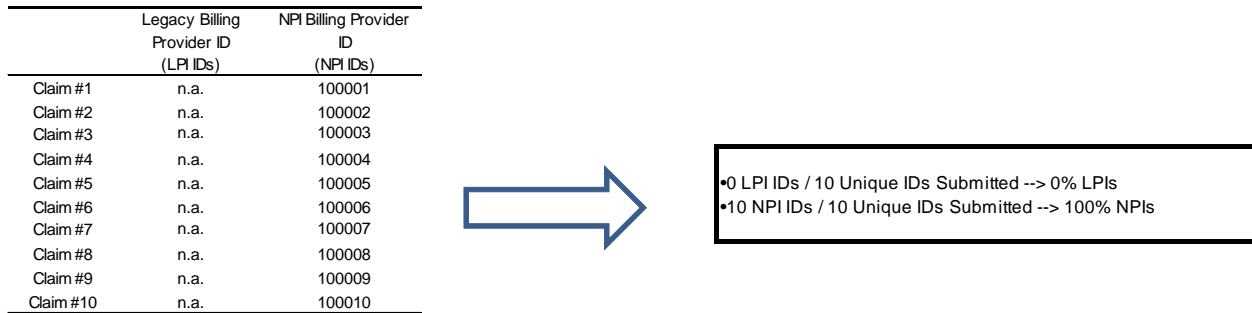
Among the records with an IP billing provider ID, it is important to understand the distribution of IDs by ID type. When a state provides an LPI and NPI on an IP claim, MAXPC generates two provider ID records. If the state submits two IDs per claim on most claims (the

expected method), the distribution of IDs by type will approach 50 percent for each type—50 percent are NPIs and 50 percent are LPIs. If the state provided one ID but not the other, the distribution by ID type will be asymmetrical, with one percentage high and one percentage low. If a state failed to adhere to the instructions not to assign the same provider ID in both the LPI and NPI, the distribution of IDs will be much higher than 50 percent and similar in value. Figure IV.1 illustrates the three scenarios.

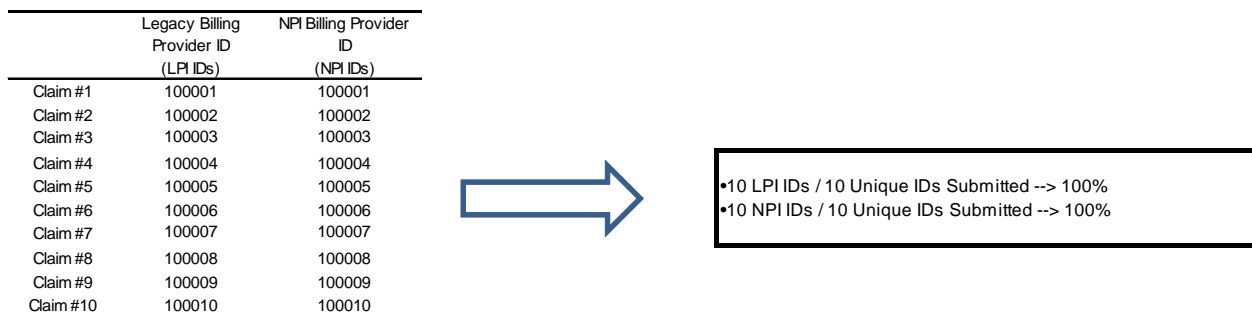
Figure IV.1. Illustration Showing Distribution of IDs by ID Type



a. Two IDs per claim produces a 50/50 distribution



b. One ID provided but not the other produces an asymmetrical distribution



c. Same provider ID submitted in both LPI and NPI produces a 100/100 distribution

Thirty-four states followed the expected method⁹, submitting both an NPI and LPI (Table IV.2). Eight states (Alaska, California, Delaware, Georgia, South Carolina, Texas, Virginia, and Wisconsin) submitted the same NPI in both the NPI and LPI data elements for the majority of the provider IDs. While submission of the same provider ID in both data elements was not what was intended in the MSIS instructions, it was nonetheless acceptable in the creation of MAXPC because we could still obtain provider characteristics. However, researchers interested in using the MAXPC file to connect the NPI to LPI for longitudinal research on providers will face difficulties with these eight states because many provider LPIs will be unavailable. In addition, as shown in Table IV.2, more than 30 percent of the IP provider IDs lacked an NPI in four states (Maine, Nebraska, New Hampshire, and Rhode Island).

For almost all states, the NPI came directly from the MSIS record (Table IV.3). When the NPI was not on the MSIS claim, we used the LPI to find the provider in the NPPES file (in either the Medicaid provider ID or Medicare UPIN) and then assigned the NPI from NPPES. Applying this method, we found NPIs for an additional 496 IP providers¹⁰. We also used the state-provided cross-reference files in Florida, Indiana, and North Carolina to locate NPIs for the LPIs. The cross-reference files for Indiana and North Carolina added another 70 NPIs, whereas Florida's file did not identify any additional NPIs.

3. NPPES Linkage Rate Among IP Billing Provider IDs

We were encouraged by the high percentage of IP billing provider IDs with an NPI. While a non-missing value was good, it was also needed to link to an NPPES record to obtain provider characteristics for provider research. A poor linkage rate would suggest that the NPI is not valid.

⁹ The percent distribution of reported NPIs and LPIs was approximately 50-50 (or 50 ± 10 percentage points).

¹⁰ In Rhode Island, almost all of the LPIs without an NPI linked to NPPES via the Medicare UPIN. The state should report the Medicaid provider ID, not the Medicare ID, in MSIS.

In Table IV.4, we display the linkage rate. Thirty-two states have a particularly high linkage rate (more than 90 percent). Twelve states linked well (70 to 90 percent), but not as high as desired (Arkansas, District of Columbia, Hawaii, Idaho, Louisiana, Massachusetts, Michigan, Missouri, New Jersey, New York, North Dakota, and Washington). If these twelve states are included in research on IP providers, researchers should exercise caution. The remaining seven states, which include the four states with few NPIs (Maine, Nebraska, New Hampshire, and Rhode Island) plus three new states (California, Ohio, and Texas), had NPIs that linked poorly and appear invalid. For example, 10 percent of Ohio's IDs, one-third of California's IDs, and a little over half of Texas's IDs linked to NPPES. In addition, not only did New Hampshire have few NPIs, but only 1 percent of the NPIs that the state reported linked to NPPES. These seven states should be excluded from IP provider research.

B. Quality of IP Billing Provider IDs

To measure the quality of the IP billing provider IDs, we examined the entity type, primary taxonomy, and business location among provider IDs that linked to NPPES. To be classified as high quality, a state had to exhibit a particularly high percentage with the expected entity type and primary taxonomy. While informative, business location was not a necessary condition for gauging quality.

1. Entity Type Among IP Billing Provider IDs

We expected IP *billing* providers to be an organization, not an individual. Among the IP provider IDs that linked to NPPES, such was the case for all but three states (Table IV.5). In Georgia, Nebraska, and Rhode Island, more than 10 percent of linked provider IDs were classified as individuals.

2. Primary Taxonomy Among IP Billing Provider IDs

All but a few of the IP provider IDs that linked to NPPES identified a primary taxonomy category in NPPES (Table IV.6). While the value of the taxonomy is highly detailed, it may be easily summarized into 11 categories for organizations and 18 categories for individuals. With IP *billing* providers, we expected the primary taxonomy category to be a hospital. In Table IV.7, we list the top four taxonomy categories. As expected, the overwhelming majority were hospitals, nursing/custodial care facilities, and hospital units. In six states, however, 20 percent or more of the IP billing providers were classified as something other than a hospital, nursing/custodial care facility, and hospital unit. Upon closer inspection (data not shown), in Georgia, Hawaii, Missouri, and Rhode Island, these atypical providers were classified as physicians, behavioral health providers, social service providers, or agencies. In Nevada and Virginia, they were ambulatory health care facilities. Researchers should exercise caution when using IP billing provider information from these six states.

3. Business Location Among IP Billing Provider IDs

All IP provider IDs that linked to NPPES provided a business location (Table IV.6). We might expect that most Medicaid beneficiaries would select a hospital near their home and within their state of residence, but such is not necessarily the case among people who live near a state border, people who need specialized care, or people who experience a medical emergency while out of state. In addition, we might expect that IP providers would identify the location of the hospital in which care was provided, but that is not necessarily the case because we are dealing with IP *billing* provider IDs. The hospital could be part of a larger health care network, and the *billing* location for that network could be located in a state other than the Medicaid beneficiary's state of residence (the state submitting the claim) and/or the state where the servicing IP provider was located. In Table IV.8, among IP billing provider IDs that provided an address in NPPES,

we compared the state on the claim to the state on the IP billing provider's address. As suspected, the percentage of billing provider IDs within the same state as the beneficiary varies substantially from one state to another, with no clear pattern or expected value for the measure.

C. Usability of IP Billing Provider IDs in Research

In summary, MAXPC data for 29 states may be used for IP provider research owing to the high level of data quality and completeness. Of the remaining states, MAXPC data for 7 states (California, Maine, Nebraska, New Hampshire, Ohio, Rhode Island, and Texas) should not be used for IP provider research because quality and completeness are poor; MAXPC data from 15 states (Arkansas, District of Columbia, Georgia, Hawaii, Idaho, Louisiana, Massachusetts, Michigan, Missouri, Nevada, New Jersey, New York, North Dakota, Virginia, and Washington) should be used with caution.

Table IV.1. Prevalence of Provider IDs on IP Claims

State	Number of Claims	Percent with NPI or LPI
Alabama	157,195	100.0
Alaska	21,066	100.0
Arizona	261,445	100.0
Arkansas	130,258	100.0
California	1,012,996	100.0
Colorado	74,948	100.0
Connecticut	266,702	100.0
Delaware	11,592	100.0
District of Columbia	31,251	100.0
Florida	609,682	99.3
Georgia	325,883	100.0
Hawaii	28,295	100.0
Idaho	34,463	100.0
Illinois	450,946	100.0
Indiana	183,622	100.0
Iowa	83,767	100.0
Kansas	87,265	100.0
Kentucky	162,209	100.0
Louisiana	310,933	100.0
Maine	35,671	100.0
Maryland	226,078	100.0
Massachusetts	169,469	100.0
Michigan	135,864	100.0
Minnesota	110,202	100.0
Mississippi	143,237	100.0
Missouri	191,005	82.7
Montana	24,552	100.0
Nebraska	51,752	99.9
Nevada	46,270	100.0
New Hampshire	22,809	100.0
New Jersey	167,082	100.0
New Mexico	81,882	100.0
New York	2,232,838	100.0
North Carolina	351,093	100.0
North Dakota	14,710	100.0
Ohio	149,506	100.0
Oklahoma	167,115	100.0
Oregon	88,039	100.0
Pennsylvania	121,267	100.0
Rhode Island	115,824	100.0
South Carolina	106,970	100.0
South Dakota	23,973	100.0
Tennessee	294,578	100.0
Texas	927,410	100.0
Utah	47,134	100.0
Vermont	18,802	100.0
Virginia	518,503	100.0
Washington	155,013	100.0
West Virginia	64,055	100.0
Wisconsin	163,913	100.0
Wyoming	16,010	100.0

Source: MSIS State Backup Files, FY 2009 Q2 - FY 2010 Q4

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table IV.2. NPIs Versus LPIs Among IP Billing Provider IDs

State	Number of IP Billing Provider IDs	Percent NPI	Percent LPI	Percent of IP Billing Provider IDs with an NPI	Percent LPI Equal to NPI
Alabama	573	49.7	50.3	100.0	0.0
Alaska	99	99.0	100.0	99.0	99.0
Arizona	945	50.1	49.9	99.9	0.0
Arkansas	485	44.3	55.7	88.0	0.0
California	2,923	84.7	100.0	85.2	84.7
Colorado	421	50.6	49.4	92.6	0.0
Connecticut	681	49.9	50.1	99.6	0.0
Delaware	44	97.7	100.0	97.7	97.7
District of Columbia	195	54.9	45.1	88.7	0.0
Florida	3,396	47.6	52.4	97.1	0.0
Georgia	756	95.5	100.0	95.8	95.5
Hawaii	223	48.0	52.0	89.7	0.0
Idaho	431	38.5	61.5	89.6	0.0
Illinois	1,349	54.3	45.7	91.0	0.0
Indiana	837	51.6	48.4	100.0	0.0
Iowa	749	49.9	50.1	99.2	0.0
Kansas	722	48.8	51.2	98.3	0.0
Kentucky	702	49.7	50.3	99.9	0.0
Louisiana	1,199	59.8	40.2	88.8	0.0
Maine	161	0.0	100.0	9.3	0.0
Maryland	461	47.1	52.9	93.3	0.0
Massachusetts	537	42.8	57.2	89.8	0.0
Michigan	1,154	31.3	72.4	84.2	5.0
Minnesota	805	49.9	50.1	90.9	0.0
Mississippi	628	50.0	50.0	99.4	0.0
Missouri	896	47.7	52.3	83.3	0.0
Montana	326	49.7	50.3	100.0	0.0
Nebraska	261	0.0	100.0	7.7	0.0
Nevada	393	48.1	51.9	100.0	0.0
New Hampshire	184	32.6	67.4	66.3	0.0
New Jersey	849	34.4	65.6	71.1	0.0
New Mexico	938	35.9	64.1	98.9	0.0
New York	2,775	53.1	46.9	88.6	0.0
North Carolina	672	50.7	49.3	100.0	0.0
North Dakota	214	46.7	53.3	87.9	0.0
Ohio	835	49.5	50.5	87.2	0.0
Oklahoma	844	49.9	50.1	99.8	0.0
Oregon	337	45.1	54.9	93.5	0.0
Pennsylvania	858	48.6	51.4	99.0	0.0
Rhode Island	1,149	4.5	100.0	6.2	4.5
South Carolina	222	100.0	100.0	100.0	100.0
South Dakota	356	49.4	50.6	100.0	0.0
Tennessee	1,772	52.7	47.3	92.8	0.0
Texas	1,130	75.2	79.6	75.3	68.9
Utah	226	44.7	55.3	92.5	0.0
Vermont	213	50.2	49.8	98.6	0.0
Virginia	1,291	100.0	100.0	100.0	100.0
Washington	682	32.8	67.2	79.9	0.0
West Virginia	484	49.8	50.2	99.6	0.0
Wisconsin	392	97.2	99.5	97.4	97.2
Wyoming	275	48.7	51.3	100.0	0.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table IV.3. Source of the NPI Among IP Billing Provider IDs

State	Number of IP Billing Provider IDs with NPIs	Percent NPI Came from MSIS	Percent NPI Came from NPPES via the LPI	Percent NPI Came from State Provider File
Alabama	573	100.0	0.0	NA
Alaska	98	100.0	0.0	NA
Arizona	944	100.0	0.0	NA
Arkansas	427	98.4	1.6	NA
California	2,490	99.4	0.6	NA
Colorado	390	96.2	3.8	NA
Connecticut	678	100.0	0.0	NA
Delaware	43	100.0	0.0	NA
District of Columbia	173	99.4	0.6	NA
Florida	3,299	99.7	0.3	0.0
Georgia	724	99.9	0.1	NA
Hawaii	200	99.5	0.5	NA
Idaho	386	99.0	1.0	NA
Illinois	1,227	100.0	0.0	NA
Indiana	837	95.7	0.4	3.9
Iowa	743	99.1	0.9	NA
Kansas	710	99.0	1.0	NA
Kentucky	701	100.0	0.0	NA
Louisiana	1,065	100.0	0.0	NA
Maine ^a	15	0.0	100.0	NA
Maryland	430	97.2	2.8	NA
Massachusetts	482	95.0	5.0	NA
Michigan	972	99.0	1.0	NA
Minnesota	732	94.7	5.3	NA
Mississippi	624	99.8	0.2	NA
Missouri	746	94.9	5.1	NA
Montana	326	100.0	0.0	NA
Nebraska ^a	20	0.0	100.0	NA
Nevada	393	100.0	0.0	NA
New Hampshire ^a	122	98.4	1.6	NA
New Jersey	604	92.9	7.1	NA
New Mexico	928	100.0	0.0	NA
New York	2,458	96.9	3.1	NA
North Carolina	672	89.9	4.6	5.5
North Dakota	188	100.0	0.0	NA
Ohio	728	88.7	11.3	NA
Oklahoma	842	99.9	0.1	NA
Oregon	315	97.5	2.5	NA
Pennsylvania	849	100.0	0.0	NA
Rhode Island ^a	71	73.2	26.8	NA
South Carolina	222	100.0	0.0	NA
South Dakota	356	99.7	0.3	NA
Tennessee	1,644	100.0	0.0	NA
Texas	851	100.0	0.0	NA
Utah	209	100.0	0.0	NA
Vermont	210	100.0	0.0	NA
Virginia	1,291	100.0	0.0	NA
Washington	545	99.8	0.2	NA
West Virginia	482	99.8	0.2	NA
Wisconsin	382	100.0	0.0	NA
Wyoming	275	100.0	0.0	NA

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information. Florida, Indiana, and North Carolina provided a state-specific provider file

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

Table IV.4. NPPES Linkage Rate Among IP Billing Provider IDs

State	Number of IP Billing Provider IDs	Number Linked to NPPES	Percent Linked to NPPES
Alabama	573	573	100.0
Alaska	99	95	96.0
Arizona	945	944	99.9
Arkansas	485	427	88.0
California	2,923	954	32.6
Colorado	421	390	92.6
Connecticut	681	678	99.6
Delaware	44	43	97.7
District of Columbia	195	148	75.9
Florida	3,396	3,291	96.9
Georgia	756	723	95.6
Hawaii	223	200	89.7
Idaho	431	386	89.6
Illinois	1,349	1,227	91.0
Indiana	837	837	100.0
Iowa	749	739	98.7
Kansas	722	710	98.3
Kentucky	702	701	99.9
Louisiana	1,199	930	77.6
Maine ^a	161	15	9.3
Maryland	461	429	93.1
Massachusetts	537	482	89.8
Michigan	1,154	964	83.5
Minnesota	805	731	90.8
Mississippi	628	624	99.4
Missouri	896	731	81.6
Montana	326	326	100.0
Nebraska ^a	261	20	7.7
Nevada	393	393	100.0
New Hampshire ^a	184	2	1.1
New Jersey	849	594	70.0
New Mexico	938	922	98.3
New York	2,775	2,435	87.7
North Carolina	672	666	99.1
North Dakota	214	188	87.9
Ohio	835	82	9.8
Oklahoma	844	842	99.8
Oregon	337	315	93.5
Pennsylvania	858	847	98.7
Rhode Island ^a	1,149	71	6.2
South Carolina	222	221	99.5
South Dakota	356	356	100.0
Tennessee	1,772	1,642	92.7
Texas	1,130	619	54.8
Utah	226	209	92.5
Vermont	213	210	98.6
Virginia	1,291	1,285	99.5
Washington	682	545	79.9
West Virginia	484	482	99.6
Wisconsin	392	382	97.4
Wyoming	275	275	100.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

Table IV.5. Entity Type Among IP Billing Provider IDs

State	Number of IP Billing Provider IDs Linked to NPPES	Percent Entity Type is an Organization	Percent Entity Type is an Individual	Percent Entity Type is Missing
Alabama	573	100.0	0.0	0.0
Alaska	95	100.0	0.0	0.0
Arizona	944	100.0	0.0	0.0
Arkansas	427	100.0	0.0	0.0
California ^b	954	99.4	0.6	0.0
Colorado	390	100.0	0.0	0.0
Connecticut	678	100.0	0.0	0.0
Delaware	43	100.0	0.0	0.0
District of Columbia	148	100.0	0.0	0.0
Florida	3,291	99.4	0.6	0.0
Georgia	723	83.4	16.6	0.0
Hawaii	200	93.5	6.5	0.0
Idaho	386	100.0	0.0	0.0
Illinois	1,227	100.0	0.0	0.0
Indiana	837	100.0	0.0	0.0
Iowa	739	100.0	0.0	0.0
Kansas	710	100.0	0.0	0.0
Kentucky	701	100.0	0.0	0.0
Louisiana	930	99.8	0.2	0.0
Maine ^{a,b}	15	100.0	0.0	0.0
Maryland	429	100.0	0.0	0.0
Massachusetts	482	100.0	0.0	0.0
Michigan	964	99.5	0.5	0.0
Minnesota	731	99.9	0.1	0.0
Mississippi	624	100.0	0.0	0.0
Missouri	731	94.3	5.7	0.0
Montana	326	100.0	0.0	0.0
Nebraska ^{a,b}	20	85.0	15.0	0.0
Nevada	393	100.0	0.0	0.0
New Hampshire ^{a,b}	2	100.0	0.0	0.0
New Jersey	594	96.1	3.9	0.0
New Mexico	922	99.1	0.9	0.0
New York	2,435	99.6	0.4	0.0
North Carolina	666	100.0	0.0	0.0
North Dakota	188	100.0	0.0	0.0
Ohio ^b	82	98.8	1.2	0.0
Oklahoma	842	100.0	0.0	0.0
Oregon	315	99.4	0.6	0.0
Pennsylvania	847	100.0	0.0	0.0
Rhode Island ^{a,b}	71	83.1	16.9	0.0
South Carolina	221	100.0	0.0	0.0
South Dakota	356	100.0	0.0	0.0
Tennessee	1,642	99.3	0.7	0.0
Texas ^b	619	96.4	3.6	0.0
Utah	209	100.0	0.0	0.0
Vermont	210	100.0	0.0	0.0
Virginia	1,285	99.9	0.1	0.0
Washington	545	98.7	1.3	0.0
West Virginia	482	100.0	0.0	0.0
Wisconsin	382	100.0	0.0	0.0
Wyoming	275	100.0	0.0	0.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

Table IV.6. NPPES Primary Taxonomy and Business Location Among IP Billing Provider IDs

State	Number of IP Billing Provider IDs Linked to NPPES	Number with a Primary Taxonomy Category	Percent with a Primary Taxonomy Category	Number with a Business Location	Percent with a Business Location
Alabama	573	573	100.0	573	100.0
Alaska	95	95	100.0	95	100.0
Arizona	944	940	99.6	944	100.0
Arkansas	427	421	98.6	427	100.0
California ^b	954	967	101.4	954	100.0
Colorado	390	387	99.2	390	100.0
Connecticut	678	678	100.0	678	100.0
Delaware	43	43	100.0	43	100.0
District of Columbia	148	148	100.0	148	100.0
Florida	3,291	3,286	99.8	3,291	100.0
Georgia	723	724	100.1	723	100.0
Hawaii	200	200	100.0	200	100.0
Idaho	386	386	100.0	386	100.0
Illinois	1,227	1,221	99.5	1,227	100.0
Indiana	837	837	100.0	837	100.0
Iowa	739	737	99.7	739	100.0
Kansas	710	710	100.0	710	100.0
Kentucky	701	701	100.0	701	100.0
Louisiana	930	923	99.2	930	100.0
Maine ^{a,b}	15	15	100.0	15	100.0
Maryland	429	418	97.4	429	100.0
Massachusetts	482	482	100.0	482	100.0
Michigan	964	965	100.1	964	100.0
Minnesota	731	730	99.9	731	100.0
Mississippi	624	624	100.0	624	100.0
Missouri	731	726	99.3	731	100.0
Montana	326	324	99.4	326	100.0
Nebraska ^{a,b}	20	20	100.0	20	100.0
Nevada	393	393	100.0	393	100.0
New Hampshire ^{a,b}	2	100	5000.0	2	100.0
New Jersey	594	590	99.3	594	100.0
New Mexico	922	922	100.0	922	100.0
New York	2,435	2,410	99.0	2,435	100.0
North Carolina	666	670	100.6	666	100.0
North Dakota	188	188	100.0	188	100.0
Ohio ^b	82	82	100.0	82	100.0
Oklahoma	842	842	100.0	842	100.0
Oregon	315	315	100.0	315	100.0
Pennsylvania	847	849	100.2	847	100.0
Rhode Island ^{a,b}	71	70	98.6	71	100.0
South Carolina	221	222	100.5	221	100.0
South Dakota	356	356	100.0	356	100.0
Tennessee	1,642	1,620	98.7	1,642	100.0
Texas ^b	619	622	100.5	619	100.0
Utah	209	209	100.0	209	100.0
Vermont	210	210	100.0	210	100.0
Virginia	1,285	1,282	99.8	1,285	100.0
Washington	545	543	99.6	545	100.0
West Virginia	482	482	100.0	482	100.0
Wisconsin	382	382	100.0	382	100.0
Wyoming	275	274	99.6	275	100.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

When the taxonomy category was not reported in NPPES but was reported in MSIS, the number with a primary taxonomy is greater than the number of provider IDs linked to NPPES and the percentage with a primary taxonomy category is more than 100 percent.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

Table IV.7. Distribution of NPPES Primary Taxonomy Among IP Billing Provider IDs

State	Number of IP Billing Provider IDs with NPPES Primary Taxonomy Category	Percent Hospitals	Percent Nursing & Custodial Care Facilities	Percent Hospital Units	Percent Ambulatory Health Care Facilities	Percent Other
Alabama	573	95.6	0.0	2.4	0.7	1.2
Alaska	95	87.4	0.0	8.4	3.2	1.1
Arizona	940	82.2	5.3	2.6	2.1	7.8
Arkansas	421	97.4	0.0	0.0	0.0	2.6
California ^b	967	92.2	0.3	4.8	1.6	1.1
Colorado	387	92.8	0.5	3.4	0.5	2.8
Connecticut	678	78.5	0.0	7.5	12.8	1.2
Delaware	43	95.3	0.0	4.7	0.0	0.0
District of Columbia	148	87.8	5.4	3.4	0.0	3.4
Florida	3,286	57.0	35.7	1.0	1.9	4.4
Georgia	724	68.0	0.6	4.3	1.8	25.4
Hawaii	200	36.5	40.0	3.0	2.0	18.5
Idaho	386	93.8	0.3	3.9	1.6	0.5
Illinois	1,221	91.0	0.2	8.4	0.2	0.1
Indiana	837	87.1	0.0	7.4	1.7	3.8
Iowa	737	78.6	0.3	3.5	1.4	16.3
Kansas	710	84.1	0.3	2.7	1.0	12.0
Kentucky	701	97.3	0.4	0.9	0.9	0.6
Louisiana	923	90.8	1.3	6.5	1.0	0.4
Maine ^{a,b}	15	100.0	0.0	0.0	0.0	0.0
Maryland	418	96.4	0.0	2.4	0.5	0.7
Massachusetts	482	93.6	0.0	0.6	5.8	0.0
Michigan	965	76.7	0.1	9.7	2.3	11.2
Minnesota	730	85.1	0.0	11.2	0.7	3.0
Mississippi	624	83.3	0.0	14.6	0.0	2.1
Missouri	726	62.1	0.0	5.0	5.9	27.0
Montana	324	85.8	1.2	7.7	2.2	3.1
Nebraska ^{a,b}	20	55.0	10.0	15.0	5.0	15.0
Nevada	393	74.8	0.5	1.5	20.4	2.8
New Hampshire ^{a,b}	100	85.0	0.0	11.0	0.0	4.0
New Jersey	590	78.5	1.4	9.8	1.7	8.6
New Mexico	922	87.6	0.1	4.4	2.3	5.5
New York	2,410	65.6	12.6	11.6	4.5	5.7
North Carolina	670	84.6	0.3	14.8	0.0	0.3
North Dakota	188	80.3	0.0	10.6	6.4	2.7
Ohio ^b	82	97.6	0.0	0.0	0.0	2.4
Oklahoma	842	98.7	0.0	0.0	0.1	1.2
Oregon	315	81.6	0.0	10.8	3.2	4.4
Pennsylvania	849	83.0	0.0	11.3	5.1	0.6
Rhode Island ^{a,b}	70	72.9	0.0	7.1	0.0	20.0
South Carolina	222	87.8	0.0	8.1	0.0	4.1
South Dakota	356	88.2	0.8	8.1	0.8	2.0
Tennessee	1,620	52.4	33.0	5.1	2.0	7.4
Texas ^b	622	81.0	0.3	3.2	4.2	11.3
Utah	209	79.4	1.9	13.9	1.9	2.9
Vermont	210	89.0	1.0	7.1	0.5	2.4
Virginia	1,282	51.3	19.4	0.9	22.9	5.4
Washington	543	87.8	0.0	7.7	1.3	3.1
West Virginia	482	92.3	0.0	7.5	0.0	0.2
Wisconsin	382	96.6	0.5	0.5	0.8	1.6
Wyoming	274	83.2	3.3	0.7	0.0	12.8

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

Table IV.8. Business Location Among IP Billing Provider IDs

State	Number of IP Billing Provider IDs with NPPES Business Location	Percent Within State of MSIS claim
Alabama	573	40.7
Alaska	95	33.7
Arizona	944	35.0
Arkansas	427	45.2
California ^b	954	40.5
Colorado	390	43.1
Connecticut	678	18.3
Delaware	43	20.9
District of Columbia	148	23.6
Florida	3,291	56.3
Georgia	723	45.1
Hawaii	200	88.0
Idaho	386	45.3
Illinois	1,227	34.7
Indiana	837	47.6
Iowa	739	35.7
Kansas	710	51.0
Kentucky	701	31.5
Louisiana	930	38.8
Maine ^{a,b}	15	93.3
Maryland	429	33.1
Massachusetts	482	51.5
Michigan	964	62.4
Minnesota	731	40.6
Mississippi	624	47.8
Missouri	731	69.9
Montana	326	43.6
Nebraska ^{a,b}	20	70.0
Nevada	393	45.5
New Hampshire ^{a,b}	2	50.0
New Jersey	594	44.6
New Mexico	922	32.0
New York	2,435	50.8
North Carolina	666	53.5
North Dakota	188	62.2
Ohio ^b	82	84.1
Oklahoma	842	42.6
Oregon	315	50.2
Pennsylvania	847	60.8
Rhode Island ^{a,b}	71	26.8
South Carolina	221	38.9
South Dakota	356	42.1
Tennessee	1,642	59.9
Texas ^b	619	63.5
Utah	209	52.2
Vermont	210	24.3
Virginia	1,285	53.7
Washington	545	63.3
West Virginia	482	28.0
Wisconsin	382	38.2
Wyoming	275	26.9

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

V. LT BILLING PROVIDER IDs

In this chapter, we focus on the quality and completeness of the LT billing provider IDs. As with the last chapter, we first examine the completeness of the data and then examine the quality. We conclude by identifying which states have usable MAXPC data and which states should not be used in LT provider research at this time. While the chapter's structure is the same as that of the previous chapter, the results differ.

A. Completeness of LT Billing Provider IDs

Similar to the last chapter, to measure the completeness of LT billing provider IDs, we examined the prevalence of provider IDs on LT claims, the extent to which an LPI may be associated with an NPI, and the linkage rate to the NPPES file. To be complete, a state must have a high percentage on all three measures.

1. Prevalence of Provider IDs on LT Claims

As of 2009, CMS revised the MSIS data dictionary specifications requiring states to include NPIs in their file submissions for the LT file. CMS instructed states to submit NPIs that correspond with legacy provider IDs in the same claim for LT billing providers. Given that the billing provider IDs were the only IDs required to be reported in the LT files prior to February 2009, the new requirement was a natural extension of the reporting of LT legacy billing provider IDs. All LT claims have either the NPI or LPI (Table V.1). This is not a surprise because the billing information is required for provider reimbursement under the FFS system.

2. NPIs Versus LPIs Among LT Billing Provider IDs

Among the records with an LT billing provider ID, it is important to understand the distribution of IDs by ID type. Thirty-four states followed the expected method, submitting both an NPI and LPI (Table V.2). Seven states (Alaska, California, Delaware, Georgia, Texas, Virginia, and Wisconsin) submitted the same NPI in both the NPI and LPI fields for the majority

of provider IDs. While submission of the same provider ID in both data elements was not desired, it was acceptable in the creation of MAXPC because we were still able to obtain provider characteristics. Researchers interested in using the MAXPC file to connect the NPI to the LPI for longitudinal provider research, however, will experience difficulties with those seven states because many provider LPIs will be unavailable. In addition, more than 30 percent of the LT providers did not have an NPI in four states (California, Maine, Nebraska, and Rhode Island).

For almost all states, the NPI came directly from the MSIS record (Table V.3). When the NPI was not part of the MSIS record, we used the LPI to find the provider in the NPPES file (in either the Medicaid provider ID or Medicare UPIN) and then assigned the NPI from NPPES. By following this method, we found an additional 1,064 NPIs. Massachusetts, New Jersey, New York, and South Carolina accounted for the majority of the NPIs (over 800) found using this method. We also used the state-provided cross-reference files in Florida, Indiana, and North Carolina to locate additional NPIs for the LPIs. The cross-reference files for Indiana and North Carolina added another 42 NPIs, whereas Florida's file added one NPI.

3. NPPES Linkage Rate Among LT Billing Provider IDs

We were encouraged by the high percentage of LT billing provider IDs with an NPI. While a non-missing value was good, it needed to link to an NPPES record to obtain provider characteristics for provider research. A poor linkage rate suggests that the NPI was invalid.

In Table V.4, we display the linkage rate. Forty-one states had a particularly high linkage rate (more than 90 percent). Four states linked well (70 to 90 percent), but not as high as desired (Illinois, Louisiana, South Carolina, and Washington). If these four states are included in provider research, they should be used with caution. The remaining six states, which include the four states that did not submit many NPIs (California, Maine, Nebraska, and Rhode Island) and two other states (New Hampshire and Ohio), had NPI values that did not link well and appear

invalid. For example, only 1 percent of New Hampshire and Ohio's IDs and a little more than one-third of California's IDs linked to NPPEs. MAXPC data for these six states should be excluded from LT provider research.

B. Quality of LT Billing Provider IDs

As with the last chapter, to measure the quality of the LT billing provider IDs, we examined the entity type, primary taxonomy, and business location among the provider IDs that linked to NPPEs. To be classified as high quality, a state must have a particularly high percentage with the expected entity type and primary taxonomy. While informative, business location was not a necessary condition for gauging quality.

1. Entity Type Among LT Billing Provider IDs

In dealing with LT *billing* providers, we expected the entity type to be an organization rather than an individual. Among the LT provider IDs that linked to NPPEs, such was the case for all but one state (Table V.5). For Nebraska, more than 10 percent of the linked provider IDs were classified as individuals.

2. Primary Taxonomy Among LT Billing Provider IDs

More than 90 percent of the LT billing provider IDs that linked to NPPEs identified a primary taxonomy category in NPPEs (Table V.6). Given that we are dealing with LT *billing* providers, we expected the primary taxonomy category to be a hospital, nursing facility, or residential treatment facility. In Table V.7, we list the top four taxonomy categories. As expected, the overwhelming majority were nursing/custodial care facilities, residential treatment facilities, hospitals, and hospital units. In one state, however, more than 20 percent of the LT billing providers were classified as something other than those four categories. On closer inspection (not shown), these atypical providers in California are physicians.

3. Business Location Among LT Billing Provider IDs

All LT provider IDs that linked to NPPES records provided a business location (Table V.6). We expected that most Medicaid beneficiaries would choose a long-term care facility located near their home, although some beneficiaries may move close to adult children when they enter a nursing facility. In Table V.8, among LT billing provider IDs that provided an address in NPPES, we compared the state on the claim to the state on the LT billing provider's address. The percentage of provider IDs within the same state was over 90 percent for 42 states. Alaska, District of Columbia, Nevada, and Wyoming had the lowest percentage of providers within the same state.

C. Usability of LT Billing Provider IDs in Research

In summary, we discovered that 41 states may be used for LT provider research owing to the high quality and completeness of their data. Six (California, Maine, Nebraska, New Hampshire, Ohio, and Rhode Island) should not be used for LT provider research because of poor data quality and poor completeness, and four states (Illinois, Louisiana, South Carolina, and Washington) should be used with caution.

Table V.1. Prevalence of Provider IDs on LT Claims

State	Number of Claims	Percent with NPI or LPI
Alabama	296,188	100.0
Alaska	16,579	100.0
Arizona	101,251	100.0
Arkansas	802,897	100.0
California	3,142,316	100.0
Colorado	538,651	100.0
Connecticut	303,292	100.0
Delaware	44,803	100.0
District of Columbia	39,743	100.0
Florida	654,352	100.0
Georgia	1,227,191	100.0
Hawaii	7,050	100.0
Idaho	124,678	100.0
Illinois	1,040,256	100.0
Indiana	795,295	100.0
Iowa	183,096	100.0
Kansas	358,632	100.0
Kentucky	366,829	100.0
Louisiana	398,067	100.0
Maine	170,418	100.0
Maryland	230,393	100.0
Massachusetts	487,402	100.0
Michigan	401,257	100.0
Minnesota	494,176	100.0
Mississippi	266,891	100.0
Missouri	620,879	100.0
Montana	59,959	100.0
Nebraska	118,308	100.0
Nevada	72,645	100.0
New Hampshire	96,029	100.0
New Jersey	462,369	100.0
New Mexico	123,136	100.0
New York	10,329,957	100.0
North Carolina	1,020,000	100.0
North Dakota	47,982	100.0
Ohio	803,573	100.0
Oklahoma	626,774	100.0
Oregon	119,720	100.0
Pennsylvania	1,008,188	100.0
Rhode Island	93,633	100.0
South Carolina	168,310	100.0
South Dakota	57,225	100.0
Tennessee	296,242	100.0
Texas	3,500,254	100.0
Utah	120,910	100.0
Vermont	52,584	100.0
Virginia	436,196	100.0
Washington	309,867	100.0
West Virginia	121,639	100.0
Wisconsin	278,584	100.0
Wyoming	31,737	100.0

Source: MSIS State Backup Files, FY 2009 Q2 - FY 2010 Q4.

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table V.2. NPIs Versus LPIs Among LT Billing Provider IDs

State	Number of LT Billing Provider IDs	Percent NPI	Percent LPI	Percent of LT Billing Provider IDs with an NPI	Percent LPI Equal to NPI
Alabama	538	49.3	50.7	100.0	0.0
Alaska	81	96.3	100.0	98.8	96.3
Arizona	288	50.0	50.0	100.0	0.0
Arkansas	622	48.7	51.3	99.7	0.0
California	3,069	64.2	100.0	64.8	64.2
Colorado	449	49.0	51.0	100.0	0.0
Connecticut	800	49.1	50.9	99.1	0.0
Delaware	67	98.5	100.0	98.5	98.5
District of Columbia	238	41.2	58.8	98.3	0.0
Florida	1,534	49.7	50.3	99.9	0.0
Georgia	438	99.1	100.0	99.1	99.1
Hawaii	123	48.0	52.0	95.9	0.0
Idaho	561	34.6	65.4	94.7	0.0
Illinois	2,216	58.4	41.6	71.1	0.0
Indiana	2,012	46.9	53.1	100.0	0.0
Iowa	1,334	50.0	50.0	100.0	0.0
Kansas	778	49.7	50.3	99.9	0.0
Kentucky	756	49.6	50.4	100.0	0.0
Louisiana	2,015	55.4	44.6	93.7	0.0
Maine	145	0.0	100.0	29.7	0.0
Maryland	475	51.8	48.2	98.1	0.0
Massachusetts	1,481	33.4	66.6	94.9	0.0
Michigan	1,714	31.9	70.7	92.6	3.7
Minnesota	1,691	49.0	51.0	98.3	0.0
Mississippi	524	50.4	49.6	99.2	0.0
Missouri	1,074	50.7	49.3	98.4	0.0
Montana	268	49.6	50.4	100.0	0.0
Nebraska	369	0.0	100.0	11.4	0.0
Nevada	234	50.4	49.6	99.1	0.0
New Hampshire	192	47.9	52.1	97.9	0.0
New Jersey	733	39.7	60.3	92.9	0.0
New Mexico	502	37.5	62.5	100.0	0.0
New York	3,459	48.2	51.8	94.6	0.0
North Carolina	1,871	44.9	55.1	100.0	0.0
North Dakota	406	47.0	53.0	94.6	0.0
Ohio	2,365	40.6	59.4	100.0	0.0
Oklahoma	909	49.7	50.3	100.0	0.0
Oregon	341	45.5	54.5	95.3	0.0
Pennsylvania	1,879	46.5	53.5	99.9	0.0
Rhode Island	324	31.5	100.0	34.6	31.5
South Carolina	285	9.8	100.0	79.3	9.8
South Dakota	333	48.9	51.1	99.4	0.0
Tennessee	899	50.6	49.4	94.7	0.0
Texas	2,081	95.3	99.4	95.3	95.3
Utah	223	48.4	51.6	96.9	0.0
Vermont	133	49.6	50.4	100.0	0.0
Virginia	374	100.0	100.0	100.0	100.0
Washington	798	33.7	66.3	81.1	0.0
West Virginia	481	49.9	50.1	100.0	0.0
Wisconsin	416	98.8	100.0	98.8	98.8
Wyoming	216	46.3	53.7	99.5	0.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information

Table V.3. Source of the NPI Among LT Billing Provider IDs

State	Number of LT Billing Provider IDs with NPIs	Percent NPI Came from MSIS	Percent NPI Came from NPPES via the LPI	Percent NPI Came from State Provider File
Alabama	538	100.0	0.0	NA
Alaska	80	97.5	2.5	NA
Arizona	288	100.0	0.0	NA
Arkansas	620	99.7	0.3	NA
California ^a	1,990	99.0	1.0	NA
Colorado	449	100.0	0.0	NA
Connecticut	793	99.0	1.0	NA
Delaware	66	100.0	0.0	NA
District of Columbia	234	100.0	0.0	NA
Florida	1,532	99.7	0.3	0.1
Georgia	434	100.0	0.0	NA
Hawaii	118	100.0	0.0	NA
Idaho	531	99.4	0.6	NA
Illinois	1,575	100.0	0.0	NA
Indiana	2,011	99.1	0.2	0.7
Iowa	1,334	100.0	0.0	NA
Kansas	777	99.9	0.1	NA
Kentucky	756	100.0	0.0	NA
Louisiana	1,888	99.9	0.1	NA
Maine ^a	43	0.0	100.0	NA
Maryland	466	99.6	0.4	NA
Massachusetts	1,406	71.0	29.0	NA
Michigan	1,587	99.3	0.7	NA
Minnesota	1,662	98.7	1.3	NA
Mississippi	520	99.6	0.4	NA
Missouri	1,057	98.3	1.7	NA
Montana	268	100.0	0.0	NA
Nebraska ^a	42	0.0	100.0	NA
Nevada	232	99.6	0.4	NA
New Hampshire	188	98.9	1.1	NA
New Jersey	681	85.8	14.2	NA
New Mexico	502	100.0	0.0	NA
New York	3,272	96.7	3.3	NA
North Carolina	1,871	97.2	1.3	1.4
North Dakota	384	100.0	0.0	NA
Ohio	2,364	99.0	1.0	NA
Oklahoma	909	100.0	0.0	NA
Oregon	325	97.5	2.5	NA
Pennsylvania	1,877	100.0	0.0	NA
Rhode Island ^a	112	94.6	5.4	NA
South Carolina	226	12.4	87.6	NA
South Dakota	331	99.4	0.6	NA
Tennessee	851	100.0	0.0	NA
Texas	1,983	100.0	0.0	NA
Utah	216	100.0	0.0	NA
Vermont	133	100.0	0.0	NA
Virginia	374	100.0	0.0	NA
Washington	647	100.0	0.0	NA
West Virginia	481	100.0	0.0	NA
Wisconsin	411	100.0	0.0	NA
Wyoming	215	100.0	0.0	NA

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information. Florida, Indiana, and North Carolina provided a state-specific provider file.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

Table V.4. NPPES Linkage Rate Among LT Billing Provider IDs

State	Number of LT Billing Provider IDs	Number Linked to NPPES	Percent Linked to NPPES
Alabama	538	530	98.5
Alaska	81	78	96.3
Arizona	288	288	100.0
Arkansas	622	620	99.7
California ^a	3,069	1,201	39.1
Colorado	449	449	100.0
Connecticut	800	793	99.1
Delaware	67	64	95.5
District of Columbia	238	234	98.3
Florida	1,534	1,526	99.5
Georgia	438	433	98.9
Hawaii	123	118	95.9
Idaho	561	531	94.7
Illinois	2,216	1,575	71.1
Indiana	2,012	2,011	100.0
Iowa	1,334	1,334	100.0
Kansas	778	775	99.6
Kentucky	756	756	100.0
Louisiana	2,015	1,693	84.0
Maine ^a	145	43	29.7
Maryland	475	466	98.1
Massachusetts	1,481	1,406	94.9
Michigan	1,714	1,583	92.4
Minnesota	1,691	1,646	97.3
Mississippi	524	520	99.2
Missouri	1,074	1,053	98.0
Montana	268	268	100.0
Nebraska ^a	369	42	11.4
Nevada	234	232	99.1
New Hampshire	192	2	1.0
New Jersey	733	680	92.8
New Mexico	502	502	100.0
New York	3,459	3,265	94.4
North Carolina	1,871	1,863	99.6
North Dakota	406	384	94.6
Ohio	2,365	24	1.0
Oklahoma	909	907	99.8
Oregon	341	323	94.7
Pennsylvania	1,879	1,877	99.9
Rhode Island ^a	324	112	34.6
South Carolina	285	226	79.3
South Dakota	333	329	98.8
Tennessee	899	851	94.7
Texas	2,081	1,968	94.6
Utah	223	216	96.9
Vermont	133	133	100.0
Virginia	374	374	100.0
Washington	798	646	81.0
West Virginia	481	481	100.0
Wisconsin	416	411	98.8
Wyoming	216	215	99.5

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

Table V.5. Entity Type Among LT Billing Provider IDs

State	Number of LT Billing Provider IDs Linked to NPPES	Percent Entity Type is an Organization	Percent Entity Type is an Individual	Percent Entity Type is Missing
Alabama	530	100.0	0.0	0.0
Alaska	78	100.0	0.0	0.0
Arizona	288	100.0	0.0	0.0
Arkansas	620	100.0	0.0	0.0
California ^{a,b}	1,201	99.8	0.2	0.0
Colorado	449	100.0	0.0	0.0
Connecticut	793	100.0	0.0	0.0
Delaware	64	100.0	0.0	0.0
District of Columbia	234	100.0	0.0	0.0
Florida	1,526	100.0	0.0	0.0
Georgia	433	99.1	0.9	0.0
Hawaii	118	100.0	0.0	0.0
Idaho	531	100.0	0.0	0.0
Illinois	1,575	100.0	0.0	0.0
Indiana	2,011	100.0	0.0	0.0
Iowa	1,334	100.0	0.0	0.0
Kansas	775	100.0	0.0	0.0
Kentucky	756	100.0	0.0	0.0
Louisiana	1,693	99.8	0.2	0.0
Maine ^{a,b}	43	100.0	0.0	0.0
Maryland	466	100.0	0.0	0.0
Massachusetts	1,406	99.9	0.1	0.0
Michigan	1,583	100.0	0.0	0.0
Minnesota	1,646	99.9	0.1	0.0
Mississippi	520	100.0	0.0	0.0
Missouri	1,053	100.0	0.0	0.0
Montana	268	100.0	0.0	0.0
Nebraska ^{a,b}	42	88.1	11.9	0.0
Nevada	232	100.0	0.0	0.0
New Hampshire ^b	2	100.0	0.0	0.0
New Jersey	680	100.0	0.0	0.0
New Mexico	502	100.0	0.0	0.0
New York	3,265	99.0	1.0	0.0
North Carolina	1,863	99.9	0.1	0.0
North Dakota	384	100.0	0.0	0.0
Ohio ^b	24	100.0	0.0	0.0
Oklahoma	907	100.0	0.0	0.0
Oregon	323	99.4	0.6	0.0
Pennsylvania	1,877	100.0	0.0	0.0
Rhode Island ^{a,b}	112	99.1	0.9	0.0
South Carolina	226	100.0	0.0	0.0
South Dakota	329	100.0	0.0	0.0
Tennessee	851	99.6	0.4	0.0
Texas	1,968	99.9	0.1	0.0
Utah	216	100.0	0.0	0.0
Vermont	133	100.0	0.0	0.0
Virginia	374	100.0	0.0	0.0
Washington	646	100.0	0.0	0.0
West Virginia	481	100.0	0.0	0.0
Wisconsin	411	100.0	0.0	0.0
Wyoming	215	100.0	0.0	0.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

Table V.6. NPPES Primary Taxonomy and Business Location Among LT Billing Provider IDs

State	Number of LT Billing Provider IDs Linked to NPPES	Number with a Primary Taxonomy Category	Percent with a Primary Taxonomy Category	Number with a Business Location	Percent with a Business Location
Alabama	530	538	101.5	530	100.0
Alaska	78	74	94.9	78	100.0
Arizona	288	286	99.3	288	100.0
Arkansas	620	612	98.7	620	100.0
California ^{a,b}	1,201	1,216	101.2	1,201	100.0
Colorado	449	445	99.1	449	100.0
Connecticut	793	788	99.4	793	100.0
Delaware	64	65	101.6	64	100.0
District of Columbia	234	234	100.0	234	100.0
Florida	1,526	1,525	99.9	1,526	100.0
Georgia	433	434	100.2	433	100.0
Hawaii	118	118	100.0	118	100.0
Idaho	531	531	100.0	531	100.0
Illinois	1,575	1,524	96.8	1,575	100.0
Indiana	2,011	1,996	99.3	2,011	100.0
Iowa	1,334	1,287	96.5	1,334	100.0
Kansas	775	771	99.5	775	100.0
Kentucky	756	756	100.0	756	100.0
Louisiana	1,693	1,686	99.6	1,693	100.0
Maine ^{a,b}	43	43	100.0	43	100.0
Maryland	466	449	96.4	466	100.0
Massachusetts	1,406	1,403	99.8	1,406	100.0
Michigan	1,583	1,560	98.5	1,583	100.0
Minnesota	1,646	1,642	99.8	1,646	100.0
Mississippi	520	520	100.0	520	100.0
Missouri	1,053	1,046	99.3	1,053	100.0
Montana	268	263	98.1	268	100.0
Nebraska ^{a,b}	42	40	95.2	42	100.0
Nevada	232	226	97.4	232	100.0
New Hampshire ^b	2	149	7450.0	2	100.0
New Jersey	680	680	100.0	680	100.0
New Mexico	502	498	99.2	502	100.0
New York	3,265	3,236	99.1	3,265	100.0
North Carolina	1,863	1,845	99.0	1,863	100.0
North Dakota	384	382	99.5	384	100.0
Ohio ^b	24	22	91.7	24	100.0
Oklahoma	907	909	100.2	907	100.0
Oregon	323	324	100.3	323	100.0
Pennsylvania	1,877	1,873	99.8	1,877	100.0
Rhode Island ^{a,b}	112	111	99.1	112	100.0
South Carolina	226	225	99.6	226	100.0
South Dakota	329	325	98.8	329	100.0
Tennessee	851	831	97.6	851	100.0
Texas	1,968	1,945	98.8	1,968	100.0
Utah	216	216	100.0	216	100.0
Vermont	133	133	100.0	133	100.0
Virginia	374	369	98.7	374	100.0
Washington	646	644	99.7	646	100.0
West Virginia	481	481	100.0	481	100.0
Wisconsin	411	411	100.0	411	100.0
Wyoming	215	214	99.5	215	100.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

When the taxonomy category was not reported in NPPES but was reported in MSIS, the number with a primary taxonomy is greater than the number of provider IDs linked to NPPES and the percentage with a primary taxonomy category is more than 100 percent.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

Table V.7. Distribution of NPPES Primary Taxonomy Among LT Billing Provider IDs

State	Number of LT Billing Provider IDs with NPPES Primary Taxonomy Category	Percent Nursing & Custodial Care Facilities	Percent Residential Treatment Facilities	Percent Hospitals	Percent Hospital Units	Percent Other
Alabama	538	83.6	6.5	5.0	2.2	2.6
Alaska	74	28.4	36.5	27.0	5.4	2.7
Arizona	286	88.8	2.8	7.7	0.7	0.0
Arkansas	612	86.3	6.9	4.4	0.0	2.5
California ^{a,b}	1,216	55.0	4.1	5.3	0.8	34.7
Colorado	445	85.6	2.5	1.3	4.9	5.6
Connecticut	788	91.2	0.3	6.5	0.8	1.3
Delaware	65	73.8	9.2	15.4	0.0	1.5
District of Columbia	234	85.5	9.4	3.8	0.0	1.3
Florida	1,525	95.0	3.5	0.4	0.3	0.9
Georgia	434	82.5	1.6	7.1	4.8	3.9
Hawaii	118	61.0	3.4	27.1	1.7	6.8
Idaho	531	76.6	0.4	19.0	3.8	0.2
Illinois	1,524	76.9	10.7	2.3	1.8	8.3
Indiana	1,996	73.6	20.2	2.7	0.5	3.1
Iowa	1,287	74.2	4.7	4.2	4.7	12.2
Kansas	771	94.0	2.9	2.6	0.0	0.5
Kentucky	756	73.5	6.0	6.7	13.0	0.8
Louisiana	1,686	65.9	17.7	6.9	4.0	5.5
Maine ^{a,b}	43	88.4	0.0	4.7	0.0	7.0
Maryland	449	94.2	2.2	2.4	0.7	0.4
Massachusetts	1,403	89.6	1.5	8.3	0.1	0.5
Michigan	1,560	85.7	0.0	7.2	1.1	6.0
Minnesota	1,642	67.7	10.8	9.4	3.0	9.0
Mississippi	520	80.0	4.2	3.8	11.2	0.8
Missouri	1,046	98.5	0.5	0.9	0.0	0.2
Montana	263	60.8	8.0	9.9	14.4	6.8
Nebraska ^{a,b}	40	82.5	5.0	2.5	0.0	10.0
Nevada	226	55.3	30.1	11.9	0.9	1.8
New Hampshire ^b	149	85.2	2.0	10.1	0.7	2.0
New Jersey	680	88.4	4.3	2.9	0.6	3.8
New Mexico	498	59.8	19.3	7.4	7.0	6.4
New York	3,236	76.0	4.3	8.0	5.0	6.8
North Carolina	1,845	84.9	11.2	2.1	1.1	0.7
North Dakota	382	75.1	2.6	5.8	9.9	6.5
Ohio ^b	22	90.9	0.0	9.1	0.0	0.0
Oklahoma	909	88.4	6.7	3.4	0.0	1.4
Oregon	324	77.8	10.5	2.5	1.9	7.4
Pennsylvania	1,873	82.2	4.9	3.0	8.6	1.2
Rhode Island ^{a,b}	111	80.2	10.8	4.5	0.0	4.5
South Carolina	225	86.7	6.7	5.3	1.3	0.0
South Dakota	325	59.7	0.9	9.8	14.5	15.1
Tennessee	831	87.0	1.8	6.6	2.6	1.9
Texas	1,945	84.4	6.8	5.7	1.3	1.7
Utah	216	89.8	0.9	5.6	1.9	1.9
Vermont	133	80.5	2.3	9.0	8.3	0.0
Virginia	369	82.7	1.4	10.6	3.5	1.9
Washington	644	88.4	0.0	3.6	7.8	0.3
West Virginia	481	76.3	12.1	4.2	6.2	1.2
Wisconsin	411	97.3	0.0	2.7	0.0	0.0
Wyoming	214	40.7	35.5	8.4	14.0	1.4

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

Table V.8. Business Location Among LT Billing Provider IDs

State	Number of LT Billing Provider IDs with NPPES Business Location	Percent Within State
Alabama	530	99.6
Alaska	78	47.4
Arizona	288	95.1
Arkansas	620	97.4
California ^{a,b}	1201	99.5
Colorado	449	97.6
Connecticut	793	95.2
Delaware	64	75.0
District of Columbia	234	67.9
Florida	1526	99.5
Georgia	433	96.8
Hawaii	118	98.3
Idaho	531	94.2
Illinois	1575	98.5
Indiana	2011	99.5
Iowa	1334	95.7
Kansas	775	98.7
Kentucky	756	99.5
Louisiana	1693	99.3
Maine ^{a,b}	43	97.7
Maryland	466	98.1
Massachusetts	1406	98.2
Michigan	1583	96.1
Minnesota	1646	94.3
Mississippi	520	95.8
Missouri	1053	99.2
Montana	268	88.8
Nebraska ^{a,b}	42	100.0
Nevada	232	54.7
New Hampshire ^b	2	100.0
New Jersey	680	97.5
New Mexico	502	81.9
New York	3265	94.4
North Carolina	1863	98.0
North Dakota	384	90.6
Ohio ^b	24	100.0
Oklahoma	907	96.0
Oregon	323	98.8
Pennsylvania	1877	99.0
Rhode Island ^{a,b}	112	94.6
South Carolina	226	98.7
South Dakota	329	92.7
Tennessee	851	98.5
Texas	1968	99.5
Utah	216	100.0
Vermont	133	78.2
Virginia	374	96.8
Washington	646	98.1
West Virginia	481	85.7
Wisconsin	411	98.5
Wyoming	215	66.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 30 percent of the provider IDs did not have a corresponding NPI.

^b More than 30 percent of the provider IDs did not link to NPPES.

VI. OT SERVICING PROVIDER IDs

In this chapter, we focus on the quality and completeness of the OT servicing provider IDs. We first examine the completeness of the data and then examine the quality. We conclude by identifying which states have usable data and which states should not be included in OT provider research at this time.

A. Completeness of OT Servicing Provider IDs

To measure the completeness of the OT servicing provider IDs, we examined the prevalence of provider IDs on OT claims, the extent to which an LPI may be associated with an NPI, and the linkage rate to the NPPES file. To be complete, a state must have a high percentage on all three measures.

1. Prevalence of Provider IDs on OT Claims

We began the analysis by examining the extent to which provider IDs are present on the OT claims (Table VI.1). All states have either the NPI or LPI reported on more than 90 percent of claims. However, unlike the IP, LT, and RX claims whereby HIPAA requires all providers to have NPIs, CMS does not require many non-medical Medicaid providers, whose claims are reported in the MSIS OT claims files, to include NPIs. Unfortunately, we have no means of measuring the percentage of claims submitted to MSIS that belong to non-medical providers.

Next, we examined the quality of the NPIs reported in the OT claims file. As of 2009, CMS revised the MSIS data dictionary specifications requiring states to include NPIs in their file submissions for the OT file. CMS instructed states to submit NPIs that correspond with legacy provider IDs in the same claim for OT servicing providers. The new requirement for reporting NPIs in the OT file was not as simple as the requirements previously noted for IP and LT providers. For the MSIS OT file, CMS previously required reporting of both the billing *and* servicing provider IDs. Despite CMS's instructions for states to report the NPI of the *servicing*

provider in the OT file, some states reported the NPI of the *billing* provider ID in the OT file. To compound matters, in FY 2009, some states mixed the reporting of provider IDs in the LPI data element. In some claims, the LPI data element contained an NPI; in other claims, the data element contained an LPI. Thus, in claims that included the NPI in the LPI data element, states were no longer reporting the true LPI.

To detect the errors, we compared the NPI to the servicing LPI and the billing LPI on OT claims. As shown in Table VI.2, seven states reported the NPIs of *billing* providers instead of *servicing* providers. Yet, it is important to note that the misreporting does not preclude linking a servicing provider ID to NPPES. Instead, the misreporting of the NPI causes an inaccurate linkage between the servicing provider ID and NPPES, which in turn causes provider characteristics to be inaccurate. Of the seven states with such misreporting, Georgia and Virginia have more than half of their NPIs equal to the OT legacy billing provider ID and should not be used for OT provider research. Alaska has more than 10 percent of its NPIs equal to the OT legacy billing provider ID and should be used with caution.

2. NPIs Versus LPIs Among OT Servicing Provider IDs

Among records with an OT servicing provider ID, it is important to understand the distribution of IDs by ID type. Twenty-five states followed the expected method, submitting both an NPI and LPI (Table VI.3). Four states submitted the same NPI in both the NPI and servicing LPI fields for the majority of provider IDs (California, Delaware, Texas, and Wisconsin). Such an approach is not the preferred method because researchers interested in using the MAXPC file to connect the NPI to the LPI for longitudinal research will be unable to do so for these four states. In addition, in twelve states (District of Columbia, Hawaii, Illinois, Maine, Maryland, Michigan, Nebraska, North Dakota, Ohio, Rhode Island, South Carolina, and Wisconsin), more than 30 percent of the OT servicing provider IDs did not have an NPI.

For almost all states, the NPI came directly from an MSIS record (Table VI.4). When the NPI was not included in the MSIS record, we used the LPI to find the provider in the NPPES file (in either the Medicaid provider ID or Medicare UPIN) and then assigned the NPI from NPPES. By following this method, we found more than 64,000 NPIs nationally, including 13,000 NPIs in Massachusetts, all 1,297 NPIs for Nebraska, and more than half of South Carolina's NPIs. We also used the state-provided cross-reference files in Florida, Indiana, and North Carolina to locate additional NPIs for the LPIs. The cross-reference files for Indiana and North Carolina added another 7,500 NPIs, whereas Florida's file did not identify any additional NPIs.

3. NPPES Linkage Rate Among OT Servicing Provider IDs

In Table VI.5, we display the linkage rates between the OT servicing provider IDs and NPPES. Eighteen states had a particularly high linkage rate (more than 90 percent). Fifteen states (Alaska, Arkansas, Connecticut, Delaware, Iowa, Kentucky, Louisiana, Massachusetts, New Mexico, New York, Pennsylvania, South Dakota, Tennessee, Washington, and Wyoming) linked well (70 to 90 percent), but not as high as desired. If included in provider research, the 15 states should be used with caution. The remaining 18 states, including the 12 states that did not submit many NPIs (District of Columbia, Hawaii, Illinois, Maine, Maryland, Michigan, Nebraska, North Dakota, Ohio, Rhode Island, South Carolina, and Wisconsin), and 6 other states (California, Idaho, Minnesota, Missouri, New Hampshire, and Texas), have NPI values that did not link well and appear invalid. These 18 states should be excluded from OT provider research.

B. Quality of OT Servicing Provider IDs

To measure the quality of the OT servicing provider IDs, we examined entity type, primary taxonomy, and business location among the provider IDs that linked to NPPES. To be classified as high quality, a state must have a particularly high percentage with the expected entity type and

primary taxonomy. While informative, business location was not a necessary condition for gauging quality.

1. Entity Type Among OT Servicing Provider IDs

In dealing with OT *servicing* providers, we expected the OT file to contain more individual entity types than organizational entity types, given that the number of individual providers rendering services to beneficiaries exceeds the number of organizational providers. Among the OT provider IDs that linked to NPPES, such was the case for all but seven states (Table VI.6). Michigan, New Hampshire, New Mexico and South Carolina classified between 30 and 50 percent of their OT servicing providers as an individual. California, Maine, and Missouri had less than 30 percent classified as an individual entity type. Researchers should exercise caution when working with these states in OT provider research.

2. Primary Taxonomy Among OT Servicing Provider IDs

All but a few of the OT provider IDs that linked to NPPES were identified with a primary taxonomy category in NPPES (Table VI.7). Given that we are dealing with OT servicing providers, we expected the largest share of reported primary taxonomy to fall into the category of allopathic and osteopathic physicians—the taxonomy category that covers internists and general practitioners. Other taxonomy categories that may be expected for OT servicing provider IDs are those of physician assistants and advanced practice nursing, behavioral health and social service providers, dentists, and eye and vision service providers. Organizational providers that could be identified in the servicing provider ID in the OT file include suppliers (e.g., durable medical equipment (DME) vendors, agencies, ambulatory health care facilities, hospitals, and transportation service providers), though they were not as prevalent as the allopathic and osteopathic physician taxonomy. In Table VI.8, we list the top five taxonomy categories for individual providers and, in Table VI.9, the top five taxonomy categories for organizational

providers. As expected, the overwhelming majority of OT providers were categorized as allopathic and osteopathic physicians, physician assistants and advanced practice nursing, followed by suppliers, hospitals, agencies, behavioral health and social service providers, dental providers, ambulatory health care facilities, and eye and vision service providers.

3. Business Location Among OT Servicing Provider IDs

All of the OT servicing provider IDs that linked to NPES provided a business location (Table VI.7). Our expectation for OT servicing provider IDs was that the vast majority of the businesses associated with the ID would be located in the beneficiary's state, given that a patient would probably want to visit a doctor or a laboratory close to home¹¹. In Table IV.10, among OT servicing providers that provided an address in NPES, we compared the state on the claim to the state on the OT servicing provider's address. As expected, the majority of OT servicing provider IDs that linked to NPES are within the same state as the beneficiary's state of residence. Only Ohio and Wyoming have more out-of-state than in-state providers.

C. Usability of OT Servicing Provider IDs in Research

In summary, 15 states (Alabama, Arizona, Colorado, Florida, Indiana, Kansas, Mississippi, Montana, Nevada, New Jersey, Oklahoma, Oregon, Utah, Vermont, and West Virginia) may be used in OT provider research owing to their high degree of data quality and completeness, and 16 states (Alaska, Arkansas, Connecticut, Delaware, Iowa, Kentucky, Louisiana, Massachusetts, New Mexico, New York, North Carolina¹², Pennsylvania, South Dakota, Tennessee, Washington, and Wyoming) should be used with caution. We should note, however, that Tennessee should not be used for OT servicing provider research *focusing on allopathic and*

¹¹ Although, beneficiaries may prefer to use out-of-state providers, such as DME (wheelchairs, scooters, assistive devices) vendors and surgical supply (titanium screws) and prostheses providers.

¹² In a research study focusing on allopathic and osteopathic physicians, over half were classified as organizational entities rather than individuals (Baugh and Verghese 2012).

osteopathic physicians because the state reported the ID for the physician's group practice in place of the servicing provider ID in MSIS whenever the servicing provider ID was unavailable (Baugh and Verghese 2012). The remaining 20 states (California, District of Columbia, Georgia, Hawaii, Idaho, Illinois, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, North Dakota, Ohio, Rhode Island, South Carolina, Texas, Virginia, and Wisconsin) should not be used for OT servicing provider research because of poor data quality and completeness.

Table VI.1. Prevalence of Provider IDs on OT Claims

State	Number of Claims	Percent with NPI or LPI
Alabama	26,383,460	100.0
Alaska	5,180,490	100.0
Arizona	41,991,128	100.0
Arkansas	29,847,981	100.0
California	202,440,603	100.0
Colorado	18,334,236	100.0
Connecticut	25,103,074	99.9
Delaware	7,324,019	100.0
District of Columbia	5,124,983	100.0
Florida	93,849,066	97.2
Georgia	52,043,701	100.0
Hawaii	5,114,672	100.0
Idaho	9,583,365	100.0
Illinois	86,009,449	100.0
Indiana	37,786,692	100.0
Iowa	15,708,143	100.0
Kansas	10,302,282	100.0
Kentucky	32,350,869	100.0
Louisiana	38,586,527	100.0
Maine	12,579,473	100.0
Maryland	36,014,714	100.0
Massachusetts	55,736,589	100.0
Michigan	67,724,400	100.0
Minnesota	40,547,122	100.0
Mississippi	24,755,057	100.0
Missouri	43,621,126	97.4
Montana	4,085,922	100.0
Nebraska	8,728,654	99.9
Nevada	5,407,078	100.0
New Hampshire	8,494,310	100.0
New Jersey	42,851,817	100.0
New Mexico	18,012,516	100.0
New York	201,994,255	100.0
North Carolina	88,619,969	100.0
North Dakota	2,543,618	100.0
Ohio	64,870,072	100.0
Oklahoma	28,475,513	100.0
Oregon	16,958,324	100.0
Pennsylvania	23,347,909	100.0
Rhode Island	5,814,993	100.0
South Carolina	21,645,473	100.0
South Dakota	2,571,584	100.0
Tennessee	32,782,465	100.0
Texas	166,528,320	99.6
Utah	5,677,718	100.0
Vermont	5,749,558	100.0
Virginia	24,378,035	100.0
Washington	32,421,838	100.0
West Virginia	13,030,188	100.0
Wisconsin	34,346,559	100.0
Wyoming	2,626,810	100.0

Source MSIS State Backup Files, FY 2009 Q2 - FY 2010 Q4, excluding capitation claims.

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table VI.2. Misreporting of NPIs to OT Billing Provider IDs, MAX 2009

State	Number NPI = OT Billing Provider ID	Number of NPIs in OT	Percent of Potentially Misreported NPIs
Alaska	1,613	6,830	23.6
California	19,151	624,249	3.1
Georgia	34,191	34,191	100.0
Michigan	55	35,707	0.2
Texas	1,845	83,050	2.2
Virginia	29,813	37,213	80.1
Wisconsin	356	22,994	1.5

Source: Medicaid Statistical Information System (MSIS) claims files, FY 2009Q2 - FY 2010Q4.

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table VI.3. NPIs Versus LPIs Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs	Percent NPI	Percent LPI	Percent of OT Servicing Provider IDs with an NPI	Percent LPI Equal to NPI
Alabama	44,185	38.8	61.2	100.0	0.0
Alaska	14,585	46.8	53.2	91.8	0.0
Arizona	51,264	44.9	55.1	91.2	0.0
Arkansas	44,258	41.7	58.3	70.6	0.0
California	776,881	80.4	97.5	90.1	79.9
Colorado	39,822	51.5	48.5	97.1	0.0
Connecticut	40,741	44.0	56.0	86.5	0.0
Delaware	8,147	77.0	99.4	77.5	76.9
District of Columbia	10,302	25.7	74.7	56.1	0.5
Florida	129,546	45.1	54.9	92.2	0.0
Georgia ^a	100,250	34.1	65.9	97.1	0.0
Hawaii	10,785	41.2	58.8	65.3	0.0
Idaho	29,348	33.9	66.1	70.0	0.0
Illinois	141,590	34.7	65.3	69.2	0.0
Indiana	61,073	44.7	55.3	97.3	0.0
Iowa	62,340	43.8	58.3	97.2	3.6
Kansas	44,172	37.6	62.4	96.1	0.0
Kentucky	54,579	45.3	78.4	89.7	30.3
Louisiana	43,247	51.6	48.4	91.7	0.0
Maine	8,028	0.1	99.9	0.1	0.0
Maryland	86,588	31.7	68.3	62.2	0.0
Massachusetts	84,143	35.6	64.4	86.0	0.0
Michigan	195,587	18.3	96.9	49.8	15.6
Minnesota	111,728	77.3	22.7	91.9	0.0
Mississippi	32,263	45.3	54.7	91.2	0.0
Missouri	57,595	20.7	79.3	74.4	0.0
Montana	17,104	47.3	52.7	97.6	0.0
Nebraska	30,412	0.0	100.0	4.3	0.0
Nevada	19,950	49.6	50.4	99.5	0.0
New Hampshire	18,620	41.1	58.9	85.3	0.0
New Jersey	68,244	58.2	41.8	97.3	0.0
New Mexico	56,879	27.8	72.2	84.5	0.0
New York	276,176	46.5	53.6	88.7	0.0
North Carolina	105,266	47.6	52.4	100.0	0.0
North Dakota	12,926	34.3	65.7	49.8	0.0
Ohio	80,592	31.3	68.7	58.2	0.0
Oklahoma	44,091	47.3	52.7	93.9	0.0
Oregon	40,211	47.7	75.3	94.7	30.5
Pennsylvania	92,945	42.1	57.9	90.3	0.0
Rhode Island	9,786	35.1	100.0	36.0	35.1
South Carolina	25,129	0.0	100.0	1.3	0.0
South Dakota	15,492	46.7	53.3	77.3	0.0
Tennessee	73,493	26.6	73.6	76.0	0.3
Texas	111,328	74.6	84.7	79.1	70.0
Utah	18,766	44.2	55.8	92.7	0.0
Vermont	14,811	51.9	48.1	99.0	0.0
Virginia ^a	74,427	50.0	50.0	100.0	0.0
Washington	94,013	32.3	67.7	79.1	0.0
West Virginia	32,803	49.4	50.6	95.5	0.0
Wisconsin	42,643	53.9	99.1	62.5	53.5
Wyoming	19,491	42.7	57.3	81.3	0.0

Source: MAXPC Validation Tables, 2009

Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

Table VI.4. Source of the NPI Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs with NPIs	Percent NPI Came from MSIS	Percent NPI Came from NPPES via the LPI	Percent NPI Came from State Provider File
Alabama	44,179	100.0	0.0	NA
Alaska	13,395	94.9	5.1	NA
Arizona	46,755	98.7	1.3	NA
Arkansas	31,261	93.7	6.3	NA
California	699,785	99.1	0.9	NA
Colorado	38,668	96.6	3.4	NA
Connecticut	35,244	99.4	0.6	NA
Delaware	6,311	99.7	0.3	NA
District of Columbia ^b	5,777	94.2	5.8	NA
Florida	119,381	98.6	1.4	0.0
Georgia ^a	97,364	99.8	0.2	NA
Hawaii ^b	7,040	96.6	3.4	NA
Idaho	20,544	92.2	7.8	NA
Illinois ^b	97,945	99.9	0.1	NA
Indiana	59,429	84.4	4.9	10.7
Iowa	60,606	99.0	1.0	NA
Kansas	42,431	99.9	0.1	NA
Kentucky	48,949	99.3	0.7	NA
Louisiana	39,653	100.0	0.0	NA
Maine ^b	12	100.0	0.0	NA
Maryland ^b	53,853	99.1	0.9	NA
Massachusetts	72,331	81.9	18.1	NA
Michigan ^b	97,398	95.3	4.7	NA
Minnesota	102,718	96.5	3.5	NA
Mississippi	29,415	99.9	0.1	NA
Missouri	42,855	94.1	5.9	NA
Montana	16,686	100.0	0.0	NA
Nebraska ^b	1,297	0.0	100.0	NA
Nevada	19,847	100.0	0.0	NA
New Hampshire	15,882	94.2	5.8	NA
New Jersey	66,416	97.7	2.3	NA
New Mexico	48,071	99.4	0.6	NA
New York	244,953	96.1	3.9	NA
North Carolina	105,244	97.9	1.0	1.1
North Dakota ^b	6,436	95.9	4.1	NA
Ohio ^b	46,886	100.0	0.0	NA
Oklahoma	41,380	99.1	0.9	NA
Oregon	38,088	99.8	0.2	NA
Pennsylvania	83,960	99.9	0.1	NA
Rhode Island ^b	3,523	97.4	2.6	NA
South Carolina ^b	325	44.9	55.1	NA
South Dakota	11,975	87.1	12.9	NA
Tennessee	55,856	98.5	1.5	NA
Texas	88,082	99.9	0.1	NA
Utah	17,395	99.9	0.1	NA
Vermont	14,664	99.6	0.4	NA
Virginia ^a	74,426	100.0	0.0	NA
Washington	74,401	100.0	0.0	NA
West Virginia	31,324	95.1	4.9	NA
Wisconsin ^b	26,635	98.7	1.3	NA
Wyoming	15,841	97.7	2.3	NA

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Florida, Indiana, and North Carolina provided a state-specific provider file.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

Table VI.5. NPPES Linkage Rate Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs	Number Linked to NPPES	Percent Linked to NPPES
Alabama	44,185	44,058	99.7
Alaska	14,585	13,032	89.4
Arizona	51,264	46,619	90.9
Arkansas	44,258	31,137	70.4
California	776,881	74,790	9.6
Colorado	39,822	38,429	96.5
Connecticut	40,741	34,879	85.6
Delaware	8,147	6,213	76.3
District of Columbia ^b	10,302	5,582	54.2
Florida	129,546	118,771	91.7
Georgia ^a	100,250	97,086	96.8
Hawaii ^b	10,785	7,008	65.0
Idaho	29,348	20,447	69.7
Illinois ^b	141,590	97,697	69.0
Indiana	61,073	58,386	95.6
Iowa	62,340	49,840	79.9
Kansas	44,172	42,195	95.5
Kentucky	54,579	48,821	89.5
Louisiana	43,247	38,317	88.6
Maine ^b	8,028	12	0.1
Maryland ^b	86,588	43,686	50.5
Massachusetts	84,143	72,178	85.8
Michigan ^b	195,587	96,586	49.4
Minnesota	111,728	54,012	48.3
Mississippi	32,263	29,272	90.7
Missouri	57,595	30,540	53.0
Montana	17,104	16,644	97.3
Nebraska ^b	30,412	1,297	4.3
Nevada	19,950	18,573	93.1
New Hampshire	18,620	1,026	5.5
New Jersey	68,244	64,783	94.9
New Mexico	56,879	47,911	84.2
New York	276,176	242,626	87.9
North Carolina	105,266	104,346	99.1
North Dakota ^b	12,926	6,394	49.5
Ohio ^b	80,592	1	0.0
Oklahoma	44,091	40,253	91.3
Oregon	40,211	37,993	94.5
Pennsylvania	92,945	83,585	89.9
Rhode Island ^b	9,786	3,505	35.8
South Carolina ^b	25,129	325	1.3
South Dakota	15,492	11,896	76.8
Tennessee	73,493	55,682	75.8
Texas	111,328	77,086	69.2
Utah	18,766	17,340	92.4
Vermont	14,811	14,615	98.7
Virginia ^a	74,427	71,074	95.5
Washington	94,013	73,945	78.7
West Virginia	32,803	31,261	95.3
Wisconsin ^b	42,643	26,509	62.2
Wyoming	19,491	15,779	81.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

Table VI.6. Entity Type Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs Linked to NPPES	Percent Entity Type is an Organization	Percent Entity Type is an Individual	Percent Entity Type is Missing
Alabama	44,058	15.3	84.7	0.0
Alaska	13,032	7.6	92.4	0.0
Arizona	46,619	17.8	82.2	0.0
Arkansas	31,137	14.5	85.5	0.0
California ^c	74,790	76.8	23.2	0.0
Colorado	38,429	14.8	85.2	0.0
Connecticut	34,879	19.2	80.8	0.0
Delaware	6,213	10.9	89.1	0.0
District of Columbia ^{b,c}	5,582	49.2	50.8	0.0
Florida	118,771	22.0	78.0	0.0
Georgia ^a	97,086	16.6	83.4	0.0
Hawaii ^{b,c}	7,008	34.5	65.5	0.0
Idaho ^c	20,447	18.4	81.6	0.0
Illinois ^{b,c}	97,697	18.9	81.1	0.0
Indiana	58,386	27.8	72.2	0.0
Iowa	49,840	22.8	77.2	0.0
Kansas	42,195	16.2	83.8	0.0
Kentucky	48,821	20.4	79.6	0.0
Louisiana	38,317	31.1	68.9	0.0
Maine ^{b,c}	12	100.0	0.0	0.0
Maryland ^{b,c}	43,686	23.9	76.1	0.0
Massachusetts	72,178	13.4	86.6	0.0
Michigan ^{b,c}	96,586	64.9	35.1	0.0
Minnesota ^c	54,012	30.6	69.4	0.0
Mississippi	29,272	19.4	80.6	0.0
Missouri ^c	30,540	79.6	20.4	0.0
Montana	16,644	20.7	79.3	0.0
Nebraska ^{b,c}	1,297	42.8	57.2	0.0
Nevada	18,573	16.7	83.3	0.0
New Hampshire ^c	1,026	51.0	49.0	0.0
New Jersey	64,783	27.1	72.9	0.0
New Mexico	47,911	67.0	33.0	0.0
New York	242,626	15.4	84.6	0.0
North Carolina	104,346	38.3	61.7	0.0
North Dakota ^{b,c}	6,394	26.3	73.7	0.0
Ohio ^{b,c}	1	0.0	100.0	0.0
Oklahoma	40,253	20.0	80.0	0.0
Oregon	37,993	10.0	90.0	0.0
Pennsylvania	83,585	17.4	82.6	0.0
Rhode Island ^{b,c}	3,505	12.6	87.4	0.0
South Carolina ^{b,c}	325	51.1	48.9	0.0
South Dakota	11,896	35.3	64.7	0.0
Tennessee	55,682	37.2	62.8	0.0
Texas ^c	77,086	21.1	78.9	0.0
Utah	17,340	24.1	75.9	0.0
Vermont	14,615	5.0	95.0	0.0
Virginia ^a	71,074	19.7	80.3	0.0
Washington	73,945	34.2	65.8	0.0
West Virginia	31,261	18.2	81.8	0.0
Wisconsin ^{b,c}	26,509	35.2	64.8	0.0
Wyoming	15,779	9.0	91.0	0.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

Table VI.7. NPPES Primary Taxonomy and Business Location Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs Linked to NPPES	Number with a Primary Taxonomy Category	Percent with a Primary Taxonomy Category	Number with a Business Location	Percent with a Business Location
Alabama	44,058	44,063	100.0	44,058	100.0
Alaska	13,032	12,690	97.4	13,032	100.0
Arizona	46,619	46,042	98.8	46,619	100.0
Arkansas	31,137	31,018	99.6	31,137	100.0
California ^c	74,790	73,774	98.6	74,790	100.0
Colorado	38,429	38,171	99.3	38,429	100.0
Connecticut	34,879	34,034	97.6	34,879	100.0
Delaware	6,213	6,234	100.3	6,213	100.0
District of Columbia ^{b,c}	5,582	5,583	100.0	5,582	100.0
Florida	118,771	118,547	99.8	118,771	100.0
Georgia ^a	97,086	97,343	100.3	97,086	100.0
Hawaii ^{b,c}	7,008	6,887	98.3	7,008	100.0
Idaho ^c	20,447	20,386	99.7	20,447	100.0
Illinois ^{b,c}	97,697	96,736	99.0	97,697	100.0
Indiana	58,386	58,390	100.0	58,386	100.0
Iowa	49,840	49,445	99.2	49,840	100.0
Kansas	42,195	40,966	97.1	42,195	100.0
Kentucky	48,821	48,874	100.1	48,821	100.0
Louisiana	38,317	37,729	98.5	38,317	100.0
Maine ^{b,c}	12	12	100.0	12	100.0
Maryland ^{b,c}	43,686	43,174	98.8	43,686	100.0
Massachusetts	72,178	72,070	99.9	72,178	100.0
Michigan ^{b,c}	96,586	96,235	99.6	96,586	100.0
Minnesota ^c	54,012	63,749	118.0	54,012	100.0
Mississippi	29,272	29,314	100.1	29,272	100.0
Missouri ^c	30,540	33,741	110.5	30,540	100.0
Montana	16,644	16,433	98.7	16,644	100.0
Nebraska ^{b,c}	1,297	1,277	98.5	1,297	100.0
Nevada	18,573	18,532	99.8	18,573	100.0
New Hampshire ^c	1,026	11,469	1117.8	1,026	100.0
New Jersey	64,783	63,645	98.2	64,783	100.0
New Mexico	47,911	47,695	99.5	47,911	100.0
New York	242,626	237,683	98.0	242,626	100.0
North Carolina	104,346	104,102	99.8	104,346	100.0
North Dakota ^{b,c}	6,394	6,426	100.5	6,394	100.0
Ohio ^{b,c}	1	0	0.0	1	100.0
Oklahoma	40,253	40,725	101.2	40,253	100.0
Oregon	37,993	38,059	100.2	37,993	100.0
Pennsylvania	83,585	83,570	100.0	83,585	100.0
Rhode Island ^{b,c}	3,505	3,498	99.8	3,505	100.0
South Carolina ^{b,c}	325	321	98.8	325	100.0
South Dakota	11,896	11,808	99.3	11,896	100.0
Tennessee	55,682	55,483	99.6	55,682	100.0
Texas ^c	77,086	77,634	100.7	77,086	100.0
Utah	17,340	17,103	98.6	17,340	100.0
Vermont	14,615	14,404	98.6	14,615	100.0
Virginia ^a	71,074	71,495	100.6	71,074	100.0
Washington	73,945	73,583	99.5	73,945	100.0
West Virginia	31,261	31,291	100.1	31,261	100.0
Wisconsin ^{b,c}	26,509	26,501	100.0	26,509	100.0
Wyoming	15,779	15,782	100.0	15,779	100.0

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

When the taxonomy category was not reported in NPPES but was reported in MSIS, the number with a primary taxonomy is greater than the number of provider IDs linked to NPPES and the percentage with a primary taxonomy category is more than 100 percent.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

Table VI.8. Distribution of NPPES Primary Taxonomy Categories (for Individual Entities) Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs with NPPES Primary Taxonomy	Percent Allopathic and Osteopathic Physicians	Percent Physician Assistants and Advanced Practice Nursing Providers	Percent Behavioral Health and Social Service Providers	Percent Dental Providers	Percent Eye and Vision Service Providers	Percent Other Individual Service Providers
Alabama	44,063	58.3	10.6	0.8	3.3	2.3	10.1
Alaska	12,690	53.1	11.5	3.7	5.5	1.9	18.1
Arizona	46,042	57.7	9.2	2.5	0.2	1.5	14.5
Arkansas	31,018	42.5	5.0	7.0	0.4	2.5	28.1
California ^c	73,774	35.5	0.3	1.0	8.8	3.0	7.8
Colorado	38,171	41.0	7.4	2.2	3.8	1.5	8.5
Connecticut	34,034	62.0	8.3	4.4	4.3	1.8	5.8
Delaware	6,234	53.2	8.1	5.9	3.4	1.0	7.1
District of Columbia ^{b,c}	5,583	44.6	3.2	0.5	3.9	0.4	5.7
Florida	118,547	52.2	9.5	3.1	1.8	2.0	15.0
Georgia ^a	97,343	54.8	11.4	3.1	3.5	1.5	10.8
Hawaii ^{b,c}	6,887	49.2	2.8	8.9	4.2	3.5	12.7
Idaho ^c	20,386	51.2	13.3	2.5	4.4	2.2	9.6
Illinois ^{b,c}	96,736	63.9	4.9	0.1	2.5	1.7	8.1
Indiana	58,390	54.9	5.9	2.2	4.4	2.5	7.5
Iowa	49,445	57.1	7.5	1.2	5.3	2.8	12.0
Kansas	40,966	55.2	13.6	6.6	1.9	2.3	6.2
Kentucky	48,874	58.0	11.0	0.5	4.1	2.0	7.3
Louisiana	37,729	50.7	12.0	1.6	3.8	1.4	9.0
Maine ^{b,c}	12	0.0	0.0	0.0	0.0	0.0	25.0
Maryland ^{b,c}	43,174	65.0	4.1	4.6	3.4	0.6	8.3
Massachusetts	72,070	67.3	4.6	3.0	4.6	2.6	9.1
Michigan ^{b,c}	96,235	44.0	6.3	2.8	4.9	1.8	7.5
Minnesota ^c	63,749	27.3	7.3	6.4	4.3	1.7	9.6
Mississippi	29,314	57.3	13.7	1.6	3.6	1.9	5.9
Missouri ^c	33,741	46.1	4.8	5.0	1.4	2.0	7.3
Montana	16,433	47.2	10.9	7.1	4.4	1.9	9.0
Nebraska ^{b,c}	1,277	22.6	2.8	5.3	12.5	5.8	19.1
Nevada	18,532	60.0	5.3	4.2	4.4	1.8	7.8
New Hampshire ^c	11,469	56.2	10.7	7.1	4.7	1.6	6.8
New Jersey	63,645	65.2	2.6	1.1	3.3	1.8	7.0
New Mexico	47,695	36.3	3.7	4.8	2.7	1.5	22.7
New York	237,683	53.4	7.4	8.5	4.6	1.6	12.6
North Carolina	104,102	44.5	4.9	8.7	4.6	2.1	10.7
North Dakota ^{b,c}	6,426	38.6	10.2	8.9	3.8	3.6	15.7
Ohio ^{b,c}	0	0.0	0.0	0.0	0.0	0.0	0.0
Oklahoma	40,725	57.5	10.1	1.9	3.2	2.7	5.6
Oregon	38,059	58.0	10.5	2.8	5.2	2.1	12.5
Pennsylvania	83,570	64.9	1.9	0.5	2.8	1.3	12.5
Rhode Island ^{b,c}	3,498	63.6	5.8	6.3	3.4	2.5	5.9
South Carolina ^{b,c}	321	28.3	0.9	3.7	1.9	2.5	12.1
South Dakota	11,808	43.2	11.5	4.2	0.5	3.4	10.5
Tennessee	55,483	37.7	10.7	5.0	2.3	2.3	8.4
Texas ^c	77,634	50.0	8.2	6.1	4.9	1.6	9.6
Utah	17,103	56.7	3.6	1.1	7.1	2.7	12.9
Vermont	14,404	54.0	11.0	14.1	4.4	1.3	9.4
Virginia ^a	71,495	57.8	5.7	6.9	3.2	2.1	8.5
Washington	73,583	53.4	10.1	0.9	4.8	2.7	10.7
West Virginia	31,291	57.9	8.0	2.3	3.6	1.3	10.9
Wisconsin ^{b,c}	26,501	23.1	10.7	11.0	4.5	2.8	16.6
Wyoming	15,782	68.0	11.0	1.5	3.7	1.9	4.5

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

Table VI.9. Distribution of NPPES Primary Taxonomy Categories (for Organizational Entities) Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs with NPPES Primary Taxonomy	Percent Suppliers	Percent Hospitals	Percent Agencies	Percent Ambulatory Health Care Facilities	Percent Transportation Services	Percent Other Organizational Service Providers
Alabama	44,063	5.1	2.5	3.3	1.6	0.8	1.3
Alaska	12,690	1.2	0.2	1.7	1.0	0.4	1.9
Arizona	46,042	1.5	3.9	2.2	2.6	0.9	3.3
Arkansas	31,018	5.7	0.7	2.0	4.2	0.8	1.1
California ^c	73,774	3.9	18.3	5.4	9.0	2.0	5.0
Colorado	38,171	5.3	23.6	2.6	1.8	0.7	1.7
Connecticut	34,034	4.7	1.4	1.4	3.7	1.2	1.0
Delaware	6,234	4.8	1.4	0.2	13.3	1.1	0.5
District of Columbia ^{b,c}	5,583	6.3	21.4	2.8	6.2	0.4	4.7
Florida	118,547	6.7	2.6	2.1	2.2	0.4	2.6
Georgia ^a	97,343	4.9	2.4	3.9	2.1	0.5	1.2
Hawaii ^{b,c}	6,887	5.7	3.7	1.6	4.6	0.3	2.8
Idaho ^c	20,386	4.9	1.0	4.2	5.0	0.8	0.8
Illinois ^{b,c}	96,736	6.3	3.4	1.3	4.7	1.4	1.7
Indiana	58,390	6.0	6.6	6.0	1.8	1.2	1.0
Iowa	49,445	5.1	0.7	3.3	1.8	1.5	1.6
Kansas	40,966	3.8	0.6	4.4	2.4	0.9	2.1
Kentucky	48,874	7.7	1.5	4.2	1.5	1.2	1.1
Louisiana	37,729	2.9	3.3	9.0	3.4	0.3	2.7
Maine ^{b,c}	12	75.0	0.0	0.0	0.0	0.0	0.0
Maryland ^{b,c}	43,174	4.9	1.6	1.6	3.5	0.9	1.6
Massachusetts	72,070	1.4	0.6	2.0	2.1	1.0	1.7
Michigan ^{b,c}	96,235	7.1	17.5	2.7	3.3	1.1	1.0
Minnesota ^c	63,749	4.2	14.2	14.9	5.0	0.6	4.6
Mississippi	29,314	5.9	3.0	1.5	3.2	0.5	1.9
Missouri ^c	33,741	6.9	2.8	8.1	8.9	1.3	5.4
Montana	16,433	5.8	4.2	4.1	1.9	1.5	2.1
Nebraska ^{b,c}	1,277	12.7	1.3	3.5	6.0	3.9	4.3
Nevada	18,532	5.7	4.4	1.8	2.3	0.8	1.4
New Hampshire ^c	11,469	4.1	0.5	3.7	1.5	1.9	1.2
New Jersey	63,645	8.1	2.8	1.8	3.1	1.1	2.0
New Mexico	47,695	4.4	8.4	5.2	7.2	1.4	1.7
New York	237,683	4.2	2.1	2.5	1.1	1.2	0.9
North Carolina	104,102	6.0	1.2	8.3	2.6	0.5	6.0
North Dakota ^{b,c}	6,426	6.4	3.8	1.3	4.3	2.2	1.1
Ohio ^{b,c}	0	0.0	0.0	0.0	0.0	0.0	0.0
Oklahoma	40,725	5.5	4.5	2.2	4.8	1.2	0.8
Oregon	38,059	3.6	0.2	1.0	1.8	1.0	1.3
Pennsylvania	83,570	4.4	1.5	3.9	3.1	2.0	1.3
Rhode Island ^{b,c}	3,498	3.3	1.4	3.9	0.9	1.0	1.9
South Carolina ^{b,c}	321	11.2	19.3	12.5	1.9	0.0	5.6
South Dakota	11,808	5.4	6.2	4.8	4.2	2.8	3.5
Tennessee	55,483	2.7	21.6	2.1	2.7	1.2	3.3
Texas ^c	77,634	4.9	1.0	6.3	3.0	1.3	3.1
Utah	17,103	6.0	2.6	2.4	2.7	1.1	1.2
Vermont	14,404	1.6	0.4	0.6	0.8	1.7	0.6
Virginia ^a	71,495	6.5	2.4	2.7	1.7	1.2	1.3
Washington	73,583	4.1	2.3	1.2	6.7	0.7	2.4
West Virginia	31,291	6.1	2.4	1.5	1.9	1.8	2.3
Wisconsin ^{b,c}	26,501	6.2	13.7	3.5	3.4	1.7	2.7
Wyoming	15,782	2.3	0.3	3.4	1.9	0.7	0.7

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

Table VI.10. Business Location Among OT Servicing Provider IDs

State	Number of OT Servicing Provider IDs with NPPES Business Location	Percent Within State
Alabama	44,058	80.0
Alaska	13,032	61.3
Arizona	46,619	80.2
Arkansas	31,137	78.7
California ^c	74,790	89.0
Colorado	38,429	88.3
Connecticut	34,879	77.3
Delaware	6,213	70.9
District of Columbia ^{b,c}	5,582	51.1
Florida	118,771	92.7
Georgia ^a	97,086	84.3
Hawaii ^{b,c}	7,008	92.1
Idaho ^c	20,447	65.5
Illinois ^{b,c}	97,697	75.3
Indiana	58,386	78.7
Iowa	49,840	63.3
Kansas	42,195	72.0
Kentucky	48,821	64.4
Louisiana	38,317	83.9
Maine ^{b,c}	12	100.0
Maryland ^{b,c}	43,686	78.7
Massachusetts	72,178	91.3
Michigan ^{b,c}	96,586	85.5
Minnesota ^c	54,012	82.8
Mississippi	29,272	63.0
Missouri ^c	30,540	81.8
Montana	16,644	62.4
Nebraska ^{b,c}	1,297	93.1
Nevada	18,573	68.5
New Hampshire ^c	1,026	81.2
New Jersey	64,783	75.4
New Mexico	47,911	60.7
New York	242,626	85.0
North Carolina	104,346	89.8
North Dakota ^{b,c}	6,394	72.0
Ohio ^{b,c}	1	0.0
Oklahoma	40,253	69.9
Oregon	37,993	75.4
Pennsylvania	83,585	89.0
Rhode Island ^{b,c}	3,505	85.2
South Carolina ^{b,c}	325	85.2
South Dakota	11,896	68.2
Tennessee	55,682	72.7
Texas ^c	77,086	94.0
Utah	17,340	87.2
Vermont	14,615	55.6
Virginia ^a	71,074	70.7
Washington	73,945	86.4
West Virginia	31,261	51.0
Wisconsin ^{b,c}	26,509	71.3
Wyoming	15,779	32.9

Source: MAXPC Validation Tables, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

VII. RX BILLING PROVIDER IDs

In this chapter, we focus on the quality and completeness of the RX billing provider IDs. We first examine the completeness of the data and then the quality. We conclude by identifying which states have usable data and which states should not be included in RX provider research at this time.

A. Completeness of RX Billing Provider IDs

To measure the completeness of the RX billing provider IDs, we examined the prevalence of provider IDs on RX claims, the extent to which an LPI may be associated with an NPI, and the linkage rate to the NPPES file. To be complete, a state must have a high percentage on all three measures.

1. Prevalence of Provider IDs on RX Claims

We began the analysis by examining the extent to which a provider ID is present on the RX claims (Table VII.1). All states reported either an NPI or LPI for nearly all claims. The result is not surprising given that billing information is a condition for provider reimbursement under the FFS system.

Similar to the process we undertook for the OT claims file and described in the previous chapter, we examined the quality of the NPIs reported in the RX claims file. As of 2009, CMS revised the MSIS data dictionary specifications requiring states to include NPIs in their file submissions for the RX file. CMS instructed states to submit NPIs that correspond with legacy provider IDs in the same claim for RX billing providers. The new requirement for reporting NPIs in the RX file was not as simple as the requirements previously noted for IP and LT providers. For the MSIS RX file, CMS previously required reporting of both the billing *and* prescribing provider IDs. Yet, despite CMS's instructions to states to report the NPI of *billing* providers in the RX file, some states reported the NPI of *prescribing* providers in the RX file.

To compound matters, in FY 2009, some states mixed the reporting of provider IDs in the LPI data element. In some claims, the LPI data element contained an NPI; in other claims, the data element contained an LPI. Thus, in claims where the NPI was in the LPI data element, the true LPIs were no longer reported.

To detect the errors, we compared the NPI to the billing LPI and the prescribing LPI. As shown in Table VII.2, eleven states reported the NPIs of *prescribing* providers instead of *billing* providers. However, it is important to note that misreporting does not preclude linking a provider ID to NPPES. Instead, misreported NPIs cause an inaccurate linkage between the billing provider ID and NPPES, which in turn causes the provider characteristics to be inaccurate. Of the eleven states misreporting, Connecticut and South Carolina had more than 90 percent of their NPIs equal to the RX prescribing provider ID and therefore should not be used. Florida, Nevada, and Oregon had more than 30 percent of their NPIs equal to the RX prescribing provider ID and therefore should be used with caution.

2. NPIs Versus LPIs Among RX Billing Provider IDs

Among the records with an RX billing provider ID, it is important to understand the distribution of IDs by ID type. Thirty-two states followed the expected method, submitting both an NPI and LPI (Table VII.3). Six states (Alaska, California, Delaware, Georgia, Virginia, and Wisconsin) submitted the same NPI in both the NPI and LPI billing provider ID data element. While submitting the same provider ID in both data elements was not desirable, it was acceptable in the creation of MAXPC because we were still able to obtain provider characteristics. However, the lack of an LPI in the claim causes difficulties for researchers who want to use pre-2009 data to perform longitudinal provider research. In addition, in four states (Michigan, Nebraska, Rhode Island, and South Carolina), more than 30 percent of the RX billing provider IDs lacked an NPI.

For almost all states, the NPI came directly from the MSIS record (Table VII.4). When the NPI was not part of the MSIS record, we used the LPI to find the provider in the NPPES file (in either the Medicaid provider ID or Medicare UPIN) and then assigned the NPI from NPPES. By following this method, we found a large number of additional NPIs for Massachusetts, Nebraska, New Hampshire, South Carolina, and South Dakota. In Nebraska, which reported no NPIs, the method identified the 153 NPIs eventually linked to NPPES. We also used the state-provided cross-reference files in Florida, Indiana, and North Carolina to locate additional NPIs for the LPIs.

3. NPPES Linkage Rate Among RX Billing Provider IDs

In Table VII.5, we display the linkage rates between the RX billing provider IDs and NPPES. We were able to link more than 90 percent of RX billing provider IDs to NPPES in 39 states. Four states (Idaho, Massachusetts, Missouri, and South Dakota) just missed the 90 percent cutoff; therefore, if they are used in RX provider research, they should be used with caution. The remaining 8 states, which include the 4 states that did not submit many NPIs (Michigan, Nebraska, Rhode Island, and South Carolina) plus 4 other states (California, Maine, Ohio, and Washington), had NPI values that did not link well and appear invalid. For example, only 2 percent of Ohio's IDs and a little more than a quarter of California's IDs linked to NPPES records. These 8 states should be excluded from RX provider research.

B. Quality of RX Billing Provider IDs

To measure the quality of the RX billing provider IDs, we examined entity type, primary taxonomy category, and business location among the provider IDs that linked to NPPES. To be classified as high quality, a state must have a particularly high percentage with the expected entity type and primary taxonomy category. While informative, business location was not a necessary condition for gauging quality.

1. Entity Type Among RX Billing Provider IDs

Given that we are dealing with RX *billing* providers, we expected the number of organizational entity types to exceed the number of individual entity types. The reason is that provider IDs in the RX billing provider ID data element should be free-standing pharmacies. Among the RX provider IDs that linked to NPPES, this is true for all but five states (Colorado, Connecticut, Iowa, South Carolina, and Wyoming) (Table VII.6). If these states are used in RX provider research, they should be used with caution.

2. Primary Taxonomy Among RX Billing Provider IDs

All but a few of the RX provider IDs that linked to NPPES were identified with a primary taxonomy category in NPPES (Table VII.7). Given that we are dealing with RX billing providers, we expected the majority of reported primary taxonomy category values to be for the supplier taxonomy, which is the typical class for pharmacies. In Table VII.8, we list the top three taxonomy categories for these provider IDs. As expected, the overwhelming majority were suppliers, except in Colorado, Connecticut, Illinois, Iowa, Missouri, South Carolina, and Wyoming, where more than 40 percent were classified as physicians and other providers.

3. Business Location Among RX Billing Provider IDs

All of the RX billing provider IDs that linked to NPPES provided a business location (Table VII.7). Our expectation for RX billing provider IDs is that many of the business locations associated with IDs for episodic prescriptions would be located within a beneficiary's state, given that a patient would probably fill a prescription at either a close-to-home drug store chain or local pharmacy with its own NPI¹³. In Table IV.9, among RX billing provider IDs that

¹³ Many free-standing pharmacies operate local stores (CVS, Wal-Mart, Rite-Aid, Albertsons, and so forth) but are subunits of national or regional chains. An NPI's association with the beneficiary's state depends on whether the NPIs reported in claims are those of a local store, regional distribution center, or national chain. For beneficiaries in managed care plans, the plan may require beneficiaries to use mail-order pharmacies for most maintenance

provided an address in NPPES, we compared the state on the claim to the state on the RX billing provider's address. As expected, most of the RX billing provider IDs are located in the same state as the recipient's state of residence. Four states (District of Columbia, New Mexico, Tennessee, and Wyoming) did not fit the pattern.

C. Usability of RX Billing Provider IDs in Research

In summary, 32 states may be used for RX provider research owing to their high level of data quality and completeness. Of the remaining states, 9 (California, Connecticut, Maine, Michigan, Nebraska, Ohio, Rhode Island, South Carolina, and Washington) should not be used for RX provider research because of poor data quality and completeness, and 10 states (Colorado, Florida, Idaho, Iowa, Massachusetts, Missouri, Nevada, Oregon, South Dakota, and Wyoming) should be used with caution.

(continued)

prescriptions. For beneficiaries under fee-for-service arrangements, many states use pharmacy benefit managers that may encourage or require beneficiaries to use mail-order pharmacies for these prescriptions.

Table VII.1. Prevalence of Provider IDs on RX Claims

State	Number of Claims	Percent with NPI or LPI
Alabama	8,960,194	100.0
Alaska	1,039,858	100.0
Arizona	11,461,997	100.0
Arkansas	5,020,733	100.0
California	68,657,052	100.0
Colorado	3,551,641	100.0
Connecticut	8,606,520	100.0
Delaware	1,922,143	100.0
District of Columbia	1,007,335	100.0
Florida	25,728,479	100.0
Georgia	15,392,991	100.0
Hawaii	1,164,934	100.0
Idaho	1,752,899	100.0
Illinois	25,257,820	100.0
Indiana	11,820,020	100.0
Iowa	4,470,727	100.0
Kansas	3,871,457	100.0
Kentucky	11,966,848	100.0
Louisiana	12,493,027	100.0
Maine	3,704,311	100.0
Maryland	8,229,417	100.0
Massachusetts	9,907,708	100.0
Michigan	17,895,968	100.0
Minnesota	11,112,444	100.0
Mississippi	5,682,463	100.0
Missouri	13,680,465	100.0
Montana	975,571	100.0
Nebraska	2,865,966	100.0
Nevada	1,661,085	100.0
New Hampshire	1,421,071	100.0
New Jersey	11,472,873	97.5
New Mexico	4,586,621	100.0
New York	57,423,766	100.0
North Carolina	15,670,182	100.0
North Dakota	623,826	100.0
Ohio	9,456,606	100.0
Oklahoma	5,960,542	100.0
Oregon	5,422,908	100.0
Pennsylvania	8,839,661	100.0
Rhode Island	1,825,540	100.0
South Carolina	4,196,709	100.0
South Dakota	873,657	100.0
Tennessee	17,165,226	100.0
Texas	31,226,334	100.0
Utah	2,629,526	100.0
Vermont	2,258,065	100.0
Virginia	9,252,143	100.0
Washington	14,698,465	100.0
West Virginia	6,503,523	100.0
Wisconsin	13,595,799	100.0
Wyoming	561,208	100.0

Source: MSIS State Backup Files, FY 2009 Q2 - FY 2010 Q4.

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table VII.2. Misreporting of NPIs to RX Prescribing Provider IDs, MAX 2009

State	Number Where NPI = RX Prescribing Provider ID	Total Number of NPIs Reported in RX	Percent of Potentially Misreported NPIs
Arizona	11	1,196	0.9
Connecticut	24,474	25,026	97.8
Florida	1,862	4,009	46.4
Illinois	13	2,746	0.5
Indiana	29	1,370	2.1
Michigan	223	2,892	7.7
Nevada	165	519	31.8
Oregon	220	727	30.3
Pennsylvania	124	3,653	3.4
South Carolina	91	91	100.0
Utah	7	574	1.2

Source: Medicaid Statistical Information System (MSIS) claims files, FY 2009Q2 - FY 2010Q4.

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table VII.3. NPIs Versus LPIs Among RX Billing Provider IDs

State	Number of RX Billing Provider IDs	Percent NPI	Percent LPI	Percent of RX Billing Provider IDs with an NPI	Percent LPI Equal to NPI
Alabama	2,797	49.9	50.1	100.0	0.0
Alaska	173	100.0	100.0	100.0	100.0
Arizona	2,393	50.0	50.0	100.0	0.0
Arkansas	1,719	49.9	50.1	99.8	0.0
California	25,779	95.2	100.0	96.3	95.2
Colorado	21,075	96.0	4.0	99.4	0.0
Connecticut ^a	26,181	95.6	4.4	98.4	0.0
Delaware	265	100.0	100.0	100.0	100.0
District of Columbia	399	46.9	53.1	95.7	0.0
Florida	8,044	49.8	50.2	99.8	0.0
Georgia	2,378	93.1	99.4	95.3	93.1
Hawaii	530	48.7	51.3	93.2	0.0
Idaho	1,276	33.3	66.7	99.5	0.0
Illinois	3,760	73.0	27.0	96.5	0.0
Indiana	2,726	50.3	49.7	100.0	0.0
Iowa	12,599	92.1	7.9	97.4	0.0
Kansas	2,366	44.7	55.3	99.9	0.0
Kentucky	2,658	49.2	50.8	99.0	0.0
Louisiana	2,545	50.9	49.1	98.7	0.0
Maine	734	49.6	50.4	100.0	0.0
Maryland	2,508	49.6	50.4	99.4	0.0
Massachusetts	3,677	33.4	66.6	87.8	0.0
Michigan	11,909	24.3	97.6	53.1	22.4
Minnesota	2,816	50.0	50.0	99.3	0.0
Mississippi	1,766	50.0	50.0	99.9	0.0
Missouri	6,847	58.2	41.8	95.4	0.0
Montana	702	49.9	50.1	99.9	0.0
Nebraska	591	0.0	100.0	25.9	0.0
Nevada	1,039	50.0	50.0	99.9	0.0
New Hampshire	726	47.8	52.2	95.6	0.0
New Jersey	4,065	49.0	51.0	99.6	0.0
New Mexico	5,239	45.4	54.6	99.9	0.0
New York	9,331	49.7	50.3	99.1	0.0
North Carolina	4,264	49.9	50.1	100.0	0.0
North Dakota	550	50.2	49.8	98.5	0.0
Ohio	7,446	52.3	47.7	98.2	0.0
Oklahoma	2,103	50.0	50.0	99.9	0.0
Oregon	1,469	49.5	50.5	99.3	0.0
Pennsylvania	7,260	50.3	49.7	99.8	0.0
Rhode Island	235	8.1	100.0	30.2	8.1
South Carolina ^a	1,362	6.7	93.3	10.4	0.0
South Dakota	428	18.9	81.1	74.5	0.0
Tennessee	14,399	48.9	51.1	100.0	0.0
Texas	8,485	49.8	50.2	100.0	0.0
Utah	1,150	49.9	50.1	99.8	0.0
Vermont	477	49.3	50.7	99.2	0.0
Virginia	1,751	100.0	100.0	100.0	100.0
Washington	3,673	27.7	72.3	70.6	0.0
West Virginia	1,526	50.4	49.6	99.9	0.0
Wisconsin	1,406	99.7	100.0	99.7	99.7
Wyoming	4,947	95.8	4.2	97.6	0.0

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

Table VII.4. Source of the NPI Among RX Billing Provider IDs

State	Number of RX Billing Provider IDs with NPIs	Percent NPI Came from MSIS	Percent NPI Came from NPPES via the LPI	Percent NPI Came from State Provider File
Alabama	2,797	100.0	0.0	NA
Alaska	173	100.0	0.0	NA
Arizona	2,392	100.0	0.0	NA
Arkansas	1,716	99.9	0.1	NA
California	24,832	98.9	1.1	NA
Colorado	20,955	96.6	3.4	NA
Connecticut ^a	25,763	98.9	1.1	NA
Delaware	265	100.0	0.0	NA
District of Columbia	382	98.4	1.6	NA
Florida	8,031	100.0	0.0	0.0
Georgia	2,266	99.5	0.5	NA
Hawaii	494	99.8	0.2	NA
Idaho	1,269	99.8	0.2	NA
Illinois	3,628	100.0	0.0	NA
Indiana	2,726	98.8	0.3	1.0
Iowa	12,269	94.7	5.3	NA
Kansas	2,364	100.0	0.0	NA
Kentucky	2,632	100.0	0.0	NA
Louisiana	2,511	100.0	0.0	NA
Maine	734	100.0	0.0	NA
Maryland	2,494	100.0	0.0	NA
Massachusetts	3,228	76.5	23.5	NA
Michigan ^b	6,322	91.5	8.5	NA
Minnesota	2,797	99.5	0.5	NA
Mississippi	1,764	100.0	0.0	NA
Missouri	6,529	97.7	2.3	NA
Montana	701	100.0	0.0	NA
Nebraska ^b	153	0.0	100.0	NA
Nevada	1,038	100.0	0.0	NA
New Hampshire	694	81.0	19.0	NA
New Jersey	4,048	99.6	0.4	NA
New Mexico	5,234	100.0	0.0	NA
New York	9,245	99.3	0.7	NA
North Carolina	4,264	100.0	0.0	0.0
North Dakota	542	100.0	0.0	NA
Ohio	7,311	97.8	2.2	NA
Oklahoma	2,101	100.0	0.0	NA
Oregon	1,458	99.7	0.3	NA
Pennsylvania	7,246	100.0	0.0	NA
Rhode Island ^b	71	100.0	0.0	NA
South Carolina ^{a,b}	142	85.9	14.1	NA
South Dakota	319	52.4	47.6	NA
Tennessee	14,392	100.0	0.0	NA
Texas	8,484	100.0	0.0	NA
Utah	1,148	100.0	0.0	NA
Vermont	473	99.8	0.2	NA
Virginia	1,751	100.0	0.0	NA
Washington	2,592	100.0	0.0	NA
West Virginia	1,524	100.0	0.0	NA
Wisconsin	1,402	100.0	0.0	NA
Wyoming	4,827	98.5	1.5	NA

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Florida, Indiana, and North Carolina provided a state-specific provider file.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

Table VII.5. NPPES Linkage Rate Among RX Billing Provider IDs

State	Number of RX Billing Provider IDs	Number Linked to NPPES	Percent Linked to NPPES
Alabama	2,797	2,789	99.7
Alaska	173	172	99.4
Arizona	2,393	2,384	99.6
Arkansas	1,719	1,707	99.3
California	25,779	7,198	27.9
Colorado	21,075	20,854	99.0
Connecticut ^a	26,181	25,519	97.5
Delaware	265	264	99.6
District of Columbia	399	374	93.7
Florida	8,044	7,945	98.8
Georgia	2,378	2,203	92.6
Hawaii	530	490	92.5
Idaho	1,276	1,064	83.4
Illinois	3,760	3,609	96.0
Indiana	2,726	2,712	99.5
Iowa	12,599	12,214	96.9
Kansas	2,366	2,360	99.7
Kentucky	2,658	2,618	98.5
Louisiana	2,545	2,479	97.4
Maine	734	0	0.0
Maryland	2,508	2,484	99.0
Massachusetts	3,677	3,214	87.4
Michigan ^b	11,909	6,281	52.7
Minnesota	2,816	2,739	97.3
Mississippi	1,766	1,754	99.3
Missouri	6,847	5,468	79.9
Montana	702	697	99.3
Nebraska ^b	591	153	25.9
Nevada	1,039	1,020	98.2
New Hampshire	726	691	95.2
New Jersey	4,065	4,000	98.4
New Mexico	5,239	5,222	99.7
New York	9,331	9,157	98.1
North Carolina	4,264	4,250	99.7
North Dakota	550	532	96.7
Ohio	7,446	164	2.2
Oklahoma	2,103	2,075	98.7
Oregon	1,469	1,458	99.3
Pennsylvania	7,260	7,194	99.1
Rhode Island ^b	235	71	30.2
South Carolina ^{a,b}	1,362	142	10.4
South Dakota	428	317	74.1
Tennessee	14,399	14,329	99.5
Texas	8,485	8,459	99.7
Utah	1,150	1,128	98.1
Vermont	477	473	99.2
Virginia	1,751	1,741	99.4
Washington	3,673	2,568	69.9
West Virginia	1,526	1,520	99.6
Wisconsin	1,406	1,379	98.1
Wyoming	4,947	4,796	96.9

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

Table VII.6. Entity Type Among RX Billing Provider IDs

State	Number of RX Billing Provider IDs Linked to NPPES	Percent Entity Type is an Organization	Percent Entity Type is an Individual	Percent Entity Type is Missing
Alabama	2,789	99.6	0.4	0.0
Alaska	172	98.8	1.2	0.0
Arizona	2,384	98.2	1.8	0.0
Arkansas	1,707	99.2	0.8	0.0
California ^c	7,198	95.3	4.7	0.0
Colorado	20,854	5.9	94.1	0.0
Connecticut ^a	25,519	8.8	91.2	0.0
Delaware	264	100.0	0.0	0.0
District of Columbia	374	100.0	0.0	0.0
Florida	7,945	99.4	0.6	0.0
Georgia	2,203	99.5	0.5	0.0
Hawaii	490	93.3	6.7	0.0
Idaho	1,064	99.6	0.4	0.0
Illinois	3,609	99.4	0.6	0.0
Indiana	2,712	100.0	0.0	0.0
Iowa	12,214	9.7	90.3	0.0
Kansas	2,360	99.8	0.2	0.0
Kentucky	2,618	98.6	1.4	0.0
Louisiana	2,479	98.4	1.6	0.0
Maine ^c	0	0.0	0.0	100.0
Maryland	2,484	100.0	0.0	0.0
Massachusetts	3,214	100.0	0.0	0.0
Michigan ^{b,c}	6,281	98.9	1.1	0.0
Minnesota	2,739	100.0	0.0	0.0
Mississippi	1,754	99.0	1.0	0.0
Missouri	5,468	94.3	5.7	0.0
Montana	697	99.7	0.3	0.0
Nebraska ^{b,c}	153	97.4	2.6	0.0
Nevada	1,020	99.6	0.4	0.0
New Hampshire	691	100.0	0.0	0.0
New Jersey	4,000	99.5	0.5	0.0
New Mexico	5,222	99.8	0.2	0.0
New York	9,157	98.2	1.8	0.0
North Carolina	4,250	99.9	0.1	0.0
North Dakota	532	99.1	0.9	0.0
Ohio ^c	164	92.7	7.3	0.0
Oklahoma	2,075	99.9	0.1	0.0
Oregon	1,458	99.4	0.6	0.0
Pennsylvania	7,194	95.4	4.6	0.0
Rhode Island ^{b,c}	71	100.0	0.0	0.0
South Carolina ^{a,b,c}	142	13.4	86.6	0.0
South Dakota	317	99.7	0.3	0.0
Tennessee	14,329	99.9	0.1	0.0
Texas	8,459	99.4	0.6	0.0
Utah	1,128	99.3	0.7	0.0
Vermont	473	99.6	0.4	0.0
Virginia	1,741	99.8	0.2	0.0
Washington ^c	2,568	100.0	0.0	0.0
West Virginia	1,520	100.0	0.0	0.0
Wisconsin	1,379	99.9	0.1	0.0
Wyoming	4,796	4.7	95.3	0.0

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

Table VII.7. NPPES Primary Taxonomy and Business Location Among RX Billing Provider IDs

State	Number of RX Billing Provider IDs Linked to NPPES	Number with a Primary Taxonomy Category	Percent with a Primary Taxonomy Category	Number with a Business Location	Percent with a Business Location
Alabama	2,789	2,797	100.3	2,789	100.0
Alaska	172	165	95.9	172	100.0
Arizona	2,384	2,386	100.1	2,384	100.0
Arkansas	1,707	1,684	98.7	1,707	100.0
California ^c	7,198	7,115	98.8	7,198	100.0
Colorado	20,854	20,653	99.0	20,854	100.0
Connecticut ^a	25,519	25,030	98.1	25,519	100.0
Delaware	264	265	100.4	264	100.0
District of Columbia	374	362	96.8	374	100.0
Florida	7,945	7,999	100.7	7,945	100.0
Georgia	2,203	2,248	102.0	2,203	100.0
Hawaii	490	486	99.2	490	100.0
Idaho	1,064	1,261	118.5	1,064	100.0
Illinois	3,609	3,597	99.7	3,609	100.0
Indiana	2,712	2,705	99.7	2,712	100.0
Iowa	12,214	12,098	99.1	12,214	100.0
Kansas	2,360	2,299	97.4	2,360	100.0
Kentucky	2,618	2,609	99.7	2,618	100.0
Louisiana	2,479	2,395	96.6	2,479	100.0
Maine ^c	0	0	N/A	0	N/A
Maryland	2,484	2,407	96.9	2,484	100.0
Massachusetts	3,214	3,207	99.8	3,214	100.0
Michigan ^{b,c}	6,281	6,240	99.3	6,281	100.0
Minnesota	2,739	2,727	99.6	2,739	100.0
Mississippi	1,754	1,764	100.6	1,754	100.0
Missouri	5,468	5,413	99.0	5,468	100.0
Montana	697	693	99.4	697	100.0
Nebraska ^{b,c}	153	151	98.7	153	100.0
Nevada	1,020	1,038	101.8	1,020	100.0
New Hampshire	691	687	99.4	691	100.0
New Jersey	4,000	3,961	99.0	4,000	100.0
New Mexico	5,222	5,184	99.3	5,222	100.0
New York	9,157	8,943	97.7	9,157	100.0
North Carolina	4,250	4,095	96.4	4,250	100.0
North Dakota	532	538	101.1	532	100.0
Ohio ^c	164	150	91.5	164	100.0
Oklahoma	2,075	2,098	101.1	2,075	100.0
Oregon	1,458	1,454	99.7	1,458	100.0
Pennsylvania	7,194	7,122	99.0	7,194	100.0
Rhode Island ^{b,c}	71	71	100.0	71	100.0
South Carolina ^{a,b,c}	142	142	100.0	142	100.0
South Dakota	317	314	99.1	317	100.0
Tennessee	14,329	14,384	100.4	14,329	100.0
Texas	8,459	8,471	100.1	8,459	100.0
Utah	1,128	1,128	100.0	1,128	100.0
Vermont	473	457	96.6	473	100.0
Virginia	1,741	1,699	97.6	1,741	100.0
Washington ^c	2,568	2,571	100.1	2,568	100.0
West Virginia	1,520	1,519	99.9	1,520	100.0
Wisconsin	1,379	1,401	101.6	1,379	100.0
Wyoming	4,796	4,782	99.7	4,796	100.0

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

When the taxonomy category was not reported in NPPES but was reported in MSIS, the number with a primary taxonomy is greater than the number of provider IDs linked to NPPES and the percentage with a primary taxonomy category is more than 100 percent.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

Table VII.8. Distribution of NPPES Primary Taxonomy Among RX Billing Provider IDs

State	Number of RX Billing Provider IDs with NPPES Primary Taxonomy	Percent Suppliers	Percent Allopathic and Osteopathic Physicians	Percent Other Service Providers
Alabama	2,797	91.5	0.0	8.5
Alaska	165	92.7	1.8	5.5
Arizona	2,386	95.8	1.0	3.3
Arkansas	1,684	91.3	0.0	8.7
California ^c	7,115	91.1	3.7	5.2
Colorado	20,653	4.5	44.8	50.7
Connecticut ^a	25,030	6.4	55.5	38.1
Delaware	265	78.9	0.0	21.1
District of Columbia	362	98.6	0.0	1.4
Florida	7,999	96.5	0.4	3.1
Georgia	2,248	93.6	0.2	6.1
Hawaii	486	81.3	6.2	12.6
Idaho	1,261	97.1	0.0	2.9
Illinois	3,597	52.7	0.0	47.3
Indiana	2,705	95.5	0.1	4.4
Iowa	12,098	6.0	67.9	26.1
Kansas	2,299	96.8	0.0	3.2
Kentucky	2,609	93.0	1.1	5.9
Louisiana	2,395	92.9	0.9	6.2
Maine ^c	0	0.0	0.0	0.0
Maryland	2,407	98.0	0.1	1.9
Massachusetts	3,207	98.5	0.0	1.5
Michigan ^{b,c}	6,240	88.6	5.8	5.5
Minnesota	2,727	97.1	0.0	2.9
Mississippi	1,764	99.3	0.0	0.7
Missouri	5,413	55.4	20.8	23.8
Montana	693	93.9	0.0	6.1
Nebraska ^{b,c}	151	94.0	0.0	6.0
Nevada	1,038	100.0	0.0	0.0
New Hampshire	687	96.9	0.0	3.1
New Jersey	3,961	97.5	0.1	2.4
New Mexico	5,184	97.7	0.1	2.2
New York	8,943	92.0	1.5	6.5
North Carolina	4,095	96.7	0.0	3.3
North Dakota	538	80.3	0.2	19.5
Ohio ^c	150	74.7	1.3	24.0
Oklahoma	2,098	99.8	0.0	0.2
Oregon	1,454	94.6	0.1	5.4
Pennsylvania	7,122	79.6	9.4	10.9
Rhode Island ^{b,c}	71	98.6	0.0	1.4
South Carolina ^{a,b,c}	142	26.8	44.4	28.9
South Dakota	314	90.1	1.0	8.9
Tennessee	14,384	99.9	0.1	0.1
Texas	8,471	99.8	0.0	0.2
Utah	1,128	94.7	0.0	5.3
Vermont	457	96.1	0.7	3.3
Virginia	1,699	96.5	0.0	3.5
Washington ^c	2,571	98.6	0.0	1.4
West Virginia	1,519	99.8	0.0	0.2
Wisconsin	1,401	94.2	0.4	5.4
Wyoming	4,782	2.4	65.2	32.4

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

Table VII.9. Business Location Among RX Billing Provider IDs

State	Number of RX Billing Provider IDs with NPPES Business Location	Percent Within State
Alabama	2,789	93.2
Alaska	172	66.3
Arizona	2,384	90.8
Arkansas	1,707	88.3
California ^c	7,198	81.4
Colorado	20,854	78.6
Connecticut ^a	25,519	68.1
Delaware	264	68.2
District of Columbia	374	54.5
Florida	7,945	99.3
Georgia	2,203	96.3
Hawaii	490	97.1
Idaho	1,064	74.5
Illinois	3,609	83.3
Indiana	2,712	87.7
Iowa	12,214	65.6
Kansas	2,360	61.7
Kentucky	2,618	86.1
Louisiana	2,479	89.8
Maine ^c	0	0.0
Maryland	2,484	90.0
Massachusetts	3,214	96.5
Michigan ^{b,c}	6,281	91.6
Minnesota	2,739	80.8
Mississippi	1,754	91.1
Missouri	5,468	85.2
Montana	697	76.3
Nebraska ^{b,c}	153	86.9
Nevada	1,020	87.5
New Hampshire	691	76.6
New Jersey	4,000	96.0
New Mexico	5,222	20.8
New York	9,157	97.9
North Carolina	4,250	93.3
North Dakota	532	70.7
Ohio ^c	164	90.9
Oklahoma	2,075	82.7
Oregon	1,458	91.2
Pennsylvania	7,194	95.1
Rhode Island ^{b,c}	71	98.6
South Carolina ^{a,b,c}	142	90.8
South Dakota	317	73.5
Tennessee	14,329	21.7
Texas	8,459	98.8
Utah	1,128	89.7
Vermont	473	60.5
Virginia	1,741	86.6
Washington ^c	2,568	94.1
West Virginia	1,520	68.9
Wisconsin	1,379	88.5
Wyoming	4,796	34.4

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a More than 50 percent of the NPIs were reported for the billing provider, which causes inaccurate linkages to NPPES for the servicing provider ID.

^b More than 30 percent of the provider IDs did not have a corresponding NPI.

^c More than 30 percent of the provider IDs did not link to NPPES.

VIII. OT BILLING PROVIDER IDs

In this chapter, we discuss the quality and completeness of OT billing provider IDs. Unlike the OT servicing provider ID, the OT *billing* provider ID does not have a corresponding NPI field on the MSIS claim. Thus, we cannot explore data quality and completeness in much depth, although we present an assessment to the extent possible. We conclude by identifying which states have usable data and which states should not be included in OT billing provider research at this time.

A. Completeness of OT Billing Provider IDs

Unlike the NPIs found in the IP and LT claims files belonging to the IP and LT billing providers, respectively, NPIs in the OT claims file should belong to the servicing provider. Accordingly, it is impossible to establish a direct correlation between the *billing* provider ID and the NPI in the OT claims file. The issue then is how to find linkages between LPI billing provider IDs in the OT claims files and their corresponding provider characteristics in NPPES. One approach is to examine the claims in which the servicing and billing provider IDs are the same. Servicing and billing provider IDs are likely to be the same for independent practicing providers—physicians, dentists, podiatrists, or therapists—or other practitioners who do not submit bills through an affiliation with group practices.

We began the analysis by examining the extent to which a billing provider ID has the same value as a servicing provider ID. As shown in Table VIII.1, for many claims, OT billing provider IDs equal the OT servicing provider ID. According to the table, 12 states had a high percentage of OT billing provider IDs equal to OT servicing provider IDs (75 percent or higher), which in turn *also* had a high rate of linkage to the NPPES (75 percent or higher). We think those 12 states can be used in OT billing provider research. The states include Arizona, Connecticut, Florida, Georgia, Kentucky, Montana, New Jersey, New York, North Carolina,

Tennessee, Utah, and Virginia. Three additional states (Kansas, Louisiana, and Mississippi) just missed the 75 percent threshold and should be included in OT billing provider research, too. At the other end of the continuum, 21 states have a low percentage of matched IDs (below 50 percent) *or* low rates of linkage with NPPES (below 50 percent) and should be excluded from OT billing provider research: Alaska, Arkansas, California, District of Columbia, Hawaii, Idaho, Illinois, Maine, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, North Dakota, Ohio, Oregon, Rhode Island, South Carolina, and Wyoming.

B. Quality of OT Billing Provider IDs

Similar to the analysis we performed for other provider ID types, we examined the quality of OT billing provider IDs—entity type, primary taxonomy category, and business location—among the provider IDs that linked to NPPES. However, we did not assess data quality. We provide the following narrative and tables for information purposes only.

1. Entity Type Among OT Billing Provider IDs

In Table VIII.2, we show the distribution of entity types among OT billing provider IDs. Not surprisingly, half of the states in MAXPC show that OT billing provider IDs were organizational providers while the other half were individual providers. Compared to the magnitude of numbers reported in the servicing provider IDs, the OT billing provider IDs represent (1) independent practices, whereby the NPI of the provider rendering services to a patient is the same NPI used to bill Medicaid, and (2) group practices, whereby services rendered by multiple servicing provider IDs are billed under a single NPI. However, the variation across states in the percentages of organizational versus individual providers was substantial.

2. Primary Taxonomy Among OT Billing Provider IDs

Nearly all OT billing provider IDs that linked to NPPES were identified with a primary taxonomy category in NPPES (Table VIII.3). We expected the primary taxonomy category

reported for OT billing provider IDs to be either the practitioner rendering and billing the service—for individual practices—or, in the case of group practices, the taxonomy category of the lead partner of the group. In the discussion of primary taxonomy categories for OT servicing provider IDs, we listed several reported taxonomy categories, including allopathic and osteopathic physicians, physician assistants, behavioral health and social service providers, dental providers, suppliers, and agencies. As shown in Table VIII.4, the most frequently reported taxonomy categories were allopathic and osteopathic physicians, suppliers, agencies, dental providers, and ambulatory health care facilities. Physician assistants and behavioral health workers were less frequently reported (data not shown). We believe that the reporting differences reflect the fact that group practices consisted of several general practitioners and physician assistants or were located in a facility employing several behavioral health workers. In such cases, we assert that the reported NPI is the NPI of the lead partner likely to be reported with a taxonomy code of physician. Hence, physician assistants and behavioral health workers are not reported.

3. Business Location Among OT Billing Provider IDs

All OT billing provider IDs that linked to NPPES provided a business location (Table VIII.3). Our expectation for OT billing provider IDs does not differ from our expectation for OT servicing provider IDs. We believe that most business locations associated with OT provider IDs are in the beneficiary's state, including practitioners in group practices. In Table VIII.5, we compared the state on the claim to the state on the OT billing provider's address for OT billing provider IDs that provided an address in NPPES. As expected, the overwhelming majority of OT billing provider IDs were located in the same state as the recipient's state of residence.

C. Usability of OT Billing Provider IDs in Research

In summary, researchers using OT billing provider IDs should exercise caution. Only 15 states have sufficiently complete data for OT billing provider research: Arizona, Connecticut, Florida, Georgia, Kansas, Kentucky, Louisiana, Mississippi, Montana, New Jersey, New York, North Carolina, Tennessee, Utah, and Virginia. To improve data usability, CMS should add the NPI of the OT billing provider ID to the MSIS record layout or obtain state-specific provider files from each state.

Table VIII.1. OT Billing Provider IDs Versus OT Servicing Provider IDs

State	Number of OT Billing Provider IDs	Number of OT Billing Provider ID = Servicing Provider ID	Percent of OT Billing Provider ID = Servicing Provider ID	Percent of OT Billing Provider IDs = Servicing Provider IDs Linked to NPPES
Alabama	7,784	4,085	52.5	99.4
Alaska	4,400	1,928	43.8	89.9
Arizona	27,306	26,773	98.0	86.7
Arkansas	13,181	10,956	83.1	49.9
California	647,098	647,020	100.0	4.3
Colorado	7,666	5,177	67.5	83.6
Connecticut	10,279	8,570	83.4	93.6
Delaware	2,139	1,278	59.7	88.7
District of Columbia	3,362	3,002	89.3	42.9
Florida	56,184	50,019	89.0	83.5
Georgia	38,391	37,055	96.5	92.4
Hawaii	6,271	5,287	84.3	37.9
Idaho	10,682	8,812	82.5	44.1
Illinois	18,057	0	0.0	0.0
Indiana	11,374	7,346	64.6	94.0
Iowa	15,413	13,622	88.4	59.3
Kansas	11,783	8,813	74.8	81.4
Kentucky	17,889	14,419	80.6	98.0
Louisiana	11,476	11,215	97.7	74.2
Maine	5,473	8	0.1	100.0
Maryland	13,191	13,022	98.7	54.1
Massachusetts	20,643	8,014	38.8	62.6
Michigan	131,261	86,932	66.2	26.5
Minnesota	86,854	23,741	27.3	56.3
Mississippi	7,293	5,455	74.8	98.3
Missouri	12,541	3,358	26.8	68.9
Montana	5,601	4,481	80.0	90.4
Nebraska	17,005	14,486	85.2	9.0
Nevada	6,091	0	0.0	0.0
New Hampshire	4,496	3,699	82.3	20.8
New Jersey	29,557	26,263	88.9	93.3
New Mexico	25,799	21,217	82.2	67.2
New York	88,530	85,930	97.1	80.4
North Carolina	27,816	26,879	96.6	99.6
North Dakota	5,362	4,873	90.9	19.9
Ohio	30,055	0	0.0	0.0
Oklahoma	10,506	6,383	60.8	79.9
Oregon	30,347	4,145	13.7	88.2
Pennsylvania	25,052	20,494	81.8	62.5
Rhode Island	7,193	5,106	71.0	13.5
South Carolina	9,896	6,084	61.5	3.6
South Dakota	8,303	8,242	99.3	57.3
Tennessee	25,788	23,881	92.6	90.5
Texas	86,143	73,352	85.2	67.8
Utah	7,008	5,782	82.5	91.2
Vermont	3,926	2,485	63.3	96.1
Virginia	32,348	29,813	92.2	94.4
Washington	23,018	19,431	84.4	53.7
West Virginia	6,175	4,264	69.1	91.3
Wisconsin	30,467	28,890	94.8	55.1
Wyoming	3,397	2,256	66.4	46.1

Source: MSIS State Backup Files, FY 2009 Q2 - FY 2010 Q4.

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table VIII.2. Entity Type Among OT Billing Provider IDs

State	Number of OT Billing Provider IDs Linked to NPPES	Percent Entity Type is an Organization	Percent Entity Type is an Individual	Percent Linked to NPPES
Alabama	5,041	76.2	23.8	64.8
Alaska ^a	1,884	27.1	72.9	42.8
Arizona	23,271	18.5	81.5	85.2
Arkansas ^a	6,044	48.9	51.1	45.9
California ^a	27,830	65.1	34.9	4.3
Colorado	5,313	72.2	27.8	69.3
Connecticut	8,067	39.9	60.1	78.5
Delaware	1,221	59.9	40.1	57.1
District of Columbia ^a	1,450	52.0	48.0	43.1
Florida	44,063	35.2	64.8	78.4
Georgia	34,236	20.0	80.0	89.2
Hawaii ^a	2,031	35.3	64.7	32.4
Idaho ^a	4,279	53.6	46.4	40.1
Illinois ^a	1,176	99.6	0.4	6.5
Indiana	10,857	73.0	27.0	95.5
Iowa	8,943	66.6	33.4	58.0
Kansas	7,786	49.2	50.8	66.1
Kentucky	15,653	42.4	57.6	87.5
Louisiana	8,316	63.5	36.5	72.5
Maine ^a	1,224	83.3	16.7	22.4
Maryland	7,069	68.3	31.7	53.6
Massachusetts ^a	6,542	70.6	29.4	31.7
Michigan ^a	23,303	52.2	47.8	17.8
Minnesota ^a	17,026	59.5	40.5	19.6
Mississippi	6,148	58.7	41.3	84.3
Missouri ^a	5,146	77.3	22.7	41.0
Montana	4,054	47.8	52.2	72.4
Nebraska ^a	1,624	40.5	59.5	9.6
Nevada ^a	1,013	59.3	40.7	16.6
New Hampshire ^a	1,039	73.5	26.5	23.1
New Jersey	24,998	31.6	68.4	84.6
New Mexico	14,437	56.4	43.6	56.0
New York	70,250	18.1	81.9	79.4
North Carolina	27,630	75.4	24.6	99.3
North Dakota ^a	980	79.1	20.9	18.3
Ohio ^a	11,310	47.4	52.6	37.6
Oklahoma	6,472	65.0	35.0	61.6
Oregon ^a	4,542	49.0	51.0	15.0
Pennsylvania	13,196	55.4	44.6	52.7
Rhode Island ^a	776	58.2	41.8	10.8
South Carolina ^a	351	80.1	19.9	3.5
South Dakota	4,738	42.5	57.5	57.1
Tennessee	21,753	15.2	84.8	84.4
Texas	49,787	26.2	73.8	57.8
Utah	5,302	40.5	59.5	75.7
Vermont	2,952	29.5	70.5	75.2
Virginia	28,263	25.1	74.9	87.4
Washington	10,478	69.9	30.1	45.5
West Virginia	4,477	72.5	27.5	72.5
Wisconsin	15,950	38.0	62.0	52.4
Wyoming ^a	1,281	56.1	43.9	37.7

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a Less than 50 percent of the OT billing provider IDs equal the servicing provider IDs, or less than 50 percent of the OT billing provider IDs that equal the servicing provider ID linked to NPPES

Table VIII.3. NPPES Primary Taxonomy and Business Location Among OT Billing Provider IDs

State	Number of OT Billing Provider IDs Linked to NPPES	Number with a Primary Taxonomy	Percent with a Primary Taxonomy	Number with a Business Location	Percent with a Business Location
Alabama	5,041	5,013	99.4	5,041	100.0
Alaska ^a	1,884	1,838	97.6	1,884	100.0
Arizona	23,271	22,986	98.8	23,271	100.0
Arkansas ^a	6,044	6,022	99.6	6,044	100.0
California ^a	27,830	27,518	98.9	27,830	100.0
Colorado	5,313	5,231	98.5	5,313	100.0
Connecticut	8,067	7,982	98.9	8,067	100.0
Delaware	1,221	1,250	102.4	1,221	100.0
District of Columbia ^a	1,450	1,457	100.5	1,450	100.0
Florida	44,063	43,952	99.7	44,063	100.0
Georgia	34,236	34,313	100.2	34,236	100.0
Hawaii ^a	2,031	1,988	97.9	2,031	100.0
Idaho ^a	4,279	4,283	100.1	4,279	100.0
Illinois ^a	1,176	1,168	99.3	1,176	100.0
Indiana	10,857	10,715	98.7	10,857	100.0
Iowa	8,943	8,929	99.8	8,943	100.0
Kansas	7,786	7,550	97.0	7,786	100.0
Kentucky	15,653	15,658	100.0	15,653	100.0
Louisiana	8,316	8,172	98.3	8,316	100.0
Maine ^a	1,224	1,224	100.0	1,224	100.0
Maryland	7,069	7,075	100.1	7,069	100.0
Massachusetts ^a	6,542	6,438	98.4	6,542	100.0
Michigan ^a	23,303	23,175	99.5	23,303	100.0
Minnesota ^a	17,026	17,122	100.6	17,026	100.0
Mississippi	6,148	6,133	99.8	6,148	100.0
Missouri ^a	5,146	5,115	99.4	5,146	100.0
Montana	4,054	3,984	98.3	4,054	100.0
Nebraska ^a	1,624	1,573	96.9	1,624	100.0
Nevada ^a	1,013	1,013	100.0	1,013	100.0
New Hampshire ^a	1,039	2,287	220.1	1,039	100.0
New Jersey	24,998	24,446	97.8	24,998	100.0
New Mexico	14,437	14,364	99.5	14,437	100.0
New York	70,250	68,736	97.8	70,250	100.0
North Carolina	27,630	27,298	98.8	27,630	100.0
North Dakota ^a	980	983	100.3	980	100.0
Ohio ^a	11,310	11,114	98.3	11,310	100.0
Oklahoma	6,472	6,530	100.9	6,472	100.0
Oregon ^a	4,542	4,534	99.8	4,542	100.0
Pennsylvania	13,196	13,194	100.0	13,196	100.0
Rhode Island ^a	776	770	99.2	776	100.0
South Carolina ^a	351	347	98.9	351	100.0
South Dakota	4,738	4,704	99.3	4,738	100.0
Tennessee	21,753	21,647	99.5	21,753	100.0
Texas	49,787	49,580	99.6	49,787	100.0
Utah	5,302	5,249	99.0	5,302	100.0
Vermont	2,952	2,890	97.9	2,952	100.0
Virginia	28,263	28,526	100.9	28,263	100.0
Washington	10,478	10,389	99.2	10,478	100.0
West Virginia	4,477	4,471	99.9	4,477	100.0
Wisconsin	15,950	15,921	99.8	15,950	100.0
Wyoming ^a	1,281	1,280	99.9	1,281	100.0

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

When the taxonomy category was not reported in NPPES but was reported in MSIS, the number with a primary taxonomy is greater than the number of provider IDs linked to NPPES and the percentage with a primary taxonomy category is more than 100 percent.

^a Less than 50 percent of the OT billing provider IDs equal the servicing provider IDs, or less than 50 percent of the OT billing provider IDs that equal the servicing provider ID linked to NPPES

Table VIII.4. Distribution of NPPES Primary Taxonomy Among OT Billing Provider IDs

State	Number of OT Billing Provider IDs with NPPES Primary Taxonomy	Percent Allopathic and Osteopathic Physicians	Percent Suppliers	Percent Agencies	Percent Dental Providers	Percent Ambulatory Health Care Facilities
Alabama	5,013	21.4	22.7	12.5	5.6	5.5
Alaska ^a	1,838	27.1	6.7	2.0	11.8	3.0
Arizona	22,986	57.4	1.7	2.2	0.2	2.6
Arkansas ^a	6,022	39.6	15.2	5.4	1.7	5.6
California ^a	27,518	36.4	5.0	4.4	15.4	10.8
Colorado	5,231	24.4	18.8	8.6	6.1	7.2
Connecticut	7,982	58.8	9.8	2.4	3.7	4.9
Delaware	1,250	26.8	23.8	1.0	6.5	9.7
District of Columbia ^a	1,457	43.7	12.1	5.2	3.8	9.7
Florida	43,952	53.1	9.1	3.8	1.3	3.5
Georgia	34,313	49.3	6.5	3.6	3.8	2.4
Hawaii ^a	1,988	40.5	9.3	2.6	4.1	5.0
Idaho ^a	4,283	23.2	12.0	10.6	8.5	10.5
Illinois ^a	1,168	0.0	1.5	0.3	0.0	0.2
Indiana	10,715	30.4	16.3	5.9	9.8	4.9
Iowa	8,929	20.2	12.5	9.1	9.2	5.1
Kansas	7,550	31.0	10.9	10.4	3.5	6.3
Kentucky	15,658	46.2	13.5	7.1	5.4	3.2
Louisiana	8,172	32.1	6.1	20.4	5.6	6.3
Maine ^a	1,224	18.3	4.8	27.9	1.6	4.8
Maryland	7,075	43.3	14.8	2.9	1.6	8.1
Massachusetts ^a	6,438	23.4	10.2	5.9	3.9	6.5
Michigan ^a	23,175	40.3	16.9	3.7	8.4	3.5
Minnesota ^a	17,122	17.6	8.7	5.2	2.5	4.7
Mississippi	6,133	34.2	14.0	3.6	6.2	9.1
Missouri ^a	5,115	27.6	19.9	9.0	2.8	10.8
Montana	3,984	17.9	12.8	10.8	7.7	3.8
Nebraska ^a	1,573	21.4	10.4	3.5	13.5	5.4
Nevada ^a	1,013	45.1	12.3	5.7	2.2	10.2
New Hampshire ^a	2,287	18.5	14.1	11.1	6.3	3.8
New Jersey	24,446	63.4	11.6	2.5	2.8	2.9
New Mexico	14,364	31.4	9.3	3.6	4.1	7.7
New York	68,736	56.5	7.0	2.9	6.0	1.3
North Carolina	27,298	24.2	12.8	12.9	6.7	4.6
North Dakota ^a	983	11.3	20.3	4.1	7.1	9.6
Ohio ^a	11,114	41.8	2.1	4.9	5.6	5.6
Oklahoma	6,530	23.1	20.8	7.8	5.9	13.4
Oregon ^a	4,534	32.5	11.5	5.0	4.2	9.5
Pennsylvania	13,194	28.6	13.7	8.7	5.2	10.2
Rhode Island ^a	770	26.1	15.8	16.5	7.5	3.6
South Carolina ^a	347	13.5	9.5	12.1	2.3	1.2
South Dakota	4,704	35.2	6.7	6.0	0.7	4.8
Tennessee	21,647	56.4	2.8	1.4	2.1	1.6
Texas	49,580	47.8	7.3	5.8	5.2	3.8
Utah	5,249	38.3	9.8	3.9	12.2	4.6
Vermont	2,890	35.0	3.1	3.6	6.1	3.7
Virginia	28,526	56.1	8.1	3.4	4.0	1.9
Washington	10,389	25.5	17.4	3.9	8.9	10.3
West Virginia	4,471	20.5	17.9	6.3	7.8	7.0
Wisconsin	15,921	22.5	10.3	5.1	5.0	5.1
Wyoming ^a	1,280	17.7	8.8	20.6	13.9	7.0

Source: MAXPC File, 2009

Note Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a Less than 50 percent of the OT billing provider IDs equal the servicing provider IDs, or less than 50 percent of the OT billing provider IDs that equal the servicing provider ID linked to NPPES

Table VIII.5. Business Location Among OT Billing Provider IDs

State	Number of OT Billing Provider IDs with NPPES Business Location	Percent Within State
Alabama	5,041	81.7
Alaska ^a	1,884	84.2
Arizona	23,271	80.4
Arkansas ^a	6,044	82.7
California ^a	27,830	87.5
Colorado	5,313	93.5
Connecticut	8,067	86.2
Delaware	1,221	77.8
District of Columbia ^a	1,450	54.1
Florida	44,063	93.4
Georgia	34,236	81.6
Hawaii ^a	2,031	92.6
Idaho ^a	4,279	80.8
Illinois ^a	1,176	65.2
Indiana	10,857	84.0
Iowa	8,943	79.1
Kansas	7,786	83.0
Kentucky	15,653	80.6
Louisiana	8,316	81.5
Maine ^a	1,224	95.3
Maryland	7,069	85.5
Massachusetts ^a	6,542	96.4
Michigan ^a	23,303	86.7
Minnesota ^a	17,026	85.6
Mississippi	6,148	78.6
Missouri ^a	5,146	86.4
Montana	4,054	81.7
Nebraska ^a	1,624	93.5
Nevada ^a	1,013	89.5
New Hampshire ^a	1,039	88.6
New Jersey	24,998	83.6
New Mexico	14,437	60.1
New York	70,250	90.8
North Carolina	27,630	92.9
North Dakota ^a	980	72.3
Ohio ^a	11,310	93.5
Oklahoma	6,472	84.9
Oregon ^a	4,542	86.4
Pennsylvania	13,196	91.7
Rhode Island ^a	776	82.7
South Carolina ^a	351	65.8
South Dakota	4,738	73.8
Tennessee	21,753	86.0
Texas	49,787	95.4
Utah	5,302	86.0
Vermont	2,952	79.4
Virginia	28,263	76.9
Washington	10,478	91.4
West Virginia	4,477	71.6
Wisconsin	15,950	83.4
Wyoming ^a	1,281	73.1

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a Less than 50 percent of the OT billing provider IDs equal the servicing provider IDs, or less than 50 percent of the OT billing provider IDs that equal the servicing provider ID linked to NPPES

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IX. RX PRESCRIBING PROVIDER IDs

In this chapter, we discuss the quality and completeness of RX prescribing provider IDs. Unlike the RX billing provider ID, the RX *prescribing* provider ID does not have a corresponding NPI field on the MSIS claim. Thus, we cannot explore data quality and completeness in much depth, although we present an assessment to the extent possible. We conclude by identifying which states have usable data and which states should not be included in RX prescribing provider research at this time.

A. Completeness of RX Prescribing Provider IDs

Not unlike NPIs in the IP and LT claims files that belong to the IP and LT billing providers, respectively, NPIs in the RX claims files should also belong to the RX billing provider of a claim. Accordingly, we have no means of establishing a direct correlation between the *prescribing* provider ID and the NPI on the RX claims. The issue then is how to find linkages between prescribing provider IDs on the RX claims and the corresponding provider characteristics in NPES.

One approach is to examine the claims in which the RX prescribing and OT servicing provider IDs are the same. Prescribing provider IDs are often not reported in the MSIS; many states choose to 9-fill this data element because many state systems do not include prescribing provider IDs. When states report a value in the prescribing provider ID data element, we believe that the RX prescribing ID is likely to contain the same ID as the servicing provider ID data element of an OT claim. In other words, the provider rendering an OT service would be the same provider prescribing a drug to a recipient and therefore the same provider whose provider ID is reported in the RX prescribing provider ID data element.

We began the analysis by examining the extent to which an RX prescribing provider ID matches an OT servicing provider ID. As shown in Table IX.1, many RX prescribing IDs equal

the OT servicing provider ID. Among those records, the percentage that linked to NPPES is often particularly high. However, only five states (Alaska, Colorado, Kentucky, North Carolina, and Vermont) have a high percentage of matched IDs (more than 75 percent), which in turn *also* have a high rate of linkage to NPPES (more than 75 percent). We think that those five states may be used in research on RX prescribing providers. In contrast, 34 states have a low percentage of matched IDs (under 50 percent) *or* low rates of linkage with NPPES (under 50 percent) and should be excluded from research on RX prescribing providers.

B. Quality of RX Prescribing Provider IDs

Similar to the analysis we performed for other provider types, we examined the quality of RX prescribing provider IDs—entity type, primary taxonomy, and business location—among the provider IDs that linked to NPPES. However, we did not assess quality. We provide the following narrative and tables for informational purposes only.

1. Entity Type Among RX Prescribing Provider IDs

Given that we expected RX prescribing provider IDs to be the same as the IDs reported in the OT servicing provider ID data element, we assumed that the number of individual entity types would exceed the number of organizational entity types found in the linkages between NPPES and RX prescribing provider IDs. In Table IX.2, we show the distribution of entity types among RX prescribing provider IDs. Not surprisingly, in 45 states, more than half of the prescribing provider IDs were individual providers.

2. Primary Taxonomy Among RX Prescribing Provider IDs

All but a few of the RX prescribing provider IDs that linked to NPPES were identified with a primary taxonomy category in NPPES (Table IX.3). We expected most RX prescribing provider IDs to be assigned to one of the following taxonomy categories: allopathic and osteopathic physicians or physician assistants and advance practice nursing providers. As shown

in Table IX.4, the most frequently reported taxonomy categories are as expected: allopathic and osteopathic physicians, and physician assistants and advance practice nursing providers. Thirty-one states appear to follow the expected distribution¹⁴. Other taxonomy categories that appeared most prevalently in the file are dental providers and hospitals.

3. Business Location Among RX Prescribing Provider IDs

All RX prescribing provider IDs that linked to NPPES provided a business location (Table IX.3). Our expectation for RX prescribing provider IDs does not differ from our expectation for OT servicing provider IDs. We believed that the vast majority of business locations associated with provider IDs would fall in a service recipient's state, including practitioners in group practices. In Table IV.5, among RX prescribing provider IDs that provided an address in NPPES, we compared the state on the claim to the state reported in the RX prescribing provider's address. As expected, the overwhelming majority of RX prescribing provider IDs were in the same state as the beneficiary's state.

C. Usability of RX Prescribing Provider IDs in Research

In summary, researchers using RX prescribing provider IDs should exercise caution. Only five states have sufficiently complete data for use in RX prescribing provider research: Alaska, Colorado, Kentucky, North Carolina, and Vermont. To improve data usability, CMS should add the NPI of the RX prescribing provider ID to the MSIS record layout or obtain state-specific provider files from each state.

¹⁴ Expected threshold was set at $\geq 70\%$.

Table IX.1. RX Prescribing Provider IDs Versus OT Servicing Provider IDs

State	Number of RX Prescribing Provider IDs	Number of RX Prescribing Provider ID = OT Servicing Provider ID	Percent of RX Prescribing ID = OT Servicing Provider ID	Percent of RX Prescribing Provider ID = OT Servicing Provider IDs Linked to NPPES
Alabama	13,796	13	0.1	100.0
Alaska	2,791	2,545	91.2	92.8
Arizona	39,145	14,464	36.9	98.2
Arkansas	9,185	6,595	71.8	79.3
California	411,612	95,781	23.3	27.0
Colorado	13,213	11,311	85.6	98.5
Connecticut	26,993	9,828	36.4	99.7
Delaware	5,264	3,282	62.3	93.5
District of Columbia	2,494	2,058	82.5	36.3
Florida	134,198	31,213	23.3	99.6
Georgia	2,318	0	0.0	0.0
Hawaii	3,207	471	14.7	41.8
Idaho	7,589	2,599	34.2	65.8
Illinois	112,184	30,187	26.9	99.8
Indiana	32,015	14,977	46.8	99.7
Iowa	11,843	0	0.0	0.0
Kansas	13,944	8,246	59.1	99.6
Kentucky	15,426	13,015	84.4	99.7
Louisiana	18,254	10,736	58.8	82.4
Maine	12,666	0	0.0	0.0
Maryland	16,619	11,548	69.5	92.2
Massachusetts	75,040	1,476	2.0	99.9
Michigan	68,783	30,097	43.8	44.3
Minnesota	23,385	15,770	67.4	55.7
Mississippi	18,136	8,008	44.2	99.6
Missouri	38,641	7,427	19.2	62.1
Montana	3,903	2,855	73.1	99.8
Nebraska	7,759	3,199	41.2	7.7
Nevada	9,687	4,688	48.4	99.6
New Hampshire	10,750	0	0.0	0.0
New Jersey	23,244	15,069	64.8	94.0
New Mexico	18,796	14,014	74.6	57.7
New York	92,951	63,286	68.1	82.2
North Carolina	25,816	21,193	82.1	99.7
North Dakota	3,584	1,976	55.1	13.0
Ohio	34,061	26,608	78.1	0.0
Oklahoma	24,546	10,001	40.7	97.3
Oregon	21,646	12,948	59.8	95.1
Pennsylvania	65,853	2,265	3.4	99.1
Rhode Island	11,658	2,312	19.8	99.8
South Carolina	47,294	12,689	26.8	1.0
South Dakota	4,737	0	0.0	0.0
Tennessee	61,665	16,294	26.4	24.8
Texas	53,540	1	0.0	0.0
Utah	11,992	4,752	39.6	99.7
Vermont	4,552	3,830	84.1	99.8
Virginia	38,379	18,199	47.4	99.7
Washington	46,353	15,713	33.9	98.8
West Virginia	18,249	1,442	7.9	99.8
Wisconsin	47,796	21,721	45.4	33.8
Wyoming	2,860	2,459	86.0	53.9

Source: MSIS State Backup Files, FY 2009 Q2 - FY 2010 Q4.

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

Table IX.2. Entity Type Among RX Prescribing Provider IDs

State	Number of RX Prescribing Provider IDs Linked to NPPES	Percent Entity Type is an Organization	Percent Entity Type is an Individual	Percent Entity Type is Missing
Alabama ^a	543	24.1	75.9	0.0
Alaska	2,415	1.3	98.7	0.0
Arizona ^a	15,609	3.6	96.4	0.0
Arkansas	6,105	14.9	85.1	0.0
California ^a	44,557	46.9	53.1	0.0
Colorado	11,681	3.3	96.7	0.0
Connecticut ^a	24,537	4.1	95.9	0.0
Delaware	3,085	1.3	98.7	0.0
District of Columbia ^a	829	23.3	76.7	0.0
Florida ^a	31,401	8.0	92.0	0.0
Georgia ^a	2	0.0	100.0	0.0
Hawaii ^a	252	96.4	3.6	0.0
Idaho ^a	1,829	4.3	95.7	0.0
Illinois ^a	30,166	1.4	98.6	0.0
Indiana ^a	14,953	2.6	97.4	0.0
Iowa ^a	2	0.0	100.0	0.0
Kansas	8,222	0.9	99.1	0.0
Kentucky	13,959	8.0	92.0	0.0
Louisiana	8,871	5.5	94.5	0.0
Maine ^a	4	0.0	100.0	0.0
Maryland	11,278	7.2	92.8	0.0
Massachusetts ^a	3,075	42.4	57.6	0.0
Michigan ^a	13,853	23.2	76.8	0.0
Minnesota	10,465	55.4	44.6	0.0
Mississippi ^a	7,992	4.9	95.1	0.0
Missouri ^a	5,053	66.5	33.5	0.0
Montana	2,850	1.6	98.4	0.0
Nebraska ^a	290	8.3	91.7	0.0
Nevada ^a	4,783	4.7	95.3	0.0
New Hampshire ^a	0	0.0	0.0	0.0
New Jersey	14,944	4.7	95.3	0.0
New Mexico	8,378	70.9	29.1	0.0
New York	53,553	2.4	97.6	0.0
North Carolina	24,325	6.2	93.8	0.0
North Dakota ^a	260	6.9	93.1	0.0
Ohio ^a	1	0.0	100.0	0.0
Oklahoma ^a	9,735	0.1	99.9	0.0
Oregon	12,559	3.8	96.2	0.0
Pennsylvania ^a	2,323	7.4	92.6	0.0
Rhode Island ^a	2,332	3.5	96.5	0.0
South Carolina ^a	432	15.5	84.5	0.0
South Dakota ^a	0	0.0	0.0	0.0
Tennessee ^a	4,057	42.4	57.6	0.0
Texas ^a	926	28.6	71.4	0.0
Utah ^a	4,778	2.2	97.8	0.0
Vermont	3,964	3.1	96.9	0.0
Virginia ^a	18,328	3.3	96.7	0.0
Washington ^a	15,565	4.1	95.9	0.0
West Virginia ^a	1,463	10.9	89.1	0.0
Wisconsin ^a	7,451	18.3	81.7	0.0
Wyoming	1,378	4.7	95.3	0.0

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a Less than 50 percent of the RX prescribing provider IDs equal the OT servicing provider IDs, or less than 50 percent of the RX prescribing provider IDs that equal the OT servicing provider ID linked to NPPES

Table IX.3. NPPES Primary Taxonomy and Business Location Among RX Prescribing Provider IDs

State	Number of RX Prescribing Provider IDs Linked to NPPES	Number with a Primary Taxonomy Category	Percent with a Primary Taxonomy Category	Number with a Business Location	Percent with a Business Location
Alabama ^a	543	522	96.1	543	100.0
Alaska	2,415	2,369	98.1	2,415	100.0
Arizona ^a	15,609	15,454	99.0	15,609	100.0
Arkansas	6,105	6,074	99.5	6,105	100.0
California ^a	44,557	43,521	97.7	44,557	100.0
Colorado	11,681	11,613	99.4	11,681	100.0
Connecticut ^a	24,537	24,059	98.1	24,537	100.0
Delaware	3,085	3,076	99.7	3,085	100.0
District of Columbia ^a	829	828	99.9	829	100.0
Florida ^a	31,401	31,323	99.8	31,401	100.0
Georgia ^a	2	36	1800.0	2	100.0
Hawaii ^a	252	250	99.2	252	100.0
Idaho ^a	1,829	1,828	99.9	1,829	100.0
Illinois ^a	30,166	29,845	98.9	30,166	100.0
Indiana ^a	14,953	14,911	99.7	14,953	100.0
Iowa ^a	2	2	100.0	2	100.0
Kansas	8,222	8,020	97.5	8,222	100.0
Kentucky	13,959	13,976	100.1	13,959	100.0
Louisiana	8,871	8,737	98.5	8,871	100.0
Maine ^a	4	4	100.0	4	100.0
Maryland	11,278	11,144	98.8	11,278	100.0
Massachusetts ^a	3,075	3,081	100.2	3,075	100.0
Michigan ^a	13,853	13,821	99.8	13,853	100.0
Minnesota	10,465	10,458	99.9	10,465	100.0
Mississippi ^a	7,992	8,017	100.3	7,992	100.0
Missouri ^a	5,053	5,026	99.5	5,053	100.0
Montana	2,850	2,812	98.7	2,850	100.0
Nebraska ^a	290	284	97.9	290	100.0
Nevada ^a	4,783	4,763	99.6	4,783	100.0
New Hampshire ^a	0	0	N/A	0	N/A
New Jersey	14,944	14,583	97.6	14,944	100.0
New Mexico	8,378	8,360	99.8	8,378	100.0
New York	53,553	52,467	98.0	53,553	100.0
North Carolina	24,325	24,170	99.4	24,325	100.0
North Dakota ^a	260	261	100.4	260	100.0
Ohio ^a	1	0	0.0	1	100.0
Oklahoma ^a	9,735	9,989	102.6	9,735	100.0
Oregon	12,559	12,568	100.1	12,559	100.0
Pennsylvania ^a	2,323	2,329	100.3	2,323	100.0
Rhode Island ^a	2,332	2,328	99.8	2,332	100.0
South Carolina ^a	432	427	98.8	432	100.0
South Dakota ^a	0	0	N/A	0	N/A
Tennessee ^a	4,057	4,059	100.0	4,057	100.0
Texas ^a	926	903	97.5	926	100.0
Utah ^a	4,778	4,708	98.5	4,778	100.0
Vermont	3,964	3,900	98.4	3,964	100.0
Virginia ^a	18,328	18,193	99.3	18,328	100.0
Washington ^a	15,565	15,483	99.5	15,565	100.0
West Virginia ^a	1,463	1,465	100.1	1,463	100.0
Wisconsin ^a	7,451	7,457	100.1	7,451	100.0
Wyoming	1,378	1,383	100.4	1,378	100.0

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

When the taxonomy category was not reported in NPPES but was reported in MSIS, the number with a primary taxonomy is greater than the number of provider IDs linked to NPPES and the percentage with a primary taxonomy category is more than 100 percent.

^a Less than 50 percent of the RX prescribing provider IDs equal the OT servicing provider IDs, or less than 50 percent of the RX prescribing provider IDs that equal the OT servicing provider ID linked to NPPES

Table IX.4. Distribution of NPPES Primary Taxonomy Among RX Prescribing Provider IDs

State	Number of RX Prescribing Provider IDs with NPPES Primary Taxonomy Category	Percent Allopathic and Osteopathic Physicians	Percent Physician Assistants and Advanced Practice Nursing Providers	Percent Dental Providers	Percent Hospitals
Alabama ^a	522	39.5	7.1	5.0	0.4
Alaska	2,369	63.8	19.2	8.9	0.1
Arizona ^a	15,454	70.2	14.3	1.3	0.4
Arkansas	6,074	66.1	4.4	1.5	0.2
California ^a	43,521	54.4	0.5	8.4	15.7
Colorado	11,613	49.8	9.0	4.4	28.0
Connecticut ^a	24,059	58.5	14.5	8.8	0.6
Delaware	3,076	74.5	11.3	6.0	1.5
District of Columbia ^a	828	69.0	4.8	4.8	3.3
Florida ^a	31,323	72.4	7.3	2.7	0.3
Georgia ^a	36	0.0	2.8	0.0	0.0
Hawaii ^a	250	3.6	0.0	0.0	21.6
Idaho ^a	1,828	51.2	20.4	14.7	1.5
Illinois ^a	29,845	82.9	4.1	3.8	1.3
Indiana ^a	14,911	75.8	7.8	7.2	0.9
Iowa ^a	2	0.0	50.0	0.0	0.0
Kansas	8,020	69.5	17.0	4.3	0.2
Kentucky	13,976	68.0	11.3	6.2	0.2
Louisiana	8,737	74.0	7.6	7.1	0.7
Maine ^a	4	75.0	25.0	0.0	0.0
Maryland	11,144	80.4	3.9	4.1	0.5
Massachusetts ^a	3,081	47.7	5.8	2.3	3.5
Michigan ^a	13,821	47.6	8.5	18.6	6.0
Minnesota	10,458	24.6	3.9	3.4	52.0
Mississippi ^a	8,017	70.5	14.8	6.3	1.2
Missouri ^a	5,026	74.1	2.2	1.2	3.0
Montana	2,812	65.9	21.4	3.6	0.4
Nebraska ^a	284	35.6	1.8	43.7	0.0
Nevada ^a	4,763	73.2	8.3	6.5	0.8
New Hampshire ^a	0	0.0	0.0	0.0	0.0
New Jersey	14,583	81.0	3.2	3.8	0.4
New Mexico	8,360	35.8	4.9	4.6	8.8
New York	52,467	69.0	11.7	8.0	0.6
North Carolina	24,170	73.8	4.2	9.3	0.3
North Dakota ^a	261	49.4	12.6	19.9	0.0
Ohio ^a	0	0.0	0.0	0.0	0.0
Oklahoma ^a	9,989	75.2	12.3	7.3	0.0
Oregon	12,568	70.2	13.0	5.4	0.4
Pennsylvania ^a	2,329	74.8	1.5	12.4	1.6
Rhode Island ^a	2,328	76.9	7.8	3.7	1.9
South Carolina ^a	427	57.1	6.1	3.7	9.1
South Dakota ^a	0	0.0	0.0	0.0	0.0
Tennessee ^a	4,059	17.1	14.4	15.0	35.6
Texas ^a	903	51.8	6.2	2.5	0.2
Utah ^a	4,708	72.9	4.2	11.4	0.2
Vermont	3,900	64.3	16.8	7.4	0.4
Virginia ^a	18,193	77.8	6.5	5.3	0.7
Washington ^a	15,483	67.4	17.1	5.3	0.0
West Virginia ^a	1,465	53.9	19.1	6.5	3.7
Wisconsin ^a	7,457	33.9	20.8	13.7	12.2
Wyoming	1,383	62.5	14.0	14.2	0.1

Source: MAXPC File, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a Less than 50 percent of the RX prescribing provider IDs equal the OT servicing provider IDs, or less than 50 percent of the RX prescribing provider IDs that equal the OT servicing provider ID linked to NPPES

Table IX.5. Business Location Among RX Prescribing Provider IDs

State	Number of RX Prescribing Provider IDs with NPPES Business Location	Percent Within State
Alabama ^a	543	8.7
Alaska	2,415	77.8
Arizona ^a	15,609	89.9
Arkansas	6,105	80.6
California ^a	44,557	85.2
Colorado	11,681	93.5
Connecticut ^a	24,537	67.2
Delaware	3,085	77.6
District of Columbia ^a	829	68.5
Florida ^a	31,401	95.6
Georgia ^a	2	0.0
Hawaii ^a	252	98.4
Idaho ^a	1,829	83.3
Illinois ^a	30,166	82.0
Indiana ^a	14,953	85.0
Iowa ^a	2	0.0
Kansas	8,222	72.3
Kentucky	13,959	74.9
Louisiana	8,871	90.1
Maine ^a	4	50.0
Maryland	11,278	84.3
Massachusetts ^a	3,075	90.8
Michigan ^a	13,853	89.4
Minnesota	10,465	84.3
Mississippi ^a	7,992	75.7
Missouri ^a	5,053	91.7
Montana	2,850	79.9
Nebraska ^a	290	96.6
Nevada ^a	4,783	85.5
New Hampshire ^a	0	0.0
New Jersey	14,944	87.2
New Mexico	8,378	83.4
New York	53,553	92.5
North Carolina	24,325	87.3
North Dakota ^a	260	65.4
Ohio ^a	1	0.0
Oklahoma ^a	9,735	79.6
Oregon	12,559	88.1
Pennsylvania ^a	2,323	89.7
Rhode Island ^a	2,332	90.1
South Carolina ^a	432	53.5
South Dakota ^a	0	0.0
Tennessee ^a	4,057	80.1
Texas ^a	926	17.0
Utah ^a	4,778	91.8
Vermont	3,964	58.8
Virginia ^a	18,328	80.7
Washington ^a	15,565	90.7
West Virginia ^a	1,463	64.3
Wisconsin ^a	7,451	74.5
Wyoming	1,378	53.6

Source: MAXPC Files, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a Less than 50 percent of the RX prescribing provider IDs equal the OT servicing provider IDs, or less than 50 percent of the RX prescribing provider IDs that equal the OT servicing provider ID linked to NPPES

X. CONCLUSIONS

We created the MAXPC file to help researchers focusing on Medicaid providers. The 51 files—one for each state and the District of Columbia—include one record for each unique provider ID with at least one IP, LT, OT, or RX claim in CY 2009 in that state. The provider ID may be easily linked to the corresponding IP, LT, OT, or RX billing provider; the OT servicing provider; and the RX prescribing provider in the claims files. The provider ID may be an LPI or NPI and may be a medical provider (which typically have an NPI) or a non-medical provider (which typically do not have an NPI). If we were able to link the provider ID to NPPES (using the NPI or LPI), we extracted information about the provider from NPPES, such as the provider name, business name, business address, primary taxonomy, and entity type. For Florida, Indiana, and North Carolina, we also used state-specific provider files to augment the provider information in MAXPC.

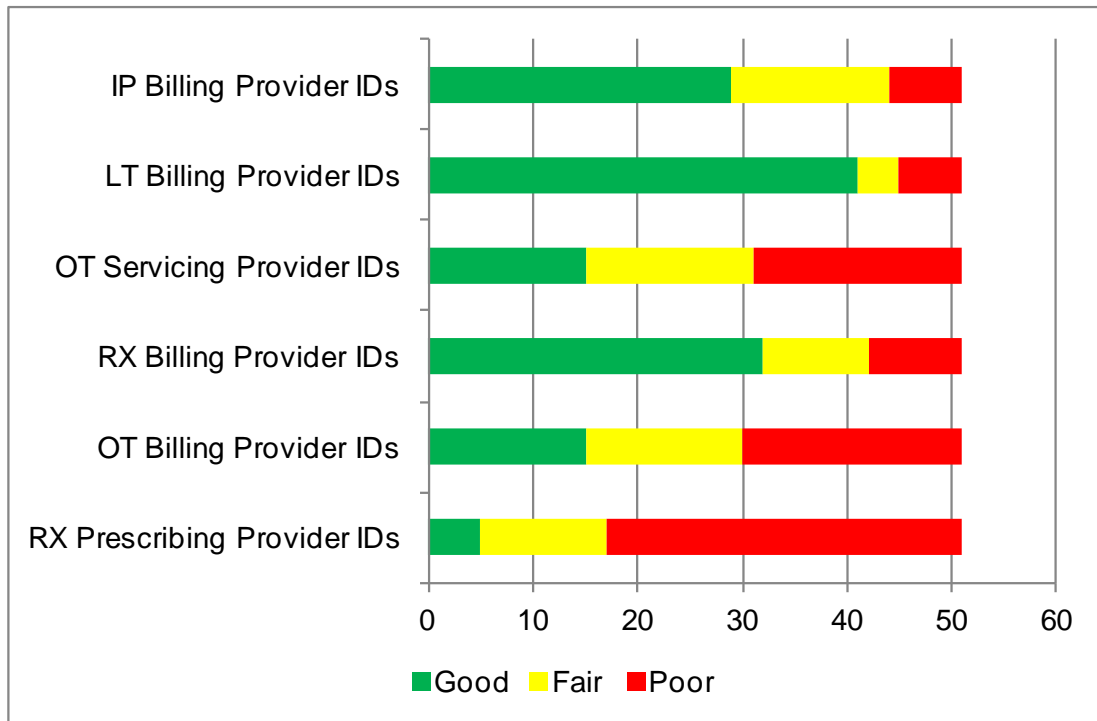
In the previous chapters, we examined the quality and completeness of each type of provider ID and classified the provider ID in each state into three categories: good, fair (use caution), and poor. Among IP, LT, and RX billing and OT servicing provider IDs, states classified as good had more than 90 percent of the claims with a provider ID, more than 90 percent of the provider IDs with an NPI, more than 90 percent of the provider IDs linked to NPPES, the correct (expected) entities, and the correct (expected) taxonomy categories. States classified as fair had 70 to 90 percent of the claims with a provider ID, 70 to 90 percent of the provider IDs with an NPI, 70 to 90 percent of the provider IDs linked to NPPES, unusual entity types, or unusual taxonomy categories. States classified as poor had more than 30 percent of the claims without a provider ID, more than 30 percent of the provider IDs without an NPI, or more than 30 percent of the provider IDs with an NPI that did not link to NPPES.

Among OT billing provider IDs, states classified as good had more than 75 percent of the OT billing provider IDs equal to the servicing provider IDs and more than 75 percent of the OT billing provider IDs that were the same as the servicing provider IDs linked to NPPES. States classified as poor had less than 50 percent of the OT billing provider IDs equal to the servicing provider IDs or less than 50 percent of the OT billing provider IDs that were the same as the servicing provider IDs linked to NPPES. All other states were classified as fair.

Among RX prescribing provider IDs, states classified as good had more than 75 percent of the RX prescribing provider IDs that were the same as the OT servicing provider IDs and more than 75 percent of the RX prescribing provider IDs that were the same as the OT servicing provider IDs linked to NPPES. States classified as poor had less than 50 percent of the RX prescribing provider IDs that were the same as the OT servicing provider IDs, or less than 50 percent of the RX prescribing provider IDs that were the same as the OT servicing provider IDs linked to NPPES. All other states were classified as fair.

In Figure X.1, we summarize the number of states classified as good, fair, and poor by each type of provider ID. The summary by type of provider for states classified as good is as follows:

- Among IP billing provider IDs, 29 states may be used for IP provider research owing to the good quality and completeness of their data.
- Among LT billing provider IDs, 41 states may be used for LT provider research;
- Among OT servicing provider IDs, 15 states may be used for OT servicing provider research.
- Among RX billing provider IDs, 32 states are good for research.
- Given that the MSIS design does not collect an NPI for OT billing providers and RX prescribing providers, it is no surprise that only 15 and 5 states, respectively, are good for these types of provider research.

Figure X.1. Summary of Usability of Provider IDs for Research

In Table X.1, we identify the states classified as good, fair, and poor by each type of provider ID. At this time, the following states should not be used for provider research:

- Seven states (California, Maine, Nebraska, New Hampshire, Ohio, Rhode Island, and Texas) should not be used for IP provider research.
- Six states (California, Maine, Nebraska, New Hampshire, Ohio, and Rhode Island) should not be used for LT provider research.
- Twenty states (California, District of Columbia, Georgia, Hawaii, Idaho, Illinois, Maine, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, North Dakota, Ohio, Rhode Island, South Carolina, Texas, Virginia, and Wisconsin) (based on the analyses presented in Table X.1) should not be used for OT servicing provider research. One additional state, Tennessee, should not be used OT servicing provider research on allopathic and osteopathic physicians based on other analysis using MAXPC data.
- Nine states (California, Connecticut, Maine, Michigan, Nebraska, Ohio, Rhode Island, South Carolina, and Washington) should not be used for RX billing provider research.

In addition, some states face data challenges that could be addressed during the processing of MSIS data:

- In California, many LT billing providers are classified as physicians, suggesting that the state is submitting physician claims to the wrong file or incorrectly reporting provider IDs.
- In Colorado, many RX billing providers are classified as physicians and other types of providers, suggesting that the state is incorrectly reporting these provider IDs.
- In Connecticut, most NPIs reported in the RX file are prescribing provider IDs. The NPIs should have been reported for billing providers.
- In Florida, many NPIs reported in the RX file are prescribing provider IDs. The NPIs should have been reported for billing providers.
- In Georgia, many IP billing providers are classified as physicians, suggesting that the state is submitting physician claims to the wrong file or incorrectly reporting provider IDs. In addition, all NPIs submitted in the OT file are NPIs of billing providers instead of NPIs of servicing providers.
- In Hawaii, many IP billing providers are classified as physicians, suggesting that the state is submitting physician claims to the wrong file or incorrectly reporting provider IDs.
- In Iowa, many RX billing providers are classified as physicians and other providers, suggesting that the state is incorrectly reporting provider IDs.
- In Missouri, many IP billing providers are classified as physicians, suggesting that the state is submitting physician claims to the wrong file or incorrectly reporting provider IDs.
- In Nevada, many NPIs reported in the RX file are prescribing provider IDs. The NPIs should have been reported for billing providers.
- In Oregon, many NPIs reported in the RX file are prescribing provider IDs. The NPIs should have been reported for billing providers.
- In Rhode Island, many IP billing providers are classified as physicians, suggesting that the state is submitting physician claims to the wrong file or incorrectly reporting provider IDs.
- In South Carolina, all NPIs reported in the RX file are prescribing provider IDs. The NPIs should have been reported for billing providers.
- In Virginia, many NPIs submitted in the OT file are billing provider IDs rather than servicing providers.
- In Wyoming, many RX billing providers are classified as physicians and other providers, suggesting that the state has incorrectly reported provider IDs.

Table X.1. Usability of Provider IDs for Research

State	IP Billing Provider IDs	LT Billing Provider IDs	OT Servicing Provider IDs	RX Billing Provider IDs	OT Billing Provider IDs	RX Prescribing Provider IDs
Alabama	Good	Good	Good	Good	Fair	Poor
Alaska	Good	Good	Fair	Good	Poor	Good
Arizona	Good	Good	Good	Good	Good	Poor
Arkansas	Fair	Good	Fair	Good	Poor	Fair
California	Poor	Poor	Poor	Poor	Poor	Poor
Colorado	Good	Good	Good	Fair	Fair	Good
Connecticut	Good	Good	Fair	Poor	Good	Poor
Delaware	Good	Good	Fair	Good	Fair	Fair
District of Columbia	Fair	Good	Poor	Good	Poor	Poor
Florida	Good	Good	Good	Fair	Good	Poor
Georgia	Fair	Good	Poor	Good	Good	Poor
Hawaii	Fair	Good	Poor	Good	Poor	Poor
Idaho	Fair	Good	Poor	Fair	Poor	Poor
Illinois	Good	Fair	Poor	Good	Poor	Poor
Indiana	Good	Good	Good	Good	Fair	Poor
Iowa	Good	Good	Fair	Fair	Fair	Poor
Kansas	Good	Good	Good	Good	Good	Fair
Kentucky	Good	Good	Fair	Good	Good	Good
Louisiana	Fair	Fair	Fair	Good	Good	Fair
Maine	Poor	Poor	Poor	Poor	Poor	Poor
Maryland	Good	Good	Poor	Good	Fair	Fair
Massachusetts	Fair	Good	Fair	Fair	Poor	Poor
Michigan	Fair	Good	Poor	Poor	Poor	Poor
Minnesota	Good	Good	Poor	Good	Poor	Fair
Mississippi	Good	Good	Good	Good	Good	Poor
Missouri	Fair	Good	Poor	Fair	Poor	Poor
Montana	Good	Good	Good	Good	Good	Fair
Nebraska	Poor	Poor	Poor	Poor	Poor	Poor
Nevada	Fair	Good	Good	Fair	Poor	Poor
New Hampshire	Poor	Poor	Poor	Good	Poor	Poor
New Jersey	Fair	Good	Good	Good	Good	Fair
New Mexico	Good	Good	Fair	Good	Fair	Fair
New York	Fair	Good	Fair	Good	Good	Fair
North Carolina	Good	Good	Fair ^d	Good	Good	Good
North Dakota	Fair	Good	Poor	Good	Poor	Poor
Ohio	Poor	Poor	Poor	Poor	Poor	Poor
Oklahoma	Good	Good	Good	Good	Fair	Poor
Oregon	Good	Good	Good	Fair	Poor	Fair
Pennsylvania	Good	Good	Fair	Good	Fair	Poor
Rhode Island	Poor	Poor	Poor	Poor	Poor	Poor
South Carolina	Good	Fair	Poor	Poor	Poor	Poor
South Dakota	Good	Good	Fair	Fair	Fair	Poor
Tennessee	Good	Good	Fair ^e	Good	Good	Poor
Texas	Poor	Good	Poor	Good	Fair	Poor
Utah	Good	Good	Good	Good	Good	Poor
Vermont	Good	Good	Good	Good	Fair	Good
Virginia	Fair	Good	Poor	Good	Good	Poor
Washington	Fair	Fair	Fair	Poor	Fair	Poor
West Virginia	Good	Good	Good	Good	Fair	Poor
Wisconsin	Good	Good	Poor	Good	Fair	Poor
Wyoming	Good	Good	Fair	Fair	Poor	Fair

Table X.1 (continued)

State	IP Billing Provider IDs	LT Billing Provider IDs	OT Servicing Provider IDs	RX Billing Provider IDs	OT Billing Provider IDs	RX Prescribing Provider IDs
Number Good: ^{a,b,c}	29	41	15	32	15	5
Number Fair: ^{a,b,c}	15	4	16	10	15	12
Number Poor: ^{a,b,c}	7	6	20	9	21	34

Source: MAXPC File, 2009

Note: Hawaii, Idaho, New Hampshire, Oklahoma, Utah, and Wisconsin were processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

^a Among IP, LT, RX billing and OT servicing provider IDs, Good = More than 90 percent of claims with provider IDs, more than 90 percent of provider IDs with NPIs, more than 90 percent of provider IDs linked to NPPES, correct entity, and correct taxonomy, Fair = 70 to 90 percent of their claims with a provider ID, 70 to 90 percent of the provider IDs with an NPI, 70 to 90 percent of provider IDs linked to NPPES, unusual entity, or unusual taxonomy, Poor = more than 30 percent of claims did not have a provider ID, more than 30 percent of provider IDs did not have an NPI, or more than 30 percent of provider IDs with an NPI did not link to NPPES

^b Among OT billing provider IDs, Good = more than 75 percent of the OT billing provider IDs equal to the servicing provider IDs and more than 75 percent of the OT billing provider IDs that equal the servicing provider ID linked to NPPES, Poor = less than 50 percent of the OT billing provider IDs equal to the servicing provider IDs or less than 50 percent of the OT billing provider IDs that equal the servicing provider ID linked to NPPES, Fair = all other cases

^c Among RX prescribing provider IDs, Good = more than 75 percent of the RX prescribing provider IDs equal to the OT servicing provider IDs and more than 75 percent of the RX prescribing provider IDs that equal the OT servicing provider ID linked to NPPES, Poor = less than 50 percent of the RX prescribing provider IDs equal to the OT servicing provider IDs or less than 50 percent of the RX prescribing provider IDs that equal the OT servicing provider ID linked to NPPES, Fair = all other cases

^d In a research study focusing on allopathic and osteopathic physicians, over half were classified as organizational entities rather than individuals (Baugh and Verghese 2012).

^e Tennessee should not be used for OT servicing provider research on allopathic and osteopathic physicians because the state reported the ID for the physician's group practice in place of the servicing provider ID in MSIS whenever the servicing provider ID was unavailable (Baugh and Verghese 2012).

XI. RECOMMENDATIONS

Despite CMS's mandate that states begin reporting NPIs in MSIS claims in FY 2009, many states did not submit NPIs on at least some of their claims due to budget limitations, data processing constraints, or failure to capture NPIs for their providers. From our evaluation of MAXPC data however, we believe that MAXPC provides high quality provider characteristics data to support CER and other research when NPIs are available for linkage to NPPES records. Subject to this limitation, we believe MAXPC provides good information especially for billing providers in the IP, LT, and RX files. However, it is essential to improve the linkage rates for OT servicing provider IDs, OT billing provider IDs, and RX prescribing provider IDs in order to ensure that high quality data for these IDs will prove useful to the research community.

It is highly likely that the reporting of NPIs in MSIS claims will naturally improve as states become accustomed to reporting them. This, in turn, will improve the linkage rate to NPPES, which will increase the number of states that can be used for provider research. In the meantime, CMS could take some additional steps to help improve the MAXPC data:

- Request state-specific provider characteristic data sets from California, Maine, Michigan, Nebraska, New Hampshire, Ohio, Rhode Island, and South Carolina because the quality and completeness of the provider IDs is poor
- Request reporting of the billing NPI (rather than the prescribing NPI) in Connecticut's RX file
- Offer technical assistance to the states whose provider IDs are of poor quality and completeness
- Consider adding two data elements to the MSIS reporting requirements:
 - NPI billing provider ID for the OT file
 - NPI prescribing provider ID for the RX file

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REFERENCES

- Baugh, David and Shinu Verghese. “Physician Service Use and Participation in Medicaid, 2009.” Washington, DC: Mathematica Policy Research, September 30, 2012.
- Bencio, Deo S., Julie Sykes, Mei-ling Mason. “Development of the Medicaid Analytic Extract Provider Characteristics (MAXPC) File, Final Implementation Report, 2006.” Washington, DC: Mathematica Policy Research, September 27, 2010. Available at [https://www.cms.gov/MedicaidDataSourcesGenInfo/downloads/MAXPC_Implementation.pdf]. Accessed March 11, 2012.
- Centers for Medicare & Medicaid Services. “MAX Provider Characteristics.” Available at [http://www.cms.gov/MedicaidDataSourcesGenInfo/09_MAXPC.asp]. Accessed March 1, 2012c.
- Centers for Medicare & Medicaid Services. “Medicaid Analytic Extract (MAX) General Information.” Available at [https://www.cms.gov/MedicaidDataSourcesGenInfo/07_MAXGeneralInformation.asp]. Accessed January 15, 2012b.
- Centers for Medicare & Medicaid Services. “Medicaid Statistical Information System (MSIS) Overview.” Available at [<http://www.cms.gov/MSIS/>] Accessed January 15, 2012a.
- Centers for Medicare & Medicaid Services. “National Provider Identifier (NPI) Overview.” Available at [<http://www.cms.gov/nationalProvIdentstand/>]. Accessed February 13, 2010.
- Washington Publishing Company. “Healthcare Provider Taxonomy Code Set.” Available at [<http://www.wpc-edi.com/codes/taxonomy>]. Accessed September 2009.

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