Medicaid Analytic Extract Provider Characteristics (MAXPC) Evaluation Report, 2010

Final Report

July 31, 2013

Deo Bencio

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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	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
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 2010), we augmented the NPPES file with three state-specific provider files obtained during the pilot test (Florida, Indiana, North Carolina), and two additional provider files obtained subsequently (Texas and Virginia).

We examined the quality and completeness of each of the six types of provider IDs in MAX 2010 data for 44 states and the District of Columbia (hereafter referred to as 45 states):

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, 32 of 45 states (71 percent) may be used for IP provider research owing to the good quality and completeness of their data. Among LT billing provider IDs, 36 of 45 states (80 percent) may be used for LT provider research. Among OT servicing provider IDs, 16 of 45 states (36 percent) may be used for OT servicing provider research. In contrast, among RX billing provider IDs, 29 of 45 states (64 percent) 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 12 and 10 out of 45 states (27 and 22 percent), respectively, are good for provider research.

From 2009 through 2010, the first two years in which NPIs became a required data element in state claims files submissions, there were only minor improvements in the number of states that have reached the good quality and completeness level. Among IP billing provider IDs, the states' reporting improved by 14 percentage points, rising to 71 percent from 57 percent. Among LT billing provider IDs, reporting remained even (80 percent in both years), continuing at its already high level from 2009. Among OT servicing provider IDs, reporting improved by 7 percentage points, rising to 36 percent from 29 percent), and among RX billing provider IDs, reporting was slightly better in 2010 than it was in 2009 (64 percent vs. 63 percent). Reporting of OT billing provider and RX prescribing provider IDs also improved by 5 and 12 percentage points, respectively, to the degree that we can attempt to measure.

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, Michigan, Nebraska, New Hampshire, and Ohio 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 and South Carolina's RX files
- 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 2010.

Since the implementation of the Balanced Budget Act of 1997, states have been required to submit quarterly enrollment and claims data to CMS through the Medicaid Statistical Information System (MSIS) for individuals enrolled in Medicaid at any time during the quarter (CMS 2013). 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 claims[1], 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 2004[2], 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 NPIs[3]. 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 and compare results obtained in the current MAXPC data versus results from

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

MAXPC 2009 (Bencio and Sykes 2012). In Chapter X, we summarize the results and identify which states should not be 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 2010 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 the third quarter of FY 2013. 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 on 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 2010 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 2010 Data Processing Steps

For MAXPC 2010, 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 website[4] 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.

Second, we extract the provider IDs from each claims file[5]. 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

[4] CMS disseminates the latest updates of NPPES downloadable files at http://nppes.viva-it.com/NPI_Files.html. We used the January 2013 version of NPPES during the production process. The file was downloaded from the NPPES website on February 7, 2013.

[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 "Valids" files—the input files to MAX—as the input files for MAXPC. We extracted all provider IDs from all original claims in the "Valids" 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.

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 NPPES 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 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, North Carolina, Texas, and Virginia. 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. Texas and Virginia provided only a crosswalk of NPIs and LPIs.

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 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 the NPI to identify provider characteristics. Among the provider IDs that do not link to NPPES, we link to the state provider file by the NPI to obtain provider characteristics. If that fails, we link again to the state provider file by the LPI to obtain provider characteristics[6].

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

[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.

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 by CMS 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. Researchers who want to summarize by provider will need to associate all provider IDs for a given provider across all states before proceeding with the analysis. This can be challenging, as we describe later in this chapter.

A. Size of the MAXPC Files

There are 45 MAXPC 2010 files, one for each state and the District of Columbia[7]. Each file contains one record for each unique provider ID with at least one IP, LT, OT, and RX claim in calendar year (CY) 2010 in a given state. There are 5,065,181 provider IDs in MAXPC 2010. 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 the District of Columbia at 4.6 megabytes (MB), and the largest is California at 502.7 MB. The overall size for all 45 states is 2,385.7 MB.

[7] Six states are not included in MAXPC 2010 because their MSIS files were unavailable or contained significant data problems. The six states are Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah. In addition, Massachusetts was 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 and the reason for including it.

The most important data element is the provider ID; it uniquely identifies each record within a state. However, if you decide to concatenate the 45 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 a unique providers (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 producing the MAXPC files for each state, we generated the MAXPC validation tables. These diagnostic tools are designed to determine whether linkages are working in the expected manner and to detect issues or problems that are peculiar to a given state or set of states. There are two sets of validation tables: state-specific and cross-state tables. Although both sets contain the exact same measures (the rows), the state-specific tables focus on one state and two years of data. There are columns for 2009, 2010, the percent change from 2009 to 2010, the expected range of values for the percent change, and an indicator showing whether the change was within the expected range. These tables are used to monitor changes over time. In contrast, the cross-state tables focus on a single year of data for all available states.

Validation tables consist of seven tables. The first six focus on each of the corresponding six provider IDs: IP billing, LT billing, OT servicing, OT billing, RX billing, and RX prescribing provider IDs. The seventh table examines all provider IDs across all of the files. Each validation table is used to detect linkage issues that are peculiar to a given provider ID. The all-provider table is used to monitor the overall quality of the linkages among all provider IDs. The

design of the validation tables is very similar across the seven tables. With the exception of a few measures at the beginning of the tables that are specific to that provider ID, 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; where the ID came from on the claim (legacy 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 services per provider ID; and the average number of beneficiaries per provider ID. 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. Using the Washington Publishing Company's (WPC) taxonomy groupings (WPC 2009), providers are classified into two groups: (1) individuals or groups of individuals and (2) non-individuals. We also reported the prevalence of non-medical providers. The sixth section focuses on individual providers and 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 add entries to the corresponding anomaly tables. The anomalies in the tables 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 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 2010 USERS

The following six states are not included in MAXPC 2010, because their MSIS files were unavailable or contained significant data problems as of April 15, 2013:

- Idaho
- Kansas
- Maine
- New Jersey
- North Dakota
- Utah

The following state was processed without the full complement of seven quarters of data typically used when processing MAX files:

- Massachusetts: Excludes IP, LT, OT, and RX claims with service dates in 2010 that were adjudicated in FY 2011 Q3 and Q4.

Table III.1. MAXPC Record Counts and File Sizes, 2010

State	Number of Records	File Size (in MB)
Alabama	68,522	32.3
Alaska	17,632	8.3
Arizona	76,931	36.2
Arkansas	51,573	24.3
California	1,067,299	502.7
Colorado	58,162	27.4
Connecticut	71,199	33.5
Delaware	11,409	5.4
District of Columbia	9,815	4.6
Florida	243,260	114.6
Georgia	143,497	67.6
Hawaii	14,881	7.0
Idaho	NA	NA
Illinois	239,556	112.8
Indiana	82,869	39.0
Iowa	81,584	38.4
Kansas	NA	NA
Kentucky	66,201	31.2
Louisiana	55,484	26.1
Maine	NA	NA
Maryland	99,424	46.8
Massachusetts	119,623	56.3
Michigan	266,011	125.3
Minnesota	189,753	89.4
Mississippi	45,552	21.5
Missouri	103,770	48.9
Montana	20,315	9.6
Nebraska	38,320	18.0
Nevada	33,106	15.6
New Hampshire	32,221	15.2
New Jersey	NA	NA
New Mexico	77,268	36.4
New York	298,536	140.6
North Carolina	113,897	53.6
North Dakota	NA	NA
Ohio	162,722	76.6
Oklahoma	56,220	26.5
Oregon	76,668	36.1
Pennsylvania	173,976	81.9
Rhode Island	28,176	13.3
South Carolina	41,107	19.4
South Dakota	21,962	10.3
Tennessee	138,621	65.3
Texas	190,482	89.7
Utah	NA	NA
Vermont	18,704	8.8
Virginia	102,658	48.4
Washington	114,956	54.1
West Virginia	53,789	25.3
Wisconsin	63,037	29.7
Wyoming	24,433	11.5
Total	5,065,181	2,385.7

Source: MAXPC files, 2010.

Note: Record length is 471 characters for each file. Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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
NPI	Character	12	25	36
NPI source	Character	1	37	37
NPPES 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, 2010.

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 NPPES 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. All states report either the NPI or LPI on more than 99 percent of claims. This 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

	Legacy Billing Provider ID (LPI IDs)	NPI Billing Provider ID (NPI IDs)
Claim #1	1234	100001
Claim #2	2345	100002
Claim #3	3456	100003
Claim #4	4567	100004
Claim #5	5678	100005
Claim #6	6789	100006
Claim #7	7890	100007
Claim #8	8901	100008
Claim #9	9012	100009
Claim #10	9123	100010

•10 LPI IDs / 20 Unique IDs Submitted --> 50% LPIs
•10 NPI IDs / 20 Unique IDs Submitted --> 50% NPIs

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

	Legacy Billing Provider ID (LPI IDs)	NPI Billing Provider ID (NPI IDs)
Claim #1	n.a.	100001
Claim #2	n.a.	100002
Claim #3	n.a.	100003
Claim #4	n.a.	100004
Claim #5	n.a.	100005
Claim #6	n.a.	100006
Claim #7	n.a.	100007
Claim #8	n.a.	100008
Claim #9	n.a.	100009
Claim #10	n.a.	100010

•0 LPI IDs / 10 Unique IDs Submitted --> 0% LPIs
•10 NPI IDs / 10 Unique IDs Submitted --> 100% NPIs

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

	Legacy Billing Provider ID (LPI IDs)	NPI Billing Provider ID (NPI IDs)
Claim #1	100001	100001
Claim #2	100002	100002
Claim #3	100003	100003
Claim #4	100004	100004
Claim #5	100005	100005
Claim #6	100006	100006
Claim #7	100007	100007
Claim #8	100008	100008
Claim #9	100009	100009
Claim #10	100010	100010

•10 LPI IDs / 10 Unique IDs Submitted --> 100%
•10 NPI IDs / 10 Unique IDs Submitted --> 100%

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

Thirty-two of 45 states followed the expected method[8], submitting both an NPI and LPI (Table IV.2). Seven of 45 states (Alaska, California, Delaware, 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 seven 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 three states (Missouri, Nebraska, 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 584 IP providers[9]. We also used the state-provided cross-reference files in Florida, Indiana, North Carolina, Texas, and Virginia to locate NPIs for the LPIs. The cross-reference files for Indiana added another 31 NPIs, whereas the other state-provided cross-reference files 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 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.

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

[9] 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-five states have a particularly high linkage rate (more than 90 percent). Four states linked well (70 to 90 percent), but not as high as desired (Arkansas, Louisiana, Michigan, and New York). If these four states are included in research on IP providers, researchers should exercise caution. The remaining six states, which include the three states with few NPIs (Missouri, Nebraska, and Rhode Island) plus three additional states (California, New Hampshire, and Ohio), had NPIs that linked poorly and appear invalid. For example, one-third of California's IDs, and 40 percent of Ohio's IDs linked to NPPES. In addition, not only did New Hampshire have few NPIs, but only 2 percent of the NPIs that the state reported linked to NPPES. These six 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 two states (Table IV.5). In 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 Hawaii and Missouri, these atypical providers were classified as physicians, ambulatory health care facilities, 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

Almost 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 32 of 45 states (71 percent) may be used for IP provider research owing to the high level of data quality and completeness. Of the remaining states, MAXPC data for 6 states (California, Missouri, Nebraska, New Hampshire, Ohio, and Rhode Island) should not be used for IP provider research because quality and completeness are poor. MAXPC data from 7 of 45 states (Arkansas, Hawaii, Louisiana, Michigan, Nevada, New York, and Virginia) should be used with caution.

From 2009 to 2010, there was a 14 percentage point improvement in the number of states that were classified as good (57 percent versus 71 percent). It should be noted, however, that of the six states listed above as states that should not be used for IP provider research because of poor data quality and completeness, five states (California, Nebraska, New Hampshire, Ohio, and Rhode Island) were in this category for MAXPC 2009 as well. There were no noticeable improvements in IP provider ID reporting for these states from 2009 to 2010.

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

State	Number of Claims	Percent with NPI or LPI
Alabama	164,547	100.0
Alaska	21,703	100.0
Arizona	228,731	100.0
Arkansas	126,864	100.0
California	966,187	100.0
Colorado	77,100	100.0
Connecticut	231,116	100.0
Delaware	13,339	100.0
District of Columbia	36,332	100.0
Florida	607,395	99.8
Georgia	321,623	100.0
Hawaii	44,861	100.0
Idaho	NA	NA
Illinois	451,815	100.0
Indiana	212,776	100.0
Iowa	84,361	100.0
Kansas	NA	NA
Kentucky	170,648	100.0
Louisiana	319,969	100.0
Maine	NA	NA
Maryland	239,561	100.0
Massachusetts	161,558	100.0
Michigan	300,270	99.8
Minnesota	124,455	100.0
Mississippi	134,639	100.0
Missouri	202,035	100.0
Montana	24,507	100.0
Nebraska	51,640	100.0
Nevada	48,124	100.0
New Hampshire	23,503	100.0
New Jersey	NA	NA
New Mexico	79,584	100.0
New York	2,191,093	100.0
North Carolina	350,808	100.0
North Dakota	NA	NA
Ohio	141,335	100.0
Oklahoma	171,635	100.0
Oregon	94,639	100.0
Pennsylvania	176,518	100.0
Rhode Island	97,779	100.0
South Carolina	96,371	100.0
South Dakota	24,588	100.0
Tennessee	293,077	100.0
Texas	977,091	100.0
Utah	NA	NA
Vermont	18,987	100.0
Virginia	536,363	100.0
Washington	141,484	100.0
West Virginia	67,149	100.0
Wisconsin	172,132	100.0
Wyoming	15,675	100.0

Source: MSIS State Valids files, FY 2010 Q2–FY 2011 Q4.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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	590	49.7	50.3	100.0	0.0
Alaska	109	97.2	100.0	98.2	97.2
Arizona	905	50.1	49.9	99.6	0.0
Arkansas	441	44.9	55.1	89.3	0.0
California	2,882	77.8	100.0	78.5	77.8
Colorado	455	50.5	49.5	96.9	0.0
Connecticut	770	49.9	50.1	99.9	0.0
Delaware	58	98.3	100.0	98.3	98.3
District of Columbia	161	49.7	50.3	97.5	0.0
Florida	3,140	47.2	52.8	96.1	0.0
Georgia	1,184	46.6	53.4	98.5	0.0
Hawaii	243	49.0	51.0	93.4	0.0
Idaho	NA	NA	NA	NA	NA
Illinois	1,277	54.9	45.1	90.8	0.0
Indiana	849	51.9	48.1	100.0	0.0
Iowa	735	49.7	50.3	99.2	0.0
Kansas	NA	NA	NA	NA	NA
Kentucky	766	49.5	50.5	99.6	0.0
Louisiana	1,282	60.8	39.2	91.8	0.0
Maine	NA	NA	NA	NA	NA
Maryland	455	46.8	53.2	93.4	0.0
Massachusetts	619	49.9	50.1	99.8	0.0
Michigan	1,654	34.9	69.0	81.0	5.7
Minnesota	880	50.0	50.0	92.2	0.0
Mississippi	684	50.4	49.6	99.0	0.0
Missouri	913	45.2	54.8	69.3	0.0
Montana	306	49.7	50.3	100.0	0.0
Nebraska	289	0.0	100.0	8.0	0.0
Nevada	431	48.7	51.3	100.0	0.0
New Hampshire	194	36.1	63.9	73.7	0.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	1,079	37.3	62.7	98.8	0.0
New York	2,381	51.2	48.8	87.4	0.0
North Carolina	754	49.9	50.1	100.0	0.0
North Dakota	NA	NA	NA	NA	NA
Ohio	1,268	58.1	41.9	84.5	0.0
Oklahoma	860	49.8	50.2	99.9	0.0
Oregon	334	45.2	54.8	95.2	0.0
Pennsylvania	832	48.9	51.1	99.3	0.0
Rhode Island	1,184	4.9	100.0	6.6	4.9
South Carolina	242	100.0	100.0	100.0	100.0
South Dakota	361	49.6	50.4	100.0	0.0
Tennessee	1,745	51.9	48.1	92.6	0.0
Texas	886	90.4	99.8	90.5	90.4
Utah	NA	NA	NA	NA	NA
Vermont	197	50.3	49.7	98.5	0.0
Virginia	1,347	100.0	100.0	100.0	100.0
Washington	517	48.5	52.0	95.7	1.1
West Virginia	420	50.0	50.0	98.8	0.0
Wisconsin	452	97.3	100.0	97.8	97.3
Wyoming	280	49.6	50.4	100.0	0.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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	590	100.0	0.0	NA
Alaska	107	99.1	0.9	NA
Arizona	901	100.0	0.0	NA
Arkansas	394	99.0	1.0	NA
California	2,261	99.2	0.8	NA
Colorado	441	99.8	0.2	NA
Connecticut	769	100.0	0.0	NA
Delaware	57	100.0	0.0	NA
District of Columbia	157	100.0	0.0	NA
Florida	3,018	99.6	0.4	0.0
Georgia	1,166	99.7	0.3	NA
Hawaii	227	99.6	0.4	NA
Idaho	NA	NA	NA	NA
Illinois	1,159	100.0	0.0	NA
Indiana	849	95.9	0.5	3.7
Iowa	729	99.0	1.0	NA
Kansas	NA	NA	NA	NA
Kentucky	763	100.0	0.0	NA
Louisiana	1,177	100.0	0.0	NA
Maine	NA	NA	NA	NA
Maryland	425	96.5	3.5	NA
Massachusetts	618	100.0	0.0	NA
Michigan	1,339	97.5	2.5	NA
Minnesota	811	95.1	4.9	NA
Mississippi	677	99.4	0.6	NA
Missouri[a]	633	79.9	20.1	NA
Montana	306	100.0	0.0	NA
Nebraska[a]	23	0.0	100.0	NA
Nevada	431	100.0	0.0	NA
New Hampshire	143	97.9	2.1	NA
New Jersey	NA	NA	NA	NA
New Mexico	1,066	100.0	0.0	NA
New York	2,080	96.6	3.4	NA
North Carolina	754	99.7	0.3	0.0
North Dakota	NA	NA	NA	NA
Ohio	1,072	82.9	17.1	NA
Oklahoma	859	100.0	0.0	NA
Oregon	318	97.2	2.8	NA
Pennsylvania	826	100.0	0.0	NA
Rhode Island[a]	78	74.4	25.6	NA
South Carolina	242	100.0	0.0	NA
South Dakota	361	100.0	0.0	NA
Tennessee	1,615	100.0	0.0	NA
Texas	802	100.0	0.0	0.0
Utah	NA	NA	NA	NA
Vermont	194	100.0	0.0	NA
Virginia	1,347	100.0	0.0	0.0
Washington	495	100.0	0.0	NA
West Virginia	415	99.5	0.5	NA
Wisconsin	442	100.0	0.0	NA
Wyoming	280	100.0	0.0	NA

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was 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, North Carolina, Texas, and Virginia provided state-specific provider files.

NA = Not available

[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	590	590	100.0
Alaska	109	103	94.5
Arizona	905	901	99.6
Arkansas	441	394	89.3
California	2,882	936	32.5
Colorado	455	441	96.9
Connecticut	770	769	99.9
Delaware	58	57	98.3
District of Columbia	161	157	97.5
Florida	3,140	3,014	96.0
Georgia	1,184	1,166	98.5
Hawaii	243	227	93.4
Idaho	NA	NA	NA
Illinois	1,277	1,159	90.8
Indiana	849	849	100.0
Iowa	735	727	98.9
Kansas	NA	NA	NA
Kentucky	766	763	99.6
Louisiana	1,282	1,006	78.5
Maine	NA	NA	NA
Maryland	455	422	92.7
Massachusetts	619	618	99.8
Michigan	1,654	1,337	80.8
Minnesota	880	810	92.0
Mississippi	684	677	99.0
Missouri[a]	913	583	63.9
Montana	306	306	100.0
Nebraska[a]	289	23	8.0
Nevada	431	431	100.0
New Hampshire	194	3	1.5
New Jersey	NA	NA	NA
New Mexico	1,079	1,066	98.8
New York	2,381	2,079	87.3
North Carolina	754	754	100.0
North Dakota	NA	NA	NA
Ohio	1,268	514	40.5
Oklahoma	860	859	99.9
Oregon	334	318	95.2
Pennsylvania	832	826	99.3
Rhode Island[a]	1,184	78	6.6
South Carolina	242	242	100.0
South Dakota	361	361	100.0
Tennessee	1,745	1,615	92.6
Texas	886	801	90.4
Utah	NA	NA	NA
Vermont	197	194	98.5
Virginia	1,347	1,343	99.7
Washington	517	495	95.7
West Virginia	420	415	98.8
Wisconsin	452	442	97.8
Wyoming	280	280	100.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	590	100.0	0.0	0.0
Alaska	103	100.0	0.0	0.0
Arizona	901	99.9	0.1	0.0
Arkansas	394	99.7	0.3	0.0
California[b]	936	98.9	1.0	0.1
Colorado	441	100.0	0.0	0.0
Connecticut	769	99.7	0.0	0.3
Delaware	57	100.0	0.0	0.0
District of Columbia	157	98.7	1.3	0.0
Florida	3,014	99.4	0.6	0.1
Georgia	1,166	99.2	0.6	0.2
Hawaii	227	96.0	4.0	0.0
Idaho	NA	NA	NA	NA
Illinois	1,159	99.9	0.0	0.1
Indiana	849	100.0	0.0	0.0
Iowa	727	99.4	0.0	0.6
Kansas	NA	NA	NA	NA
Kentucky	763	100.0	0.0	0.0
Louisiana	1,006	99.7	0.2	0.1
Maine	NA	NA	NA	NA
Maryland	422	100.0	0.0	0.0
Massachusetts	618	99.7	0.0	0.3
Michigan	1,337	98.7	1.1	0.2
Minnesota	810	99.9	0.1	0.0
Mississippi	677	99.4	0.6	0.0
Missouri[a,b]	583	92.5	7.0	0.5
Montana	306	100.0	0.0	0.0
Nebraska[a,b]	23	87.0	13.0	0.0
Nevada	431	100.0	0.0	0.0
New Hampshire[b]	3	100.0	0.0	0.0
New Jersey	NA	NA	NA	NA
New Mexico	1,066	98.4	1.2	0.4
New York	2,079	99.2	0.2	0.6
North Carolina	754	100.0	0.0	0.0
North Dakota	NA	NA	NA	NA
Ohio[b]	514	99.6	0.4	0.0
Oklahoma	859	99.8	0.0	0.2
Oregon	318	99.4	0.6	0.0
Pennsylvania	826	99.6	0.0	0.4
Rhode Island[a,b]	78	88.5	11.5	0.0
South Carolina	242	100.0	0.0	0.0
South Dakota	361	100.0	0.0	0.0
Tennessee	1,615	99.4	0.4	0.2
Texas	801	97.1	2.5	0.4
Utah	NA	NA	NA	NA
Vermont	194	100.0	0.0	0.0
Virginia	1,343	99.8	0.1	0.1
Washington	495	100.0	0.0	0.0
West Virginia	415	100.0	0.0	0.0
Wisconsin	442	100.0	0.0	0.0
Wyoming	280	100.0	0.0	0.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	590	588	99.7	590	100.0
Alaska	103	103	100.0	103	100.0
Arizona	901	899	99.8	901	100.0
Arkansas	394	390	99.0	394	100.0
California[b]	936	932	99.6	935	99.9
Colorado	441	437	99.1	441	100.0
Connecticut	769	757	98.4	767	99.7
Delaware	57	57	100.0	57	100.0
District of Columbia	157	157	100.0	157	100.0
Florida	3,014	2,994	99.3	3,012	99.9
Georgia	1,166	1,162	99.7	1,164	99.8
Hawaii	227	227	100.0	227	100.0
Idaho	NA	NA	NA	NA	NA
Illinois	1,159	1,150	99.2	1,158	99.9
Indiana	849	843	99.3	849	100.0
Iowa	727	721	99.2	723	99.4
Kansas	NA	NA	NA	NA	NA
Kentucky	763	763	100.0	763	100.0
Louisiana	1,006	1,001	99.5	1,005	99.9
Maine	NA	NA	NA	NA	NA
Maryland	422	420	99.5	422	100.0
Massachusetts	618	614	99.4	616	99.7
Michigan	1,337	1,330	99.5	1,334	99.8
Minnesota	810	806	99.5	810	100.0
Mississippi	677	675	99.7	677	100.0
Missouri[a,b]	583	578	99.1	580	99.5
Montana	306	304	99.3	306	100.0
Nebraska[a,b]	23	23	100.0	23	100.0
Nevada	431	429	99.5	431	100.0
New Hampshire[b]	3	3	100.0	3	100.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	1,066	1,057	99.2	1,062	99.6
New York	2,079	2,051	98.7	2,067	99.4
North Carolina	754	754	100.0	754	100.0
North Dakota	NA	NA	NA	NA	NA
Ohio[b]	514	507	98.6	514	100.0
Oklahoma	859	853	99.3	857	99.8
Oregon	318	318	100.0	318	100.0
Pennsylvania	826	817	98.9	823	99.6
Rhode Island[a,b]	78	77	98.7	78	100.0
South Carolina	242	240	99.2	242	100.0
South Dakota	361	359	99.4	361	100.0
Tennessee	1,615	1,584	98.1	1,611	99.8
Texas	801	792	98.9	798	99.6
Utah	NA	NA	NA	NA	NA
Vermont	194	194	100.0	194	100.0
Virginia	1,343	1,324	98.6	1,341	99.9
Washington	495	493	99.6	495	100.0
West Virginia	415	415	100.0	415	100.0
Wisconsin	442	439	99.3	442	100.0
Wyoming	280	270	96.4	280	100.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 and Custodial Care Facilities	Percent Hospital Units	Percent Ambulatory Health Care Facilities	Percent Other
Alabama	588	95.9	0.0	4.1	0.0	0.0
Alaska	103	88.3	0.0	6.8	3.9	1.0
Arizona	899	88.3	0.9	2.4	2.0	6.3
Arkansas	390	99.7	0.0	0.0	0.0	0.3
California[b]	932	92.5	0.3	4.8	0.9	1.5
Colorado	437	96.3	0.0	2.1	0.9	0.7
Connecticut	757	91.7	0.0	7.5	0.3	0.5
Delaware	57	96.5	0.0	1.8	1.8	0.0
District of Columbia	157	87.3	0.0	6.4	0.0	6.4
Florida	2,994	75.9	17.4	1.4	1.9	3.4
Georgia	1,162	94.4	0.5	1.6	0.2	3.3
Hawaii	227	32.2	37.9	3.5	1.8	24.7
Idaho	NA	NA	NA	NA	NA	NA
Illinois	1,150	90.3	0.3	8.8	0.3	0.3
Indiana	843	89.6	0.1	7.1	1.7	1.5
Iowa	721	95.7	0.0	3.7	0.3	0.3
Kansas	NA	NA	NA	NA	NA	NA
Kentucky	763	100.0	0.0	0.0	0.0	0.0
Louisiana	1,001	92.6	1.1	5.6	0.6	0.1
Maine	NA	NA	NA	NA	NA	NA
Maryland	420	95.5	0.0	1.4	0.5	2.6
Massachusetts	614	83.7	0.0	15.3	0.7	0.3
Michigan	1,330	82.8	0.3	7.3	2.1	7.5
Minnesota	806	88.1	0.0	10.3	0.9	0.7
Mississippi	675	88.9	0.3	10.2	0.0	0.6
Missouri[a,b]	578	61.1	0.0	5.9	7.6	25.4
Montana	304	88.2	0.0	8.2	3.0	0.7
Nebraska[a,b]	23	43.5	13.0	13.0	17.4	13.0
Nevada	429	77.2	0.0	1.4	21.4	0.0
New Hampshire[b]	3	100.0	0.0	0.0	0.0	0.0
New Jersey	NA	NA	NA	NA	NA	NA
New Mexico	1,057	88.0	0.6	5.4	1.8	4.3
New York	2,051	72.7	4.4	13.0	4.6	5.3
North Carolina	754	85.9	0.3	13.3	0.3	0.3
North Dakota	NA	NA	NA	NA	NA	NA
Ohio[b]	507	65.9	31.6	0.8	0.2	1.6
Oklahoma	853	85.9	0.0	10.6	0.5	3.0
Oregon	318	85.2	0.0	10.4	0.6	3.8
Pennsylvania	817	88.1	0.0	10.8	0.0	1.1
Rhode Island[a,b]	77	74.0	0.0	5.2	1.3	19.5
South Carolina	240	90.8	0.4	7.5	0.0	1.3
South Dakota	359	88.6	0.6	8.6	1.1	1.1
Tennessee	1,584	52.6	35.4	5.5	0.5	6.1
Texas	792	86.7	0.0	3.2	4.7	5.4
Utah	NA	NA	NA	NA	NA	NA
Vermont	194	96.9	0.0	3.1	0.0	0.0
Virginia	1,324	53.5	18.6	1.3	23.5	3.1
Washington	493	92.3	0.0	6.5	0.8	0.4
West Virginia	415	95.2	0.0	4.3	0.0	0.5
Wisconsin	439	98.4	0.0	0.2	0.0	1.4
Wyoming	270	90.0	2.2	0.0	0.7	7.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	590	40.7
Alaska	103	33.0
Arizona	901	31.0
Arkansas	394	49.0
California[b]	935	33.7
Colorado	441	39.5
Connecticut	767	16.4
Delaware	57	15.8
District of Columbia	157	27.4
Florida	3,012	40.3
Georgia	1,164	37.6
Hawaii	227	91.2
Idaho	NA	NA
Illinois	1,158	36.4
Indiana	849	48.8
Iowa	723	35.8
Kansas	NA	NA
Kentucky	763	29.0
Louisiana	1,005	37.2
Maine	NA	NA
Maryland	422	34.4
Massachusetts	616	40.3
Michigan	1,334	42.4
Minnesota	810	35.8
Mississippi	677	42.8
Missouri[a,b]	580	73.8
Montana	306	47.7
Nebraska[a,b]	23	78.3
Nevada	431	42.2
New Hampshire[b]	3	66.7
New Jersey	NA	NA
New Mexico	1,062	28.0
New York	2,067	44.9
North Carolina	754	46.4
North Dakota	NA	NA
Ohio[b]	514	85.2
Oklahoma	857	44.2
Oregon	318	50.0
Pennsylvania	823	60.8
Rhode Island[a,b]	78	25.6
South Carolina	242	37.2
South Dakota	361	40.4
Tennessee	1,611	62.4
Texas	798	71.3
Utah	NA	NA
Vermont	194	22.7
Virginia	1,341	51.3
Washington	495	43.2
West Virginia	415	33.5
Wisconsin	442	31.0
Wyoming	280	23.9

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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-three states followed the expected method, submitting both an NPI and LPI (Table V.2). Eight of 45 states (Alaska, California, Delaware, Georgia, Rhode Island, Texas, Virginia, and Wisconsin) submitted the same NPI in both the NPI and LPI

fields for approximately half or more of their 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 eight states because many provider LPIs will be unavailable. In addition, more than 30 percent of the LT providers did not have an NPI in five states (California, Illinois, Louisiana, Nebraska, and Washington).

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 929 NPIs. New York, Ohio, and South Carolina accounted for the majority of the NPIs (over 700) found using this method. We also used the state-provided cross-reference files in Florida, Indiana, North Carolina, Texas, and Virginia to locate additional NPIs for the LPIs. The cross-reference files for Indiana and Florida added another 7 NPIs. The other state-provided cross-reference files did not contribute additional NPIs.

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. Thirty-six states had a particularly high linkage rate (more than 90 percent). Two states linked well (70 to 90 percent), but not as high as desired (Michigan and South Carolina). If these two states are included in provider research, they should be used with caution. The remaining seven states, which include the five states that did not

submit many NPIs (California, Illinois, Louisiana, Nebraska, and Washington) and two other states (New Hampshire and Ohio), had NPI values that did not link well and appear invalid. For example, only 2 percent of New Hampshire's, 31 percent of Ohio's and a quarter of California's IDs linked to NPPES. MAXPC data for these seven 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

In every state, 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 these are 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 of primary taxonomy categories reported in all states were nursing/custodial care facilities, residential treatment facilities, hospitals, and hospital units. It is important to note that California substantially improved its reporting of the taxonomy in NPPES.

In 2009, 35 percent of its LT billing provider IDs were classified as "other" and now only 2 percent are classified as "other".

3. Business Location Among LT Billing Provider IDs

Almost 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 37 states. In contrast, Alaska had the lowest with only 50 percent of its providers in the same state as the beneficiary.

C. Usability of LT Billing Provider IDs in Research

In summary, 36 of the 45 states in MAXPC 2010 (80 percent) may be used for LT provider research owing to the high quality and completeness of their data. Seven states (California, Illinois, Louisiana, Nebraska, New Hampshire, Ohio, and Washington) should not be used for LT provider research because of poor data quality and poor completeness. Two states (Michigan and South Carolina) should be used with caution.

Compared to 2009, the percentage of states classified as good remained the same, (80 percent in both 2009 and 2010). Unfortunately, California, Nebraska, New Hampshire, and Ohio continue to be classified as poor.

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

State	Number of Claims	Percent with NPI or LPI
Alabama	293,978	100.0
Alaska	16,245	100.0
Arizona	143,197	100.0
Arkansas	803,537	100.0
California	3,201,357	100.0
Colorado	558,149	100.0
Connecticut	298,100	100.0
Delaware	49,691	100.0
District of Columbia	45,816	100.0
Florida	696,288	100.0
Georgia	1,186,353	100.0
Hawaii	1,344	100.0
Idaho	NA	NA
Illinois	999,173	100.0
Indiana	833,337	100.0
Iowa	181,290	100.0
Kansas	NA	NA
Kentucky	394,990	100.0
Louisiana	406,353	100.0
Maine	NA	NA
Maryland	237,992	100.0
Massachusetts	433,033	100.0
Michigan	408,257	100.0
Minnesota	523,422	100.0
Mississippi	268,195	100.0
Missouri	614,381	100.0
Montana	59,645	100.0
Nebraska	108,951	100.0
Nevada	75,039	100.0
New Hampshire	104,128	100.0
New Jersey	NA	NA
New Mexico	113,194	100.0
New York	11,160,595	100.0
North Carolina	1,025,408	100.0
North Dakota	NA	NA
Ohio	749,684	100.0
Oklahoma	632,242	100.0
Oregon	116,564	100.0
Pennsylvania	1,546,415	100.0
Rhode Island	90,902	100.0
South Carolina	169,518	100.0
South Dakota	56,098	100.0
Tennessee	388,693	100.0
Texas	3,508,821	100.0
Utah	NA	NA
Vermont	51,405	100.0
Virginia	432,537	100.0
Washington	363,711	100.0
West Virginia	129,661	100.0
Wisconsin	272,875	100.0
Wyoming	34,220	100.0

Source: MSIS State Valids Files, FY 2010 Q2–FY 2011 Q4.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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 with LPI Equal to NPI
Alabama	523	49.3	50.7	100.0	0.0
Alaska	79	98.7	100.0	98.7	98.7
Arizona	286	50.0	50.0	100.0	0.0
Arkansas	641	48.4	51.6	99.7	0.0
California	3,007	48.1	100.0	48.8	48.1
Colorado	453	49.4	50.6	100.0	0.0
Connecticut	793	48.9	51.1	99.9	0.0
Delaware	65	98.5	100.0	98.5	98.5
District of Columbia	236	42.4	57.6	98.3	0.0
Florida	1,543	49.8	50.2	99.9	0.0
Georgia	789	54.4	98.4	99.7	53.6
Hawaii	64	48.4	51.6	95.3	0.0
Idaho	NA	NA	NA	NA	NA
Illinois	2,296	57.9	42.1	66.5	0.0
Indiana	2,033	46.5	53.5	100.0	0.0
Iowa	1,390	48.8	51.2	100.0	0.0
Kansas	NA	NA	NA	NA	NA
Kentucky	775	48.8	51.2	99.9	0.0
Louisiana	1,925	52.7	47.3	54.2	0.0
Maine	NA	NA	NA	NA	NA
Maryland	486	52.5	47.5	98.1	0.0
Massachusetts	1,040	49.5	50.5	100.0	0.0
Michigan	1,325	43.0	61.0	90.0	6.6
Minnesota	1,644	48.8	51.2	96.6	0.0
Mississippi	521	50.3	49.7	98.8	0.0
Missouri	1,077	50.9	49.1	98.1	0.0
Montana	262	50.0	50.0	100.0	0.0
Nebraska	362	0.0	100.0	11.9	0.0
Nevada	239	50.2	49.8	99.2	0.0
New Hampshire	200	48.0	52.0	98.5	0.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	478	38.9	61.1	99.8	0.0
New York	3,345	49.7	50.3	94.7	0.0
North Carolina	1,770	45.8	54.2	100.0	0.0
North Dakota	NA	NA	NA	NA	NA
Ohio	2,825	50.2	49.8	97.1	0.0
Oklahoma	889	49.9	50.1	99.7	0.0
Oregon	348	44.5	55.5	95.1	0.0
Pennsylvania	1,843	46.5	53.5	99.9	0.0
Rhode Island	310	94.8	100.0	97.7	94.8
South Carolina	287	10.8	100.0	80.1	10.8
South Dakota	325	48.0	52.0	100.0	0.0
Tennessee	962	49.8	50.2	94.4	0.0
Texas	1,930	99.1	99.6	99.4	99.1
Utah	NA	NA	NA	NA	NA
Vermont	140	50.0	50.0	99.3	0.0
Virginia	378	100.0	100.0	100.0	100.0
Washington	552	48.9	51.3	55.8	0.4
West Virginia	483	50.1	49.9	99.8	0.0
Wisconsin	421	98.8	100.0	98.8	98.8
Wyoming	176	49.4	50.6	100.0	0.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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	523	100.0	0.0	NA
Alaska	78	100.0	0.0	NA
Arizona	286	100.0	0.0	NA
Arkansas	639	99.7	0.3	NA
California[a]	1,467	98.6	1.4	NA
Colorado	453	100.0	0.0	NA
Connecticut	792	98.4	1.6	NA
Delaware	64	100.0	0.0	NA
District of Columbia	232	99.6	0.4	NA
Florida	1,541	99.5	0.4	0.1
Georgia	787	100.0	0.0	NA
Hawaii	61	100.0	0.0	NA
Idaho	NA	NA	NA	NA
Illinois[a]	1,527	100.0	0.0	NA
Indiana	2,033	99.4	0.3	0.3
Iowa	1,390	100.0	0.0	NA
Kansas	NA	NA	NA	NA
Kentucky	774	100.0	0.0	NA
Louisiana[a]	1,044	99.9	0.1	NA
Maine	NA	NA	NA	NA
Maryland	477	99.8	0.2	NA
Massachusetts	1,040	100.0	0.0	NA
Michigan	1,192	98.3	1.7	NA
Minnesota	1,588	98.4	1.6	NA
Mississippi	515	99.8	0.2	NA
Missouri	1,057	96.8	3.2	NA
Montana	262	100.0	0.0	NA
Nebraska[a]	43	0.0	100.0	NA
Nevada	237	100.0	0.0	NA
New Hampshire	197	98.5	1.5	NA
New Jersey	NA	NA	NA	NA
New Mexico	477	100.0	0.0	NA
New York	3,169	96.3	3.7	NA
North Carolina	1,770	100.0	0.0	0.0
North Dakota	NA	NA	NA	NA
Ohio	2,742	85.0	15.0	NA
Oklahoma	886	99.9	0.1	NA
Oregon	331	95.5	4.5	NA
Pennsylvania	1,842	100.0	0.0	NA
Rhode Island	303	97.0	3.0	NA
South Carolina	230	13.5	86.5	NA
South Dakota	325	100.0	0.0	NA
Tennessee	908	100.0	0.0	NA
Texas	1,918	100.0	0.0	0.0
Utah	NA	NA	NA	NA
Vermont	139	100.0	0.0	NA
Virginia	378	100.0	0.0	0.0
Washington[a]	308	100.0	0.0	NA
West Virginia	482	100.0	0.0	NA
Wisconsin	416	100.0	0.0	NA
Wyoming	176	100.0	0.0	NA

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was 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, North Carolina, Texas, and Virginia provided state-specific provider files.

NA = Not available

[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	523	523	100.0
Alaska	79	74	93.7
Arizona	286	286	100.0
Arkansas	641	639	99.7
California[a]	3,007	736	24.5
Colorado	453	453	100.0
Connecticut	793	792	99.9
Delaware	65	62	95.4
District of Columbia	236	232	98.3
Florida	1,543	1,535	99.5
Georgia	789	787	99.7
Hawaii	64	61	95.3
Idaho	NA	NA	NA
Illinois[a]	2,296	1,527	66.5
Indiana	2,033	2,033	100.0
Iowa	1,390	1,390	100.0
Kansas	NA	NA	NA
Kentucky	775	774	99.9
Louisiana[a]	1,925	930	48.3
Maine	NA	NA	NA
Maryland	486	477	98.1
Massachusetts	1,040	1,040	100.0
Michigan	1,325	1,189	89.7
Minnesota	1,644	1,568	95.4
Mississippi	521	515	98.8
Missouri	1,077	1,057	98.1
Montana	262	262	100.0
Nebraska[a]	362	43	11.9
Nevada	239	237	99.2
New Hampshire	200	3	1.5
New Jersey	NA	NA	NA
New Mexico	478	477	99.8
New York	3,345	3,169	94.7
North Carolina	1,770	1,770	100.0
North Dakota	NA	NA	NA
Ohio	2,825	863	30.5
Oklahoma	889	886	99.7
Oregon	348	331	95.1
Pennsylvania	1,843	1,842	99.9
Rhode Island	310	303	97.7
South Carolina	287	230	80.1
South Dakota	325	325	100.0
Tennessee	962	908	94.4
Texas	1,930	1,907	98.8
Utah	NA	NA	NA
Vermont	140	139	99.3
Virginia	378	378	100.0
Washington[a]	552	308	55.8
West Virginia	483	481	99.6
Wisconsin	421	416	98.8
Wyoming	176	176	100.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	523	98.5	0.0	1.5
Alaska	74	100.0	0.0	0.0
Arizona	286	100.0	0.0	0.0
Arkansas	639	100.0	0.0	0.0
California[a,b]	736	99.6	0.4	0.0
Colorado	453	99.6	0.0	0.4
Connecticut	792	100.0	0.0	0.0
Delaware	62	100.0	0.0	0.0
District of Columbia	232	100.0	0.0	0.0
Florida	1,535	100.0	0.0	0.0
Georgia	787	99.9	0.0	0.1
Hawaii	61	100.0	0.0	0.0
Idaho	NA	NA	NA	NA
Illinois[a,b]	1,527	100.0	0.0	0.0
Indiana	2,033	100.0	0.0	0.0
Iowa	1,390	99.9	0.0	0.1
Kansas	NA	NA	NA	NA
Kentucky	774	99.7	0.0	0.3
Louisiana[a,b]	930	99.7	0.2	0.1
Maine	NA	NA	NA	NA
Maryland	477	100.0	0.0	0.0
Massachusetts	1,040	100.0	0.0	0.0
Michigan	1,189	99.7	0.1	0.2
Minnesota	1,568	100.0	0.0	0.0
Mississippi	515	100.0	0.0	0.0
Missouri	1,057	99.9	0.0	0.1
Montana	262	100.0	0.0	0.0
Nebraska[a,b]	43	88.4	11.6	0.0
Nevada	237	100.0	0.0	0.0
New Hampshire[b]	3	100.0	0.0	0.0
New Jersey	NA	NA	NA	NA
New Mexico	477	100.0	0.0	0.0
New York	3,169	98.3	1.7	0.1
North Carolina	1,770	99.9	0.1	0.0
North Dakota	NA	NA	NA	NA
Ohio[b]	863	100.0	0.0	0.0
Oklahoma	886	99.8	0.0	0.2
Oregon	331	99.4	0.6	0.0
Pennsylvania	1,842	100.0	0.0	0.0
Rhode Island	303	99.7	0.3	0.0
South Carolina	230	100.0	0.0	0.0
South Dakota	325	99.4	0.0	0.6
Tennessee	908	99.9	0.1	0.0
Texas	1,907	99.9	0.1	0.0
Utah	NA	NA	NA	NA
Vermont	139	100.0	0.0	0.0
Virginia	378	99.7	0.0	0.3
Washington[a,b]	308	100.0	0.0	0.0
West Virginia	481	100.0	0.0	0.0
Wisconsin	416	100.0	0.0	0.0
Wyoming	176	100.0	0.0	0.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	523	508	97.1	515	98.5
Alaska	74	72	97.3	74	100.0
Arizona	286	278	97.2	286	100.0
Arkansas	639	631	98.7	639	100.0
California[a,b]	736	732	99.5	736	100.0
Colorado	453	447	98.7	451	99.6
Connecticut	792	776	98.0	792	100.0
Delaware	62	59	95.2	62	100.0
District of Columbia	232	230	99.1	232	100.0
Florida	1,535	1,521	99.1	1,535	100.0
Georgia	787	786	99.9	786	99.9
Hawaii	61	61	100.0	61	100.0
Idaho	NA	NA	NA	NA	NA
Illinois[a,b]	1,527	1,488	97.4	1,527	100.0
Indiana	2,033	2,002	98.5	2,033	100.0
Iowa	1,390	1,364	98.1	1,388	99.9
Kansas	NA	NA	NA	NA	NA
Kentucky	774	768	99.2	772	99.7
Louisiana[a,b]	930	926	99.6	929	99.9
Maine	NA	NA	NA	NA	NA
Maryland	477	463	97.1	477	100.0
Massachusetts	1,040	1,032	99.2	1,040	100.0
Michigan	1,189	1,163	97.8	1,187	99.8
Minnesota	1,568	1,535	97.9	1,568	100.0
Mississippi	515	515	100.0	515	100.0
Missouri	1,057	1,052	99.5	1,056	99.9
Montana	262	256	97.7	262	100.0
Nebraska[a,b]	43	41	95.3	43	100.0
Nevada	237	227	95.8	237	100.0
New Hampshire[b]	3	3	100.0	3	100.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	477	464	97.3	477	100.0
New York	3,169	3,150	99.4	3,167	99.9
North Carolina	1,770	1,729	97.7	1,770	100.0
North Dakota	NA	NA	NA	NA	NA
Ohio[b]	863	847	98.1	863	100.0
Oklahoma	886	862	97.3	884	99.8
Oregon	331	315	95.2	331	100.0
Pennsylvania	1,842	1,702	92.4	1,842	100.0
Rhode Island	303	297	98.0	303	100.0
South Carolina	230	230	100.0	230	100.0
South Dakota	325	310	95.4	323	99.4
Tennessee	908	887	97.7	908	100.0
Texas	1,907	1,878	98.5	1,907	100.0
Utah	NA	NA	NA	NA	NA
Vermont	139	135	97.1	139	100.0
Virginia	378	365	96.6	377	99.7
Washington[a,b]	308	302	98.1	308	100.0
West Virginia	481	477	99.2	481	100.0
Wisconsin	416	413	99.3	416	100.0
Wyoming	176	164	93.2	176	100.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	508	86.8	6.1	5.1	1.2	0.8
Alaska	72	30.6	31.9	27.8	5.6	4.2
Arizona	278	88.5	2.2	8.6	0.7	0.0
Arkansas	631	85.9	6.7	5.2	0.0	2.2
California[a,b]	732	75.3	18.0	3.7	1.4	1.6
Colorado	447	92.2	1.1	2.7	3.1	0.9
Connecticut	776	90.9	0.3	6.8	0.5	1.5
Delaware	59	78.0	11.9	6.8	0.0	3.4
District of Columbia	230	60.4	30.9	6.1	0.0	2.6
Florida	1,521	95.3	3.4	0.7	0.3	0.4
Georgia	786	92.7	0.8	4.2	2.2	0.1
Hawaii	61	45.9	6.6	41.0	0.0	6.6
Idaho	NA	NA	NA	NA	NA	NA
Illinois[a,b]	1,488	81.0	11.0	2.4	1.9	3.8
Indiana	2,002	73.4	19.8	2.4	0.4	3.9
Iowa	1,364	82.4	4.8	5.1	6.7	1.0
Kansas	NA	NA	NA	NA	NA	NA
Kentucky	768	74.2	5.6	5.1	13.9	1.2
Louisiana[a,b]	926	64.7	20.1	6.0	4.0	5.2
Maine	NA	NA	NA	NA	NA	NA
Maryland	463	90.7	5.0	3.2	0.2	0.9
Massachusetts	1,032	84.6	1.4	12.7	0.8	0.6
Michigan	1,163	78.2	0.0	13.6	2.2	6.0
Minnesota	1,535	76.4	2.3	12.6	5.2	3.5
Mississippi	515	80.0	5.0	5.6	8.2	1.2
Missouri	1,052	98.6	0.4	0.8	0.0	0.3
Montana	256	62.5	7.0	16.4	13.3	0.8
Nebraska[a,b]	41	82.9	7.3	0.0	0.0	9.8
Nevada	227	59.9	25.6	13.7	0.0	0.9
New Hampshire[b]	3	66.7	0.0	33.3	0.0	0.0
New Jersey	NA	NA	NA	NA	NA	NA
New Mexico	464	62.5	12.7	12.3	5.4	7.1
New York	3,150	75.9	4.6	7.2	4.7	7.6
North Carolina	1,729	82.5	14.0	1.6	1.4	0.5
North Dakota	NA	NA	NA	NA	NA	NA
Ohio[b]	847	98.6	0.5	0.6	0.0	0.4
Oklahoma	862	89.6	5.3	4.4	0.5	0.2
Oregon	315	84.8	6.7	3.5	2.5	2.5
Pennsylvania	1,702	80.7	4.6	4.2	8.6	1.9
Rhode Island	297	46.1	48.8	1.3	0.0	3.7
South Carolina	230	85.7	6.5	7.0	0.9	0.0
South Dakota	310	74.2	1.3	11.3	11.6	1.6
Tennessee	887	82.4	4.8	7.2	3.5	2.0
Texas	1,878	87.1	7.0	2.7	1.4	1.8
Utah	NA	NA	NA	NA	NA	NA
Vermont	135	77.8	1.5	14.1	6.7	0.0
Virginia	365	80.5	2.7	9.6	6.3	0.8
Washington[a,b]	302	82.5	0.3	7.6	9.6	0.0
West Virginia	477	75.7	8.8	8.4	6.3	0.8
Wisconsin	413	96.9	0.2	2.4	0.0	0.5
Wyoming	164	51.2	20.7	13.4	14.6	0.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	515	98.5
Alaska	74	50.0
Arizona	286	93.0
Arkansas	639	97.2
California[a,b]	736	99.3
Colorado	451	98.5
Connecticut	792	94.7
Delaware	62	77.4
District of Columbia	232	67.7
Florida	1535	99.6
Georgia	786	98.5
Hawaii	61	100.0
Idaho	NA	NA
Illinois[a,b]	1527	98.4
Indiana	2033	99.6
Iowa	1388	95.0
Kansas	NA	NA
Kentucky	772	99.1
Louisiana[a,b]	929	99.6
Maine	NA	NA
Maryland	477	97.1
Massachusetts	1040	93.7
Michigan	1187	96.2
Minnesota	1568	94.6
Mississippi	515	96.1
Missouri	1056	99.3
Montana	262	91.6
Nebraska[a,b]	43	100.0
Nevada	237	56.1
New Hampshire[b]	3	100.0
New Jersey	NA	NA
New Mexico	477	81.8
New York	3167	95.2
North Carolina	1770	97.5
North Dakota	NA	NA
Ohio[b]	863	100.0
Oklahoma	884	96.4
Oregon	331	98.8
Pennsylvania	1842	99.5
Rhode Island	303	98.3
South Carolina	230	99.1
South Dakota	323	95.7
Tennessee	908	97.9
Texas	1907	99.7
Utah	NA	NA
Vermont	139	74.8
Virginia	377	95.8
Washington[a,b]	308	92.2
West Virginia	481	84.6
Wisconsin	416	98.6
Wyoming	176	69.3

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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, nine 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 nine 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-six states followed the expected method, submitting both an NPI and LPI (Table VI.3). Five states submitted the same NPI in both the NPI and servicing LPI fields for the majority of provider IDs (California, Delaware, Rhode Island, 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 five states. In addition, in eight states (Hawaii, Illinois, Maryland, Michigan, Nebraska, 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 47,024 NPIs nationally, including more than 7,600 NPIs in Michigan, all 1,287 NPIs for Nebraska, and nearly 6,500 NPIs in New York. We also used the state-provided cross-reference files in Florida, Indiana, North Carolina, Texas, and Virginia to locate additional NPIs for the LPIs. The cross-reference files for Florida, Indiana and North Carolina added another 5,760 NPIs, Texas' file identified one NPI, and Virginia's file identified none.

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 of 45 states had a particularly high linkage rate (more than 90 percent). Fourteen states (Alaska, Arkansas, Connecticut, Delaware, District of Columbia, Iowa, Louisiana, New Mexico, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, and Wyoming) linked well (70 to 90 percent), but not as high as desired. If included in provider research, the 14 states should be used with caution. The remaining 13 states, including the 8 states that did not submit many NPIs (Hawaii, Illinois, Maryland, Michigan, Nebraska, Rhode Island, South Carolina, and Wisconsin), and 5 other states (California, Minnesota, Missouri, New Hampshire, and Ohio), have NPI values that did not link well and appear invalid. These 13 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 five states (Table VI.6). Michigan, New Hampshire, and New Mexico classified between 30 and 50 percent of their OT servicing providers as an individual. California, 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

Almost 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). 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 include physician assistants and advanced practice nursing providers, 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 and physician assistants and advanced practice nursing providers, followed by suppliers, hospitals, agencies, behavioral health and social service providers, dental providers, ambulatory health care facilities, and eye and vision service providers. Four states (California, Nebraska, New Hampshire, and Wisconsin) do not fit the expected pattern however. In each of these four states, the top four taxonomy categories combined for individual entities are less than 50 percent of reported taxonomies. In Nebraska and New Hampshire, many of the reported provider taxonomies are identified as suppliers, while in California and Wisconsin, many providers are identified as hospitals. It is important to note that researchers should use caution when working with these states in OT provider research.

3. Business Location Among OT Servicing Provider IDs

Almost all of the OT servicing provider IDs that linked to NPPES 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 home[10]. In Table IV.10, among OT servicing providers that provided an address in NPPES, 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 NPPES are within the same state as the beneficiary's state of residence. Only West Virginia and Wyoming have more out-of-state than in-state providers, with West Virginia just slightly under 50 percent.

[10] 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.

C. Usability of OT Servicing Provider IDs in Research

In summary, 16 of 45 (36 percent) states (Alabama, Arizona, Colorado, Florida, Indiana, Kentucky, Massachusetts, Mississippi, Montana, Nevada, New York, North Carolina[11], Oklahoma, Vermont, Washington, and West Virginia) may be used in OT provider research owing to their high degree of data quality and completeness, and 14 states (Alaska, Arkansas, Connecticut, Delaware, District of Columbia, Iowa, Louisiana, New Mexico, Oregon, Pennsylvania, South Dakota, Tennessee, Texas, 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 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 15 states (California, Georgia, Hawaii, Illinois, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, Ohio, Rhode Island, South Carolina, Virginia, and Wisconsin) should not be used for OT servicing provider research because of poor data quality and completeness.

Compared to 2009, there has been a notable improvement in the percentage of states classified as good (29 percent in 2009 versus 36 percent in 2010). Unfortunately all 15 states that were classified as poor continue to have poor quality and completeness in 2010.

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

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

State	Number of Claims	Percent with NPI or LPI
Alabama	28,270,469	100.0
Alaska	5,881,832	100.0
Arizona	34,175,754	100.0
Arkansas	30,605,421	100.0
California	203,804,982	100.0
Colorado	21,547,187	100.0
Connecticut	30,600,292	100.0
Delaware	7,866,581	100.0
District of Columbia	8,027,640	100.0
Florida	100,227,855	99.2
Georgia	51,735,816	100.0
Hawaii	7,269,465	100.0
Idaho	NA	NA
Illinois	91,195,466	100.0
Indiana	40,661,179	100.0
Iowa	17,035,821	100.0
Kansas	NA	NA
Kentucky	34,498,694	100.0
Louisiana	41,083,800	100.0
Maine	NA	NA
Maryland	42,142,658	100.0
Massachusetts	58,410,762	100.0
Michigan	77,136,474	99.8
Minnesota	47,389,719	100.0
Mississippi	25,260,071	100.0
Missouri	46,443,579	100.0
Montana	5,371,580	100.0
Nebraska	8,757,101	100.0
Nevada	5,570,433	100.0
New Hampshire	8,729,261	100.0
New Jersey	NA	NA
New Mexico	19,639,513	100.0
New York	215,845,722	100.0
North Carolina	87,957,940	100.0
North Dakota	NA	NA
Ohio	66,830,062	100.0
Oklahoma	30,968,646	100.0
Oregon	18,808,195	100.0
Pennsylvania	29,238,374	100.0
Rhode Island	5,914,427	100.0
South Carolina	23,278,550	100.0
South Dakota	2,780,048	100.0
Tennessee	38,367,244	100.0
Texas	194,931,047	99.9
Utah	NA	NA
Vermont	5,889,431	100.0
Virginia	26,774,465	100.0
Washington	41,045,047	100.0
West Virginia	13,856,150	100.0
Wisconsin	37,956,217	100.0
Wyoming	2,856,413	100.0

Source: MSIS State Valids files, FY 2010 Q2–FY 2011 Q4, excluding capitation claims.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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

State	Number Where NPI = OT Billing Provider ID	Number of NPIs in OT	Percent of Potentially Misreported NPIs
Alaska	1,136	7,223	15.7
California	18,313	596,581	3.1
Delaware	154	6,815	2.3
Georgia	32,220	35,062	91.9
Michigan	240	34,584	0.7
Texas	1,886	78,746	2.4
Virginia	31,075	39,184	79.3
Washington	25	34,035	0.1
Wisconsin	385	24,676	1.6

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was 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	47,397	38.7	61.3	100.0	0.0
Alaska	15,008	48.1	51.9	91.1	0.0
Arizona	52,151	45.6	54.4	91.6	0.0
Arkansas	44,992	42.9	57.1	72.7	0.0
California	763,626	78.1	97.6	87.3	77.6
Colorado	43,901	52.7	47.3	97.4	0.0
Connecticut	48,371	43.9	56.1	88.0	0.0
Delaware	8,291	82.2	98.1	82.5	81.9
District of Columbia	8,832	45.3	54.7	71.2	0.0
Florida	138,141	45.5	54.5	93.0	0.0
Georgia[a]	108,833	32.2	67.8	98.3	0.0
Hawaii	12,420	43.8	56.2	68.2	0.0
Idaho	NA	NA	NA	NA	NA
Illinois	147,362	34.9	65.1	69.7	0.0
Indiana	56,753	50.3	49.7	97.5	0.0
Iowa	64,366	43.7	57.8	97.4	2.6
Kansas	NA	NA	NA	NA	NA
Kentucky	56,341	46.8	78.6	90.3	32.3
Louisiana	44,464	52.6	47.4	91.7	0.0
Maine	NA	NA	NA	NA	NA
Maryland	92,158	31.7	68.3	62.3	0.0
Massachusetts	62,596	50.5	49.5	99.1	0.0
Michigan	198,167	17.5	94.1	36.2	12.3
Minnesota	118,305	78.0	22.0	92.2	0.0
Mississippi	30,680	51.0	49.0	99.6	0.0
Missouri	59,506	19.8	80.2	82.7	0.0
Montana	17,482	48.5	51.5	97.6	0.0
Nebraska	30,747	0.0	100.0	4.2	0.0
Nevada	20,683	49.8	50.2	99.9	0.0
New Hampshire	19,899	41.7	58.3	85.7	0.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	58,663	29.1	70.9	83.2	0.0
New York	270,533	51.9	48.1	92.8	0.0
North Carolina	102,817	47.7	52.3	100.0	0.0
North Dakota	NA	NA	NA	NA	NA
Ohio	126,113	36.5	63.5	71.4	0.0
Oklahoma	45,186	49.1	51.0	94.8	0.1
Oregon	47,710	40.6	76.9	84.0	22.8
Pennsylvania	97,737	42.0	58.0	89.5	0.0
Rhode Island	13,909	55.9	100.0	56.6	55.9
South Carolina	25,807	0.0	100.0	47.9	0.0
South Dakota	14,350	52.6	47.4	83.0	0.0
Tennessee	73,001	27.0	73.5	75.6	0.6
Texas	112,155	70.2	93.0	75.1	68.0
Utah	NA	NA	NA	NA	NA
Vermont	15,869	51.5	48.5	99.1	0.0
Virginia[a]	78,368	50.0	50.0	100.0	0.0
Washington	68,491	49.7	51.3	99.0	2.0
West Virginia	33,271	49.6	50.4	96.2	0.0
Wisconsin	46,918	52.6	99.2	61.0	52.2
Wyoming	20,519	42.8	57.2	83.5	0.0

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	47,392	100.0	0.0	NA
Alaska	13,671	96.3	3.7	NA
Arizona	47,790	98.8	1.2	NA
Arkansas	32,723	93.3	6.7	NA
California	666,401	99.1	0.9	NA
Colorado	42,740	97.3	2.7	NA
Connecticut	42,543	99.7	0.3	NA
Delaware	6,843	99.7	0.3	NA
District of Columbia	6,292	94.3	5.7	NA
Florida	128,537	98.6	1.3	0.0
Georgia[a]	107,013	99.7	0.3	NA
Hawaii[b]	8,475	97.1	2.9	NA
Idaho	NA	NA	NA	NA
Illinois[b]	102,704	99.9	0.1	NA
Indiana	55,321	83.6	6.5	9.9
Iowa	62,704	99.1	0.9	NA
Kansas	NA	NA	NA	NA
Kentucky	50,887	99.6	0.4	NA
Louisiana	40,763	100.0	0.0	NA
Maine	NA	NA	NA	NA
Maryland[b]	57,418	99.1	0.9	NA
Massachusetts	62,058	100.0	0.0	NA
Michigan[b]	71,720	89.4	10.6	NA
Minnesota	109,049	96.4	3.6	NA
Mississippi	30,556	99.9	0.1	NA
Missouri	49,222	94.6	5.4	NA
Montana	17,054	100.0	0.0	NA
Nebraska[b]	1,287	0.0	100.0	NA
Nevada	20,672	100.0	0.0	NA
New Hampshire	17,051	94.7	5.3	NA
New Jersey	NA	NA	NA	NA
New Mexico	48,780	99.4	0.6	NA
New York	250,947	97.4	2.6	NA
North Carolina	102,784	99.7	0.1	0.2
North Dakota	NA	NA	NA	NA
Ohio	90,030	99.4	0.6	NA
Oklahoma	42,849	99.1	0.9	NA
Oregon	40,061	99.1	0.9	NA
Pennsylvania	87,444	99.9	0.1	NA
Rhode Island[b]	7,870	98.8	1.2	NA
South Carolina[b]	12,371	98.4	1.6	NA
South Dakota	11,906	89.7	10.3	NA
Tennessee	55,206	99.1	0.9	NA
Texas	84,257	99.9	0.1	0.0
Utah	NA	NA	NA	NA
Vermont	15,730	99.7	0.3	NA
Virginia[a]	78,368	100.0	0.0	0.0
Washington	67,788	100.0	0.0	NA
West Virginia	31,998	95.7	4.3	NA
Wisconsin[b]	28,607	97.8	2.2	NA
Wyoming	17,131	97.7	2.3	NA

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was 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, North Carolina, Texas, and Virginia provided state-specific provider files.

NA = Not available

[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	47,397	47,370	99.9
Alaska	15,008	13,405	89.3
Arizona	52,151	47,788	91.6
Arkansas	44,992	32,707	72.7
California	763,626	73,286	9.6
Colorado	43,901	42,652	97.2
Connecticut	48,371	42,327	87.5
Delaware	8,291	6,768	81.6
District of Columbia	8,832	6,280	71.1
Florida	138,141	128,262	92.8
Georgia[a]	108,833	107,002	98.3
Hawaii[b]	12,420	8,475	68.2
Idaho	NA	NA	NA
Illinois[b]	147,362	102,693	69.7
Indiana	56,753	54,491	96.0
Iowa	64,366	52,197	81.1
Kansas	NA	NA	NA
Kentucky	56,341	50,887	90.3
Louisiana	44,464	39,327	88.4
Maine	NA	NA	NA
Maryland[b]	92,158	46,956	51.0
Massachusetts	62,596	62,034	99.1
Michigan[b]	198,167	71,445	36.1
Minnesota	118,305	57,306	48.4
Mississippi	30,680	30,496	99.4
Missouri	59,506	31,466	52.9
Montana	17,482	17,054	97.6
Nebraska[b]	30,747	1,287	4.2
Nevada	20,683	19,479	94.2
New Hampshire	19,899	935	4.7
New Jersey	NA	NA	NA
New Mexico	58,663	48,777	83.1
New York	270,533	250,487	92.6
North Carolina	102,817	102,775	100.0
North Dakota	NA	NA	NA
Ohio	126,113	44,210	35.1
Oklahoma	45,186	41,875	92.7
Oregon	47,710	40,061	84.0
Pennsylvania	97,737	87,434	89.5
Rhode Island[b]	13,909	7,702	55.4
South Carolina[b]	25,807	12,371	47.9
South Dakota	14,350	11,856	82.6
Tennessee	73,001	55,194	75.6
Texas	112,155	83,141	74.1
Utah	NA	NA	NA
Vermont	15,869	15,712	99.0
Virginia[a]	78,368	74,984	95.7
Washington	68,491	67,455	98.5
West Virginia	33,271	31,998	96.2
Wisconsin[b]	46,918	28,607	61.0
Wyoming	20,519	17,117	83.4

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	47,370	12.9	86.8	0.4
Alaska	13,405	7.1	92.6	0.3
Arizona	47,788	15.9	83.7	0.4
Arkansas	32,707	13.6	86.0	0.5
California[c]	73,286	80.4	19.4	0.2
Colorado	42,652	14.7	85.0	0.3
Connecticut	42,327	19.3	80.4	0.4
Delaware	6,768	9.6	90.1	0.3
District of Columbia	6,280	40.1	59.5	0.4
Florida	128,262	21.1	78.3	0.6
Georgia[a]	107,002	15.2	84.5	0.3
Hawaii[b,c]	8,475	33.9	65.6	0.6
Idaho	NA	NA	NA	NA
Illinois[b,c]	102,693	18.1	81.5	0.4
Indiana	54,491	19.2	80.3	0.5
Iowa	52,197	21.6	78.0	0.4
Kansas	NA	NA	NA	NA
Kentucky	50,887	17.8	81.7	0.5
Louisiana	39,327	28.9	70.7	0.4
Maine	NA	NA	NA	NA
Maryland[b,c]	46,956	23.1	76.6	0.3
Massachusetts	62,034	10.9	88.8	0.3
Michigan[b,c]	71,445	51.6	48.1	0.3
Minnesota[c]	57,306	30.3	69.4	0.3
Mississippi	30,496	16.8	82.7	0.5
Missouri[c]	31,466	79.8	19.9	0.4
Montana	17,054	17.8	81.9	0.3
Nebraska[b,c]	1,287	44.7	55.3	0.0
Nevada	19,479	16.3	83.4	0.4
New Hampshire[c]	935	52.2	47.8	0.0
New Jersey	NA	NA	NA	NA
New Mexico	48,777	67.0	32.5	0.5
New York	250,487	13.1	86.3	0.6
North Carolina	102,775	31.8	67.9	0.4
North Dakota	NA	NA	NA	NA
Ohio[c]	44,210	13.8	86.0	0.2
Oklahoma	41,875	18.7	80.7	0.6
Oregon	40,061	9.5	90.0	0.5
Pennsylvania	87,434	16.2	83.5	0.3
Rhode Island[b,c]	7,702	11.2	88.4	0.4
South Carolina[b,c]	12,371	1.9	97.8	0.4
South Dakota	11,856	33.2	66.6	0.2
Tennessee	55,194	34.6	65.0	0.4
Texas	83,141	21.0	78.5	0.5
Utah	NA	NA	NA	NA
Vermont	15,712	4.8	94.9	0.3
Virginia[a]	74,984	19.3	80.3	0.4
Washington	67,455	17.4	82.3	0.3
West Virginia	31,998	16.6	83.1	0.3
Wisconsin[b,c]	28,607	33.8	65.8	0.4
Wyoming	17,117	8.1	91.4	0.5

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	47,370	46,266	97.7	47,200	99.6
Alaska	13,405	13,136	98.0	13,361	99.7
Arizona	47,788	46,967	98.3	47,573	99.6
Arkansas	32,707	32,250	98.6	32,555	99.5
California[c]	73,286	71,526	97.6	73,119	99.8
Colorado	42,652	42,147	98.8	42,504	99.7
Connecticut	42,327	41,196	97.3	42,171	99.6
Delaware	6,768	6,671	98.6	6,748	99.7
District of Columbia	6,280	6,128	97.6	6,254	99.6
Florida	128,262	126,112	98.3	127,471	99.4
Georgia[a]	107,002	105,096	98.2	106,628	99.7
Hawaii[b,c]	8,475	8,187	96.6	8,428	99.4
Idaho	NA	NA	NA	NA	NA
Illinois[b,c]	102,693	100,714	98.1	102,307	99.6
Indiana	54,491	53,712	98.6	54,244	99.5
Iowa	52,197	51,378	98.4	51,972	99.6
Kansas	NA	NA	NA	NA	NA
Kentucky	50,887	50,161	98.6	50,637	99.5
Louisiana	39,327	38,754	98.5	39,163	99.6
Maine	NA	NA	NA	NA	NA
Maryland[b,c]	46,956	45,956	97.9	46,793	99.7
Massachusetts	62,034	60,202	97.0	61,840	99.7
Michigan[b,c]	71,445	69,853	97.8	71,212	99.7
Minnesota[c]	57,306	56,221	98.1	57,113	99.7
Mississippi	30,496	30,032	98.5	30,346	99.5
Missouri[c]	31,466	30,698	97.6	31,352	99.6
Montana	17,054	16,658	97.7	16,997	99.7
Nebraska[b,c]	1,287	1,272	98.8	1,287	100.0
Nevada	19,479	19,113	98.1	19,410	99.6
New Hampshire[c]	935	884	94.5	935	100.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	48,777	47,480	97.3	48,529	99.5
New York	250,487	244,807	97.7	249,066	99.4
North Carolina	102,775	100,722	98.0	102,389	99.6
North Dakota	NA	NA	NA	NA	NA
Ohio[c]	44,210	43,680	98.8	44,105	99.8
Oklahoma	41,875	41,173	98.3	41,641	99.4
Oregon	40,061	39,168	97.8	39,876	99.5
Pennsylvania	87,434	85,992	98.4	87,136	99.7
Rhode Island[b,c]	7,702	7,506	97.5	7,670	99.6
South Carolina[b,c]	12,371	12,243	99.0	12,324	99.6
South Dakota	11,856	11,661	98.4	11,833	99.8
Tennessee	55,194	54,313	98.4	54,989	99.6
Texas	83,141	81,577	98.1	82,716	99.5
Utah	NA	NA	NA	NA	NA
Vermont	15,712	15,233	97.0	15,664	99.7
Virginia[a]	74,984	73,292	97.7	74,690	99.6
Washington	67,455	66,547	98.7	67,270	99.7
West Virginia	31,998	31,467	98.3	31,892	99.7
Wisconsin[b,c]	28,607	28,018	97.9	28,497	99.6
Wyoming	17,117	16,794	98.1	17,034	99.5

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	46,266	62.2	12.5	0.9	3.7	2.3	7.0
Alaska	13,136	51.1	12.7	3.9	5.6	2.0	18.5
Arizona	46,967	58.5	10.3	2.2	0.2	1.3	14.3
Arkansas	32,250	42.2	6.6	7.9	0.5	2.6	29.8
California[c]	71,526	36.7	0.3	0.9	8.6	1.8	6.4
Colorado	42,147	56.1	12.6	4.1	4.4	1.6	10.7
Connecticut	41,196	61.1	9.0	5.0	4.4	1.7	6.3
Delaware	6,671	54.4	9.2	6.6	3.4	1.0	17.1
District of Columbia	6,128	63.5	2.5	0.4	3.2	0.4	5.1
Florida	126,112	52.4	10.6	3.2	1.8	2.0	13.9
Georgia[a]	105,096	57.2	13.0	2.8	3.3	1.4	8.7
Hawaii[b,c]	8,187	47.6	3.2	10.6	3.6	4.0	12.1
Idaho	NA	NA	NA	NA	NA	NA	NA
Illinois[b,c]	100,714	63.0	6.2	0.2	3.7	1.7	7.7
Indiana	53,712	60.5	7.8	2.6	4.7	2.8	7.9
Iowa	51,378	58.7	8.2	1.2	5.3	2.8	10.4
Kansas	NA	NA	NA	NA	NA	NA	NA
Kentucky	50,161	60.0	12.6	0.4	4.6	2.0	5.3
Louisiana	38,754	51.9	12.9	1.6	4.1	1.4	8.9
Maine	NA	NA	NA	NA	NA	NA	NA
Maryland[b,c]	45,956	63.0	4.8	5.9	4.1	0.6	8.3
Massachusetts	60,202	67.5	5.2	2.9	5.3	2.5	8.3
Michigan[b,c]	69,853	46.3	6.8	3.7	6.8	2.2	9.7
Minnesota[c]	56,221	35.8	11.1	9.0	5.0	2.0	10.3
Mississippi	30,032	57.0	14.6	1.4	3.6	2.1	8.4
Missouri[c]	30,698	41.7	1.7	6.0	1.7	2.2	5.2
Montana	16,658	48.3	11.4	7.3	4.6	2.1	9.4
Nebraska[b,c]	1,272	22.3	2.8	4.8	12.3	5.8	19.2
Nevada	19,113	58.7	6.4	4.7	4.4	2.0	8.8
New Hampshire[c]	884	22.3	4.4	15.8	5.8	2.1	6.7
New Jersey	NA	NA	NA	NA	NA	NA	NA
New Mexico	47,480	45.4	4.2	5.4	2.9	1.3	9.0
New York	244,807	52.7	8.3	9.0	4.7	1.7	14.2
North Carolina	100,722	44.2	6.4	9.7	4.0	2.0	9.4
North Dakota	NA	NA	NA	NA	NA	NA	NA
Ohio[c]	43,680	73.8	5.4	0.8	2.0	1.3	6.7
Oklahoma	41,173	56.5	10.2	2.8	3.4	2.8	8.4
Oregon	39,168	58.3	11.8	3.0	5.4	2.1	11.0
Pennsylvania	85,992	63.8	2.2	0.5	3.1	1.3	14.2
Rhode Island[b,c]	7,506	63.1	8.2	7.2	3.3	2.2	6.8
South Carolina[b,c]	12,243	74.3	10.7	0.4	6.6	2.1	4.5
South Dakota	11,661	43.4	14.2	4.4	0.4	3.3	11.3
Tennessee	54,313	37.1	12.2	5.7	3.7	2.4	8.4
Texas	81,577	49.3	9.9	6.1	5.3	1.8	8.5
Utah	NA	NA	NA	NA	NA	NA	NA
Vermont	15,233	54.0	12.0	14.0	4.2	1.4	10.4
Virginia[a]	73,292	57.6	8.0	7.0	3.4	2.1	6.0
Washington	66,547	54.4	12.9	1.5	6.2	2.7	11.6
West Virginia	31,467	55.8	7.8	2.1	3.5	1.3	14.3
Wisconsin[b,c]	28,018	24.0	10.9	10.9	4.5	2.3	16.8
Wyoming	16,794	66.0	11.4	1.8	3.6	1.8	8.8

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	46,266	4.9	1.4	2.2	1.0	0.8	1.3
Alaska	13,136	1.2	0.3	1.3	0.9	0.6	1.9
Arizona	46,967	1.5	3.1	2.1	2.4	1.0	3.1
Arkansas	32,250	4.9	0.6	1.9	1.6	0.7	0.7
California[a,c]	71,526	5.6	13.3	6.1	10.1	2.1	8.1
Colorado	42,147	4.8	0.6	1.4	1.4	0.7	1.5
Connecticut	41,196	4.2	3.1	1.3	1.6	1.3	1.1
Delaware	6,671	4.2	0.3	0.5	1.6	1.0	0.7
District of Columbia	6,128	7.8	5.5	2.9	4.4	0.3	3.9
Florida	126,112	6.2	2.6	2.1	2.0	0.4	2.6
Georgia[a]	105,096	4.2	2.0	4.0	1.8	0.4	1.2
Hawaii[b,c]	8,187	5.5	3.6	2.7	4.3	0.4	2.4
Idaho	NA	NA	NA	NA	NA	NA	NA
Illinois[b,c]	100,714	6.2	2.8	2.8	2.4	1.4	2.0
Indiana	53,712	6.5	1.9	1.7	1.3	1.2	1.1
Iowa	51,378	4.7	0.6	3.1	1.8	1.4	1.7
Kansas	NA	NA	NA	NA	NA	NA	NA
Kentucky	50,161	6.3	0.8	4.3	1.3	1.2	1.1
Louisiana	38,754	2.5	2.0	8.9	2.9	0.2	2.7
Maine	NA	NA	NA	NA	NA	NA	NA
Maryland[b,c]	45,956	4.1	1.6	1.7	3.3	0.9	1.6
Massachusetts	60,202	0.7	1.7	2.0	1.2	0.8	1.9
Michigan[b,c]	69,853	7.6	6.6	2.5	5.3	1.2	1.3
Minnesota[c]	56,221	4.4	12.1	3.6	2.6	0.7	3.5
Mississippi	30,032	5.1	2.0	1.6	2.0	0.5	1.6
Missouri[c]	30,698	6.8	3.9	9.6	14.9	1.5	4.9
Montana	16,658	5.5	2.1	3.9	1.5	1.3	2.5
Nebraska[b,c]	1,272	13.4	0.9	3.4	5.8	4.1	5.1
Nevada	19,113	5.5	4.2	1.5	2.2	0.8	0.8
New Hampshire[c]	884	26.8	0.8	6.7	4.2	1.7	2.7
New Jersey	NA	NA	NA	NA	NA	NA	NA
New Mexico	47,480	5.1	7.0	6.6	9.1	1.6	2.5
New York	244,807	4.3	1.2	1.4	1.0	0.7	0.8
North Carolina	100,722	6.2	1.4	8.4	1.9	0.5	5.8
North Dakota	NA	NA	NA	NA	NA	NA	NA
Ohio[c]	43,680	2.1	1.0	2.5	1.9	1.9	0.6
Oklahoma	41,173	5.0	3.4	3.1	2.1	1.0	1.2
Oregon	39,168	3.4	0.2	0.9	1.5	1.1	1.4
Pennsylvania	85,992	4.2	1.6	3.6	2.4	2.0	1.1
Rhode Island[b,c]	7,506	3.7	0.3	2.6	0.7	0.8	1.2
South Carolina[b,c]	12,243	0.2	0.1	0.7	0.2	0.0	0.3
South Dakota	11,661	5.5	3.6	3.9	3.6	2.9	3.5
Tennessee	54,313	2.7	20.8	1.6	2.4	1.2	1.8
Texas[a]	81,577	4.6	1.3	6.5	2.7	1.2	2.8
Utah	NA	NA	NA	NA	NA	NA	NA
Vermont	15,233	1.2	0.1	0.6	0.2	1.5	0.6
Virginia[a]	73,292	6.3	2.5	3.2	1.6	0.9	1.4
Washington	66,547	4.0	1.5	1.4	2.7	0.6	0.7
West Virginia	31,467	5.6	2.1	2.7	1.5	1.6	1.6
Wisconsin[a,b,c]	28,018	6.2	13.7	3.5	2.9	1.6	2.6
Wyoming	16,794	2.0	0.5	1.7	1.1	0.5	0.8

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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	47,200	77.8
Alaska	13,361	60.4
Arizona	47,573	79.3
Arkansas	32,555	77.7
California[c]	73,119	88.4
Colorado	42,504	87.4
Connecticut	42,171	71.1
Delaware	6,748	66.2
District of Columbia	6,254	55.5
Florida	127,471	91.4
Georgia[a]	106,628	83.9
Hawaii[b,c]	8,428	88.4
Idaho	NA	NA
Illinois[b,c]	102,307	73.7
Indiana	54,244	75.5
Iowa	51,972	61.3
Kansas	NA	NA
Kentucky	50,637	63.2
Louisiana	39,163	84.3
Maine	NA	NA
Maryland[b,c]	46,793	77.6
Massachusetts	61,840	88.7
Michigan[b,c]	71,212	83.8
Minnesota[c]	57,113	81.9
Mississippi	30,346	60.9
Missouri[c]	31,352	82.3
Montana	16,997	61.7
Nebraska[b,c]	1,287	92.9
Nevada	19,410	67.8
New Hampshire[c]	935	82.1
New Jersey	NA	NA
New Mexico	48,529	60.2
New York	249,066	82.0
North Carolina	102,389	88.0
North Dakota	NA	NA
Ohio[c]	44,105	88.9
Oklahoma	41,641	69.4
Oregon	39,876	72.5
Pennsylvania	87,136	88.0
Rhode Island[b,c]	7,670	66.2
South Carolina[b,c]	12,324	78.4
South Dakota	11,833	66.6
Tennessee	54,989	73.8
Texas	82,716	93.1
Utah	NA	NA
Vermont	15,664	54.3
Virginia[a]	74,690	69.3
Washington	67,270	81.9
West Virginia	31,892	49.8
Wisconsin[b,c]	28,497	69.2
Wyoming	17,034	32.3

Source: MAXPC Validation Tables, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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, twelve states reported the NPIs of *prescribing* providers instead of *billing* providers in at least some of their claims. 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 twelve states misreporting, Connecticut and South Carolina had more than half of their NPIs equal to the RX prescribing provider ID and therefore should not be used. Florida, Nevada, Oregon, and Washington had more than 10 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 states followed the expected method, submitting both an NPI and LPI (Table VII.3). Six states (Alaska, California, Delaware, Rhode Island, 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 three states (Louisiana, Nebraska, and South Dakota), 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 an additional 4,440 NPIs for a number of states including Colorado, Iowa, Michigan, Missouri, Nebraska, New Hampshire, Ohio, and South Dakota. In Nebraska, which reported no NPIs, the method identified the 148 NPIs eventually linked to NPPES. We also used the state-provided cross-reference files in Florida, Indiana, North Carolina, Texas, and Virginia to locate an additional 20 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 of the 45 states. The remaining 6 states, which include the 3 states that did not submit many NPIs (Louisiana, Nebraska, and South Dakota) plus 3 other states (California, Michigan, and Ohio), had NPI values that did not link well and appear invalid. For example, only 12 percent of Ohio's IDs and a little more than a third of California's IDs linked to NPPES records. These 6 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 four states (Colorado, 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

Almost 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). 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, Iowa, Michigan, Missouri, South Carolina, and Wyoming, where one third or more of NPIs were classified as physicians and other providers.

3. Business Location Among RX Billing Provider IDs

Almost 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 NPI[12]. In Table VII.9, among RX billing provider IDs that

[12] 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, 29 of 45 states (64 percent) may be used for RX provider research owing to their high level of data quality and completeness. Of the remaining states, 8 (California, Connecticut, Louisiana, Michigan, Nebraska, Ohio, South Carolina, and South Dakota) should not be used for RX provider research because of poor data quality and completeness, and 8 states (Colorado, Florida, Iowa, Missouri, Nevada, Oregon, Washington, and Wyoming) should be used with caution.

Compared to 2009, the percentage of states classified as good slightly improved (63 percent in 2009 versus 64 percent in 2010). Of the 7 states that are deemed to be of poor data quality and completeness, 6 states (California, Connecticut, Michigan, Nebraska, Ohio, and South Carolina) were also on this list in MAXPC 2009.

(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	9,555,742	100.0
Alaska	1,122,203	100.0
Arizona	13,276,756	100.0
Arkansas	4,978,192	100.0
California	71,659,153	100.0
Colorado	4,590,646	100.0
Connecticut	9,672,537	100.0
Delaware	2,143,643	100.0
District of Columbia	1,090,418	100.0
Florida	28,536,870	100.0
Georgia	15,791,105	100.0
Hawaii	2,287,081	100.0
Idaho	NA	NA
Illinois	26,402,774	100.0
Indiana	14,437,937	100.0
Iowa	4,710,785	100.0
Kansas	NA	NA
Kentucky	13,552,132	100.0
Louisiana	13,146,388	100.0
Maine	NA	NA
Maryland	9,373,662	100.0
Massachusetts	10,383,985	100.0
Michigan	20,343,684	100.0
Minnesota	18,066,206	98.1
Mississippi	5,813,838	100.0
Missouri	14,986,031	100.0
Montana	1,045,508	100.0
Nebraska	2,949,964	100.0
Nevada	1,803,080	100.0
New Hampshire	1,477,913	100.0
New Jersey	NA	NA
New Mexico	4,971,669	100.0
New York	60,562,360	100.0
North Carolina	15,773,968	100.0
North Dakota	NA	NA
Ohio	27,864,198	100.0
Oklahoma	6,502,342	100.0
Oregon	6,227,753	100.0
Pennsylvania	9,392,843	100.0
Rhode Island	1,803,646	100.0
South Carolina	4,103,448	100.0
South Dakota	931,359	100.0
Tennessee	13,111,319	100.0
Texas	34,282,210	100.0
Utah	NA	NA
Vermont	2,265,413	100.0
Virginia	9,473,413	100.0
Washington	14,926,814	99.7
West Virginia	6,690,113	100.0
Wisconsin	14,640,310	100.0
Wyoming	574,665	100.0

Source: MSIS State Valids files, FY 2010 Q2–FY 2011 Q4.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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

	Number Where NPI = RX Prescribing Provider ID	Total Number of NPIs Reported in RX	Percent of NPIs Potentially Misreported
Arizona	3	1,177	0.3
Connecticut	738	1,062	69.5
Florida	1,292	4,159	31.1
Georgia	13	2,283	0.6
Illinois	26	2,770	0.9
Indiana	19	1,378	1.4
Michigan	723	9,278	7.8
Nevada	87	524	16.6
Oregon	173	740	23.4
Pennsylvania	135	3,710	3.6
South Carolina	18,684	18,684	100.0
Washington	412	1,234	33.4

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was 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	2,819	49.7	50.3	100.0	0.0
Alaska	182	100.0	100.0	100.0	100.0
Arizona	2,354	50.0	50.0	100.0	0.0
Arkansas	1,683	49.9	50.1	100.0	0.0
California	20,556	98.7	100.0	98.8	98.7
Colorado	23,096	96.3	3.7	99.4	0.0
Connecticut[a]	2,580	41.2	58.8	100.0	0.0
Delaware	275	100.0	100.0	100.0	100.0
District of Columbia	463	49.9	50.1	99.6	0.0
Florida	8,345	49.8	50.2	99.8	0.0
Georgia	4,828	47.3	98.0	97.9	46.2
Hawaii	479	49.3	50.7	96.7	0.0
Idaho	NA	NA	NA	NA	NA
Illinois	3,774	73.4	26.6	96.7	0.0
Indiana	2,742	50.3	49.7	100.0	0.0
Iowa	13,097	92.3	7.7	97.2	0.0
Kansas	NA	NA	NA	NA	NA
Kentucky	2,731	49.0	51.0	99.2	0.0
Louisiana	2,408	50.5	49.5	51.5	0.0
Maine	NA	NA	NA	NA	NA
Maryland	2,643	47.7	52.3	99.6	0.0
Massachusetts	2,534	49.8	50.2	100.0	0.0
Michigan	16,106	57.6	90.2	75.0	53.0
Minnesota	2,939	50.0	50.0	99.6	0.0
Mississippi	1,756	49.7	50.3	99.3	0.0
Missouri	5,623	48.7	51.3	94.9	0.0
Montana	708	50.0	50.0	100.0	0.0
Nebraska	581	0.0	100.0	25.5	0.0
Nevada	1,047	50.0	50.0	99.9	0.0
New Hampshire	680	49.7	50.3	94.6	0.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	6,834	46.6	53.4	99.9	0.0
New York	9,538	50.0	50.0	99.3	0.0
North Carolina	4,343	49.9	50.1	100.0	0.0
North Dakota	NA	NA	NA	NA	NA
Ohio	7,704	54.2	45.8	95.6	0.0
Oklahoma	2,149	50.0	50.0	99.9	0.0
Oregon	1,497	49.4	50.6	99.2	0.0
Pennsylvania	7,615	48.7	51.3	99.9	0.0
Rhode Island	233	96.6	100.0	97.0	96.6
South Carolina[a]	19,952	93.6	6.4	93.9	0.0
South Dakota	408	15.7	84.3	69.4	0.0
Tennessee	15,542	49.4	50.6	99.9	0.0
Texas	8,744	49.8	50.2	99.9	0.0
Utah	NA	NA	NA	NA	NA
Vermont	486	49.6	50.4	99.8	0.0
Virginia	1,768	100.0	100.0	100.0	100.0
Washington	2,609	47.3	52.7	96.3	0.0
West Virginia	1,559	50.8	49.2	99.9	0.0
Wisconsin	1,406	99.8	100.0	99.8	99.8
Wyoming	5,401	96.1	3.9	97.8	0.0

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[a]More than 50 percent of the NPIs were reported for the prescribing provider, which causes inaccurate linkages to NPPES for the billing 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	2,819	100.0	0.0	NA
Alaska	182	100.0	0.0	NA
Arizona	2,354	100.0	0.0	NA
Arkansas	1,683	100.0	0.0	NA
California	20,310	99.9	0.1	NA
Colorado	22,964	96.9	3.1	NA
Connecticut[a]	2,579	99.8	0.2	NA
Delaware	275	100.0	0.0	NA
District of Columbia	461	100.0	0.0	NA
Florida	8,326	100.0	0.0	0.0
Georgia	4,725	99.8	0.2	NA
Hawaii	463	100.0	0.0	NA
Idaho	NA	NA	NA	NA
Illinois	3,648	100.0	0.0	NA
Indiana	2,742	99.1	0.2	0.7
Iowa	12,736	95.1	4.9	NA
Kansas	NA	NA	NA	NA
Kentucky	2,710	100.0	0.0	NA
Louisiana[b]	1,241	99.8	0.2	NA
Maine	NA	NA	NA	NA
Maryland	2,632	100.0	0.0	NA
Massachusetts	2,533	100.0	0.0	NA
Michigan	12,080	86.6	13.4	NA
Minnesota	2,927	99.4	0.6	NA
Mississippi	1,743	99.9	0.1	NA
Missouri	5,336	96.7	3.3	NA
Montana	708	100.0	0.0	NA
Nebraska[b]	148	0.0	100.0	NA
Nevada	1,046	99.9	0.1	NA
New Hampshire	643	72.9	27.1	NA
New Jersey	NA	NA	NA	NA
New Mexico	6,830	100.0	0.0	NA
New York	9,476	99.4	0.6	NA
North Carolina	4,343	99.9	0.0	0.0
North Dakota	NA	NA	NA	NA
Ohio	7,366	91.8	8.2	NA
Oklahoma	2,147	99.8	0.2	NA
Oregon	1,485	99.7	0.3	NA
Pennsylvania	7,608	100.0	0.0	NA
Rhode Island	226	99.6	0.4	NA
South Carolina[a]	18,725	99.9	0.1	NA
South Dakota[b]	283	45.6	54.4	NA
Tennessee	15,530	100.0	0.0	NA
Texas	8,738	99.9	0.1	0.0
Utah	NA	NA	NA	NA
Vermont	485	99.8	0.2	NA
Virginia	1,768	100.0	0.0	0.0
Washington	2,512	100.0	0.0	NA
West Virginia	1,557	100.0	0.0	NA
Wisconsin	1,403	100.0	0.0	NA
Wyoming	5,281	98.5	1.5	NA

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was 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, North Carolina, Texas, and Virginia provided state-specific provider files.

NA = Not available

[a]More than 50 percent of the NPIs were reported for the prescribing provider, which causes inaccurate linkages to NPPES for the billing 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	2,819	2,819	100.0
Alaska	182	182	100.0
Arizona	2,354	2,354	100.0
Arkansas	1,683	1,683	100.0
California	20,556	7,305	35.5
Colorado	23,096	22,922	99.2
Connecticut[a]	2,580	2,579	100.0
Delaware	275	275	100.0
District of Columbia	463	461	99.6
Florida	8,345	8,322	99.7
Georgia	4,828	4,709	97.5
Hawaii	479	463	96.7
Idaho	NA	NA	NA
Illinois	3,774	3,648	96.7
Indiana	2,742	2,742	100.0
Iowa	13,097	12,735	97.2
Kansas	NA	NA	NA
Kentucky	2,731	2,710	99.2
Louisiana[b]	2,408	1,223	50.8
Maine	NA	NA	NA
Maryland	2,643	2,632	99.6
Massachusetts	2,534	2,533	100.0
Michigan	16,106	10,868	67.5
Minnesota	2,939	2,926	99.6
Mississippi	1,756	1,743	99.3
Missouri	5,623	5,334	94.9
Montana	708	708	100.0
Nebraska[b]	581	148	25.5
Nevada	1,047	1,046	99.9
New Hampshire	680	643	94.6
New Jersey	NA	NA	NA
New Mexico	6,834	6,830	99.9
New York	9,538	9,476	99.3
North Carolina	4,343	4,343	100.0
North Dakota	NA	NA	NA
Ohio	7,704	924	12.0
Oklahoma	2,149	2,147	99.9
Oregon	1,497	1,485	99.2
Pennsylvania	7,615	7,608	99.9
Rhode Island	233	226	97.0
South Carolina[a]	19,952	18,650	93.5
South Dakota[b]	408	283	69.4
Tennessee	15,542	15,530	99.9
Texas	8,744	8,738	99.9
Utah	NA	NA	NA
Vermont	486	485	99.8
Virginia	1,768	1,768	100.0
Washington	2,609	2,512	96.3
West Virginia	1,559	1,557	99.9
Wisconsin	1,406	1,403	99.8
Wyoming	5,401	5,273	97.6

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[a]More than 50 percent of the NPIs were reported for the prescribing provider, which causes inaccurate linkages to NPPES for the billing 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	2,819	98.9	0.4	0.8
Alaska	182	96.7	1.6	1.6
Arizona	2,354	99.3	0.2	0.5
Arkansas	1,683	98.9	0.6	0.5
California[c]	7,305	98.5	0.9	0.6
Colorado	22,922	5.2	94.4	0.5
Connecticut[a]	2,579	96.9	2.1	1.0
Delaware	275	98.5	0.0	1.5
District of Columbia	461	98.0	0.2	1.7
Florida	8,322	98.2	0.4	1.5
Georgia	4,709	99.0	0.4	0.6
Hawaii	463	98.5	1.1	0.4
Idaho	NA	NA	NA	NA
Illinois	3,648	98.8	0.5	0.6
Indiana	2,742	99.4	0.0	0.6
Iowa	12,735	8.7	90.7	0.6
Kansas	NA	NA	NA	NA
Kentucky	2,710	97.6	1.5	0.8
Louisiana[b,c]	1,223	97.1	2.1	0.8
Maine	NA	NA	NA	NA
Maryland	2,632	99.4	0.0	0.6
Massachusetts	2,533	99.0	0.0	1.0
Michigan[c]	10,868	86.1	13.6	0.2
Minnesota	2,926	98.5	0.0	1.5
Mississippi	1,743	98.6	0.9	0.5
Missouri	5,334	94.2	5.5	0.3
Montana	708	98.9	0.3	0.8
Nebraska[b,c]	148	95.9	4.1	0.0
Nevada	1,046	98.9	0.4	0.8
New Hampshire	643	99.7	0.0	0.3
New Jersey	NA	NA	NA	NA
New Mexico	6,830	99.7	0.1	0.2
New York	9,476	96.9	2.2	0.9
North Carolina	4,343	99.8	0.1	0.1
North Dakota	NA	NA	NA	NA
Ohio[c]	924	98.1	1.9	0.0
Oklahoma	2,147	98.6	0.1	1.3
Oregon	1,485	98.6	0.6	0.8
Pennsylvania	7,608	95.7	3.8	0.5
Rhode Island	226	99.1	0.0	0.9
South Carolina[a]	18,650	1.8	97.6	0.6
South Dakota[b,c]	283	99.3	0.0	0.7
Tennessee	15,530	99.5	0.1	0.4
Texas	8,738	99.1	0.6	0.4
Utah	NA	NA	NA	NA
Vermont	485	99.2	0.4	0.4
Virginia	1,768	99.0	0.2	0.7
Washington	2,512	99.1	0.0	0.9
West Virginia	1,557	99.5	0.0	0.5
Wisconsin	1,403	98.4	0.1	1.6
Wyoming	5,273	3.8	95.6	0.6

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[a]More than 50 percent of the NPIs were reported for the prescribing provider, which causes inaccurate linkages to NPPES for the billing 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	2,819	2,723	96.6	2,797	99.2
Alaska	182	172	94.5	179	98.4
Arizona	2,354	2,334	99.2	2,342	99.5
Arkansas	1,683	1,659	98.6	1,675	99.5
California[c]	7,305	7,193	98.5	7,263	99.4
Colorado	22,922	22,625	98.7	22,818	99.5
Connecticut[a]	2,579	2,468	95.7	2,553	99.0
Delaware	275	267	97.1	271	98.5
District of Columbia	461	445	96.5	453	98.3
Florida	8,322	8,130	97.7	8,201	98.5
Georgia	4,709	4,622	98.2	4,681	99.4
Hawaii	463	449	97.0	461	99.6
Idaho	NA	NA	NA	NA	NA
Illinois	3,648	3,570	97.9	3,626	99.4
Indiana	2,742	2,706	98.7	2,726	99.4
Iowa	12,735	12,535	98.4	12,659	99.4
Kansas	NA	NA	NA	NA	NA
Kentucky	2,710	2,643	97.5	2,687	99.2
Louisiana[b,c]	1,223	1,192	97.5	1,213	99.2
Maine	NA	NA	NA	NA	NA
Maryland	2,632	2,544	96.7	2,616	99.4
Massachusetts	2,533	2,477	97.8	2,507	99.0
Michigan[c]	10,868	10,766	99.1	10,842	99.8
Minnesota	2,926	2,848	97.3	2,881	98.5
Mississippi	1,743	1,709	98.0	1,735	99.5
Missouri	5,334	5,262	98.7	5,319	99.7
Montana	708	688	97.2	702	99.2
Nebraska[b,c]	148	148	100.0	148	100.0
Nevada	1,046	1,031	98.6	1,038	99.2
New Hampshire	643	637	99.1	641	99.7
New Jersey	NA	NA	NA	NA	NA
New Mexico	6,830	6,783	99.3	6,815	99.8
New York	9,476	9,225	97.4	9,395	99.1
North Carolina	4,343	4,183	96.3	4,339	99.9
North Dakota	NA	NA	NA	NA	NA
Ohio[c]	924	884	95.7	924	100.0
Oklahoma	2,147	2,044	95.2	2,120	98.7
Oregon	1,485	1,435	96.6	1,473	99.2
Pennsylvania	7,608	7,449	97.9	7,568	99.5
Rhode Island	226	223	98.7	224	99.1
South Carolina[a]	18,650	18,395	98.6	18,540	99.4
South Dakota[b,c]	283	278	98.2	281	99.3
Tennessee	15,530	15,400	99.2	15,468	99.6
Texas	8,738	8,591	98.3	8,704	99.6
Utah	NA	NA	NA	NA	NA
Vermont	485	471	97.1	483	99.6
Virginia	1,768	1,699	96.1	1,755	99.3
Washington	2,512	2,457	97.8	2,490	99.1
West Virginia	1,557	1,507	96.8	1,549	99.5
Wisconsin	1,403	1,362	97.1	1,381	98.4
Wyoming	5,273	5,178	98.2	5,239	99.4

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[a]More than 50 percent of the NPIs were reported for the prescribing provider, which causes inaccurate linkages to NPPES for the billing 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	2,723	92.1	0.1	7.8
Alaska	172	92.4	1.7	5.8
Arizona	2,334	97.9	0.0	2.1
Arkansas	1,659	91.7	0.0	8.3
California[c]	7,193	95.2	0.3	4.5
Colorado	22,625	4.0	58.4	37.6
Connecticut[a]	2,468	95.9	0.2	3.9
Delaware	267	97.8	0.0	2.2
District of Columbia	445	98.4	0.2	1.3
Florida	8,130	97.7	0.3	2.0
Georgia	4,622	95.0	0.1	4.9
Hawaii	449	89.5	1.1	9.4
Idaho	NA	NA	NA	NA
Illinois	3,570	95.3	0.1	4.6
Indiana	2,706	97.7	0.1	2.3
Iowa	12,535	5.6	68.6	25.8
Kansas	NA	NA	NA	NA
Kentucky	2,643	95.4	1.3	3.3
Louisiana[b,c]	1,192	92.6	1.5	5.9
Maine	NA	NA	NA	NA
Maryland	2,544	97.8	0.0	2.2
Massachusetts	2,477	97.4	0.1	2.5
Michigan[c]	10,766	66.2	24.5	9.3
Minnesota	2,848	96.9	0.0	3.1
Mississippi	1,709	90.9	0.0	9.1
Missouri	5,262	51.7	22.9	25.4
Montana	688	94.5	0.0	5.5
Nebraska[b,c]	148	92.6	0.0	7.4
Nevada	1,031	97.1	0.6	2.3
New Hampshire	637	97.8	0.0	2.2
New Jersey	NA	NA	NA	NA
New Mexico	6,783	98.5	0.1	1.5
New York	9,225	91.8	2.0	6.1
North Carolina	4,183	96.8	0.0	3.2
North Dakota	NA	NA	NA	NA
Ohio[c]	884	88.5	0.8	10.7
Oklahoma	2,044	93.7	0.0	6.3
Oregon	1,435	96.7	0.1	3.3
Pennsylvania	7,449	79.7	13.5	6.8
Rhode Island	223	97.3	0.0	2.7
South Carolina[a]	18,395	0.1	70.7	29.1
South Dakota[b,c]	278	91.4	1.1	7.6
Tennessee	15,400	98.7	0.2	1.1
Texas	8,591	96.7	0.0	3.3
Utah	NA	NA	NA	NA
Vermont	471	96.0	0.4	3.6
Virginia	1,699	96.0	0.0	4.0
Washington	2,457	96.8	0.0	3.1
West Virginia	1,507	96.2	0.0	3.8
Wisconsin	1,362	91.9	0.4	7.8
Wyoming	5,178	2.1	62.7	35.2

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available.

[a]More than 50 percent of the NPIs were reported for the prescribing provider, which causes inaccurate linkages to NPPES for the billing 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	2,797	92.0
Alaska	179	67.0
Arizona	2,342	89.4
Arkansas	1,675	87.8
California[c]	7,263	78.4
Colorado	22,818	76.1
Connecticut[a]	2,553	83.4
Delaware	271	66.2
District of Columbia	453	49.0
Florida	8,201	97.8
Georgia	4,681	94.7
Hawaii	461	95.2
Idaho	NA	NA
Illinois	3,626	82.2
Indiana	2,726	86.6
Iowa	12,659	63.4
Kansas	NA	NA
Kentucky	2,687	84.2
Louisiana[b,c]	1,213	94.2
Maine	NA	NA
Maryland	2,616	88.7
Massachusetts	2,507	95.0
Michigan[c]	10,842	61.5
Minnesota	2,881	75.4
Mississippi	1,735	90.7
Missouri	5,319	89.8
Montana	702	75.1
Nebraska[b,c]	148	87.2
Nevada	1,038	84.8
New Hampshire	641	76.7
New Jersey	NA	NA
New Mexico	6,815	16.1
New York	9,395	97.0
North Carolina	4,339	93.0
North Dakota	NA	NA
Ohio[c]	924	94.2
Oklahoma	2,120	81.1
Oregon	1,473	89.9
Pennsylvania	7,568	94.8
Rhode Island	224	86.3
South Carolina[a]	18,540	62.7
South Dakota[b,c]	281	74.9
Tennessee	15,468	20.5
Texas	8,704	98.6
Utah	NA	NA
Vermont	483	61.0
Virginia	1,755	86.4
Washington	2,490	91.1
West Virginia	1,549	68.0
Wisconsin	1,381	85.2
Wyoming	5,239	32.2

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[a]More than 50 percent of the NPIs were reported for the prescribing provider, which causes inaccurate linkages to NPPES for the billing 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, 7 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 7 states can be used in OT billing provider research. The states include Arizona, Connecticut, Florida, New York, Tennessee, Virginia, and Washington. Five additional states

(Georgia, Kentucky, Louisiana, Montana, and North Carolina) just missed the 75 percent threshold and should be included in OT billing provider research, too. At the other end of the continuum, 18 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: Alabama, Alaska, California, District of Columbia, Hawaii, Illinois, Massachusetts, Michigan, Minnesota, Missouri, Nebraska, Nevada, New Hampshire, 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, approximately 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

Almost 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 12 of 45 states (27 percent) fit the criteria to analyze the quality and completeness of OT billing provider IDs. These states include: Arizona, Connecticut, Florida, Georgia, Kentucky, Louisiana, Montana, New York, North Carolina, Tennessee, Virginia, and Washington. 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. Compared to 2009, 11 of 12 states included in the list above (all except Washington) appeared on the list of states that were deemed of high quality and completeness in MAXPC 2009 as well.

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

State	Number of OT Billing Provider IDs	Number Where OT Billing Provider ID = Servicing Provider ID	Percent Where OT Billing Provider ID = Servicing Provider ID	Percent of OT Billing Provider IDs = Servicing Provider IDs Linked to NPPES
Alabama	7,896	3,225	40.8	99.9
Alaska	3,554	1,429	40.2	87.3
Arizona	28,177	26,865	95.3	87.8
Arkansas	12,872	10,377	80.6	52.5
California	624,999	624,924	100.0	4.2
Colorado	8,028	5,127	63.9	85.2
Connecticut	14,333	11,590	80.9	97.9
Delaware	2,179	1,265	58.1	88.4
District of Columbia	4,197	3,845	91.6	38.9
Florida	60,311	52,648	87.3	85.3
Georgia	55,437	38,823	70.0	96.1
Hawaii	6,846	6,078	88.8	39.9
Idaho	NA	NA	NA	NA
Illinois	16,683	0	0.0	0.0
Indiana	11,358	6,947	61.2	92.7
Iowa	17,641	15,204	86.2	64.0
Kansas	NA	NA	NA	NA
Kentucky	18,680	13,892	74.4	98.0
Louisiana	11,802	10,569	89.6	71.1
Maine	NA	NA	NA	NA
Maryland	13,357	13,095	98.0	53.6
Massachusetts	11,543	881	7.6	99.9
Michigan	134,117	122,637	91.4	22.7
Minnesota	92,851	24,368	26.2	56.6
Mississippi	7,294	4,605	63.1	98.4
Missouri	12,813	3,554	27.7	70.2
Montana	5,547	3,930	70.8	89.1
Nebraska	16,508	13,888	84.1	9.3
Nevada	6,233	0	0.0	0.0
New Hampshire	4,511	3,679	81.6	19.4
New Jersey	NA	NA	NA	NA
New Mexico	26,953	20,065	74.4	63.2
New York	93,129	89,917	96.6	87.0
North Carolina	27,209	19,881	73.1	99.9
North Dakota	NA	NA	NA	NA
Ohio	35,099	12,412	35.4	95.6
Oklahoma	11,090	6,642	59.9	80.1
Oregon	30,149	8,268	27.4	41.5
Pennsylvania	25,612	20,453	79.9	58.6
Rhode Island	7,594	5,844	77.0	21.8
South Carolina	9,934	5,509	55.5	35.7
South Dakota	8,463	6,775	80.1	64.0
Tennessee	27,080	24,235	89.5	91.2
Texas	98,470	83,496	84.8	66.2
Utah	NA	NA	NA	NA
Vermont	4,062	2,593	63.8	96.5
Virginia	33,877	31,075	91.7	94.6
Washington	9,573	8,359	87.3	95.3
West Virginia	5,986	3,891	65.0	93.0
Wisconsin	34,286	32,511	94.8	56.4
Wyoming	3,412	2,159	63.3	47.6

Source: MSIS State Valids files, FY 2010 Q2–FY 2011 Q4.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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[a]	4,542	75.6	24.0	57.5
Alaska[a]	1,420	38.4	61.5	40.0
Arizona	23,810	16.4	83.2	84.5
Arkansas	6,194	48.5	51.0	48.1
California[a]	26,114	69.2	30.4	4.2
Colorado	5,498	75.4	24.2	68.5
Connecticut	11,466	34.7	64.9	80.0
Delaware	1,234	59.3	39.8	56.6
District of Columbia[a]	1,630	55.1	44.4	38.8
Florida	47,778	34.0	65.4	79.2
Georgia	37,644	21.1	78.5	67.9
Hawaii[a]	2,449	37.0	62.3	35.8
Idaho	NA	NA	NA	NA
Illinois[a]	1,060	99.3	0.5	6.4
Indiana	10,532	74.1	25.5	92.7
Iowa	10,803	61.4	38.2	61.2
Kansas	NA	NA	NA	NA
Kentucky	15,978	41.5	58.1	85.5
Louisiana	7,839	62.6	37.2	66.4
Maine	NA	NA	NA	NA
Maryland	7,064	70.9	28.7	52.9
Massachusetts[a]	1,695	95.9	4.0	14.7
Michigan[a]	28,063	48.9	50.8	20.9
Minnesota[a]	17,781	59.3	40.5	19.2
Mississippi	5,790	57.8	41.8	79.4
Missouri[a]	5,392	74.6	25.2	42.1
Montana	3,630	45.1	54.6	65.4
Nebraska[a]	1,636	42.5	57.5	9.9
Nevada[a]	972	59.4	40.6	15.6
New Hampshire[a]	973	74.0	26.0	21.6
New Jersey	NA	NA	NA	NA
New Mexico	13,247	55.1	44.2	49.1
New York	79,463	16.1	83.4	85.3
North Carolina	26,298	79.3	20.3	96.7
North Dakota	NA	NA	NA	NA
Ohio[a]	19,186	35.3	64.5	54.7
Oklahoma	6,726	65.0	34.3	60.6
Oregon[a]	4,248	52.0	47.5	14.1
Pennsylvania	12,449	57.4	42.2	48.6
Rhode Island[a]	1,394	59.6	39.9	18.4
South Carolina[a]	2,290	23.3	76.2	23.1
South Dakota	4,541	39.9	60.1	53.7
Tennessee	22,466	13.0	86.6	83.0
Texas	55,625	26.1	73.4	56.5
Utah	NA	NA	NA	NA
Vermont	3,033	28.3	71.4	74.7
Virginia	29,512	24.9	74.7	87.1
Washington	7,990	70.2	29.4	83.5
West Virginia	4,264	72.7	26.9	71.2
Wisconsin	18,364	34.8	64.7	53.6
Wyoming[a]	1,329	56.8	42.6	39.0

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 IDs are 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[a]	4,542	4,371	96.2	4,525	99.6
Alaska[a]	1,420	1,389	97.8	1,418	99.9
Arizona	23,810	23,404	98.3	23,703	99.6
Arkansas	6,194	6,104	98.5	6,164	99.5
California[a]	26,114	25,487	97.6	26,007	99.6
Colorado	5,498	5,405	98.3	5,478	99.6
Connecticut	11,466	11,111	96.9	11,417	99.6
Delaware	1,234	1,206	97.7	1,223	99.1
District of Columbia[a]	1,630	1,604	98.4	1,622	99.5
Florida	47,778	46,992	98.4	47,507	99.4
Georgia	37,644	36,894	98.0	37,485	99.6
Hawaii[a]	2,449	2,362	96.4	2,431	99.3
Idaho	NA	NA	NA	NA	NA
Illinois[a]	1,060	1,035	97.6	1,058	99.8
Indiana	10,532	10,314	97.9	10,485	99.6
Iowa	10,803	10,603	98.1	10,763	99.6
Kansas	NA	NA	NA	NA	NA
Kentucky	15,978	15,738	98.5	15,904	99.5
Louisiana	7,839	7,718	98.5	7,818	99.7
Maine	NA	NA	NA	NA	NA
Maryland	7,064	6,907	97.8	7,033	99.6
Massachusetts[a]	1,695	1,655	97.6	1,694	99.9
Michigan[a]	28,063	27,554	98.2	27,981	99.7
Minnesota[a]	17,781	17,567	98.8	17,744	99.8
Mississippi	5,790	5,688	98.2	5,766	99.6
Missouri[a]	5,392	5,326	98.8	5,378	99.7
Montana	3,630	3,515	96.8	3,619	99.7
Nebraska[a]	1,636	1,603	98.0	1,636	100.0
Nevada[a]	972	972	100.0	972	100.0
New Hampshire[a]	973	923	94.9	973	100.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	13,247	12,858	97.1	13,148	99.3
New York	79,463	77,658	97.7	79,073	99.5
North Carolina	26,298	25,619	97.4	26,194	99.6
North Dakota	NA	NA	NA	NA	NA
Ohio[a]	19,186	18,923	98.6	19,156	99.8
Oklahoma	6,726	6,573	97.7	6,678	99.3
Oregon[a]	4,248	4,106	96.7	4,227	99.5
Pennsylvania	12,449	12,133	97.5	12,394	99.6
Rhode Island[a]	1,394	1,353	97.1	1,387	99.5
South Carolina[a]	2,290	2,253	98.4	2,279	99.5
South Dakota	4,541	4,461	98.2	4,538	99.9
Tennessee	22,466	22,064	98.2	22,371	99.6
Texas	55,625	54,373	97.7	55,329	99.5
Utah	NA	NA	NA	NA	NA
Vermont	3,033	2,901	95.6	3,024	99.7
Virginia	29,512	28,800	97.6	29,397	99.6
Washington	7,990	7,855	98.3	7,961	99.6
West Virginia	4,264	4,179	98.0	4,244	99.5
Wisconsin	18,364	17,923	97.6	18,279	99.5
Wyoming[a]	1,329	1,278	96.2	1,321	99.4

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 IDs are 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[a]	4,371	23.8	25.9	7.6	6.0	4.7
Alaska[a]	1,389	21.5	9.5	3.5	12.9	3.7
Arizona	23,404	58.5	1.7	2.1	0.2	2.4
Arkansas	6,104	38.5	13.5	7.2	2.1	5.3
California[a]	25,487	35.6	5.3	5.6	16.5	11.3
Colorado	5,405	26.3	18.1	8.5	7.2	8.1
Connecticut	11,111	58.5	8.3	1.9	3.4	1.9
Delaware	1,206	26.5	23.1	2.5	6.9	8.8
District of Columbia[a]	1,604	39.7	15.1	6.2	4.6	6.9
Florida	46,992	54.4	8.5	3.9	1.4	3.4
Georgia	36,894	48.9	6.1	4.4	4.2	2.4
Hawaii[a]	2,362	36.2	9.4	2.8	3.2	5.1
Idaho	NA	NA	NA	NA	NA	NA
Illinois[a]	1,035	0.0	44.0	1.2	0.0	0.1
Indiana	10,314	28.8	16.9	6.4	10.1	5.2
Iowa	10,603	29.3	10.5	8.9	7.5	4.7
Kansas	NA	NA	NA	NA	NA	NA
Kentucky	15,738	46.5	12.7	8.0	6.5	2.8
Louisiana	7,718	33.1	5.4	21.9	6.1	4.1
Maine	NA	NA	NA	NA	NA	NA
Maryland	6,907	43.4	13.6	3.5	0.1	9.1
Massachusetts[a]	1,655	34.4	1.2	2.2	1.1	7.5
Michigan[a]	27,554	39.0	9.1	3.0	9.0	4.5
Minnesota[a]	17,567	22.7	8.6	5.1	2.2	3.5
Mississippi	5,688	35.2	13.2	4.5	6.7	7.6
Missouri[a]	5,326	26.8	17.8	10.8	2.9	12.9
Montana	3,515	15.7	14.4	11.5	9.0	3.2
Nebraska[a]	1,603	20.5	10.7	3.3	13.5	5.0
Nevada[a]	972	44.0	12.3	5.1	2.0	10.7
New Hampshire[a]	923	25.8	25.8	6.5	7.4	5.4
New Jersey	NA	NA	NA	NA	NA	NA
New Mexico	12,858	35.1	11.7	5.6	5.7	4.6
New York	77,658	56.8	6.5	2.1	6.1	1.2
North Carolina	25,619	21.3	14.7	16.2	5.8	6.1
North Dakota	NA	NA	NA	NA	NA	NA
Ohio[a]	18,923	53.1	3.5	4.5	4.3	4.3
Oklahoma	6,573	24.3	19.4	11.3	5.8	6.2
Oregon[a]	4,106	32.2	12.5	5.2	3.4	10.2
Pennsylvania	12,133	28.3	15.2	8.8	5.6	8.7
Rhode Island[a]	1,353	24.5	20.6	12.8	9.7	4.0
South Carolina[a]	2,253	45.1	1.2	3.8	24.1	1.4
South Dakota	4,461	37.3	7.5	5.7	0.6	4.8
Tennessee	22,064	54.4	2.5	1.3	4.7	0.8
Texas	54,373	48.3	6.7	6.2	4.7	3.6
Utah	NA	NA	NA	NA	NA	NA
Vermont	2,901	33.7	2.6	3.6	5.7	3.1
Virginia	28,800	57.5	8.0	4.1	4.4	2.0
Washington	7,855	22.6	16.6	5.6	13.1	10.8
West Virginia	4,179	22.6	17.3	12.0	8.3	6.1
Wisconsin	17,923	24.9	9.6	4.9	4.4	3.8
Wyoming[a]	1,278	17.2	8.2	12.1	13.5	6.4

Source: MAXPC file, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 IDs are 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[a]	4,525	83.2
Alaska[a]	1,418	83.1
Arizona	23,703	79.8
Arkansas	6,164	83.6
California[a]	26,007	85.5
Colorado	5,478	93.1
Connecticut	11,417	79.9
Delaware	1,223	73.6
District of Columbia[a]	1,622	51.8
Florida	47,507	92.2
Georgia	37,485	82.5
Hawaii[a]	2,431	87.7
Idaho	NA	NA
Illinois[a]	1,058	62.3
Indiana	10,485	83.1
Iowa	10,763	79.7
Kansas	NA	NA
Kentucky	15,904	80.6
Louisiana	7,818	83.8
Maine	NA	NA
Maryland	7,033	84.2
Massachusetts[a]	1,694	89.0
Michigan[a]	27,981	83.9
Minnesota[a]	17,744	86.2
Mississippi	5,766	79.7
Missouri[a]	5,378	87.4
Montana	3,619	86.0
Nebraska[a]	1,636	93.3
Nevada[a]	972	89.2
New Hampshire[a]	973	89.7
New Jersey	NA	NA
New Mexico	13,148	60.1
New York	79,073	89.3
North Carolina	26,194	93.0
North Dakota	NA	NA
Ohio[a]	19,156	91.0
Oklahoma	6,678	84.4
Oregon[a]	4,227	86.1
Pennsylvania	12,394	91.1
Rhode Island[a]	1,387	83.6
South Carolina[a]	2,279	84.7
South Dakota	4,538	73.2
Tennessee	22,371	86.1
Texas	55,329	94.6
Utah	NA	NA
Vermont	3,024	79.3
Virginia	29,397	75.9
Washington	7,961	87.6
West Virginia	4,244	72.3
Wisconsin	18,279	78.7
Wyoming[a]	1,321	71.3

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 IDs are 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 NPPES.

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 seven states (Alaska, Arkansas, Colorado, Kentucky, Montana, 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 seven states may be used in research on RX prescribing providers. An additional 3 states (Maryland, New York, and Oklahoma) are just below the established thresholds and can be included in this group. In contrast, 27 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 39 of 45 states, more than half of the prescribing provider IDs were individual providers.

2. Primary Taxonomy Among RX Prescribing Provider IDs

Almost 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-two states appear to follow the expected distribution[13]. Other taxonomy categories that appeared most prevalently in the file are dental providers and hospitals.

3. Business Location Among RX Prescribing Provider IDs

Almost 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. Ten states fit the criteria which we were using to analyze the quality and completeness of the RX prescribing provider IDs. These states include: Alaska, Arkansas, Colorado, Kentucky, Maryland, Montana, New York, North Carolina, Oklahoma, 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. Compared to 2009, 5 of the 10 states that

[13] Expected threshold was set at >= 70%.

are deemed to be of high quality and completeness of the RX prescribing provider ID also appeared on this list in MAXPC 2009. These states are: Alaska, Colorado, Kentucky, North Carolina, and Vermont.

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	13,834	0	0.0	0.0
Alaska	3,113	2,799	89.9	95.3
Arizona	35,862	14,718	41.0	98.7
Arkansas	8,741	6,783	77.6	82.5
California	389,535	106,898	27.4	20.3
Colorado	13,899	12,043	86.6	99.2
Connecticut	29,269	11,289	38.6	100.0
Delaware	5,533	3,489	63.1	95.2
District of Columbia	2,741	2,432	88.7	34.2
Florida	125,474	33,442	26.7	100.0
Georgia	34,172	18,254	53.4	100.0
Hawaii	1,840	352	19.1	15.6
Idaho	NA	NA	NA	NA
Illinois	105,095	31,881	30.3	100.0
Indiana	35,099	15,827	45.1	100.0
Iowa	12,282	0	0.0	0.0
Kansas	NA	NA	NA	NA
Kentucky	16,628	13,632	82.0	100.0
Louisiana	16,082	10,895	67.7	84.5
Maine	NA	NA	NA	NA
Maryland	16,642	12,005	72.1	94.5
Massachusetts	47,998	1,373	2.9	100.0
Michigan	78,252	31,667	40.5	50.6
Minnesota	23,660	15,953	67.4	54.9
Mississippi	18,566	8,385	45.2	100.0
Missouri	40,445	7,987	19.7	68.1
Montana	3,490	2,937	84.2	100.0
Nebraska	7,954	3,268	41.1	7.2
Nevada	9,849	4,762	48.4	100.0
New Hampshire	10,795	0	0.0	0.0
New Jersey	NA	NA	NA	NA
New Mexico	20,072	14,852	74.0	57.5
New York	87,985	65,556	74.5	88.6
North Carolina	23,499	21,171	90.1	100.0
North Dakota	NA	NA	NA	NA
Ohio	39,203	30,199	77.0	2.8
Oklahoma	14,798	10,637	71.9	99.9
Oregon	17,040	11,367	66.7	86.6
Pennsylvania	67,728	2,460	3.6	100.0
Rhode Island	15,880	3,770	23.7	100.0
South Carolina	23,527	13,312	56.6	91.4
South Dakota	5,024	0	0.0	0.0
Tennessee	64,729	17,759	27.4	27.1
Texas	55,413	1	0.0	0.0
Utah	NA	NA	NA	NA
Vermont	4,661	3,976	85.3	100.0
Virginia	39,801	18,828	47.3	100.0
Washington	64,279	20,247	31.5	100.0
West Virginia	18,285	1,397	7.6	100.0
Wisconsin	36,224	22,092	61.0	33.3
Wyoming	3,065	2,629	85.8	59.5

Source: MSIS State Valids files, FY 2010 Q2–FY 2011 Q4.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

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]	578	24.9	75.1	0.0
Alaska	2,728	1.0	98.6	0.4
Arizona[a]	15,760	2.5	97.1	0.4
Arkansas	5,739	2.0	97.5	0.5
California[a]	36,551	45.9	53.9	0.1
Colorado	12,543	2.0	97.7	0.3
Connecticut[a]	11,452	7.7	91.9	0.4
Delaware	3,332	0.8	99.0	0.2
District of Columbia[a]	880	40.5	59.1	0.5
Florida[a]	33,677	5.4	94.0	0.7
Georgia	18,806	9.6	90.0	0.4
Hawaii[a]	55	78.2	21.8	0.0
Idaho	NA	NA	NA	NA
Illinois[a]	31,947	1.2	98.4	0.4
Indiana[a]	15,840	1.8	97.6	0.5
Iowa[a]	3	0.0	100.0	0.0
Kansas	NA	NA	NA	NA
Kentucky	14,569	2.1	97.4	0.4
Louisiana	9,243	3.6	95.8	0.6
Maine	NA	NA	NA	NA
Maryland	11,984	6.3	93.3	0.4
Massachusetts[a]	2,438	9.0	90.9	0.2
Michigan[a]	16,407	15.7	83.9	0.4
Minnesota	10,105	51.3	48.6	0.1
Mississippi[a]	8,402	4.5	94.9	0.6
Missouri[a]	5,647	65.4	34.5	0.1
Montana	2,942	0.8	98.8	0.4
Nebraska[a]	280	9.6	90.4	0.0
Nevada[a]	4,853	2.7	96.8	0.4
New Hampshire[a]	0	0.0	0.0	100.0
New Jersey	NA	NA	NA	NA
New Mexico	8,782	71.9	27.8	0.4
New York	59,550	0.9	98.6	0.5
North Carolina	23,359	4.5	95.0	0.5
North Dakota	NA	NA	NA	NA
Ohio[a]	892	0.6	99.2	0.2
Oklahoma	10,634	0.1	99.2	0.7
Oregon	9,965	2.6	97.0	0.4
Pennsylvania[a]	2,569	7.4	92.3	0.3
Rhode Island[a]	3,784	2.0	97.7	0.3
South Carolina	18,632	1.8	97.6	0.6
South Dakota[a]	0	0.0	0.0	100.0
Tennessee[a]	4,826	41.5	58.1	0.4
Texas[a]	971	30.3	69.7	0.0
Utah	NA	NA	NA	NA
Vermont	4,027	0.3	99.4	0.3
Virginia[a]	19,085	2.2	97.4	0.4
Washington[a]	20,428	3.2	96.5	0.3
West Virginia[a]	1,410	6.0	93.5	0.4
Wisconsin[a]	7,457	14.5	85.1	0.4
Wyoming	1,608	2.4	97.3	0.4

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 IDs are 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]	578	562	97.2	578	100.0
Alaska	2,728	2,680	98.2	2,717	99.6
Arizona[a]	15,760	15,516	98.5	15,696	99.6
Arkansas	5,739	5,667	98.7	5,709	99.5
California[a]	36,551	35,689	97.6	36,501	99.9
Colorado	12,543	12,434	99.1	12,509	99.7
Connecticut[a]	11,452	11,181	97.6	11,408	99.6
Delaware	3,332	3,291	98.8	3,326	99.8
District of Columbia[a]	880	859	97.6	876	99.5
Florida[a]	33,677	33,176	98.5	33,458	99.3
Georgia	18,806	18,513	98.4	18,724	99.6
Hawaii[a]	55	55	100.0	55	100.0
Idaho	NA	NA	NA	NA	NA
Illinois[a]	31,947	31,393	98.3	31,823	99.6
Indiana[a]	15,840	15,656	98.8	15,755	99.5
Iowa[a]	3	3	100.0	3	100.0
Kansas	NA	NA	NA	NA	NA
Kentucky	14,569	14,403	98.9	14,510	99.6
Louisiana	9,243	9,109	98.6	9,187	99.4
Maine	NA	NA	NA	NA	NA
Maryland	11,984	11,795	98.4	11,933	99.6
Massachusetts[a]	2,438	2,424	99.4	2,434	99.8
Michigan[a]	16,407	16,167	98.5	16,348	99.6
Minnesota	10,105	10,045	99.4	10,097	99.9
Mississippi[a]	8,402	8,263	98.3	8,350	99.4
Missouri[a]	5,647	5,605	99.3	5,641	99.9
Montana	2,942	2,893	98.3	2,931	99.6
Nebraska[a]	280	275	98.2	280	100.0
Nevada[a]	4,853	4,777	98.4	4,832	99.6
New Hampshire[a]	0	0	NA	0	0.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	8,782	8,668	98.7	8,750	99.6
New York	59,550	58,272	97.9	59,273	99.5
North Carolina	23,359	22,992	98.4	23,243	99.5
North Dakota	NA	NA	NA	NA	NA
Ohio[a]	892	881	98.8	890	99.8
Oklahoma	10,634	10,479	98.5	10,563	99.3
Oregon	9,965	9,820	98.5	9,926	99.6
Pennsylvania[a]	2,569	2,538	98.8	2,561	99.7
Rhode Island[a]	3,784	3,734	98.7	3,774	99.7
South Carolina	18,632	18,378	98.6	18,522	99.4
South Dakota[a]	0	0	NA	0	0.0
Tennessee[a]	4,826	4,783	99.1	4,808	99.6
Texas[a]	971	948	97.6	971	100.0
Utah	NA	NA	NA	NA	NA
Vermont	4,027	3,951	98.1	4,015	99.7
Virginia[a]	19,085	18,826	98.6	19,009	99.6
Washington[a]	20,428	20,191	98.8	20,371	99.7
West Virginia[a]	1,410	1,390	98.6	1,404	99.6
Wisconsin[a]	7,457	7,358	98.7	7,427	99.6
Wyoming	1,608	1,586	98.6	1,602	99.6

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 IDs are 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]	562	36.7	12.3	4.8	0.4
Alaska	2,680	61.1	22.6	9.1	0.1
Arizona[a]	15,516	72.3	16.1	1.3	0.4
Arkansas	5,667	77.5	6.9	2.2	0.2
California[a]	35,689	57.8	0.6	8.9	8.6
Colorado	12,434	70.5	15.8	5.4	0.1
Connecticut[a]	11,181	65.8	13.8	6.9	0.1
Delaware	3,291	72.2	13.2	6.2	0.2
District of Columbia[a]	859	69.8	4.3	5.4	5.7
Florida[a]	33,176	74.2	9.2	2.9	0.2
Georgia	18,513	68.9	7.7	5.8	0.4
Hawaii[a]	55	20.0	0.0	0.0	72.7
Idaho	NA	NA	NA	NA	NA
Illinois[a]	31,393	80.8	5.4	5.5	0.5
Indiana[a]	15,656	74.4	10.0	7.3	0.5
Iowa[a]	3	33.3	33.3	0.0	0.0
Kansas	NA	NA	NA	NA	NA
Kentucky	14,403	71.7	14.3	6.8	0.2
Louisiana	9,109	73.7	9.5	7.4	0.5
Maine	NA	NA	NA	NA	NA
Maryland	11,795	78.9	5.3	5.0	0.7
Massachusetts[a]	2,424	74.8	13.2	3.1	3.0
Michigan[a]	16,167	57.8	7.9	16.2	4.9
Minnesota	10,045	35.7	6.7	3.2	44.2
Mississippi[a]	8,263	66.8	15.9	6.1	1.4
Missouri[a]	5,605	74.1	1.8	1.2	4.4
Montana	2,893	65.2	23.1	3.0	0.2
Nebraska[a]	275	34.9	1.8	43.6	0.0
Nevada[a]	4,777	73.1	10.3	6.5	0.1
New Hampshire[a]	0	0.0	0.0	0.0	0.0
New Jersey	NA	NA	NA	NA	NA
New Mexico	8,668	54.8	4.6	6.4	11.1
New York	58,272	68.3	13.1	8.2	0.3
North Carolina	22,992	76.5	5.2	8.3	0.3
North Dakota	NA	NA	NA	NA	NA
Ohio[a]	881	89.8	5.1	0.2	0.2
Oklahoma	10,479	70.8	12.8	7.7	0.0
Oregon	9,820	68.3	16.6	6.6	0.2
Pennsylvania[a]	2,538	90.2	0.6	1.6	1.6
Rhode Island[a]	3,734	75.3	12.3	4.4	0.5
South Carolina	18,378	70.7	13.2	7.2	0.2
South Dakota[a]	0	0.0	0.0	0.0	0.0
Tennessee[a]	4,783	15.8	15.9	16.0	40.0
Texas[a]	948	49.7	6.2	3.1	0.2
Utah	NA	NA	NA	NA	NA
Vermont	3,951	66.0	19.5	7.4	0.0
Virginia[a]	18,826	74.6	9.8	5.7	0.6
Washington[a]	20,191	66.2	17.3	7.2	0.1
West Virginia[a]	1,390	55.4	19.4	7.0	2.6
Wisconsin[a]	7,358	38.1	23.1	14.3	11.3
Wyoming	1,586	64.2	15.3	12.1	0.2

Source: MAXPC file, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 providers are 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]	578	6.9
Alaska	2,717	75.1
Arizona[a]	15,696	88.1
Arkansas	5,709	78.1
California[a]	36,501	85.8
Colorado	12,509	92.4
Connecticut[a]	11,408	86.8
Delaware	3,326	74.3
District of Columbia[a]	876	64.1
Florida[a]	33,458	94.5
Georgia	18,724	88.9
Hawaii[a]	55	94.5
Idaho	NA	NA
Illinois[a]	31,823	79.5
Indiana[a]	15,755	83.1
Iowa[a]	3	0.0
Kansas	NA	NA
Kentucky	14,510	71.0
Louisiana	9,187	89.4
Maine	NA	NA
Maryland	11,933	82.5
Massachusetts[a]	2,434	88.8
Michigan[a]	16,348	89.6
Minnesota	10,097	85.0
Mississippi[a]	8,350	72.9
Missouri[a]	5,641	92.7
Montana	2,931	77.0
Nebraska[a]	280	96.4
Nevada[a]	4,832	84.0
New Hampshire[a]	0	0.0
New Jersey	NA	NA
New Mexico	8,750	83.8
New York	59,273	91.9
North Carolina	23,243	86.5
North Dakota	NA	NA
Ohio[a]	890	96.0
Oklahoma	10,563	77.6
Oregon	9,926	84.8
Pennsylvania[a]	2,561	88.3
Rhode Island[a]	3,774	81.3
South Carolina	18,522	62.7
South Dakota[a]	0	0.0
Tennessee[a]	4,808	80.5
Texas[a]	971	16.4
Utah	NA	NA
Vermont	4,015	56.9
Virginia[a]	19,009	79.2
Washington[a]	20,371	86.1
West Virginia[a]	1,404	62.3
Wisconsin[a]	7,427	72.6
Wyoming	1,602	51.1

Source: MAXPC files, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 IDs were linked to NPPES

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X. CONCLUSIONS

We created the MAXPC file to help researchers focusing on Medicaid providers. The 45 files include one record for each unique provider ID with at least one IP, LT, OT, or RX claim in CY 2010 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, North Carolina, Texas, and Virginia we also used state-specific provider files to try to augment the provider information in MAXPC, though neither Texas nor Virginia's state-specific provider files contributed any new information to the analysis. These latter two files only consisted of crosswalks between NPIs and LPIs, information that was already derived in NPPES.

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.

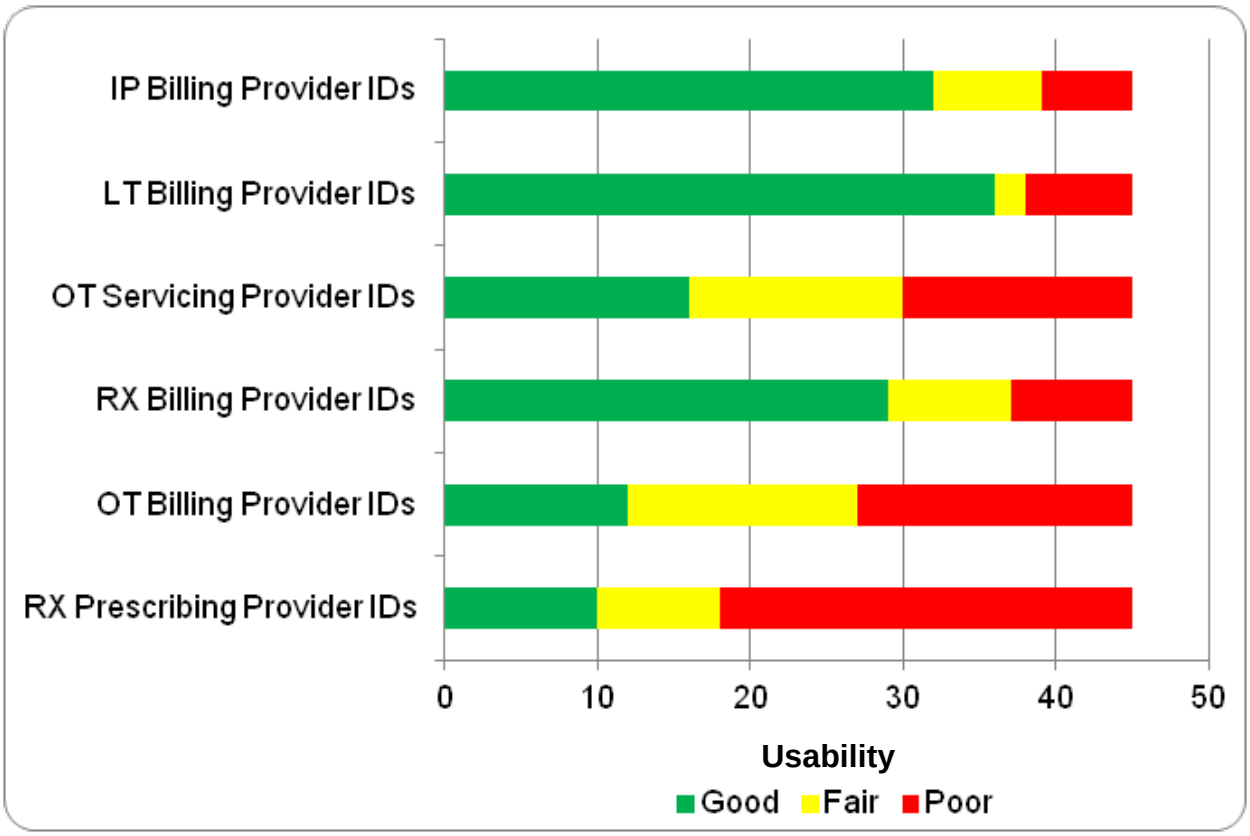
Among OT billing provider IDs, states classified as good had more than 75 percent of the OT billing provider IDs equal to the servicing provider IDs and more than 75 percent of the OT billing provider IDs that were the same as the servicing provider IDs linked to NPPES. States classified as poor had 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, 32 states may be used for IP provider research owing to the good quality and completeness of their data.
- Among LT billing provider IDs, 36 states may be used for LT provider research.
- Among OT servicing provider IDs, 16 states may be used for OT servicing provider research.
- Among RX billing provider IDs, 29 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 12 and 10 states, respectively, are usable 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. The following states should not be used for provider research:

- Six states (California, Missouri, Nebraska, New Hampshire, Ohio, and Rhode Island) should not be used for IP provider research.
- Seven states (California, Illinois, Louisiana, Nebraska, New Hampshire, Ohio, and Washington) should not be used for LT provider research.
- Fifteen states (California, Georgia, Hawaii, Illinois, Maryland, Michigan, Minnesota, Missouri, Nebraska, New Hampshire, Ohio, Rhode Island, South Carolina, Virginia, and Wisconsin) should not be used for OT servicing provider research. One additional state, Tennessee, should not be used for OT servicing provider research on allopathic and osteopathic physicians based on another analysis using MAXPC data.
- Eight states (California, Connecticut, Louisiana, Michigan, Nebraska, Ohio, South Carolina, and South Dakota) 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 Alaska, many NPIs reported in the OT file are the same as the billing provider IDs instead of the servicing 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, many 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, most 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 Michigan, 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 addition, many RX billing providers are classified as physicians and other providers, suggesting that the state is incorrectly reporting provider IDs.
- In Nebraska, many IP and 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 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 addition the state is reporting the Medicare UPIN as the IP billing provider ID rather than the Medicaid ID on many claims.
- 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 NPIs of billing provider IDs instead of servicing providers.
- In Washington, many NPIs submitted in the RX file are prescribing provider IDs. The NPIs should have been reported for billing 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	Poor	Poor
Alaska	Good	Good	Fair	Good	Poor	Good
Arizona	Good	Good	Good	Good	Good	Poor
Arkansas	Fair	Good	Fair	Good	Fair	Good
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	Good	Good	Fair	Good	Poor	Poor
Florida	Good	Good	Good	Fair	Good	Poor
Georgia	Good	Good	Poor	Good	Good	Fair
Hawaii	Fair	Good	Poor	Good	Poor	Poor
Idaho	NA	NA	NA	NA	NA	NA
Illinois	Good	Poor	Poor	Good	Poor	Poor
Indiana	Good	Good	Good	Good	Fair	Poor
Iowa	Good	Good	Fair	Fair	Fair	Poor
Kansas	NA	NA	NA	NA	NA	NA
Kentucky	Good	Good	Good	Good	Good	Good
Louisiana	Fair	Poor	Fair	Poor	Good	Fair
Maine	NA	NA	NA	NA	NA	NA
Maryland	Good	Good	Poor	Good	Fair	Good
Massachusetts	Good	Good	Good	Good	Poor	Poor
Michigan	Fair	Fair	Poor	Poor	Poor	Poor
Minnesota	Good	Good	Poor	Good	Poor	Fair
Mississippi	Good	Good	Good	Good	Fair	Poor
Missouri	Poor	Good	Poor	Fair	Poor	Poor
Montana	Good	Good	Good	Good	Good	Good
Nebraska	Poor	Poor	Poor	Poor	Poor	Poor
Nevada	Fair	Good	Good	Fair	Poor	Poor
New Hampshire	Poor	Poor	Poor	Good	Poor	Poor
New Jersey	NA	NA	NA	NA	NA	NA
New Mexico	Good	Good	Fair	Good	Fair	Fair
New York	Fair	Good	Good	Good	Good	Good
North Carolina	Good	Good	Good	Good	Good	Good
North Dakota	NA	NA	NA	NA	NA	NA
Ohio	Poor	Poor	Poor	Poor	Poor	Poor
Oklahoma	Good	Good	Good	Good	Fair	Good
Oregon	Good	Good	Fair	Fair	Poor	Fair
Pennsylvania	Good	Good	Fair	Good	Fair	Poor
Rhode Island	Poor	Good	Poor	Good	Poor	Poor
South Carolina	Good	Fair	Poor	Poor	Poor	Fair
South Dakota	Good	Good	Fair	Poor	Fair	Poor
Tennessee	Good	Good	Fair	Good	Good	Poor
Texas	Good	Good	Fair	Good	Fair	Poor
Utah	NA	NA	NA	NA	NA	NA
Vermont	Good	Good	Good	Good	Fair	Good
Virginia	Fair	Good	Poor	Good	Good	Poor
Washington	Good	Poor	Good	Fair	Good	Poor
West Virginia	Good	Good	Good	Good	Fair	Poor
Wisconsin	Good	Good	Poor	Good	Fair	Poor
Wyoming	Good	Good	Fair	Fair	Poor	Fair

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]	32	36	16	29	12	10
Number Fair[a,b,c]	7	2	14	8	15	8
Number Poor[a,b,c]	6	7	15	8	18	27

Source: MAXPC file, 2010.

Note: Idaho, Kansas, Maine, New Jersey, North Dakota, and Utah were not included in MAXPC 2010 because the corresponding MSIS files were unavailable or contained significant data problems. Massachusetts was processed without the full complement of seven quarters of data typically used when processing MAX files. See Section III.F for more information.

NA = Not available

[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 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 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.

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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.

Although only minimal improvement in the reporting of provider IDs was evident in MAXPC 2010 relative to MAXPC 2009, it is highly likely that the reporting of NPIs in MSIS claims will 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, Michigan, Nebraska, New Hampshire, and Ohio 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 and South Carolina's RX files
- 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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