



# H·CUP

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## **INTRODUCTION**

This document provides an evaluation of the PNUM\_R data element in publicly-available HCUP data sets (i.e., those available through the HCUP Central Distributor) for the 2003 data year. States provide the PNUM data element to allow for constructing person-level analyses, and an encrypted version of this identifier is available on certain data sets available through the HCUP Central Distributor. Such an identifier is useful in conducting an array of health service research studies, including analysis of chronic conditions, readmission patterns, and resource utilization across settings. Ideally, this identifier is unique and specific to each individual over time and across settings. In practice, researchers have noted that PNUM may not always be an adequate identifier and that PNUM alone may not be useful in identifying individuals.

This activity is designed to assess the characteristics of the PNUM\_R data element across states and settings. The specific objective is to examine the PNUM\_R in light of three criteria essential for data quality (Statistics Canada, 2003). Brief descriptions of these criteria are presented below. Methods and results associated with each characteristic are described in sections that follow. Relevant aspects of data quality are:

- Completeness
- Accuracy
- Consistency.

### **Completeness**

An obvious desirable characteristic for PNUM\_R is that it is present (non-missing) for most or all of the records in each database. Completeness refers to the extent to which PNUM is present with each state's database(s). Not all states submit PNUM, and states that do submit PNUM may have missing values for some records. For this report, analyses were limited to those states that provided a version of PNUM through the HCUP Central Distributor in data year 2003. Specifically, the PNUM\_R data element is used since this is an encrypted version of the PNUM data element supplied by the data source.

### **Accuracy**

For non-missing values, a desirable attribute of PNUM\_R is that it has the capacity to identify each person in a data set. Likewise, it is desirable if the same value of PNUM\_R is used for all records that represent the same person. These characteristics describe ability of a data element to accurately capture what is designed to measure.

### **Consistency**

Assuming PNUM\_R values are present and the data element is well-constructed, a third desirable characteristic is the extent to which other data elements "agree" with PNUM\_R when identifying individuals. For instance, if two observations match on PNUM\_R then the two observations should represent the same person. Assuming other data elements are accurately coded, the two observations should have identical values for certain fields (e.g., DOB, FEMALE, AGE, RACE). Other fields (e.g., ZIP) should also agree provided the underlying characteristics do not change.

## OVERVIEW OF METHODS

In this section the cross-cutting methods used in these analyses are described. Since various analyses used different inclusion/exclusion criteria, detailed descriptions of the analysis-specific methods are presented in the Completeness, Accuracy, and Consistency sections below.

### Source Data

SID, SASD, and SEDD data were analyzed for each state that released a version of PNUM\_R through the HCUP Central Distributor in data year 2003. Table 1 summarizes the availability of PNUM\_R for states and databases included in this analysis. As noted in the table, relatively few states allow PNUM\_R to be released through the central distributor. In addition to the 5 states that release a version of PNUM through the HCUP Central Distributor, 5 other HCUP Central Distributor states (Florida, Massachusetts, Nebraska, Virginia, and Wisconsin) include a version of PNUM on the intramural data files. Further evaluation of PNUM is available and AHRQ staff can be contacted to facilitate potential access to that data element for the states in the HCUP Central Distributor.

The scope of this report is limited to those states that include PNUM\_R in the data year 2003 databases released through the HCUP Central Distributor. These data collectively represent approximately 3 million observations<sup>1</sup> from 5 states.

**Table 1: Availability of PNUM\_R by State and Data Type, 2003 Data Year**

| State | Inpatient (SID)        |                  | Ambulatory Surgery (SASD) |                  | Emergency Department (SEDD) |                  |
|-------|------------------------|------------------|---------------------------|------------------|-----------------------------|------------------|
|       | In Central Distributor | PNUM_R Available | In Central Distributor    | PNUM_R Available | In Central Distributor      | PNUM_R Available |
| AZ    | ●                      | ●                |                           |                  |                             |                  |
| CO    | ●                      |                  | ●                         |                  |                             |                  |
| FL    | ●                      |                  | ●                         |                  |                             |                  |
| IA    | ●                      |                  |                           |                  |                             |                  |
| KY    | ●                      |                  | ●                         |                  |                             |                  |
| MA    | ●                      |                  |                           |                  | ●                           |                  |
| MD    | ●                      |                  | ●                         |                  | ●                           |                  |
| ME    | ●                      |                  | ●                         |                  | ●                           |                  |
| MI    | ●                      |                  |                           |                  |                             |                  |
| NC    | ●                      | ●                | ●                         | ●                |                             |                  |
| NE    | ●                      |                  | ●                         |                  | ●                           |                  |
| NJ    | ●                      |                  | ●                         |                  |                             |                  |
| NV    | ●                      | ●                | ●                         |                  |                             |                  |
| OR    | ●                      |                  |                           |                  |                             |                  |
| RI    | ●                      |                  |                           |                  |                             |                  |
| UT    | ●                      |                  | ●                         |                  | ●                           | ●                |
| WA    | ●                      | ●                |                           |                  |                             |                  |
| WI    | ●                      |                  | ●                         |                  |                             |                  |
| WV    | ●                      |                  |                           |                  |                             |                  |

<sup>1</sup> Observation: A record or row in the source data. In SID databases, each observation should represent a distinct inpatient stay.

## Classification of Observations

Based on previous experience with PNUM\_R-based analyses, each observation was classified as either “newborn,” “maternity,” or “all other.” This sorting was done to identify possible sources of variation in terms of missing values (anecdotal evidence suggests that PNUM\_R is often missing for newborns) and false matches (anecdotal evidence also suggests that newborns are sometimes assigned the same PNUM\_R as their mother). For purposes of analyses, newborns were identified as any observation with an AGE of less than one year. Maternity discharges were classified using the NEOMAT data element, and any non-newborn, non-maternity observation was classified as “all other.” The NEOMAT data element identifies discharges with neonatal and/or maternal diagnoses and procedures. After these initial classifications were assigned, the list of PNUM\_Rs for maternity observations was compared to the list of PNUM\_Rs for “all other” observations. Any value of PNUM\_R that appeared in both the initial “maternity” list and the initial “all other” list was removed from the “all other” list.<sup>2</sup> This deletion was done to account for the possibility of maternity patients being admitted prior or subsequent to delivery. Thus, the resulting categories are mutually exclusive and exhaustive.

## COMPLETENESS

The primary issue with respect to data completeness is the proportion of observations for which PNUM\_R is non-missing. These analyses use all available records from each database. Tables 2, 3, and 4 summarize the proportion of observations with missing PNUM\_R values for the SID, SASD, and SEDD, respectively. Appendix A includes a parallel set of tables that display the number (rather than proportion) of observations with blank/non-missing PNUM\_Rs.

Results indicate that most observations contain a PNUM\_R value, and that the proportion of observations with missing values is roughly equivalent across the three databases. Across all states represented here, PNUM\_R is missing for approximately 20 percent of the observations in the SID, 39 percent of the observations in the SASD, and 21 percent of the observations in the SEDD. For both the SASD and SEDD states, the calculations are based on only one state, and the full research files may have a lower observed proportion of records with missing PNUM values.

**Table 2: Proportion of Observations with Missing and Non-Missing Values for PNUM\_R by Patient Type, Central Distributor SID 2003 Data**

| State | Category                                | Maternity (percent) | Newborns (percent) | All Others (percent) | All Patients (percent) |
|-------|---|---------------------|--------------------|----------------------|------------------------|
| AZ    | Observations with Non-Missing PNUM_Rs   | 92                  | 62                 | 97                   | 91                     |
|       | Observations with Blank/Missing PNUM_Rs | 8                   | 38                 | 3                    | 9                      |
| NC    | Observations with Non-Missing PNUM_Rs   | 64                  | 21                 | 64                   | 59                     |
|       | Observations with Blank/Missing PNUM_Rs | 36                  | 79                 | 36                   | 41                     |
| NV    | Observations with Non-Missing PNUM_Rs   | 94                  | 54                 | 97                   | 90                     |
|       | Observations with Blank/Missing PNUM_Rs | 6                   | 46                 | 3                    | 10                     |
| WA    | Observations with Non-Missing PNUM_Rs   | 100                 | 100                | 100                  | 100                    |
|       | Observations with Blank/Missing PNUM_Rs | 0                   | 0                  | 0                    | 0                      |

<sup>2</sup> This step was ultimately not performed for Wisconsin data because the limited PNUM length resulted in almost all non-newborn observations being classified as maternity. These preliminary analyses resulted in approximately 450,000 maternity discharges, 75,000 newborns, and 125,000 “all other” discharges.

**Table 3: Proportion of Observations with Missing and Non-Missing Values for PNUM\_R by Patient Type, Central Distributor SASD 2003 Data**

| State | Category                                | Maternity (percent) | Newborns (percent) | All Others (percent) | All Patients (percent) |
|-------|---|---------------------|--------------------|----------------------|------------------------|
| NC    | Observations with Non-Missing PNUM_Rs   | 4                   | 47                 | 100                  | 61                     |
|       | Observations with Blank/Missing PNUM_Rs | 96                  | 53                 | 0                    | 39                     |

**Table 4: Proportion of Observations with Missing and Non-Missing Values for PNUM\_R by Patient Type, Central Distributor SEDD 2003 Data**

| State | Category                                | Maternity (percent) | Newborns (percent) | All Others (percent) | All Patients (percent) |
|-------|---|---------------------|--------------------|----------------------|------------------------|
| UT    | Observations with Non-Missing PNUM_Rs   | 100                 | 13                 | 0                    | 79                     |
|       | Observations with Blank/Missing PNUM_Rs | 0                   | 87                 | 100                  | 21                     |

**ACCURACY**

In terms of evaluating the accuracy of PNUM\_R, the first issue addressed is the “capacity” of PNUM\_R as it was provided by the data source. Implicit in the construction of PNUM\_R is the concept that the data element is constructed in such a way as to allow unique identifiers for an entire population (e.g., all potential patients within a given state). By examining the number of characters used in each state’s PNUM\_R, it is possible to estimate the possible number of distinct values that can be represented by the PNUM\_R data element. Analysis of the length of non-missing PNUM\_R values for each state indicates that most states use PNUM\_R that is at least 9 digits long, thus allowing for approximately one billion possible values.

**Table 5: Nominal Length of PNUM\_R Data Element by State, SID 2003 Data**

| State | Nominal PNUM_R Length | Approximate Number of Possible PNUM_R Values | Approximate Number of Inpatient Observations (Annual) |
|-------|-----------------------|--|---|
| AZ    | 19                    | Several billion                              | 650,000   |
| NC    | 9                     | one billion                                  | 1,000,000   |
| NV    | 12                    | one billion                                  | 250,000   |
| UT    | 9-12                  | one billion                                  | 250,000   |
| WA    | 12                    | one billion                                  | 600,000   |

**Percent Duplicates**

A second aspect of accuracy relates to the frequency with which each PNUM\_R value occurs in a data set. Because some persons are readmitted in the course of a year, one would not expect to see each PNUM\_R only once. Conversely, it is unlikely that a single person would be readmitted more than a dozen times per year (though some outliers with more than twelve visits in a year are possible). For these analyses, all non-missing observations were examined and measures were calculated as to whether each distinct PNUM\_R appeared once or more than once in a data year. Observations linked to a PNUM\_R that appears only once in that year are labeled “singletons,” whereas observations linked to a PNUM\_R that appeared two or more times have “recurring PNUM\_Rs.” For instance, suppose the PNUM\_R ‘A001A’ appears only once in a data set and there are five observations with a PNUM\_R value of ‘A001B.’ All five observations with a PNUM\_R of ‘A001B’ would be flagged as having a recurring PNUM\_R. The observation with a PNUM\_R value of ‘A001A’ would be marked as a singleton. While the five ‘recurring PNUM\_R’ observations may or may not represent the same person, these analyses provide some insight as to the efficacy of using PNUM\_R to identify readmissions.



Results of these analyses are displayed in Tables 6, 7, and 8. Although the recurring PNUM\_Rs do not necessarily represent readmissions, it is useful to compare the obtained values to benchmark readmission rates. For purposes of comparison, an all-population readmission rate of 5.5 percent was used. Based on this benchmark, one would expect to see the preponderance of observations in the “singleton” category. For example, with inpatient data one would expect to see approximately 5,500 observations with recurring PNUM\_Rs for every 100,000 singletons.

Except in the case of the ED data, across all states and patient types, the number of observations linked to recurring PNUM\_Rs is less than the number singleton observations. Within and across states, the proportion of singletons varied by patient type, with maternity discharges and newborn discharges representing a high percentage of singletons (73 percent and 72 percent, respectively) across all data types. For the “all other” population, the majority of observations (56 percent) were associated with singleton PNUM\_R values, although the relative increase in observations associated with recurring PNUM\_R values suggest this population is more likely to be re-admitted.

**Table 6: Proportion of Observations Linked to Singleton versus Recurring PNUM\_Rs, by Patient Type - Central Distributor SID 2003 Data**

| State | Category          | Maternity (percent) |              | Newborns (percent) |              | All Others (percent) |              | Total (percent) |              |
|-------|-------------------|---------------------|--------------|--------------------|--------------|----------------------|--------------|-----------------|--------------|
|       |                   | PNUM_Rs             | Observations | PNUM_Rs            | Observations | PNUM_Rs              | Observations | PNUM_Rs         | Observations |
| AZ    | Singleton PNUM_Rs | 92                  | 70           | 76                 | 70           | 79                   | 60           | 81              | 62           |
|       | Recurring PNUM_Rs | 8                   | 30           | 24                 | 30           | 21                   | 40           | 19              | 38           |
| NC    | Singleton PNUM_Rs | 91                  | 78           | 89                 | 49           | 73                   | 50           | 76              | 54           |
|       | Recurring PNUM_Rs | 9                   | 22           | 11                 | 51           | 27                   | 50           | 24              | 46           |
| NV    | Singleton PNUM_Rs | 93                  | 85           | 91                 | 74           | 77                   | 56           | 81              | 62           |
|       | Recurring PNUM_Rs | 7                   | 15           | 9                  | 26           | 23                   | 44           | 19              | 38           |
| WA    | Singleton PNUM_Rs | 93                  | 85           | 91                 | 83           | 75                   | 53           | 81              | 62           |
|       | Recurring PNUM_Rs | 7                   | 15           | 9                  | 17           | 25                   | 47           | 19              | 38           |

**Table 7: Proportion of Observations Linked to Singleton versus Recurring PNUM\_Rs, by Patient Type - Central Distributor SASD 2003 Data**

| State | Category          | Maternity (percent) |              | Newborns (percent) |              | All Others (percent) |              | All Patients (percent) |              |
|-------|-------------------|---------------------|--------------|--------------------|--------------|----------------------|--------------|------------------------|--------------|
|       |                   | PNUM_Rs             | Observations | PNUM_Rs            | Observations | PNUM_Rs              | Observations | PNUM_Rs                | Observations |
| NC    | Singleton PNUM_Rs | 78                  | 43           | 95                 | 70           | 82                   | 66           | 82                     | 65           |
|       | Recurring PNUM_Rs | 22                  | 57           | 5                  | 30           | 18                   | 34           | 18                     | 35           |

**Table 8: Proportion of Observations Linked to Singleton versus Recurring PNUM\_Rs, by Patient Type - Central Distributor SASD 2003 Data**

| State | Category          | Maternity (percent) |              | Newborns (percent) |              | All Others (percent) |              | All Patients (percent) |              |
|-------|-------------------|---------------------|--------------|--------------------|--------------|----------------------|--------------|------------------------|--------------|
|       |                   | PNUM_Rs             | Observations | PNUM_Rs            | Observations | PNUM_Rs              | Observations | PNUM_Rs                | Observations |
| UT    | Singleton PNUM_Rs | 59                  | 28           | 69                 | 36           | 73                   | 46           | 73                     | 45           |
|       | Recurring PNUM_Rs | 41                  | 72           | 31                 | 64           | 27                   | 54           | 27                     | 55           |

### Frequency with which PNUM\_R Values Appear

Examination of the number of singleton PNUM\_Rs led to an analysis of how frequently values of PNUM\_R appeared. For these analyses, observations with missing PNUM\_R values were excluded and list of distinct PNUM\_R values was constructed for each database. The number of times each distinct value of PNUM\_R appeared in the data set were then examined. Results for each database are included in Appendix A, with sample output below. Table 9 uses Nevada SID data to illustrate a typical pattern associated with these data. As shown in the table, a total of 91,982 observations are associated with various values of PNUM\_R that appeared only once. Another 18,354 observations are linked to various other values of PNUM\_R that appeared twice, and so on, culminating with one value of PNUM\_R that appeared a total of 26 times. It is unlikely that this represents one person who was hospitalized 26 times in one year, and there are myriad possible causes for a given value of PNUM\_R to appear numerous times in the same year. Such causes include submission of test data, clerical errors resulting in multiple discharge abstracts, and attempts to submit correcting or adjusted claims.

**Table 9: Frequency of Occurrence for PNUM\_R Values – Nevada Central Distributor SID 2003 Data**

| Frequency of Occurrence | Number of Observations |
|-------------------------|------------------------|
| 1                       | 91,982                 |
| 2                       | 18,354                 |
| 3                       | 5,359                  |
| 4                       | 2,119                  |
| 5                       | 978                    |
| 6                       | 490                    |
| 7                       | 210                    |
| 8                       | 138                    |
| 9                       | 60                     |
| 10                      | 43                     |
| 11                      | 31                     |
| 12                      | 15                     |
| 13                      | 9                      |
| 14                      | 4                      |
| 15                      | 11                     |
| 16                      | 3                      |
| 17                      | 2                      |
| 18                      | 3                      |
| 25                      | 1                      |
| 26                      | 1                      |

By comparison, Table 10 illustrates a somewhat unusual pattern: in this case a small set of PNUM\_R values that appear very frequently, with one value occurring 7,636 times and seven other values occurring at least 100 times. In a practical sense, these PNUM\_R values are effectively missing since they do not add any new information about each observation.

**Table 10: Frequency of Occurrence for PNUM\_R Values North Carolina Central Distributor SID 2003 Data**

| Frequency of Occurrence | Number of Observations |
|-------------------------|------------------------|
| 1                       | 340,792                |
| 2                       | 67,953                 |
| 3                       | 20,941                 |
| 4                       | 8,309                  |
| 5                       | 3,647                  |
| 6                       | 1,762                  |
| 7                       | 889                    |
| 8                       | 498                    |
| 9                       | 273                    |
| 10                      | 175                    |
| 11                      | 112                    |
| 12                      | 64                     |
| 13                      | 38                     |
| 14                      | 35                     |
| 15                      | 18                     |
| 16                      | 17                     |
| 17                      | 7                      |
| 18                      | 7                      |
| 19                      | 5                      |
| 20                      | 1                      |
| 21                      | 5                      |
| 22                      | 4                      |
| 24                      | 1                      |
| 25                      | 1                      |
| 26                      | 1                      |
| 27                      | 1                      |
| 29                      | 1                      |
| 34                      | 1                      |
| 35                      | 1                      |
| 51                      | 1                      |
| 128                     | 1                      |
| 292                     | 1                      |
| 303                     | 1                      |
| 507                     | 1                      |
| 825                     | 1                      |
| 976                     | 1                      |
| 2,079                   | 1                      |
| 7,636                   | 1                      |

**Number of Duplicate Records**

Findings thus far illustrate that some values of PNUM\_R are repeated in the database and some values appear quite frequently. A logical follow-on is to examine the databases for duplicate records by checking for observations that match on every data element. These “clone” records likely represent duplicate submissions from the facility or the data source.

Results of these analyses are presented in Tables 11, 12, and 13. Duplicate records do not appear to be a significant issue for most states, although a notable exception is North Carolina SASD. While the overall proportion of duplicate observations is still relatively low (less than one percent) for this state, the potential for more than 2,000 duplicates may impact certain types of analyses.

**Table 11: Number of Duplicate Records by State and Patient Type – Central Distributor SID 2003 Data**

| State | Category              | Maternity | Newborns | All Others | All Patients |
|-------|-----------------------|-----------|----------|------------|--------------|
| AZ    | Duplicate Records     | 2         | 10       | 12         | 24           |
|       | AZ Total Observations | 100,162   | 100,609  | 462,745    | 663,516      |
| NC    | Duplicate Records     | 48        | 202      | 505        | 755          |
|       | NC Total Observations | 129,529   | 127,959  | 811,226    | 1,068,714    |
| NV    | Duplicate Records     | 0         | 48       | 2          | 50           |
|       | NV Total Observations | 34,993    | 35,450   | 170,344    | 240,787      |
| WA    | Duplicate Records     | 0         | 38       | 2          | 40           |
|       | WA Total Observations | 83,463    | 84,828   | 420,742    | 589,033      |

**Table 12: Number of Duplicate Records by State and Patient Type – Central Distributor SASD 2003 Data**

| State | Category              | Maternity | Newborns | All Others | All Patients |
|-------|-----------------------|-----------|----------|------------|--------------|
| NC    | Duplicate Records     | 72        | 28       | 2,103      | 2,203        |
|       | NC Total Observations | 24,911    | 8,823    | 1,181,961  | 1,215,695    |

**Table 13: Number of Duplicate Records by State and Patient Type – Central Distributor SEDD 2003 Data**

| State | Category              | Maternity | Newborns | All Others | All Patients |
|-------|-----------------------|-----------|----------|------------|--------------|
| UT    | Duplicate Records     | 0         | 0        | 4          | 4            |
|       | UT Total Observations | 24,567    | 25,593   | 514,918    | 565,078      |

## CONSISTENCY

The final set of analyses address the extent to which other data elements are consistent with PNUM\_R. The underlying premise for these analyses is that if two or more records match on PNUM\_R, these records should represent the same person. By extension, values for key demographic variables (e.g., FEMALE, DOB) for observations that match on PNUM\_R should also match. In other words, if two observations match on PNUM\_R, they should represent the same person, and both records should have the same value for age, sex, and other demographic data elements.

To calculate the consistency measures, observations that had non-missing PNUM\_R values were selected and any duplicate records were excluded. Since consistency can only be evaluated using observations that match on PNUM\_R, “singleton” observations were excluded from analysis. A final restriction was to exclude any value of PNUM\_R that appeared more than 100 times in a data set. Since the databases released through the HCUP Central Distributor contain limited demographic information and would permit in-depth analyses, the results presented below reflect analyses conducted on the more detailed intramural database.

For the remaining observations the SAS MERGE function was used to identify sets or “clusters” of observations that match on PNUM\_R. Within each cluster, the demographic values (i.e., FEMALE, AGE, DOB, ZIP, RACE) and MRN for each observation was compared to the corresponding values for all other observations in the cluster. Although not technically a demographic data element, MRN was also included in these analyses. This approach is analogous to conducting a series of pairwise comparisons for each set of records that match on PNUM\_R. Each pairwise comparison results in either agreement or disagreement, and an overall agreement score is calculated for the cluster. Agreement scores are calculated for each

data element, and scores are averaged across all clusters. The result is an average level of agreement for observations that match on PNUM\_R.

Results of these analyses for SID, SASD, and SEDD databases are presented in Tables 14, 15, and 16, respectively. By way of interpretation, these results describe the average agreement among records that match on PNUM\_R. Thus, if two records from the Arizona SID have the same PNUM\_R, there is a 93.2 percent chance they will have the same value for FEMALE, a 72.6 percent chance they will have the same value for AGE, and so on. Across all states, databases, and data elements, levels of agreement were generally high – typically in excess of 80 percent. The highest levels of agreement are obtained for gender, whereas low levels of agreement exist for AGE, a pattern that held across databases. Low levels of agreement are a function of either miscoding of data elements, false matches on PNUM\_R, or missing values. Agreement on MRN is typically low, and could be the result of a number of factors, including admissions to different facilities or facilities assigning stay-specific MRNs. The RACE data was the most varied in terms of agreement, with some states approximating 75 percent agreement and others at approximately 40 percent.

Agreement on DOB is typically greater than agreement on AGE, presumably because some patients may have a birthday between service dates. In these instances, DOB would agree but age would not. In order to explore this possibility, a measure for Age  $\pm$  one year was created. As the name implies, this measure treats any two AGE values that are within one year of each other as an agreement. This does result in higher levels of agreement than obtained for “strict” age comparisons, although in some case the level of agreement exceed that obtained for DOB, suggesting some agreement in the Age  $\pm$  one year measure is due to false positives.

**Table 14: Levels of Agreement for Demographic Fields on Observations with Matching PNUM\_R Values – Central Distributor SID 2003 Data**

| State | Female | Age (strict) | Age ( $\pm$ 1 yr) | DOB   | Year of Birth | Month of Birth | Day of Birth | ZIP Code | Race  | MRN |
|-------|--------|--------------|-------------------|-------|---------------|----------------|--------------|----------|-------|-----|
| AZ    | 93.2%  | 72.6%        | 86.9%             | 86.2% | 86.7%         | 87.9%          | 87.0%        | 94.0%    | 88.8% | N/A |
| NC    | 98.0%  | 77.8%        | 95.7%             | 94.8% | 95.4%         | 95.9%          | 95.3%        | 90.8%    | 66.7% | N/A |
| NV    | 100%   | 83.1%        | 100%              | 100%  | 100%          | 100%           | 100%         | 86.8%    | N/A   | N/A |
| WA    | 99.0%  | 84.1%        | 100%              | 100%  | 100%          | 100%           | 100%         | 91.9%    | N/A   | N/A |

**Table 15: Levels of Agreement for Demographic Fields on Observations with Matching PNUM\_R Values – Central Distributor SASD 2003 Data**

| State | Female | Age (strict) | Age ( $\pm$ 1 yr) | DOB   | Year of Birth | Month of Birth | Day of Birth | ZIP Code | Race | MRN |
|-------|--------|--------------|-------------------|-------|---------------|----------------|--------------|----------|------|-----|
| NC    | 98.3%  | 75.4%        | 96.5%             | 96.0% | 96.3%         | 96.7%          | 96.3%        | 93.5%    | N/A  | N/A |

**Table 16: Levels of Agreement for Demographic Fields on Observations with Matching PNUM\_R Values – Central Distributor SEDD 2003 Data**

| State | Female | Age (strict) | Age ( $\pm$ 1 yr) | DOB   | Year of Birth | Month of Birth | Day of Birth | ZIP Code | Race  | MRN   |
|-------|--------|--------------|-------------------|-------|---------------|----------------|--------------|----------|-------|-------|
| UT    | 99.5%  | 79.9%        | 99.2%             | 98.7% | 99.1%         | 99.2%          | 99.0%        | 89.9%    | 36.8% | 69.7% |

## SUMMARY

Taken together, these results illustrate the complexity associated with using and analyzing person-level identifiers, especially in the context of administrative health data. The purpose of a variable such as PNUM\_R is to uniquely identify records that represent the same person. While

the results presented here do not allow us to state definitively whether any state's PNUM\_R is effective, some general assessment as to the efficacy of PNUM\_R can be made.

A first recommendation is that researchers wishing to use PNUM\_R conduct relatively thorough exploratory analyses prior to using PNUM\_R to link records for the same individuals. Examining the number of duplicate records, number of observations with the same PNUM\_R, and proportion of observation missing PNUM\_R are useful starting points.

In a research context, it would seem it is possible to use the PNUM\_R data element to track individuals within a database, at least once certain conditions are met. The high levels of agreement obtained for some states and databases suggest that PNUM\_R (either alone or in conjunction with other data elements) can be used to identify distinct individuals within a data set. It should be noted that these levels of agreement were achieved only after certain types of records were excluded from analysis.

Finally, the value of PNUM\_R varies across a number of different contexts. Differences with respect to patient types (e.g., newborns, maternity) were observed, as were differences between states, and variation between databases (i.e., SID, SASD, and SEDD). These differences imply that PNUM\_R is neither universally "good" nor universally "bad." Each state appears to have different issues surrounding their implementation of PNUM, which may present opportunities for future collaboration and development.

#### **Reference**

Statistics Canada (2003). Statistics Canada Quality Guidelines. Statistics Canada Catalogue no. 12-539-XIE.

Appendix A – Number of Observations with Missing and Non-Missing values for PNUM\_R by Patient Type

**Table 17: Number of Observations with Missing and Non-Missing values for PNUM\_R by Patient Type, Central Distributor SID 2003 Data**

| State | Category                                | Maternity | Newborns | All Others | All Patients |
|-------|---|-----------|----------|------------|--------------|
| AZ    | Observations with Non-Missing PNUM_Rs   | 91,726    | 62,388   | 446,627    | 600,741      |
|       | Observations with Blank/Missing PNUM_Rs | 8,436     | 38,221   | 16,118     | 62,775       |
|       | AZ Total                                | 100,162   | 100,609  | 462,745    | 663,516      |
| NC    | Observations with Non-Missing PNUM_Rs   | 83,191    | 27,461   | 522,402    | 633,054      |
|       | Observations with Blank/Missing PNUM_Rs | 46,338    | 100,498  | 288,824    | 435,660      |
|       | NC Total                                | 129,529   | 127,959  | 811,226    | 1,068,714    |
| NV    | Observations with Non-Missing PNUM_Rs   | 32,977    | 19,147   | 165,611    | 217,735      |
|       | Observations with Blank/Missing PNUM_Rs | 2,016     | 16,303   | 4,733      | 23,052       |
|       | NV Total                                | 34,993    | 35,450   | 170,344    | 240,787      |
| WA    | Observations with Non-Missing PNUM_Rs   | 83,463    | 84,828   | 420,742    | 589,033      |
|       | Observations with Blank/Missing PNUM_Rs | 0         | 0        | 0          | 0            |
|       | WA Total                                | 83,463    | 84,828   | 420,742    | 589,033      |

**Table 18: Number of Observations with Missing and Non-Missing values for PNUM\_R by Patient Type, Central Distributor SASD 2003 Data**

| State | Category                                | Maternity | Newborns | All Others | All Patients |
|-------|---|-----------|----------|------------|--------------|
| NC    | Observations with Non-Missing PNUM_Rs   | 20,495    | 4,153    | 722,198    | 746,846      |
|       | Observations with Blank/Missing PNUM_Rs | 464,179   | 4,670    | 0          | 468,849      |
|       | NC Total                                | 484,674   | 8,823    | 722,198    | 1,215,695    |

**Table 19: Number of Observations with Missing and Non-Missing values for PNUM\_R by Patient Type, Central Distributor SEDD 2003 Data**

| State | Category                                | Maternity | Newborns | All Others | All Patients |
|-------|---|-----------|----------|------------|--------------|
| UT    | Observations with Non-Missing PNUM_Rs   | 441,700   | 3,441    | 0          | 445,141      |
|       | Observations with Blank/Missing PNUM_Rs | 1,330     | 22,152   | 96,455     | 119,937      |
|       | UT Total                                | 443,030   | 25,593   | 96,455     | 565,078      |

Appendix B – Number of Observations Linked to Singleton versus Recurring PNUM\_Rs

**Table 20: Number of Observations Linked to Singleton versus Recurring PNUM\_Rs, by Patient Type - Central Distributor SID 2003 Data**

| State | Category             | Maternity |              | Newborns |              | All Others |              | Total   |              |
|-------|----------------------|-----------|--------------|----------|--------------|------------|--------------|---------|--------------|
|       |                      | PNUM_Rs   | Observations | PNUM_Rs  | Observations | PNUM_Rs    | Observations | PNUM_Rs | Observations |
| AZ    | Singleton PNUM_Rs    | 63,789    | 63,789       | 43,521   | 43,521       | 266,522    | 266,522      | 373,832 | 373,832      |
|       | Recurring PNUM_Rs    | 5,924     | 27,937       | 13,798   | 18,867       | 70,061     | 180,105      | 89,783  | 226,909      |
|       | AZ Total Non-Missing | 69,713    | 91,726       | 57,319   | 62,388       | 336,583    | 446,627      | 463,615 | 600,741      |
| NC    | Singleton PNUM_Rs    | 65,109    | 65,109       | 13,398   | 13,398       | 262,285    | 262,285      | 340,792 | 340,792      |
|       | Recurring PNUM_Rs    | 6,379     | 18,082       | 1,626    | 14,063       | 96,771     | 260,117      | 104,776 | 292,262      |
|       | NC Total Non-Missing | 71,488    | 83,191       | 15,024   | 27,461       | 359,056    | 522,402      | 445,568 | 633,054      |
| NV    | Singleton PNUM_Rs    | 28,104    | 28,104       | 14,180   | 14,180       | 91,982     | 91,982       | 134,266 | 134,266      |
|       | Recurring PNUM_Rs    | 2,210     | 4,873        | 1,354    | 4,967        | 27,831     | 73,629       | 31,395  | 83,469       |
|       | NV Total Non-Missing | 30,314    | 32,977       | 15,534   | 19,147       | 119,813    | 165,611      | 165,661 | 217,735      |
| WA    | Singleton PNUM_Rs    | 70,915    | 70,915       | 70,118   | 70,118       | 222,580    | 222,580      | 363,613 | 363,613      |
|       | Recurring PNUM_Rs    | 5,562     | 12,548       | 6,541    | 14,710       | 74,410     | 198,162      | 86,513  | 225,420      |
|       | WA Total Non-Missing | 76,477    | 83,463       | 76,659   | 84,828       | 296,990    | 420,742      | 450,126 | 589,033      |

**Table 21: Number of Observations Linked to Singleton versus Recurring PNUM\_Rs, by Patient Type - Central Distributor SASD 2003 Data**

| State | Category             | Maternity |              | Newborns |              | All Others |              | Total   |              |
|-------|----------------------|-----------|--------------|----------|--------------|------------|--------------|---------|--------------|
|       |                      | PNUM_Rs   | Observations | PNUM_Rs  | Observations | PNUM_Rs    | Observations | PNUM_Rs | Observations |
| NC    | Singleton PNUM_Rs    | 8,801     | 8,801        | 2,924    | 2,924        | 474,301    | 474,301      | 486,026 | 486,026      |
|       | Recurring PNUM_Rs    | 2,456     | 11,694       | 154      | 1,229        | 102,316    | 247,897      | 104,926 | 260,820      |
|       | NC Total non-missing | 11,257    | 20,495       | 3,078    | 4,153        | 576,617    | 722,198      | 590,952 | 746,846      |

**Table 22: Number of Observations Linked to Singleton versus Recurring PNUM\_Rs, by Patient Type - Central Distributor SEDD 2003 Data**

| State | Category             | Maternity |              | Newborns |              | All Others |              | Total   |              |
|-------|----------------------|-----------|--------------|----------|--------------|------------|--------------|---------|--------------|
|       |                      | PNUM_Rs   | Observations | PNUM_Rs  | Observations | PNUM_Rs    | Observations | PNUM_Rs | Observations |
| UT    | Singleton PNUM_Rs    | 6,396     | 6,396        | 1,248    | 1,248        | 191,828    | 191,828      | 199,472 | 199,472      |
|       | Recurring PNUM_Rs    | 4,469     | 16,841       | 558      | 2,193        | 69,404     | 226,635      | 74,431  | 245,669      |
|       | UT Total non-missing | 10,865    | 23,237       | 1,806    | 3,441        | 261,232    | 418,463      | 273,903 | 445,141      |



Appendix C – Frequencies for Number of Occurrences for PNUM\_R Values

**SID**

**AZ : Unformatted Freq of PNUMCOUNT for ALL Records**

| pnumcount | Frequency | Percent | Frequency | Percent |
|-----------|-----------|---------|-----------|---------|
| 1         | 373832    | 80.63   | 373832    | 80.63   |
| 2         | 65077     | 14.04   | 438909    | 94.67   |
| 3         | 15308     | 3.30    | 454217    | 97.97   |
| 4         | 5140      | 1.11    | 459357    | 99.08   |
| 5         | 2182      | 0.47    | 461539    | 99.55   |
| 6         | 954       | 0.21    | 462493    | 99.76   |
| 7         | 469       | 0.10    | 462962    | 99.86   |
| 8         | 284       | 0.06    | 463246    | 99.92   |
| 9         | 136       | 0.03    | 463382    | 99.95   |
| 10        | 74        | 0.02    | 463456    | 99.97   |
| 11        | 49        | 0.01    | 463505    | 99.98   |
| 12        | 42        | 0.01    | 463547    | 99.99   |
| 13        | 15        | 0.00    | 463562    | 99.99   |
| 14        | 7         | 0.00    | 463569    | 99.99   |
| 15        | 9         | 0.00    | 463578    | 99.99   |
| 16        | 4         | 0.00    | 463582    | 99.99   |
| 17        | 5         | 0.00    | 463587    | 99.99   |
| 18        | 5         | 0.00    | 463592    | 100.00  |
| 19        | 3         | 0.00    | 463595    | 100.00  |
| 21        | 3         | 0.00    | 463598    | 100.00  |
| 22        | 1         | 0.00    | 463599    | 100.00  |
| 23        | 1         | 0.00    | 463600    | 100.00  |
| 24        | 2         | 0.00    | 463602    | 100.00  |
| 25        | 1         | 0.00    | 463603    | 100.00  |
| 31        | 1         | 0.00    | 463604    | 100.00  |
| 39        | 2         | 0.00    | 463606    | 100.00  |
| 47        | 1         | 0.00    | 463607    | 100.00  |
| 51        | 1         | 0.00    | 463608    | 100.00  |
| 63        | 1         | 0.00    | 463609    | 100.00  |
| 73        | 1         | 0.00    | 463610    | 100.00  |
| 151       | 1         | 0.00    | 463611    | 100.00  |
| 482       | 1         | 0.00    | 463612    | 100.00  |
| 526       | 1         | 0.00    | 463613    | 100.00  |
| 1058      | 1         | 0.00    | 463614    | 100.00  |
| 1610      | 1         | 0.00    | 463615    | 100.00  |

**NC : Unformatted Freq of PNUMCOUNT for ALL Records**

| pnumcount | Frequency | Percent | Cumul ative Frequency | Cumul ative Percent |
|-----------|-----------|---------|-----------------------|---------------------|
| 1         | 340792    | 76.48   | 340792                | 76.48               |
| 2         | 67953     | 15.25   | 408745                | 91.74               |
| 3         | 20941     | 4.70    | 429686                | 96.44               |
| 4         | 8309      | 1.86    | 437995                | 98.30               |
| 5         | 3647      | 0.82    | 441642                | 99.12               |
| 6         | 1762      | 0.40    | 443404                | 99.51               |
| 7         | 889       | 0.20    | 444293                | 99.71               |
| 8         | 498       | 0.11    | 444791                | 99.83               |
| 9         | 273       | 0.06    | 445064                | 99.89               |
| 10        | 175       | 0.04    | 445239                | 99.93               |
| 11        | 112       | 0.03    | 445351                | 99.95               |
| 12        | 64        | 0.01    | 445415                | 99.97               |
| 13        | 38        | 0.01    | 445453                | 99.97               |
| 14        | 35        | 0.01    | 445488                | 99.98               |
| 15        | 18        | 0.00    | 445506                | 99.99               |
| 16        | 17        | 0.00    | 445523                | 99.99               |
| 17        | 7         | 0.00    | 445530                | 99.99               |
| 18        | 7         | 0.00    | 445537                | 99.99               |
| 19        | 5         | 0.00    | 445542                | 99.99               |
| 20        | 1         | 0.00    | 445543                | 99.99               |
| 21        | 5         | 0.00    | 445548                | 100.00              |
| 22        | 4         | 0.00    | 445552                | 100.00              |
| 24        | 1         | 0.00    | 445553                | 100.00              |
| 25        | 1         | 0.00    | 445554                | 100.00              |
| 26        | 1         | 0.00    | 445555                | 100.00              |
| 27        | 1         | 0.00    | 445556                | 100.00              |
| 29        | 1         | 0.00    | 445557                | 100.00              |
| 34        | 1         | 0.00    | 445558                | 100.00              |
| 35        | 1         | 0.00    | 445559                | 100.00              |
| 51        | 1         | 0.00    | 445560                | 100.00              |
| 128       | 1         | 0.00    | 445561                | 100.00              |
| 292       | 1         | 0.00    | 445562                | 100.00              |
| 303       | 1         | 0.00    | 445563                | 100.00              |

|      |   |      |        |        |
|------|---|------|--------|--------|
| 507  | 1 | 0.00 | 445564 | 100.00 |
| 825  | 1 | 0.00 | 445565 | 100.00 |
| 976  | 1 | 0.00 | 445566 | 100.00 |
| 2079 | 1 | 0.00 | 445567 | 100.00 |
| 7636 | 1 | 0.00 | 445568 | 100.00 |

**NV : Unformatted Freq of PNUMCOUNT for ALL Records**

| pnumcount | Frequency | Percent | Cumul ative<br>Frequency | Cumul ative<br>Percent |
|-----------|-----------|---------|--------------------------|------------------------|
| 1         | 134266    | 81.05   | 134266                   | 81.05                  |
| 2         | 20795     | 12.55   | 155061                   | 93.60                  |
| 3         | 5867      | 3.54    | 160928                   | 97.14                  |
| 4         | 2357      | 1.42    | 163285                   | 98.57                  |
| 5         | 1124      | 0.68    | 164409                   | 99.24                  |
| 6         | 577       | 0.35    | 164986                   | 99.59                  |
| 7         | 272       | 0.16    | 165258                   | 99.76                  |
| 8         | 176       | 0.11    | 165434                   | 99.86                  |
| 9         | 80        | 0.05    | 165514                   | 99.91                  |
| 10        | 56        | 0.03    | 165570                   | 99.95                  |
| 11        | 35        | 0.02    | 165605                   | 99.97                  |
| 12        | 21        | 0.01    | 165626                   | 99.98                  |
| 13        | 9         | 0.01    | 165635                   | 99.98                  |
| 14        | 5         | 0.00    | 165640                   | 99.99                  |
| 15        | 11        | 0.01    | 165651                   | 99.99                  |
| 16        | 3         | 0.00    | 165654                   | 100.00                 |
| 17        | 2         | 0.00    | 165656                   | 100.00                 |
| 18        | 3         | 0.00    | 165659                   | 100.00                 |
| 25        | 1         | 0.00    | 165660                   | 100.00                 |
| 26        | 1         | 0.00    | 165661                   | 100.00                 |

**WA : Unformatted Freq of PNUMCOUNT for ALL Records**

| pnumcount | Frequency | Percent | Cumul ative<br>Frequency | Cumul ative<br>Percent |
|-----------|-----------|---------|--------------------------|------------------------|
| 1         | 363613    | 80.78   | 363613                   | 80.78                  |
| 2         | 58513     | 13.00   | 422126                   | 93.78                  |
| 3         | 16485     | 3.66    | 438611                   | 97.44                  |
| 4         | 5968      | 1.33    | 444579                   | 98.77                  |
| 5         | 2581      | 0.57    | 447160                   | 99.34                  |
| 6         | 1361      | 0.30    | 448521                   | 99.64                  |
| 7         | 686       | 0.15    | 449207                   | 99.80                  |
| 8         | 341       | 0.08    | 449548                   | 99.87                  |
| 9         | 200       | 0.04    | 449748                   | 99.92                  |
| 10        | 119       | 0.03    | 449867                   | 99.94                  |
| 11        | 91        | 0.02    | 449958                   | 99.96                  |
| 12        | 63        | 0.01    | 450021                   | 99.98                  |
| 13        | 23        | 0.01    | 450044                   | 99.98                  |
| 14        | 13        | 0.00    | 450057                   | 99.98                  |
| 15        | 17        | 0.00    | 450074                   | 99.99                  |
| 16        | 15        | 0.00    | 450089                   | 99.99                  |
| 17        | 8         | 0.00    | 450097                   | 99.99                  |
| 18        | 5         | 0.00    | 450102                   | 99.99                  |
| 19        | 11        | 0.00    | 450113                   | 100.00                 |
| 20        | 3         | 0.00    | 450116                   | 100.00                 |
| 21        | 1         | 0.00    | 450117                   | 100.00                 |
| 22        | 4         | 0.00    | 450121                   | 100.00                 |
| 23        | 2         | 0.00    | 450123                   | 100.00                 |
| 25        | 1         | 0.00    | 450124                   | 100.00                 |
| 32        | 1         | 0.00    | 450125                   | 100.00                 |
| 36        | 1         | 0.00    | 450126                   | 100.00                 |

**SASD**

**NC SASD: Unformatted Freq of PNUMCOUNT for ALL Records**

| pnumcount | Frequency | Percent | Cumul ative<br>Frequency | Cumul ative<br>Percent |
|-----------|-----------|---------|--------------------------|------------------------|
| 1         | 486026    | 82.24   | 486026                   | 82.24                  |
| 2         | 77976     | 13.19   | 564002                   | 95.44                  |
| 3         | 17637     | 2.98    | 581639                   | 98.42                  |
| 4         | 5311      | 0.90    | 586950                   | 99.32                  |
| 5         | 2053      | 0.35    | 589003                   | 99.67                  |
| 6         | 961       | 0.16    | 589964                   | 99.83                  |
| 7         | 391       | 0.07    | 590355                   | 99.90                  |
| 8         | 238       | 0.04    | 590593                   | 99.94                  |
| 9         | 126       | 0.02    | 590719                   | 99.96                  |
| 10        | 67        | 0.01    | 590786                   | 99.97                  |
| 11        | 42        | 0.01    | 590828                   | 99.98                  |
| 12        | 32        | 0.01    | 590860                   | 99.98                  |

|      |    |      |        |        |
|------|----|------|--------|--------|
| 13   | 15 | 0.00 | 590875 | 99.99  |
| 14   | 18 | 0.00 | 590893 | 99.99  |
| 15   | 12 | 0.00 | 590905 | 99.99  |
| 16   | 7  | 0.00 | 590912 | 99.99  |
| 17   | 4  | 0.00 | 590916 | 99.99  |
| 18   | 6  | 0.00 | 590922 | 99.99  |
| 19   | 5  | 0.00 | 590927 | 100.00 |
| 20   | 2  | 0.00 | 590929 | 100.00 |
| 21   | 1  | 0.00 | 590930 | 100.00 |
| 22   | 2  | 0.00 | 590932 | 100.00 |
| 23   | 1  | 0.00 | 590933 | 100.00 |
| 24   | 1  | 0.00 | 590934 | 100.00 |
| 25   | 5  | 0.00 | 590939 | 100.00 |
| 27   | 1  | 0.00 | 590940 | 100.00 |
| 29   | 1  | 0.00 | 590941 | 100.00 |
| 31   | 1  | 0.00 | 590942 | 100.00 |
| 36   | 1  | 0.00 | 590943 | 100.00 |
| 46   | 1  | 0.00 | 590944 | 100.00 |
| 53   | 1  | 0.00 | 590945 | 100.00 |
| 71   | 1  | 0.00 | 590946 | 100.00 |
| 92   | 1  | 0.00 | 590947 | 100.00 |
| 156  | 1  | 0.00 | 590948 | 100.00 |
| 168  | 1  | 0.00 | 590949 | 100.00 |
| 325  | 1  | 0.00 | 590950 | 100.00 |
| 1176 | 1  | 0.00 | 590951 | 100.00 |
| 3894 | 1  | 0.00 | 590952 | 100.00 |

### SEDD

#### UT SEDD: Unformatted Freq of PNUMCOUNT for ALL Records

| pnumcount | Frequency | Percent | Cumulati ve<br>Frequency | Cumulati ve<br>Percent |
|-----------|-----------|---------|--------------------------|------------------------|
| 1         | 199472    | 72.83   | 199472                   | 72.83                  |
| 2         | 43728     | 15.96   | 243200                   | 88.79                  |
| 3         | 14276     | 5.21    | 257476                   | 94.00                  |
| 4         | 6286      | 2.29    | 263762                   | 96.30                  |
| 5         | 3237      | 1.18    | 266999                   | 97.48                  |
| 6         | 1948      | 0.71    | 268947                   | 98.19                  |
| 7         | 1102      | 0.40    | 270049                   | 98.59                  |
| 8         | 788       | 0.29    | 270837                   | 98.88                  |
| 9         | 529       | 0.19    | 271366                   | 99.07                  |
| 10        | 417       | 0.15    | 271783                   | 99.23                  |
| 11        | 320       | 0.12    | 272103                   | 99.34                  |
| 12        | 268       | 0.10    | 272371                   | 99.44                  |
| 13        | 228       | 0.08    | 272599                   | 99.52                  |
| 14        | 179       | 0.07    | 272778                   | 99.59                  |
| 15        | 142       | 0.05    | 272920                   | 99.64                  |
| 16        | 135       | 0.05    | 273055                   | 99.69                  |
| 17        | 97        | 0.04    | 273152                   | 99.73                  |
| 18        | 77        | 0.03    | 273229                   | 99.75                  |
| 19        | 72        | 0.03    | 273301                   | 99.78                  |
| 20        | 68        | 0.02    | 273369                   | 99.81                  |
| 21        | 45        | 0.02    | 273414                   | 99.82                  |
| 22        | 61        | 0.02    | 273475                   | 99.84                  |
| 23        | 38        | 0.01    | 273513                   | 99.86                  |
| 24        | 34        | 0.01    | 273547                   | 99.87                  |
| 25        | 36        | 0.01    | 273583                   | 99.88                  |
| 26        | 27        | 0.01    | 273610                   | 99.89                  |
| 27        | 24        | 0.01    | 273634                   | 99.90                  |
| 28        | 29        | 0.01    | 273663                   | 99.91                  |
| 29        | 21        | 0.01    | 273684                   | 99.92                  |
| 30        | 19        | 0.01    | 273703                   | 99.93                  |
| 31        | 17        | 0.01    | 273720                   | 99.93                  |
| 32        | 20        | 0.01    | 273740                   | 99.94                  |
| 33        | 10        | 0.00    | 273750                   | 99.94                  |
| 34        | 8         | 0.00    | 273758                   | 99.95                  |
| 35        | 11        | 0.00    | 273769                   | 99.95                  |
| 36        | 10        | 0.00    | 273779                   | 99.95                  |
| 37        | 10        | 0.00    | 273789                   | 99.96                  |
| 38        | 7         | 0.00    | 273796                   | 99.96                  |
| 39        | 7         | 0.00    | 273803                   | 99.96                  |
| 40        | 7         | 0.00    | 273810                   | 99.97                  |
| 41        | 6         | 0.00    | 273816                   | 99.97                  |
| 42        | 7         | 0.00    | 273823                   | 99.97                  |
| 43        | 8         | 0.00    | 273831                   | 99.97                  |
| 44        | 4         | 0.00    | 273835                   | 99.98                  |
| 45        | 6         | 0.00    | 273841                   | 99.98                  |
| 46        | 5         | 0.00    | 273846                   | 99.98                  |
| 47        | 5         | 0.00    | 273851                   | 99.98                  |
| 48        | 1         | 0.00    | 273852                   | 99.98                  |

|     |   |      |        |        |
|-----|---|------|--------|--------|
| 49  | 4 | 0.00 | 273856 | 99.98  |
| 50  | 2 | 0.00 | 273858 | 99.98  |
| 51  | 3 | 0.00 | 273861 | 99.98  |
| 52  | 3 | 0.00 | 273864 | 99.99  |
| 53  | 3 | 0.00 | 273867 | 99.99  |
| 54  | 2 | 0.00 | 273869 | 99.99  |
| 55  | 2 | 0.00 | 273871 | 99.99  |
| 56  | 3 | 0.00 | 273874 | 99.99  |
| 58  | 1 | 0.00 | 273875 | 99.99  |
| 59  | 2 | 0.00 | 273877 | 99.99  |
| 60  | 2 | 0.00 | 273879 | 99.99  |
| 61  | 1 | 0.00 | 273880 | 99.99  |
| 64  | 3 | 0.00 | 273883 | 99.99  |
| 67  | 1 | 0.00 | 273884 | 99.99  |
| 68  | 1 | 0.00 | 273885 | 99.99  |
| 69  | 1 | 0.00 | 273886 | 99.99  |
| 70  | 1 | 0.00 | 273887 | 99.99  |
| 71  | 3 | 0.00 | 273890 | 100.00 |
| 72  | 1 | 0.00 | 273891 | 100.00 |
| 74  | 1 | 0.00 | 273892 | 100.00 |
| 75  | 1 | 0.00 | 273893 | 100.00 |
| 77  | 1 | 0.00 | 273894 | 100.00 |
| 79  | 1 | 0.00 | 273895 | 100.00 |
| 83  | 1 | 0.00 | 273896 | 100.00 |
| 87  | 2 | 0.00 | 273898 | 100.00 |
| 98  | 1 | 0.00 | 273899 | 100.00 |
| 112 | 1 | 0.00 | 273900 | 100.00 |
| 115 | 1 | 0.00 | 273901 | 100.00 |
| 123 | 1 | 0.00 | 273902 | 100.00 |
| 128 | 1 | 0.00 | 273903 | 100.00 |