

Denomination Inflation White Paper Appendix: Tables and Figures

Table 1: Denominator inflation issues addressed, by primary and replication sites.

Lead Site	IIS Name	Denominator Inflation Issue	Replication Site(s)
Michigan	MCIR	Moved Away	Oregon
Minnesota	MIIC	Record Fragmentation	North Dakota
New York City	CIR	Record Fragmentation	Michigan, Oregon
North Dakota	NDIIS	Moved Away	Minnesota
Oregon	ALERT IIS	Record Fragmentation	Wisconsin
Wisconsin	WIR	Moved Away	New York City

Table 2: Use of Generic Birthdates, MIIC-Frequency of Day of Birth, January 1, 2, and 3

January/Day of Month	Frequency
1	75,029
2	18,805
3	19,479

Table 3: Use of Generic Birthdates, MIIC-Select Demographic variables and percent of population

Data Variable	Frequency	Percent Populated
Street Name	60,977	97.0%
City	62,240	99.8%
Mother's Maiden Name	4,661	7.5%
Telephone Number	26,881	43.1%
Street Number	58,401	93.7%
Street Address	61,011	97.9%

Table 4: Use of Generic Birthdates, MIIC-Record Fragments Identified by Matched Data Variables

Data Variable	Count	Verified Matches	Percent Matched
Street Name	50	19	38%
City	15	2	13%
Telephone Number	15	4	27%
Street Number	50	30	60%
Street Address	50	39	78%

Table 5: Use of Generic Birthdates, NDIIS-Select Demographic variables and percent of population

Variable	Frequency	Percent Populated
Address 1	5,354	97.4%
Address 2	82	1.5%
City	5,497	100.0%
Telephone number	3,662	66.6%
Mother's maiden name	112	2.0%
Mother's last name	386	7.0%
Parent/guardian last name	562	10.2%

Table 6: Use of Generic Names, CIR, ALERT IIS, MCIR-Examples of Generic Names

Examples of Generic Names		
CIR	ALERT IIS	MCIR
MALE	BAB	A B
FEMALE	BOYA	BABAYBOY
MC	BOY A	BABBOYA
BM	GIRL B	BABGIRL
M-C	AF BABY GO	BTEST
B	BABY-SARA	D FNAME FNU
BB	BOY	HBOY HE HEP
B B	GIR	THE TWIN A
BBB	TRUE	ZZZNEWBORN
BTWIN	NB-AMY	CVX
ATWINBOYOF	BOY ONE [MOTHER'S FIRST NAME]	BABTBOY
MC-A	ADDRESS	INANT MU NA
FC-B	AF	TWINFIRLA
UNBORN1	AF BABY	TWINGIRLB V Z
X	A F BABY	TWINBABYGIRL
MALETWINA	AF BABY BO	CJSBABY
BBA	AF BABY GI	GIRLB GIRLTWINB
BBB	GIRLA	OO T TBABYFEMALE
INFANT	NBF	
CHILDO	AF	
CHILDOF[MOTHER'S FIRSTNAME]	B C S	
[MOTHER'S FIRSTNAME]SGIRL	B S C	
G-O		
B-O		
NONAME		

Table 7: Use of Generic Names, CIR, ALERT IIS, MCIR-Rate of duplicate records by age group

Age groups	2-6 weeks			19-35 months		
	CIR	ALERT IIS	MCIR	CIR	ALERT IIS	MCIR
Sample size	5,000	4,448	8,714	5,000	5,000	173,967
Number of unique children with duplicates	564	571	228	420	30	1,288
Total number of duplicates	593	591	228	537	33	1,288
Number of generic duplicates	571	540	27	376	3	2
Cohort Inflation – all duplicates	11.86%	13.3%	2.62%	8.74%	0.7%	0.74%
Cohort Inflation – generic duplicates	11.42%	12.1%	0.31%	7.52%	0.1%	0%
Percent of generic duplicates	96.3%	91.4%	11.84%	86.0%	9.1%	0.1%

Table 8: Use of numeric fields during deduplication, ALERT IIS, WIR-Counts of possible merges by alpha/numeric variables

	ALERT IIS		WIR	
	Count	Possible Merges	Count	Possible Merges
Total Population	710,820	N/A	1,770,400	N/A
# clients w/L4F3 populated	710,820	35,154	1,770,400	5,904
# clients w/Medicaid ID populated	335,521	18,495	870,018	1
# clients w/phone number populated	667,471	44,401	1,540,723	1,912
# clients w/Chart ID populated	710,820	42,514	1,698,809	8,026

Table 9: Use of numeric fields during deduplication, ALERT IIS, WIR-Merging results, Test variables in order of testing, left to right

	ALERT IIS				WIR			
	L4F3*	Medicaid ID	Phone Number**	Chart ID ***	L4F3*	Medicaid ID	Phone Number**	Chart ID ***
Total clients^	245	235	247	240	250	1	250	250
Merged	214	207	185	201	128	0	20	138
Not Merged	30	20	52	4	122	1	230	112
Not Available	1	8	10	35	0	0	0	0
Merge Rate	87.7%	91.2%	78.7%	98.0%	51%	0%	8%	55%

^ Number did not equal 250 due to some clients matching uniquely on more than one client

(Note: the number of clients unavailable for merging increased over the tests as clients who matched on more than one variable were merged.)

* L4F3 First four letters of last name, first three letters of first name created as unique variable

** Also includes gender (where gender is equal)

*** Also included Provider Org ID (must be equal)

Table 10: Bad Address Data, MCIR-Key words for address field searches (street address line, city of residence)

Key words
Update
Unknown
Moved
No Address
Returned
Bad Address
No Info
Undeliverable
Unable
None
Unk
Migrant
Can't find
Anywhere
No such address

Table 11: Bad Address Data, MCIR-Characteristics of records with good and bad addresses, by age group

Age group	3 through 35 months				4 through 6 years				11 through 12 years				13 through 17 years			
Population size	322,846				376,331				806,851				2,173,384			
Sample size	32,285		10.0%		37,633		10.0%		80,685		10.0%		217,338		10.0%	
	Good Address		Bad Address		Good Address		Bad Address		Good Address		Bad Address		Good Address		Bad Address	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	32,170	99.6%	115	0.4%	37,392	99.4%	241	0.6%	78,559	97.4%	2,126	2.6%	208,884	96.1%	8,454	3.9%
Key words* found in street	0	0.0%	35	30.4%	0	0.0%	54	22.4%	0	0.0%	147	6.9%	0	0.0%	540	6.4%
Only numbers in street	0	0.0%	6	5.2%	0	0.0%	14	5.8%	0	0.0%	23	1.1%	0	0.0%	77	0.9%
No numbers in street	0	0.0%	9	7.8%	0	0.0%	16	6.6%	0	0.0%	87	4.1%	0	0.0%	393	4.7%
Street is null	0	0.0%	62	53.9%	0	0.0%	151	62.7%	0	0.0%	1,858	87.4%	0	0.0%	7,363	87.1%
Key words* found in city	0	0.0%	3	8.6%	0	0.0%	4	1.7%	0	0.0%	3	0.1%	0	0.0%	32	0.4%
City is null	0	0.0%	58	50.4%	0	0.0%	138	57.3%	0	0.0%	1,941	91.3%	0	0.0%	7,132	84.4%
No doses recorded	988	3.7%	13	11.3%	1,123	3.0%	80	33.2%	1,938	2.5%	797	37.5	5,165	2.5%	2,589	30.6%
One dose recorded	859	2.7%	5	4.4%	511	1.4%	8	3.3%	643	0.8%	35	1.7%	1,559	0.8%	155	1.8%
Two + doses recorded	30,323	94.3%	97	84.4%	35,758	95.6%	153	63.5%	75,978	96.7%	1,294	60.9%	202,160	96.8%	5,710	67.5%
Mean days since last dose	160	N/A	286	N/A	481	N/A	992	N/A	878	N/A	1,802	N/A	896	N/A	1,870	N/A
Median days since last dose	109	N/A	216	N/A	302	N/A	774	N/A	292	N/A	1,697	N/A	535	N/A	1,040	N/A

Table 12: Bad Address Data, ALERT IIS-Characteristics of records with good and bad addresses, by age group

Age group	3 through 35 months				4 through 6 years				11 through 12 years				13 through 17 years			
Population size	160,063				191,401				138,010				360,581			
Sample size	16,209		10.13%		18,933		9.89%		13,822		10.06%		36,345		10.08%	
	Good Address		Bad Address		Good Address		Bad Address		Good Address		Bad Address		Good Address		Bad Address	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Total	16,101	99.3%	108	0.7%	18,703	98.8%	230	1.2%	13,718	98.8%	164	1.2%	38,807	98.5%	538	1.5
Key words* found in street	0	0.0%	12	11.1%	0	0.0%	7	3.0%	0	0.0%	11	6.7%	0	0.0%	48	8.9%
Only numbers in street	0	0.0%	8	7.4%	0	0.0%	4	1.7%	0	0.0%	3	1.8%	0	0.0%	14	2.6%
No numbers in street	0	0.0%	18	16.7%	0	0.0%	29	12.6%	0	0.0%	46	28.1%	0	0.0%	167	31.0%
Key words* found in city	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
City is null	0	0.0%	61	56.5%	0	0.0%	173	75.2%	0	0.0%	86	52.4%	0	0.0%	229	42.6%
No doses recorded	1,468	9.1%	42	38.9%	2,323	12.4%	64	27.8%	1,353	9.9%	45	27.4%	3,416	9.5%	94	17.5%
One dose recorded	1,932	12.0%	8	7.4%	829	4.4%	21	9.1%	444	3.2%	17	10.4%	1,265	3.5%	64	11.9%
Two + doses recorded	12,702	78.9%	58	53.7%	15,551	83.2%	145	63.0%	11,921	86.9%	102	62.2%	31,126	86.9%	380	70.6%
Mean days since last dose	194	N/A	269	N/A	611	N/A	949	N/A	1,324	N/A	1,643	N/A	1,487	N/A	2,445	N/A
Median days since last dose	144	N/A	241	N/A	359	N/A	856	N/A	641	N/A	1,373	N/A	720	N/A	1,594	N/A

Table 13. Bad Address Data, MCIR-Flags

Age group	3 through 35 months				4 through 6 years				11 through 12 years				13 through 17 years			
Random sample size	32,285		10.0%		37,633		10.0%		80,685		10.0%		217,338		10.0%	
	Good Address		Bad Address*		Good Address		Bad Address*		Good Address		Bad Address*		Good Address		Bad Address*	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
No county affiliation	129	0.40%	65	56.52%	279	0.75%	158	65.6%	1,435	1.83%	1,333	62.7%	4,095	1.96%	4,240	50.2%
Invalid address	765	2.38%	82	71.3%	918	2.46%	181	75.1%	1,794	2.28%	2,043	96.1%	7,846	3.76%	8,096	95.8%
Jurisdiction status is active	32,077	99.7%	91	79.1%	37,080	99.2%	204	84.7%	77,141	98.2%	1,069	50.3%	204,176	97.8%	4,956	58.6%
Provider status is active	31,620	98.3%	99	86.1%	36,499	97.6%	207	85.9%	74,545	94.9%	998	46.9%	189,782	90.9%	4,516	53.4%

Figure 1: College Student Population Movement, NDIIS- Higher education vaccination requirements

State Board of Higher Education (SBHE), North Dakota University System (NDUS) Procedure – 506.1, Effective November 16, 2016

- 1) Any student enrolled at any NDUS institution must provide documentation of immunity against measles, mumps and rubella (MMR). The Chancellor shall adopt procedures implementing this policy.
 - a) Documentation of immunity under subsection 1 in SBHE Policy 506.1 means: (a) evidence of two doses of measles, mumps, and rubella (MMR) vaccine no less than 28 days apart from a licensed provider or authorized representative of a state or local health department; (b) proof of a positive serologic test for measles, mumps, and rubella; or (c) proof of date of birth prior to 1957.

- 2) Effective fall 2017, newly admitted students ages 21 and younger must provide documentation of immunity against meningococcal disease in accordance with this policy. The Chancellor shall adopt procedures implementing these requirements.
 - a) Documentation of immunity under subsection 2 in SBHE Policy 506.1 means evidence of at least one dose of meningococcal conjugate vaccine at age 16 or older.

Table 14: College Student Population Movement, NDIS-Records with selected demographic data and no reported vaccinations during freshman, term and postgraduate timeframes

	Out of State Identifier Score (N)				Row Total
Out-of-State Identifiers	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>Score of at least one</u>
Non North Dakota County	2	1	0	0	3
Non North Dakota Birth State	2	461	249	48	760
No Freshman Vaccinations	0	0	1	0	1
No Term Vaccinations	2	460	16	2	480
No Postgrad Vaccinations	2	461	234	0	697
Total Records	2	461	250	50	763

Table 15: College Student Population Movement, MIIC-Records with selected demographic data and no reported vaccinations during freshman, term and postgraduate timeframes

	Out of State Identifier Score (N)				Row Total
Out-of-State Identifiers	<u>4</u>	<u>3</u>	<u>2</u>	<u>1</u>	<u>Score of at least one</u>
Non Minnesota Address	0	0	153	223	376
Non Minnesota Birth State	--	--	--	--	--
No Freshman Vaccinations	0	0	220	219	439
No Term Vaccinations	0	0	106	10	116
No Postgrad Vaccinations	0	0	1	0	1
Total Records	0	0	221	241	462

Table 16: Population Estimation, WIR, CIR-The comparison of populations aged 1 through 19 years within IIS jurisdictions

Year	IIS Population	Census Population	Annual Migration Count	Expected IIS Population*	Compounded Migration	IIS Population	Census Population	Annual Migration Count	Expected IIS Population*	Compounded Migration
	Wisconsin					New York City**				
2014	1571898	1392127	29587	1542311	296640	-	-	-	-	-
2013	1569276	1399293	27649	1541627	267053	-	-	-	-	-
2012	1565598	1425455	25774	1539824	239404	-	-	-	-	-
2011	1559887	1426674	25988	1533899	213630	2763405	1876831	14944	2748461	60351
2010	1556800	1435619	29754	1527046	187642	2725359	1887720	14358	2711001	45407
2009	1550529	1407977	31420	1519109	157888	2652228	1987377	14508	2637720	31049
2008	1510119	1408225	33097	1477022	126468	2549117	2030536	6345	2549088	16541
2007	1490730	1416764	32451	1458279	93371	2369665	2007950	6741	2362924	10196
2006	1459453	1418269	30087	1429366	60920	2220906	2047703	1768	2219138	3455
2005	1347582	1367308	30833	1316749	30833	2000122	1978770	1687	1998435	1687

*Expected IIS Population is the IIS population with migrants removed

**Migration estimates for New York City were not available 2012-2014

Table 17: Difference between the IIS and Census Populations in the 1-19 year old age groups attributable to out-migration

Year	Difference between IIS and Census Population	% Difference Attributable to Outmigration***	Difference between IIS and Census Population	% Difference Attributable to Outmigration
	WIR		CIR	
2014*	179,771	16.46%	-	-
2013*	169,983	16.27%	-	-
2012*	140,143	18.39%	-	-
2011	133,213	19.51%	886,574	1.69%
2010	121,181	24.55%	837,639	1.71%
2009	142,552	22.04%	664,851	2.18%
2008	101,894	32.48%	518,581	1.22%
2007	73,966	43.87%	361,715	1.86%
2006	41,184	73.06%	173,203	1.02%
2005	-19,726	N/A**	21,352	7.90%

Abbreviations: N/A, Not Applicable

*Migration Estimates for New York City were not available for 2012-2014

**Difference Attributable to Outmigration could not be calculated since the IIS population was below the census estimate for the year

***Annual migration count divided by Difference between IIS and Census population