Modular Program Report

The following report(s) provides findings from an FDA-initiated query using its Mini-Sentinel pilot. While Mini-Sentinel queries may be undertaken to assess potential medical product safety risks, they may also be initiated for various other reasons. Some examples include determining a rate or count of an identified health outcome of interest, examining medical product use, exploring the feasibility of future, more detailed analyses within Mini-Sentinel, and seeking to better understand the capabilities of the Mini-Sentinel pilot.

Data obtained through Mini-Sentinel are intended to complement other types of evidence such as preclinical studies, clinical trials, postmarket studies, and adverse event reports, all of which are used by FDA to inform regulatory decisions regarding medical product safety. The information contained in this report is provided as part of FDA's commitment to place knowledge acquired from the Mini-Sentinel pilot in the public domain as soon as possible. Any public health actions taken by FDA regarding products involved in Mini-Sentinel queries will continue to be communicated through existing channels.

FDA wants to emphasize that the fact that FDA has initiated a query involving a medical product and is reporting findings related to that query does not mean that FDA is suggesting health care practitioners should change their prescribing practices for the medical product or that patients taking the medical product should stop using it. Patients who have questions about the use of an identified medical product should contact their health care practitioners.

The following report contains a description of the request, request specifications, and results from the modular program run(s).

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Overview	
Request Description	FDA requested use of Modular Program #6, version 6.0, to investigate new use of intravenous immunoglobulin (IVIg) (see Appendix A) and subsequent diagnosis of acute renal failure (ARF) and transfusion procedures (see Appendix B) among patients with and without a new hemolysis diagnosis (see Appendix C) after exposure to IVIg within 3, 14, and 21 days of index IVIg dispensing. The query was run against the Mini-Sentinel Distributed Databse (MSDD) for the time period of January 1, 2006 through December 31, 2012. This request was distributed to 18 Mini-Sentinel Data Partners on October 25, 2013. Results provide counts of prevalent users, lookup periods, total lookup period duration (days), number of users with a new event, eligible members, and member-years.
Request ID	msy5_mpr06_v1 Report 1 of 1
Specifications	Program parameter inputs and scenarios
Glossary	List of terms found in this report and their definitions
Table 1	Table of Summary of New IVIg Use and Acute Renal Failure and Transfusion Events in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status and Risk Window
Table 2	Table of Summary of New IVIg Use and Acute Renal Failure and Transfusion Events in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status, Risk Window, and Age Group
Table 3	Table of Summary of New IVIg Use and Acute Renal Failure and Transfusion Events in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status, Risk Window, and Sex
Table 4	Table of Summary of New IVIg Use and Acute Renal Failure and Transfusion Events in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status, Risk Window, and Year
Appendix A	List of Intravenous Immunoglobulin (IVIg) Codes
Appendix B	List of Acute Renal Failure (ARF) and Transfusion Codes
Appendix C	List of Hemolysis Codes
Notes:	Please contact the Mini-Sentinel Operations Center (MSOC_Requests@harvardpilgrim.org) for questions and to provide comments/suggestions for future enhancements to this document.

Modular Program Specifications MSY5_MPR06_V1

Modular Program #6, version 6.0, was used to investigate use of IVIg (see Appendix A) and subsequent diagnosis of acute renal failure (ARF) and transfusion procedure (see Appendix B) among patients with and without a new hemolysis diagnosis (see Appendix C) after index exposure to IVIg. The query period was from January 1, 2006 to December 31, 2012, and the enrollment gap was set at 45 days. Age groups were split as follows: 0-17, 18-44, 45-64, 65+. The program considers exposure, inclusion/ exclusion criteria, and outcome events in the outpatient, emergency department, and inpatient care setting only. In total, 12 unique scenarios were examined in this request with differing exposures of interest, lookup period duration, and exclusion criteria. See below for a description of each of these scenarios.

Coverage Requirement	Drug and Medical Coverage
Query Period	January 1, 2006 to December 31, 2012
Enrollment Gap	45 Days
Enrollment Days	90
Age Stratifications	0-17, 18 - 44, 45-64, 65+
Minimum Lookup Period	0 Days

	Exposure Criteria (Event file in MP6)						Exclusion/Inclusion Criteria						Outcome (Post-event treatment file in MP6)					
Scenario	**Incident exposure**	**Incident w/ respect to:**	**Incidence Type**	**Washout Period (days)**	**Lookup Period Duration**	**Exposure Care Setting**	**Condition**	**Exclude/ Include**	**Lookback Period Start**	**Lookback Period End**	**Care Setting**	**Principal Dx**	**Event/ Outcome**	**Incident w/ respect to:**	**Incidence Type**	**Washout Period (days)**	**Care Setting**	**Principal Dx**
1	IVIg	IVIg	MULT	21	3	IP, ED, OA, AV	Hemolysis	Exclude	-90	-1	IP, ED, OA, AV	Any	ARF	ARF	MULT	90	IP, ED, OA, AV	Any
							Hemolysis	Include	0	2	IP, ED, OA, AV	Any						
2	IVIg	IVIg	MULT	21	14	IP, ED, OA, AV	Hemolysis	Exclude	-90	-1	IP, ED, OA, AV	Any	ARF	ARF	MULT	90	IP, ED, OA, AV	Any
							Hemolysis	Include	0	13	IP, ED, OA, AV	Any						
3	IVIg	IVIg	MULT	21	21	IP, ED, OA, AV	Hemolysis	Exclude	-90	-1	IP, ED, OA, AV	Any	ARF	ARF	MULT	90	IP, ED, OA, AV	Any
							Hemolysis	Include	0	20	IP, ED, OA, AV	Any						
4	IVIg	IVIg	MULT	21	3	IP, ED, OA, AV	Hemolysis	Exclude	-90	2	IP, ED, OA, AV	Any	ARF	ARF	MULT	90	IP, ED, OA, AV	Any
5	IVIg	IVIg	MULT	21	14	IP, ED, OA, AV	Hemolysis	Exclude	-90	13	IP, ED, OA, AV	Any	ARF	ARF	MULT	90	IP, ED, OA, AV	Any
6	IVIg	IVIg	MULT	21	21	IP, ED, OA, AV	Hemolysis	Exclude	-90	20	IP, ED, OA, AV	Any	ARF	ARF	MULT	90	IP, ED, OA, AV	Any
7	IVIg	IVIg	MULT	21	3	IP, ED, OA, AV	Hemolysis	Exclude	-90	-1	IP, ED, OA, AV	Any	Transfusion	Transfusion	MULT	90	IP, ED, OA, AV	Any
							Hemolysis	Include	0	2	IP, ED, OA, AV	Any						

	Exposure Criteria (Event file in MP6)						Exclusion/Inclusion Criteria						Outcome (Post-event treatment file in MP6)					
Scenario	Incident exposure	Incident w/ respect to:	Incidence Type	Washout Period (days)	Lookup Period Duration	Exposure Care Setting	Condition	Exclude/ Include	Lookback Period Start	Lookback Period End	Care Setting	Principal Dx	Event/ Outcome	Incident w/ respect to:	Incidence Type	Washout Period (days)	Care Setting	Principal Dx
8	IVIg	IVIg	MULT	21	14	IP, ED, OA, AV	Hemolysis	Exclude	-90	-1	IP, ED, OA, AV	Any	Transfusion	Transfusion	MULT	90	IP, ED, OA, AV	Any
							Hemolysis	Include	0	13	IP, ED, OA, AV	Any						
9	IVIg	IVIg	MULT	21	21	IP, ED, OA, AV	Hemolysis	Exclude	-90	-1	IP, ED, OA, AV	Any	Transfusion	Transfusion	MULT	90	IP, ED, OA, AV	Any
							Hemolysis	Include	0	20	IP, ED, OA, AV	Any						
10	IVIg	IVIg	MULT	21	3	IP, ED, OA, AV	Hemolysis	Exclude	-90	2	IP, ED, OA, AV	Any	Transfusion	Transfusion	MULT	90	IP, ED, OA, AV	Any
11	IVIg	IVIg	MULT	21	14	IP, ED, OA, AV	Hemolysis	Exclude	-90	13	IP, ED, OA, AV	Any	Transfusion	Transfusion	MULT	90	IP, ED, OA, AV	Any
12	IVIg	IVIg	MULT	21	21	IP, ED, OA, AV	Hemolysis	Exclude	-90	20	IP, ED, OA, AV	Any	Transfusion	Transfusion	MULT	90	IP, ED, OA, AV	Any

Glossary of Terms in Modular Program 6*

Care Setting - type of medical encounter or facility where the exposure, event, or condition code was recorded. Possible care settings include: Inpatient Hospital Stay (IP), Non-Acute Institutional Stay (IS), Emergency Department (ED), Ambulatory Visit (AV), and Other Ambulatory Visit (OA).

Eligible Members - Number of members eligible for an incident exposure/lookup period (defined by the exposure and event washout periods) with drug and medical coverage during the query period.

Enrollment Gap - number of days allowed between two consecutive enrollment periods without breaking a "continuously enrolled" sequence.

Incidence Type (drug/exposure)- *Minimum Incidence type* will consider the first exposure/lookup period in the query period as long as it is the first exposure/lookup period in the user's entire available history. *Single* and *Multiple Incidence types* will use the washout period to establish incidence; however, *Single* will only consider the first exposure/lookup period whereas *Multiple* will consider all qualifying exposures/lookup periods.

Incidence Type (event/outcome)- *Minimum Incidence type* considers the first event in a valid episode as long as it is the first event in the user's entire available history. *Multiple Incidence type* uses the washout period to establish incidence and considers all qualifying incident exposures/lookup periods.

Inclusion/Exclusion Indicator - indicates whether condition(s) of interest are used for inclusion or exclusion criteria. A value of 1 instructs the program that members must have the condition of interest (inclusion criteria); a value of 0 instructs the program that members must not have the condition of interest (exclusion criteria).

Lookup Period - fixed period of time following an incident exposure that the MP6 program searches for events of interest.

Lookback Period Start and End - range of days relative to index that the program looks for inclusion/exclusion conditions of interest. For example, if the Inclusion/Exclusion Indicator =1, Lookback Period Start = -183 and Lookback Period End = 0, the cohort will only include members with the condition of interest present in the 183 days prior to and including the index date (the index date is day 0).

Member-Days - sum of all days a member is eligible for an incident exposure/lookup period (i.e., days that the member meets all inclusion criteria such a incidence, pre-existing condition, and enrollment requirements).

Minimum Lookup Period Duration - minimum number of enrollment days required after an incident exposure/lookup period start. For example, if the minimum duration =10, a member must have 10 or more days of continuous enrollment in drug and medical benefit coverage following the exposure/lookup period start in order for the lookup period to be included in output metrics.

New Users - number of members with incident exposure/lookup period during the query period. A user may only be counted once in a query period.

Principal Diagnosis - diagnosis or condition established to be chiefly responsible for admission of the patient to the hospital. YES will only consider diagnoses flagged as Principal.

Query Period - period in which the modular program evaluates exposures of interest.

Time-to-Event (tte)- number of days between the start of an event lookup period (index date) and the first treatment episode/procedure/diagnosis claim.

Washout Period (drug/exposure) -** number of days a user is required to have no evidence of prior exposure (drug dispensing/procedure) and continuous drug and medical coverage prior to an incident exposure/lookup period.

Washout Period (event/outcome) -** number of days a user is required to have no evidence of a prior event (procedure/diagnosis) and continuous drug and medical coverage prior to an incident exposure/lookup period.

*all terms may not be used in this report

Table 1. Summary of New IVIg use and Acute Renal Failure and Transfusion Events in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status and Risk Window

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Acute Renal Failure with Hemolysis								
3 day risk window	331	353	1,058	35	48,490	14,581	6.83	10.57
14 day risk window	428	472	6,580	54	49,060	17,985	8.72	12.62
21 day risk window	484	544	11,326	58	49,390	19,810	9.80	11.98
Acute Renal Failure, no Hemolysis								
3 day risk window	48,565	273,743	821,229	861	94,619,410	220,211,232	0.51	1.77
14 day risk window	48,132	271,424	3,799,936	1,203	94,373,349	217,736,139	0.51	2.50
21 day risk window	47,817	269,742	5,664,582	1,387	94,222,266	216,164,914	0.51	2.90
Transfusions with Hemolysis								
3 day risk window	309	332	995	13	48,873	14,443	6.32	4.21
14 day risk window	394	436	6,079	28	49,371	17,797	7.98	7.11
21 day risk window	446	504	10,505	32	49,640	19,605	8.98	7.17
Transfusions, no Hemolysis								
3 day risk window	48,114	271,943	815,829	541	94,624,577	220,456,433	0.51	1.12
14 day risk window	47,683	269,660	3,775,240	860	94,378,874	217,974,228	0.51	1.80
21 day risk window	47,365	267,985	5,627,685	1,021	94,228,111	216,398,964	0.50	2.16

* Eligible members are limited by hemolysis status.

Table 2. Summary of New IVIg use and Acute Renal Failure and Transfusion Event in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status, Risk Window, and Age Group

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Acute Renal Failure with Hemolysis								
3 day risk window								
0-17 years	69	74	222	5	4,094	1,139	16.85	7.25
18-44 years	80	80	239	10	12,994	2,357	6.16	12.50
45-64 years	91	95	285	11	16,551	4,742	5.50	12.09
65+ years	92	104	312	9	15,420	6,343	5.97	9.78
14 day risk window								
0-17 years	83	91	1,263	6	4,116	1,334	20.17	7.23
18-44 years	105	106	1,467	13	13,101	3,079	8.01	12.38
45-64 years	127	135	1,890	18	16,750	5,884	7.58	14.17
65+ years	117	140	1,960	17	15,716	7,688	7.44	14.53
21 day risk window								
0-17 years	90	102	2,111	6	4,134	1,452	21.77	6.67
18-44 years	116	119	2,455	14	13,157	3,461	8.82	12.07
45-64 years	146	161	3,373	19	16,860	6,493	8.66	13.01
65+ years	136	162	3,387	19	15,886	8,404	8.56	13.97
Acute Renal Failure, no Hemolysis								
3 day risk window								
0-17 years	9,305	34,457	103,371	68	23,394,754	50,525,138	0.40	0.73
18-44 years	13,200	61,710	185,130	158	43,861,791	82,356,970	0.30	1.20
45-64 years	18,393	119,619	358,857	357	27,043,579	64,400,164	0.68	1.94
65+ years	8,949	57,957	173,871	278	8,180,475	22,928,960	1.09	3.11
14 day risk window								
0-17 years	9,201	34,156	478,184	78	23,323,914	49,959,155	0.39	0.85
18-44 years	13,055	61,049	854,686	200	43,702,825	81,234,921	0.30	1.53
45-64 years	18,256	118,622	1,660,708	512	26,967,469	63,763,087	0.68	2.80
65+ years	8,891	57,597	806,358	414	8,138,152	22,778,976	1.09	4.66
21 day risk window								
0-17 years	9,132	33,910	712,110	84	23,281,867	49,599,658	0.39	0.92
18-44 years	12,962	60,620	1,273,020	225	43,598,102	80,523,182	0.30	1.74
45-64 years	18,152	117,901	2,475,921	604	26,922,412	63,358,219	0.67	3.33
65+ years	8,837	57,311	1,203,531	477	8,113,786	22,683,855	1.09	5.40

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Transfusions with Hemolysis								
3 day risk window								
0-17 years	63	68	204	0	4,015	1,152	15.69	0.00
18-44 years	74	74	221	5	12,997	2,329	5.69	6.76
45-64 years	93	97	291	6	16,672	4,730	5.58	6.45
65+ years	80	93	279	2	15,757	6,232	5.08	2.50
14 day risk window								
0-17 years	76	84	1,168	3	4,047	1,349	18.78	3.95
18-44 years	97	98	1,355	10	13,102	3,040	7.40	10.31
45-64 years	126	133	1,862	10	16,882	5,868	7.46	7.94
65+ years	99	121	1,694	5	15,962	7,540	6.20	5.05
21 day risk window								
0-17 years	82	94	1,953	5	4,063	1,460	20.18	6.10
18-44 years	108	111	2,293	10	13,157	3,420	8.21	9.26
45-64 years	143	157	3,289	12	16,988	6,479	8.42	8.39
65+ years	117	142	2,970	5	16,078	8,246	7.28	4.27
Transfusions, no Hemolysis								
3 day risk window								
0-17 years	9,129	33,659	100,977	129	23,394,534	50,523,212	0.39	1.41
18-44 years	13,163	61,510	184,530	92	43,862,247	82,372,788	0.30	0.70
45-64 years	18,252	119,226	357,678	177	27,045,634	64,476,721	0.67	0.97
65+ years	8,857	57,548	172,644	144	8,184,351	23,083,712	1.08	1.63
14 day risk window								
0-17 years	9,024	33,366	467,124	174	23,323,693	49,957,242	0.39	1.93
18-44 years	13,015	60,850	851,900	153	43,703,343	81,250,417	0.30	1.18
45-64 years	18,118	118,234	1,655,276	302	26,969,626	63,838,036	0.67	1.67
65+ years	8,801	57,210	800,940	232	8,142,126	22,928,533	1.08	2.64
21 day risk window								
0-17 years	8,959	33,129	695,709	189	23,281,656	49,597,756	0.38	2.11
18-44 years	12,918	60,420	1,268,820	185	43,598,667	80,538,483	0.30	1.43
45-64 years	18,016	117,514	2,467,794	352	26,924,676	63,432,240	0.67	1.95
65+ years	8,741	56,922	1,195,362	298	8,117,860	22,830,486	1.08	3.41

* Eligible members are limited by hemolysis status.

Table 3. Summary of New IVIg use and Acute Renal Failure and Transfusion Event in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status, Risk Window, and Sex

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Acute Renal Failure with Hemolysis								
3 day risk window								
Female	176	185	554	24	28,740	8,427	6.12	13.64
Male	155	168	504	11	19,747	6,152	7.85	7.10
Unknown	0	0	0	0	3	2	0.00	---
14 day risk window								
Female	223	239	3,326	31	29,057	10,437	7.67	13.90
Male	205	233	3,254	23	20,000	7,546	10.25	11.22
Unknown	0	0	0	0	3	2	0.00	---
21 day risk window								
Female	249	269	5,600	34	29,242	11,506	8.52	13.65
Male	235	275	5,726	24	20,145	8,302	11.67	10.21
Unknown	0	0	0	0	3	2	0.00	---
Acute Renal Failure, no Hemolysis								
3 day risk window								
Female	26,598	154,939	464,817	359	48,045,953	113,241,497	0.55	1.35
Male	21,966	118,802	356,406	502	46,568,242	106,960,589	0.47	2.29
Unknown	1	2	6	0	5,215	9,145	0.19	0.00
14 day risk window								
Female	26,349	153,628	2,150,792	490	47,926,749	111,986,329	0.55	1.86
Male	21,782	117,794	1,649,116	713	46,441,415	105,740,818	0.47	3.27
Unknown	1	2	28	0	5,185	8,992	0.19	0.00
21 day risk window								
Female	26,184	152,691	3,206,511	571	47,854,226	111,189,418	0.55	2.18
Male	21,632	117,049	2,458,029	816	46,362,870	104,966,601	0.47	3.77
Unknown	1	2	42	0	5,170	8,895	0.19	0.00

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Transfusions with Hemolysis								
3 day risk window								
Female	162	170	509	6	28,874	8,331	5.61	3.70
Male	147	162	486	7	19,996	6,111	7.35	4.76
Unknown	0	0	0	0	3	2	0.00	---
14 day risk window								
Female	203	216	3,004	16	29,161	10,311	6.96	7.88
Male	191	220	3,075	12	20,207	7,484	9.45	6.28
Unknown	0	0	0	0	3	2	0.00	---
21 day risk window								
Female	226	243	5,057	18	29,307	11,366	7.71	7.96
Male	220	261	5,448	14	20,330	8,237	10.82	6.36
Unknown	0	0	0	0	3	2	0.00	---
Transfusions, no Hemolysis								
3 day risk window								
Female	26,363	154,071	462,213	257	48,047,982	113,344,442	0.55	0.97
Male	21,750	117,870	353,610	284	46,571,380	107,102,842	0.47	1.31
Unknown	1	2	6	0	5,215	9,149	0.19	0.00
14 day risk window								
Female	26,117	152,777	2,138,878	407	47,928,858	112,086,176	0.54	1.56
Male	21,565	116,881	1,636,334	453	46,444,831	105,879,056	0.46	2.10
Unknown	1	2	28	0	5,185	8,996	0.19	0.00
21 day risk window								
Female	25,951	151,846	3,188,766	482	47,856,471	111,287,519	0.54	1.86
Male	21,413	116,137	2,438,877	539	46,366,470	105,102,546	0.46	2.52
Unknown	1	2	42	0	5,170	8,899	0.19	0.00

* Eligible members are limited by hemolysis status.

Table 4. Summary of New IVIg use and Acute Renal Failure and Transfusion Event in the MSDD between January 1, 2006 and December 31, 2012, by Hemolysis Status, Risk Window, and Year

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Acute Renal Failure with Hemolysis								
3 day risk window								
2006	18	18	54	0	4,312	467	4.17	0.00
2007	31	31	93	3	5,677	1,213	5.46	9.68
2008	76	76	228	3	11,325	2,061	6.71	3.95
2009	60	63	189	7	12,399	2,878	4.84	11.67
2010	52	53	159	2	11,529	3,011	4.51	3.85
2011	52	53	159	7	10,742	2,853	4.84	13.46
2012	58	59	176	13	9,713	2,098	5.97	22.41
14 day risk window								
2006	28	28	392	2	4,453	691	6.29	7.14
2007	42	42	588	3	5,851	1,493	7.18	7.14
2008	90	91	1,266	7	11,624	2,616	7.74	7.78
2009	79	83	1,162	12	12,709	3,509	6.22	15.19
2010	74	75	1,042	5	11,925	3,625	6.21	6.76
2011	73	76	1,064	10	11,038	3,432	6.61	13.70
2012	76	77	1,066	15	9,927	2,620	7.66	19.74
21 day risk window								
2006	31	31	651	2	4,533	803	6.84	6.45
2007	47	47	987	3	5,963	1,647	7.88	6.38
2008	102	105	2,160	7	11,850	2,925	8.61	6.86
2009	91	95	1,992	13	12,886	3,841	7.06	14.29
2010	85	87	1,807	7	12,114	3,949	7.02	8.24
2011	86	89	1,865	11	11,208	3,740	7.67	12.79
2012	87	90	1,864	15	10,062	2,906	8.65	17.24
Acute Renal Failure, no Hemolysis								
3 day risk window								
2006	5,659	17,081	51,243	26	21,711,130	15,534,101	0.26	0.46
2007	6,892	22,951	68,853	58	25,285,671	19,073,794	0.27	0.84
2008	12,650	44,525	133,575	115	49,581,002	35,426,954	0.26	0.91
2009	13,011	50,576	151,728	138	49,670,007	39,433,673	0.26	1.06
2010	12,297	46,201	138,603	180	47,851,126	38,044,327	0.26	1.46
2011	12,262	47,368	142,104	180	46,714,764	37,374,658	0.26	1.47
2012	11,406	45,041	135,123	177	44,512,313	35,323,724	0.26	1.55

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Acute Renal Failure, no Hemolysis (continued)								
14 day risk window								
2006	5,629	16,982	237,748	45	21,671,485	15,412,326	0.26	0.80
2007	6,854	22,824	319,536	81	25,231,531	18,921,747	0.27	1.18
2008	12,556	44,221	619,094	154	49,478,734	35,076,934	0.25	1.23
2009	12,911	50,210	702,940	180	49,569,013	39,036,751	0.26	1.39
2010	12,204	45,845	641,830	269	47,776,775	37,682,218	0.26	2.20
2011	12,157	46,946	657,244	263	46,649,089	37,009,943	0.26	2.16
2012	11,282	44,396	621,544	247	44,415,208	34,596,218	0.25	2.19
21 day risk window								
2006	5,612	16,929	355,509	56	21,648,809	15,335,044	0.26	1.00
2007	6,833	22,737	477,477	93	25,202,432	18,825,228	0.27	1.36
2008	12,492	43,994	923,874	186	49,424,903	34,854,815	0.25	1.49
2009	12,835	49,903	1,047,963	226	49,521,999	38,784,840	0.26	1.76
2010	12,142	45,631	958,251	299	47,734,090	37,452,283	0.25	2.46
2011	12,090	46,671	980,091	296	46,596,360	36,778,367	0.26	2.45
2012	11,184	43,877	921,417	295	44,357,607	34,134,338	0.25	2.64
Transfusions with Hemolysis								
3 day risk window								
2006	15	15	45	0	4,270	460	3.51	0.00
2007	30	30	90	1	5,634	1,192	5.32	3.33
2008	69	69	207	3	11,306	2,030	6.10	4.35
2009	52	55	165	2	12,423	2,850	4.19	3.85
2010	49	51	153	1	11,557	2,985	4.24	2.04
2011	50	51	153	2	10,878	2,838	4.60	4.00
2012	59	61	182	4	9,860	2,088	5.98	6.78
14 day risk window								
2006	24	24	336	1	4,426	678	5.42	4.17
2007	39	39	546	4	5,812	1,464	6.71	10.26
2008	82	83	1,157	5	11,600	2,576	7.07	6.10
2009	67	71	994	5	12,729	3,472	5.26	7.46
2010	68	70	972	1	11,952	3,591	5.69	1.47
2011	69	72	1,008	5	11,141	3,414	6.19	7.25
2012	75	77	1,066	7	10,052	2,602	7.46	9.33

	New Users	Lookup Periods	Lookup Period Duration	New Users with a New Event	Eligible Members*	Member-Years	Users/ 1000 Eligible Members	% New Users with a New Event
Transfusions with Hemolysis (continued)								
21 day risk window								
2006	28	28	588	1	4,506	789	6.21	3.57
2007	44	44	924	4	5,925	1,616	7.43	9.09
2008	92	95	1,966	7	11,819	2,880	7.78	7.61
2009	79	83	1,740	5	12,904	3,801	6.12	6.33
2010	78	81	1,684	1	12,124	3,911	6.43	1.28
2011	80	83	1,739	6	11,310	3,720	7.07	7.50
2012	86	90	1,864	8	10,160	2,888	8.46	9.30
Transfusions, no Hemolysis								
3 day risk window								
2006	5,587	16,883	50,649	35	21,711,829	15,542,152	0.26	0.63
2007	6,814	22,662	67,986	52	25,287,354	19,089,433	0.27	0.76
2008	12,538	44,164	132,492	120	49,584,182	35,458,477	0.25	0.96
2009	12,910	50,193	150,579	102	49,673,651	39,474,027	0.26	0.79
2010	12,212	46,062	138,186	95	47,855,201	38,089,491	0.26	0.78
2011	12,158	47,123	141,369	93	46,719,175	37,424,756	0.26	0.76
2012	11,320	44,856	134,568	76	44,517,452	35,378,098	0.25	0.67
14 day risk window								
2006	5,556	16,787	235,018	63	21,672,224	15,420,112	0.26	1.13
2007	6,778	22,539	315,546	71	25,233,243	18,936,947	0.27	1.05
2008	12,444	43,866	614,124	175	49,482,063	35,107,540	0.25	1.41
2009	12,812	49,834	697,676	174	49,572,841	39,075,944	0.26	1.36
2010	12,118	45,707	639,898	154	47,781,086	37,726,124	0.25	1.27
2011	12,053	46,707	653,898	147	46,653,734	37,058,727	0.26	1.22
2012	11,200	44,220	619,080	137	44,420,682	34,648,834	0.25	1.22
21 day risk window								
2006	5,539	16,734	351,414	79	21,649,550	15,342,687	0.26	1.43
2007	6,757	22,453	471,513	91	25,204,198	18,840,183	0.27	1.35
2008	12,383	43,642	916,482	203	49,428,366	34,884,907	0.25	1.64
2009	12,733	49,531	1,040,151	203	49,525,988	38,823,380	0.26	1.59
2010	12,054	45,492	955,332	181	47,738,568	37,495,477	0.25	1.50
2011	11,986	46,431	975,051	178	46,601,183	36,826,403	0.26	1.49
2012	11,098	43,702	917,742	169	44,363,365	34,185,928	0.25	1.52

* Eligible members are limited by hemolysis status.

Appendix A. Intraveneous Immunoglobulin (IVIg) Codes

Description	Code	Code Type
Gammaplex	J1557, C9270	HCPCS[1]
Privigen	J1459, Q4097	HCPCS
Gamunex	J1561, Q4092	HCPCS
Octagam	J1568, Q4087	HCPCS
Gammagard Liquid	J1569, Q4088	HCPCS
Flebogamma	J1572, Q4091	HCPCS
Lyophilized product IV	J1566, Q9941, Q9942	HCPCS
Non-lyophilized intramuscular route	90281, J1460, J1470, J1480, J1490, J1500, J1510, J1520, J1530, J1540, J1550, J1560, P9014	CPT[2] and HCPCS
Non-lyophilized unspecified route	90399, 99.14	CPT and ICD-9[3] Procedure
Other IVIg, brand not specified	J1563, J1564, J1567, J1599, Q9943, Q9944, S9545, 90283	HCPCS

[1]Healthcare Common Procedure Coding System

[2] Current Procedural Terminology

[3]International Statistical Classification of Diseases, Ninth Revision

Appendix B. Acute Rebnal Failure (ARF) and Transfusion Codes

ARF

Description	Code	Code Type
Acute kidney failure (includes only the following: 584.5-584.9)	584	ICD-9 Diagnosis
Acute kidney failure with lesion of tubular necrosis	584.5	ICD-9 Diagnosis
Acute kidney failure with lesion of renal cortical necrosis	584.6	ICD-9 Diagnosis
Acute kidney failure with lesion of renal medullary (papillary) necrosis	584.7	ICD-9 Diagnosis
Acute kidney failure with other specified pathological lesion in kidney	584.8	ICD-9 Diagnosis
Acute kidney failure, unspecified	584.9	ICD-9 Diagnosis

Transfusions

Description	Code	Code Type
transfusion, blood without reported diagnosis	V58.2	ICD-9 Diagnosis
Blood transfusion	36430	CPT
RBC's	P9021	HCPCS
Washed RBCs	P9022	HCPCS
RBC irradiated	P9038	HCPCS
RBC deglycerolized	P9039	HCPCS
RBC leukocyte reduced	P9016	HCPCS
RBS leukoreduced irradiated	P9040	HCPCS
RBC,frz/deg/l/r, irrad	P9057	HCPCS
RBC, l/r, cmv-neg, irrad	P9058	HCPCS
whole blood _or_ rbc l/r, CMV-neg	P9051	HCPCS
whole blood or rbc l/r, frozen, degly, washed	P9054	HCPCS

Appendix C. Hemolysis Codes

Description	Code	Code Type
Acquired hemolytic anemias	283*	ICD-9 Diagnosis
ABO incompatibility reaction	999.6	ICD-9 Diagnosis
Rh incompatibility reaction	999.7	ICD-9 Diagnosis
Hemolytic transfusion reaction, incompatibility unspecified	999.83	ICD-9 Diagnosis
Acute hemolytic transfusion reaction, incompatibility unspecified	999.84	ICD-9 Diagnosis
Delayed hemolytic transfusion reaction, incompatibility unspecified	999.85	ICD-9 Diagnosis