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The following report provides findings from an FDA-initiated query using Sentinel. While 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 Sentinel, and seeking to better understand Sentinel capabilities.

Data obtained through Sentinel are intended to complement other types of evidence such as preclinical studies, clinical trials, post market 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 Sentinel in the public domain as soon as possible. Any public health actions taken by FDA regarding products involved in 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 for Request: cder_mpl1r_wp132

Request ID: cder_mpl1r_wp132_nsdv_v01

Report Description: In this report we estimated the prevalence of penicillin allergy testing in the Sentinel Distributed Database (SDD).

Sentinel Routine Querying Module: Cohort Identification and Descriptive Analysis (CIDA) module, version 7.0.5

Data Source: We distributed this request to 17 Data Partners on February 1, 2019. The study period included data from January 1, 2008 to August 31, 2018. See Appendix A for a list of dates of available data for each Data Partner.

Study Design: We designed this request to estimate the prevalence of penicillin allergy testing. Results were stratified by calendar year, sex, age group, age group by calendar year, and sex by age group by calendar year.

Event of Interest: We defined the event of interest as penicillin allergy testing using a combination of penicillin allergy status and penicillin allergy testing codes. The date of the penicillin allergy status diagnosis code served as the event index date, and individuals were allowed to have multiple index dates during the query period. To be a valid event combination, a procedure code for penicillin allergy testing must have occurred A) on the same day or B) within +/- 2 days of the diagnosis code. See Appendix B for a list of Current Procedural Terminology, Fourth Edition (CPT-4) procedure codes used to define penicillin allergy testing and Appendix C for a list of International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) and International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) diagnosis codes used to define penicillin allergy status.

Sensitivity Analysis: We conducted a sensitivity analysis for the event of interest defined as occurrence of procedure codes for penicillin allergy testing. Members were required to have a diagnosis of penicillin allergy status in their enrollment history up until the date of penicillin allergy testing. See Appendix B for a list of CPT-4 procedure codes used to define exposures. See Appendix C for a list of ICD-9-CM and ICD-10-CM diagnosis codes used to define penicillin allergy status inclusion criteria.

Cohort Eligibility Criteria: We required members in the cohort to be enrolled in health plans with at least medical coverage on the event index date. Gaps in coverage of up to 45 days were allowed. The following age groups were included in the cohort: 0-16, 17+ years of age.

Please see Appendix D for specifications for parameters used to define the analyses in this request

Limitations: Algorithms used to define exposures and inclusion criteria may be imperfect; thus, it is possible that there may be misclassification. Therefore, data should be interpreted with this limitation in mind.

Notes: Please contact the Sentinel Operations Center (info@sentinelssystem.org) for questions and to provide comments/suggestions for future enhancements to this document.

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**Glossary of Terms for Analyses Using
Cohort Identification and Descriptive Analysis (CIDA) Tool***

Amount Supplied - number of units (pills, tablets, vials) dispensed. Net amount per NDC per dispensing.

Blackout Period - number of days at the beginning of a treatment episode that events are to be ignored. If an event occurs during the blackout period, the episode is excluded.

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). For laboratory results, possible care settings include: Emergency Department (E), Home (H), Inpatient (I), Outpatient (O), or Unknown or Missing (U). The Care Setting, along with the Principal Diagnosis Indicator (PDX), forms the Care Setting/PDX parameter.

Ambulatory Visit (AV) - includes visits at outpatient clinics, same-day surgeries, urgent care visits, and other same-day ambulatory hospital encounters, but excludes emergency department encounters.

Emergency Department (ED) - includes ED encounters that become inpatient stays (in which case inpatient stays would be a separate encounter). Excludes urgent care visits.

Inpatient Hospital Stay (IP) - includes all inpatient stays, same-day hospital discharges, hospital transfers, and acute hospital care where the discharge is after the admission date.

Non-Acute Institutional Stay (IS) - includes hospice, skilled nursing facility (SNF), rehab center, nursing home, residential, overnight non-hospital dialysis and other non-hospital stays.

Other Ambulatory Visit (OA) - includes other non overnight AV encounters such as hospice visits, home health visits, skilled nursing facility visits, other non-hospital visits, as well as telemedicine, telephone and email consultations.

Charlson/Elixhauser Combined Comorbidity Score - calculated based on comorbidities observed during a requester-defined window around the exposure episode start date (e.g., in the 183 days prior to index).

Cohort Definition (drug/exposure) - indicates how the cohort will be defined: 01: Cohort includes only the first valid treatment episode during the query period; 02: Cohort includes all valid treatment episodes during the query period; 03: Cohort includes all valid treatment episodes during the query period until an event occurs.

Computed Start Marketing Date - represents the first observed dispensing date among all valid users within a GROUP (scenario) within each Data Partner site.

Days Supplied - number of days supplied for all dispensings in qualifying treatment episodes.

Eligible Members - number of members eligible for an incident treatment episode (defined by the drug/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.

Episodes - treatment episodes; length of episode is determined by days supplied in one dispensing or consecutive dispensings bridged by the episode gap.

Episode Gap - number of days allowed between two (or more) consecutive exposures (dispensings/procedures) to be considered the same treatment episode.

Event Deduplication - specifies how events are counted by the Modular Program (MP) algorithm: 0: Counts all occurrences of a health outcome of interest (HOI) during an exposure episode; 1: de-duplicates occurrences of the same HOI code and code type on the same day; 2: de-duplicates occurrences of the same HOI group on the same day (e.g., de-duplicates at the group level).

Exposure Episode Length - number of days after exposure initiation that is considered "exposed time."

Exposure Extension Period - number of days post treatment period in which the outcomes/events are counted for a treatment episode. Extensions are added after any episode gaps have been bridged.

Lookback Period - number of days wherein a member is required to have evidence of pre-existing condition (diagnosis/procedure/drug dispensing).

Maximum Episode Duration - truncates exposure episodes after a requester-specified number of exposed days. Applied after any gaps are bridged and extension days added to the length of the exposure episode.

Member-Years - sum of all days of enrollment with medical and drug coverage in the query period preceded by an exposure washout period all divided by 365.25.

Minimum Days Supplied - specifies a minimum number of days in length of the days supplied for the episode to be considered.

Minimum Episode Duration - specifies a minimum number of days in length of the episode for it to be considered. Applied after any gaps are bridged and extension days added to the length of the exposure episode.

Monitoring Period - used to define time periods of interest for both sequential analysis and simple cohort characterization requests.

Principal Diagnosis (PDX) - diagnosis or condition established to be chiefly responsible for admission of the patient to the hospital. 'P' = principal diagnosis, 'S' = secondary diagnosis, 'X' = unspecified diagnosis, '.' = blank. Along with the Care Setting values, forms the Caresetting/PDX parameter.

Query Period - period in which the modular program looks for exposures and outcomes of interest.

Switch Evaluation Step Value - value used to differentiate evaluation step. Each switch pattern can support up to 2 evaluation steps (0 = switch pattern evaluation start; 1 = first evaluation; 2 = second evaluation).

Switch Gap Inclusion Indicator - indicator for whether gaps in treatment episodes that are included in a switch episode will be counted as part of the switch episode duration.

Switch Pattern Cohort Inclusion Date - indicates which date to use for inclusion into the switch pattern cohort of interest as well as optionally as the index date of the treatment episode initiating the switch pattern. Valid options are the product approval date, product marketing date, other requester defined date, or computed start marketing date.

Switch Pattern Cohort Inclusion Strategy - indicates how the switch pattern cohort inclusion date will be used: 01: used only as a switch cohort entry date. First treatment episode dispensing date is used as index for computing time to first switch; 02: used as switch cohort entry date and as initial switch step index date for computing time to first switch.

Treatment Episode Truncation Indicator - indicates whether the exposure episode will be truncated at the occurrence of a requester-specified code.

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 treatment episode.

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 treatment episode.

Years at Risk - number of days supplied plus any episode gaps and exposure extension periods all divided by 365.25.

*All terms listed above may not be used in this report

Table 1. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Overall

CPT-4 Code	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
Penicillin allergy status diagnosis code and same-day penicillin allergy test CPT-4 code				
95004	20,619	21,455	279,907,312	0.74
95018	24,304	24,715	279,907,312	0.87
95024	6,779	6,954	279,907,312	0.24
95004, 95018, or 95024	37,992	40,524	279,907,312	1.36
Penicillin allergy status diagnosis code and penicillin allergy test CPT-4 code within +/- 2 days				
95004	21,966	23,304	279,907,312	0.78
95018	24,590	25,896	279,907,312	0.88
95024	7,357	7,765	279,907,312	0.26
95004, 95018, or 95024	39,653	43,438	279,907,312	1.42
History of penicillin allergy status diagnosis code				
95004	145,988	171,878	5,742,516	254.22
95018	36,703	39,139	5,742,516	63.91
95024	54,864	74,245	5,742,516	95.54
95004, 95018, or 95024	176,624	230,778	5,742,516	307.57

¹Eligible Members are reflective of the number of patients that met all cohort entry criteria on at least one day during the query period

Table 2. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code and Year

Year	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
Penicillin allergy status diagnosis code and same-day penicillin allergy test CPT-4 code				
<i>CPT-4 code 95004</i>				
2008	258	263	79,148,035	0.03
2009	286	290	78,474,825	0.04
2010	658	670	111,840,492	0.06
2011	855	866	112,857,889	0.08
2012	961	989	116,808,470	0.08
2013	1,225	1,260	118,012,337	0.10
2014	1,576	1,649	120,627,690	0.13
2015	2,565	2,659	121,039,268	0.21
2016	5,011	5,193	123,122,568	0.41
2017	5,605	5,764	87,067,810	0.64
2018	1,810	1,852	48,237,287	0.38
<i>CPT-4 code 95018</i>				
2008	0	0	79,148,035	0.00
2009	0	0	78,474,825	0.00
2010	0	0	111,840,492	0.00
2011	0	0	112,857,889	0.00
2012	0	0	116,808,470	0.00
2013	2,364	2,402	118,012,337	0.20
2014	2,906	2,930	120,627,690	0.24
2015	4,207	4,260	121,039,268	0.35
2016	6,451	6,544	123,122,568	0.52
2017	6,518	6,609	87,067,810	0.75
2018	1,942	1,970	48,237,287	0.40
<i>CPT-4 code 95024</i>				
2008	94	99	79,148,035	0.01
2009	96	97	78,474,825	0.01
2010	211	216	111,840,492	0.02
2011	284	285	112,857,889	0.03
2012	363	370	116,808,470	0.03
2013	431	440	118,012,337	0.04
2014	536	556	120,627,690	0.04
2015	852	873	121,039,268	0.07
2016	1,588	1,631	123,122,568	0.13
2017	1,719	1,752	87,067,810	0.20
2018	625	635	48,237,287	0.13

Table 2. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code and Year

Year	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95004, 95018, or 95024</i>				
2008	281	293	79,148,035	0.04
2009	303	309	78,474,825	0.04
2010	687	701	111,840,492	0.06
2011	887	908	112,857,889	0.08
2012	1,009	1,050	116,808,470	0.09
2013	3,192	3,338	118,012,337	0.27
2014	3,986	4,161	120,627,690	0.33
2015	6,019	6,333	121,039,268	0.50
2016	9,443	10,059	123,122,568	0.77
2017	9,602	10,165	87,067,810	1.10
2018	3,054	3,207	48,237,287	0.63
Penicillin allergy status diagnosis code and penicillin allergy test CPT-4 code within +/- 2 days				
<i>CPT-4 code 95004</i>				
2008	293	305	79,148,035	0.04
2009	324	335	78,474,825	0.04
2010	740	771	111,840,492	0.07
2011	938	970	112,857,889	0.08
2012	1,064	1,108	116,808,470	0.09
2013	1,373	1,440	118,012,337	0.12
2014	1,749	1,860	120,627,690	0.14
2015	2,763	2,929	121,039,268	0.23
2016	5,241	5,533	123,122,568	0.43
2017	5,799	6,091	87,067,810	0.67
2018	1,880	1,962	48,237,287	0.39
<i>CPT-4 code 95018</i>				
2008	0	0	79,148,035	0.00
2009	0	0	78,474,825	0.00
2010	0	0	111,840,492	0.00
2011	0	0	112,857,889	0.00
2012	0	0	116,808,470	0.00
2013	2,406	2,554	118,012,337	0.20
2014	2,975	3,141	120,627,690	0.25
2015	4,267	4,505	121,039,268	0.35
2016	6,517	6,800	123,122,568	0.53
2017	6,559	6,838	87,067,810	0.75
2018	1,954	2,058	48,237,287	0.41

Table 2. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code and Year

Year	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95024</i>				
2008	115	122	79,148,035	0.01
2009	114	119	78,474,825	0.01
2010	241	252	111,840,492	0.02
2011	328	335	112,857,889	0.03
2012	406	421	116,808,470	0.03
2013	501	524	118,012,337	0.04
2014	593	631	120,627,690	0.05
2015	922	981	121,039,268	0.08
2016	1,698	1,800	123,122,568	0.14
2017	1,810	1,899	87,067,810	0.21
2018	656	681	48,237,287	0.14
<i>CPT-4 code 95004, 95018, or 95024</i>				
2008	320	339	79,148,035	0.04
2009	345	361	78,474,825	0.04
2010	779	812	111,840,492	0.07
2011	996	1,039	112,857,889	0.09
2012	1,133	1,192	116,808,470	0.10
2013	3,401	3,675	118,012,337	0.29
2014	4,236	4,584	120,627,690	0.35
2015	6,280	6,835	121,039,268	0.52
2016	9,731	10,607	123,122,568	0.79
2017	9,802	10,614	87,067,810	1.13
2018	3,128	3,380	48,237,287	0.65
History of penicillin allergy status diagnosis code				
<i>CPT-4 code 95004</i>				
2008	2,779	3,033	300,802	92.39
2009	4,500	4,954	424,003	106.13
2010	7,126	7,734	848,984	83.94
2011	10,066	10,979	1,387,962	72.52
2012	13,863	15,085	1,853,372	74.80
2013	17,518	19,004	2,283,057	76.73
2014	21,017	22,753	2,707,045	77.64
2015	25,658	27,699	3,120,805	82.22
2016	26,780	28,844	3,606,122	74.26
2017	22,610	24,126	1,562,020	144.75
2018	7,241	7,667	946,164	76.53

Table 2. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code and Year

Year	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95018</i>				
2008	0	0	300,802	0.00
2009	0	0	424,003	0.00
2010	0	0	848,984	0.00
2011	0	0	1,387,962	0.00
2012	0	0	1,853,372	0.00
2013	4,096	4,398	2,283,057	17.94
2014	5,364	5,672	2,707,045	19.81
2015	7,194	7,578	3,120,805	23.05
2016	9,057	9,521	3,606,122	25.12
2017	8,835	9,195	1,562,020	56.56
2018	2,658	2,775	946,164	28.09
<i>CPT-4 code 95024</i>				
2008	1,566	1,838	300,802	52.06
2009	2,421	2,881	424,003	57.10
2010	3,325	3,983	848,984	39.16
2011	4,337	5,426	1,387,962	31.25
2012	5,463	7,045	1,853,372	29.48
2013	6,534	8,444	2,283,057	28.62
2014	7,369	9,448	2,707,045	27.22
2015	8,407	10,530	3,120,805	26.94
2016	10,053	11,769	3,606,122	27.88
2017	8,858	9,775	1,562,020	56.71
2018	2,903	3,106	946,164	30.68
<i>CPT-4 code 95004, 95018, or 95024</i>				
2008	3,065	3,647	300,802	101.89
2009	4,924	5,908	424,003	116.13
2010	7,837	9,238	848,984	92.31
2011	11,141	13,435	1,387,962	80.27
2012	15,329	18,483	1,853,372	82.71
2013	22,267	26,754	2,283,057	97.53
2014	26,945	32,042	2,707,045	99.54
2015	32,946	38,699	3,120,805	105.57
2016	34,758	40,245	3,606,122	96.39
2017	28,478	32,193	1,562,020	182.32
2018	9,151	10,134	946,164	96.72

¹Eligible Members are reflective of the number of patients that met all cohort entry criteria on at least one day during the query period

Table 3. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code and Sex

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
Penicillin allergy status diagnosis code and same-day penicillin allergy test CPT-4 code				
<i>CPT-4 code 95004</i>				
Male	7,339	7,611	136,291,504	0.54
<i>CPT-4 code 95018</i>				
Male	8,480	8,608	136,291,504	0.62
<i>CPT-4 code 95024</i>				
Male	2,168	2,209	136,291,504	0.16
<i>CPT-4 code 95004, 95018, or 95024</i>				
Male	13,319	14,123	136,291,504	0.98
Penicillin allergy status diagnosis code and penicillin allergy test CPT-4 code within +/- 2 days				
<i>CPT-4 code 95004</i>				
Male	7,722	8,142	136,291,504	0.57
<i>CPT-4 code 95018</i>				
Male	8,581	9,012	136,291,504	0.63
<i>CPT-4 code 95024</i>				
Male	2,300	2,402	136,291,504	0.17
<i>CPT-4 code 95004, 95018, or 95024</i>				
Male	13,785	15,002	136,291,504	1.01
History of penicillin allergy status diagnosis code				
<i>CPT-4 code 95004</i>				
Male	41,739	49,181	1,884,081	221.54
<i>CPT-4 code 95018</i>				
Male	12,135	12,703	1,884,081	64.41
<i>CPT-4 code 95024</i>				
Male	14,286	18,574	1,884,081	75.82
<i>CPT-4 code 95004, 95018, or 95024</i>				
Male	51,354	65,349	1,884,081	272.57

¹Eligible Members are reflective of the number of patients that met all cohort entry criteria on at least one day during the query period

Table 4. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code and Age Group

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
Penicillin allergy status diagnosis code and same-day penicillin allergy test CPT-4 code				
<i>CPT-4 code 95004</i>				
0-16 years	6,244	6,520	53,428,012	1.17
17+ years	14,379	14,935	237,085,662	0.61
<i>CPT-4 code 95018</i>				
0-16 years	4,745	4,815	53,428,012	0.89
17+ years	19,559	19,900	237,085,662	0.82
<i>CPT-4 code 95024</i>				
0-16 years	1,083	1,098	53,428,012	0.20
17+ years	5,696	5,856	237,085,662	0.24
<i>CPT-4 code 95004, 95018, or 95024</i>				
0-16 years	9,139	9,782	53,428,012	1.71
17+ years	28,863	30,742	237,085,662	1.22
Penicillin allergy status diagnosis code and penicillin allergy test CPT-4 code within +/- 2 days				
<i>CPT-4 code 95004</i>				
0-16 years	6,435	6,775	53,428,012	1.20
17+ years	15,535	16,529	237,085,662	0.66
<i>CPT-4 code 95018</i>				
0-16 years	4,761	4,897	53,428,012	0.89
17+ years	19,829	20,999	237,085,662	0.84
<i>CPT-4 code 95024</i>				
0-16 years	1,132	1,172	53,428,012	0.21
17+ years	6,225	6,593	237,085,662	0.26
<i>CPT-4 code 95004, 95018, or 95024</i>				
0-16 years	9,327	10,081	53,428,012	1.75
17+ years	30,336	33,357	237,085,662	1.28
History of penicillin allergy status diagnosis code				
<i>CPT-4 code 95004</i>				
0-16 years	23,260	28,713	239,992	969.20
17+ years	122,938	143,165	5,549,922	221.51
<i>CPT-4 code 95018</i>				
0-16 years	6,454	6,726	239,992	268.93
17+ years	30,251	32,413	5,549,922	54.51
<i>CPT-4 code 95024</i>				
0-16 years	5,027	5,611	239,992	209.47
17+ years	49,895	68,634	5,549,922	89.90
<i>CPT-4 code 95004, 95018, or 95024</i>				
0-16 years	26,871	34,029	239,992	1,119.66
17+ years	150,007	196,749	5,549,922	270.29

¹Eligible Members are reflective of the number of patients that met all cohort entry criteria on at least one day during the query period

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
Penicillin allergy status diagnosis code and same-day penicillin allergy test CPT-4 code				
<i>CPT-4 code 95004</i>				
<i>Age: 0-16 years</i>				
2008	111	111	17,998,946	0.06
2009	122	123	17,667,078	0.07
2010	238	243	17,206,082	0.14
2011	293	298	16,950,052	0.17
2012	291	300	17,344,140	0.17
2013	361	373	17,231,162	0.21
2014	396	411	17,273,912	0.23
2015	655	672	17,088,237	0.38
2016	1,516	1,550	17,283,368	0.88
2017	1,822	1,866	17,097,394	1.07
2018	568	573	8,481,800	0.67
<i>Age: 17+ years</i>				
2008	147	152	62,095,685	0.02
2009	164	167	61,752,574	0.03
2010	420	427	95,553,313	0.04
2011	562	568	96,817,305	0.06
2012	670	689	100,391,324	0.07
2013	864	887	101,702,176	0.08
2014	1,180	1,238	104,268,291	0.11
2015	1,910	1,987	104,870,328	0.18
2016	3,495	3,643	106,764,721	0.33
2017	3,783	3,898	70,845,052	0.53
2018	1,242	1,279	39,993,606	0.31
<i>CPT-4 code 95018</i>				
<i>Age: 0-16 years</i>				
2008	0	0	17,998,946	0.00
2009	0	0	17,667,078	0.00
2010	0	0	17,206,082	0.00
2011	0	0	16,950,052	0.00
2012	0	0	17,344,140	0.00
2013	323	323	17,231,162	0.19
2014	413	414	17,273,912	0.24
2015	586	593	17,088,237	0.34
2016	1,345	1,355	17,283,368	0.78
2017	1,631	1,650	17,097,394	0.95
2018	475	480	8,481,800	0.56

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Age: 17+ years</i>				
2008	0	0	62,095,685	0.00
2009	0	0	61,752,574	0.00
2010	0	0	95,553,313	0.00
2011	0	0	96,817,305	0.00
2012	0	0	100,391,324	0.00
2013	2,041	2,079	101,702,176	0.20
2014	2,493	2,516	104,268,291	0.24
2015	3,621	3,667	104,870,328	0.35
2016	5,106	5,189	106,764,721	0.48
2017	4,887	4,959	70,845,052	0.69
2018	1,467	1,490	39,993,606	0.37
<i>CPT-4 code 95024</i>				
<i>Age: 0-16 years</i>				
2008	17	17	17,998,946	0.01
2009	26	27	17,667,078	0.01
2010	42	42	17,206,082	0.02
2011	69	69	16,950,052	0.04
2012	85	87	17,344,140	0.05
2013	85	86	17,231,162	0.05
2014	71	71	17,273,912	0.04
2015	118	118	17,088,237	0.07
2016	224	227	17,283,368	0.13
2017	261	264	17,097,394	0.15
2018	88	90	8,481,800	0.10
<i>Age: 17+ years</i>				
2008	77	82	62,095,685	0.01
2009	70	70	61,752,574	0.01
2010	169	174	95,553,313	0.02
2011	215	216	96,817,305	0.02
2012	278	283	100,391,324	0.03
2013	346	354	101,702,176	0.03
2014	465	485	104,268,291	0.04
2015	734	755	104,870,328	0.07
2016	1,364	1,404	106,764,721	0.13
2017	1,458	1,488	70,845,052	0.21
2018	537	545	39,993,606	0.13

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95004, 95018, or 95024</i>				
<i>Age: 0-16 years</i>				
2008	114	115	17,998,946	0.06
2009	131	133	17,667,078	0.07
2010	243	248	17,206,082	0.14
2011	298	305	16,950,052	0.18
2012	301	314	17,344,140	0.17
2013	557	590	17,231,162	0.32
2014	664	694	17,273,912	0.38
2015	1,054	1,107	17,088,237	0.62
2016	2,321	2,447	17,283,368	1.34
2017	2,797	2,936	17,097,394	1.64
2018	869	893	8,481,800	1.02
<i>Age: 17+ years</i>				
2008	167	178	62,095,685	0.03
2009	172	176	61,752,574	0.03
2010	444	453	95,553,313	0.05
2011	589	603	96,817,305	0.06
2012	708	736	100,391,324	0.07
2013	2,636	2,748	101,702,176	0.26
2014	3,322	3,467	104,268,291	0.32
2015	4,965	5,226	104,870,328	0.47
2016	7,124	7,612	106,764,721	0.67
2017	6,805	7,229	70,845,052	0.96
2018	2,185	2,314	39,993,606	0.55
Penicillin allergy status diagnosis code and penicillin allergy test CPT-4 code within +/- 2 days				
<i>CPT-4 code 95004</i>				
<i>Age: 0-16 years</i>				
2008	117	118	17,998,946	0.07
2009	132	133	17,667,078	0.07
2010	251	259	17,206,082	0.15
2011	304	312	16,950,052	0.18
2012	306	316	17,344,140	0.18
2013	376	391	17,231,162	0.22
2014	420	436	17,273,912	0.24
2015	675	695	17,088,237	0.40
2016	1,556	1,608	17,283,368	0.90
2017	1,847	1,912	17,097,394	1.08
2018	582	595	8,481,800	0.69

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Age: 17+ years</i>				
2008	176	187	62,095,685	0.03
2009	192	202	61,752,574	0.03
2010	489	512	95,553,313	0.05
2011	634	658	96,817,305	0.07
2012	758	792	100,391,324	0.08
2013	997	1,049	101,702,176	0.10
2014	1,329	1,424	104,268,291	0.13
2015	2,088	2,234	104,870,328	0.20
2016	3,685	3,925	106,764,721	0.35
2017	3,952	4,179	70,845,052	0.56
2018	1,298	1,367	39,993,606	0.32
<i>CPT-4 code 95018</i>				
<i>Age: 0-16 years</i>				
2008	0	0	17,998,946	0.00
2009	0	0	17,667,078	0.00
2010	0	0	17,206,082	0.00
2011	0	0	16,950,052	0.00
2012	0	0	17,344,140	0.00
2013	326	332	17,231,162	0.19
2014	418	423	17,273,912	0.24
2015	588	598	17,088,237	0.34
2016	1,348	1,379	17,283,368	0.78
2017	1,632	1,673	17,097,394	0.95
2018	477	492	8,481,800	0.56
<i>Age: 17+ years</i>				
2008	0	0	62,095,685	0.00
2009	0	0	61,752,574	0.00
2010	0	0	95,553,313	0.00
2011	0	0	96,817,305	0.00
2012	0	0	100,391,324	0.00
2013	2,080	2,222	101,702,176	0.20
2014	2,557	2,718	104,268,291	0.25
2015	3,679	3,907	104,870,328	0.35
2016	5,169	5,421	106,764,721	0.48
2017	4,927	5,165	70,845,052	0.70
2018	1,477	1,566	39,993,606	0.37

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95024</i>				
<i>Age: 0-16 years</i>				
2008	21	22	17,998,946	0.01
2009	30	32	17,667,078	0.02
2010	45	47	17,206,082	0.03
2011	74	75	16,950,052	0.04
2012	88	90	17,344,140	0.05
2013	89	90	17,231,162	0.05
2014	73	74	17,273,912	0.04
2015	124	127	17,088,237	0.07
2016	233	242	17,283,368	0.13
2017	268	278	17,097,394	0.16
2018	91	95	8,481,800	0.11
<i>Age: 17+ years</i>				
2008	94	100	62,095,685	0.02
2009	84	87	61,752,574	0.01
2010	196	205	95,553,313	0.02
2011	254	260	96,817,305	0.03
2012	318	331	100,391,324	0.03
2013	412	434	101,702,176	0.04
2014	520	557	104,268,291	0.05
2015	798	854	104,870,328	0.08
2016	1,465	1,558	106,764,721	0.14
2017	1,542	1,621	70,845,052	0.22
2018	565	586	39,993,606	0.14
<i>CPT-4 code 95004, 95018, or 95024</i>				
<i>Age: 0-16 years</i>				
2008	121	123	17,998,946	0.07
2009	142	145	17,667,078	0.08
2010	256	264	17,206,082	0.15
2011	309	319	16,950,052	0.18
2012	316	330	17,344,140	0.18
2013	573	613	17,231,162	0.33
2014	690	725	17,273,912	0.40
2015	1,075	1,134	17,088,237	0.63
2016	2,355	2,516	17,283,368	1.36
2017	2,820	2,990	17,097,394	1.65
2018	883	922	8,481,800	1.04

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Age: 17+ years</i>				
2008	199	216	62,095,685	0.03
2009	203	216	61,752,574	0.03
2010	523	548	95,553,313	0.05
2011	687	720	96,817,305	0.07
2012	817	862	100,391,324	0.08
2013	2,829	3,062	101,702,176	0.28
2014	3,546	3,859	104,268,291	0.34
2015	5,205	5,701	104,870,328	0.50
2016	7,378	8,091	106,764,721	0.69
2017	6,982	7,624	70,845,052	0.99
2018	2,245	2,458	39,993,606	0.56
History of penicillin allergy status diagnosis code				
<i>CPT-4 code 95004</i>				
<i>Age: 0-16 years</i>				
2008	640	677	21,724	294.61
2009	1,085	1,172	31,656	342.75
2010	1,460	1,546	39,864	366.25
2011	1,813	1,934	48,663	372.56
2012	2,047	2,182	57,276	357.39
2013	2,452	2,622	65,625	373.64
2014	2,614	2,783	74,857	349.20
2015	3,314	3,510	88,047	376.39
2016	4,623	4,946	107,322	430.76
2017	5,383	5,683	125,273	429.70
2018	1,599	1,658	66,494	240.47
<i>Age: 17+ years</i>				
2008	2,139	2,356	280,442	76.27
2009	3,415	3,782	394,353	86.60
2010	5,667	6,188	811,640	69.82
2011	8,254	9,045	1,342,488	61.48
2012	11,816	12,903	1,799,841	65.65
2013	15,066	16,382	2,221,774	67.81
2014	18,404	19,970	2,637,053	69.79
2015	22,346	24,189	3,038,692	73.54
2016	22,159	23,898	3,505,715	63.21
2017	17,227	18,443	1,444,278	119.28
2018	5,642	6,009	881,780	63.98

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95018</i>				
<i>Age: 0-16 years</i>				
2008	0	0	21,724	0.00
2009	0	0	31,656	0.00
2010	0	0	39,864	0.00
2011	0	0	48,663	0.00
2012	0	0	57,276	0.00
2013	533	543	65,625	81.22
2014	671	681	74,857	89.64
2015	919	943	88,047	104.38
2016	1,694	1,756	107,322	157.84
2017	2,113	2,166	125,273	168.67
2018	626	637	66,494	94.14
<i>Age: 17+ years</i>				
2008	0	0	280,442	0.00
2009	0	0	394,353	0.00
2010	0	0	811,640	0.00
2011	0	0	1,342,488	0.00
2012	0	0	1,799,841	0.00
2013	3,563	3,855	2,221,774	16.04
2014	4,693	4,991	2,637,053	17.80
2015	6,275	6,635	3,038,692	20.65
2016	7,363	7,765	3,505,715	21.00
2017	6,722	7,029	1,444,278	46.54
2018	2,032	2,138	881,780	23.04
<i>CPT-4 code 95024</i>				
<i>Age: 0-16 years</i>				
2008	155	163	21,724	71.35
2009	284	300	31,656	89.71
2010	338	352	39,864	84.79
2011	452	485	48,663	92.88
2012	479	509	57,276	83.63
2013	533	572	65,625	81.22
2014	526	564	74,857	70.27
2015	661	688	88,047	75.07
2016	773	812	107,322	72.03
2017	880	925	125,273	70.25
2018	226	241	66,494	33.99

Table 5. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Age: 17+ years</i>				
2008	1,411	1,675	280,442	50.31
2009	2,137	2,581	394,353	54.19
2010	2,988	3,631	811,640	36.81
2011	3,885	4,941	1,342,488	28.94
2012	4,984	6,536	1,799,841	27.69
2013	6,001	7,872	2,221,774	27.01
2014	6,843	8,884	2,637,053	25.95
2015	7,746	9,842	3,038,692	25.49
2016	9,280	10,957	3,505,715	26.47
2017	7,978	8,850	1,444,278	55.24
2018	2,677	2,865	881,780	30.36
<i>CPT-4 code 95004, 95018, or 95024</i>				
<i>Age: 0-16 years</i>				
2008	656	713	21,724	301.97
2009	1,119	1,240	31,656	353.49
2010	1,497	1,612	39,864	375.53
2011	1,859	2,033	48,663	382.02
2012	2,112	2,293	57,276	368.74
2013	2,775	3,070	65,625	422.86
2014	3,051	3,330	74,857	407.58
2015	3,883	4,243	88,047	441.01
2016	5,604	6,201	107,322	522.17
2017	6,603	7,189	125,273	527.09
2018	1,991	2,105	66,494	299.43
<i>Age: 17+ years</i>				
2008	2,409	2,934	280,442	85.90
2009	3,805	4,668	394,353	96.49
2010	6,343	7,626	811,640	78.15
2011	9,283	11,402	1,342,488	69.15
2012	13,217	16,190	1,799,841	73.43
2013	19,493	23,684	2,221,774	87.74
2014	23,896	28,712	2,637,053	90.62
2015	29,066	34,456	3,038,692	95.65
2016	29,158	34,044	3,505,715	83.17
2017	21,877	25,004	1,444,278	151.47
2018	7,160	8,029	881,780	81.20

¹Eligible Members are reflective of the number of patients that met all cohort entry criteria on at least one day during the query period

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
Penicillin allergy status diagnosis code and same-day penicillin allergy test CPT-4 code				
<i>CPT-4 code 95004</i>				
<i>Male, Age: 0-16 years</i>				
2008	55	55	9,203,877	0.06
2009	71	72	9,031,801	0.08
2010	118	122	8,794,156	0.13
2011	148	152	8,660,221	0.17
2012	161	166	8,858,317	0.18
2013	188	193	8,801,391	0.21
2014	217	225	8,821,933	0.25
2015	352	362	8,731,715	0.40
2016	830	846	8,832,436	0.94
2017	974	998	8,738,286	1.11
2018	305	308	4,337,729	0.70
<i>Male, Age: 17+ years</i>				
2008	39	42	29,902,107	0.01
2009	43	44	29,701,002	0.01
2010	100	100	44,697,720	0.02
2011	150	152	45,492,840	0.03
2012	167	168	47,268,843	0.04
2013	240	244	48,051,656	0.05
2014	307	317	49,408,813	0.06
2015	503	526	49,801,948	0.10
2016	986	1,010	50,732,642	0.19
2017	1,117	1,147	34,475,628	0.32
2018	351	362	19,369,057	0.18
<i>CPT-4 code 95018</i>				
<i>Male, Age: 0-16 years</i>				
2008	0	0	9,203,877	0.00
2009	0	0	9,031,801	0.00
2010	0	0	8,794,156	0.00
2011	0	0	8,660,221	0.00
2012	0	0	8,858,317	0.00
2013	165	165	8,801,391	0.19
2014	215	216	8,821,933	0.24
2015	291	296	8,731,715	0.33
2016	694	699	8,832,436	0.79
2017	829	842	8,738,286	0.95
2018	250	251	4,337,729	0.58

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Male, Age: 17+ years</i>				
2008	0	0	29,902,107	0.00
2009	0	0	29,701,002	0.00
2010	0	0	44,697,720	0.00
2011	0	0	45,492,840	0.00
2012	0	0	47,268,843	0.00
2013	635	643	48,051,656	0.13
2014	760	768	49,408,813	0.15
2015	1,037	1,045	49,801,948	0.21
2016	1,579	1,597	50,732,642	0.31
2017	1,565	1,592	34,475,628	0.45
2018	485	494	19,369,057	0.25
<i>CPT-4 code 95024</i>				
<i>Male, Age: 0-16 years</i>				
2008	*****	*****	9,203,877	*****
2009	*****	*****	9,031,801	*****
2010	19	19	8,794,156	0.02
2011	38	38	8,660,221	0.04
2012	47	49	8,858,317	0.05
2013	45	46	8,801,391	0.05
2014	37	37	8,821,933	0.04
2015	63	63	8,731,715	0.07
2016	126	128	8,832,436	0.14
2017	141	142	8,738,286	0.16
2018	50	50	4,337,729	0.12
<i>Male, Age: 17+ years</i>				
2008	20	21	29,902,107	0.01
2009	19	19	29,701,002	0.01
2010	47	48	44,697,720	0.01
2011	60	60	45,492,840	0.01
2012	67	67	47,268,843	0.01
2013	89	90	48,051,656	0.02
2014	129	130	49,408,813	0.03
2015	220	226	49,801,948	0.04
2016	385	396	50,732,642	0.08
2017	407	412	34,475,628	0.12
2018	142	144	19,369,057	0.07

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95004, 95018, or 95024</i>				
<i>Male, Age: 0-16 years</i>				
2008	58	58	9,203,877	0.06
2009	77	78	9,031,801	0.09
2010	121	125	8,794,156	0.14
2011	150	156	8,660,221	0.17
2012	167	175	8,858,317	0.19
2013	288	302	8,801,391	0.33
2014	354	374	8,821,933	0.40
2015	543	575	8,731,715	0.62
2016	1,247	1,303	8,832,436	1.41
2017	1,462	1,538	8,738,286	1.67
2018	463	472	4,337,729	1.07
<i>Male, Age: 17+ years</i>				
2008	47	51	29,902,107	0.02
2009	47	48	29,701,002	0.02
2010	108	109	44,697,720	0.02
2011	157	162	45,492,840	0.03
2012	181	182	47,268,843	0.04
2013	794	818	48,051,656	0.17
2014	978	1,010	49,408,813	0.20
2015	1,406	1,470	49,801,948	0.28
2016	2,105	2,220	50,732,642	0.41
2017	2,058	2,181	34,475,628	0.60
2018	680	716	19,369,057	0.35
Penicillin allergy status diagnosis code and penicillin allergy test CPT-4 code within +/- 2 days				
<i>CPT-4 code 95004</i>				
<i>Male, Age: 0-16 years</i>				
2008	58	58	9,203,877	0.06
2009	77	78	9,031,801	0.09
2010	124	131	8,794,156	0.14
2011	158	164	8,660,221	0.18
2012	169	174	8,858,317	0.19
2013	199	206	8,801,391	0.23
2014	233	241	8,821,933	0.26
2015	365	377	8,731,715	0.42
2016	851	877	8,832,436	0.96
2017	984	1,019	8,738,286	1.13
2018	311	319	4,337,729	0.72

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Male, Age: 17+ years</i>				
2008	39	43	29,902,107	0.01
2009	50	53	29,701,002	0.02
2010	116	124	44,697,720	0.03
2011	162	168	45,492,840	0.04
2012	198	206	47,268,843	0.04
2013	270	279	48,051,656	0.06
2014	351	369	49,408,813	0.07
2015	544	590	49,801,948	0.11
2016	1,031	1,080	50,732,642	0.20
2017	1,150	1,200	34,475,628	0.33
2018	368	386	19,369,057	0.19
<i>CPT-4 code 95018</i>				
<i>Male, Age: 0-16 years</i>				
2008	0	0	9,203,877	0.00
2009	0	0	9,031,801	0.00
2010	0	0	8,794,156	0.00
2011	0	0	8,660,221	0.00
2012	0	0	8,858,317	0.00
2013	167	170	8,801,391	0.19
2014	219	223	8,821,933	0.25
2015	292	298	8,731,715	0.33
2016	696	712	8,832,436	0.79
2017	829	857	8,738,286	0.95
2018	252	257	4,337,729	0.58
<i>Male, Age: 17+ years</i>				
2008	0	0	29,902,107	0.00
2009	0	0	29,701,002	0.00
2010	0	0	44,697,720	0.00
2011	0	0	45,492,840	0.00
2012	0	0	47,268,843	0.00
2013	648	690	48,051,656	0.13
2014	782	849	49,408,813	0.16
2015	1,062	1,121	49,801,948	0.21
2016	1,597	1,663	50,732,642	0.31
2017	1,575	1,650	34,475,628	0.46
2018	487	522	19,369,057	0.25

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95024</i>				
<i>Male, Age: 0-16 years</i>				
2008	*****	*****	9,203,877	*****
2009	*****	*****	9,031,801	*****
2010	19	21	8,794,156	0.02
2011	42	42	8,660,221	0.05
2012	49	51	8,858,317	0.06
2013	47	48	8,801,391	0.05
2014	37	37	8,821,933	0.04
2015	68	69	8,731,715	0.08
2016	132	139	8,832,436	0.15
2017	144	149	8,738,286	0.16
2018	50	52	4,337,729	0.12
<i>Male, Age: 17+ years</i>				
2008	20	22	29,902,107	0.01
2009	21	23	29,701,002	0.01
2010	54	56	44,697,720	0.01
2011	66	67	45,492,840	0.01
2012	78	81	47,268,843	0.02
2013	102	105	48,051,656	0.02
2014	143	146	49,408,813	0.03
2015	237	254	49,801,948	0.05
2016	403	427	50,732,642	0.08
2017	424	433	34,475,628	0.12
2018	149	153	19,369,057	0.08
<i>CPT-4 code 95004, 95018, or 95024</i>				
<i>Male, Age: 0-16 years</i>				
2008	61	61	9,203,877	0.07
2009	83	85	9,031,801	0.09
2010	127	134	8,794,156	0.14
2011	160	168	8,660,221	0.18
2012	175	183	8,858,317	0.20
2013	298	315	8,801,391	0.34
2014	372	395	8,821,933	0.42
2015	557	592	8,731,715	0.64
2016	1,265	1,342	8,832,436	1.43
2017	1,471	1,566	8,738,286	1.68
2018	470	486	4,337,729	1.08

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Male, Age: 17+ years</i>				
2008	47	52	29,902,107	0.02
2009	54	58	29,701,002	0.02
2010	128	136	44,697,720	0.03
2011	172	181	45,492,840	0.04
2012	216	224	47,268,843	0.05
2013	837	897	48,051,656	0.17
2014	1,040	1,138	49,408,813	0.21
2015	1,476	1,609	49,801,948	0.30
2016	2,167	2,344	50,732,642	0.43
2017	2,093	2,273	34,475,628	0.61
2018	696	763	19,369,057	0.36
History of penicillin allergy status diagnosis code				
<i>CPT-4 code 95004</i>				
<i>Male, Age: 0-16 years</i>				
2008	365	388	11,648	313.36
2009	624	681	17,094	365.04
2010	824	872	21,451	384.13
2011	1,061	1,143	26,222	404.62
2012	1,222	1,302	31,017	393.98
2013	1,410	1,500	35,498	397.21
2014	1,516	1,609	40,422	375.04
2015	1,881	1,994	47,329	397.43
2016	2,585	2,775	57,613	448.68
2017	3,025	3,198	67,129	450.62
2018	886	916	35,736	247.93
<i>Male, Age: 17+ years</i>				
2008	432	466	86,671	49.84
2009	722	784	123,194	58.61
2010	1,224	1,323	252,273	48.52
2011	1,795	1,916	418,734	42.87
2012	2,681	2,878	560,866	47.80
2013	3,498	3,778	694,219	50.39
2014	4,230	4,543	824,099	51.33
2015	5,125	5,531	949,630	53.97
2016	5,256	5,634	1,098,731	47.84
2017	4,219	4,468	466,667	90.41
2018	1,394	1,482	288,056	48.39

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>CPT-4 code 95018</i>				
<i>Male, Age: 0-16 years</i>				
2008	0	0	11,648	0.00
2009	0	0	17,094	0.00
2010	0	0	21,451	0.00
2011	0	0	26,222	0.00
2012	0	0	31,017	0.00
2013	277	281	35,498	78.03
2014	348	353	40,422	86.09
2015	476	487	47,329	100.57
2016	885	923	57,613	153.61
2017	1,107	1,139	67,129	164.91
2018	340	344	35,736	95.14
<i>Male, Age: 17+ years</i>				
2008	0	0	86,671	0.00
2009	0	0	123,194	0.00
2010	0	0	252,273	0.00
2011	0	0	418,734	0.00
2012	0	0	560,866	0.00
2013	1,003	1,065	694,219	14.45
2014	1,336	1,396	824,099	16.21
2015	1,706	1,774	949,630	17.96
2016	2,107	2,185	1,098,731	19.18
2017	2,031	2,104	466,667	43.52
2018	626	652	288,056	21.73
<i>CPT-4 code 95024</i>				
<i>Male, Age: 0-16 years</i>				
2008	84	89	11,648	72.12
2009	148	154	17,094	86.58
2010	186	197	21,451	86.71
2011	262	281	26,222	99.92
2012	268	282	31,017	86.40
2013	282	308	35,498	79.44
2014	282	301	40,422	69.76
2015	345	366	47,329	72.89
2016	420	442	57,613	72.90
2017	476	500	67,129	70.91
2018	131	136	35,736	36.66

Table 6. Summary of Patients with Penicillin Allergy Testing and Penicillin Allergy Status in the Sentinel Distributed Database between January 1, 2008 and August 31, 2018, by Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Code, Sex, Age Group, and Year

	Patients with an Event	Total Events	Eligible Members ¹	Number of Patients with an Event per 10,000 Eligible Members
<i>Male, Age: 17+ years</i>				
2008	278	325	86,671	32.08
2009	454	535	123,194	36.85
2010	641	784	252,273	25.41
2011	870	1,101	418,734	20.78
2012	1,141	1,460	560,866	20.34
2013	1,330	1,706	694,219	19.16
2014	1,579	2,018	824,099	19.16
2015	1,779	2,239	949,630	18.73
2016	2,173	2,527	1,098,731	19.78
2017	1,904	2,092	466,667	40.80
2018	689	731	288,056	23.92
<i>CPT-4 code 95004, 95018, or 95024</i>				
<i>Male, Age: 0-16 years</i>				
2008	375	408	11,648	321.94
2009	645	717	17,094	377.33
2010	844	913	21,451	393.45
2011	1,089	1,201	26,222	415.30
2012	1,254	1,359	31,017	404.29
2013	1,571	1,731	35,498	442.56
2014	1,735	1,892	40,422	429.22
2015	2,162	2,364	47,329	456.80
2016	3,093	3,428	57,613	536.86
2017	3,648	3,981	67,129	543.43
2018	1,097	1,155	35,736	306.97
<i>Male, Age: 17+ years</i>				
2008	490	581	86,671	56.54
2009	812	966	123,194	65.91
2010	1,375	1,649	252,273	54.50
2011	2,033	2,451	418,734	48.55
2012	3,006	3,595	560,866	53.60
2013	4,658	5,512	694,219	67.10
2014	5,761	6,760	824,099	69.91
2015	6,936	8,091	949,630	73.04
2016	7,171	8,235	1,098,731	65.27
2017	5,580	6,285	466,667	119.57
2018	1,867	2,075	288,056	64.81

¹Eligible Members are reflective of the number of patients that met all cohort entry criteria on at least one day during the query period
 *****Data are not presented in these cells due to a small sample size or to assure a small cell cannot be recalculated through the cells presented.

Appendix A. Dates of Available Data for Each Data Partner (DP) as of Request Distribution Date (February 1, 2019)

DP ID	DP Start Date ¹	DP End Date ¹
DP01	06/01/2007	04/30/2018
DP02	01/01/2000	10/31/2017
DP03	01/01/2000	06/30/2018
DP04	01/01/2008	06/30/2018
DP05	01/01/2006	05/31/2018
DP06	01/01/2000	12/31/2017
DP07	01/01/2008	09/30/2017
DP08	01/01/2010	12/31/2016
DP09	01/01/2005	12/17/2017
DP10	01/01/2000	03/31/2016
DP11	01/01/2000	05/31/2015
DP12	01/01/2000	03/31/2018
DP13	01/01/2000	12/31/2017
DP14	01/01/2000	06/30/2018
DP15	01/01/2004	08/31/2018
DP16	01/01/2000	03/31/2018
DP17	01/01/2012	06/30/2017

¹The start and end dates are based on the minimum and maximum dates within each DP. The month with the maximum date must have at least 80% of the number of records in the previous month.

Appendix B. List of Current Procedural Terminology, Fourth Edition (CPT-4) Procedure Codes Used to Define Penicillin Allergy Testing in this Request

Code	Description	Code Type	Code Category
95004	Percutaneous tests (scratch, puncture, prick) with allergenic extracts, immediate type reaction, including test interpretation and report, specify number of tests	CPT-4	Procedure
95018	Allergy testing, any combination of percutaneous (scratch, puncture, prick) and intracutaneous (intradermal), sequential and incremental, with drugs or biologicals, immediate type reaction, including test interpretation and report, specify number of tests	CPT-4	Procedure
95024	Intracutaneous (intradermal) tests with allergenic extracts, immediate type reaction, including test interpretation and report, specify number of tests	CPT-4	Procedure

Appendix C. List of International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) and International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) Diagnosis Codes Used to Define Penicillin Allergy Status in this Request

Code	Description	Code Type	Code Category
V14.0	Personal history of allergy to penicillin	ICD-9-CM	Diagnosis
Z88.0	Allergy status to penicillin	ICD-10-CM	Diagnosis

Appendix D. Specifications for Parameters for this Request

This request utilized the Cohort Identification and Descriptive Analysis (CIDA) module, version 7.0.5 to estimate the prevalence of penicillin allergy testing in the Sentinel Distributed Database (SDD).

Query period: January 1, 2008 - August 31, 2018
Enrollment gap: 45 days
Age groups: 0-16, 17+ years
Pre-index enrollment requirement: 0 days
Post-index enrollment requirement: 0 days
Coverage requirement: At Least Medical Coverage
Stratifications: Calendar year; Age group by Calendar year; Sex by Age group by Calendar year

Scenario	Exposure/Event				Inclusion/Exclusion Criteria							
	Index Exposure/ Event	Cohort Definition	Washout Period	Care Setting	Censor Enrollment at Evidence of:	Inclusion/ Exclusion	Criteria	Care Setting	Principal Diagnosis Position	Evaluation Period Start	Evaluation Period End	Number of Instances the Criteria Should be Found in Evaluation Period
1	Diagnosis code: V14.0 or Z88.0 AND same-day CPT-4: 95004	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--
2	Diagnosis code: V14.0 or Z88.0 AND same-day CPT-4: 95018	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--
3	Diagnosis code: V14.0 or Z88.0 AND same-day CPT-4: 95024	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--

Appendix D. Specifications for Parameters for this Request												
Scenario	Exposure/Event					Inclusion/Exclusion Criteria						Number of Instances the Criteria Should be Found in Evaluation Period
	Index Exposure/Event	Cohort Definition	Washout Period	Care Setting	Censor Enrollment at Evidence of:	Inclusion/Exclusion	Criteria	Care Setting	Principal Diagnosis Position	Evaluation Period Start	Evaluation Period End	
4	Diagnosis code: V14.0 or Z88.0 AND same-day CPT-4: 95004, 95018, or 95024	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--
5	Diagnosis code: V14.0 or Z88.0 AND +/- 2 days CPT-4: 95004	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--
6	Diagnosis code: V14.0 or Z88.0 AND +/- 2 days CPT-4: 95018	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--
7	Diagnosis code: V14.0 or Z88.0 AND +/- 2 days CPT-4: 95024	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--
8	Diagnosis code: V14.0 or Z88.0 AND +/- 2 days CPT-4: 95004, 95018, or 95024	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	--	--	--	--	--	--	--

Appendix D. Specifications for Parameters for this Request

Scenario	Exposure/Event					Inclusion/Exclusion Criteria						
	Index Exposure/ Event	Cohort Definition	Washout Period	Care Setting	Censor Enrollment at Evidence of:	Inclusion/ Exclusion	Criteria	Care Setting	Principal Diagnosis Position	Evaluation Period Start	Evaluation Period End	Number of Instances the Criteria Should be Found in Evaluation Period
9	CPT-4: 95004	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	Inclusion	Penicillin allergy status Diagnosis code: V14.0 or Z88.0	Any care setting	N/A	Total enrollment history	0	1 code
10	CPT-4: 95018	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	Inclusion	Penicillin allergy status Diagnosis code: V14.0 or Z88.0	Any care setting	N/A	Total enrollment history	0	1 code
11	CPT-4: 95024	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	Inclusion	Penicillin allergy status Diagnosis code: V14.0 or Z88.0	Any care setting	N/A	Total enrollment history	0	1 code
12	CPT-4: 95004, 95018, or 95024	02: All valid index dates; re-entry allowed	0	Any care setting	Death; Data Partner End Date; Query End Date	Inclusion	Penicillin allergy status Diagnosis code: V14.0 or Z88.0	Any care setting	N/A	Total enrollment history	0	1 code

International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM), International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) and Current Procedural Terminology, Fourth Edition (CPT-4) codes are provided by Optum360.

National Drug Codes (NDCs) are checked against First Data Bank's "National Drug Data File (NDDF®) Plus."