Disclaimer

The following report(s) 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, 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 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

Date Run: October 31, 2017

Request Description: The purpose of this report was to compare the frequency of diagnoses of allergic reactions using International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) and International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes. ICD-10-CM code definitions were determined by mapping from ICD-9-CM code definitions using the Centers for Medicare and Medicaid Services (CMS) General Equivalence Mappings (GEMs). Simple forward mapping (SFM) and forward-backward mapping (FBM) were used used to map ICD-9-CM to ICD-10-CM codes.[1]

Sentinel Modular Program Tool Used: Cohort Identification and Descriptive Analysis (CIDA) tool, version 5.0.4

Data Source: This request was run against the IBM® MarketScan® Commercial Claims and Encounters Database and Medicare Supplemental Database, which included 121 million members. Data from October 1, 2010 to September 30, 2016 were included in this report. The report includes three separate time periods: 1) October 1, 2010 to September 30, 2016, 2) April 1, 2015 to September 30, 2015, and 3) April 1, 2016 to September 31, 2016. See Appendix A for the dates of available data used in this report.

Study Design: We examined the incidence and prevalence of allergic reactions across the ICD-9-CM era (October 2010 - September 2015) and ICD-10-CM era (October 2015 - September 2016) in the US. Incidence was additionally evaluated from April 2015 to September 2015 and April 2016 to September 2016. See Appendix B for specific codes used to define allergic reactions.

Cohort Eligibility Criteria: Members included in the cohorts were required to be enrolled in health plans with medical and drug coverage. The following age groups were included in the cohorts: 0-18, 19-24, 25-64, and 65+ years.

Incident Cohorts: Members included in the incident cohorts were required to be continuously enrolled in health plans with medical and drug coverage for at least 183 days prior to the first qualifying (index) allergic reaction diagnosis during which gaps in coverage of up to 45 days were allowed. Incident allergic reactions were defined as no previous allergic reaction diagnoses in the 183 days preceding the index date with respect to ICD-9-CM and ICD-10-CM codes.

Prevalent Cohorts: There was no enrollment time requirement for members in the prevalent cohorts. All qualifying diagnosis codes that occurred between October 1, 2010 and September 30, 2016 were included.

Please refer to Appendix C for detailed specifications of parameters used in the analyses for this request.

Limitations: Algorithms used to define outcomes are imperfect; thus, it is possible that there may be misclassification. Therefore, data should be interpreted with this limitation in mind. The MarketScan claims databases are based on a large convenience sample. Because the sample is not random, it may contain biases or fail to generalize well to other populations. Data come mostly from large employers; medium and small firms may be underrepresented.[2]

Notes: Please contact the Sentinel Operations Center Query Fulfillment Team (qf@sentinelsystem.org) for questions and to provide comments/suggestions for future enhancements to this document.

[1]Fung, K. W., et al. (2016). "Preparing for the ICD-10-CM Transition: Automated Methods for Translating ICD Codes in Clinical Phenotype Definitions." EGEMS (Wash DC) 4(1): 1211.

[2]IBM Watson Health (2018). [online] ibm.com. Available at: https://www.ibm.com/downloads/cas/OWZWJ0QO [Accessed 01 Mar. 2019].

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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.

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.

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.

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 may not be used in this report

Table 1. Comparison of Incident* Allergic Reaction Diagnoses in the International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) and International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) Eras (April 1, 2015 - September 30, 2015 and April 1, 2016 - September 30, 2016)

	Members with Diagnosis	Eligible Members	Members with Diagnosis per 1,000 Eligible Members
Allergic Reactions			
ICD-9-CM: April 1, 2015 - September 30, 2015			
	1,029,605	23,661,804	43.51
ICD-10-CM Simple Forward Mapping: April 1, 2016 - September 30, 2016			
	773,332	23,533,473	32.86
ICD-10-CM Forward-Backward Mapping: April 1, 2016 - September 30, 2016			
	1,124,705	23,414,158	48.04

*Incidence defined by 183 day washout

Figure 1. Incidence of Allergic Reaction Diagnoses per 1,000 Eligible Members from October 2010 - September 2016 by Code Type, 183-Day Washout
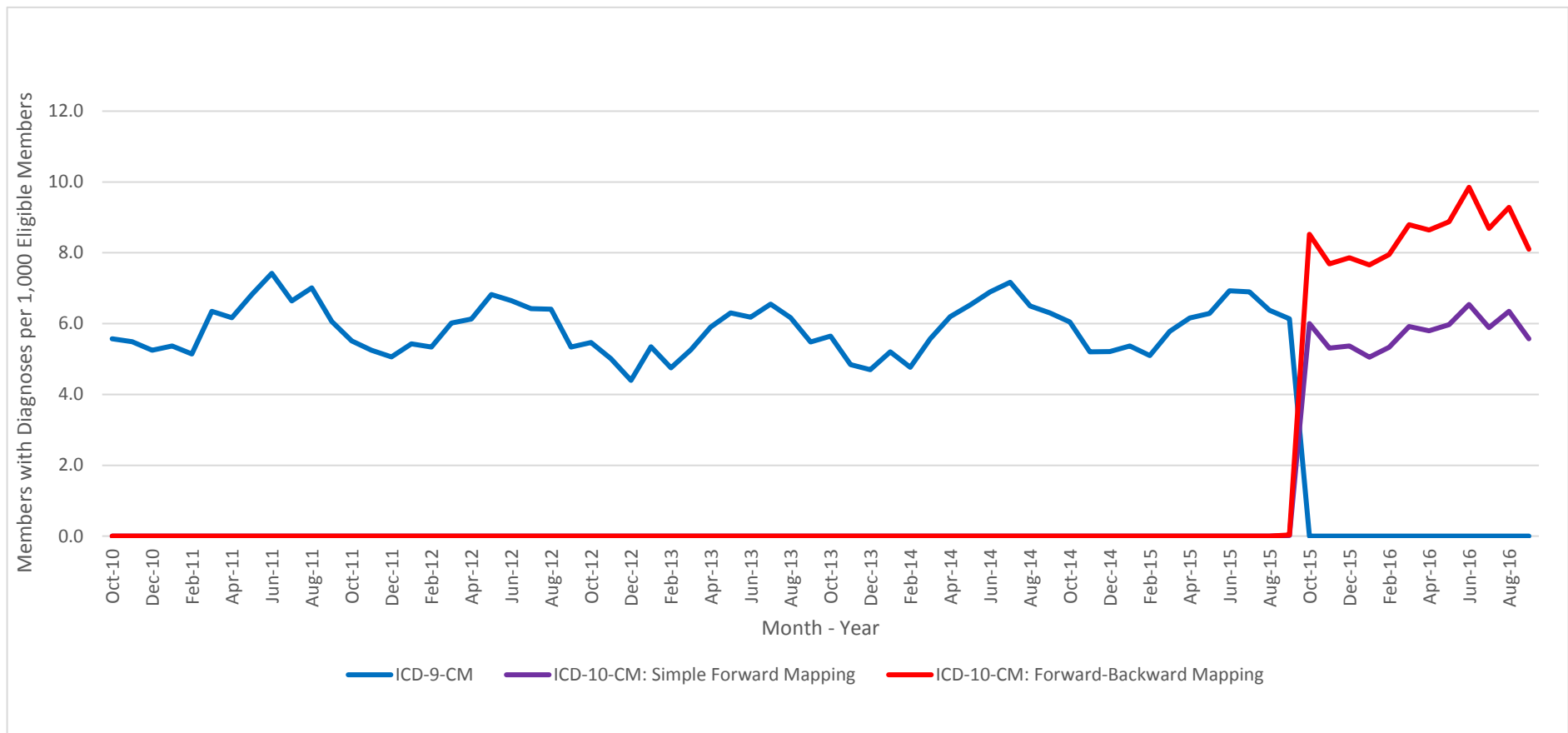
Figure 2. Prevalence of Allergic Reaction Diagnoses per 1,000 Eligible Members from October 2010 - September 2016 by Code Type, 0-Day Washout
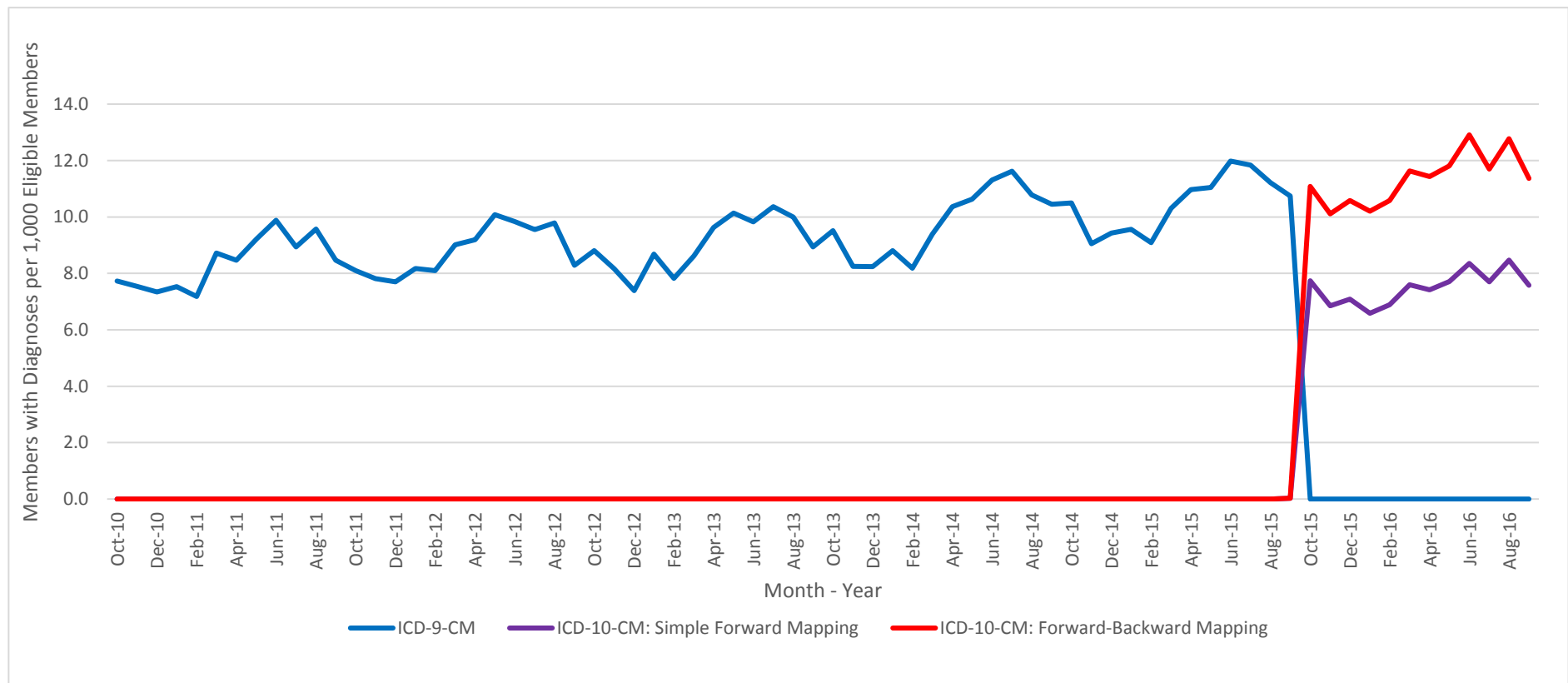
Appendix A. Dates Available for IBM® MarketScan® Commercial and Medicare Supplemental Databases

Databases	Start Date	End Date
IBM MarketScan Commercial and Medicare Supplemental Databases[1]	1/1/2010	9/30/2016

[1] The IBM MarketScan Databases includes a sample of 121 million employees, dependents, and retirees in the United States with primary or Medicare supplemental coverage through privately insured fee-for-service, point-of-service, or capitated health plans. The IBM MarketScan claims databases are based on a large convenience sample. Because the sample is not random, it may contain biases or fail to generalize well to other populations. Data come mostly from large employers; medium and small firms may be underrepresented. For more information on the IBM MarketScan Databases, please review the White Paper here: https://www.ibm.com/downloads/cas/OWZWJ0QO

Appendix B. 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 Allergic Reactions

Code	Description	Code Type
	ICD-9-CM	
477.1	Allergic rhinitis, due to food	ICD-9-CM
518.6	Allergic bronchopulmonary aspergillosis	ICD-9-CM
558.3	Gastroenteritis and colitis, allergic	ICD-9-CM
691.0	Diaper or napkin rash	ICD-9-CM
691.8	Other atopic dermatitis and related conditions	ICD-9-CM
692.0	Contact dermatitis and other eczema due to detergents	ICD-9-CM
692.1	Contact dermatitis and other eczema due to oils and greases	ICD-9-CM
692.2	Contact dermatitis and other eczema due to solvents	ICD-9-CM
692.3	Contact dermatitis and other eczema due to drugs and medicines in contact with skin	ICD-9-CM
692.4	Contact dermatitis and other eczema due to other chemical products	ICD-9-CM
692.5	Contact dermatitis and other eczema due to food in contact with skin	ICD-9-CM
692.6	Contact dermatitis and other eczema due to plants (except food)	ICD-9-CM
692.70	Unspecified dermatitis due to sun	ICD-9-CM
692.71	Contact dermatitis and other eczema due to sunburn	ICD-9-CM
692.72	Acute dermatitis due to solar radiation	ICD-9-CM
692.73	Actinic reticuloid and actinic granuloma	ICD-9-CM
692.74	Other chronic dermatitis due to solar radiation	ICD-9-CM
692.79	Other dermatitis due to solar radiation	ICD-9-CM
692.81	Dermatitis due to cosmetics	ICD-9-CM
692.82	Dermatitis due to other radiation	ICD-9-CM
692.83	Dermatitis due to metals	ICD-9-CM
692.84	Contact dermatitis and other eczema due to animal (cat) (dog) dander	ICD-9-CM
692.89	Contact dermatitis and other eczema due to other specified agent	ICD-9-CM
692.9	Contact dermatitis and other eczema, due to unspecified cause	ICD-9-CM
693.0	Dermatitis due to drugs and medicines taken internally	ICD-9-CM
693.1	Dermatitis due to food taken internally	ICD-9-CM
693.8	Dermatitis due to other specified substances taken internally	ICD-9-CM
693.9	Dermatitis due to unspecified substance taken internally	ICD-9-CM
708.0	Allergic urticaria	ICD-9-CM
708.1	Idiopathic urticaria	ICD-9-CM
708.2	Urticaria due to cold and heat	ICD-9-CM
708.3	Dermatographic urticaria	ICD-9-CM
708.4	Vibratory urticaria	ICD-9-CM
708.5	Cholinergic urticaria	ICD-9-CM
708.8	Other specified urticaria	ICD-9-CM
708.9	Unspecified urticaria	ICD-9-CM
995.0	Other anaphylactic reaction	ICD-9-CM
995.3	Allergy, unspecified not elsewhere classified	ICD-9-CM
995.60	Anaphylactic reaction due to unspecified food	ICD-9-CM
995.61	Anaphylactic reaction due to peanuts	ICD-9-CM
995.62	Anaphylactic reaction due to crustaceans	ICD-9-CM
995.63	Anaphylactic reaction due to fruits and vegetables	ICD-9-CM
995.64	Anaphylactic reaction due to tree nuts and seeds	ICD-9-CM

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Code	Description	Code Type
995.65	Anaphylactic reaction due to fish	ICD-9-CM
995.66	Anaphylactic reaction due to food additives	ICD-9-CM
995.67	Anaphylactic reaction due to milk products	ICD-9-CM
995.68	Anaphylactic reaction due to eggs	ICD-9-CM
995.69	Anaphylactic reaction due to other specified food	ICD-9-CM
995.7	Other adverse food reactions, not elsewhere classified	ICD-9-CM
V07.1	Need for desensitization to allergens	ICD-9-CM
V13.81	Personal history of anaphylaxis	ICD-9-CM
V14.0	Personal history of allergy to penicillin	ICD-9-CM
V14.1	Personal history of allergy to other antibiotic agent	ICD-9-CM
V14.2	Personal history of allergy to sulfonamides	ICD-9-CM
V14.3	Personal history of allergy to other anti-infective agent	ICD-9-CM
V14.4	Personal history of allergy to anesthetic agent	ICD-9-CM
V14.5	Personal history of allergy to narcotic agent	ICD-9-CM
V14.6	Personal history of allergy to analgesic agent	ICD-9-CM
V14.7	Personal history of allergy to serum or vaccine	ICD-9-CM
V14.8	Personal history of allergy to other specified medicinal agents	ICD-9-CM
V14.9	Personal history of allergy to unspecified medicinal agent	ICD-9-CM
V72.7	Diagnostic skin and sensitization tests	ICD-9-CM
V15.0	Personal history of allergy, other than to medicinal agents, presenting hazards to health	ICD-9-CM
V15.01	Personal history of allergy to peanuts	ICD-9-CM
V15.02	Personal history of allergy to milk products	ICD-9-CM
V15.03	Personal history of allergy to eggs	ICD-9-CM
V15.04	Personal history of allergy to seafood	ICD-9-CM
V15.05	Personal history of allergy to other foods	ICD-9-CM
V15.06	Allergy to insects and arachnids	ICD-9-CM
V15.07	Personal history of allergy to latex	ICD-9-CM
V15.08	Personal history of allergy to radiographic dye	ICD-9-CM
V15.09	Personal history of other allergy, other than to medicinal agents	ICD-9-CM
ICD-10-CM: Simple Forward Mapping		
B44.81	Allergic bronchopulmonary aspergillosis	ICD-10-CM
J30.5	Allergic rhinitis due to food	ICD-10-CM
K52.21	Food protein-induced enterocolitis syndrome	ICD-10-CM
K52.22	Food protein-induced enteropathy	ICD-10-CM
K52.29	Other allergic and dietetic gastroenteritis and colitis	ICD-10-CM
L20.0	Besnier's prurigo	ICD-10-CM
L20.81	Atopic neurodermatitis	ICD-10-CM
L20.82	Flexural eczema	ICD-10-CM
L20.84	Intrinsic (allergic) eczema	ICD-10-CM
L20.89	Other atopic dermatitis	ICD-10-CM
L22	Diaper dermatitis	ICD-10-CM
L23.0	Allergic contact dermatitis due to metals	ICD-10-CM
L23.81	Allergic contact dermatitis due to animal (cat) (dog) dander	ICD-10-CM
L24.0	Irritant contact dermatitis due to detergents	ICD-10-CM

Appendix B. 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 Allergic Reactions

Code	Description	Code Type
L24.1	Irritant contact dermatitis due to oils and greases	ICD-10-CM
L24.2	Irritant contact dermatitis due to solvents	ICD-10-CM
L24.81	Irritant contact dermatitis due to metals	ICD-10-CM
L25.0	Unspecified contact dermatitis due to cosmetics	ICD-10-CM
L25.1	Unspecified contact dermatitis due to drugs in contact with skin	ICD-10-CM
L25.2	Unspecified contact dermatitis due to dyes	ICD-10-CM
L25.3	Unspecified contact dermatitis due to other chemical products	ICD-10-CM
L25.4	Unspecified contact dermatitis due to food in contact with skin	ICD-10-CM
L25.5	Unspecified contact dermatitis due to plants, except food	ICD-10-CM
L25.8	Unspecified contact dermatitis due to other agents	ICD-10-CM
L25.9	Unspecified contact dermatitis, unspecified cause	ICD-10-CM
L27.0	Generalized skin eruption due to drugs and medicaments taken internally	ICD-10-CM
L27.1	Localized skin eruption due to drugs and medicaments taken internally	ICD-10-CM
L27.2	Dermatitis due to ingested food	ICD-10-CM
L27.8	Dermatitis due to other substances taken internally	ICD-10-CM
L27.9	Dermatitis due to unspecified substance taken internally	ICD-10-CM
L50.0	Allergic urticaria	ICD-10-CM
L50.1	Idiopathic urticaria	ICD-10-CM
L50.2	Urticaria due to cold and heat	ICD-10-CM
L50.3	Dermatographic urticaria	ICD-10-CM
L50.4	Vibratory urticaria	ICD-10-CM
L50.5	Cholinergic urticaria	ICD-10-CM
L50.6	Contact urticaria	ICD-10-CM
L50.8	Other urticaria	ICD-10-CM
L50.9	Urticaria, unspecified	ICD-10-CM
L55.0	Sunburn of first degree	ICD-10-CM
L55.9	Sunburn, unspecified	ICD-10-CM
L56.0	Drug phototoxic response	ICD-10-CM
L56.1	Drug photoallergic response	ICD-10-CM
L56.2	Photocontact dermatitis [berloque dermatitis]	ICD-10-CM
L56.8	Other specified acute skin changes due to ultraviolet radiation	ICD-10-CM
L57.1	Actinic reticuloid	ICD-10-CM
L57.5	Actinic granuloma	ICD-10-CM
L57.8	Other skin changes due to chronic exposure to nonionizing radiation	ICD-10-CM
L57.9	Skin changes due to chronic exposure to nonionizing radiation, unspecified	ICD-10-CM
L58.9	Radiodermatitis, unspecified	ICD-10-CM
T78.00XA	Anaphylactic reaction due to unspecified food, initial encounter	ICD-10-CM
T78.01XA	Anaphylactic reaction due to peanuts, initial encounter	ICD-10-CM
T78.02XA	Anaphylactic reaction due to shellfish (crustaceans), initial encounter	ICD-10-CM
T78.03XA	Anaphylactic reaction due to other fish, initial encounter	ICD-10-CM
T78.04XA	Anaphylactic reaction due to fruits and vegetables, initial encounter	ICD-10-CM
T78.05XA	Anaphylactic reaction due to tree nuts and seeds, initial encounter	ICD-10-CM
T78.06XA	Anaphylactic reaction due to food additives, initial encounter	ICD-10-CM
T78.07XA	Anaphylactic reaction due to milk and dairy products, initial encounter	ICD-10-CM

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Code	Description	Code Type
T78.08XA	Anaphylactic reaction due to eggs, initial encounter	ICD-10-CM
T78.09XA	Anaphylactic reaction due to other food products, initial encounter	ICD-10-CM
T78.1XXA	Other adverse food reactions, not elsewhere classified, initial encounter	ICD-10-CM
T78.2XXA	Anaphylactic shock, unspecified, initial encounter	ICD-10-CM
T78.40XA	Allergy, unspecified, initial encounter	ICD-10-CM
Z01.89	Encounter for other specified special examinations	ICD-10-CM
Z51.6	Encounter for desensitization to allergens	ICD-10-CM
Z87.892	Personal history of anaphylaxis	ICD-10-CM
Z88.0	Allergy status to penicillin	ICD-10-CM
Z88.1	Allergy status to other antibiotic agents status	ICD-10-CM
Z88.2	Allergy status to sulfonamides status	ICD-10-CM
Z88.3	Allergy status to other anti-infective agents status	ICD-10-CM
Z88.4	Allergy status to anesthetic agent status	ICD-10-CM
Z88.5	Allergy status to narcotic agent status	ICD-10-CM
Z88.6	Allergy status to analgesic agent status	ICD-10-CM
Z88.7	Allergy status to serum and vaccine status	ICD-10-CM
Z88.8	Allergy status to other drugs, medicaments and biological substances status	ICD-10-CM
Z88.9	Allergy status to unspecified drugs, medicaments and biological substances status	ICD-10-CM
Z91.010	Allergy to peanuts	ICD-10-CM
Z91.011	Allergy to milk products	ICD-10-CM
Z91.012	Allergy to eggs	ICD-10-CM
Z91.013	Allergy to seafood	ICD-10-CM
Z91.018	Allergy to other foods	ICD-10-CM
Z91.038	Other insect allergy status	ICD-10-CM
Z91.040	Latex allergy status	ICD-10-CM
Z91.041	Radiographic dye allergy status	ICD-10-CM
Z91.048	Other nonmedicinal substance allergy status	ICD-10-CM
ICD-10-CM: Forward-Backward Mapping		
B44.81	Allergic bronchopulmonary aspergillosis	ICD-10-CM
J30.5	Allergic rhinitis due to food	ICD-10-CM
K52.21	Food protein-induced enterocolitis syndrome	ICD-10-CM
K52.22	Food protein-induced enteropathy	ICD-10-CM
K52.29	Other allergic and dietetic gastroenteritis and colitis	ICD-10-CM
L20.0	Besnier's prurigo	ICD-10-CM
L20.81	Atopic neurodermatitis	ICD-10-CM
L20.82	Flexural eczema	ICD-10-CM
L20.84	Intrinsic (allergic) eczema	ICD-10-CM
L20.89	Other atopic dermatitis	ICD-10-CM
L20.9	Atopic dermatitis, unspecified	ICD-10-CM
L22	Diaper dermatitis	ICD-10-CM
L23.0	Allergic contact dermatitis due to metals	ICD-10-CM
L23.1	Allergic contact dermatitis due to adhesives	ICD-10-CM
L23.2	Allergic contact dermatitis due to cosmetics	ICD-10-CM
L23.3	Allergic contact dermatitis due to drugs in contact with skin	ICD-10-CM

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Code	Description	Code Type
L23.4	Allergic contact dermatitis due to dyes	ICD-10-CM
L23.5	Allergic contact dermatitis due to other chemical products	ICD-10-CM
L23.6	Allergic contact dermatitis due to food in contact with the skin	ICD-10-CM
L23.7	Allergic contact dermatitis due to plants, except food	ICD-10-CM
L23.81	Allergic contact dermatitis due to animal (cat) (dog) dander	ICD-10-CM
L23.89	Allergic contact dermatitis due to other agents	ICD-10-CM
L23.9	Allergic contact dermatitis, unspecified cause	ICD-10-CM
L24.0	Irritant contact dermatitis due to detergents	ICD-10-CM
L24.1	Irritant contact dermatitis due to oils and greases	ICD-10-CM
L24.2	Irritant contact dermatitis due to solvents	ICD-10-CM
L24.3	Irritant contact dermatitis due to cosmetics	ICD-10-CM
L24.4	Irritant contact dermatitis due to drugs in contact with skin	ICD-10-CM
L24.5	Irritant contact dermatitis due to other chemical products	ICD-10-CM
L24.6	Irritant contact dermatitis due to food in contact with skin	ICD-10-CM
L24.7	Irritant contact dermatitis due to plants, except food	ICD-10-CM
L24.81	Irritant contact dermatitis due to metals	ICD-10-CM
L24.89	Irritant contact dermatitis due to other agents	ICD-10-CM
L24.9	Irritant contact dermatitis, unspecified cause	ICD-10-CM
L25.0	Unspecified contact dermatitis due to cosmetics	ICD-10-CM
L25.1	Unspecified contact dermatitis due to drugs in contact with skin	ICD-10-CM
L25.2	Unspecified contact dermatitis due to dyes	ICD-10-CM
L25.3	Unspecified contact dermatitis due to other chemical products	ICD-10-CM
L25.4	Unspecified contact dermatitis due to food in contact with skin	ICD-10-CM
L25.5	Unspecified contact dermatitis due to plants, except food	ICD-10-CM
L25.8	Unspecified contact dermatitis due to other agents	ICD-10-CM
L25.9	Unspecified contact dermatitis, unspecified cause	ICD-10-CM
L27.0	Generalized skin eruption due to drugs and medicaments taken internally	ICD-10-CM
L27.1	Localized skin eruption due to drugs and medicaments taken internally	ICD-10-CM
L27.2	Dermatitis due to ingested food	ICD-10-CM
L27.8	Dermatitis due to other substances taken internally	ICD-10-CM
L27.9	Dermatitis due to unspecified substance taken internally	ICD-10-CM
L30.0	Nummular dermatitis	ICD-10-CM
L30.2	Cutaneous autosensitization	ICD-10-CM
L30.8	Other specified dermatitis	ICD-10-CM
L30.9	Dermatitis, unspecified	ICD-10-CM
L50.0	Allergic urticaria	ICD-10-CM
L50.1	Idiopathic urticaria	ICD-10-CM
L50.2	Urticaria due to cold and heat	ICD-10-CM
L50.3	Dermatographic urticaria	ICD-10-CM
L50.4	Vibratory urticaria	ICD-10-CM
L50.5	Cholinergic urticaria	ICD-10-CM
L50.6	Contact urticaria	ICD-10-CM
L50.8	Other urticaria	ICD-10-CM
L50.9	Urticaria, unspecified	ICD-10-CM

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Code	Description	Code Type
L55.0	Sunburn of first degree	ICD-10-CM
L55.9	Sunburn, unspecified	ICD-10-CM
L56.0	Drug phototoxic response	ICD-10-CM
L56.1	Drug photoallergic response	ICD-10-CM
L56.2	Photocontact dermatitis [berloque dermatitis]	ICD-10-CM
L56.3	Solar urticaria	ICD-10-CM
L56.4	Polymorphous light eruption	ICD-10-CM
L56.8	Other specified acute skin changes due to ultraviolet radiation	ICD-10-CM
L56.9	Acute skin change due to ultraviolet radiation, unspecified	ICD-10-CM
L57.1	Actinic reticuloid	ICD-10-CM
L57.5	Actinic granuloma	ICD-10-CM
L57.8	Other skin changes due to chronic exposure to nonionizing radiation	ICD-10-CM
L57.9	Skin changes due to chronic exposure to nonionizing radiation, unspecified	ICD-10-CM
L58.0	Acute radiodermatitis	ICD-10-CM
L58.1	Chronic radiodermatitis	ICD-10-CM
L58.9	Radiodermatitis, unspecified	ICD-10-CM
L59.0	Erythema ab igne [dermatitis ab igne]	ICD-10-CM
L59.8	Other specified disorders of the skin and subcutaneous tissue related to radiation	ICD-10-CM
L59.9	Disorder of the skin and subcutaneous tissue related to radiation, unspecified	ICD-10-CM
T78.00XA	Anaphylactic reaction due to unspecified food, initial encounter	ICD-10-CM
T78.01XA	Anaphylactic reaction due to peanuts, initial encounter	ICD-10-CM
T78.02XA	Anaphylactic reaction due to shellfish (crustaceans), initial encounter	ICD-10-CM
T78.03XA	Anaphylactic reaction due to other fish, initial encounter	ICD-10-CM
T78.04XA	Anaphylactic reaction due to fruits and vegetables, initial encounter	ICD-10-CM
T78.05XA	Anaphylactic reaction due to tree nuts and seeds, initial encounter	ICD-10-CM
T78.06XA	Anaphylactic reaction due to food additives, initial encounter	ICD-10-CM
T78.07XA	Anaphylactic reaction due to milk and dairy products, initial encounter	ICD-10-CM
T78.08XA	Anaphylactic reaction due to eggs, initial encounter	ICD-10-CM
T78.09XA	Anaphylactic reaction due to other food products, initial encounter	ICD-10-CM
T78.1XXA	Other adverse food reactions, not elsewhere classified, initial encounter	ICD-10-CM
T78.2XXA	Anaphylactic shock, unspecified, initial encounter	ICD-10-CM
T78.40XA	Allergy, unspecified, initial encounter	ICD-10-CM
T78.49XA	Other allergy, initial encounter	ICD-10-CM
T88.6XXA	Anaphylactic reaction due to adverse effect of correct drug or medicament properly administered, initial encounter	ICD-10-CM
Z01.82	Encounter for allergy testing	ICD-10-CM
Z01.89	Encounter for other specified special examinations	ICD-10-CM
Z51.6	Encounter for desensitization to allergens	ICD-10-CM
Z87.892	Personal history of anaphylaxis	ICD-10-CM
Z88.0	Allergy status to penicillin	ICD-10-CM
Z88.1	Allergy status to other antibiotic agents status	ICD-10-CM
Z88.2	Allergy status to sulfonamides status	ICD-10-CM
Z88.3	Allergy status to other anti-infective agents status	ICD-10-CM
Z88.4	Allergy status to anesthetic agent status	ICD-10-CM

Appendix B. 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 Allergic Reactions

Code	Description	Code Type
Z88.5	Allergy status to narcotic agent status	ICD-10-CM
Z88.6	Allergy status to analgesic agent status	ICD-10-CM
Z88.7	Allergy status to serum and vaccine status	ICD-10-CM
Z88.8	Allergy status to other drugs, medicaments and biological substances status	ICD-10-CM
Z88.9	Allergy status to unspecified drugs, medicaments and biological substances status	ICD-10-CM
Z91.010	Allergy to peanuts	ICD-10-CM
Z91.011	Allergy to milk products	ICD-10-CM
Z91.012	Allergy to eggs	ICD-10-CM
Z91.013	Allergy to seafood	ICD-10-CM
Z91.018	Allergy to other foods	ICD-10-CM
Z91.02	Food additives allergy status	ICD-10-CM
Z91.030	Bee allergy status	ICD-10-CM
Z91.038	Other insect allergy status	ICD-10-CM
Z91.040	Latex allergy status	ICD-10-CM
Z91.041	Radiographic dye allergy status	ICD-10-CM
Z91.048	Other nonmedicinal substance allergy status	ICD-10-CM
Z91.09	Other allergy status, other than to drugs and biological substances	ICD-10-CM

Appendix C. Specifications for Parameters of this Request

Sentinel's Cohort Identification and Descriptive Analysis (CIDA) tool, version 5.0.4, was used to compare the frequency of diagnoses for allergic reactions using International Classificiation of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) versus International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM) codes.

Enrollment Gap: 45 days
Enrollment Requirement: 183 days for incidence scenarios; 0 days for prevalence scenarios
Coverage Requirement: Medical and drug coverage
Age Groups: 0-18, 19-24, 25-64, and 65+ years

Scenario	Query Start Date	Query End Date	Event	Code Source	Incident with Respect to:	Washout (days)	Cohort Definition	Care Setting
1	4/1/2015	9/30/2015	Allergic Reactions	ICD-9-CM	ICD-9-CM	183	First valid event only	Any
2	4/1/2016	9/30/2016	Allergic Reactions	ICD-10-CM Simple Forward Mapping (SFM)	ICD-10-CM	183	First valid event only	Any
3	4/1/2016	9/30/2016	Allergic Reactions	ICD-10-CM Forward-Backward Mapping (FBM)	ICD-10-CM	183	First valid event only	Any
4	10/1/2010	9/30/2016	Allergic Reactions	ICD-9-CM	ICD-9-CM or ICD-10-CM	183	First valid event only	Any
5	10/1/2010	9/30/2016	Allergic Reactions	ICD-10-CM SFM	ICD-9-CM or ICD-10-CM	183	First valid event only	Any
6	10/1/2010	9/30/2016	Allergic Reactions	ICD-10-CM FBM	ICD-9-CM or ICD-10-CM	183	First valid event only	Any
7	10/1/2010	9/30/2016	Allergic Reactions	ICD-9-CM	N/A	0	All valid events	Any
8	10/1/2010	9/30/2016	Allergic Reactions	ICD-10-CM SFM	N/A	0	All valid events	Any
9	10/1/2010	9/30/2016	Allergic Reactions	ICD-10-CM FBM	N/A	0	All valid events	Any

ICD-9-CM and ICD-10-CM are provided by Optum360. ICD-10-CM codes were mapped from ICD-9-CM codes using the Centers for Medicare and Medicaid Services General Equivalence Mappings.