



## **DoD/VA Interagency Program Office**

# **Health Interoperability and Exchange Alliance (HIEA) “Most Common Allergen Terms” Joint Exploratory Team (JET) Results Briefing**

**Nov. 25, 2015**



# Health Interoperability and Exchange Alliance (HIEA) Overview

Operationalize the suite of Standards, Services, and Policies necessary to achieve interoperability between the Departments and their partners, including developing and maintaining implementation guidance and adopting best practices from industry.

## Joint Steering Committee (JSC)

Governing body consisting of senior leaders from the Departments and other Federal partners. The JSC approves and prioritizes Technical Forums and ONC Town Hall topics and provides subject matter experts (SMEs) to participate in the Health Information and Data Standards (HIDS) Working Group (WG) and JETs.



### Technical Forums / ONC Town Halls

Information sharing between Health Stakeholders in emerging technical solutions, standards, services, policy, and other interoperability-related challenges.



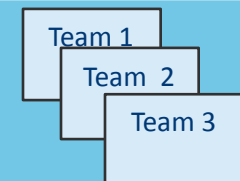
### Health Information and Data Standards (HIDS) Working Group

Information sharing between Health Stakeholders in emerging technical solutions, standards, services, policy, and other interoperability-related challenges.



### Joint Exploratory Teams (JETs)

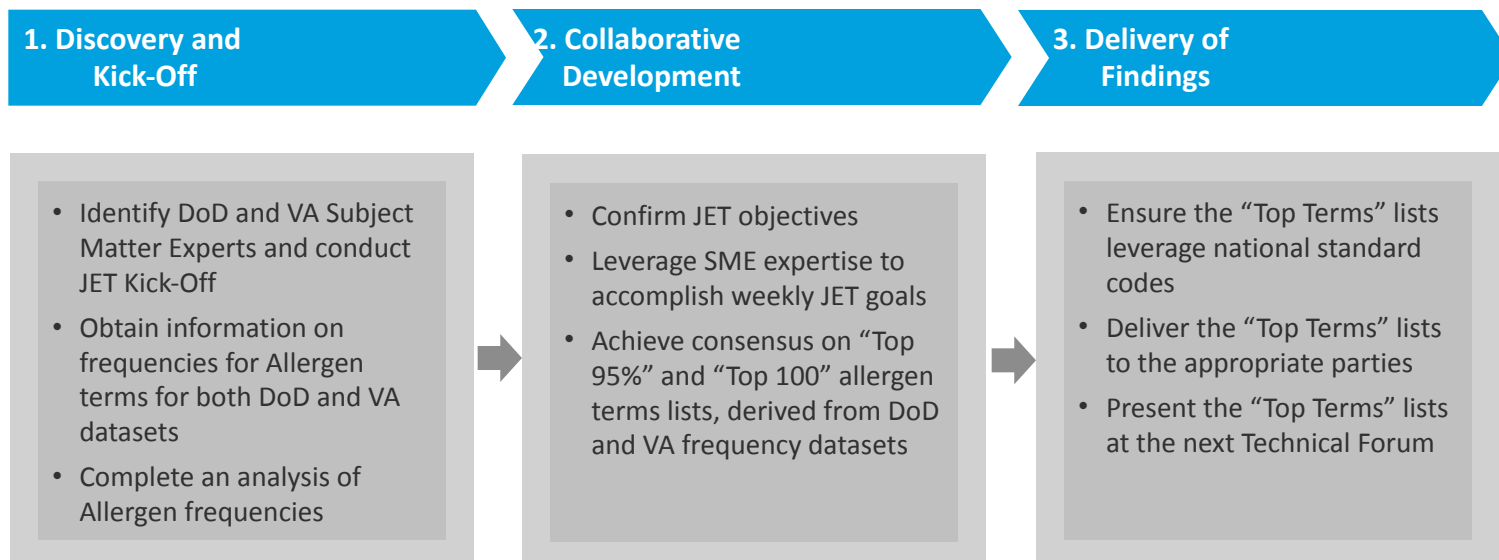
Cross-departmental tiger teams to solve technical interoperability challenges.





## "Most Common Allergen Terms" JET Purpose

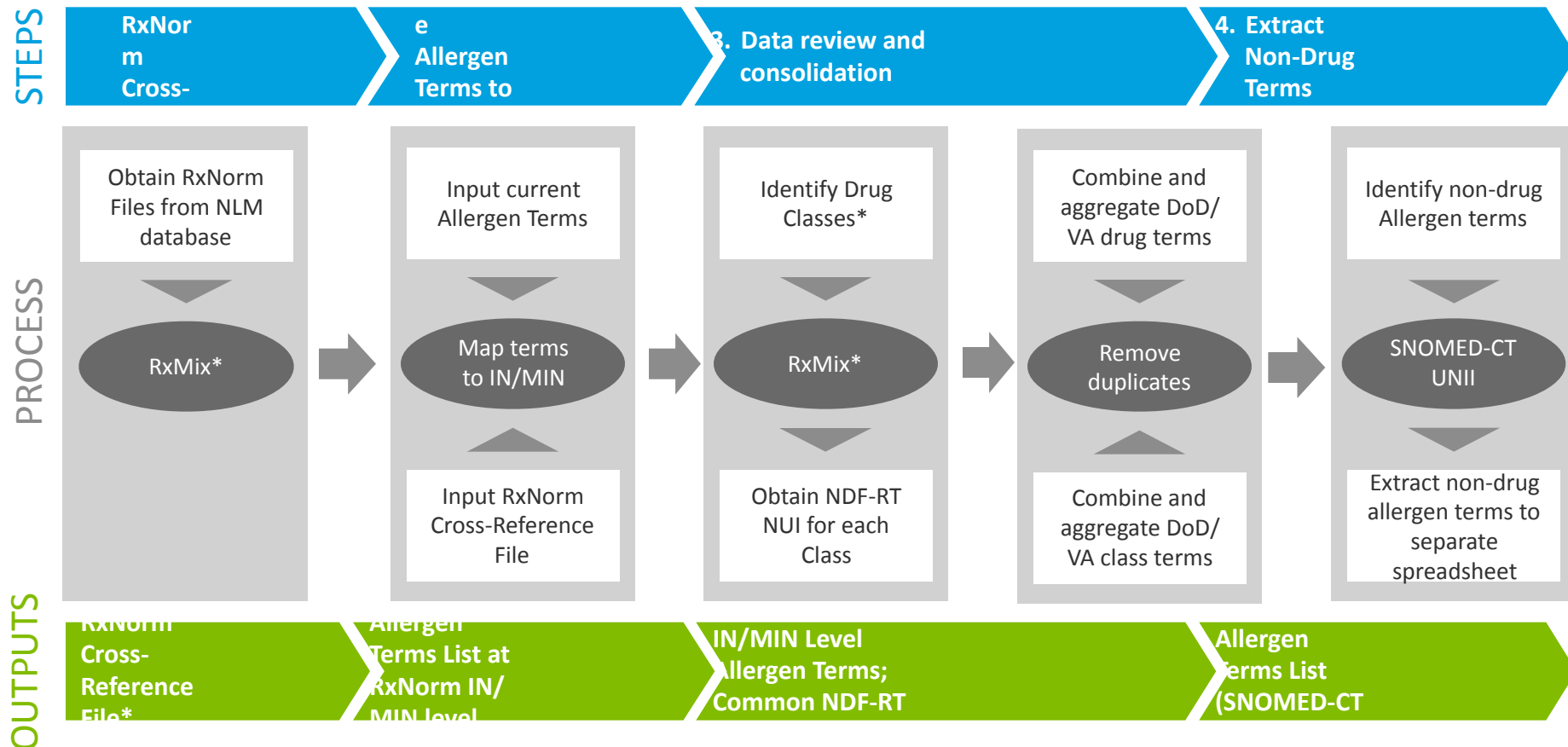
The purpose of this JET is to identify a set of most commonly used allergen terms within the allergies domain, at the ingredient level, across the DoD and VA. The team will leverage pre-existing work efforts as it pertains to allergen term-mapping in order to initiate the effort at the appropriate starting point.



**GOAL #1 - Create a Semi-Automated Data Process**  
**GOAL #2 - Organize and Validate Allergen Terms Into Groups and Classes**  
**GOAL #3 - Complete Top 95% and Top 100 Allergen Terms Lists**  
**GOAL #4 - Expose Results and Best Practices**



## Goal 1 – Create a Semi-Automated Data Process



**\*Note:** Additional detail for this process is provided in the backup slides



## Goal 2 – Organize and Validate Allergen Terms

A robust clinical review process was leveraged to organize and validate the allergen terms datasets, which entailed four steps: Review, Validate, Identify, and Update. This step-by-step process ensures that all allergen terms are validated, and duplicates or incorrect categorizations are corrected.

### 1. Review

- Line-by-line clinical review of all drug and non-drug reactant terms
- Flag duplicates for removal

### 2. Validate

- Confirm validity of categorization of terms from a clinical/pharmaceutical perspective
- Flag terms confirmed to be in the incorrect category for removal (Examples: “Air” listed as a drug reactant; “Cortisone” listed as a non-drug reactant)

### 3. Identify

- Identify drug reactants which have the potential to be non-drug reactants (Example: “Lactate” potentially is a non-drug reactant)
- Identify non-drug reactants which have the potential to be drug reactants (Example: “Alpha Lipoic Acid” potentially is a drug reactant)

### 4. Update

- Remove duplicates and terms within incorrect categories
- Create a new tab listing potential drug reactants and update totals
- Create a new tab listing potential non-drug reactants and update totals

**\*Note:** Questions for Clinical Consideration arising as outputs of this process are listed in the backup slides



## Goal 3 – Complete Top 100 DoD and VA Allergen Terms List



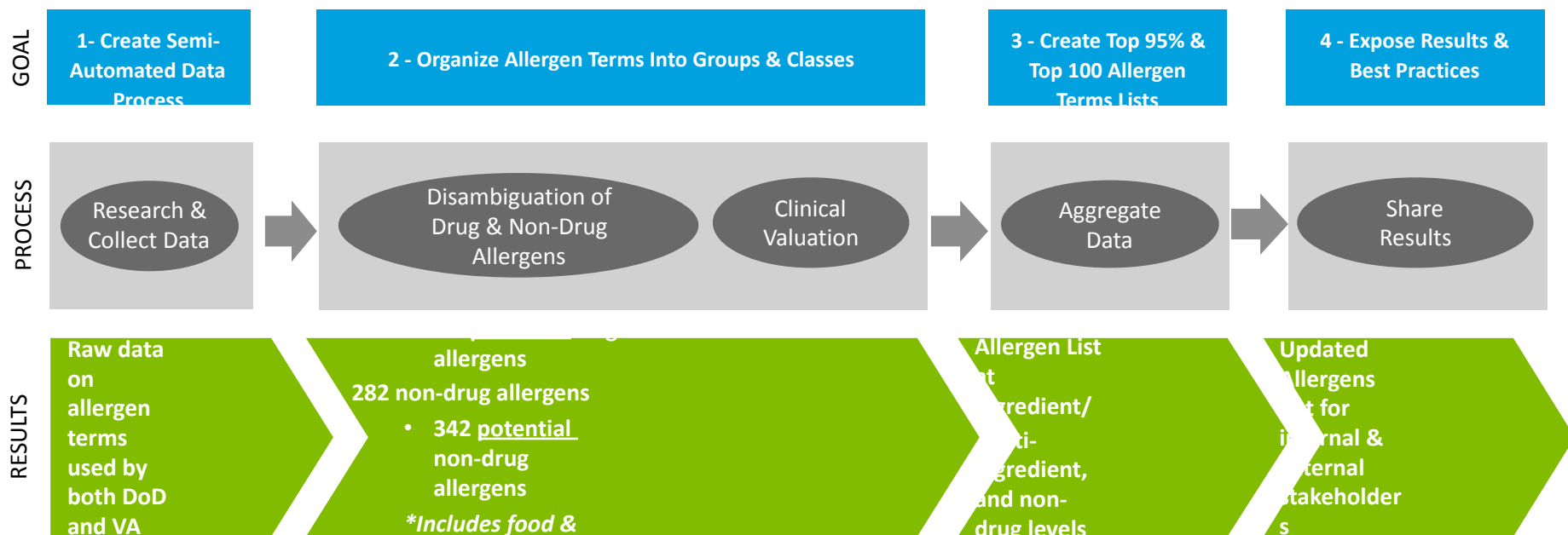
To view the full dataset, including allergen terms beyond the Top 100, click on the Excel spreadsheet icon.

1	Penicillin	26	Amoxicillin / Clavulanate	51	flunisolide	76	Fentanyl
2	Codeine	27	Amlodipine	52	meloxicam	77	Sumatriptan
3	Lisinopril	28	Doxycycline	53	Omeprazole	78	Allopurinol
4	Penicillin G	29	Azithromycin	54	Promethazine	79	oxybutynin
5	Amoxicillin	30	Clindamycin	55	Metronidazole	80	Indomethacin
6	Morphine	31	Meperidine	56	Lovastatin	81	Mirtazapine
7	Simvastatin	32	Trazodone	57	Lactose	82	Sulfamethoxazole
8	atorvastatin	33	Ampicillin	58	Primaquine	83	Fluoxetine
9	Penicillin V	34	Bupropion	59	Propoxyphene	84	Purified Protein Derivative of Tuberculin
10	Erythromycin	35	Acetaminophen / Hydrocodone	60	Pseudoephedrine	85	Albuterol
11	Aspirin	36	Levofloxacin	61	sildenafil	86	Metoclopramide
12	Sulfamethoxazole / Trimethoprim	37	Sertraline	62	zolpidem	87	topiramate
13	Ibuprofen	38	Terazosin	63	Amitriptyline	88	Acetaminophen / Propoxyphene
14	gabapentin	39	Cefaclor	64	tamsulosin	89	pregabalin
15	Iodine	40	rosuvastatin	65	Clarithromycin	90	Minocycline
16	Tramadol	41	venlafaxine	66	Nicotine	91	celecoxib
17	Metformin	42	Prednisone	67	Gemfibrozil	92	Methadone
18	Pravastatin	43	Acetaminophen	68	Atenolol	93	Diazepam
19	Ciprofloxacin	44	Prochlorperazine	69	Citalopram	94	Methocarbamol
20	Tetracycline	45	Vancomycin	70	Spirolactone	95	Diclofenac
21	Oxycodone	46	Metoprolol	71	Glipizide	96	Risperidone
22	Cephalexin	47	Hydrochlorothiazide	72	Nifedipine	97	Hydroxyzine
23	Naproxen	48	Nitrofurantoin	73	Lidocaine	98	Hydromorphone
24	Hydrocodone	49	Diphenhydramine	74	cyclobenzaprine	99	Heparin
25	Acetaminophen / Oxycodone	50	Losartan	75	Prazosin	100	quetiapine



# JET Results Synopsis

The JET collected data from both DoD and the VA on allergen terms. The data was combined and further analyzed for duplicates, incorrect classifications, etc. and reclassified at the ingredient/multi-ingredient level, and again for non-drug allergens. Lastly, the data was then validated with clinical experts in order to create a final list of Top 100 allergen terms and the 95% most frequently used allergen terms.





## Notable Findings from the JET

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1. Duplicates and allergen terms which are confirmed to be within the wrong category will be identified and removed or moved to the correct category.
2. Potential drug reactants will be identified and copied to a separate tab, but will also be left within the original non-drug reactant dataset.
3. Potential non-drug allergens will be identified and copied to a separate tab, but will also be left within the original drug reactant dataset.
4. Over-the-counter (OTC) drugs will remain in the original drug reactant dataset.





## Opportunities for Ensuing JETs

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- Identify gaps in UMLS CUI
- Determine if identification beyond the individual, active ingredient level is needed
- Determine if classes should be defined functionally, structurally, or a mixture of the two criteria
- Identify the best way to present this data to a broader community according to interest(s)



# Backup Slides



# Data Analysis Process Details

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## •RxMix – Crosswalk between code sets:

- RxCUI to UMLS CUI (these terms are one-to-one mapped):
  - Parameter: RxNorm/findRxcuiById, selecting input of UMLS CUI
- To find NUI for UMLS CUI or vice versa:
  - Parameter: NDF-RT/findConceptsById, selecting input of UMLSCUI or NUI
- Obtaining properties for codes:
  - Parameter: RxNorm/getRxConceptProperties
  - Parameter: RxNorm/getRxcuiStatus
  - Parameter: RxNorm/getRelatedByType = IN or MIN
  - NDF-RT/getConceptProperties = kind

## •Identifying Drug Classes:

- VA: classes were pulled simply from original dataset, filtered by NDF-RT
- DoD: identified manually by going through and marking the Class terms in the subset of the DoD allergen map that was not mapped to RxNorm
  - Used RxMix to get NUIs from the mapped UMLSCUIs, NUIs in RxMIX
  - Used RxMix to get NUIs by text string comparison
  - Few manually mapped

## •RxNorm Cross-Reference File provides the following information:

- Status, Name, Term Type (TTY), UMLS CUI (if status is not retired or alien)
- Related ingredient level RxCUI (IN or MIN), if only one term was returned
- Name, TTY, UMLS CUI of the related ingredient level term



## Additional Questions for Clinical Consideration

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- How should elements listed as reactants be classified (drug or non-drug)?
  - *Example: "Nickel"*
- How should ions listed as reactants be classified (drug or non-drug)?
  - *Example: "Sulfate Ion"*
- How should dyes, oils, herbals, preservatives, and sweeteners listed as reactants be classified (drug or non-drug)?
  - *Examples: "Soybean oil"; "Aspartame"; "Formaldehyde"; "Banana Extract"*



## Top 95 Percent DoD and VA Allergens

To view the full dataset, including the corresponding percentages, click on the Excel icon. For this specific listing of the Top 95 Percent of allergens most frequently used, note the following:



- 530 allergens out of a total of 1860 allergens are among the top 95 Percent of shared DoD and VA terms
- Periodic repeat analyses should take place in the future in order to capture changes in the shared term profile

1 Penicillin	20 Tetracycline	39 Cefaclor	58 Primaquine
2 Codeine	21 Oxycodone	40 rosuvastatin	59 Propoxyphene
3 Lisinopril	22 Cephalexin	41 venlafaxine	60 Pseudoephedrine
4 Penicillin G	23 Naproxen	42 Prednisone	61 sildenafil
5 Amoxicillin	24 Hydrocodone	43 Acetaminophen	62 zolpidem
6 Morphine	25 Acetaminophen / Oxycodone	44 Prochlorperazine	63 Amitriptyline
7 Simvastatin	26 Amoxicillin / Clavulanate	45 Vancomycin	64 tamsulosin
8 atorvastatin	27 Amlodipine	46 Metoprolol	65 Clarithromycin
9 Penicillin V	28 Doxycycline	47 Hydrochlorothiazide	66 Nicotine
10 Erythromycin	29 Azithromycin	48 Nitrofurantoin	67 Gemfibrozil
11 Aspirin	30 Clindamycin	49 Diphenhydramine	68 Atenolol
12 Sulfamethoxazole / Trimethoprim	31 Meperidine	50 Losartan	69 Citalopram
13 Ibuprofen	32 Trazodone	51 flunisolide	70 Spironolactone
14 gabapentin	33 Ampicillin	52 meloxicam	71 Glipizide
15 Iodine	34 Bupropion	53 Omeprazole	72 Nifedipine
16 Tramadol	35 Acetaminophen / Hydrocodone	54 Promethazine	73 Lidocaine
17 Metformin	36 Levofloxacin	55 Metronidazole	74 cyclobenzaprine
18 Pravastatin	37 Sertraline	56 Lovastatin	75 Prazosin
19 Ciprofloxacin	38 Terazosin	57 Lactose	



## Top 95 Percent DoD and VA Allergens, Continued

76	Fentanyl	10	12
77	Sumatriptan	1 Ketorolac	6 Bacitracin
78	Allopurinol	10	12
79	oxybutynin	2 lamotrigine	7 Phenobarbital
80	Indomethacin	10	12
81	Mirtazapine	3 Paroxetine	8 Ceftriaxone
82	Sulfamethoxazole	10	12
83	Fluoxetine	4 Nortriptyline	9 benazepril
84	Purified Protein Derivative of Tuberculin	10	13
85	Albuterol	5 Povidone-Iodine	0 gatifloxacin
86	Metoclopramide	10	13
87	topiramate	6 Enalapril	1 Amiodarone
88	Acetaminophen / Propoxyphene	10	13
89	pregabalin	7 Warfarin	2 Ranitidine
90	Minocycline	10	13
91	celecoxib	8 Baclofen	3 Inactivated Tetanus Toxoid
92	Methadone	10	13
93	Diazepam	9 POLLEN EXTRACTS	4 Phenytoin
94	Methocarbamol	11	13
95	Diclofenac	0 Acetaminophen / Codeine	5 Guaifenesin
96	Risperidone	11	13
97	Hydroxyzine	1 Clonidine	6 Lithium
98	Hydromorphone	11	13
99	Heparin	2 Procaine	7 Loratadine
10	quetiapine	11	13
0		3 Cortisone	8 Hydralazine
		11	13
		4 Carbamazepine	9 pantoprazole
		11	14
		5 donepezil	0 rofecoxib
		11	14
		6 Alendronate	1 Cefazolin
		11	14
		7 Fosinopril	2 Finasteride
		11	14
		8 Neomycin	3 duloxetine
		11	14
		9 Etodolac	4 clopidogrel
		12	14



# Top 95 Percent DoD and VA Allergens, Continued

15		17		20	
1	Alcohols	6	Buspirone	1	Cimetidine
15		17		20	
2	brimonidine	7	varenicline	2	Hydrocortisone
15		17		20	
3	Erythromycin / Sulfisoxazole	8	Pneumococcal vaccine	3	Benzoyl Peroxide
15		17		20	
4	Colestipol	9	Clonazepam	4	Cefixime
15		18		20	
5	lothalamate	0	aripiprazole	5	Cephadrine
15		18		20	
6	Cefuroxime	1	Isosorbide	6	lansoprazole
15		18		20	
7	cefprozil	2	Capsaicin	7	valsartan
15		18		20	
8	Epinephrine	3	rabeprazole	8	Fluconazole
15		18		20	
9	Verapamil	4	Trimethoprim	9	Iron
16		18		21	
0	carvedilol	5	terbinafine	0	Salsalate
16		18		21	
1	Cetirizine	6	Theophylline	1	Pertussis Vaccine
16		18		21	
2	Furosemide	7	Ramipril	2	Ofloxacin
16		18		21	
3	Felodipine	8	Dicloxacillin	3	Colchicine
16		18		21	
4	Fenofibrate	9	Haloperidol	4	Glyburide
16		19		21	
5	Vaccines, Typhoid	0	Pentazocine	5	tizanidine
16		19		21	
6	Nitroglycerin	1	Phenazopyridine	6	pioglitazone
16		19		21	
7	Testosterone	2	fluvastatin	7	APIS MELLIFERA VEN PROTEIN
16		19		21	
8	fluticasone	3	ropinirole	8	Ondansetron
16		19		21	
9	isoniazid	4	ezetimibe	9	Methylphenidate
17		19		22	



# Top 95 Percent DoD and VA Allergens, Continued

22		25		27	
6	Dicyclomine	1	levothyroxine	6	chocolate allergenic extract
22		25		27	
7	Ketoconazole	2	Itraconazole	7	Carisoprodol
22		25		27	
8	olanzapine	3	Sulfacetamide	8	Chlorhexidine
22		25		27	
9	Sulfasalazine	4	Enoxaparin	9	dorzolamide
23		25		28	
0	Midazolam	5	benzonatate	0	Miconazole
23		25		28	Acetaminophen / dichloralphenazone /
1	Methylprednisolone	6	Chlorpheniramine	1	isometheptene
23		25		28	
2	Mometasone	7	Chlorpromazine	2	Piperacillin / tazobactam
23		25		28	
3	Butorphanol	8	Benzoin	3	ziprasidone
23		25		28	
4	montelukast	9	Acarbose	4	Nystatin
23		26		28	
5	Doxepin	0	Benzocaine	5	oxaprozin
23		26		28	
6	Hydroxychloroquine	1	Salicylic Acid	6	Esomeprazole
23		26		28	
7	Temazepam	2	Sulfisoxazole	7	Cerivastatin sodium
23		26		28	
8	strawberry allergenic extract	3	Iodides	8	pineapple extract
23		26		28	
9	Cholestyramine Resin	4	Alprazolam	9	Meclizine
24		26		29	
0	Chlorzoxazone	5	rosiglitazone	0	Dextromethorphan
24		26		29	
1	Primidone	6	Chloroquine	1	Gentamicin Sulfate (USP)
24		26		29	
2	Captopril	7	peanut allergenic extract	2	Digoxin
24		26		29	
3	Cat dander extract	8	trivalent influenza vaccine	3	Droperidol
24		26		29	
4	Succinylcholine	9	cilostazol	4	Terfenadine
24		27		29	





# Top 95 Percent DoD and VA Allergens, Continued

30		32		35	
1	Nalbuphine	6	Amantadine	1	tolterodine
30		32		35	
2	Propofol	7	cefepime	2	oxcarbazepine
30		32		35	
3	rivaroxaban	8	Barium Sulfate	3	Scopolamine
30		32		35	
4	cefpodoxime	9	telmisartan	4	Mefloquine
30		33		35	
5	Chlorpheniramine / Phenylpropanolamine	0	Naltrexone	5	Cholecalciferol
30		33	Atropine / Hyoscyamine / Phenobarbital /	35	
6	Budesonide / formoterol	1	Scopolamine	6	Benzalkonium
30			Bordetella pertussis filamentous	35	
7	Triamcinolone		hemagglutinin vaccine, inactivated /	7	alfuzosin
30			Bordetella pertussis toxoid vaccine,	35	
8	Cefoperazone		inactivated / diphtheria toxoid vaccine,	8	Onion extract
30		33	inactivated / tetanus toxoid vaccine,	35	
30	Bacitracin / Hydrocortisone / Neomycin /	2	inactivated	9	Bacitracin / Polymyxin B
9	Polymyxin B	33		36	
31		3	prednisolone	0	rizatriptan
0	Oxytetracycline	33		36	Acetaminophen / Diphenhydramine /
31		4	Phenylephrine	1	Phenylephrine
1	Lactase	33		36	
31		5	Minoxidil	2	Estrogens, Conjugated (USP)
2	irbesartan	33		36	
31		6	Sotalol	3	Lactase / rennet
3	Chlorpheniramine / Pseudoephedrine	33		36	
31		7	Thiopental	4	Orphenadrine
4	quinapril	33		36	
31		8	Magnesium Oxide	5	Memantine
5	Aspirin / butalbital / Caffeine	33		36	
31		9	nabumetone	6	saxagliptin
6	homatropine / Hydrocodone	34		36	
31		0	Smallpox Vaccine	7	Neomycin / Polymyxin B
7	Clotrimazole	34		36	
31		1	valdecoxib	8	Potassium Chloride
8	Nafcillin	34		36	
31		2	Ethinyl Estradiol / Levonorgestrel	9	fluticasone / salmeterol
9	Imipramine	34		37	
32		3	Smallpox Vaccine		



## Top 95 Percent DoD and VA Allergens, Continued

37		40		42	
6	mesalamine	1	Bupivacaine	6	Calcium Carbonate
37		40		42	
7	Ascorbic Acid	2	Ephedrine	7	valacyclovir
37		40		42	
8	tetanus toxoid vaccine, inactivated	3	linezolid	8	lurasidone
37		40		42	
9	peach allergenic extract	4	Hydrocortisone / Neomycin / Polymyxin B	9	Estradiol
38		40		43	
0	Estrogens	5	Daptomycin	0	Belladonna Alkaloids
38		40	Acetaminophen / phenyltoloxamine /		Influenza A virus vaccine, A-
1	Ticlopidine	6	salicylamide		California-7-2009 (H1N1)-like virus /
38		40			Influenza A virus vaccine, A-
2	Ketamine	7	almond allergenic extract		Victoria-361-2011 (H3N2)-like virus /
38		40		43	Influenza B virus vaccine, B-
3	Acetaminophen / butalbital / Caffeine	8	Apple extract	1	Wisconsin-1-2010-like virus
38		40		43	
4	Acetazolamide	9	Lactulose	2	atomoxetine
38		41		43	
5	nefazodone	0	Diphenhydramine / Pseudoephedrine	3	Tetracaine
38		41		43	
6	Desipramine	1	Terbutaline	4	liraglutide
38		41		43	
7	Labetalol	2	Cyproheptadine	5	Iohexol
38		41		43	
8	sitagliptin	3	Metolazone	6	Risedronate
38		41		43	
9	Caffeine / Ergotamine	4	infliximab	7	Sucralfate
39		41		43	
0	trimethobenzamide	5	Calamine	8	Acetaminophen / Aspirin / Caffeine
39		41		43	
1	Amphetamine	6	Aspirin / Codeine	9	Pramipexole
39		41		44	
2	zonisamide	7	Phenylpropanolamine	0	pitavastatin
39		41		44	
3	Budesonide	8	Benzotropine	1	mercaptopurine
39		41		44	
4	Old tuberculin	9	norelgestromin	2	ertapenem
39		42		44	



# Top 95 Percent DoD and VA Allergens, Continued

45		47		50		52	
1	exenatide	6	Isosorbide Dinitrate	1	Aminophylline	6	Carboplatin
45		47		50		52	
2	Mupirocin	7	Ephedrine / Phenobarbital / Theophylline	2	Chlordiazepoxide	7	Furazolidone
45		47		50		52	
3	Lincomycin	8	metaproterenol	3	Methyldopa	8	iopromide
45		47		50		52	
4	candesartan	9	ezetimibe / Simvastatin	4	Nitrous Oxide	9	trichloroacetaldehyde
45		48			Amphetamine aspartate / Amphetamine	53	
5	Fluorescein	0	Iron Carbonyl	50	Sulfate / Dextroamphetamine saccharate /	0	Glycopyrrolate
45		48		5	Dextroamphetamine Sulfate		
6	glimepiride	1	sultamicillin	50			
45		48		6	avocado allergenic extract		
7	Melatonin	2	Eszopiclone	50			
45		48		7	carbinoxamine / Pseudoephedrine		
8	Cefotetan	3	dorzolamide / Timolol	50			
45		48		8	carrot allergenic extract		
9	Flecainide	4	modafinil	50			
46		48		9	cherry allergenic extract		
0	Oxymetazoline	5	bismuth subsalicylate	51			
46		48		0	Dihydroergotoxine		
1	Beclomethasone	6	Oxytocin	51			
46		48		1	Typhoid Vaccine Live Ty21a		
2	Aspirin / Caffeine / Orphenadrine	7	Rabies Vaccines	51			
46		48		2	Phenylbutazone		
3	rivastigmine	8	allyl sulfide	51			
46		48		3	Glucosamine		
4	Cefoxitin	9	Anthrax Vaccine Adsorbed	51			
46		49		4	salmeterol		
5	rituximab	0	Flurbiprofen	51			
46		49		5	Halothane		
6	Mepivacaine	1	Atropine / Diphenoxylate	51			
46		49		6	Ticagrelor		
7	Cocaine	2	Dipyridamole	51			
46		49		7	Opium		
8	abacavir	3	Probenecid	51			
46		49		8	Tropicamide		
9	efavirenz	4	Interferon Alfa-2a	51			
47		49		9	Bacitracin / Neomycin / Polymyxin B		