Improving Data Validation Performance

Vanessa Willis, BS
Data Quality Coordinator
Colorado Department of Public Health and Environment

Outline

- Background
- Data Validation Manual Process
- Process Improvement
- Implementing Process Improvement
- Data Validation Automated Process
- Manual Process vs. Automated Process

Background

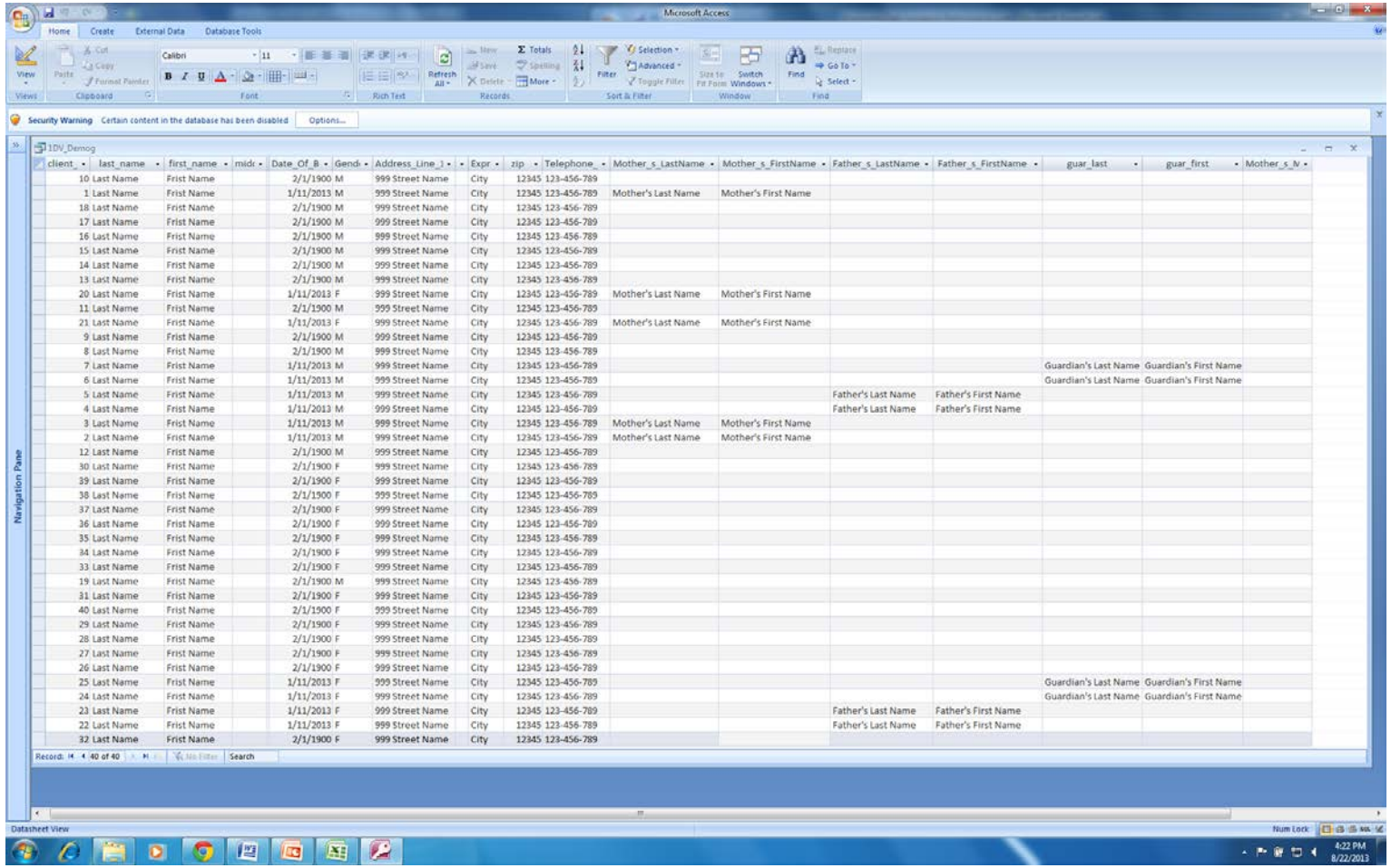
- The data validation is an integral step for the Colorado Immunization Information System (CIIS) to receive accurate and complete data from providers that want to electronically report to the immunization registry.
- There are over 450 providers on the CIIS waiting list for interface implementation.

Manual Process

Data validation review was a manual process requiring several steps.

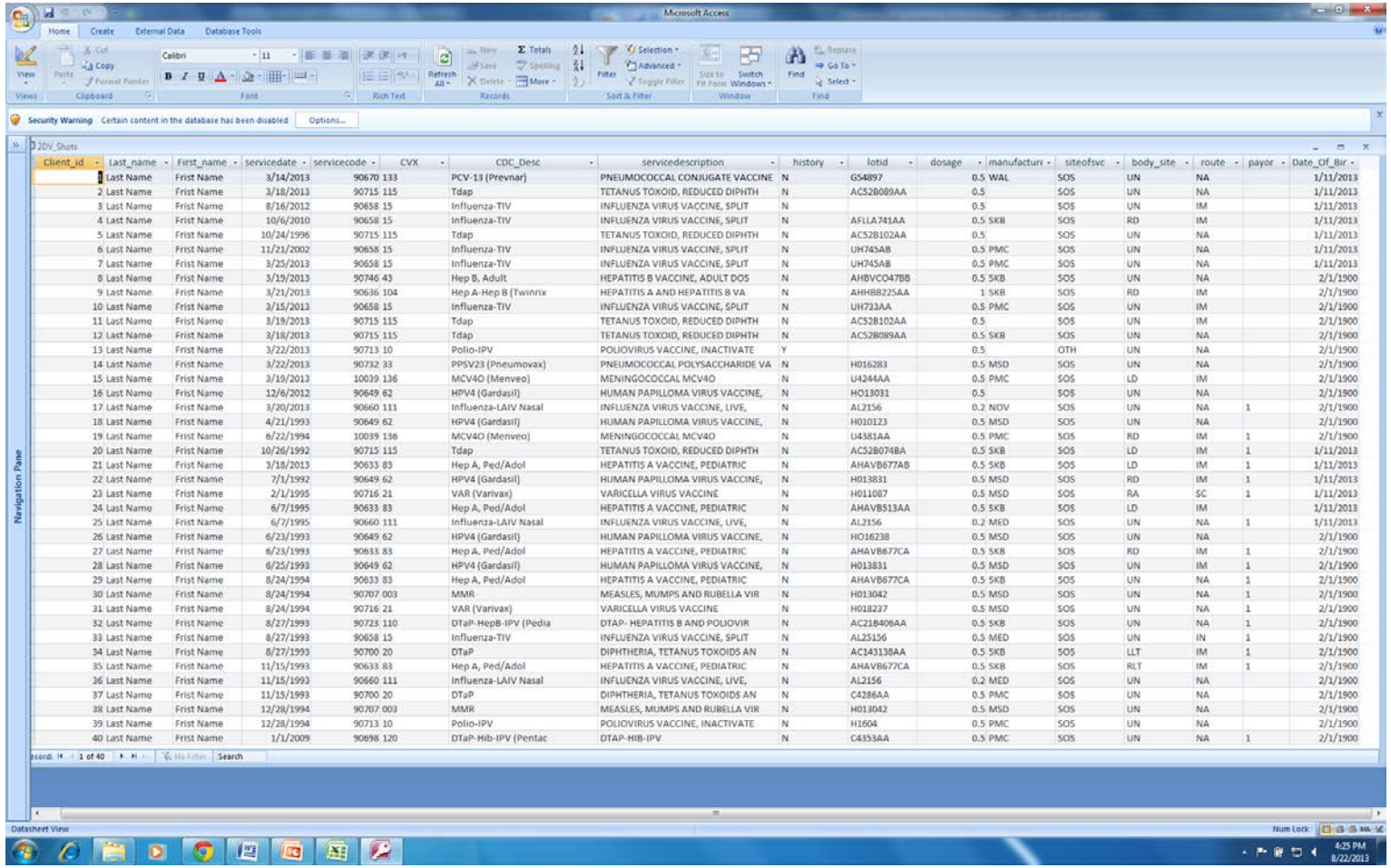
- The raw data sent in the HL7 format is organized into an Access database.
  - Two series of SQL queries are executed
    - The first SQL query pulls all the data together and separates the demographic data from the vaccine services data.
    - The second SQL query pulls out 40 randomly selected patients to be included in the review.

Access Database: Demographics



client_	last_name	first_name	midc	Date_Of_B	Gend	Address_Line_1	Expr	zip	Telephone_	Mother_s_LastName	Mother_s_FirstName	Father_s_LastName	Father_s_FirstName	guar_last	guar_first	Mother_s_N
10	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
1	Last Name	Frist Name		1/11/2013	M	999 Street Name	City	12345	123-456-789	Mother's Last Name	Mother's First Name					
18	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
17	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
16	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
15	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
14	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
13	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
20	Last Name	Frist Name		1/11/2013	F	999 Street Name	City	12345	123-456-789	Mother's Last Name	Mother's First Name					
11	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
21	Last Name	Frist Name		1/11/2013	F	999 Street Name	City	12345	123-456-789	Mother's Last Name	Mother's First Name					
9	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
8	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
7	Last Name	Frist Name		1/11/2013	M	999 Street Name	City	12345	123-456-789					Guardian's Last Name	Guardian's First Name	
6	Last Name	Frist Name		1/11/2013	M	999 Street Name	City	12345	123-456-789					Guardian's Last Name	Guardian's First Name	
5	Last Name	Frist Name		1/11/2013	M	999 Street Name	City	12345	123-456-789			Father's Last Name	Father's First Name			
4	Last Name	Frist Name		1/11/2013	M	999 Street Name	City	12345	123-456-789			Father's Last Name	Father's First Name			
3	Last Name	Frist Name		1/11/2013	M	999 Street Name	City	12345	123-456-789	Mother's Last Name	Mother's First Name					
2	Last Name	Frist Name		1/11/2013	M	999 Street Name	City	12345	123-456-789	Mother's Last Name	Mother's First Name					
12	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
30	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
39	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
38	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
37	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
36	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
35	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
34	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
33	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
19	Last Name	Frist Name		2/1/1900	M	999 Street Name	City	12345	123-456-789							
31	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
40	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
29	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
28	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
27	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
26	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							
25	Last Name	Frist Name		1/11/2013	F	999 Street Name	City	12345	123-456-789					Guardian's Last Name	Guardian's First Name	
24	Last Name	Frist Name		1/11/2013	F	999 Street Name	City	12345	123-456-789					Guardian's Last Name	Guardian's First Name	
23	Last Name	Frist Name		1/11/2013	F	999 Street Name	City	12345	123-456-789			Father's Last Name	Father's First Name			
22	Last Name	Frist Name		1/11/2013	F	999 Street Name	City	12345	123-456-789			Father's Last Name	Father's First Name			
32	Last Name	Frist Name		2/1/1900	F	999 Street Name	City	12345	123-456-789							

Access Database: Vaccines



Microsoft Access

Security Warning Certain content in the database has been disabled Options...

2DV_Shots

Client_id	last_name	First_name	servicedate	servicecode	CVX	CDC_Desc	servicedescription	history	lotid	dosage	manufacturer	siteofsvc	body_site	route	payor	Date_Of_Bir
1	Last Name	Frist Name	3/14/2013	90670	133	PCV-13 (Prevnar)	PNEUMOCOCCAL CONJUGATE VACCINE	N	G54897	0.5	WAL	SOS	UN	NA		1/11/2013
2	Last Name	Frist Name	3/18/2013	90715	115	Tdap	TETANUS TOXOID, REDUCED DIPHTH	N	AC52B089AA	0.5		SOS	UN	NA		1/11/2013
3	Last Name	Frist Name	8/16/2012	90658	15	Influenza-TIV	INFLUENZA VIRUS VACCINE, SPLIT	N		0.5		SOS	UN	IM		1/11/2013
4	Last Name	Frist Name	10/6/2010	90658	15	Influenza-TIV	INFLUENZA VIRUS VACCINE, SPLIT	N	AFLLA741AA	0.5	SKB	SOS	RD	IM		1/11/2013
5	Last Name	Frist Name	10/24/1996	90715	115	Tdap	TETANUS TOXOID, REDUCED DIPHTH	N	AC52B102AA	0.5		SOS	UN	NA		1/11/2013
6	Last Name	Frist Name	11/21/2002	90658	15	Influenza-TIV	INFLUENZA VIRUS VACCINE, SPLIT	N	UH745AB	0.5	PMC	SOS	UN	NA		1/11/2013
7	Last Name	Frist Name	3/25/2013	90658	15	Influenza-TIV	INFLUENZA VIRUS VACCINE, SPLIT	N	UH745AB	0.5	PMC	SOS	UN	NA		1/11/2013
8	Last Name	Frist Name	3/19/2013	90746	43	Hep B, Adult	HEPATITIS B VACCINE, ADULT DOS	N	AHBVC047BB	0.5	SKB	SOS	UN	NA		2/1/1900
9	Last Name	Frist Name	3/21/2013	90636	104	Hep A-Hep B (Twinrix	HEPATITIS A AND HEPATITIS B VA	N	AHHBB225AA	1	SKB	SOS	RD	IM		2/1/1900
10	Last Name	Frist Name	3/15/2013	90658	15	Influenza-TIV	INFLUENZA VIRUS VACCINE, SPLIT	N	UH733AA	0.5	PMC	SOS	UN	IM		2/1/1900
11	Last Name	Frist Name	3/19/2013	90715	115	Tdap	TETANUS TOXOID, REDUCED DIPHTH	N	AC52B102AA	0.5		SOS	UN	IM		2/1/1900
12	Last Name	Frist Name	3/18/2013	90715	115	Tdap	TETANUS TOXOID, REDUCED DIPHTH	N	AC52B089AA	0.5	SKB	SOS	UN	NA		2/1/1900
13	Last Name	Frist Name	3/22/2013	90713	10	Polio-IPV	POLIOVIRUS VACCINE, INACTIVATE	Y		0.5		OTH	UN	NA		2/1/1900
14	Last Name	Frist Name	3/22/2013	90732	33	PPSV23 (Pneumovax)	PNEUMOCOCCAL POLYSACCHARIDE VA	N	H016283	0.5	MSD	SOS	UN	NA		2/1/1900
15	Last Name	Frist Name	3/19/2013	10039	136	MCV4O (Menveo)	MENINGOCOCCAL MCV4O	N	U4244AA	0.5	PMC	SOS	LD	IM		2/1/1900
16	Last Name	Frist Name	12/6/2012	90649	62	HPV4 (Gardasil)	HUMAN PAPILLOMA VIRUS VACCINE,	N	HO13031	0.5		SOS	UN	NA		2/1/1900
17	Last Name	Frist Name	3/20/2013	90660	111	Influenza-LAIV Nasal	INFLUENZA VIRUS VACCINE, LIVE,	N	AL2156	0.2	NOV	SOS	UN	NA	1	2/1/1900
18	Last Name	Frist Name	4/21/1993	90649	62	HPV4 (Gardasil)	HUMAN PAPILLOMA VIRUS VACCINE,	N	H010123	0.5	MSD	SOS	UN	NA		2/1/1900
19	Last Name	Frist Name	6/22/1994	10039	136	MCV4O (Menveo)	MENINGOCOCCAL MCV4O	N	U4381AA	0.5	PMC	SOS	RD	IM	1	2/1/1900
20	Last Name	Frist Name	10/26/1992	90715	115	Tdap	TETANUS TOXOID, REDUCED DIPHTH	N	AC52B074BA	0.5	SKB	SOS	LD	IM	1	1/11/2013
21	Last Name	Frist Name	3/18/2013	90633	83	Hep A, Ped/Adol	HEPATITIS A VACCINE, PEDIATRIC	N	AHAVB677AB	0.5	SKB	SOS	LD	IM	1	1/11/2013
22	Last Name	Frist Name	7/1/1992	90649	62	HPV4 (Gardasil)	HUMAN PAPILLOMA VIRUS VACCINE,	N	H013831	0.5	MSD	SOS	RD	IM	1	1/11/2013
23	Last Name	Frist Name	2/1/1995	90716	21	VAR (Varivax)	VARICELLA VIRUS VACCINE	N	H011087	0.5	MSD	SOS	RA	SC	1	1/11/2013
24	Last Name	Frist Name	6/7/1995	90633	83	Hep A, Ped/Adol	HEPATITIS A VACCINE, PEDIATRIC	N	AHAVB513AA	0.5	SKB	SOS	LD	IM		1/11/2013
25	Last Name	Frist Name	6/7/1995	90660	111	Influenza-LAIV Nasal	INFLUENZA VIRUS VACCINE, LIVE,	N	AL2156	0.2	MED	SOS	UN	NA	1	1/11/2013
26	Last Name	Frist Name	6/23/1993	90649	62	HPV4 (Gardasil)	HUMAN PAPILLOMA VIRUS VACCINE,	N	HO16238	0.5	MSD	SOS	UN	NA		2/1/1900
27	Last Name	Frist Name	6/23/1993	90633	83	Hep A, Ped/Adol	HEPATITIS A VACCINE, PEDIATRIC	N	AHAVB677CA	0.5	SKB	SOS	RD	IM	1	2/1/1900
28	Last Name	Frist Name	6/25/1993	90649	62	HPV4 (Gardasil)	HUMAN PAPILLOMA VIRUS VACCINE,	N	H013831	0.5	MSD	SOS	UN	IM	1	2/1/1900
29	Last Name	Frist Name	8/24/1994	90633	83	Hep A, Ped/Adol	HEPATITIS A VACCINE, PEDIATRIC	N	AHAVB677CA	0.5	SKB	SOS	UN	NA	1	2/1/1900
30	Last Name	Frist Name	8/24/1994	90707	003	MMR	MEASLES, MUMPS AND RUBELLA VIR	N	H013042	0.5	MSD	SOS	UN	NA	1	2/1/1900
31	Last Name	Frist Name	8/24/1994	90716	21	VAR (Varivax)	VARICELLA VIRUS VACCINE	N	H018237	0.5	MSD	SOS	UN	NA	1	2/1/1900
32	Last Name	Frist Name	8/27/1993	90723	110	DTaP-HepB-IPV (Pedia	DTAP- HEPATITIS B AND POLIOVIR	N	AC21B406AA	0.5	SKB	SOS	UN	NA	1	2/1/1900
33	Last Name	Frist Name	8/27/1993	90658	15	Influenza-TIV	INFLUENZA VIRUS VACCINE, SPLIT	N	AL25156	0.5	MED	SOS	UN	IN	1	2/1/1900
34	Last Name	Frist Name	8/27/1993	90700	20	DTaP	DIPHTHERIA, TETANUS TOXOIDS AN	N	AC143138AA	0.5	SKB	SOS	LLT	IM	1	2/1/1900
35	Last Name	Frist Name	11/15/1993	90633	83	Hep A, Ped/Adol	HEPATITIS A VACCINE, PEDIATRIC	N	AHAVB677CA	0.5	SKB	SOS	RLT	IM	1	2/1/1900
36	Last Name	Frist Name	11/15/1993	90660	111	Influenza-LAIV Nasal	INFLUENZA VIRUS VACCINE, LIVE,	N	AL2156	0.2	MED	SOS	UN	NA		2/1/1900
37	Last Name	Frist Name	11/15/1993	90700	20	DTaP	DIPHTHERIA, TETANUS TOXOIDS AN	N	C4286AA	0.5	PMC	SOS	UN	NA		2/1/1900
38	Last Name	Frist Name	12/28/1994	90707	003	MMR	MEASLES, MUMPS AND RUBELLA VIR	N	H013042	0.5	MSD	SOS	UN	NA		2/1/1900
39	Last Name	Frist Name	12/28/1994	90713	10	Polio-IPV	POLIOVIRUS VACCINE, INACTIVATE	N	H1604	0.5	PMC	SOS	UN	NA		2/1/1900
40	Last Name	Frist Name	1/1/2009	90698	120	DTaP-Hib-IPV (Pentac	DTAP-HIB-IPV	N	C4353AA	0.5	PMC	SOS	UN	NA	1	2/1/1900

Record: 14 1 of 40 No Filter Search

Navigation Pane

Datasheet View

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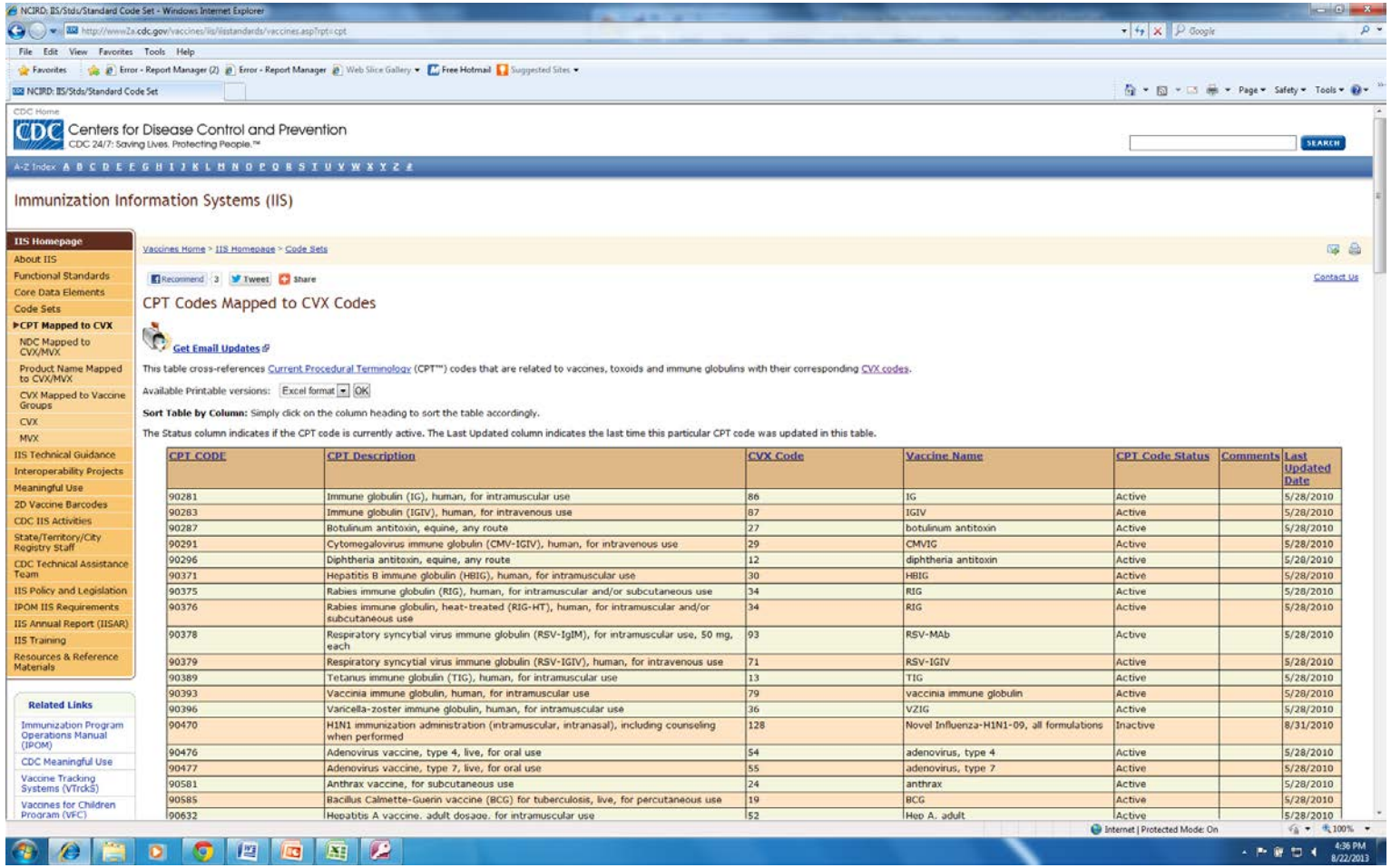
Manual Process *continued*

- The data in the Access database is compared to the hard copy records received from the provider for the 40 selected patients.
  - patient's first and last name
  - patient's address and phone number
  - gender
  - date of birth
  - parent name (if the patient is under 19 years of age)
  - vaccination administration dates
  - vaccine names
  - lot numbers (if administered)
  - administering clinic
  - VFC eligibility
  - CPT/CVX codes

Manual Process *continued*

- Several reference tables are used to verify the accuracy of the vaccine services.
  - CDC Immunization Information Systems (IIS) tables is used to check:
    - CPT codes
    - CVX codes
    - Manufacturer codes
  - Pink Book references tables include:
    - U.S Vaccine
    - Selected Discontinued U.S Vaccines
    - Administering Vaccines: Dose, Route, Site and Needle Size
  - CIIS Reference Code Table created by our Nurse Consultant

CDC IIS: CPT Code, CPT Description, CVX Code, and Vaccine Name



NCIRD: IIS/Stds/Standard Code Set - Windows Internet Explorer

http://www2a.cdc.gov/vaccines/iis/iisstandards/vaccines.asp?rpt=cpt

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Favorites | Error - Report Manager (2) | Error - Report Manager | Web Slice Gallery | Free Hotmail | Suggested Sites

NCIRD: IIS/Stds/Standard Code Set

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Vaccines for Children Program (VFC)

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CPT Codes Mapped to CVX Codes

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This table cross-references Current Procedural Terminology (CPT™) codes that are related to vaccines, toxoids and immune globulins with their corresponding CVX codes.

Available Printable versions: Excel format OK

Sort Table by Column: Simply click on the column heading to sort the table accordingly.

The Status column indicates if the CPT code is currently active. The Last Updated column indicates the last time this particular CPT code was updated in this table.

CPT CODE	CPT Description	CVX Code	Vaccine Name	CPT Code Status	Comments	Last Updated Date
90281	Immune globulin (IG), human, for intramuscular use	86	IG	Active		5/28/2010
90283	Immune globulin (IGIV), human, for intravenous use	87	IGIV	Active		5/28/2010
90287	Botulinum antitoxin, equine, any route	27	botulinum antitoxin	Active		5/28/2010
90291	Cytomegalovirus immune globulin (CMV-IGIV), human, for intravenous use	29	CMVIG	Active		5/28/2010
90296	Diphtheria antitoxin, equine, any route	12	diphtheria antitoxin	Active		5/28/2010
90371	Hepatitis B immune globulin (HBIG), human, for intramuscular use	30	HBIG	Active		5/28/2010
90375	Rabies immune globulin (RIG), human, for intramuscular and/or subcutaneous use	34	RIG	Active		5/28/2010
90376	Rabies immune globulin, heat-treated (RIG-HT), human, for intramuscular and/or subcutaneous use	34	RIG	Active		5/28/2010
90378	Respiratory syncytial virus immune globulin (RSV-IgIM), for intramuscular use, 50 mg, each	93	RSV-MAb	Active		5/28/2010
90379	Respiratory syncytial virus immune globulin (RSV-IGIV), human, for intravenous use	71	RSV-IGIV	Active		5/28/2010
90389	Tetanus immune globulin (TIG), human, for intramuscular use	13	TIG	Active		5/28/2010
90393	Vaccinia immune globulin, human, for intramuscular use	79	vaccinia immune globulin	Active		5/28/2010
90396	Varicella-zoster immune globulin, human, for intramuscular use	36	VZIG	Active		5/28/2010
90470	H1N1 immunization administration (intramuscular, intranasal), including counseling when performed	128	Novel Influenza-H1N1-09, all formulations	Inactive		8/31/2010
90476	Adenovirus vaccine, type 4, live, for oral use	54	adenovirus, type 4	Active		5/28/2010
90477	Adenovirus vaccine, type 7, live, for oral use	55	adenovirus, type 7	Active		5/28/2010
90581	Anthrax vaccine, for subcutaneous use	24	anthrax	Active		5/28/2010
90585	Bacillus Calmette-Guerin vaccine (BCG) for tuberculosis, live, for percutaneous use	19	BCG	Active		5/28/2010
90632	Hepatitis A vaccine, adult dosage, for intramuscular use	52	Hep A, adult	Active		5/28/2010

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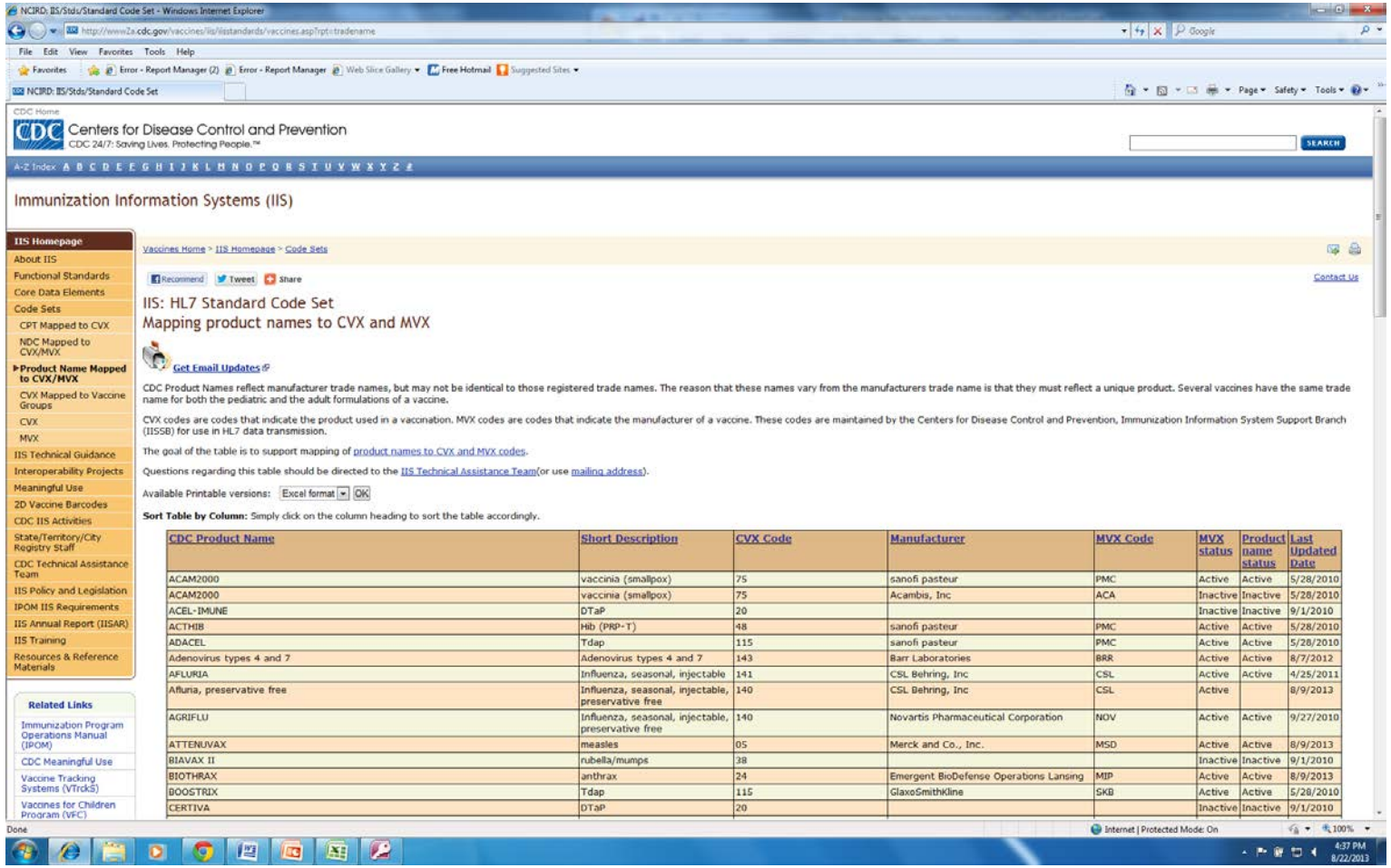
CDC IIS: Product Name, Short Description, and Manufacturer Name and Code



NCIRD: IIS/Stds/Standard Code Set - Windows Internet Explorer

http://www2a.cdc.gov/vaccines/iis/iisstandards/vaccines.asp?rpt=tradename

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Related Links
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- CDC Meaningful Use
- Vaccine Tracking Systems (VTrckS)
- Vaccines for Children Program (VFC)

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IIS: HL7 Standard Code Set
Mapping product names to CVX and MVX

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CDC Product Names reflect manufacturer trade names, but may not be identical to those registered trade names. The reason that these names vary from the manufacturers trade name is that they must reflect a unique product. Several vaccines have the same trade name for both the pediatric and the adult formulations of a vaccine.

CVX codes are codes that indicate the product used in a vaccination. MVX codes are codes that indicate the manufacturer of a vaccine. These codes are maintained by the Centers for Disease Control and Prevention, Immunization Information System Support Branch (IISSB) for use in HL7 data transmission.

The goal of the table is to support mapping of product names to CVX and MVX codes.

Questions regarding this table should be directed to the IIS Technical Assistance Team(or use mailing address).

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Sort Table by Column: Simply click on the column heading to sort the table accordingly.

CDC Product Name	Short Description	CVX Code	Manufacturer	MVX Code	MVX status	Product name status	Last Updated Date
ACAM2000	vaccinia (smallpox)	75	sanofi pasteur	PMC	Active	Active	5/28/2010
ACAM2000	vaccinia (smallpox)	75	Acambis, Inc	ACA	Inactive	Inactive	5/28/2010
ACEL-IMUNE	DTaP	20			Inactive	Inactive	9/1/2010
ACTHIB	Hib (PRP-T)	48	sanofi pasteur	PMC	Active	Active	5/28/2010
ADACEL	Tdap	115	sanofi pasteur	PMC	Active	Active	5/28/2010
Adenovirus types 4 and 7	Adenovirus types 4 and 7	143	Barr Laboratories	BRR	Active	Active	8/7/2012
AFLURIA	Influenza, seasonal, injectable	141	CSL Behring, Inc	CSL	Active	Active	4/25/2011
Afluria, preservative free	Influenza, seasonal, injectable, preservative free	140	CSL Behring, Inc	CSL	Active		8/9/2013
AGRIFLU	Influenza, seasonal, injectable, preservative free	140	Novartis Pharmaceutical Corporation	NOV	Active	Active	9/27/2010
ATTENUVAX	measles	05	Merck and Co., Inc.	MSD	Active	Active	8/9/2013
BIAVAX II	rubella/mumps	38			Inactive	Inactive	9/1/2010
BIOTHRAX	anthrax	24	Emergent BioDefense Operations Lansing	MIP	Active	Active	8/9/2013
BOOSTRIX	Tdap	115	GlaxoSmithKline	SKB	Active	Active	5/28/2010
CERTIVA	DTaP	20			Inactive	Inactive	9/1/2010

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Pink Book


CDC - Pinkbook: Cover and Front Matter - Epidemiology of Vaccine-Preventable Diseases - Windows Internet Explorer
http://www.cdc.gov/vaccines/pubs/pinkbook/table-of-contents.html
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Cover, Front Matter, and Table of Contents
Epidemiology and Prevention of Vaccine-Preventable Diseases
The Pink Book: Course Textbook - 12th Edition Second Printing (May 2012)
Printer friendly version [204 KB, 12 pages]
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On the Cover
Front Matter
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Vaccines and Related Products Distributed in the United States - 2011
On the Cover
Epidemiology and Prevention of Vaccine-Preventable Diseases
12th Edition
Four scientists who made major contributions to vaccine research and development (clockwise from top left): Emil von Behring (1854-1917) – developed the first effective diphtheria antitoxin. For this work he received the first Nobel Prize for Medicine or Physiology in 1901; Gaston Ramon (1886-1963) – French veterinarian who in the 1920s developed methods for inactivating diphtheria and tetanus toxins, a critical discovery for the development of diphtheria and tetanus toxoids; Maurice Hilleman (1919-2005) – researcher who developed numerous vaccines at Merck including hepatitis B., mumps, and MMR vaccines; John Enders (1897-1985) – developed a method to grow poliovirus using tissue culture media which led to the development of the first successful polio vaccines. He and his coworkers received the Nobel Prize in Medicine in 1954 for this discovery. Dr. Enders was also the first to isolate measles virus in 1954, which led to the first measles vaccine.
Images of these scientists appear in the animated "gallery" shown at the beginning of all NCIRD broadcasts and video productions.
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Front Matter
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E-mail address for comments, questions or suggestions about the contents of this book: nipinfo@cdc.gov.
Edited by: William Atkinson, MD, MPH; Charles (Skip) Wolfe; Jennifer Hamborsky, MPH, CHES
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Email page link
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Contact Us:
Centers for Disease Control and Prevention
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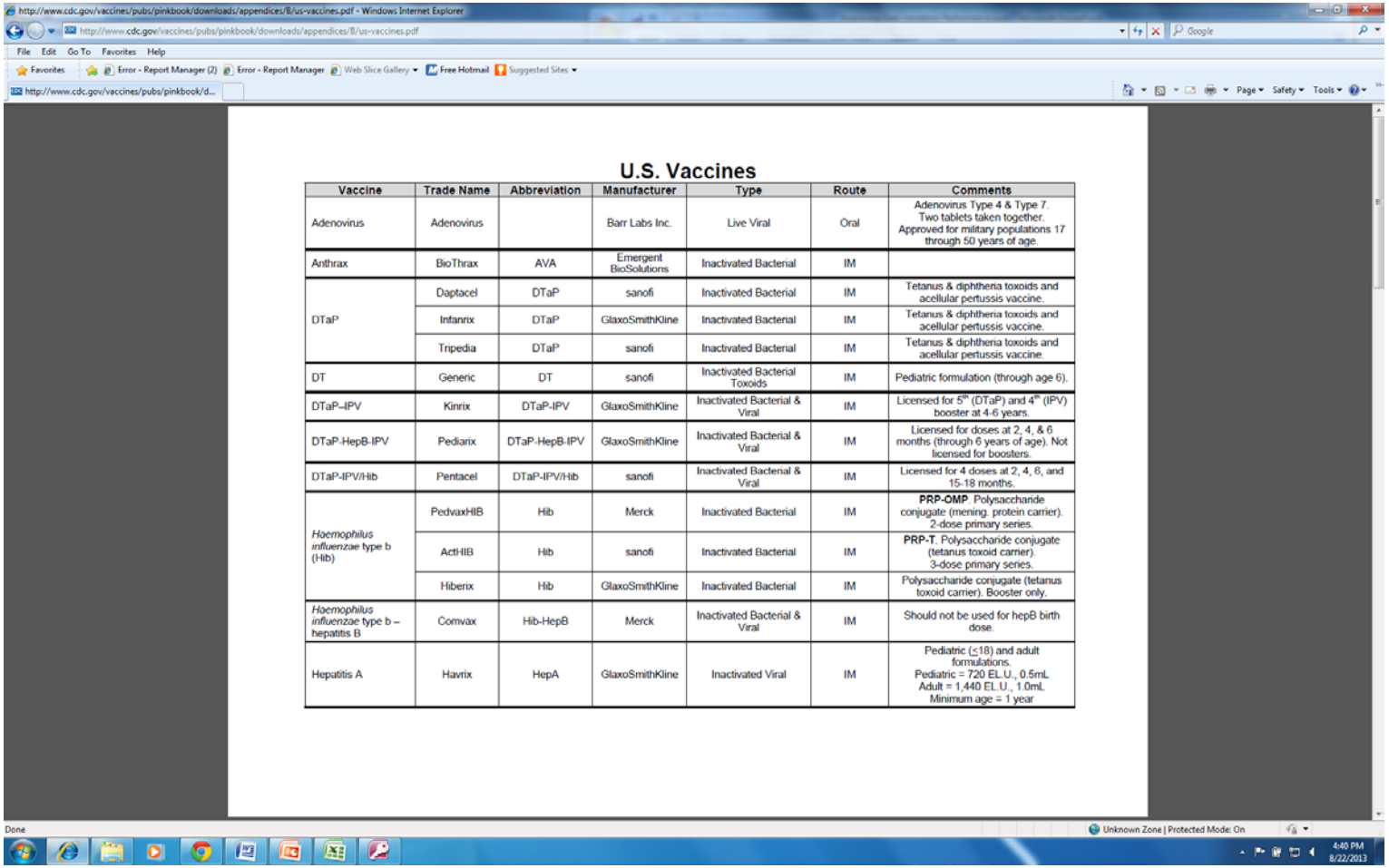
Pink Book: U.S. Vaccine Table



U.S. Vaccines

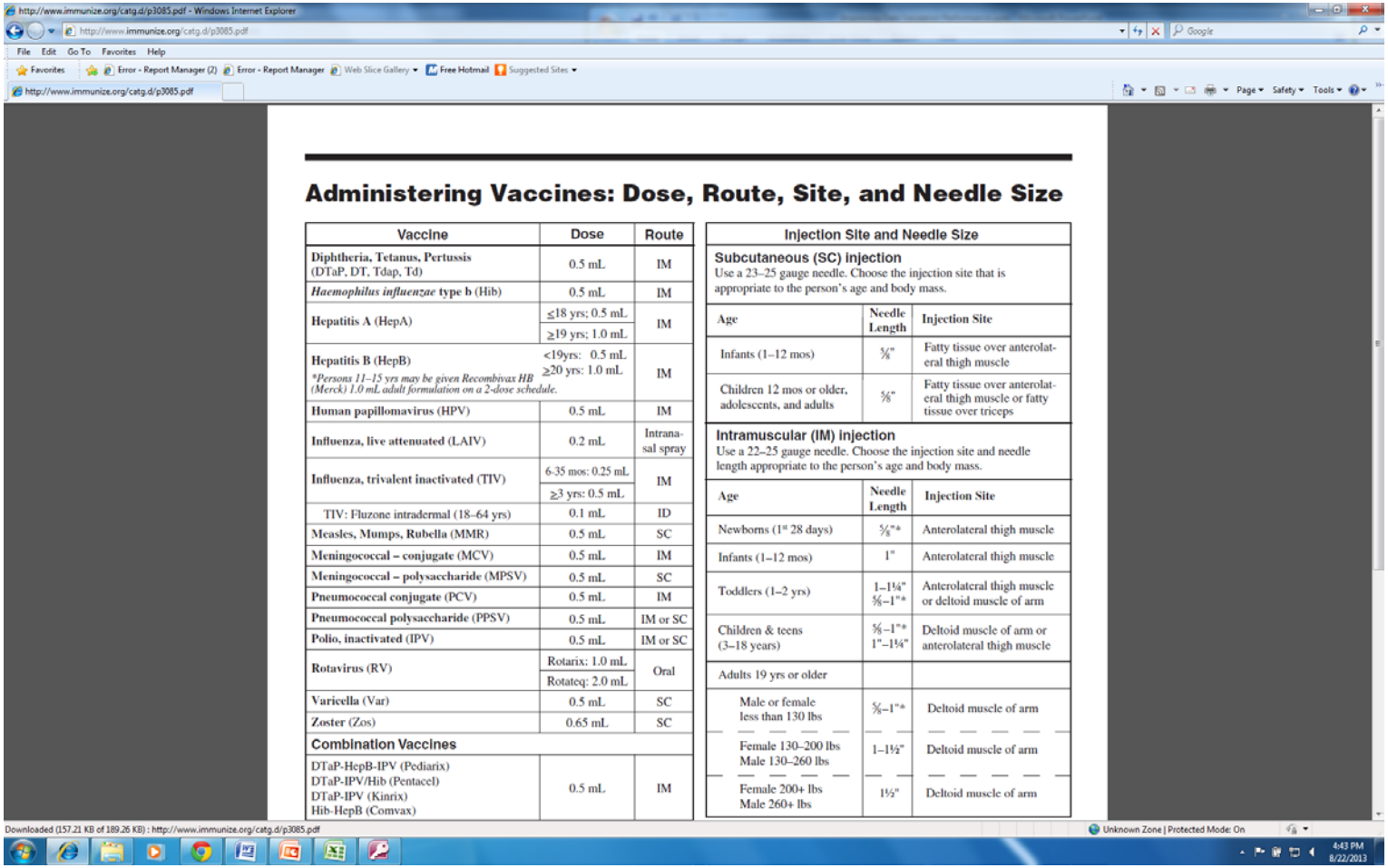
Vaccine	Trade Name	Abbreviation	Manufacturer	Type	Route	Comments
Adenovirus	Adenovirus		Barr Labs Inc.	Live Viral	Oral	Adenovirus Type 4 & Type 7. Two tablets taken together. Approved for military populations 17 through 50 years of age.
Anthrax	BioThrax	AVA	Emergent BioSolutions	Inactivated Bacterial	IM	
DTaP	Daptacel	DTaP	sanofi	Inactivated Bacterial	IM	Tetanus & diphtheria toxoids and acellular pertussis vaccine.
	Infanrix	DTaP	GlaxoSmithKline	Inactivated Bacterial	IM	Tetanus & diphtheria toxoids and acellular pertussis vaccine.
	Tripedia	DTaP	sanofi	Inactivated Bacterial	IM	Tetanus & diphtheria toxoids and acellular pertussis vaccine.
DT	Generic	DT	sanofi	Inactivated Bacterial Toxoids	IM	Pediatric formulation (through age 6).
DTaP–IPV	Kinrix	DTaP-IPV	GlaxoSmithKline	Inactivated Bacterial & Viral	IM	Licensed for 5th (DTaP) and 4th (IPV) booster at 4-6 years.
DTaP-HepB-IPV	Pediarix	DTaP-HepB-IPV	GlaxoSmithKline	Inactivated Bacterial & Viral	IM	Licensed for doses at 2, 4, & 6 months (through 6 years of age). Not licensed for boosters.
DTaP-IPV/Hib	Pentacel	DTaP-IPV/Hib	sanofi	Inactivated Bacterial & Viral	IM	Licensed for 4 doses at 2, 4, 6, and 15-18 months.
Haemophilus influenzae type b (Hib)	PedvaxHIB	Hib	Merck	Inactivated Bacterial	IM	**PRP-OMP**. Polysaccharide conjugate (mening. protein carrier). 2-dose primary series.
	ActHIB	Hib	sanofi	Inactivated Bacterial	IM	**PRP-T**. Polysaccharide conjugate (tetanus toxoid carrier). 3-dose primary series.
	Hiberix	Hib	GlaxoSmithKline	Inactivated Bacterial	IM	Polysaccharide conjugate (tetanus toxoid carrier). Booster only.
Haemophilus influenzae type b – hepatitis B	Comvax	Hib-HepB	Merck	Inactivated Bacterial & Viral	IM	Should not be used for hepB birth dose.
Hepatitis A	Havrix	HepA	GlaxoSmithKline	Inactivated Viral	IM	Pediatric (≤18) and adult formulations. Pediatric = 720 EL.U., 0.5mL Adult = 1,440 EL.U., 1.0mL Minimum age = 1 year

Pink Book: Selected Discontinued U.S. Vaccine Table

Selected Discontinued U.S. Vaccines

Trade Name	Antigen(s)	Years
Acel-Imune	DTaP	1991-2001
Attenuvax-Smallpox	Measles-Smallpox	1967
b-CAPSA-1	Hib (polysaccharide)	1985-89
Biavax	Rubella-Mumps (live)	
BioRab	Rabies	1988-2007
Cendevax	Rubella (live)	1969-79
Certiva	DTaP	1998-2000
Dip-Pert-Tet	DTP	
Diptussis	Diphtheria-Pertussis	1949-55
Dryvax	Vaccinia	1944-2008
Ecolarix	Measles-Rubella (live)	
Flu Shield	Influenza	
Fluogen	Influenza	
Heptavax-B	Hepatitis B (plasma derived)	1981-90
HIB-Immune	Hib (polysaccharide)	1985-89
HibTITER	Hib (conjugate)	1990-2007
HIB-Vax	Hib (polysaccharide)	1985-89
JE-VAX	Japanese Encephalitis	
Liovax	Smallpox	
Lirubel	Measles-Rubella (live)	1974-78
Lirugen	Measles (live)	1965-76
Lymerix	Lyme Disease	1998-2002
M-Vac	Measles	1963-79
M-M-Vax	Measles-Mumps (live)	1973
Meningovax	Meningococcal	
Mevilin-L	Measles (live)	
MOPV	Polio (live, oral, monovalent, types I, II, & III)	

Pink Book: Administering Vaccines Table



Administering Vaccines: Dose, Route, Site, and Needle Size

Vaccine	Dose	Route
Diphtheria, Tetanus, Pertussis (DTaP, DT, Tdap, Td)	0.5 mL	IM
***Haemophilus influenzae* type b** (Hib)	0.5 mL	IM
Hepatitis A (HepA)	≤18 yrs: 0.5 mL ≥19 yrs: 1.0 mL	IM
Hepatitis B (HepB) **Persons 11–15 yrs may be given Recombivax HB (Merck) 1.0 mL adult formulation on a 2-dose schedule.*	<19yrs: 0.5 mL ≥20 yrs: 1.0 mL	IM
Human papillomavirus (HPV)	0.5 mL	IM
Influenza, live attenuated (LAIV)	0.2 mL	Intranasal spray
Influenza, trivalent inactivated (TIV)	6-35 mos: 0.25 mL ≥3 yrs: 0.5 mL	IM
TIV: Fluzone intradermal (18–64 yrs)	0.1 mL	ID
Measles, Mumps, Rubella (MMR)	0.5 mL	SC
Meningococcal – conjugate (MCV)	0.5 mL	IM
Meningococcal – polysaccharide (MPSV)	0.5 mL	SC
Pneumococcal conjugate (PCV)	0.5 mL	IM
Pneumococcal polysaccharide (PPSV)	0.5 mL	IM or SC
Polio, inactivated (IPV)	0.5 mL	IM or SC
Rotavirus (RV)	Rotarix: 1.0 mL Rotateq: 2.0 mL	Oral
Varicella (Var)	0.5 mL	SC
Zoster (Zos)	0.65 mL	SC
Combination Vaccines		
DTaP-HepB-IPV (Pediarix) DTaP-IPV/Hib (Pentacel) DTaP-IPV (Kinrix) Hib-HepB (Comvax)	0.5 mL	IM

Injection Site and Needle Size

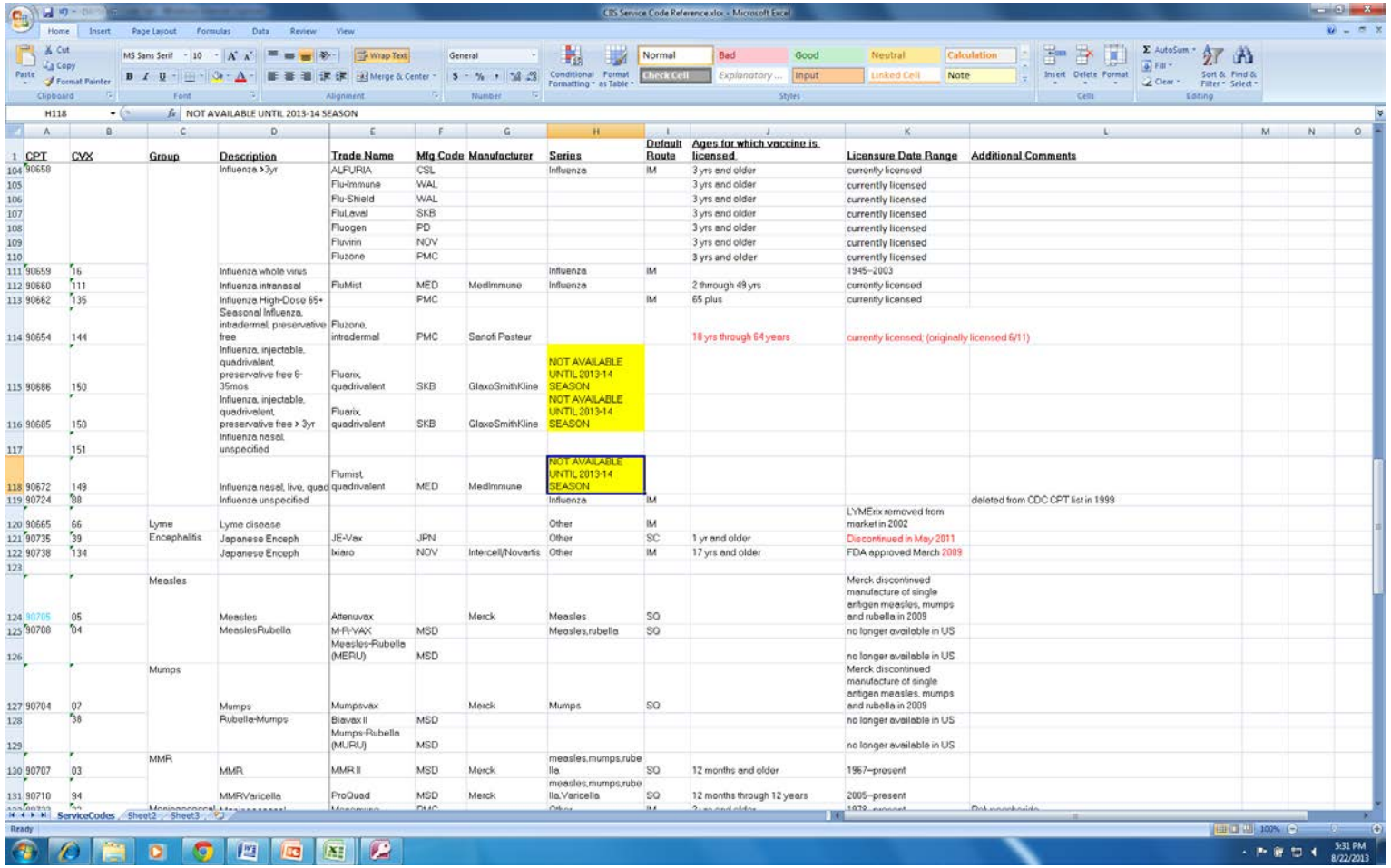
Subcutaneous (SC) injection
Use a 23–25 gauge needle. Choose the injection site that is appropriate to the person's age and body mass.

Age	Needle Length	Injection Site
Infants (1–12 mos)	⅝"	Fatty tissue over anterolateral thigh muscle
Children 12 mos or older, adolescents, and adults	⅝"	Fatty tissue over anterolateral thigh muscle or fatty tissue over triceps

Intramuscular (IM) injection
Use a 22–25 gauge needle. Choose the injection site and needle length appropriate to the person's age and body mass.

Age	Needle Length	Injection Site
Newborns (1st 28 days)	⅝"*	Anterolateral thigh muscle
Infants (1–12 mos)	1"	Anterolateral thigh muscle
Toddlers (1–2 yrs)	1–1¼" ⅝–1"*	Anterolateral thigh muscle or deltoid muscle of arm
Children & teens (3–18 years)	⅝–1"* 1"–1¼"	Deltoid muscle of arm or anterolateral thigh muscle
Adults 19 yrs or older		
Male or female less than 130 lbs	⅝–1"*	Deltoid muscle of arm
Female 130–200 lbs Male 130–260 lbs	1–1½"	Deltoid muscle of arm
Female 200+ lbs Male 260+ lbs	1½"	Deltoid muscle of arm

CIIS Reference Code Table



CIIS Service Code Reference.xlsx - Microsoft Excel

H118: NOT AVAILABLE UNTIL 2013-14 SEASON

	CPT	CVX	Group	Description	Trade Name	Mfg Code	Manufacturer	Series	Default Route	Ages for which vaccine is licensed	Licensure Date Range	Additional Comments
104	90658			Influenza > 3yr	ALFLURIA	CSL		Influenza	IM	3 yrs and older	currently licensed	
105					Flu-Immune	WAL				3 yrs and older	currently licensed	
106					Flu-Shield	WAL				3 yrs and older	currently licensed	
107					FluLaval	SKB				3 yrs and older	currently licensed	
108					Fluogen	PD				3 yrs and older	currently licensed	
109					Fluvirin	NOV				3 yrs and older	currently licensed	
110					Fluzone	PMC				3 yrs and older	currently licensed	
111	90659	16		Influenza whole virus				Influenza	IM		1945–2003	
112	90660	111		Influenza intranasal	FluMist	MED	MedImmune	Influenza		2 through 49 yrs	currently licensed	
113	90662	135		Influenza High-Dose 65+		PMC			IM	65 plus	currently licensed	
114	90654	144		Seasonal Influenza, intradermal, preservative free	Fluzone, intradermal	PMC	Sanofi Pasteur			18 yrs through 64 years	currently licensed; (originally licensed 6/11)	
115	90686	150		Influenza, injectable, quadrivalent, preservative free 6-35mos	Fluarix, quadrivalent	SKB	GlaxoSmithKline	NOT AVAILABLE UNTIL 2013-14 SEASON				
116	90685	150		Influenza, injectable, quadrivalent, preservative free > 3yr	Fluarix, quadrivalent	SKB	GlaxoSmithKline	NOT AVAILABLE UNTIL 2013-14 SEASON				
117		151		Influenza nasal, unspecified								
118	90672	149		Influenza nasal, live, quad	Flumist, quadrivalent	MED	MedImmune	NOT AVAILABLE UNTIL 2013-14 SEASON				
119	90724	88		Influenza unspecified				Influenza	IM			deleted from CDC CPT list in 1999
120	90665	66	Lyme	Lyme disease				Other	IM		LYMErix removed from market in 2002	
121	90735	39	Encephalitis	Japanese Enceph	JE-Vax	JPN		Other	SC	1 yr and older	Discontinued in May 2011	
122	90738	134		Japanese Enceph	Ixiaro	NOV	Intercell/Novartis	Other	IM	17 yrs and older	FDA approved March 2009	
123												
124	90705	05	Measles	Measles	Attenuvax		Merck	Measles	SQ		Merck discontinued manufacture of single antigen measles, mumps and rubella in 2009	
125	90708	04		MeaslesRubella	M-R-VAX	MSD		Measles,rubella	SQ		no longer available in US	
126					Measles-Rubella (MERU)	MSD					no longer available in US	
127	90704	07	Mumps	Mumps	Mumpsvax		Merck	Mumps	SQ		Merck discontinued manufacture of single antigen measles, mumps and rubella in 2009	
128		38		Rubella-Mumps	Biavax II	MSD					no longer available in US	
129					Mumps-Rubella (MURU)	MSD					no longer available in US	
130	90707	03	MMR	MMR	MMR II	MSD	Merck	measles,mumps,rubella	SQ	12 months and older	1967–present	
131	90710	94		MMRVaricella	ProQuad	MSD	Merck	measles,mumps,rubella,Varicella	SQ	12 months through 12 years	2005–present	

Sheets: ServiceCodes | Sheet2 | Sheet3

Ready

5:31 PM
8/22/2013

Manual Process *continued*

- The results are calculated and are reported along with the common discrepancies to the provider.
  - Results are reported in an Word document
  - Clinics must achieve at least a 95% accuracy rate before going live with CIIS.
- The entire manual process from start to finish takes 283 minutes (4 hours and 43minutes) to complete
  - Step 1: Creating access database = 27minutes
  - Step 2: Performing data validation = 200.5 minutes
  - Step 3: Compiling data validation report = 55.5 minutes

Process Improvement

- Area of improvement
  - Increase efficiency of the program by getting through the wait list faster
  - Increase the bandwidth of my position to focus on other data quality projects

Implementing Process Improvement

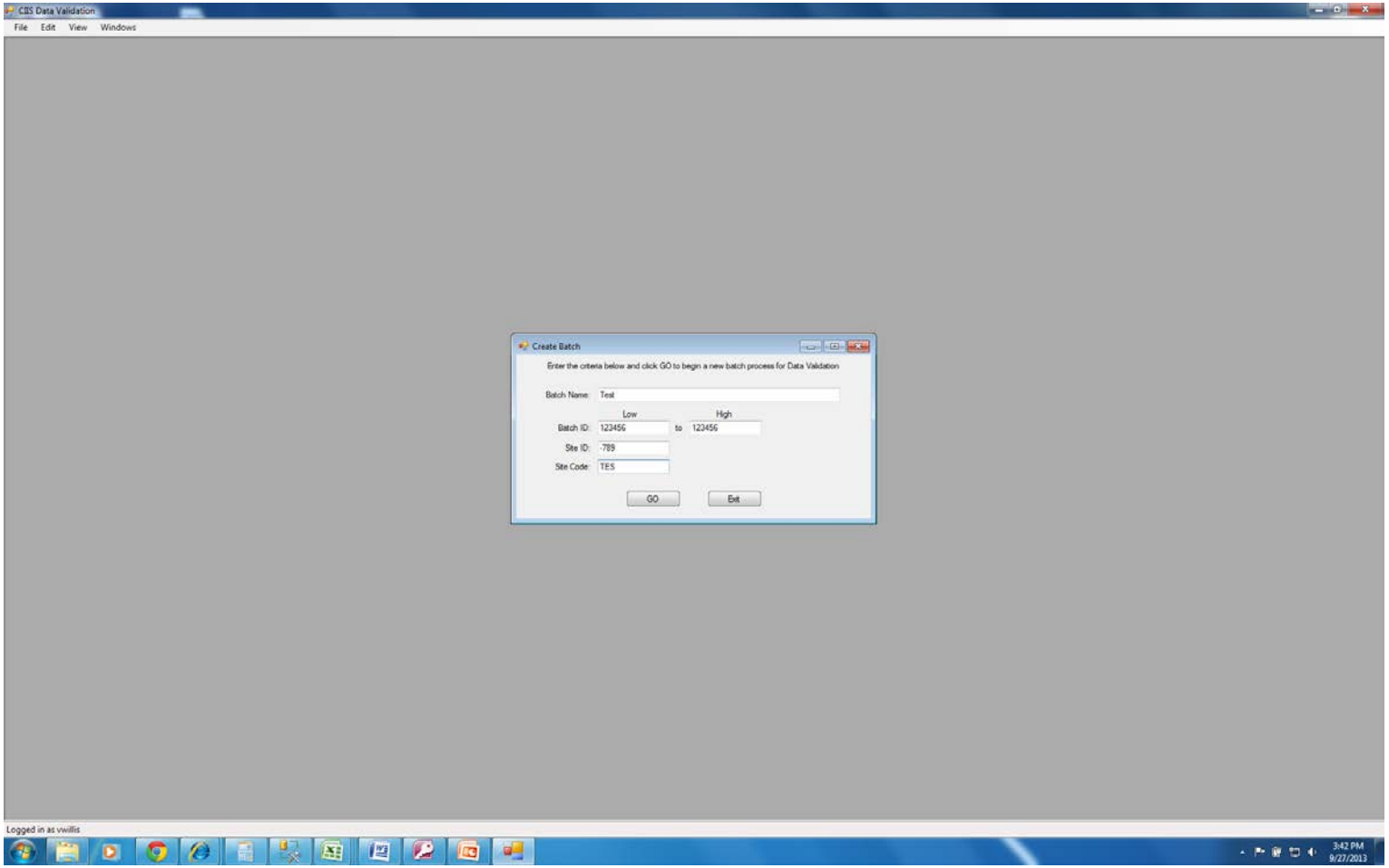
Created an application to get through the data validation process quicker

- CIIS program worked with our IT department to create an desktop application to automate the data validation process
  - IT department is centralized
  - Application developer work on desktop application
  - 78 hours spent to work on desktop application
- Completed a cross reference table to combine all four reference sources into one

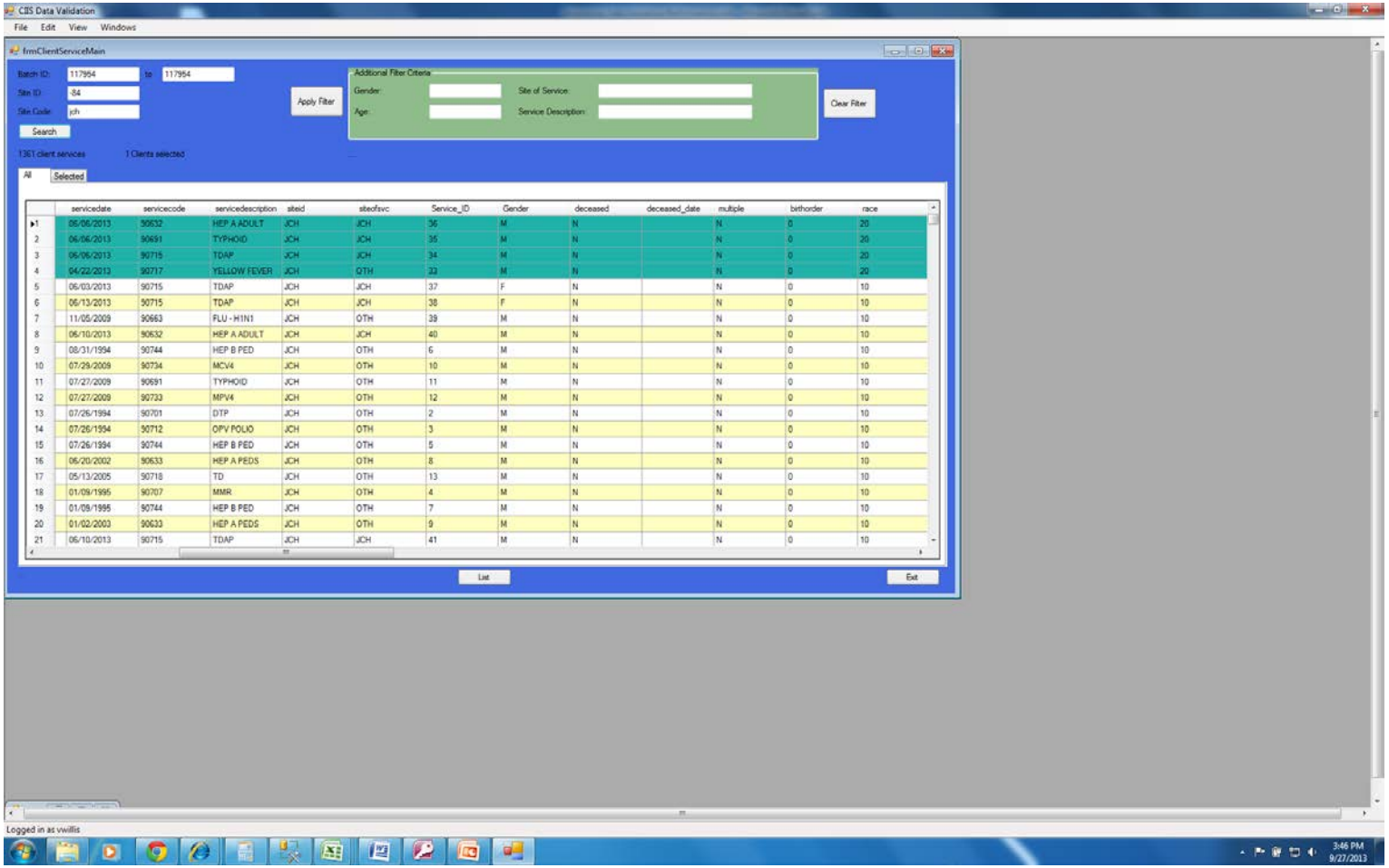
Automated Data Validation Process

- This is a desktop application
- Front end view
- Cross reference table is incorporated into the application
- Common Errors table in incorporated into the application
- Report is generated from the application to report results and common discrepancies

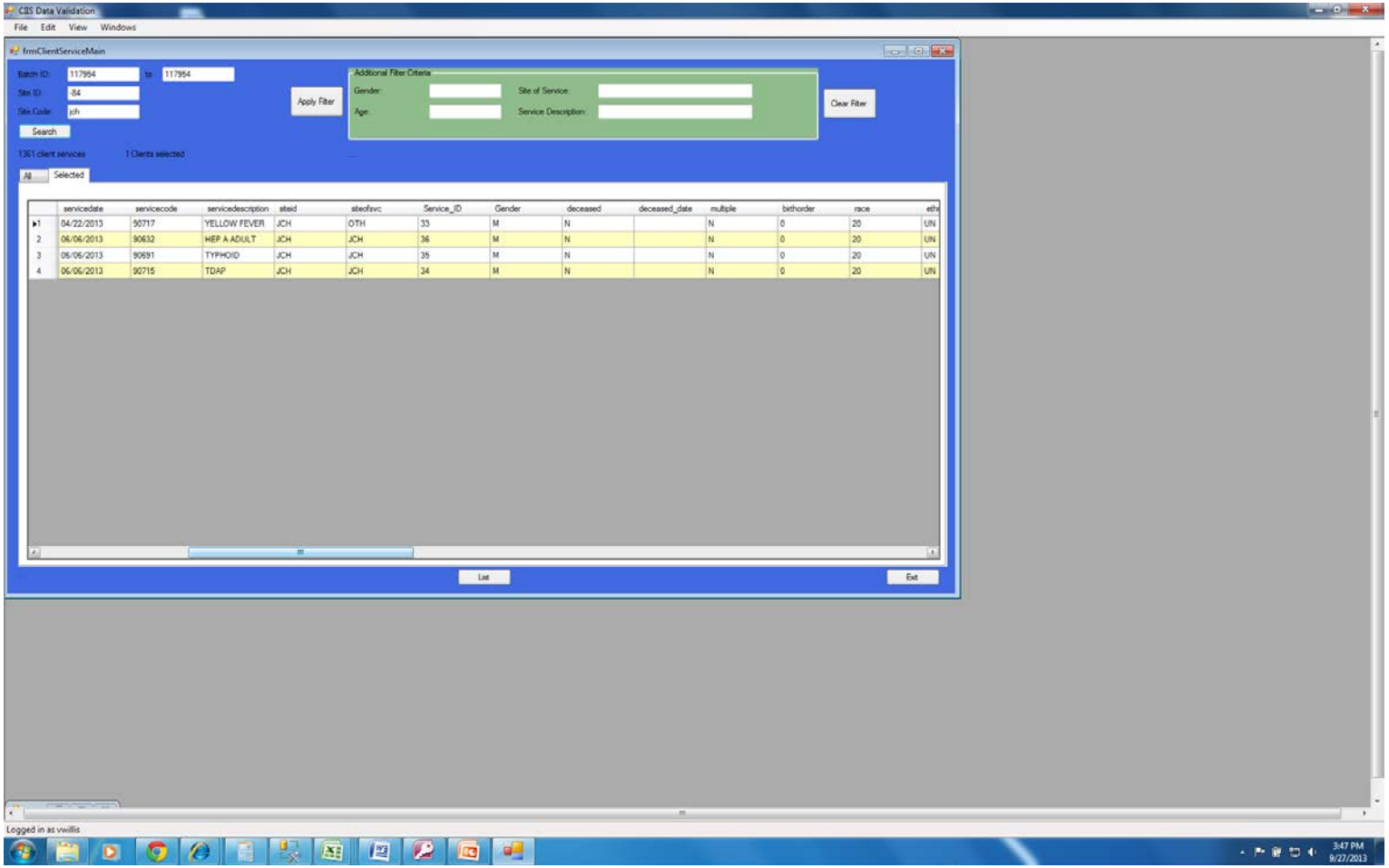
Desktop Application: Front End View to Create Database



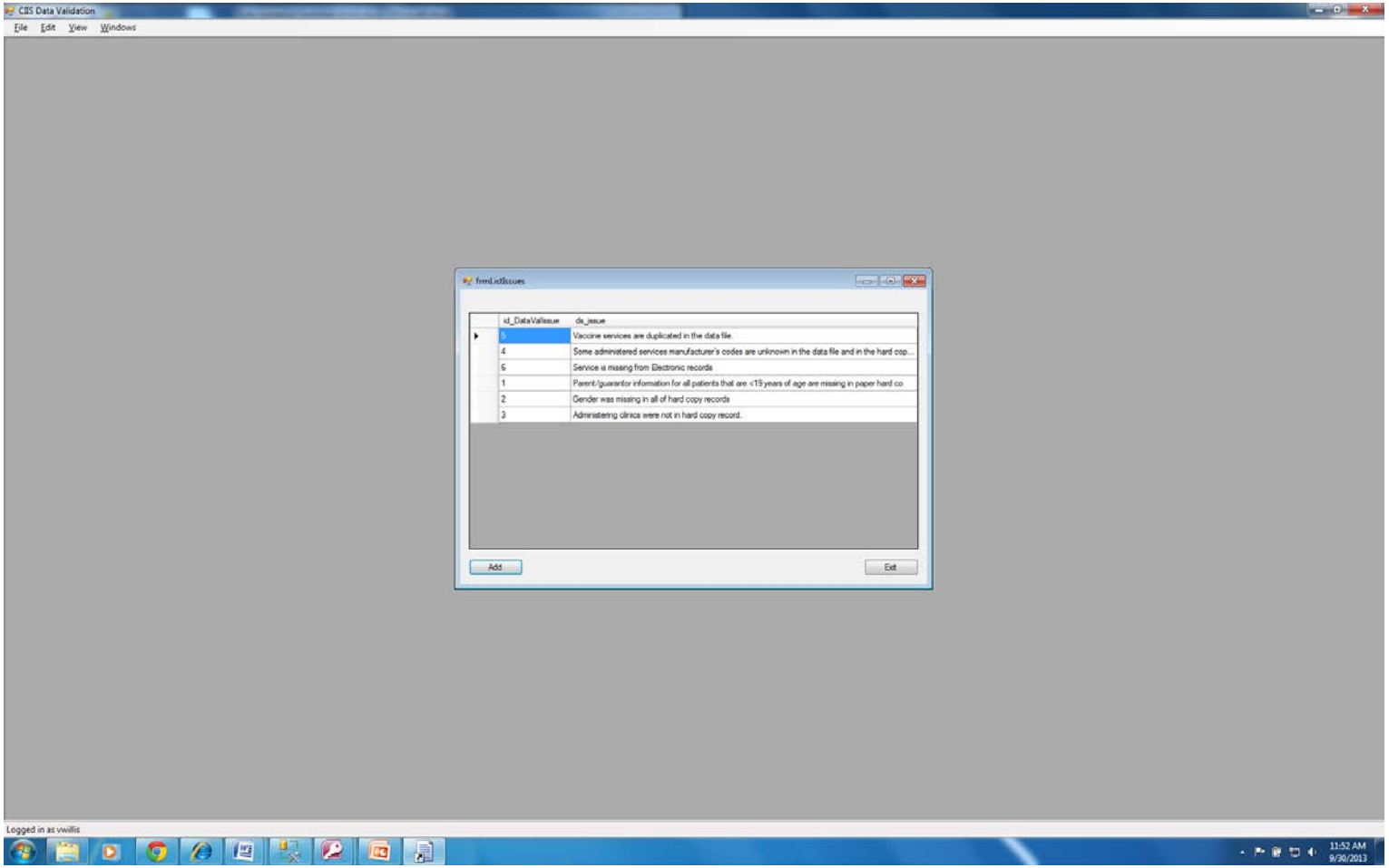
Desktop Application: Demographics and Vaccines Services



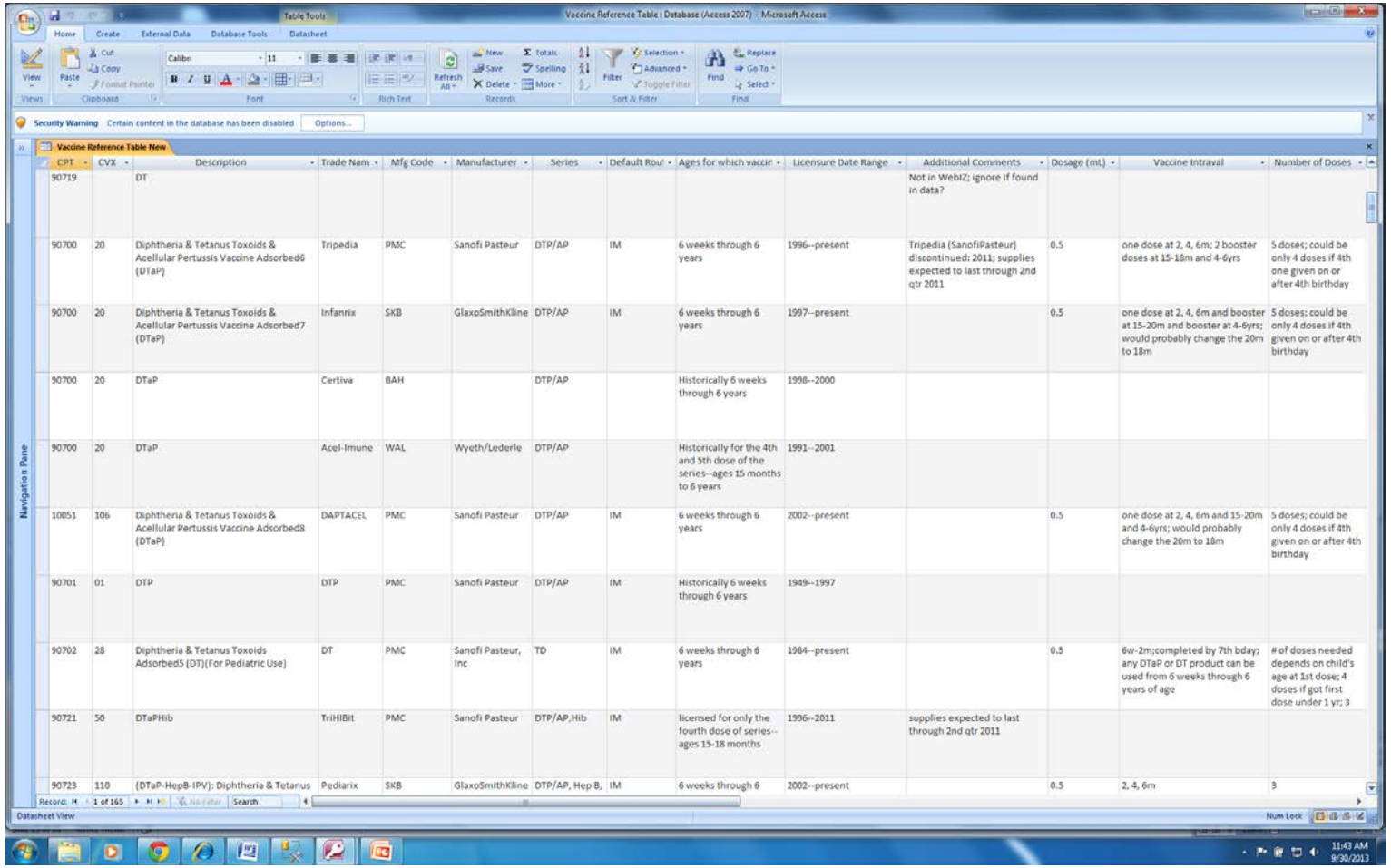
Desktop Application: Selected Patients



Desktop Application: Common Errors Table



Cross Reference Vaccine Table



CPT	CVX	Description	Trade Nam	Mfg Code	Manufacturer	Series	Default Rou	Ages for which vaccir	Licensure Date Range	Additional Comments	Dosage (mL)	Vaccine Intraval	Number of Doses
90719		DT								Not in WebIZ; ignore if found in data?			
90700	20	Diphtheria & Tetanus Toxoids & Acellular Pertussis Vaccine Adsorbed6 (DTaP)	Tripedia	PMC	Sanofi Pasteur	DTP/AP	IM	6 weeks through 6 years	1996--present	Tripedia (SanofiPasteur) discontinued: 2011; supplies expected to last through 2nd qtr 2011	0.5	one dose at 2, 4, 6m; 2 booster doses at 15-18m and 4-6yrs	5 doses; could be only 4 doses if 4th one given on or after 4th birthday
90700	20	Diphtheria & Tetanus Toxoids & Acellular Pertussis Vaccine Adsorbed7 (DTaP)	Infanrix	SKB	GlaxoSmithKline	DTP/AP	IM	6 weeks through 6 years	1997--present		0.5	one dose at 2, 4, 6m and booster at 15-20m and booster at 4-6yrs; would probably change the 20m to 18m	5 doses; could be only 4 doses if 4th given on or after 4th birthday
90700	20	DTaP	Certiva	BAH		DTP/AP		Historically 6 weeks through 6 years	1998--2000				
90700	20	DTaP	Acel-Imune	WAL	Wyeth/Lederle	DTP/AP		Historically for the 4th and 5th dose of the series--ages 15 months to 6 years	1991--2001				
10051	106	Diphtheria & Tetanus Toxoids & Acellular Pertussis Vaccine Adsorbed8 (DTaP)	DAPTACEL	PMC	Sanofi Pasteur	DTP/AP	IM	6 weeks through 6 years	2002--present		0.5	one dose at 2, 4, 6m and 15-20m and 4-6yrs; would probably change the 20m to 18m	5 doses; could be only 4 doses if 4th given on or after 4th birthday
90701	01	DTP	DTP	PMC	Sanofi Pasteur	DTP/AP	IM	Historically 6 weeks through 6 years	1949--1997				
90702	28	Diphtheria & Tetanus Toxoids Adsorbed5 (DT)(For Pediatric Use)	DT	PMC	Sanofi Pasteur, Inc	TD	IM	6 weeks through 6 years	1984--present		0.5	6w-2m;completed by 7th bday; any DTaP or DT product can be used from 6 weeks through 6 years of age	# of doses needed depends on child's age at 1st dose; 4 doses if got first dose under 1 yr; 3
90721	50	DTaPHib	TriHIBit	PMC	Sanofi Pasteur	DTP/AP,Hib	IM	licensed for only the fourth dose of series--ages 15-18 months	1996--2011	supplies expected to last through 2nd qtr 2011			
90723	110	(DTaP-HepB-IPV): Diphtheria & Tetanus	Pediarix	SKB	GlaxoSmithKline	DTP/AP, Hep B,	IM	6 weeks through 6	2002--present		0.5	2, 4, 6m	3

Automated Data Validation Process

- Entire automated process from start to finish takes 271 minutes (4 hours and 31 minutes) to complete
  - Step 1: Creating automated database = 9.5 minutes
  - Step 2: Performing data validation = x minutes
  - Step 3: Compiling data validation report = x minutes

Manual vs. Automated Results

	Step 1: Creating Database (minutes)	Step 2: Validating Data (minutes)	Step 3: Compiling report (minutes)
Manual Data Validation	27	200.5	55.5
Automated Data Validation	9.5	x	x
Time saved	17.5		

Manual vs. Automated Conclusion

- With the automated process I was able to save x time on completing a data validation
  - Imputing the provider's codes in a front end view and the corresponding data being pulled into readable organized table automatically
  - Incorporating a vaccine cross-reference table for automated vaccine checks
  - The common errors table is linked to a generated report to automated and standardized reporting

Conclusion

- Automating the data validation process
  - Now allows me to complete x validations a day
  - Has improved the data validation performance and efficiency to get through the waitlist quicker
  - Has increased the bandwidth of my position so I can start to work on other data quality projects

Questions

Vanessa Willis

Data Quality Coordinator

vanessa.willis@ state.co.us

303.692.2622