ARIZONA
DEPARTMENT OF
HEALTH SERVICES

Data Quality Playbook

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Financial Disclosures

- Danielle Falcone and Valentin Sostaric, faculty for this CE activity, have no relevant financial relationship(s) with ineligible companies to disclose.
- None of the planners for this activity have relevant financial relationships to disclose with ineligible companies.
- The Arizona Alliance for Community Health Centers is accredited by the Arizona Medical Association to provide medical education for physicians.
- The Arizona Alliance for Community Health Centers designated the 2025 Arizona Immunization Conference educational activity for a maximum of 11 hours AMA PRA Category 1 Credits Physicians should only claim credit commensurate with the extent of their participation in the activity.
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In a world full of cacti in the desert...be a cactus in the snow!!

nationalparkservice • Follow
Saguaro National Park

nationalparkservice My favorite part of winter is watching it on TV from Arizona.

Wait? Who changed the channel? Even in the Sonoran Desert, Saguaro National Park can be a snowy place. (Talk about some cold pricklies.) A snowstorm can be good for the Desert; as the snow melts it is able to percolate into the ground much more so than the heavy monsoon rains (which come quickly and leave quickly due to the hard soils).

Image: Snow covering green cacti and trees from a storm earlier this week at @saguaronationalpark. NPS/Spreiser

#cactus #arizona #cold #winterwonderland #sonorandesert

188,580 likes
March 4, 2023

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Background

Duplicate Records

Bad Merges

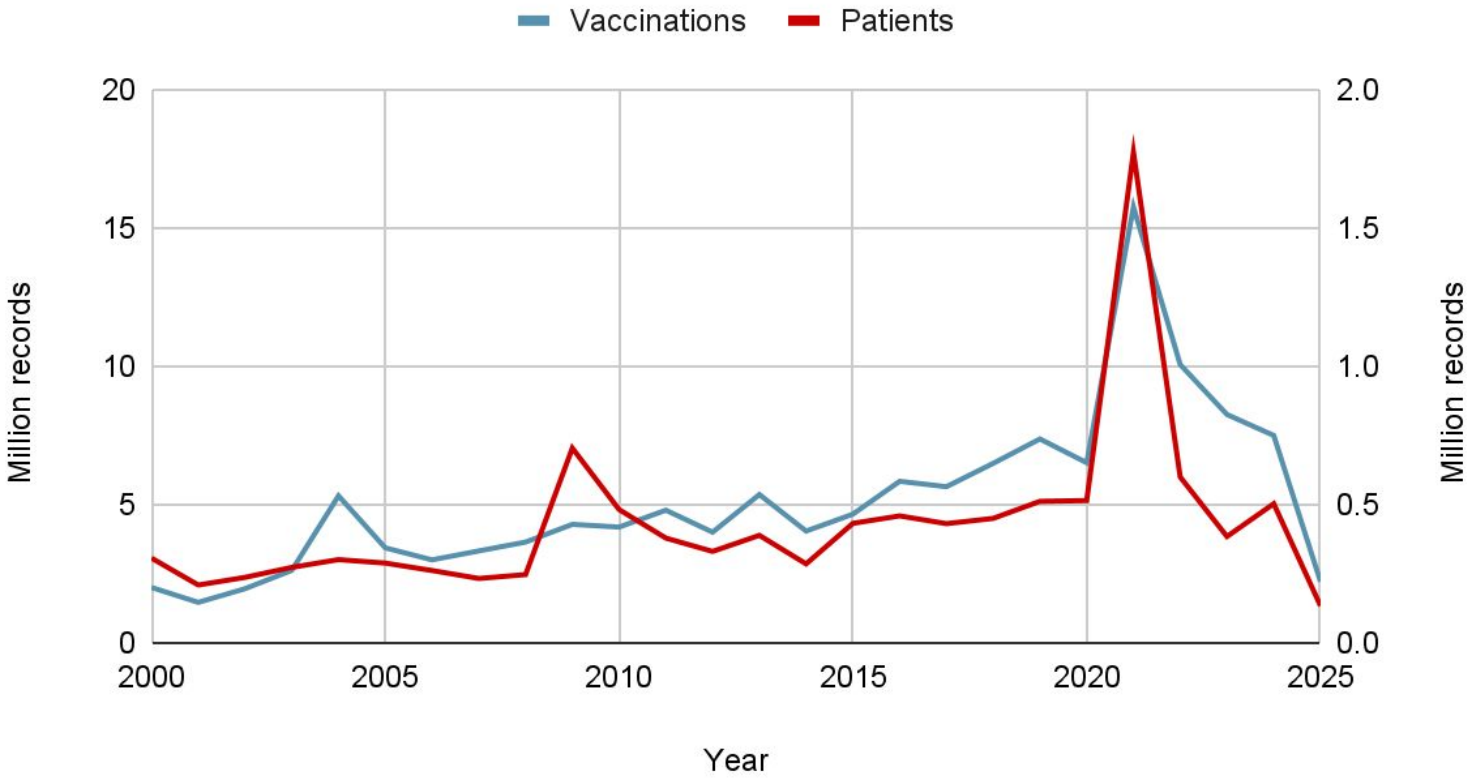
Importance of Quality Data

Resources

Arizona - ASIIS

- 1998 - State Mandate to report immunizations
- Registry – Developed and hosted by STC
- Sites reporting: ≈ **4,000**
- HL7 reporters: ≈ **3,300**
- Bi-directional HL7 reporters: ≈ **3,000**
- VFC Providers: ≈ **650**
- Public Vaccines shipped in 2024: ≈ **1,660,000**
- Public Vaccines Admin. in 2024: ≈ **1,370,000**

Vaccinations and Patients



Numbers

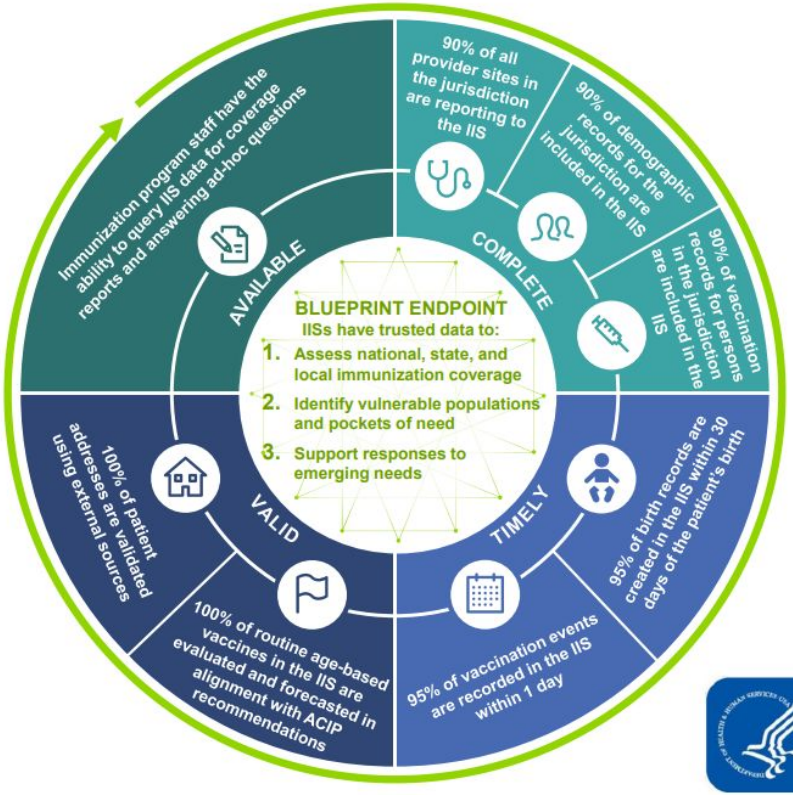
ASIIS, April 2025

Master Patient Records:	12,080,602
Reserve Patient Records:	54,667,970
Master Vaccination Records:	138,412,467
Reserve Vaccination Records:	218,485,168

Data Quality Team Focus

- New team formed in 2021
- Bad merges
- Duplicate records
- Data quality issues with reporting
- Monitoring data
- Decrementing doses
- Adding/deleting/updating vaccines
- MyIR Matching Requests

CDC Data Quality Blueprint



Golden Standards of Data Quality

#1 Validity – List of rules, requirements and definitions for the data recording process;

#2 Accuracy – The records must be accurate and detailed for enabling the well-thought clinical decision making;

#3 Consistency – Set of definitions in order to provide a consistent data environment;

#4 Uniqueness – This indicates if it is a single recorded instance in the data set used. It is the most critical dimension for ensuring no duplication or overlaps;

#5 Timeliness – The fast access to the real-time data influences the service quality and enables the well-thought clinical decision making;

#6 Completeness – The records should be entered without gaps in the information and without duplication;

#7 Integrity – Maintenance and assurance of accuracy and consistency of the data over its entire life-cycle;

#8 Conformity – The data values of the same attributes must be represented in a uniform format and data types;

#9 Precision – The degree to which the data has been rounded or aggregated;

#10 Currency – Data Currency is about the reflection of the real-world state vs. the state captured in the dataset.

Data Quality Dimensions

Duplicate Records

Patient Demographics

required fields

- First Name
- Last Name
- Birth Date
- Guardian First Name
- Mother's Maiden Name
- Street
- City
- State
- Zip Code
- Sex
- Eligibility Category
- Patient Status

additional fields

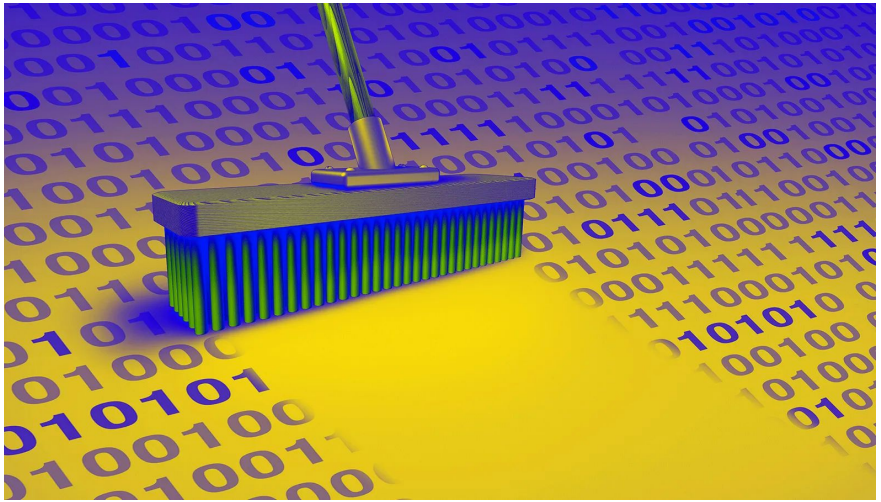
- Middle Name
- Race & Ethnicity
- Birth File Number
- Multiple Birth & Birth Order
- Phone Number / Phone Use Code
- Email
- Guardian First & Last Name
- Guardian 2 First & Last Name
- Health Plan Information

MaddieThaBaddiee@yahoo.com

Dirty Data

What can dirty data be:

- Various transpositions and typos
- Misspelling and variations in records formatting and naming

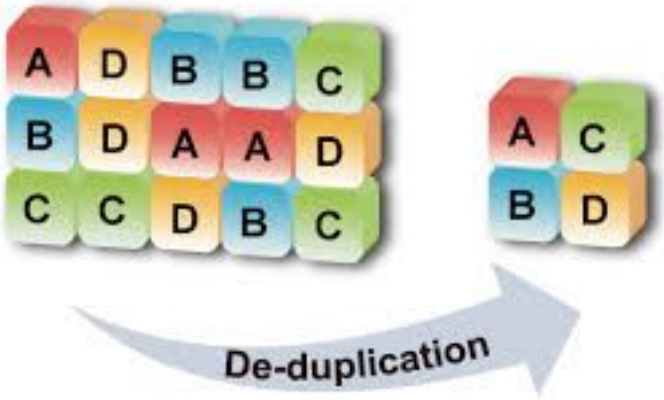


Dirty Data

- **Incorrect data** – validation rules in PHC-Hub (Patients age should be less than 120 years, and months can range only from 1 to 12)
- **Inaccurate records** – Lot numbers and vaccine types (may be correct but inaccurate). The zip code 85007 of Phoenix is accurate, and the state code of New York is NY, but when you use them together, it will be inaccurate.
- **Inconsistent data** – middle names vs middle initials, nicknames vs. legal names
- **Incomplete records** – missing address, phone number, email etc. This happens when users responsible for data entry, misinterpret the value of some data and avoid to enter it.

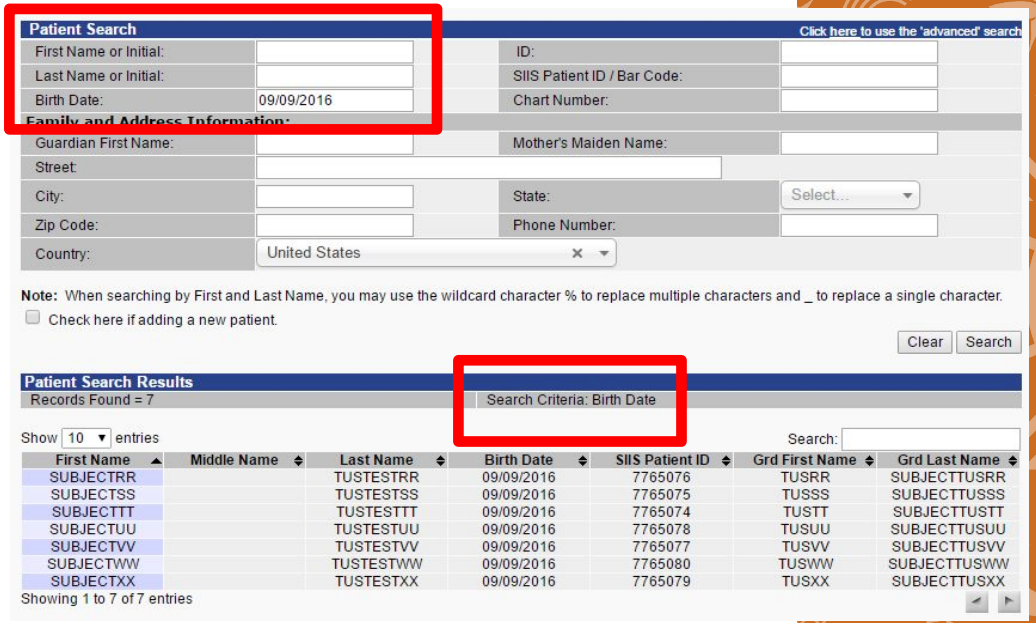
Duplicate Patients

- The Online Interface forces the user to perform a thorough search for a patient, but duplications are still possible due to the following while performing a search:
  - Variations in the name spelling
  - Address changes
  - Typographical errors
- Overall, any difference between how the patient was originally entered and how it's being searched for can result in the system not locating a match and thus, a duplicate patient is entered.
- Every time a patient demographics is sent via a HL7 message, the registry compares the incoming information with the one in the system. If it finds more than one record with matching information that vaccination will be sent to Manual Deduplication.

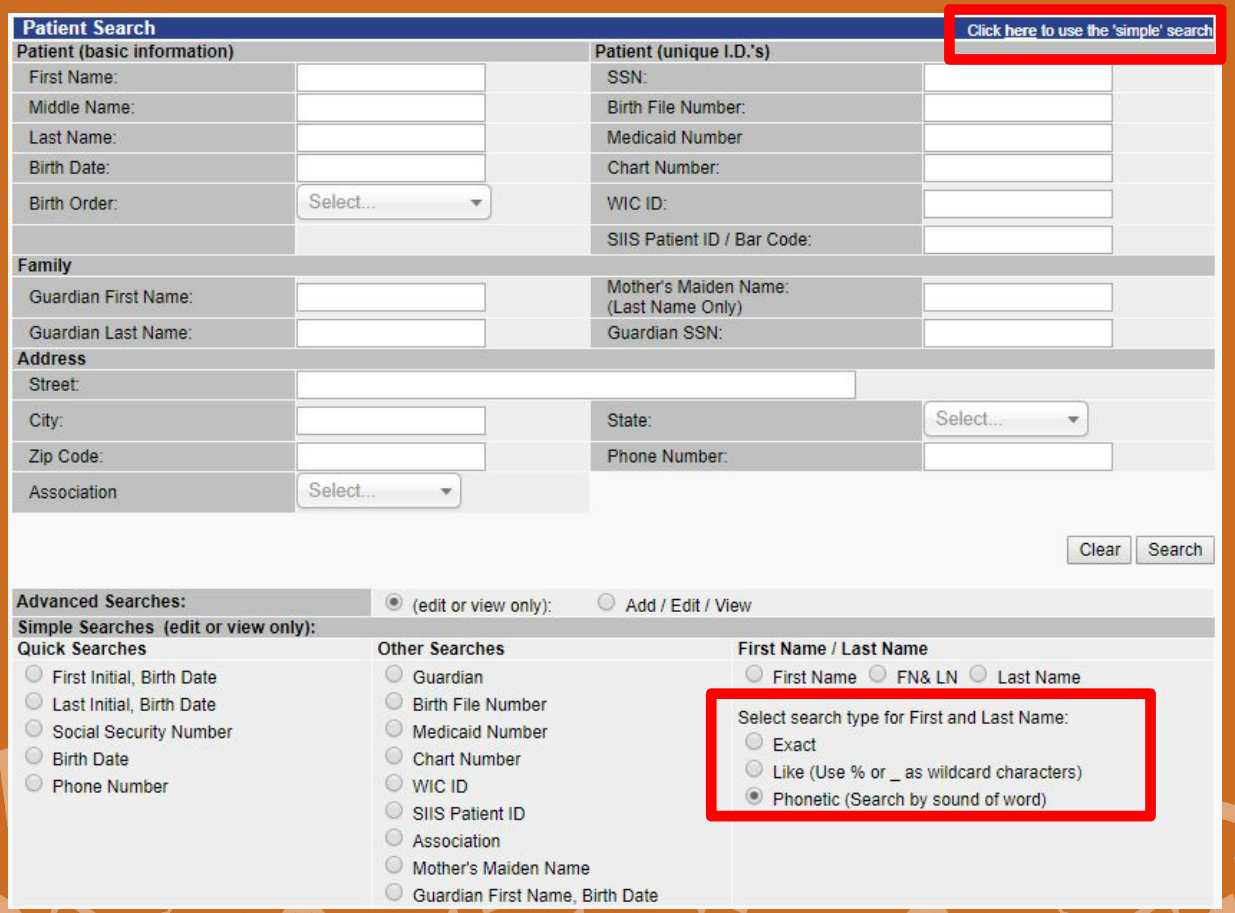


Patient Search

- The "Search" process in ASIIS requires a minimum amount of search criteria to be entered.
- This information is fed into a sophisticated search algorithm that is able to search many different combinations of the information against the database tables.



Patient Search



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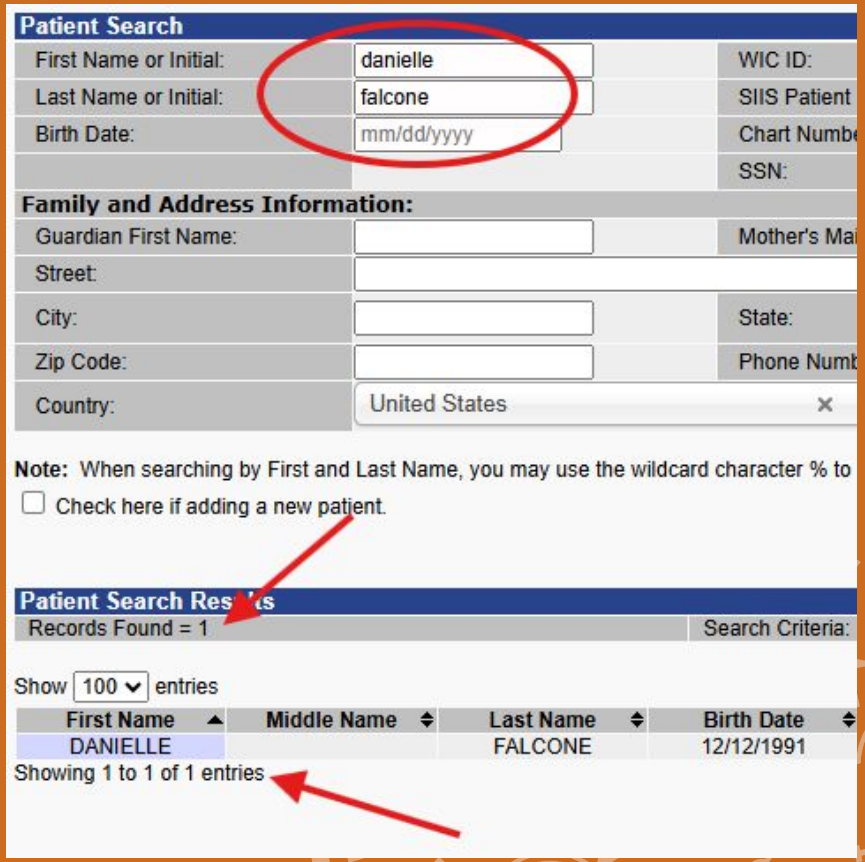

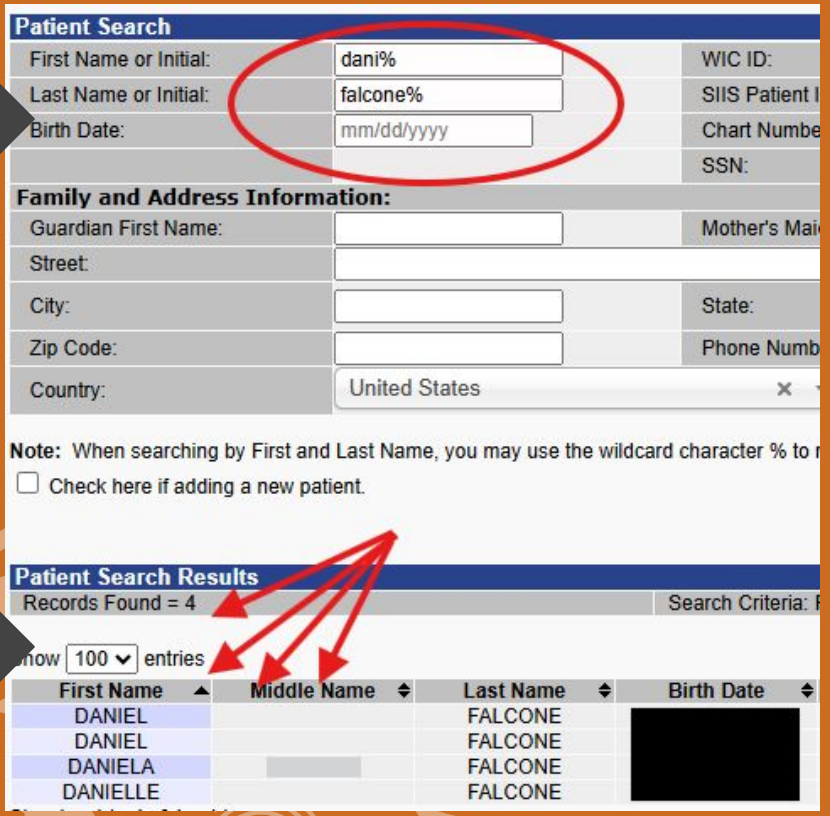

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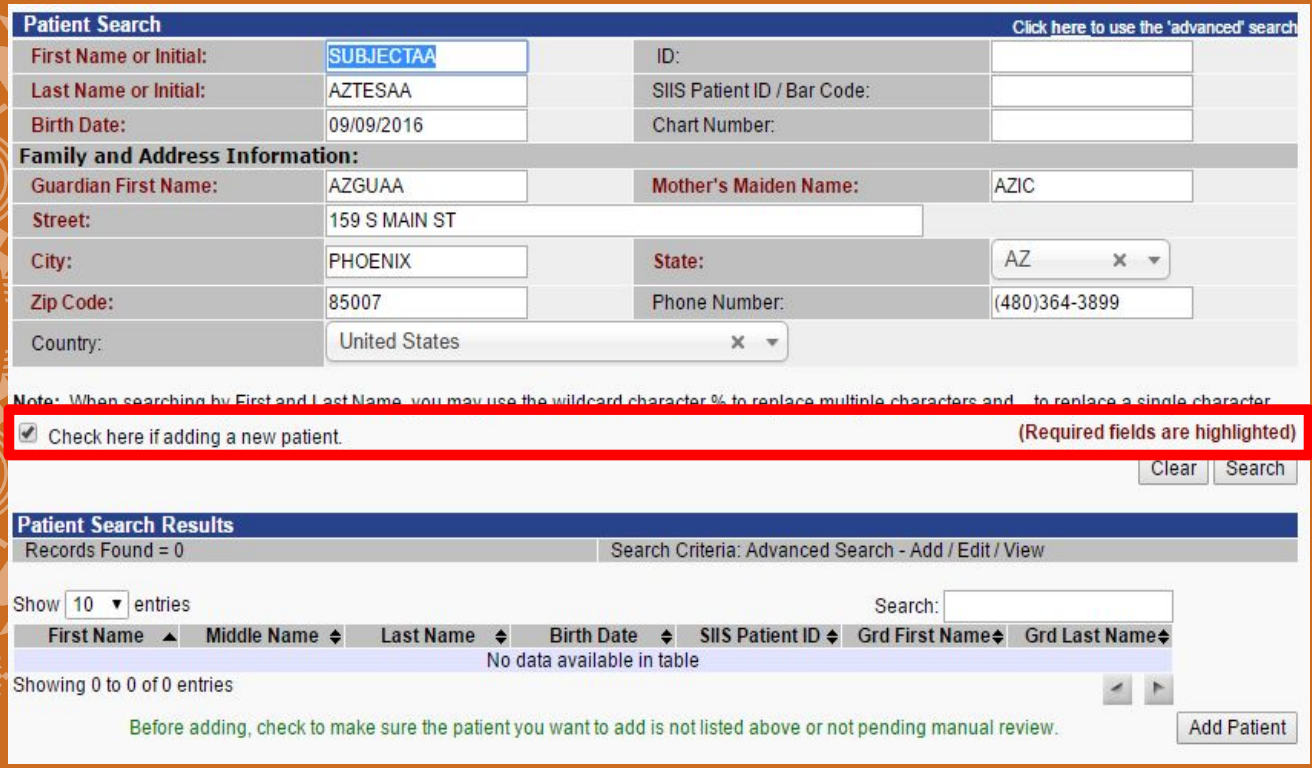
Adding New Patient



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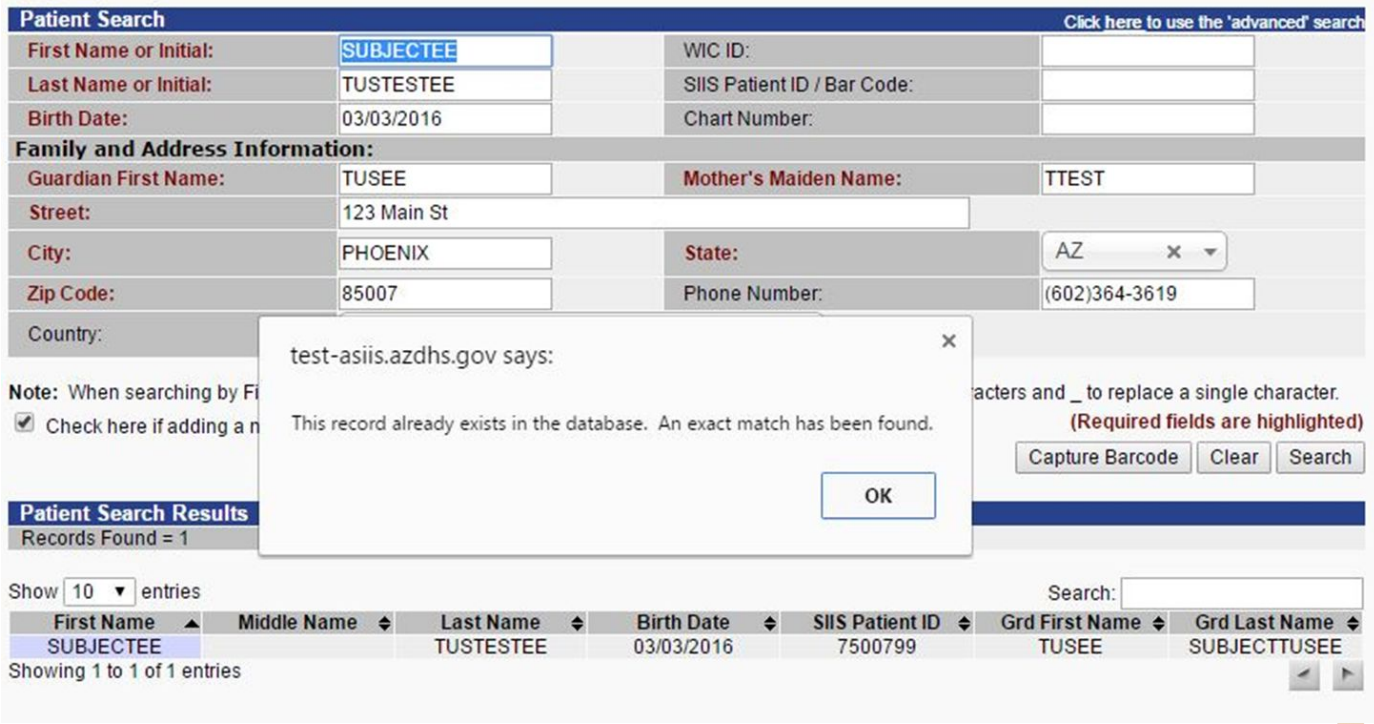
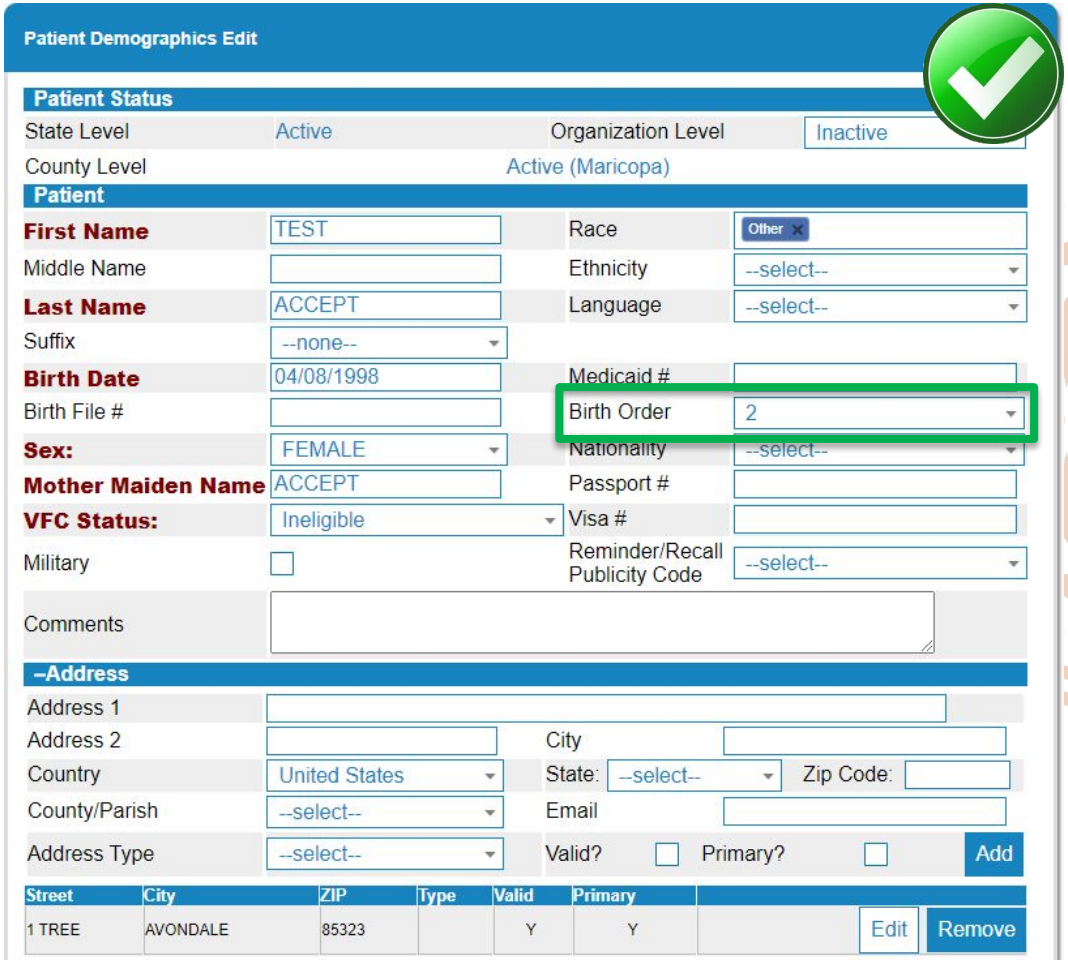
Adding New Patient



Adding Patient Birth Order



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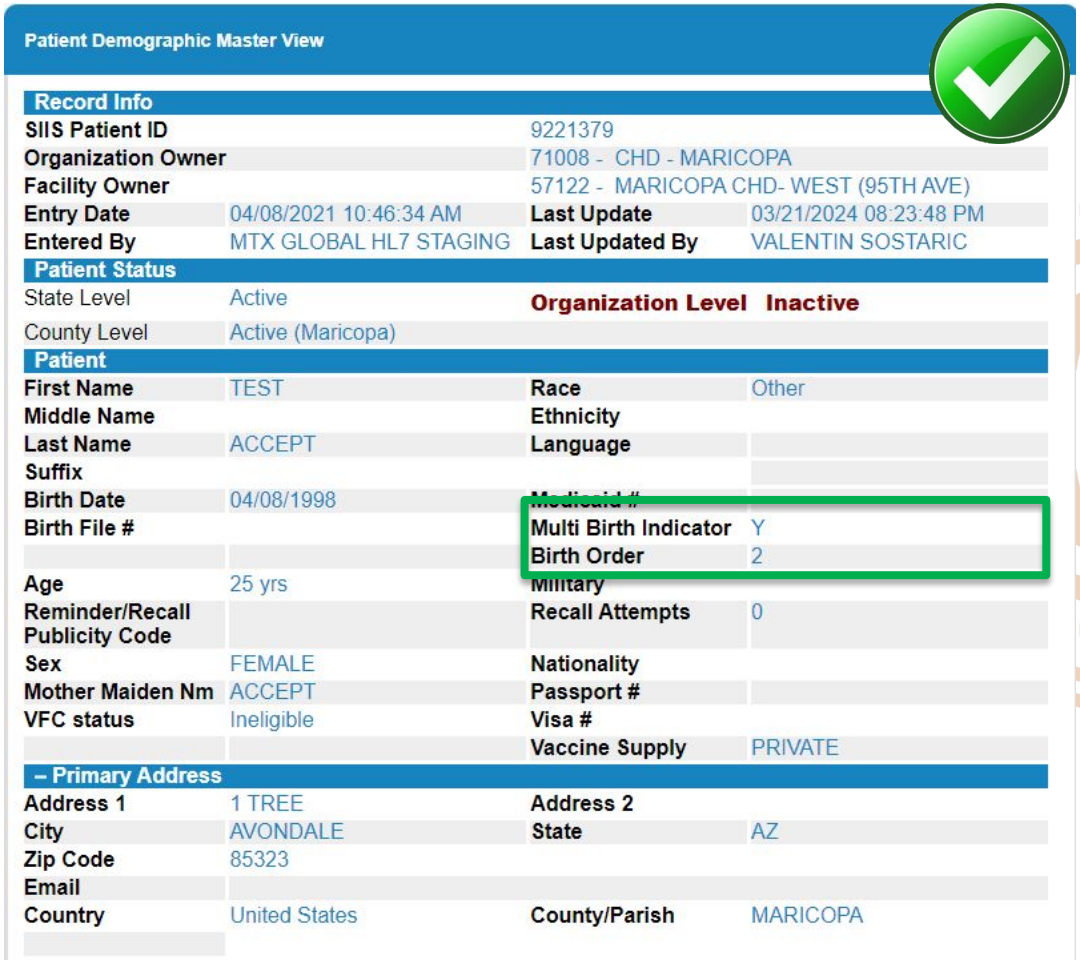
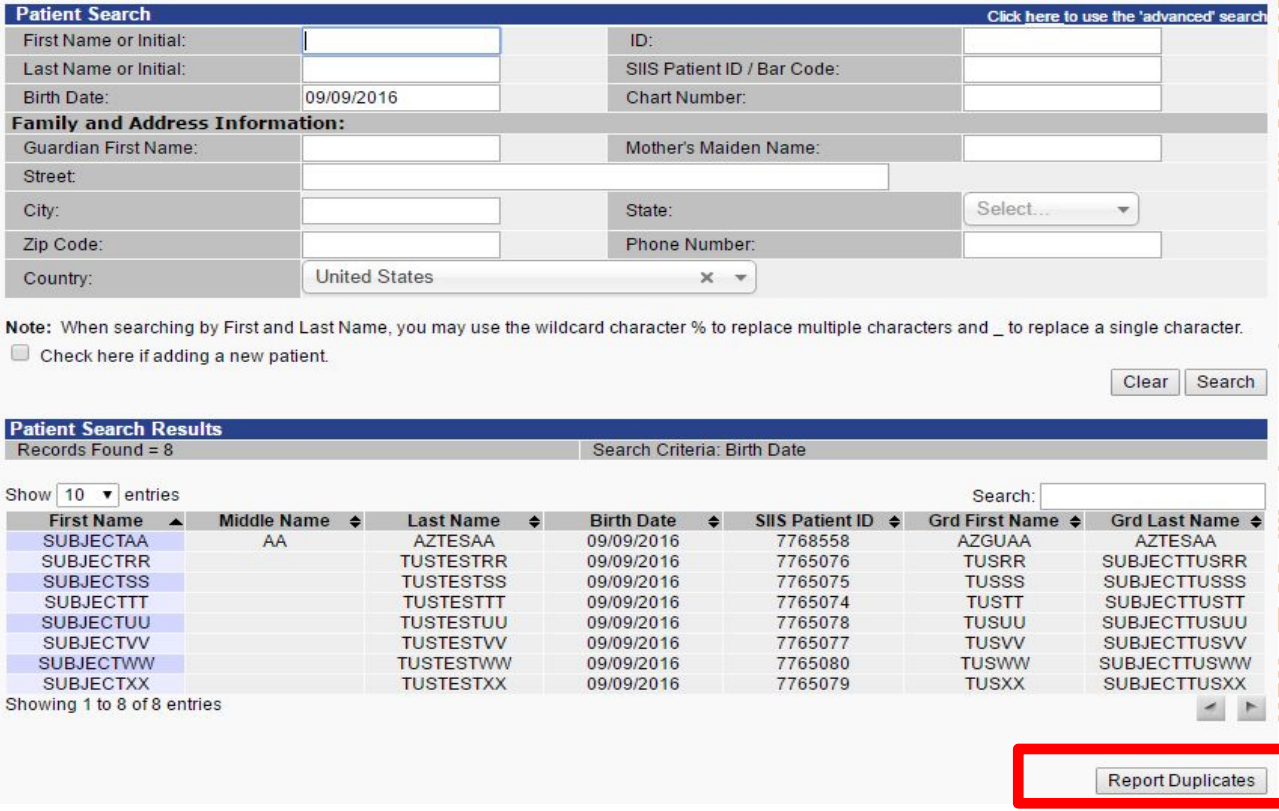


Patient Demographic Master View

Record Info			
SIIS Patient ID		9221379	
Organization Owner		71008 - CHD - MARICOPA	
Facility Owner		57122 - MARICOPA CHD- WEST (95TH AVE)	
Entry Date	04/08/2021 10:46:34 AM	**Last Update**	03/21/2024 08:23:48 PM
Entered By	MTX GLOBAL HL7 STAGING	**Last Updated By**	VALENTIN SOSTARIC
Patient Status			
State Level	Active	**Organization Level**	**Inactive**
County Level	Active (Maricopa)		
Patient			
First Name	TEST	**Race**	Other
Middle Name		**Ethnicity**	
Last Name	ACCEPT	**Language**	
Suffix			
Birth Date	04/08/1998	**Medicaid #**	
Birth File #		**Multi Birth Indicator**	Y
		Birth Order	2
Age	25 yrs	**Military**	
Reminder/Recall Publicity Code		**Recall Attempts**	0
Sex	FEMALE	**Nationality**	
Mother Maiden Nm	ACCEPT	**Passport #**	
VFC status	Ineligible	**Visa #**	
		Vaccine Supply	PRIVATE
– Primary Address			
Address 1	1 TREE	**Address 2**	
City	AVONDALE	**State**	AZ
Zip Code	85323		
Email			
Country	United States	**County/Parish**	MARICOPA

Reporting Duplicate Patients



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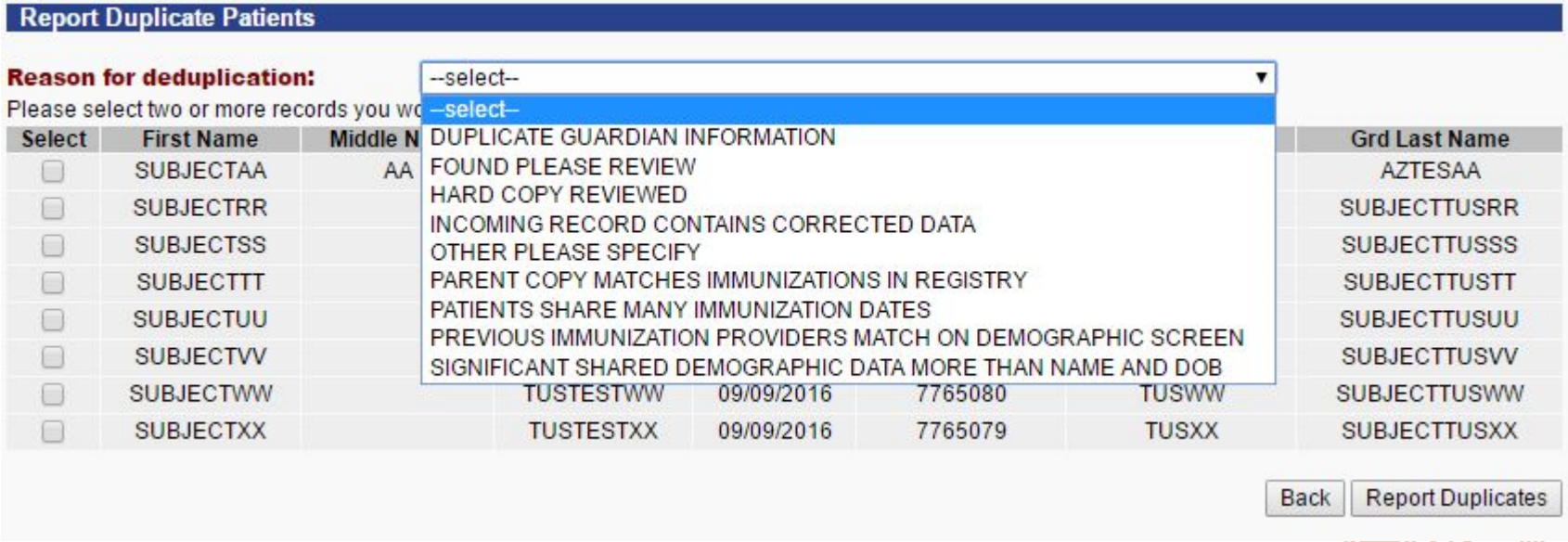


Reporting Duplicate Patients

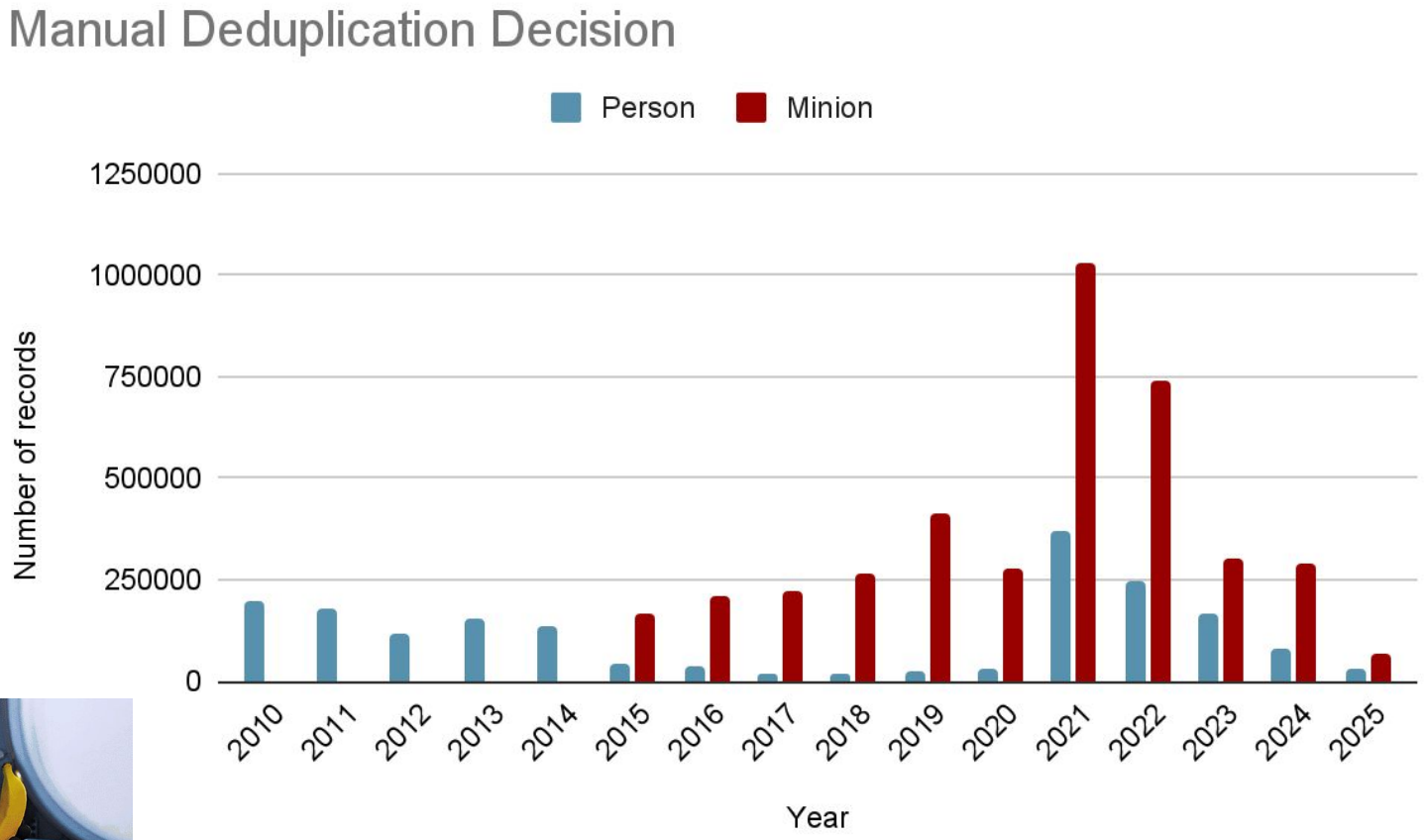
Manual Deduplication

- The registry is designed to minimize the number of duplicate patient and vaccination records within it.

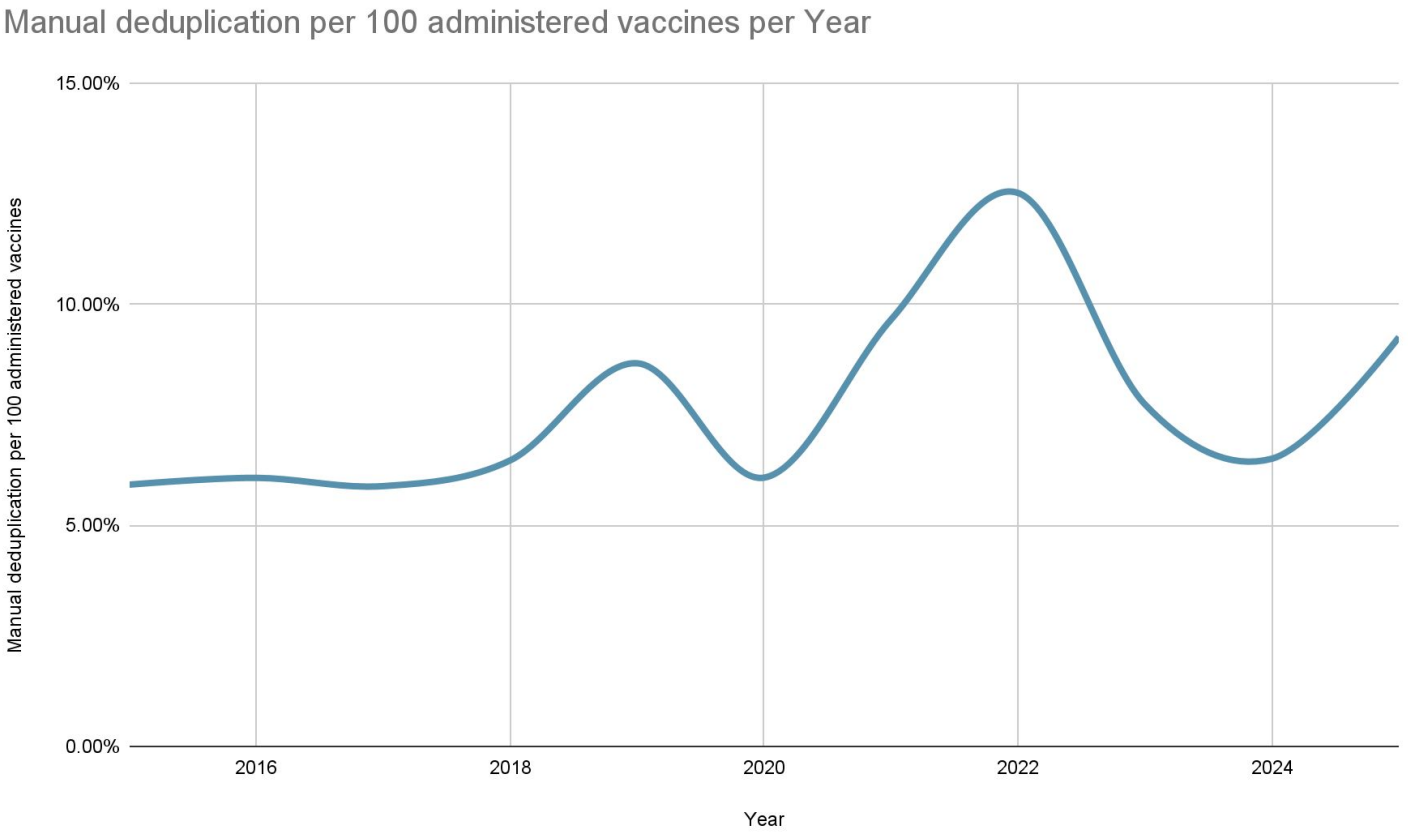
- Manual De-duplication is a "manual" process when an administrator visually reviews both the incoming patient record and the record residing in the "Reserve" table and makes a decision. This decision is either to create a new patient record or merge the patient records.

The number of records coming in daily for “Manual Deduplication” is enormous!

Manual Deduplication - Over the years



Manual Deduplication - Over the years



Manual Deduplication

Join at **menti.com** | use code **6168 0572**

1. **Scan the QR Code**
2. **Click “Sign up for Mentimeter”**
3. **Enter the code at the top of the screen**
4. **Hit the “Join” button**

Manual Deduplication

Other factors we consider:

- Last names can change due to marriage, divorce, custody changes, etc.
- Addresses change when patients move.
- Twins will have all fields in common except for first names and possibly middle names.
- Sons are named the same as their fathers where the record difference will only be seen in the birth date.

Manual Deduplication

Foster and shelter homes can have several children located at the same address, so addresses and phone numbers are not significant for the record comparison.

We look for swapped entries; such as the First Name being placed in the Last Name field, or Middle Name in the First Name field, etc.

Bad Merges

Separating Bad Merges

Vaccination Summary

Vaccinations outside the ACIP schedule are marked with an 'X'.

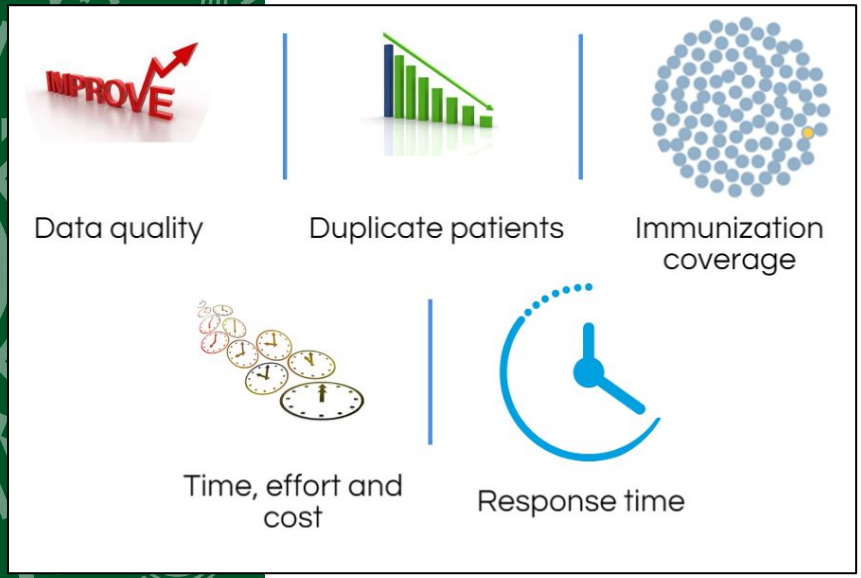
Vaccine	1	2	3	4	5	6	7	8	
DTaP/DTP/Td	01/10/2001 10 weeks	03/14/2001 4 months	05/11/2001 6 months	02/12/2002 15 months	11/04/2005 5 years	01/04/2010 9 years	04/19/2010 9 years	06/14/2010 9 years	02/17/2015 14 years
Tdap	11/11/2010 10 years								
OPV/IPV	01/10/2001 10 weeks	03/14/2001 4 months	05/11/2001 6 months	11/04/2005 5 years	01/04/2010 9 years	04/19/2010 9 years	06/14/2010 9 years	02/17/2015 14 years	
MMR	X 11/06/2001 12 months	11/04/2005 5 years	02/17/2015 14 years						
Hib	01/10/2001 10 weeks	03/14/2001 4 months	02/12/2002 15 months						
Hep A	11/01/2002 24 months	11/03/2003 3 years							
Hep B - 3 Dose	01/10/2001 10 weeks	03/14/2001 4 months	08/28/2001 9 months	01/04/2010 9 years	04/19/2010 9 years	06/14/2010 9 years			
Varicella	X 11/06/2001 12 months	11/05/2008 8 years	02/17/2015 14 years						
Rotavirus	X 01/04/2010 9 years	X 04/19/2010 9 years	X 06/14/2010 9 years						
Influenza	11/05/2008 8 years	10/29/2009 8 years	10/04/2010 9 years	11/07/2011 11 years	09/18/2013 12 years	01/02/2015 14 years			
Pneumo (PCV)	01/10/2001 10 weeks	03/14/2001 4 months	05/11/2001 6 months	01/04/2010 9 years	04/19/2010 9 years	06/14/2010 9 years			
Meningococcal	11/07/2011 11 years								
Novel Influenza H1N1-09	10/29/2009 8 years								

Data Quality - Demographics

Entering current and accurate patient demographics helps ASIIS and all of us to find the correct patient and avoid creating duplicate patients and helps to prevent bad merges.

Importance of Quality Data

How is this all tied together?



Improving the data quality of patient records leads to:

a. Reducing the number of duplicate patients in ASIIS and helps to prevent bad merges
b. Reducing the number of duplicate patients in ASIIS which will improve providers coverage rates
c. Reduces labor time and effort in everyday work
    i. Providers finding the patients, reviewing reports
    ii. State deduplication of the records, reviewing patient data quality
d. Reduces response time when providing quality services to our clients - the patients

Long-term Benefits of Good Data

1. Population coverage rates and analytics
1. Accurate Statistical data
1. Accurate Research data
1. Effective Reminder/Recall

Population coverage

Statistical data

Research data

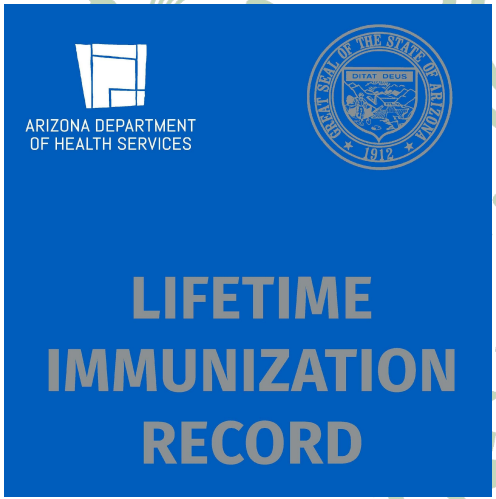
Reminder/Recall

Immediate Benefits of Good Data

Ultimately:

- Prevents invalid or outside of ACIP recommendations (Advisory Committee on Immunization Practices)
- Accurate vaccine forecasting
- Preventing unnecessary vaccinations
- Accurate immunization records

MyIR



Resources

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Data Quality Best Practices

Data Quality Tips

Importance of Data Completeness

Tips for Ensuring ASIIS Data Quality

Bad Merges and What to Do

Ensure Your Office Submits Quality Data to ASIIS

VOMS 2.0 Training Guide

VOMS 2.0 Training Guide

Our team is dedicated to ensuring you have the knowledge and tools to maintain the highest standards in data quality.

We're here to support you every step of the way. If you have any questions or need further assistance, feel free to contact us.

Together, we can build a foundation for your success.

Bureau of Immunization Services |(602)-364-3899| asiis_data_quality@azdhs.gov

Ensure Your Office Submits Quality Data to ASIIS

High-quality data is accurate, complete, and timely:

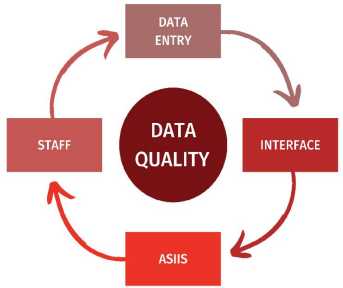
- Accurate: ASIIS data accurately reflects what occurred in a clinical visit
- Complete: Full patient information is captured in ASIIS. The more patient information ASIIS has, the higher the chances that incoming data will be merged with the correct patient
- Timely: Timely submission helps ensure that the data is in ASIIS by the next doctor visit

High quality data benefits your office and patients:

- Supports more accurate vaccine forecasting to decrease missed opportunities and over-vaccination
- Ensures the patients immunization record is portable and follows the patient as they see other providers
- Helps schools and childcare facilities generate accurate and complete records required for entry
- Supports the ability to assess accurate coverage rates and address gaps

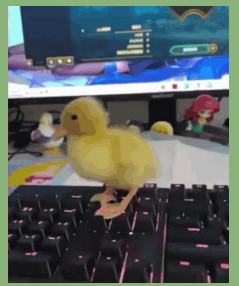
Take these steps to ensure high data quality with your patient records:

Data Circle of Life



High data quality is maintained by ensuring data being entered/reported into ASIIS is accurate and it takes the cooperation between all areas to make sure the information is accurate, complete, and timely.

602-364-3899
ASIIS_Data_Quality@azdhs.gov
https://azdhs.gov/vfc



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Tips for Ensuring ASIIS Data Quality

Receive doses into ASIIS inventory before administering to patient

- When shipment arrives, open immediately
- Compare packing slip with contents in box and ASIIS order
- If you administered doses before receiving them into your ASIIS inventory, contact the AIPO immediately
- Check lot number
- Check manufacturer
- Check expiration date
- Do not reject doses

Ensure lot number, expiration date, manufacturer, funding source, NDC/CVX/CPT in EMR are accurate

- CDC CVX/CPT code resources
- Allow 24 hours for HL7 data transfer
  - Contact ASIIS_Electronic_Reporting@azdhs.gov for reporting issues seen from your HL7 interface

Use a Dose Accountability Log and/or Lot Tracking Log to help keep track of doses administered

- Go to azdhs.gov/vfc then "Operations Guide and Resources" to locate these under the Dose Accountability header

Ensure Patient Data Accuracy

- Check patient's name (use a legal name, not nicknames)
- Check date of birth
- Check address

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602-364-3642
ASIISHelpDesk@azdhs.gov
https://azdhs.gov/vfc

Common Errors

Lot number typos

- 5 and S
- 2 or Z
- 4 or A
- G or 6
- 1 or i
- 0 or O
- Extra numbers or letters
- Missing numbers or letters
- Lot number 1/Lot number 2 - Due to not receiving lot numbers correctly in ASIIS when a shipment contains 2 lot numbers of the same vaccine type
- Transposed numbers and letters
- Extra numbers or letters
- Writing NDC number instead of lot number
- Writing lot number from the vial or syringe instead of the box
- Writing lot number from the diluent instead of the vaccine box

Vaccine Error

- Adult HepA and Pediatric HepA
- Adult HepB and Pediatric HepB
- HPV4 and HPV9
- Unspecified formula
- DTP and DTaP
- MenB and MenACWY
- PCV13 and PPSV23

Do not leave manufacturer, funding source, or lot number blank. Do not mark unknown. Any information left blank or marked unknown results in a non-complete record for the patient and will not decrement from your inventory.

Attend the Dose Accountability Webinar

- More tips on troubleshooting ASIIS inventory issues
- Held on the last Wednesday of every month (except in April and December - live sessions are offered in April at the annual immunization conference) 12-1:30pm
- Follow these instructions to sign up

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ASIISHelpDesk@azdhs.gov
https://azdhs.gov/vfc

Bad Merges

Important tips

Locating patient records can present challenges at times. In this informational, we will provide you with valuable tips on effectively managing and resolving issues related to merged patient records.

1

Do not create a new patient

Exercise caution when creating new patient records. It is crucial to consider the possibility that a patient may have been merged with another patient, have a twin, or be accidentally merged with a family member. Creating a duplicate patient record can lead to complications and inaccuracies in medical records.

2

Search for patient

It is crucial to employ efficient search techniques. One effective strategy is to utilize the patient's guardians as a search element. Collect comprehensive information about the patient's guardians and use their details as search parameters. Engage with guardians or patient to gather any additional information that could assist in locating the patient.

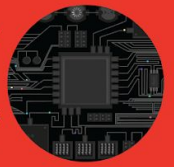
3

Reach out to Data Quality

Feel free to reach out to our Data quality team. They will be able to assist in locating, merging, and with badly merged patients.

Their email address is: asiis_data_quality@azdhs.gov.

Be sure to provide as much information as possible when attempting to locate, merge or resolve a bad merge.



4

Prevention

To prevent data quality issues, we encourage you to continue to provide full and concise patient information to their records, diligently verify patient information, cross-reference existing records, and consult with relevant staff members or departments before proceeding with the creation of a new patient entry.

5

Closing

In conclusion, exercise caution when creating new patient records to avoid complications and inaccuracies. Consider the possibility of patient merges, twins, or accidental merges with family members. Efficient search techniques can be instrumental in locating patients. For assistance, our Data Quality team is available at asiis_data_quality@azdhs.gov.

Bureau of Immunization Services |(602)-364-3899| asiis_data_quality@azdhs.gov

Data Quality

It is imppssible for the Registry datasabe software to regocnize spilling mestakes.

Any
Questions

Take Away Moment

Write two things you can do or use from what you just learned.

Circle the one you plan to do first.

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Conclusion

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Danielle Falcone | Immunization Data Quality Manager
Valentin Sostaric | Immunization Data Systems Chief
Arizona Department of Health Services

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Scan this QR code

Claim your CE credits for physicians, nurses, CHES, MCHES, and non-Accredited Certificates of Attendance from the Arizona Alliance for Community Health Centers

Pharmacy CEs pick up your QR code at the registration desk to Claim your CEs!