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Monitoring data quality— the hows and whys

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DEPT. OF HEALTH AND HUMAN SERVICES



Agenda

**1.Nebraska State Immunization
Information System (NESIIS)
history**

2.Maintaining data integrity

3.Goals and approach

4.Onboarding

5.Ongoing

6.Results

7.Onwards

8.Wrap

9.Q&A

NESIIS history

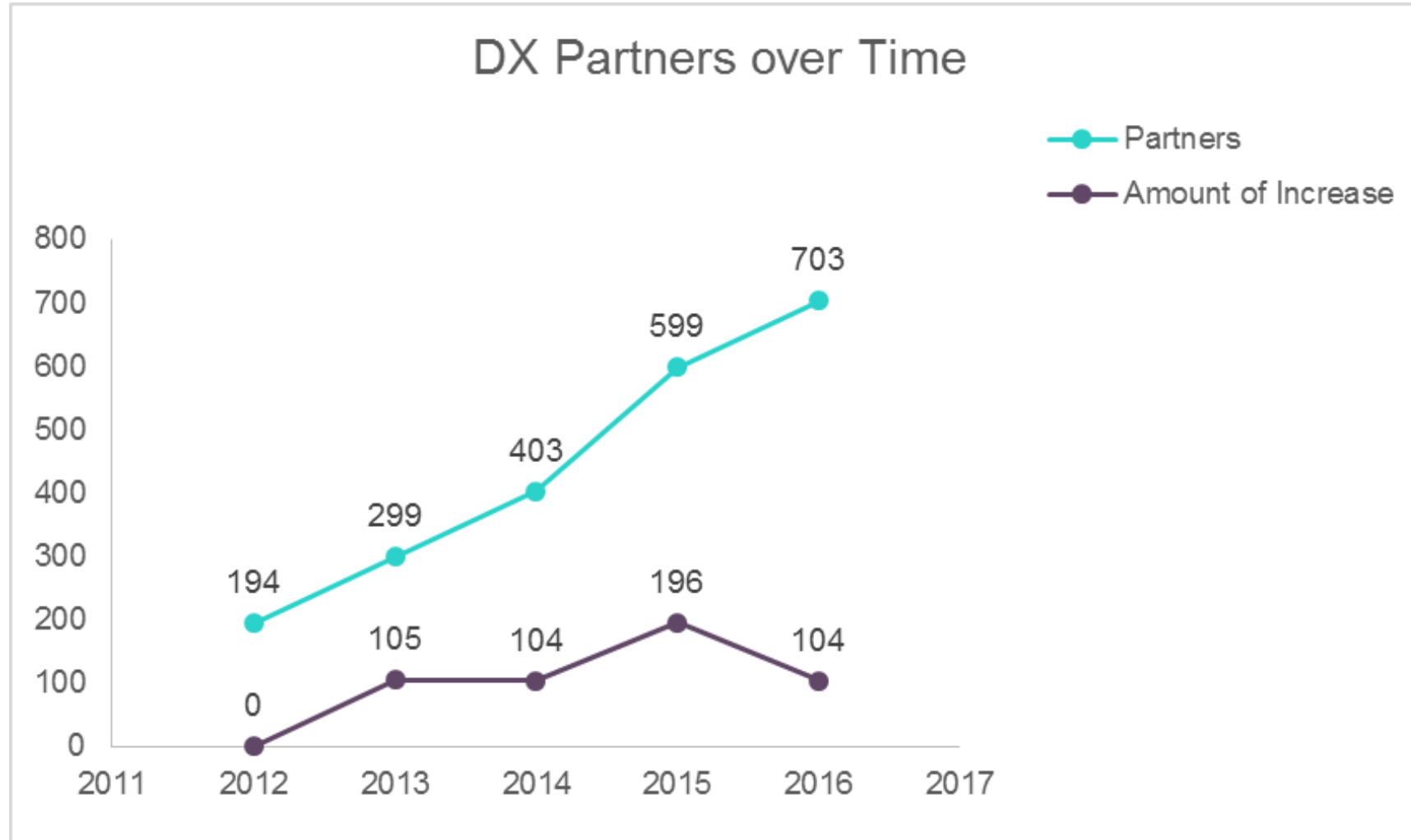
NESIIS history

- **Secure, statewide, web-based system**
- **Been in place since March 2008**
- **Currently contains over 16,606,858 immunizations on over 1,967,309 clients**

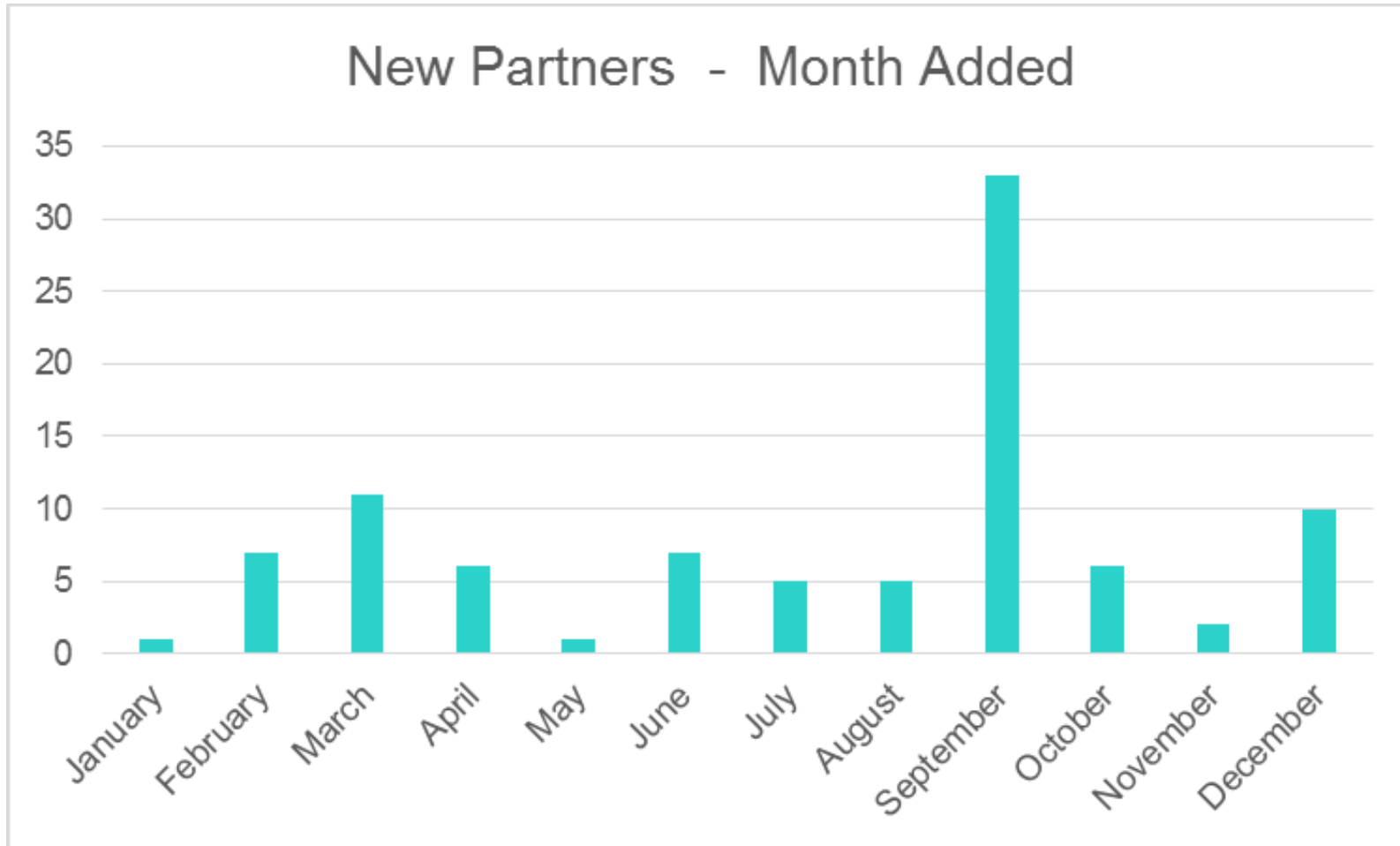
NESIIS history

- **Manual User Interface**
 - Dose administration entry
 - Inventory management
 - 2D barcode scanning
 - VFC Provider Enrollment
 - Flu Pre-booking
 - Reporting
- **Is capable of uni-directional and bi-directional data exchange**
- **Public Access Portal for individual record access**
- **No mandate to report**

NESIIS history

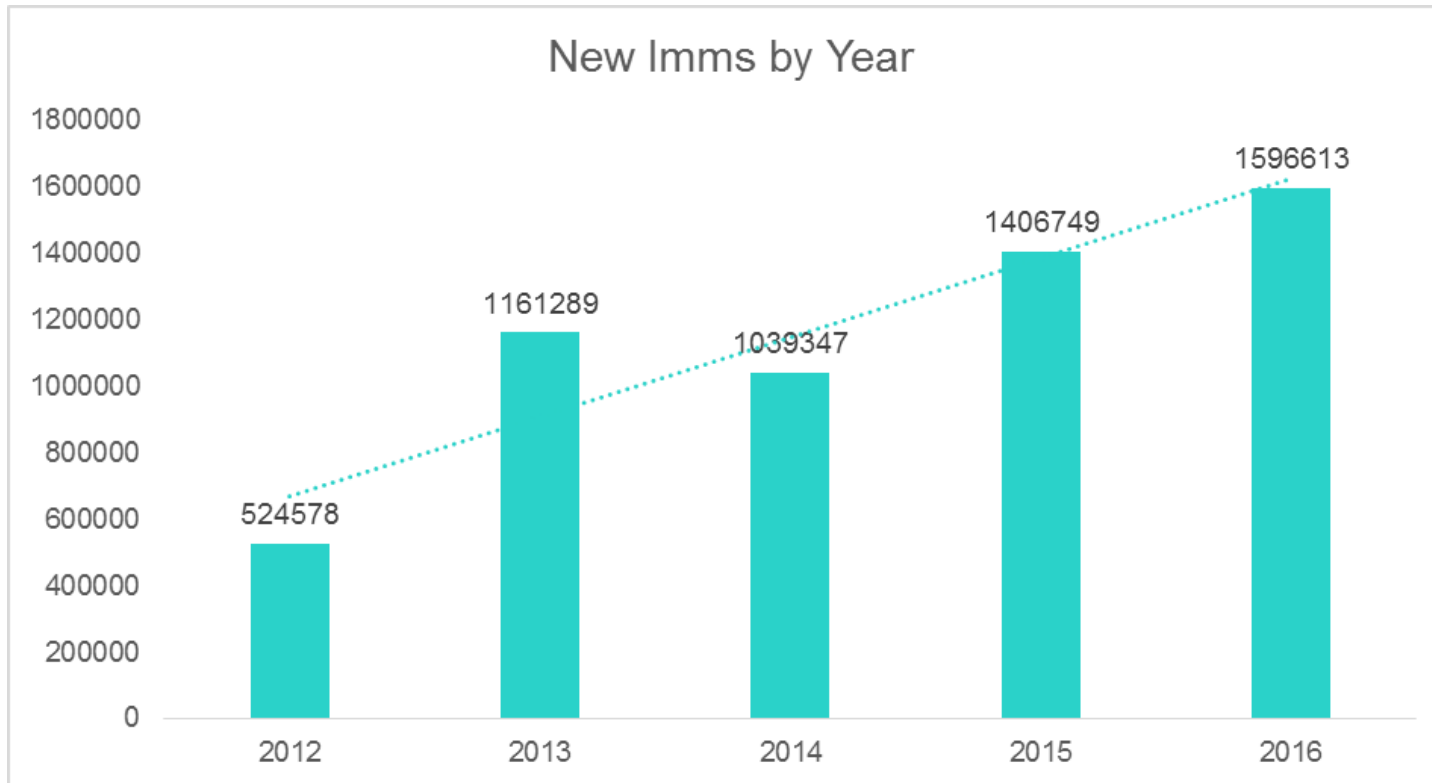


NESIIS History



NESIIS added 94 new organizations in 2016, adding more than 30% during the month of September.

NESIIS history



1,596,613 New Immunizations - 13.5% Increase over last year



Maintaining data integrity

Maintaining data integrity

Multiple phased approach:

Phase 1:

- Develop plan to monitor data frequency and timeliness
- Ensure providers continuously send data based off of their previous trends
- Allows us to track provider participation
- Allows us to determine population representativeness

Maintaining data integrity:

Multiple phased approach:

Phase 2:

- Develop plan to monitor data quality and completeness
- Ensure providers continuously send good/appropriate data
- Allows us to track data quality issues
- Allows us to determine immunization completeness and rates

BUILD TRUST BY MAINTAINING DATA INTEGRITY!!!!



Goals and approach

Goals and approach

- **Goals**

- Improve data monitoring and quality
- Improve submission frequency and monitoring
- Improve outreach and communication
- Enhance reporting capabilities
- Build a foundation for additional enhanced analysis/monitoring

Goals and approach

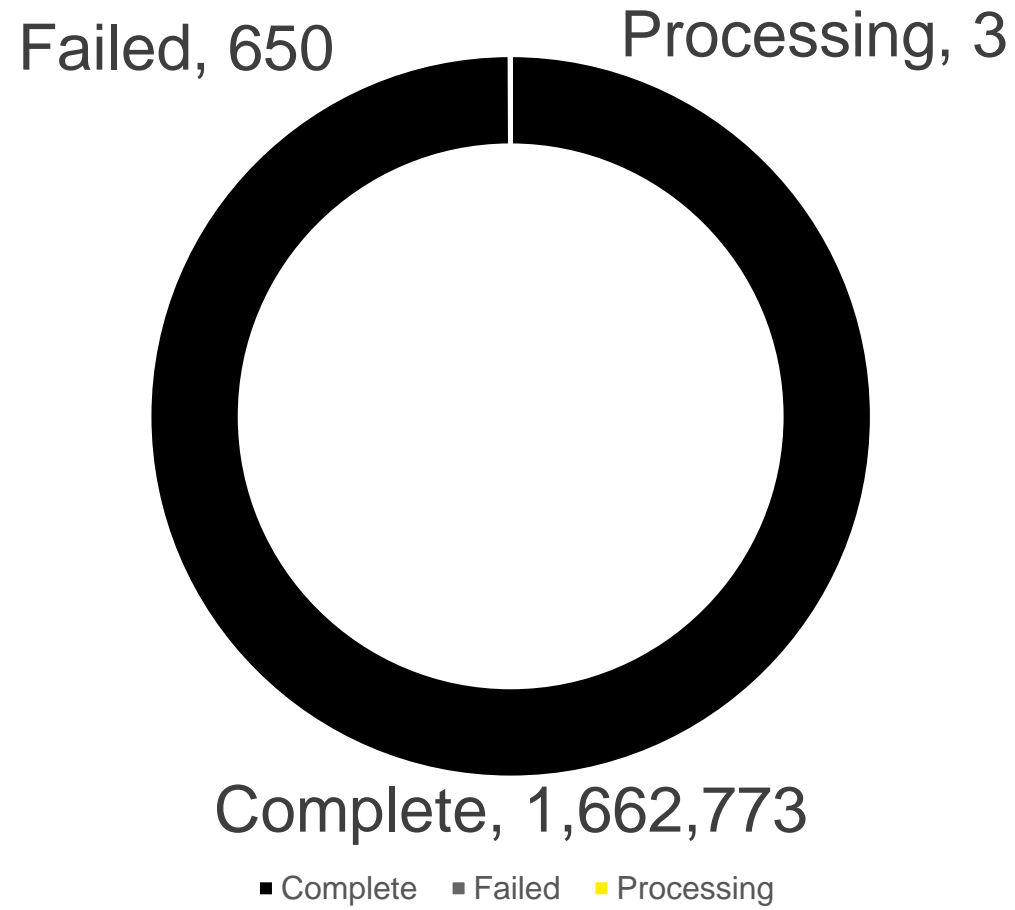
- **Approach**
 - Track and analyze data exchange activity
 - Identify and eliminate roadblocks
 - Follow-up and continued communication

Onboarding

Onboarding

- **Work with the file creators—copy the decision makers**
- **Clear, consistent, firm guidelines**
- **Optimize testing**
- **Be responsive**

Onboarding



Ongoing

Ongoing

- **Monitor jobs**

- Most organizations are submitting records continuously
- Identify immediately if DX drops off

- **Monitor records**

- Identify problems with the HL7 format/structure
- Identify problem with the organization's data
- Help new organizations establish quality data exchange

Ongoing

- **Track job status and volume**
 - Completed
 - Failed (exception or error)
- **Track records**
 - Volume
 - Status (processed or rejected)
 - Rejection reasons
 - Trends
 - NESIIS Level
 - Vendor, parent, and organization-specific

Ongoing

- **Initially reviewed randomly chosen samples**
- **New sample size determination process**
 - Achieve 95% confidence with 5% variance
 - Review at least 1 record per sending org
 - Actual number is proportional to orgs share of NESIIS rejections

Ongoing

$$s = \frac{X^2 NP(1-P)}{d^2(N-1)} + \frac{X^2 P(1-P)}{d^2}$$

s = required sample size

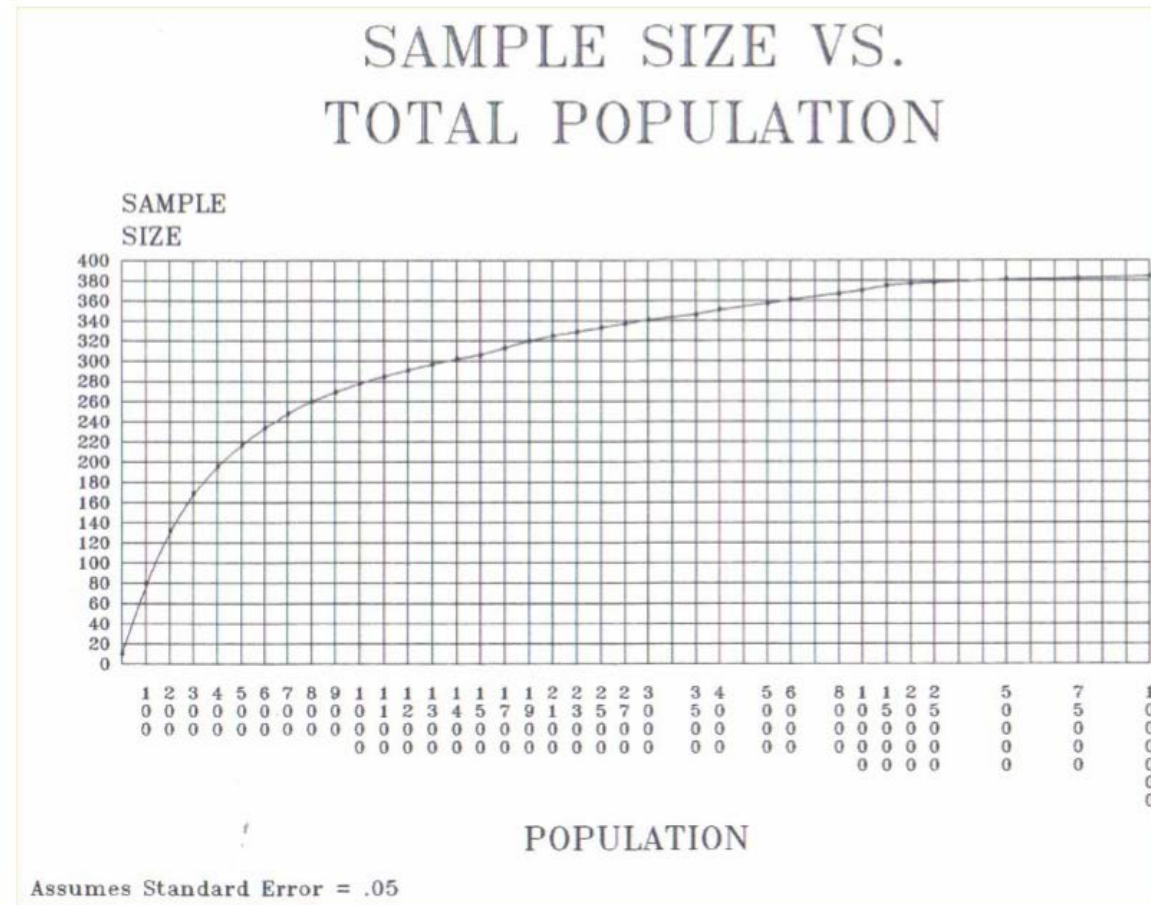
X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841)

N = the population size

P = the population proportion (assumed to be .50 since this would provide the maximum sample size)

d = the degree of accuracy expressed as a proportion (.05)

Ongoing



Ongoing

- **Review**
 - Rejected records
 - Rejected segments/fields
 - Specific invalid RXA-5 and MSH-4 values

Ongoing

Enter Date Range	Import Job Statuses	Import Rejected Record Data
Confirm Active Orgs	Print View	View Print
Open Rejects Tracking Form	List-Append All Rejects	Add Batch Data to RTT
Clear TBS	Process Sampled Data	Confirm Weekly Orgs Imms
DXQ Deliverable	DXQ Analysis	Review RXA5 Text
Add or Update DX Partners	GO TO MAINTENANCE PAGE	High Level Imms Data
View DX Partners		View Print

Tools

- Desktop database
- Customized spreadsheets
- Macros
- Various data tables

Ongoing

NESIIS New Org Totals	0	2793	0	14	11	0	3	0	0	0	0	0	0
Count of New Orgs	48												
New Org Name	Jobs	Imms	Rejected Imm	Sample	RXA-1	RXA-4	PID-5	RXA-3	DUP	MSH	ORC	PID-7	Non-consen

Stats at a Glance															
Jobs	Imm Records	Rejected	New Imms	Sampled	RXA5	RXA6	PID5	RXA3	MSH0	ORC3	PID7	Dup_	Non consent_	Unidentified_	Other_ MSH4
55474	130352	5390	53996	266	114	34	42	23				15			38

Stats at a glance

- Summarizes statistics at the IIS level
- Specific statistics are also summarized above each report table

Ongoing

Vendor Table	Jobs	Imm Records	Rejected	New Imms	Sampled	RXA5	RXA6	PID5	RXA3	MSH0	ORC3	PID7	Dup	Non consent	Unidentified	Other	MSH4
Vendor 1	1	1	0	1													
Parent 1	1	1	0	1													
Provider 1	1	1	0	1													
Vendor 2	2098	2074	41	1363	95	53		41	1		0	0		0			
Vendor 3				0													
Vendor 4	5	1063	39	557	13						0	0	13	0			
Vendor 5	179	180	0	122													
Vendor 6	1389	5128	160	497	14	2					0	0	12	0			
Vendor 7				179	15	15					0	0		0			
Vendor 8	3186	6675	1554	2221	26				26		0	0		0			
Vendor 9	66	367	3	53	1			1			0	0		0			
Vendor 10	1519	1517	37	228	4			4			0	0		0			
Vendor 11	465	710	14	410	0						0	0		0			
Vendor 12	178	311	3	219	2	2					0	0		0			

Statistics by organization

- Summarized by vendor and parent groups
- Drill down capability

Ongoing

Vendor Table	Jobs	Imm Records	Rejected	New Imms	Sampled	RXA5	RXA6	PID5	RXA3	MSH0	ORC3	PID7	Dup	Non consent	Unidentified	Other	MSH4
Vendor 1	1	1	0	1													
Parent 1	1	1	0	1													
Provider 1	1	1	0	1													
Vendor 2	2098	2074	41	1363	95	53		41	1		0	0		0			
Parent 2				191													
Provider 2				191													
Provider 3				0													
Parent 3				372	5	5					0	0		0			
Provider 4				0													
Provider 5				0													
Provider 6				0													
Provider 7				0													
Provider 8				62	1	1					0	0		0			
Provider 9				120	1	1					0	0		0			
Provider 10				22	3	3					0	0		0			
Provider 11				168													

Click once

- to view parents within vendor groups

Click again

- to view orgs within parent groups

Ongoing

Org ID	Org Name	Org Short Name	Org Level	First Live DX Date	Parent	Vendor
1	Provider 1	AAAA	C/V	1/28/13	Parent 1	Vendor 1
2	Provider 2	AAAB	C/V	1/29/13	Parent 1	Vendor 1
3	Provider 3	AAAC	C/V	2/2/15	Parent 1	Vendor 1
4	Provider 4	AAAD	C/P	7/15/14	Parent 2	Vendor 2
5	Provider 5	AAAE	C/P	1/22/15	Parent 2	Vendor 2
6	Provider 6	AAAF	C/P	1/27/12	Parent 3	Vendor 3
7	Provider 7	AAAG	C/P	5/6/11	Parent 3	Vendor 3

Organization data:

- Org ID
- Org name
- Org short name
- First live DX date
- Parent
- Vendor

Ongoing

COMPLET	Failed	Total Job	Percent Completed Job	Immunization Records	Rejected Imms	Percent Rejected Records for Sending Org	New Immunizations
							5
							15
28		28	100.00%	11			11
							42
							350
							204
							4
							27
							33
							60
7		7	100.00%	9	2	22.22%	5
							30
							323
							64
							11
53		53	100.00%	73			16
							209
							691
							295

Jobs Data:

- Complete
- Failed
- Total
- Percent Complete
- Imm Records
- Rejected Imms
- Percent Rejected
- New Imms

Ongoing

Total Sampled Record	RXA-5	RXA-6	PID-5	RXA-3	MSH-0	ORC-3	PID-7	DUP	Non-consent	Unidentified	Other	MSH-4
1	1											
2			2									
23		23										
2	2											
5	4			1								
1			1									

Records data:

- Total Sampled
- RXA-5, RXA-6
- PID-5, RXA-3
- MSH-0, ORC-3
- PID-7, Dup
- Non-Consent
- Unidentified
- Other, MSH-4

[illegible]

RXA-5 Rejection Reasons		
Total RXA-5 Errors		
Rejection Reason	REC FAC	Total
CPT Code, Vaccine Group and Tradename are not a valid combination.	Provider 1	1
	Provider 2	1
	Provider 3	2
68 is an invalid CVX code	Provider 3	1
96 is an invalid CVX code	Provider 4	1

Count of Non-Submitters	246
ORG_ID	ORG_NAME
1	Provider 1
2	Provider 2
3	Provider 3
4	Provider 4
5	Provider 5
6	Provider 6

Watch areas:

- New orgs
- Non-Submitters
- Job with no Immunizations
- Failed jobs
- RXA-5 specifics
- High rejections

Ongoing

Vendor Table	January	February	March	April	May	June	July	August	September	October	November	December
Vendor 1	60	21	0	0	0	0	0	0	0	0	0	0
Vendor 2	7773	6469	0	0	0	0	0	0	0	0	0	0
Vendor 3	1123	800	0	0	0	0	0	0	0	0	0	0
Vendor 4	666	611	0	0	0	0	0	0	0	0	0	0
Vendor 5	3095	2367	0	0	0	0	0	0	0	0	0	0
Vendor 6	11701	10107	0	0	0	0	0	0	0	0	0	0
Vendor 7	363	324	0	0	0	0	0	0	0	0	0	0

Stats at a glance

- Monthly immunizations counts
- Summarized by vendor and parent groups with drill down capacity

Ongoing

Vendor Table	January	February	March	April	May	June	July	August	September	October	November	December
Vendor 1	60	21	0	0	0	0	0	0	0	0	0	0
Parent 1	60	21	0	0	0	0	0	0	0	0	0	0
Provider 1	60	21	0	0	0	0	0	0	0	0	0	0
Vendor 2	7773	6469	0	0	0	0	0	0	0	0	0	0
Parent 2	1046	746	0	0	0	0	0	0	0	0	0	0
Provider 2	1046	746	0	0	0	0	0	0	0	0	0	0
Provider 3	0	0	0	0	0	0	0	0	0	0	0	0
Parent 3	2038	1687	0	0	0	0	0	0	0	0	0	0
Provider 4	0	0	0	0	0	0	0	0	0	0	0	0
Provider 5	0	0	0	0	0	0	0	0	0	0	0	0
Provider 6	3	3	0	0	0	0	0	0	0	0	0	0
Provider 7	0	0	0	0	0	0	0	0	0	0	0	0
Provider 8	378	362	0	0	0	0	0	0	0	0	0	0
Provider 9	213	179	0	0	0	0	0	0	0	0	0	0
Provider 10	150	90	0	0	0	0	0	0	0	0	0	0
Provider 11	1294	1053	0	0	0	0	0	0	0	0	0	0

View:

- Parents within vendor groups
- Organizations within parent groups

Ongoing

Org ID	Org Name	Org Level	Date Added	First Live DX Date	HL7 Version	Transaction Type	Parent	Vendor	Status	Dec-15	17-Jan
24277	Provider 1	C/V	11/24/2014	1/28/2013	2.5.1	PHINMS	Parent 1	Vendor 1	Active	0	0
24257	Provider 2	C/V	1/29/2013	1/29/2013	2.4	PHINMS	Parent 1	Vendor 1	Active	782	506
27777	Provider 3	C/V	2/18/2015	2/2/2015	2.5.1	PHINMS	Parent 1	Vendor 1	Active	4	3
25279	Provider 4	C/P	11/17/2014	7/15/2014	2.5.1	PHINMS	Parent 2	Vendor 2	Active	54	37
27771	Provider 5	C/P	2/5/2015	1/22/2015	2.5.1	PHINMS	Parent 2	Vendor 2	Active	976	982
18220	Provider 6	C/P	1/1/2012	1/27/2012	2.5.1	Web Service	Parent 3	Vendor 3	Active	2	0
20037	Provider 7	C/P	1/1/2012	5/6/2011	2.5.1	Web Service	Parent 3	Vendor 3	Active	1	1
25745	Provider 8	C/P	7/9/2014	7/2/2014	2.5.1	Web Service	Parent 3	Vendor 3	Active	0	0
25741	Provider 9	C/P	10/19/2015	10/2/2015	2.5.1	Web Service	Parent 3	Vendor 3	Active	0	0
25769	Provider 10	C/P	12/1/2013	12/1/2013	2.5.1	Web Service	Parent 3	Vendor 3	Active	37	37

Monthly items:

- Org ID
- Org level
- First live DX date
- Transaction type
- Status
- Org name
- Date added
- HL7 version
- Parent/vendor
- Monthly imms

Ongoing

NESIIS Totals					
Org Name	Org ID	New Imms With No Elig	100% Null Elig	Children with Adult Elig	Adults with Child Elig
		30170	21723	68	406
				474	
Count of Organizations	704	181	81	8	43

Org Name	Org ID	New Imms With No Elig	100% Null Elig	Children with Adult Elig	Adults with Child Elig
Provider 1	1				
Provider 2	2				
Provider 3	3				
Provider 4	4	29	29		
Provider 5	5	398			
Provider 6	6				
Provider 7	7				
Provider 8	8				

Records counts of:

- No eligibility data
- Incorrect eligibility data

Ongoing

NESIIS Totals														
Org Name	Org ID	January	February	March	April	May	June	July	August	September	October	November	December	
		32748	30170	0	0	0	0	0	0	0	0	0	0	0
Count of Orgs		705												
Org Name	Org ID	January	February	March	April	May	June	July	August	September	October	November	December	
Provider 1	1			0	0	0	0	0	0	0	0	0	0	0
Provider 2	2			0	0	0	0	0	0	0	0	0	0	0
Provider 3	3			0	0	0	0	0	0	0	0	0	0	0
Provider 4	4	37	29	0	0	0	0	0	0	0	0	0	0	0
Provider 5	5	511	398	0	0	0	0	0	0	0	0	0	0	0

**Month to month,
from January to
the current
month**

Ongoing

Org Name	Org ID	January Immunizations	January Eligibility	January Ratio	February Immunizations	February Eligibility	February Ratio
Provider 1	1	0			0		
Provider 1	2	506			472		
Provider 1	3	3			17		
Provider 1	4	37	37	100.00%	31	29	93.55%
Provider 1	5	982	511	52.04%	731	398	54.45
Provider 1	6	0			0		
Provider 1	7	1			0		
Provider 1	8	0			0		
Provider 1	9	0			0		
Provider 1	10	37			17		
Provider 1	11	5			8		
Provider 1	12	0			0		

**Compares total
immunizations
submitted to
immunizations
submitted with
no eligibility data**

Ongoing

Filter to Increases					
Org ID	Org Name	Dec to Jan Change	Dec to Jan Rate of change	Jan to Feb Change	Jan to Feb Rate of Change
Count	122			>0	
December to January			January to February		
Org ID	Org Name	Dec to Jan Change	Dec to Jan Rate of change	Jan to Feb Change	Jan to Feb Rate of Change
1	Provider 1	-1	0	14	466.67%
2	Provider 2	-1	0	3	60.00%
3	Provider 3	-5	0	26	152.94%
4	Provider 4	-13	-1	7	233.33%
5	Provider 5	-2	-1	2	100.00%
6	Provider 6	39	1	47	64.38%
7	Provider 7	8	0	56	94.92%
8	Provider 8	-11	-1	66	

Watch areas:

- Rate of change month over month
- Increases
- Decreases
- Zero imms for the month

Org ID	Org Name	Org Level	Date Added	First Live DX Date	HL7 Version	Transaction Type	Parent	Vendor	Status	Dec-15	17-Jan
24277	Provider 1	C/V	11/24/2014	1/28/2013	2.5.1	PHINMS	Parent 1	Vendor 1	Active	0	0
18220	Provider 2	C/P	1/1/2012	1/27/2012	2.5.1	Web Service	Parent 1	Vendor 2	Active	2	0
20037	Provider 3	C/P	1/1/2012	5/6/2011	2.5.1	Web Service	Parent 1	Vendor 2	Active	1	1
25745	Provider 4	C/P	7/9/2014	7/2/2014	2.5.1	Web Service	Parent 1	Vendor 2	Active	0	0
25741	Provider 5	C/P	10/19/2015	10/2/2015	2.5.1	Web Service	Parent 1	Vendor 2	Active	0	0
25740	Provider 6	C/P	12/1/2013	12/1/2013	2.5.1	Web Service	Parent 1	Vendor 2	Active	0	0
19997	Provider 7	C/P	1/1/2012	5/6/2011	2.5.1	Web Service	Parent 1	Vendor 2	Active	0	0

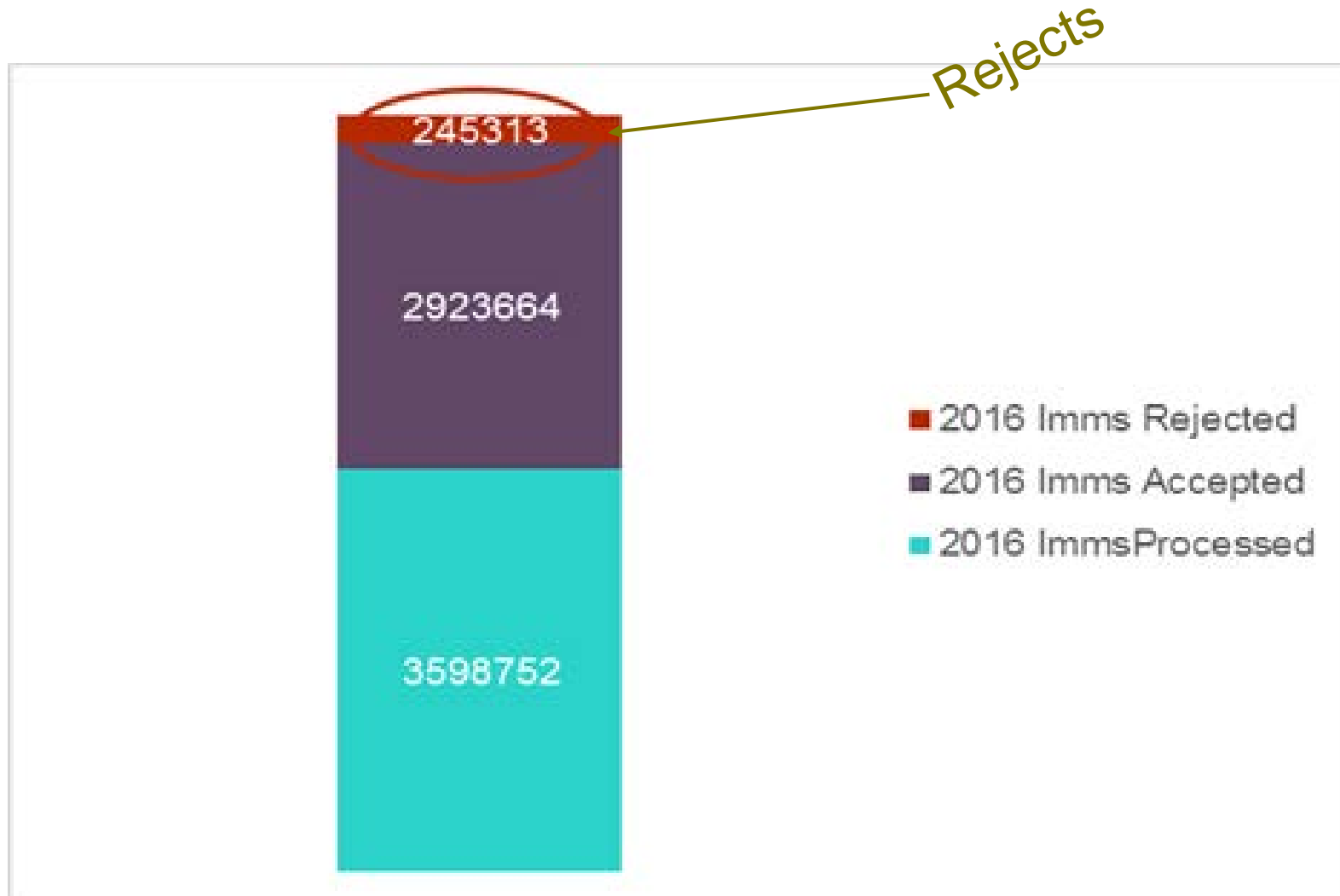
Ongoing

- **Actions**

- Timely feedback
- Monitor responses (timeliness, accuracy, understanding)
- Follow up as needed

Results

Results



Results

- **Website listing of participating facilities**
- **Administrative updates to directors and legislators**
- **Coordination with other meaningful use measures**
- **Internal data exchange promotion and recruitment**

Results

- **Provider participation rates**



Onwards

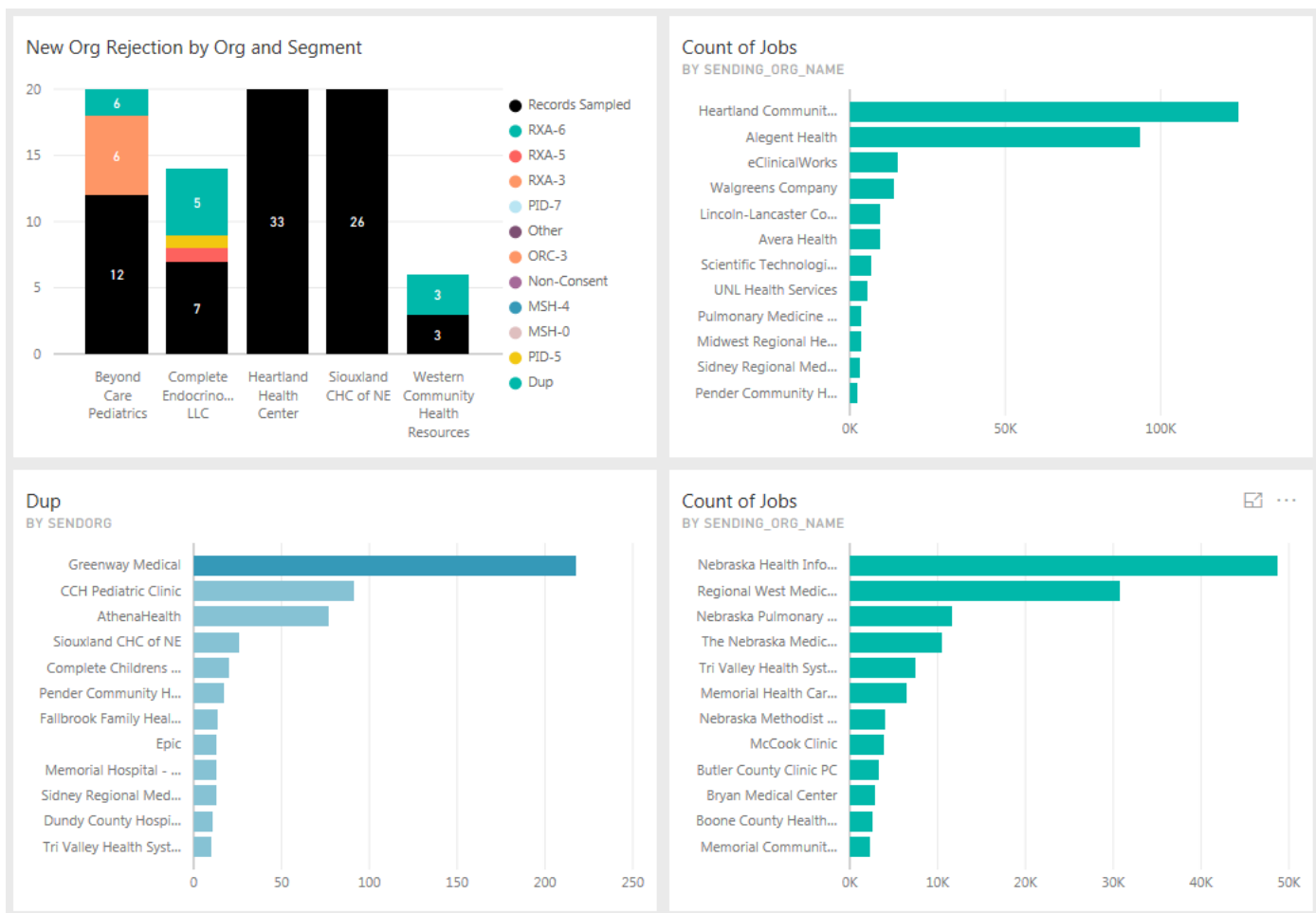




Onwards

- **NE Medicaid and Managed Care Unit**
- **Project tracking tool**
- **Attestation verification**
- **Public health role in the MU process**

Onwards



Power BI
Data exchange
scanning tool

Wrap

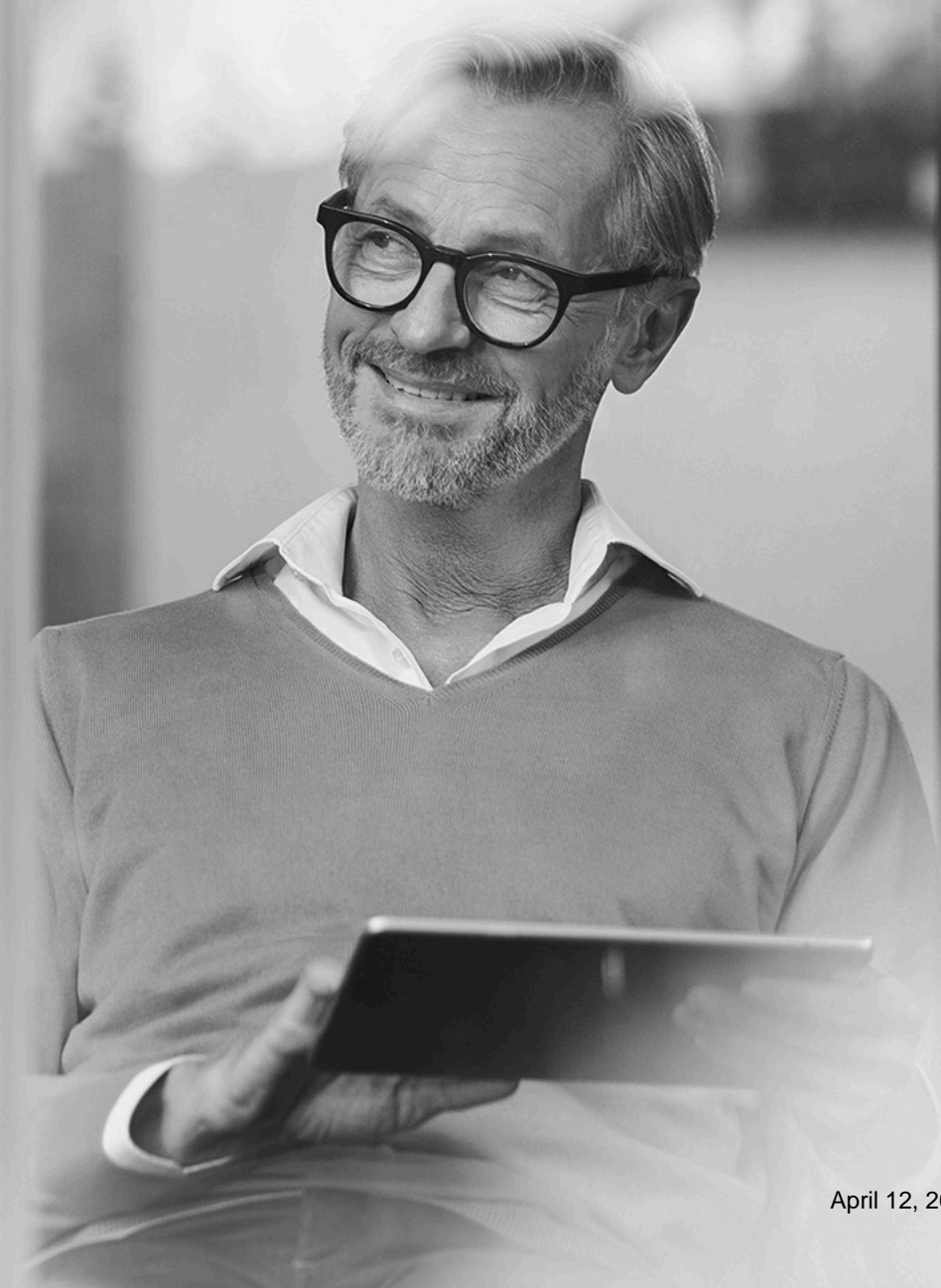
Wrap

- **Drive Successful Data Exchange Relationships**
 - Improve data quality
 - Improve submission frequency
 - Improve outreach and communication
 - Improve reporting capabilities
 - Improve monitoring capabilities

Q&A



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DEPT. OF HEALTH AND HUMAN SERVICES



Thank you

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