



TEXAS
Health and Human
Services

Texas Department of State
Health Services

Data Quality

Managing, Normalizing & Maintaining



TEXAS
Health and Human
Services

Texas Department of State
Health Services

Data Quality

Managing, Normalizing and Maintaining

Background

The Texas Immunization Registry Quality Assurance (QA) team analyzes data for its integrity.

Data that is incorrectly recorded in the system:

- ✓ causes potential issues with searching and finding client/immunization data
- ✓ triggers an increase in questionable matches that registry staff must resolve manually



Approach

The QA team focuses on one data field at a time, unless it is observed that multiple data fields can be normalized all at once.



Keeping the scope small helps prevent overcomplicating remediation techniques that could extend time, resources, effort and costs.

Tools

Software Used

- ImmTrac2 Application
- SQL Developer
- Tableau
- Excel





TEXAS

Health and Human Services

Texas Department of State
Health Services

Data Quality Characteristics

Accuracy and Precision

Legitimacy and Validity

Reliability and Consistency

Timeliness and Relevance

Completeness & Comprehensiveness

Availability and Accessibility

Granularity and Uniqueness



Texas Department of State
Health Services

Data Quality Elements

1. Find
2. Capture
3. Secure
4. Manage
5. Normalize
6. Maintain
7. Aggregate
8. Understand
9. Report
10. Act Upon





Texas Department of State
Health Services

Data Quality Elements

Focus

Managing

Normalizing

Maintaining



Texas Department of State
Health Services

Managing Data

Data management is an administrative process that includes acquiring, validating, storing, protecting, and processing key data to ensure the reliability, integrity, accessibility, security and timeliness of data for its clients and users.



Data Analysis

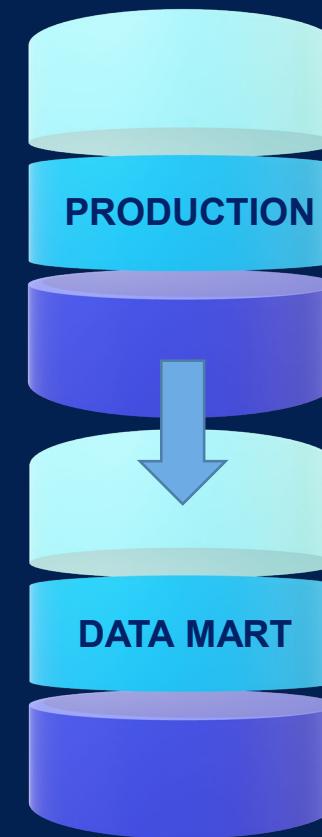
Schemas

Production (transactional database):

- Registered Organizations and users
- Prescribing Authorities and Clinicians
- Data Exchange Logs

Data Mart (data subset):

- Clients
- Immunizations
- Client Immunization Schedules
- Audit Tables



Remediation



System and Data Remediation can be handled by:

- Application Developers
- Database Administrators

Training Staff and End Users:

- Business Analysts
- Interoperability Team
- Quality Assurance Team
- ImmTrac2 Trainers
- Operations Coordinator
- Customer Support Team



FIX IT!

Inappropriate Data

Inappropriate data entry can be damaging to the patient/client, the healthcare provider and the IIS.

- Misleading data
- Duplicate data
- Incorrect data
- Inaccurate data
- Data that violates business rules
- Data without generalized formatting
- Incorrectly punctuated or misspelled data



Data Business Rules



Texas Department of State
Health Services

Recording TB test results in ImmTrac2 is considered an inappropriate data entry.

Allowing TB test results in the IIS could be misconstrued as a diagnosis and a privacy violation matter.

TB Test Results DO NOT indicate a diagnosis.

TB Tests
• **Negative**
• **Positive**



TB Test Results

The options to prevent this were:

- Disallow TB tests to be entered in the IIS by removing the option to select them in the vaccine drop-down list
- Lock down (gray out) the Lot # field when TB tests are selected
- Create logic that does not allow words associated to TB test results to be entered. Like “NEG” and “POS”
- Disallow certain free text fields, like Client Notes field



TB Test Results

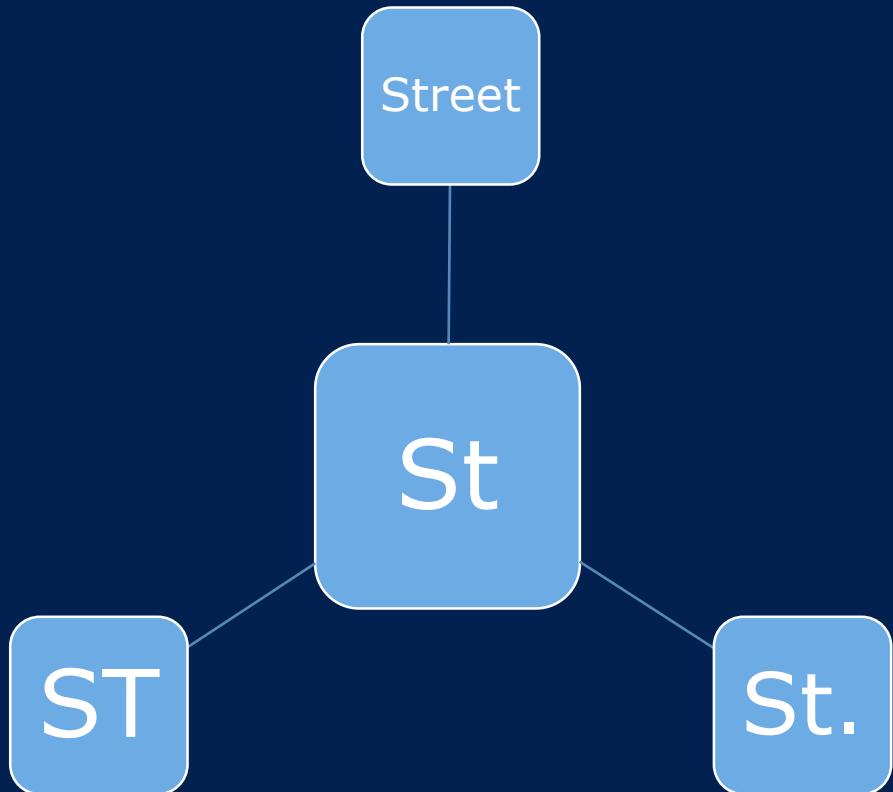
The options to prevent this were:

- Disallow TB tests to be entered in the IIS by removing the option to select them in the vaccine drop-down list
- Lock down (gray out) the Lot # field when TB tests are selected
- Create logic that does not allow words associated to TB test results to be entered. Like “NEG” and “POS”
- Disallow certain free text fields, like Client Notes field

Normalizing Data

Normalization:

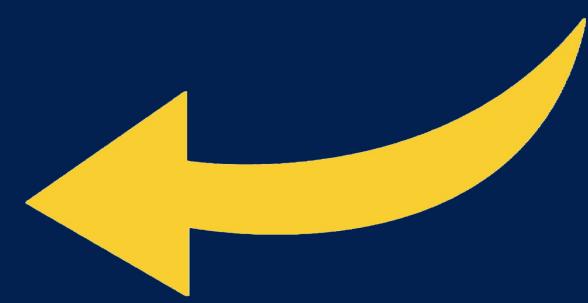
- is the process of restructuring data values in a relational database in accordance with a series of “normal” forms to improve data integrity.
- ensures that all your data looks and reads the same way across all records.
- can standardize fields including organization names, street addresses, mother's maiden names and client last names.





Last Names and Suffixes

For example, here are three common types of last name anomalies that we often see:

- Escobar Jr.
 - GarzaJr
 - San Gabriel,JR.
 - Smith, JR
- 





Cleanup

This is how the data should look after cleanup:

LAST_NAME	NAME_SUFFIX
ESCOBAR	JR
GARZA	JR
SAN GABRIEL	JR
SMITH	JR

Other Data Anomalies

- Mother's maiden name unknown
- Facility address
- Numbers, special characters in the client name

Data Matching



Unknown, Unk, Ukn, N/A, Not Known

Maiden Name Types



TEXAS

Health and Human Services

Texas Department of State
Health Services

MAIDEN_NAME	COUNT
NA	16003
SWK	3443
UNK	3359
SAME	1110
UNKOWN	642
UNKNOWN	489

MAIDEN_NAME	COUNT
UKN	232
SHELTER	224
NOT STATED	126
NOT AVAILABLE	123
MOTHER	67
MOM	37

Using SQL Regular Expressions



TEXAS

Health and Human Services

Texas Department of State
Health Services

```
WHERE (REEXP_LIKE (C.MOTHERS_MAIDEN, '^U(N|K) (K|N)$')  
OR REEXP_LIKE (C.MOTHERS_MAIDEN_LAST, '^U(N|K) (K|N) OWN$'))  
OR REEXP_LIKE (C.MOTHERS_MAIDEN_LAST, '^MOTHER$|^MOM$|^NA$|N/A|^NONE%|^SAME$|CHILDREN|  
SHELTER|NOT USE|ADOPT|FOSTER CARE|FOSTER CHILD|FOSTER PARENT|  
^IES|DECEASED|NOT AVAIL|NOT APPL|NOT GIVE|NOT KNOWN|NOT LIST|  
NOT PRO|NOT SP|NOT STATED|CPS|/ ', 'i')
```



Texas Department of State
Health Services

Maintaining Data

- **Systematic**
 - During capturing - as it enters the system
 - Scheduled Jobs - Systematic Cleanup
- **Manual**
 - Cleanup Tasks - assigned to staff
 - Training ImmTrac2 Users - Outreach Specialists



Outreach Specialists

Responsible Entities:

- local health departments
- health service regions

Contain Outreach Specialists who each out to providers in order to help improve our data quality.

They help with:

- training providers on how to consent clients into the system
- Perform assigned activities to help overall immunization rates

Summary



Texas Department of State
Health Services

It is truly a state-wide team effort in improving data quality for the Texas Immunization Registry.

TEAM WORK



TEXAS
Health and Human
Services

Texas Department of State
Health Services

Thank you

**Arthur Lara – Quality Assurance Coordinator
1100 West 49th Street
Austin, Texas 78756
(512) 776-3056
Email: arthur.lara@dshs.texas.gov**