TransMed Adaptive HUB™

Healthcare Unified Bioclinical Warehouse

Unlock the power of your healthcare data to improve patient outcomes

A significant benefit resulting from the adoption of electronic medical records (EMR) by healthcare organizations is the accumulation of vast repositories of clinical data. Simultaneously, advancement in genetic profiling is resulting in the accumulation of vast repositories of molecular data.

Only by integrating patient clinical and molecular repositories along with finance and research repositories, can an organization mine the data to improve patient outcomes and clinical quality. To maximize this potential, there are challenges such as:
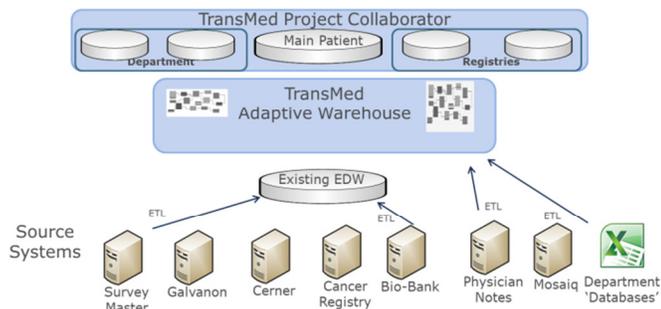
- Providing fast and easy access to all this data to users without deep database engineering skills
- Combining multiple, disparate clinical data sources and integrating thousands of heterogeneous data elements (molecular, clinical and others) into one repository

> TransMed Adaptive HUB minimizes time to value, total cost of ownership and risk traditionally associated with a data warehouse while maximizing its multi-purpose value by serving not only translational medicine; but also quality and operations reporting

Highlights

- Adaptive technology is essential for future of ever-changing healthcare data elements

- Immediate response to information requests through self-service access to all bio-clinical data

- Fast time to value and low total cost of ownership with technology that accelerates implementation and reduces maintenance

- Multi-purpose HUB with primary support for translational medicine but also operations, quality and safety reporting

- Continuous learning healthcare with evidence based clinical quality & translational medicine

Adaptive Warehouse

Respect Existing Technology Investment

If you have already invested and successfully implemented and deployed an enterprise data warehouse, TransMed integrates to that corporate asset in order to enhance its utilization by layering a translational medicine and research suite of tools providing business users such as clinicians, quality analysts and investigators self-service access to explore, report and analyze that data.

Adaptive Warehouse
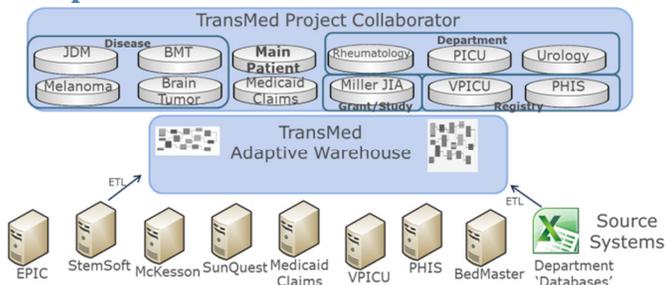
If your organization does not have an enterprise data warehouse, TransMed efficiently combines data from multiple different healthcare source systems and generates an integrated data warehouse. Instead of conforming your data to a vendor-specific, predefined schema, the TransMed warehouse adapts to your organizaiton's unique data. It follows a simple, consistent data model that maintains your terminology making it easy to learn, use and understand.

Open, Multi-Purpose Warehouse

Since the Adaptive Warehouse is relational, it can serve not only translational medicine and research purposes; but also, can be re-leveraged for hospital operations reporting, quality and safety reporting, business intelligence, etc. Report writers can connect existing commercial reporting tools to the warehouse. In order to maximize its utility for these additional reporting purposes, it includes source systems keys for traceability/data lineage, meta-data describing all the data elements and reference data.

Holistic View of Data

The TransMed adaptive warehouse integrates the vast amount and wide variety of data generated in today's healthcare organization. For example, patient and encounter data from the EMR; second by second physiologic data from bedside monitors; genomic data from genetic experiments; claims, billing and financial data; biobanking, LIMS and research data; etc.. The adaptive warehouse can store identified and de-identified versions of PHI data elements.

Patient		
Trait	Value	Protected
ID	MRN-01234	Yes
DeID_ID	A999812278	No
DoB	ID:Dec 7, 1941 DeID:Dec 21 1941	No
Name	John Doe	Yes
Sample Storage Location	Refrigerator 1, Box 1	No
Histology	Malignant melanoma, NOS	No
Variant Gene	BRAF	No
Variant AA Change	V600E	No

TransMed Adaptive Warehouse embraces a future with an accelerating pace of change in the data elements that drive healthcare decisions

Adaptive ETL

Efficiently Adapt the Warehouse

Healthcare is constantly evolving. Genetic and other molecular data is evidence of the accelerating pace and increasing importance of the rate of change of data that drives healthcare decisions. Adaptive ETL anticipates this need for change by codifying a simple, repeatable recipe to


adapt the warehouse and integrate in each new healthcare source system or changing data elements from existing source systems. This adaptive process is meta-data driven and follows a consistent pattern making it easy for the ETL architect to learn. In the face of ever-changing data elements, Adaptive ETL and all components of the TransMed Suite prepare you for the future because they are not hard-wired against a vendor-specific, predefined schema but instead work off meta-data making them adaptive to a changing future.

Efficiently Populate the Warehouse

Building a healthcare data warehouse is expensive and time consuming. Adaptive ETL is a supported software product that codifies ETL industry best practices and automates much of the routine work involved in the initial generation and

ongoing maintenance of the TransMed warehouse. For example, the Adaptive ETL provides: bulk and incremental
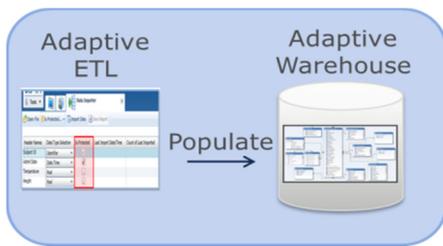
loads from conformed input to the EDW; schema and index creation and maintenance; meta-data management, validations, error handling, rollback, and auditing; etc. This productized approach frees the ETL architect from these routine tasks allowing them to focus their intellectual activity on deeply understanding the data of the source system.

Data de-identification

The Adaptive ETL comes out-of-the-box with de-identification processes such as patient de-identified key generation and mapping to MRN; date shifting, etc. Or, the Adaptive ETL can integrate with your organization's existing PHI de-identification procedures.

Integrate Non-Enterprise Data into Warehouse

The TransMed Adaptive ETL provides an ability to integrate departmental data (non-enterprise data) with the enterprise data in the warehouse so exploring, reporting and analysis can be performed on the combined data. The Adaptive ETL provides a simple user experience to import data from an Excel file. An authorized, business user, with

import permission and with minimal training, is able to characterize the data in the excel file and load the data into a schema integrated with the adaptive warehouse.

TransMed Adaptive ETL reduces the time to value, total cost of ownership and risk typically associated with the creation and administration of a traditional healthcare enterprise data warehouse
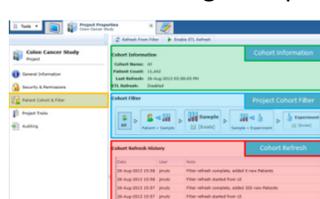
Project Administrator

Quickly Fulfill Data Requests

The Adaptive Warehouse maintains one copy of the data; Project Administrator manages "projects" which are views of the warehouse. IT no longer needs to maintain separate data marts for departments, disease registries, investigational studies, etc. Instead, an IRB honest broker uses Project Administrator's simple user experience to grant and control user access to projects. Thus streamlining the steps to fulfill data requests by empowering business users with self-service capabilities.

Control Data Visibility

An honest broker uses Project Administrator to configure which patients (rows) and traits (data elements or columns) are visible through the project. This enables Project


Administrator to support IRB protocols. Projects are also configured so the list of patients visible through the project is either static or using filter criteria is refreshed manually or automatically after each incremental load updates the adaptive warehouse with new data.
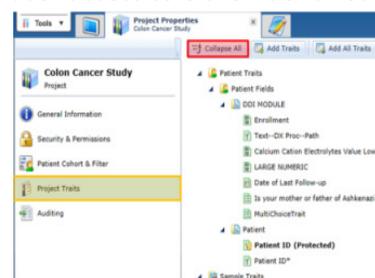
Grant User Access

Project Administrator integrates with LDAP providers to specify groups and users who have access to the project. Project Administrator also grants functional entitlement such as exploring, reporting, analyzing or exporting data from the project.
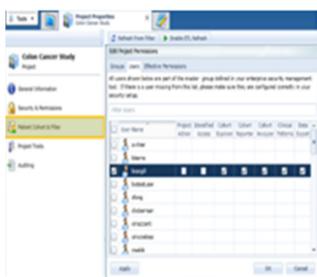
Manage Protected Health Information

The Adaptive Warehouse maintains identified and de-identified versions of PHI data elements. Project Administrator constrains user access to either identified or de-identified views of the project.

Therefore, a user can start working with the de-identified project and once IRB approval is granted, the honest broker can quickly "re-identify" the data by simply granting the user access to the identified view of the project. An audit trail can also be enabled which records actions such as: project user access, data filter request, cohort creation, data export, etc.

Hub-and-Spoke Support

TransMed Suite enables a cost-effective deployment of a hub-and-spoke architecture that delivers real value to business users.

- Project Administrator grants user access and data visibility
- Adaptive ETL integrates departmental data (non-enterprise data) with enterprise data
- Project Collaborator facilitates cross-functional team collaboration by sharing data artifacts in project workspaces and
- Bioinformatics Suite provides business users self-service access to explore, report and analyze the project's data.

TransMed Project Administrator enables Information Technology to quickly and efficiently fulfill business users' requests for data

TransMed