The ‘Ins’ and ‘Outs’ of Data Conversions

By Nathan Patrick Taylor, MPH, MS, CHDA

Many people in healthcare tend to think simply about data “in” and data “out.” They see the process of data conversion as cost effective and expect it to be easy. It’s not easy.

Data conversions are commonplace in healthcare today, especially with constant improvements and evolutions in electronic health record (EHR) functionality. New enhancements in EHR technology give rise to changes in vendors which lead to data conversions. In some cases, physician dissatisfaction can lead to a change in vendors. A RAND study published in 2013 found that “Poor EHR usability, time-consuming data entry, interference with face-to-face patient care, inefficient and less fulfilling work content, inability to exchange health information between EHR products, and degradation of clinical documentation were prominent sources of professional dissatisfaction.”[1] As more healthcare providers seek to benefit from improvements within state-of-the-art EHRs, the healthcare industry may very well see an increase in the number of data conversions.

How to Handle Staff Training

Staff training is the key to a successful conversion. In fact, a conversion can be viewed as a “reimplementation.” There are opportunities to fix or streamline current unwanted behavior. Training is not only about the new system or application, but also the mechanics and processes (such as clinical workflows) used to operate the new system.

Remember that the decision to change from one system to another must be accompanied by valid reasons. For example, the change may be due to the new system having a richer feature set or additional modules that are not available in the old system. By nature, the new system will be different—and for good reason. Changing to a new system with the same mechanics would be pointless.

Data requirements and processes will be different in the new system and many details will change. For example, the previous system may use a generic workflow for patient admissions whereas the new system may adopt an evidence-based workflow such as the INTERACT II clinical decision support tools.

Staff training should be kept as close to the go-live date as possible so that the new materials are still fresh. Staff can quickly forget the training when they are not using the new system on a daily basis. In addition, web-based EHRs can be updated frequently, which causes a mental disconnect between what was taught in training and what the updated system looks like. Emphasis should be placed on building habits and keeping timeframes between training and go-live short.

Pay Attention to Team Behaviors

The ideal team should be composed of individuals who are considered by others to be “people persons.” What that means is that they should be comfortable communicating with people up and down their chain of command. Whether it’s the C-suite or entry level personnel, they should be able to communicate well in both settings. This helps people feel like their contribution to the project is valued and important. Team members should respect each other and each others’ time. Another key trait for a data conversion team member is flexibility. Many times throughout the course of a conversion team members will be thrown curveballs. Even the most well-planned and documented conversions can be sent off course. The best team members are those who can quickly shift gears with little complaint or frustration.

Parallel Processing Can Be a Necessary Burden

It is possible to run an old system and new system at the same time. This method is called parallel processing and is sometimes referred to as dual-entry, and there are some advantages and disadvantages. Because both systems are online, staff will better

retain their training on the new system. The longer you can reasonably afford to run in parallel, the better uptake staff will have of the new system.

In some environments, running parallel systems will be unavoidable. This is the "nature of the beast" when it comes to conversions. Parallel processing requires double data entry and is a necessary burden. No one likes to enter data twice so expect a collective groan from staff. In addition, CEOs and other executives won't understand the need to pay overtime for staff to keep up with turnaround times and documentation requirements. Evaluation of temporary staff and the use of interns may be necessary. Although this can be associated with added costs, the use of such measures can be an effective way to mitigate the burden of parallel processing. Once again, be flexible and patient.

Ideal Technical Skills

Knowledge of SQL (structured query language) and various reporting tools is a must for any data conversion team member. A traditional EHR database will be optimized for transactional processing. In other words, speed is the goal—not human readability. Many clinical databases lack clear documentation identifying relationships among entities and exactly what is stored in each field, which further complicates data extraction tasks from your source system.

Knowing the structure of your current data, its contents, and how to move data between various sources and targets is a value-add. Your in-house (or current vendor's) documentation can be scarce at times, so having individuals who are able to understand clinical data concepts and quickly interpret relationships among the data for the team will lend much credibility and expertise to the project.

If your old system contained bad data, wasn't fully optimized for your specialty, or was implemented based on flawed clinical workflows, then a new system won't solve those problems. The workflow flaws will still exist and so will bad data. When you convert that bad data it'll follow you into the new system. As the saying goes, "garbage in, garbage out." That sentiment applies not only to data entering your system but also converted data.

Getting data "out" is different than putting data "in." Forms used as input provide important context to both structured and unstructured data that is easily lost once stored in a database. A value of "100," for example, could be a temperature reading, a high diastolic blood pressure, or a near optimal LDL cholesterol level. Semantics—the definitions of terms—within a new system are important to understand so those terms can be mapped back to the old system.

Vendor import specifications can sometimes be outdated or simply incorrect. Again, team flexibility and patience are critical for success in handling the incorrect information.

Process, Common Pitfalls, and Hints and Tips

The conversion process looks similar to the ETL (extract, transform, and load) process used in data warehousing. The source system's data will be extracted and transformed to match the import specifications of the target system. Ideally, data can be cleansed prior to conversion or as the data are being processed to the target system. Clean up of the source data can also occur at the transform step. Errors such as erroneous dates, incorrect fields, duplicate data, and missing data can be fixed. For example, incorrect city names, such as "unknown," can be fixed using address look-up (if ZIP code or other address elements are available) or set to "null."

The conversion from ICD-9-CM to ICD-10-CM/PCS and various standardized coding systems can cause data integrity issues. Even though the codes are standard, the methods in which they are stored could differ based on how the fields in the database were created and formatted. As a concrete example, some EHRs store codes with the characters "ICD-" in front of the code. If the expected code is simply "250.0," the target system will reject the code.

The project plan should take staffing levels and time constraints into consideration; especially for the technical staff who may be asked to perform conversion tasks on top of their traditional work.

Testing and Validation: The Devil is in the Details

It's crucial to create and run identical reports and audits in both systems in order to compare the output during a conversion. When analyzing these reports, subtle differences between the source and target system will cause the bottom line to not match perfectly. Consider the semantics and the concept that vendor definitions may not always correlate. The terminology used in the target system may be different.

For example, on a report listing discharges for the day, it's important to make sure the definition of a "discharge" matches in both systems. Some reports provide options to include or exclude patients who left against medical advice. The preceding example is trivial but highlights how small details can influence the matching of reports. When reports don't specify options, it's critical to fully understand what data is included and how it is filtered. Although there will be differences, those differences need to be understood and explained to all users. In other words, work toward standardization but accept and embrace the differences between systems and know why they exist.

Finally, it's not uncommon to see the original source system called into question. Programming flaws and errors within the source system may be uncovered during the validation process. No two conversions are the same, but many share similar traits. Strive to set realistic expectations and know that the road will not be perfect. Be prepared to work through the conversion tasks more than once as you learn the details of the old and new system. Remember that the data going out of your old system and into your new system must have credibility and reliability. Most of all—be flexible.

Note

1. Friedberg, Mark W. et al. "Factors Affecting Physician Professional Satisfaction and Their Implications for Patient Care, Health Systems, and Health Policy." The Rand Corporation. 2013. www.rand.org/pubs/research_reports/RR439.

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