

Dialysis Machine Interoperability Project

Overview

The purpose of the Dialysis Machine Interoperability Project is to create a new machine schema for all dialysis vendors to conform to for purpose of integration. Currently, different vendors create their own data standards. Each standard is good within in its own silo of operations, but interoperability and common (and correct) usage of the data is difficult. The project, when completed, will provide a vendor-approved schema.

Background

Currently, each vendor has a data message standard (or schema) that it implements. These schemas not only vary from vendor to vendor, but also within a vendor's fleet of machine models. The result is each time a new dialysis machine is brought into a clinic, extra work is required to interface that machine make/model into the enterprise.

This is a common problem across many industries and not just an issue within healthcare. As each company builds a solution, it will build its own if a standard is not present. Problems manifest when data from these disparate vendor data silos need to be merged into a common meaning and form. For dialysis providers, this means dialysis machine data that alerts and integrates with electronic medical record and clinical decision support systems require additional initiatives to map, normalize and store the data. Thereby requiring potentially manifold sets of interfaces to integrate that same data into the enterprise. There is an entire industry built around gathering and normalizing medical device interface data.

Therefore, the goal of this project is to define a schema to ensure vendor-neutral dialysis machine computable semantic interoperability. The schema to be defined will be an ontology. In computer science and information science, an ontology is a formal naming and definition of the types, properties, and interrelationships of the entities that really or fundamentally exist for a particular domain of discourse. It is thus a practical application of philosophical ontology, with a taxonomy. An ontology compartmentalizes the variables needed for some set of computations and establishes the relationships between them. (WIKIPEDIA) Fundamentally, the dialysis machine interoperability ontology will define the rules for common language that dialysis provider systems can use to communicate. Common examples of this are the Health Language 7 (HL7) messaging schemas or the Continuity of Care Document. If two systems "speak" a common HL7 flavor, they can communicate.

Ontologies enable computable semantic interoperability. Computable semantic interoperability enables machine computable logic, inference, knowledge discovery, and data federation between information systems. Simply put, this enables the ability to have applications/systems exchange data with an unambiguous, shared meaning.

Key Performance Indicators

We will measure the success of the project based on several key performance indicators. A key performance indicator (KPI) is a business metric used to evaluate factors that are crucial to the success of an organization.

Time to Integrate Message Collection

This KPI will measure how long it will take to collect a new dialysis machine's data utilizing the schema versus a machine with a vendor-specific schema. This measure is to the point of collection only.

Time to Integrate Message Data

This KPI will measure how long it will take to integrate a new dialysis machine utilizing the schema's data versus a machine with a vendor-specific schema. This measure is to track the time for utilizing the data from the collection point forward.

Machine Maintenance

This KPI will measure the accuracy and ability to maintain the dialysis machine itself within its own lifecycle. This will include onboarding, reliability, maintenance costs, machine hardware and software versions and prediction of failure.

Summary

The purpose of the project is to simplify the collection and usage of dialysis machine data and to expand on what data is available. By providing a vendor neutral schema, we will enable computable semantic interoperability. This means that instead of building software to handle N different schemas, consumption of data will follow a common pattern. This will allow us to then focus on the usage of data and not integrating it into dialysis provider systems.

Objectives

The goal of this project is to define a schema to ensure vendor-neutral dialysis machine computable semantic interoperability in order to drive operational and clinical value.

- Operational-
In current state, significant cost and overhead is incurred to enlist support from the system integration industry. With completion of this project, that support will no longer be required, resulting in improved operational efficiency and cost avoidance for Dialysis providers.
- Clinical-

Stakeholders

Dialysis Care Providers	Dialysis Machine/Medical Device Manufacturers
<i>DaVita</i>	<i>B. Braun</i>
<i>Fresenius Medical Care</i>	<i>NxStage</i>
<i>Tufts Medical Center</i>	<i>Baxter</i>
<i>DCi</i>	<i>Medtronic</i>

Constraints

- HL7 (FHIR)—normative vote is next spring 2017; require the spec complete and submitted in time for the normative vote

Out of Scope

- Prototyping of a software platform