Personalized Medicine, Using pharmacogenetics information in the EHR using HL7 FHIR

Problem The decode of the human genome has been possible thanks to the technological developments that enable research in molecular genetics. With a big number of scientific publications and clinical studies, there is clinical evidence of the individual genetic for the processing of drugs. Each person processes in an individual way that is determined by their, in other words by its genetic characteristics. This information is essential to be able to efficiently medicate a patient. However, this information is not available for the physicians in accessible and standardized manner. Since the pharmacogenetic information is unique and constant throughout the life of each person – PGx Profile Pharmacogenetic Profile – we consider it essential that this information should be available in the EHR.

Solution This work present a propossal for the implementation of personalized medicine in a hospital by integrating pharmacogenetic information in a EHR. Basis is the new standard for health interoperability HL7 FHIR. This provides a structures for genomic information. In this way, it is possible to find a solution to fulfill the interoperability requirements when the results or pharmacogenetics reports are deliver by the genetic lab and shall be available to the physician through the EHR.

Method The background of the project is in relation with the use of standardized information model for pharmacogenetics Pgx report. HL7 FHIR has been working in this field during past years. Like a result of this job the standard provides some resources and some APIs. The aim of this work is to use the actual resources of HL7 FHIR standard for pharmacogenomics report and identify if its necessary to work in extensions.

Metric and Variables This work will base in information model, or information block of the pharmacogenomics report, these could be: main document, header, sections and entrys. Base on these analysis it could be possible to identify all the of the Pgx Report variables and create a implementation guide using HL7 FHIR resources.

Hypothesis The Pharmacogenomics Report could be implemented using the HL7 FHIR resources: DiagnosticReport, Observation, MolecularSequence and Composition. If it is not possible to map the proposal information model could be necessary to define extensions.

Objectives: How to use the HL7 FHIR standard to specify Pharmacogenetics reports for Personalized Medicine

- Identify the components of the Information Model in a clinical report for Personalized Medicine in Pharmacogenetics
- Use the HL7 FHIR Resources to implement the clinical report in Pharmacogenetics using the definitions of the Information Model
- Implement a POC proof of concept showing that the goal has been achieved.

Results: Proof Of Concept POC implemented and ready to be used in a Hospital. It will be possible to use the HL7 FHIR resources in a case of pharmacogenomics. The Health information systems HIS will improve their CDSS Clinical Decision Support Systems using pharmacogenomics detailed information. It may be necessary to define data extensions to be included in the evolution of the standard. The results of the project increase the use of the pharmacogenomics data for health in other areas like AI using health interoperability standards

Perspective: With the results of this work it would be possible to validate the current state of the genomics standards and how are they near to the real applications. This work encourage to advanced in the field of application using genomic information for precision medicine that is a huge field for de develop the health informatics in next years. Increase the safety and quality for patients that use PMI. The results of this work will help to sizing genomics solutions.

References

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