Medical Informatics: The Key to Unlocking Personalized Medicine

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OVERVIEW

Our purpose is to illustrate that Medical Informatics is the key to delivering personalized medicine. Medical Informatics is the science of studying clinical, biological, and behavioral patient data. It helps in the early detection of disease in providing optimum therapies, and in decreasing prescribing errors.

Medical Informatics' purpose is to reduce clinical trial costs, to reduce adverse drug reactions, increase patient compliance with therapy, improve the selection of targets for drug discovery, reduce drug development cost, reduce total cost of care, and improve quality of life.

MEDICAL INFORMATICS

Our department's directive is to provide data, information, and expertise to support clinical initiatives and public policy in the renal research arena. The qualitative and quantitative data are the inputs into the artificial intelligence engines that drive personalized medicine (Figure 1).

Qualitative informatics data includes patient behaviors, quality of life, physician and healthcare provider process adherence, and historical physician decisions.

Quantitative data can consist of clinical outcomes, medication, adverse events, genomics, proteomics, biomarkers, and transplant findings.

PERSONALIZED MEDICINE

Personalized decision support tools assist the clinicians in making decisions, always leaving the ultimate decision in their control. Personalized medicine is the use of detailed information about a patient's level of gene expression and a patient's clinical data to select a medication, therapy or preventive measure that is particularly suited to that patient at the time of administration. This biomedical research has unfolded a series of new, predictive sciences.
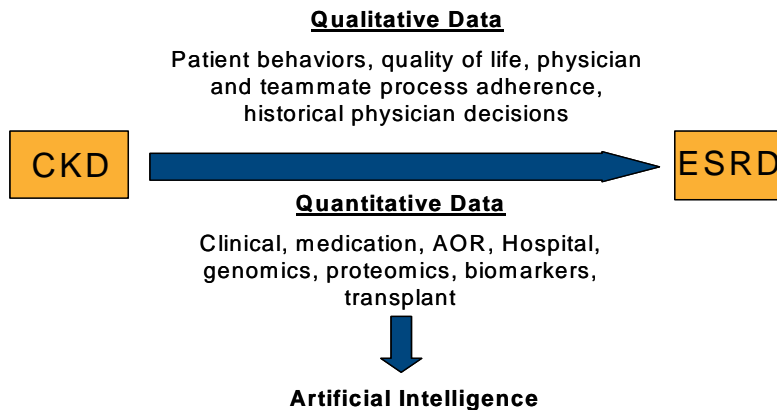
Qualitative Data

Patient behaviors, quality of life, physician and teammate process adherence, historical physician decisions

CKD → ESRD

Quantitative Data

Clinical, medication, AOR, Hospital, genomics, proteomics, biomarkers, transplant

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Artificial Intelligence

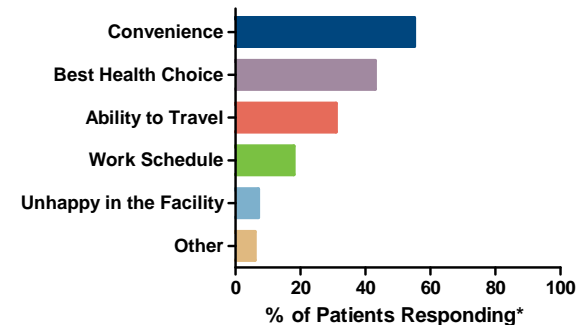**Figure 1: Medical Informatics Renal Data Model**

Figure 2: Analysis Example from HHD Research Determining "Why did you choose HHD rather than another type of dialysis?"

CASE STUDY: HOME HEMO DIALYSIS

One area of renal research is the emergence and effectiveness of Home Hemodialysis (HHD). A goal of HHD to help patients improve their quality of life and have successful health outcomes with their dialysis. Using our repository of patient data we are able to analyze patient demographics, experiences, and outcomes to provide an At Home Patient Profile (Figure 2). To this end, we can assist healthcare providers in guiding patients to a modality most suited to their needs.

ACKNOWLEDGEMENT