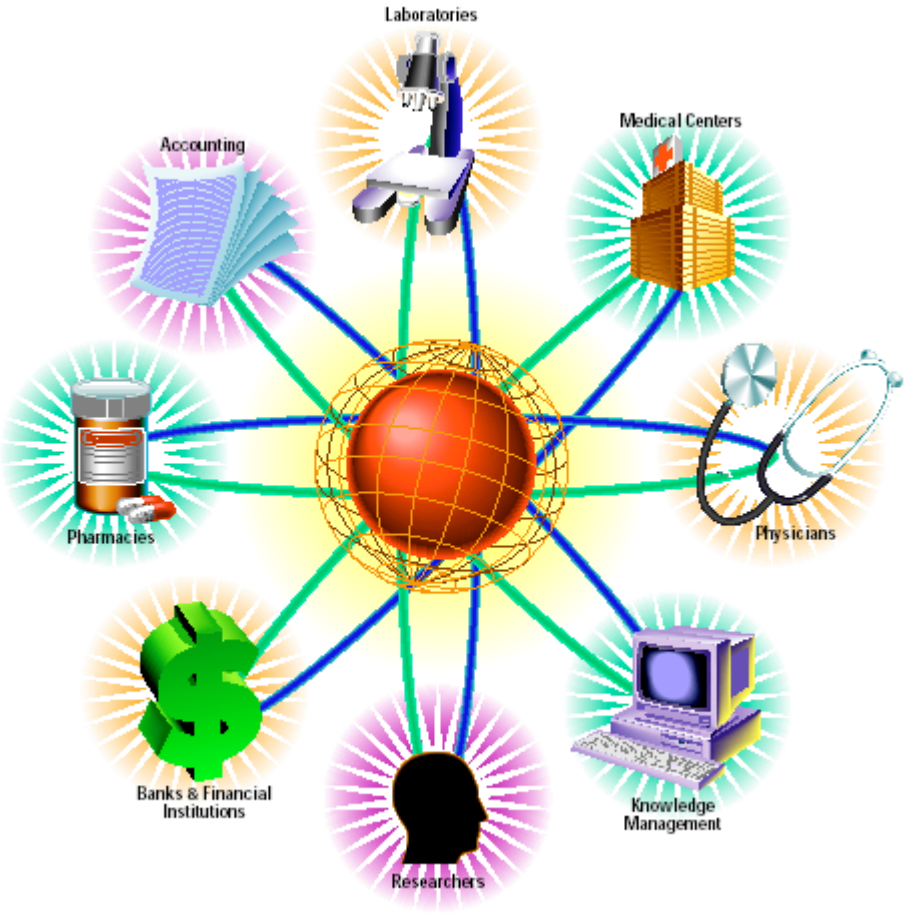

Assignment 1

Definitions

Medical Informatics

Medical Informatics is the scientific field or discipline engaged with the storage, retrieval, sharing and optimal use of biomedical information, data and knowledge coupled with the application of modern information technologies (notably, in the areas of computing and communication) for problem solving and decision making in order to deliver improved health care and promote health.

Decision Support Systems

Decision Support systems are interactive computer based systems that utilize data and models to assist decision makers in improving the effectiveness of their decisions.

Data Warehouse

A data warehouse is a subject-oriented repository (or archive) of information gathered from multiple sources stored under a unified scheme at a single site; thus providing the user with a single consolidated interface to data and thereby making decision support queries easier to write.

Clinical Decision Making

Clinical decision support systems are "software designed to directly aid in clinical decision making in which characteristics of individual patients are matched to a computerized knowledge base for the purpose of generating patient-specific assessments that are then presented to clinicians for consideration."

Expert Systems

Expert systems are programs that closely resemble human logic in their implementation and emulate human expertise in well-defined problem domains.

Telemedicine

Telemedicine is a comprehensive system integrating various applications including: clinical healthcare delivery; arrangement of medical information; and educational and administrative services and utilizing the latest innovations in computing and telecommunication technology to provide superior, timely, quality specialty medical care to patients worldwide who are separated geographically from specialist health care providers.

Information Technologies are transforming the way health care is delivered. Innovations such as computer-based patient records, hospital information systems, computer-based decision support tools, community health information networks, telemedicine and other new ways of distributing health information to consumers are beginning to affect the cost, quality, and accessibility of health care.

Health care has historically been a very fragmented industry. For centuries, till a few decades back, medicine has been practiced as an independent science, focusing mainly on the treatment of diseases. Routine medical care, crisis medical care, medical insurance, medical research and management of public health were typically handled by entirely separate organizations in business, government and universities, and a large number of intermediary institutions as well. Even though the primary focus still remains the same, medical industry has widened its horizons and diversified into multi-various specialty divisions, all of which together constitute the massive health care industry of today.

The advent of computers and new innovations in the telecommunications technology has changed every existing industry beyond recognition at an accelerated pace during the last few decades. The impact of this information technology revolution is very much visible in the health care industry too. A probable solution to unify the fragmented health care industry would be to take advantage of the Information technology revolution and adopt integrated health care delivery systems that brings together hospitals, primary care providers, nursing homes, home health care providers, pharmacies, and other services into a single system.

The introduction of hospital information systems into the clinical practice has led to large amounts of data, extracted from various sources, thus making available a new type of knowledge, which could be exploited. A Data warehouses thus built could be used both by knowledge management tools and decision support systems for building a more effective health care delivery system.

Clinical decision support systems (CDSS) can help physicians provide better care for patients and make their practices more efficient. A CDSS simply follows the medical workflow and enhances it by providing relevant information, organizing data in a useful fashion, and performing logical analysis in response to new data. CDSS take computers from simply being passive reporters of facts and bring them into active participation in physician practice. The computer system is not generating the treatment plan and is not in any other way usurping the clinician's decision-making role. Instead, the system functions as an active partner to the clinician, providing important information at the right time so the clinician can make the right decision about a patient's care. The system functions less as an expert consultant and more as an industrious medical student-not fully capable of making the complete decision, but ever watchful for interesting new data and ready to notify the clinician when they arrive. Clinical decision support systems, thus improve communication, increase clinician and patient satisfaction, and, in general, significantly enhance the process of care.

Just a few decades ago, who might have thought that it would be possible that things like remote monitoring of patient condition, and robotic interventions would be possible? Telemedicine today encompasses a common infrastructure including physical facilities, and equipment used to capture, transmit, store, process and display voice, data and images. Technological advances such as fiber optics, satellite communications, and compressed video have minimized expansion costs and

limitations, thereby initiating a growth of private and public sector interest. Telemedicine impacts how medical care is delivered, who delivers it, and who pays for it.

Increased access to health care and client demand for better services continue to drive demand for new health care solutions. To meet these new challenges, health care organizations are increasingly turning to information technology and business process solutions to help them manage risk, control costs, attract new customers, and improve the quality of health care.

Information Technology can be effectively used to provide more health-related information to consumers, thereby educating them and helping them take measures to prevent illness and disease, by adjusting lifestyles or taking safety precautions to allow them to lead healthier lives. Shared Decision Support Systems designed to inform patient/provider decisions regarding prevention, diagnosis, management and treatment have already proven to reduce costs and ultimately improve the quality of care. A fine example is the interactive videodisk system developed at Dartmouth Medical School that allows men with benign prostatic hyperplasia and early stage prostatic cancer to share in decisions on their course of treatment. These computer-based systems are transforming the culture of the health care to one in which patients, physicians and other providers play equal role in decision-making.

Information technology has made the concept of 'Demand Management' [– defined as the support of individuals so that they can make rational health and medical decisions based on a consideration of the benefits and risks of options available] possible, which could result in reducing a consumer's need for health care services. When developed, a demand management system will allow the consumers to understand, choose, and evaluate health services in new ways and this would have positive impacts on health care costs and quality.

Information technology also fosters communication among people who can provide support and encouragement to those dealing with chronic illness or a medical crisis. There is a large growing community of people using computers to provide help and support to one another to address a variety of concerns. The CHESS (Comprehensive Health Enhancement Support System), an easy-to-use online program designed to help people make well-informed decisions and cope with issues surrounding specific health concerns is another fine example of information technology's role in improving the outcomes in the field of health care.

Advanced information technologies offer an array of possibilities for influencing delivery of health care services. Yet, information technology is often found in "islands of automation" in health care provider and payer institutions. Despite the incorporation of high technology into almost every aspect of clinical practice, information technologies have not yet been fully embraced.