Technology in Health Care
The Movement of Data
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Objectives

- Explain the history of the pharmacy technician
- Explain the impact of technology in healthcare
- Describe how information is shared by healthcare providers
- Explain how shared information can be used in both the hospital and community settings
- Identify the challenges associated with the sharing of information

History of the Pharmacy Technician

Before the title of Pharmacy Technician came to be, what were some common titles used?
- Drug Clerk
- Pharmacy Assistant
- Pharmacy Typist

References

Disclosure
I do not have (nor does any immediate family member have) a vested interest or affiliation with any corporate organization offering financial support or grant monies for this continuing education activity, or any affiliation with an organization whose philosophy could potentially bias my presentation.

References
History of the Pharmacy Technician

What did the previously mentioned changes mean for Pharmacy Assistants?

- Workload and workflow changes
- As pharmacists started to take on more clinical roles and became more involved in patient care, the pharmacy assistants had to take on more of the technical roles.
- This increase in technical roles such as order entry, ordering of medications, inventory management, and insurance billing marked the change from Pharmacy Assistant to Pharmacy Technician.

References

Impact of Technology in Healthcare

What are some examples of technology in pharmacy?

- Patients no longer had to bring in a prescription, it could be called in.
- Less paper, fewer mistakes, quicker access to patient records
- Forms no longer needed to be mailed in, prescriptions could be faxed in.
- Allows for additional safety checks and inventory control.
- Allows for increased automation, faster medication access, reporting capabilities.

References
Impact of Technology in Healthcare

Technological advancements for Healthcare in the last decade:
- Electronic Medical Record/Electronic Health Record
- Mobile Health
- Telemedicine
- Portal Technology
- Self Service Kiosks
- Remote Monitoring Tools
- Sensors and Wearable Technology
- Wireless Communication
- Real Time Locating Services
- Pharmacogenomics/ Genome Sequencing

References

Electronic Medical Record/Electronic Health Record
- Allows for centralization and efficiency of patient information, allowing the information to be a data and population health tool.
- In 2009, only 16% of the hospitals in the US were using an EHR system. By 2015, that number increased to 90%.
- In 2013, 78% of office based physicians reported using a certified EMR system.

Why is this important?
- Cultural shift toward data-driven medicine.
- Data can change and improve outcomes of the consistency of the medicine delivered.

Telemedicine
- Allows rural settings to have access to the same resources as metropolitan areas.
- Cost benefits to patients due to decreased overhead.

Remote Monitoring
- Helps reduce costs and unnecessary visits to a doctor’s office as well as being able to provide early interventions.
- Helps hospitals reduce readmission rates.

Pharmacogenomics/ Genome Sequencing
- Individualized treatment plans
- Diagnostic accuracy
- Leads the way for data analytics and data aggregation for the purpose of population health
- Understanding and connecting these variables will be profound as it relates to moving forward in healthcare and designing interventions and analyzing patient populations to improve the lives and health of others.

Sharing Information
How has patient information been shared between providers in the past?
- Mailing copies of the patient’s medical record
- Doctor’s notes
- Doctor to doctor consultations
- Relying on the patient for medical history/information
What are some current methods of sharing patient information between providers?

- Mailing copies of the patient's medical record
- Doctor's notes
- Doctor to doctor consultations
- Relying on the patient for medical history/information
- EMR/EHR information
- State or Private HIEs
- C-CDA
- E Forcse

What is the difference between an EMR and an EHR?

- Electronic Medical Record (EMR) contains the standard medical and clinical data gathered in one provider's office.
- Electronic Health Record (EHR) goes beyond the data collected in the provider's office to include a more comprehensive patient history and is designed to contained and share information from all providers involved in a patient's care.

What are the benefits of an Electronic Health Record?

- Track data over time
- Identify patients who are due for preventative screenings/visits
- Monitor how patients measure up to certain parameters like vaccines and blood pressure readings
- Improve quality of care in a practice
- The information stored in EMRs is not easily shared with providers outside of the practice

What is an HIE?

- Health Information Exchange
  - Allows health care providers to appropriately access and securely share a patient’s vital medical information electronically.
  - This function can be State sponsored or privatized.
  - Serves as the infrastructure for data sharing between providers and will ultimately provide the vehicle for data sharing among provider practices and health systems through the Nationwide Health Information Network (NwHIN).

What type of information can be on an HIE?

- Labs
- Radiology reports
- Physician notes
- Past Diagnoses
- Admission, Discharge, and Transfer information
- Patient demographics
- Medications prescribed
- Medications filled
- Past providers
**Sharing Information**

**Key Forms of Health Information Exchange**
- **Directed Exchange** – ability to send and receive secure information electronically between care providers to support coordinated care.
- **Query Based Exchange** – ability for providers to find and/or request information on a patient from other providers, often for unplanned care.
- **Consumer Mediated Exchange** – ability for patients to aggregate and control the use of their health information among providers.

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**Sharing Information**

**How is patient data submitted to an HIE?**
- Manual uploading of records via Secure File Transfer Protocol (SFTP)
  - Traditionally done in batches once or twice a day.
- Secure emails
  - Patient specific, only one record can be sent at a time.
- Setting up interfaces between the physician's office or hospital and the HIE
  - Use of HL7 data
  - Provides real-time information.

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**Sharing Information**

**What is HL7?**
- Health Level 7 is a set of international standards for transfer of clinical and administrative data between software applications used by providers.
- The name HL7 comes from the seven levels of the Open Systems Interconnection (OSI) model.
- Provides standards for interoperability to improve care delivery, optimize workflow, reduce ambiguity, and enhance transfer of data among stakeholders.

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**Sharing Information**

**What is C-CDA?**
- Consolidated Clinical Document Architecture, is a complete architecture used to create documents and template methodologies for those documents.
- Primary function is to standardize the content and structure for clinical care summaries.
- Two main components:
  - Human readable components in the section/text
  - Machine readable components found in the section/entry

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**Sharing Information**

**Benefits of C-CDA**
- Supports the exchange of clinical documents between care providers.
- Supports the re-use of clinical data for public health reporting, quality monitoring, patient safety, and clinical trials.
- Accommodates all medical documents, including binary code and other document types.
- Allows for user defined fields.
- Enables global interoperability.

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**Sharing Information**

**E-Forcse**
- Electronic – Florida Online Reporting of Controlled Substances Evaluation
- Created in 2009 by the Florida Legislature in an initiative to encourage safer prescribing of controlled substances in Schedules II, III, and IV.
- Requires health care practitioners to report to the Prescription Drug Management Program (PDMP) each time a controlled substance is dispensed to an individual.
- Information is reported through the electronic system as soon as possible but no more than 7 days after dispensing.

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Sharing Information

Who has access to E-forcse?

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Has E-forcse made an impact on the way the controlled substances are prescribed and dispensed?

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Use of Shared Information

 Across Settings

- Community Pharmacy
- Hospital Pharmacy
- Public Health Studies
- Research
- Private Practices

Use of Shared Information

What are some other examples of how shared information can be used in the community setting?

- Avoid duplicate efforts
  - Ex. Patient receiving the flu vaccine twice in one season
- Help with medication adherence
  - Ex. Tech sees that Valsartan has been prescribed for the patient, but has no history of filling
- Helps avoid duplications in therapy and/or contraindications
  - Ex. Patient takes Fluoxetine that is filled through mail order pharmacy, fills script for Phentermine

Use of Shared Information

What are some other examples of how shared information can be used in the hospital setting?

- Avoid duplicate efforts
  - Ex. Patient receiving the pneumonia vaccine twice in one year
- Help with medication adherence and reconciliation
  - Ex. Tech sees that Amlodipine has been prescribed for the patient, but has no history of filling
- Helps avoid duplications in therapy and/or contraindications
  - Ex. Patient takes Carvedilol at home, physician orders Metoprolol in hospital to take in conjunction
**Research**

- Research at Vanderbilt University Medical Center and the University of Arizona College of Pharmacy have found that EHRs can aid in the understanding, treatment, and ultimately prevention of disease.

- Using EHRs, researchers created the first comprehensive catalog of diseases associated with variations in human leukocyte antigens (HLA genes) that regulate the body’s immune system.

**Research Continued**

- The catalog could help identify individuals who are at risk for certain autoimmune diseases or who may generate antibodies that attack their own tissues in response to an infection.

- Individual variations in HLA genes have been linked to adverse drug reactions, rejection of transplanted organs, and autoimmune diseases like rheumatoid arthritis and insulin dependent diabetes.

**Findings:**

- From the genetic code, researchers were able to determine which HLAs would be expressed in over 37,000 individuals out of 230,000 samples.
  - Approximately 16%

**Challenges Associated with Sharing of Information**

- Legal Issues Regarding Patient Privacy
- Cultural Barriers
- Technical Challenges

**Legal Issues Relating to Patient Privacy**

- Public remains concerned over potential of loss of privacy and information being used in a way that is not intended.
- HIPAA
- Common Rule
  - Provides protection for human research subjects, and outlines the basic provisions for IRBs, informed consent, and assurances of compliance.
- FDA
  - Part 11 Rule covers the submission of electronic data to the FDA.

**References**

Challenges of Sharing Information

Cultural Barriers
- Need for Incentives
- Refusal to share data due to cost and trouble of putting data bases together
- Fears Regarding Misuse of Shared Data
- Questions regarding how clinical data will be reused and interpretation of data
- Building Trust
  - All participating parties must be able to trust each other
  - Data agreements, terms of use, BAAs, etc., help ensure ethical management of data

References


Monegain, B. (2017). EHRs help researchers crack immune system code. Healthcare IT News. Retrieved from: http://www.healthcareitnews.com/news/ehrs-help-researchers-crack-immune-system-code?mkt_tok=eyJpIjoiTVdNNE1ERTVOR1kxWkRnMkIsInQiOiJQckpWRlZKa2JrWGpPZHZGbFFSYWF6XC9LbDEwYVpuMFFyd0RDRFhRcXbtRME5ieXhMbmRlODFQTTdiNEhtbmpldmxsdmpCMHZxdEV5b0themRCWmZhMVJvU2d5YTl0SG5VOTB6K2hQeU5nQlpVSDc1eG9OUGJpMWVTNmoifQ%3D%3D


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Questions?