
Connected Health

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Objectives

- Identify and define Big Data as it applies to Healthcare
- Identify Databases developed through Healthcare
- Discuss advancements in patient care through Supporting Technologies
- Identify and discuss remote and “tele” opportunities in healthcare

Big Data

What is Data

Data assembled

Significance



What Makes Big Data?

- Large sources of data
- Data collected in high volume
- Data is moved at high velocity
- Data structures are variable
- Data latency



Healthcare Big Data

What is the advantage?

- Create very large databases
- Improve patient care
- Learn about care delivery
- Reduce costs
- Use High-quality data

<https://publichealth.tulane.edu/blog/big-data-in-healthcare/>

Data Structures

Not alike

How to aggregate “not alike” data

System integration v. proprietary systems

Standardized system?

Data Integrity

Large databases

Accurate interpretation

Examples:

Under-reported populations

Fair representation of Cultural and Racial populations

Generational gaps

Current outliers

Standardized Reporting Practices

Goals:

Protect data integrity

Identify national and international reporting standards

Maintain authentication protocols

Maintain security for data protection

Perform routine auditing

United Nations Statistics Division

<https://unstats.un.org/home/>

Artificial Intelligence (AI)

Computer systems making decisions based on data programs

AI requires human interaction and intelligence for final decisions

AI areas of interest include:

Machine Learning (ML)

Natural Language Processing (NLP)

Medical Algorithms (MA)

Clinical Decision Support (CDS)



Machine Learning

Traditional education is in the classroom

Education has transformed from traditional to many other forms

COVID taught us education can become virtual

If virtual, why not machine learning?

Education can be divided into modules taught through Computer Based Training

Human interaction is still necessary for setting up details

Natural Language Processing

Speech recognition programs

Dictation

Closed Captioning

Dictation can be template driven or ad lib speech

Programs have been modified for healthcare language

Programs adapt to speech patterns

Medical Algorithms

Grown out of Big Data

Based on clinical data, identified steps can be searched

MA reviews current admission EHR for identified dx

Example - 2017 AHA/ACC Clinical Performance and Quality Measure for Adults with ST-Elevation (STEMI) and non-ST Elevation (non-STEMI) Myocardial Infarction

<https://www.ahajournals.org/doi/10.1161/HCQ.000000000000032#d3e1731>

Clinical Decision Support

Provides tools for clinical workers to make decisions

Order sets specific to dx/gender/age, etc.

Documentation templates with support references

Built in alerts based on documentation/orders (automatic messaging)

New EHR search methods - Google Care Studio

Non-healthcare vendor

Databases of Healthcare Big Data

Do we play nice in the sandbox? Not always..

Finding data that can be shared:

Databases sponsored by .gov sites sometimes will be shared - not always

Databases sponsored by .org sites sometimes will be shared - not always

How do you know a database is reliable: use the same standards used when choosing healthcare websites. Probably - .gov, .org, .edu, .mil are reliable.

Large corporations that collect data can be reliable, but research these.

Databases



International - WHO

Other world wide and international organizations have reliable data but should be researched.

United States - US Census Bureau, CDC, NIH, AHRQ are all .gov sites

Many educational and research organization sites will open some research up if the researcher register.

Private companies will also sometimes open research databases if researchers register.

Supporting Technologies - Telephony

Closed network system

Allows centralized types of technology

- Telephone
- Email
- Text
- IM
- Paging
- Patient/Nurse Call



Networked Telephony Systems

Networked Telephony Systems

Secure, private, expandable

Run off of the facility/corporation network

Relies on network integrity

Application can run on many device types - administrators choice

Facility provided device or BYOD

Calling, texting, IM, Paging, Nurse call

Telephony

HIPAA criteria met

Ordering protocols do not change (no text/IM orders)

Devices are individually assigned - all caregivers have them

No need for a Unit Secretary to be the hub of activity

Patients call nurses directly instead of using a call light system

This can include provider depending on the style of care practiced

How does this work for impaired patients?

Telephony Changes the Game

Secured network & privacy

Communication throughout facilities in market settings

Locate a centralized communication hub

Network communications for multi-purposes

Centralized Telemetry Monitoring

Old scenario - patients had to be on the same unit as the telemetry monitor and dedicated monitor tech

New scenario:

- centralized hub
- communicate through the networked telephony system
- caregiver assignments are reported at the beginning of shift
- slave monitors are placed on the patient units for caregivers to review tracings
- monitor strips are scanned into the EHR BID and at event

Centralized Telemetry Monitoring

Pros

Staffing is shared and dedicated

Consistent training

Policies and Procedures must be in place

Policies and Procedures should align between facilities

Cons

Network goes down - no CTM

Communication is not always “realized”

Staffing issues will affect a larger portion of hospitals

Remote Radiology/tele-radiology

Remote radiology is not new

Picture Archiving Communication Systems (PACS) made this possible several decades ago

Subset of providers that choose radiology-call (after hours, weekends, holidays)

It's 5 o'clock somewhere - location does not matter as long as connectivity is intact

Once in the network, network communications provide security and privacy

Remote ICU/CCU - tele-critical care

Traditional Intensivist coverage - contract driven - are they always available?

Tele-CC - contract driven - contract driven

Equipment needed - cameras located in every room - key locations. Interfaces into monitoring equipment. Access to EHR

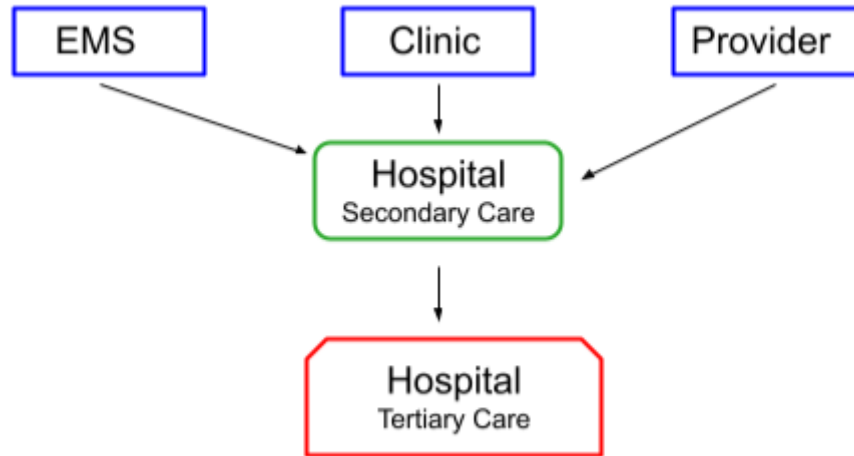
Tele-CC can be used for after hours coverage or emergent fill in

Policies and Procedures need to be in place

Legislation and credentialing are factors

Remote Consultations

Structure of healthcare settings:



Remote Consultations

Example specialty areas: Psychiatry and Neurology

Network connection - secured through private and protected network

Teleconference with remote specialist

Specialist makes recommendation to transfer

- Quicker time to consulting provider
- Reduction of unnecessary transfers
- Better patient care
- Higher level of care can be received quicker

Remote Pharmacy

Dependencies:

- Policies and Procedures
- Automated Medication Dispensing Machines (AMDM)
- Patient Barcode Scanning identification
- Barcode Scanning Medication Administration (BCMA)
- Computerized Provider Order Entry (CPOE)

Benefits for small facilities that do not have pharmacists available 24/7

Unusual circumstances may require courier delivery or pharmacist intervention

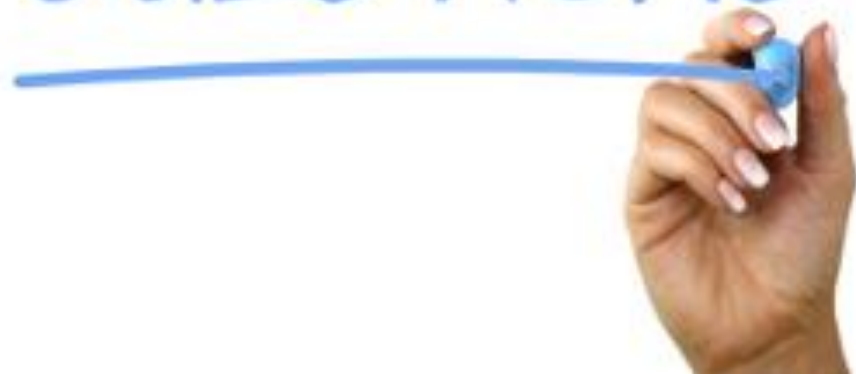
Remote Pharmacy

Workflow:

- Medication order written (through computerized provider order entry-CPOE)
- Order is reviewed by remote pharmacists and processed
- Approved order appears for nurse to review and give
- Nurse finds medication is AMDM inventory and obtains
- Nurse goes to patient bedside, scans pt armband and medication
 - This action validates the pt, drug, allergies, “rights”

Pharmacist/provider credentialing will need to be considering based on locations

QUESTIONS



References

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