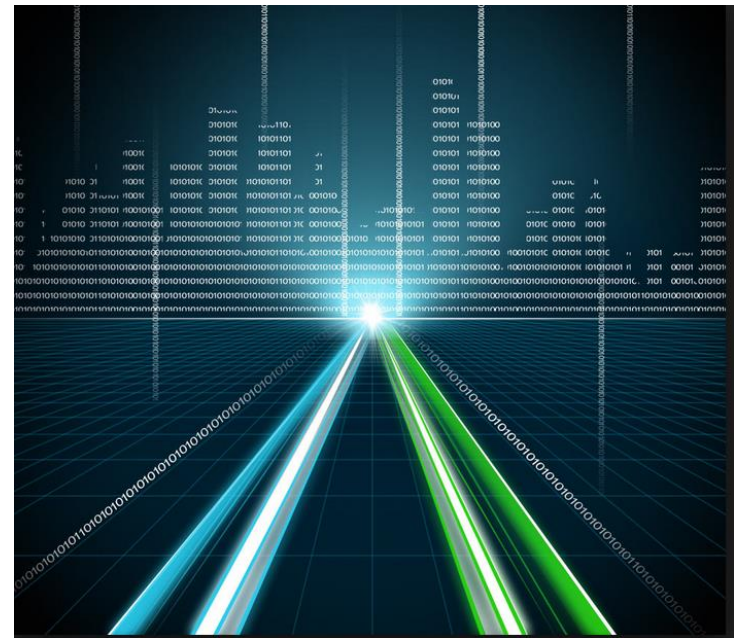


Clinical Informatics: From Dirt Roads to Superhighways

Patricia Korolog Mulberger, MSN, RN-BC



Along Montana's "Information Superhighway"

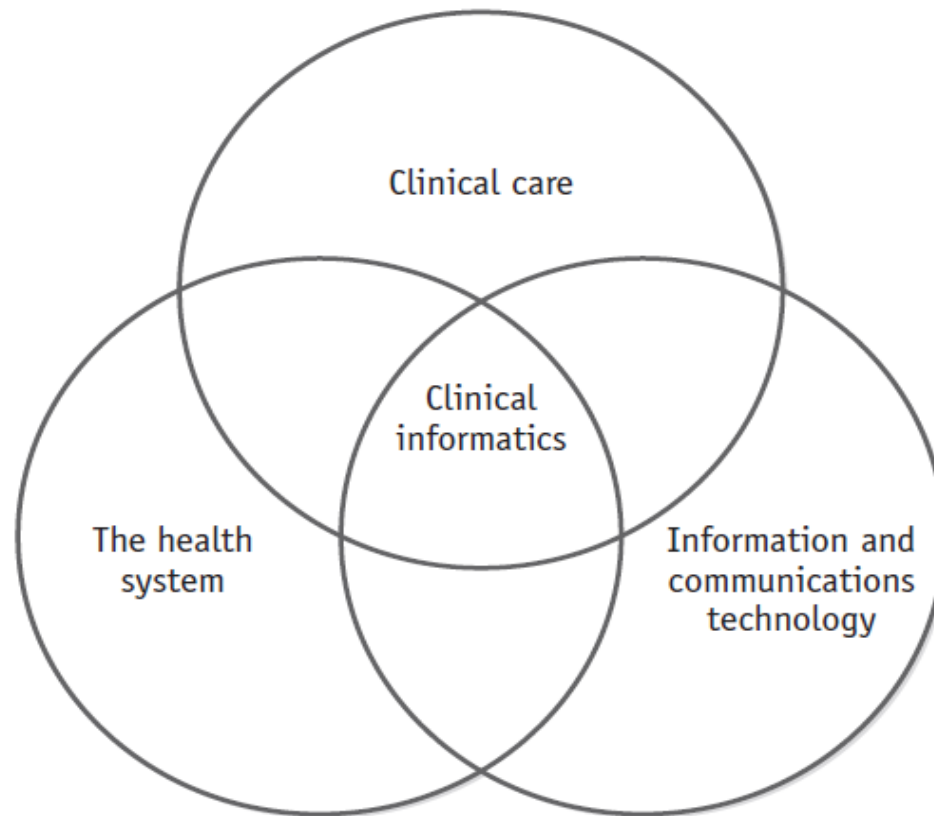


ANIA
Where caring and technology meet

Objectives



Domains of Clinical Informatics



The Reality of Clinical Informatics

- **Multidisciplinary**

- **Medicine**
- **Nursing**
- **Public Health**
- **Pharmacy**
- **Radiology**

- **Other Relevant Fields**

- **Information Management**
- **Computer Science**
- **Cognitive Science**
- **Science of Terminologies & Taxonomies**
- **Heuristics**
- **Library Sciences**
- **Archival Science**
- **Mathematics**

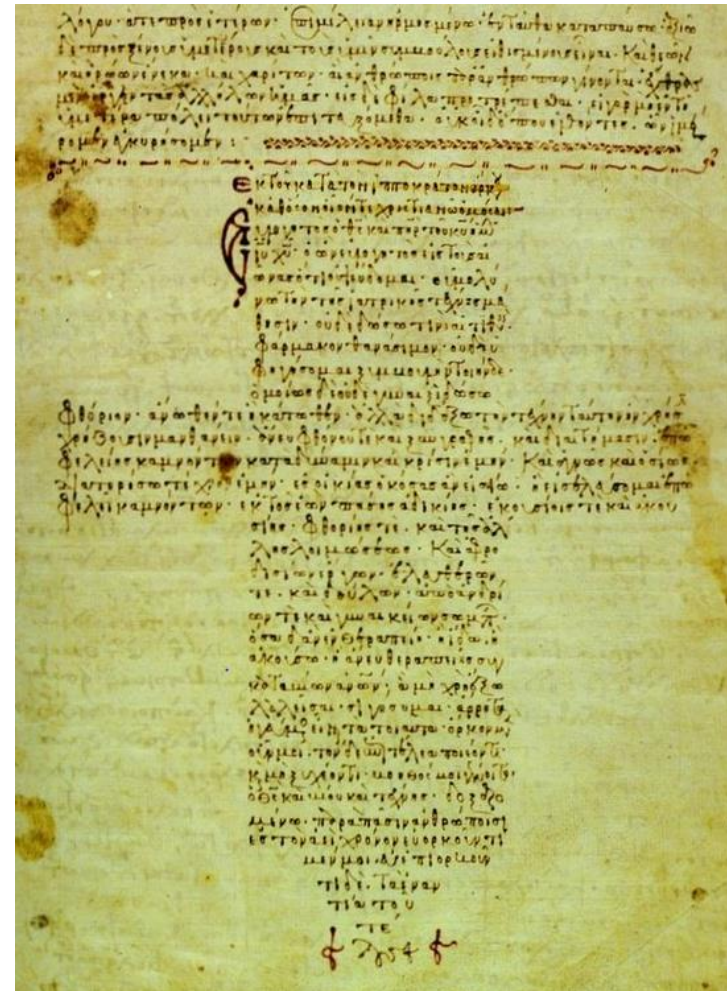
Very Early Origins

- Hippocrates

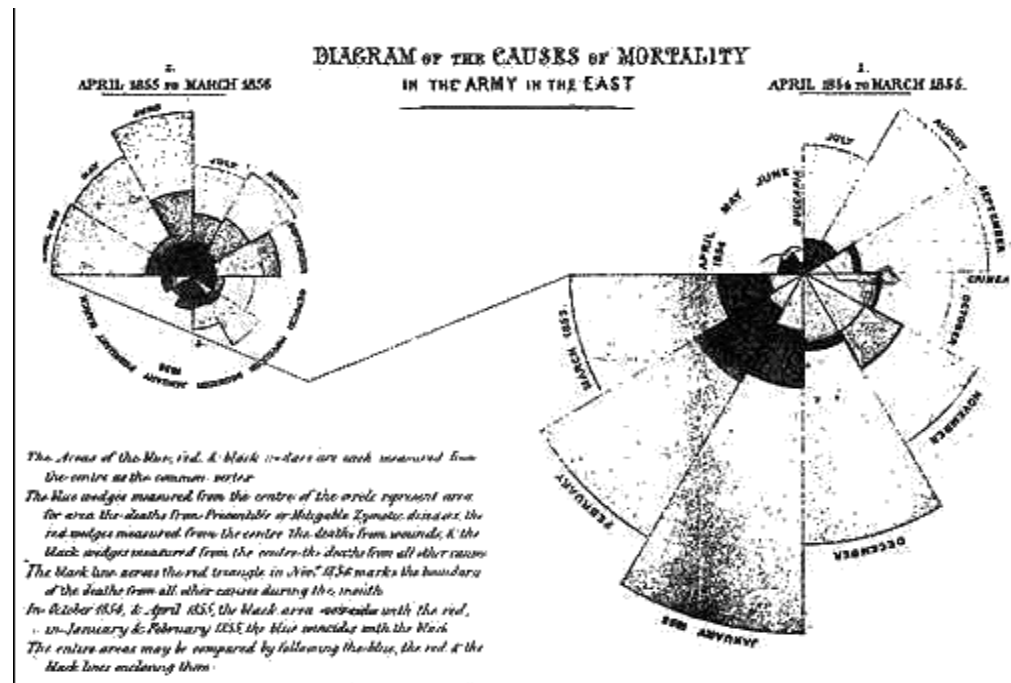
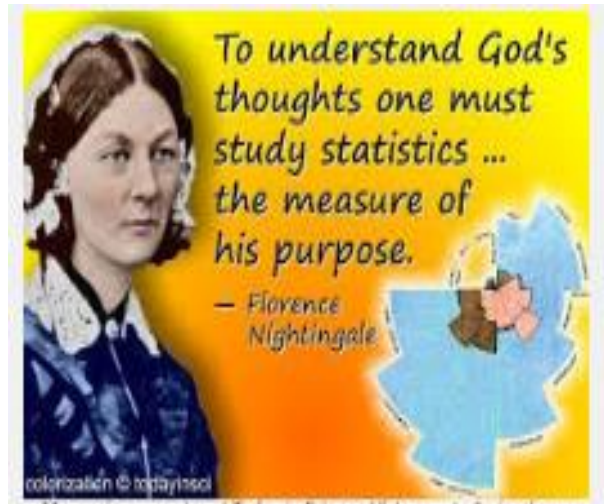
Medical record should accurately reflect
Course of disease
Probable cause of disease

“I believe that it is an excellent thing for a physician to practice forecasting. He will carry out the treatment best if he knows beforehand from the present symptoms what will take place later”

<http://www.historylearningsite.co.uk/hippocrates.htm>



“First Informatics Nurse”

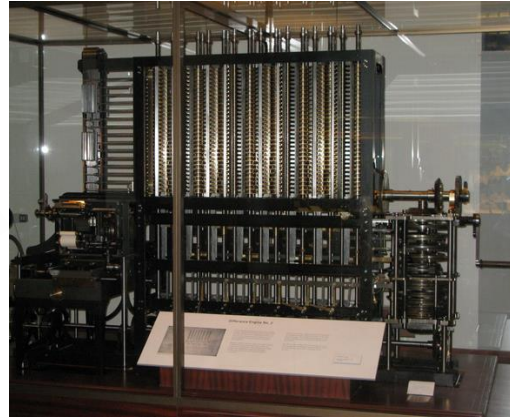


<https://www.google.com/webhp?sourceid=chrome-instant&ion=1&espv=2&ie=UTF-8#q=florence%20nightingale%20polar%20area%20diagrams>



Mid
1600's

• Mechanical
Calculator

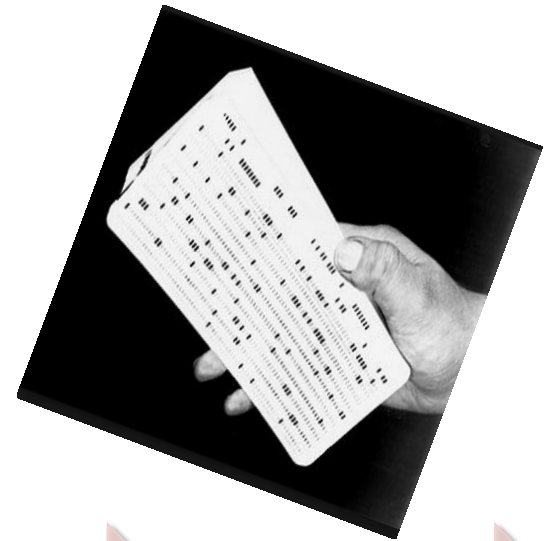


1830's

Automated
mechanical
computer

Late
19th
Century

Census
Early IBM



1940

Binary Code

1943

WWII





1946 ENIAC

1952 1st computer used in clinical practice

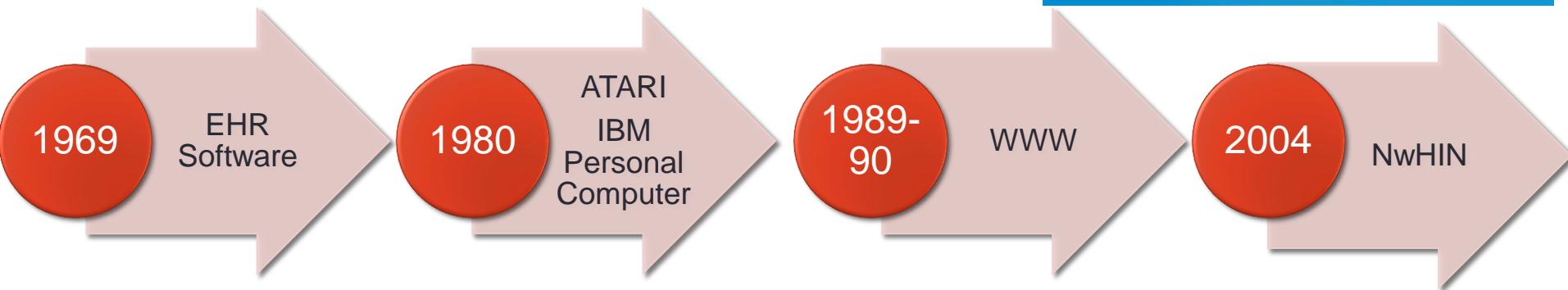
1956 Mobile Telephone

1959 Robert Ledley

1961 Dept of Medical Methods Research



More Driving Forces





1984-
2003

Human
Genome
Project

2009

ARRA

NOW

Need Grows
for clinical
informaticists



My Journey



Paths To Clinical Informatics Career



Nursing Formal/Academic

- Undergraduate Level
 - *Informatics Nurse (IN)*
 - RN w/ interest/experience in informatics field
 - Mostly on the job learning
- Graduate Level
 - *Informatics Nurse Specialist (INS)*
- Post Graduate Focus
 - PhD or DNP
 - Academic (PhD)
 - Faculty
 - Applied Practice (DNP)

Credentialing

- ANA
 - Nursing Informatics is a nursing specialty (1992)
- Scope and Standards of Practice
 - 1994 1st Edition
 - 2015 2nd Edition
- American Nursing Credentialing Center
 - Nursing Informatics
- HIMSS
 - Certified Professional in Healthcare Information and Management Systems
- American Board of Imaging Informatics
 - Certified Imaging Informatics Professional



American Healthcare Informatics Professional Organizations



The Promises

<https://www.youtube.com/watch?v=t-aiKlIc6uk>





The Health Data Challenge Series

Helping private, non-profit, and government organizations connect with innovators solving for the major challenges facing health and healthcare.

[LEARN MORE](#)

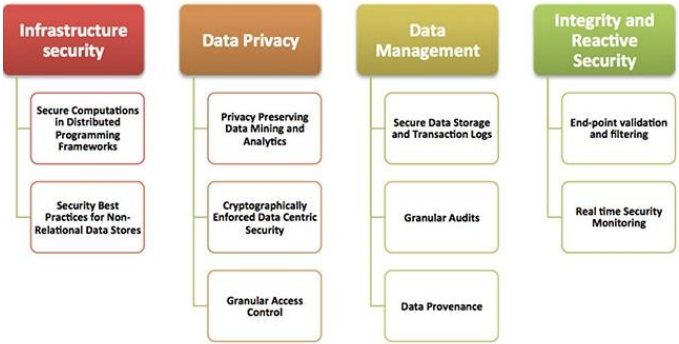
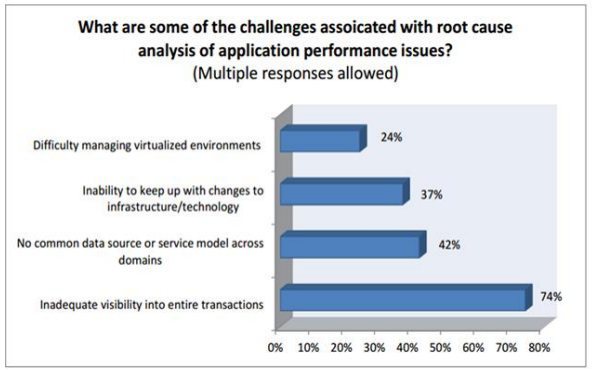


Figure Classification of the Top 10 Challenges

Trends

- Emphasis on change in delivery models
 - Providing care outside of hospital setting
 - More cost efficient
 - Clinically relevant
 - Outcome based
- Patient Engagement
- Population Health
- Bioinformatics
- Genomics

Trends

- Rise of Analytics
 - Opportunities to participate, create, and shape tomorrow's healthcare
 - Population Health
 - Community Health
 - PBM (Pharmacy Benefit Manager) companies
 - Wellness care
 - Quality/performance measure

NowTrending.HHS.gov

The screenshot shows a web browser window with the URL `nowtrending.hhs.gov`. The page header includes the U.S. Department of Health & Human Services logo and a "Public Health Emergency" banner. Below the banner, there are navigation links for "Trends", "by condition", and "by location". The main content area features a "Welcome!" message and a text box explaining the site's purpose. Three key metrics are displayed: 4,133,872 tweets gathered from Twitter's Streaming API, 65,609 (1%) tweets with a sensor-based location, and 2,184,485 (52%) tweets with a popular user profile location. At the bottom, there are three sections: "Conditions by Tweet Count", "Top 20 Tweet Locations", and "Top 20 User Locations".

NowTrending.HHS.gov **beta** Trends ▾ by condition ▾ by location ▾

Welcome! We are tracking disease trends, 140 characters at a time

In March 2012, the Assistant Secretary for Preparedness and Response at the Department of Health and Human Services launched a challenge competition titled Now Trending: #Health in My Community. This contest challenged entrants to create a web-based application that searched open source Twitter data for health topics and delivered analyses of that data for both a specified geographic area and the national level. This website is a result of that contest. The information available below and throughout the website is a tool intended for health departments and other health entities to use in multiple ways such as serving as an indicator of potential health issues emerging in the population, building a baseline of trend data, engaging the public on trending health topics, or cross-referencing other data sources.

The data and metrics on this site represent data for up to the last two weeks. Full historical data is being maintained but is not publicly available at this time.

4,133,872
tweets gathered from Twitter's Streaming API. All of them match at least one of the 234 condition terms currently tracked across 27 conditions.

65,609 (1%)
tweets with a sensor-based location
[\(read more about how we calculate this\)](#)

2,184,485 (52%)
tweets with a popular user profile location
[\(read more about how we calculate this\)](#)

Conditions by Tweet Count

ebola acute respiratory illness std natural disaster influenza common cold meningitis gastroenteritis tuberculosis polio pertussis malaria dengue pneumonia rabies varicella tick borne disease legionnaires disease tetanus enterovirus cholera anthrax measles chagas mosquito borne disease mumps typhoid yellow fever smallpox diphtheria

Top 20 Tweet Locations

california, us nigeria nevada, us los angeles, ca manhattan, ny punjab, pakistan national capital region, republic of the philippines georgia, us chicago, il alaska, us houston, tx florida, us kenya texas, us pennsylvania, us orlando, fl philadelphia, pa washington, dc oklahoma, us san francisco, ca

Top 20 User Locations

usa london #215love #lcm philly atl to philly dmV to philly chi town to philly atlanta, georgia new york philippines worldwide uk canada california united states indonesia global nigeria texas india

dsrip_timeline.pdf Show All

Individual Apps

- Monitoring, Tracking and Trending
- Connecting
- Digital Coaching
- Disease oriented cookbooks
- Body Measurements.

HR, RR, Steps, Stairs, Calories

<http://medicaleconomics.modernmedicine.com/medical-economics/content/tags/android/top-10-apps-physicians-recommend-their-patients?page=full>

Past Challenges Meet Future Trends



New Healthcare Data Sources

- RFID
- Streaming Device Data
 - Physiological Monitors
 - Ventilators
 - Wearables
- Social Media
- Geographic Information System (GIS) Data
- Open Data
 - www.data.gov
- Internet of Things (IoT)

FHIR – The “Public API” for Healthcare?

FHIR = Fast Health Interoperability Resource

- Builds on previous HL7 data structures to describe data formats and elements
- More powerful & less complex than HL7 V3
- Easier to implement
- Uses web-based http application programming interface



FHIR – The “Public API” for Healthcare?

FHIR Resources

- Well-defined, simple snippets of data that capture core clinical entities
- Build on top of existing HL7 data types
- Resources are the “objects” in a network of URI reference links



SMART Platform –Open Specification for Apps

- “Substitutable Medical Apps”
 - Kohane/Mandl – NEJM (2009)
- A SMART App is a Web App
 - HTML5 + JavaScript
 - Remote or embedded in EHR
 - URL passes context & FHIR link
- EHR Data Access via FHIR



Who is driving the train!



New Drivers

- Cognitive and Behavioral Psychology
- User Experience
- Human & Computer Interaction
 - Devices
 - Wearables
- Patients & Family



Now on the Team

- AND ALL OF YOU



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American Nursing Informatics Association



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Medical Center**
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