SCHOOL OF HEALTH SCIENCES CHATHAM UNIVERSITY

Bloomsburg University OF PENNSYLVANIA

chatham UNIVERSITY

Using Data to Fuel Innovation

AND EXCELLENCE IN NURSING

February 22, 2019

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Objectives

American Association of Colleges of Nursing

- Introduce the concept of "Big Data Analytics"
- Explore sources of "Big Data"
- Explore guiding principles/Recommendations
- Discuss the use of analytics

"Identify the educational needs of MSN prepared nurse leaders"

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Passionate Statistician

Florence Nightingale
1820 – 1910

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Questions

What are the risks to employees, clients, and populations?

How do we improve individual's health?

How do we promote healthy living?

Who is predicted to be compliant with treatment?

How can we realize personalized care?

How are we achieving quality outcomes?

Who needs additional community resources?

How do we balance quality and cost?

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Answer

Data

Big Data

Big Data

Datasets that are massive in size

Datasets captured by software tools, managed, but not analyzed

Described in terms of

- VOLUME
- VARIETY
- VELOCITY
- VERACITY

McKinsey Global Institute, 2011
Gaffney & Huckabee, 2014

Three Types of Data

Discretely coded billing data

Clinical transaction data

Blobs of text data

Value of data

WHAT DOES IT MEAN

Key points

- Data is the driver of revenue
- Data is reorganizing companies and organizations
- Data is leading organizations to surpass past investments

Baldwin, 2015

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Dr. Carolyn McGregor

- Reduced death rate premature infants by ???

Niesche, D., (2015). Professor Carolyn McGregor: Using big data to save lives. Retrieved from https://www.australiaunlimited.com/technology/big-data-saving-lives.

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Predicting Flu Epidemic

- Becomes a reality
- Using Predictive analysis
- Using the "Search Terms" within Google Search box
- Data used from previous 5 year period – compared to actual dates of outbreaks
- Using Algorithms
- Predict within 2 weeks of actual occurrence
- Caution- not always accurate due to marketing awareness of immunizations can increase searches prematurely

Medsker, B. & Smolan, S. (Producers), & Smolan, S. (Director). (2014)

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Predicting Disease

- Personalized Medicine
- Genome sequencing/mutations
- BRA Analysis
- BRCA mutation in women
- Predicting Breast/Ovarian Cancer occurrence
- Ancestry
- 23 and Me

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Predict Depression

- Using behavioral patterns – data from wearable devices that record and sensor activity
- Distinguishing normal from abnormal behavior
  - Decrease in emails sent, texts,
  - Increase in time spent at home
- Using pattern recognition algorithms
- Accuracy within 2 days of being depressed

Medsker, B. & Smolan, S. (Producers), & Smolan, S. (Director). (2014)

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Reduce Malaria Worldwide

- Kenya – millions of mobile phones and technology
- Use of internet/WWW increases access to educational opportunities
- Integrated/overlay data
  - Hospitals
  - Community geographical - parasite prevalence data
- Decreased malaria by 25% since 2000

Medsker, B. & Smolan, S. (Producers), & Smolan, S. (Director). (2014)

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Where is Nursing

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Historically

Focus System Implementation

- Process redesign
- Data input
- Data requirements
- Data to be viewed
- Required training

Focus on Data Analytics

- Retrieving data from system
- Conducting analytics on data
- Questioning IT dept. on reports available
- Requesting electronic reports
- Customizing vendor reports
- Mandate the use of standardize language

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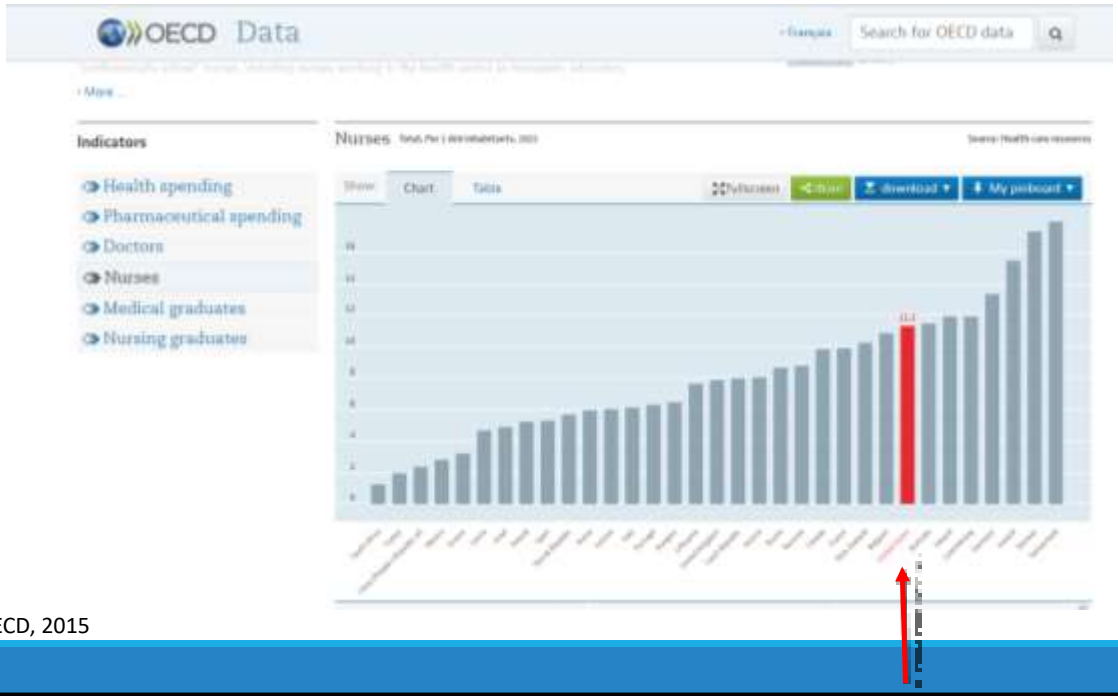

OECD, 2015

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OECD, 2013

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OECD, 2015

19

OECD, 2016

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OECD, 2015; US life expectancy 76.3 years of age

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Nurses….

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Analytics

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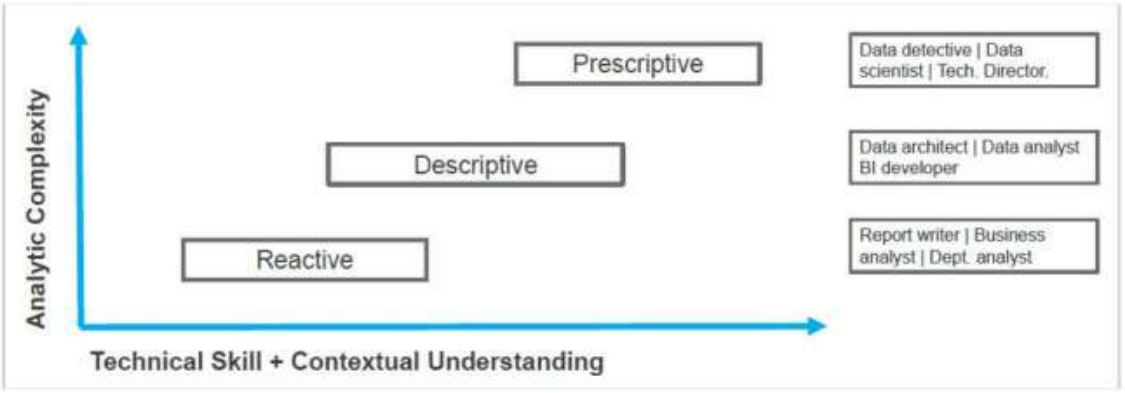
Analytics

- Comparative
- Predictive
- Prescriptive
- Inferential
- Retrospective

- Data Visualization
- Visual analytics
  - Explore data in real time
  - Change data with one click
  - Supports deeper analysis
  - Helps you tell a story

Analytic Driven Culture



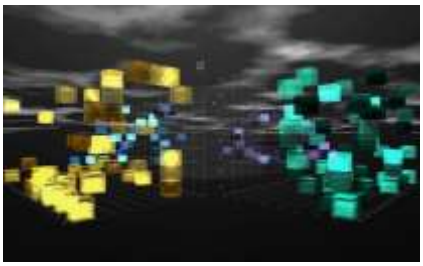
Wadsworth (2016)

What nurses should ask for……

- A Data Scientist or Senior Data Analyst or a Citizen Data Scientist
  - Clear communication
  - Clear vision of what you want to achieve
  - Clear outline of data sets to be used
- A story or interpretable data
  - Clearly illustrates findings
  - Clearly allows interpretation
  - Clearly reflects trends
- Specific type of analytics you are interested

Big Data - Sharable & Comparable

Harper, E. (2015). *Clinical Integration and the Continuum of Care [PowerPoint slides].* Retrieved from http://files.himss.org/2015Conference/handouts/NI5_1428848643264_4.pdf



Visualization of Data

REPORTS, DASHBOARDS, ILLUSTRATIONS, TRENDS

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Best Practices

- Message and metrics are clear
- Color enhances meaning
- All information is presented

- Thoughtful planning
- Informed design
- Critical eye
- Interactive capabilities
- Requesting revisions
- Asking others to interpret the visualization

Nadelhoffer (n. d.)

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Dashboard Pitfalls

- One dashboard, to many questions
- Using metrics no one understands
- Cluttering dashboard with low-value graphics and widgets
- Not viewing the dashboard as others will
- Forgetting to confirm dashboard layout is what is being requested

Nadelhoffer (n. d.)

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Examples: What to ask for

COMPARISONS OF VISUALIZATIONS

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2	2	5	6	7	1	1	6	9	1	9	8
9	8	7	5	5	5	6	2	5	9	5	9
3	4	1	9	5	9	6	5	3	2	3	2
5	3	7	1	3	8	6	3	5	0	5	0
1	6	8	2	4	7	8	2	9	1	9	1
3	9	5	2	7	5	6	3	2	1	2	1
9	4	7	5	8	7	9	2	1	6	1	6
7	3	6	4	2	7	1	8	2	9	2	9
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5	3	9	3	7	1	3	0	2	8	2	1

2	2	5	6	7	1	1	6	9	1	9	8
9	**8**	7	5	5	5	6	2	5	9	5	9
3	4	1	9	5	9	6	5	3	2	3	2
5	3	7	1	3	**8**	6	3	5	0	5	0
1	6	**8**	2	4	7	**8**	2	9	1	9	1
3	9	5	2	7	5	6	3	2	1	2	1
9	4	7	5	**8**	7	9	2	1	6	1	6
7	3	6	4	2	7	1	**8**	2	9	2	9
2	6	9	5	3	**8**	7	2	1	4	1	4
5	3	9	3	7	1	3	0	2	**8**	2	**1**

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2	2	5	6	7	1	1	6	9	1	9	1
9	8	7	5	5	5	6	2	5	9	5	9
3	4	1	9	5	9	6	5	3	2	3	2
5	3	7	1	3	8	6	3	5	0	5	0
1	6	8	2	4	7	8	2	9	1	9	1
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7	3	6	4	2	7	1	8	2	9	2	9
2	6	9	5	3	8	7	2	1	4	1	4
5	3	9	3	7	1	3	0	2	8	2	8

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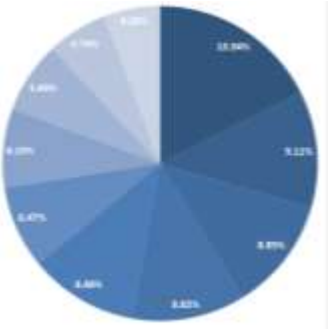
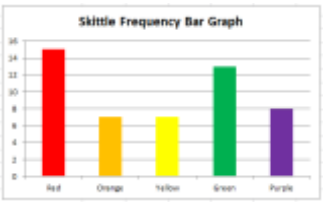
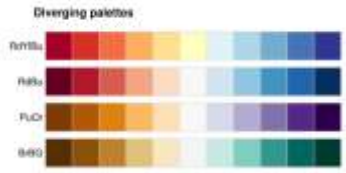
Using Color to Visualize Data

- Sequentialing
- Diverging
- Categorical
- Highlight
- Alert







Wexler, Shaffer, J & Cotgreave, (2017)

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Dashboards

- Static
- Interactive

- Sliders
- Distribution curves
- Filters
- Geographical Display

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Medsker, B. & Smolan, S. (Producers), & Smolan, S. (Director). (2014)

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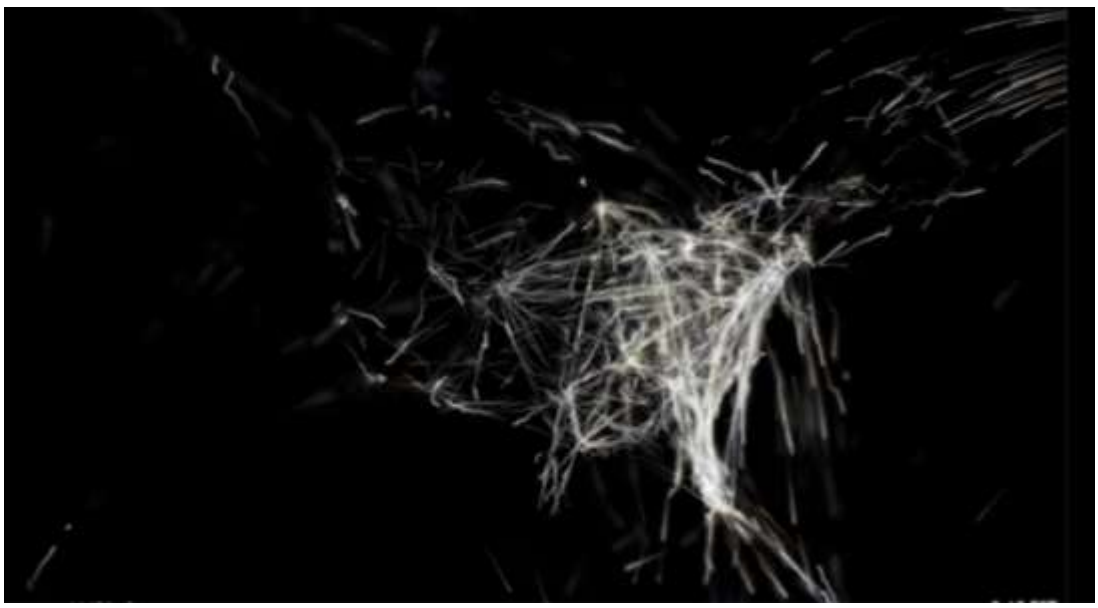

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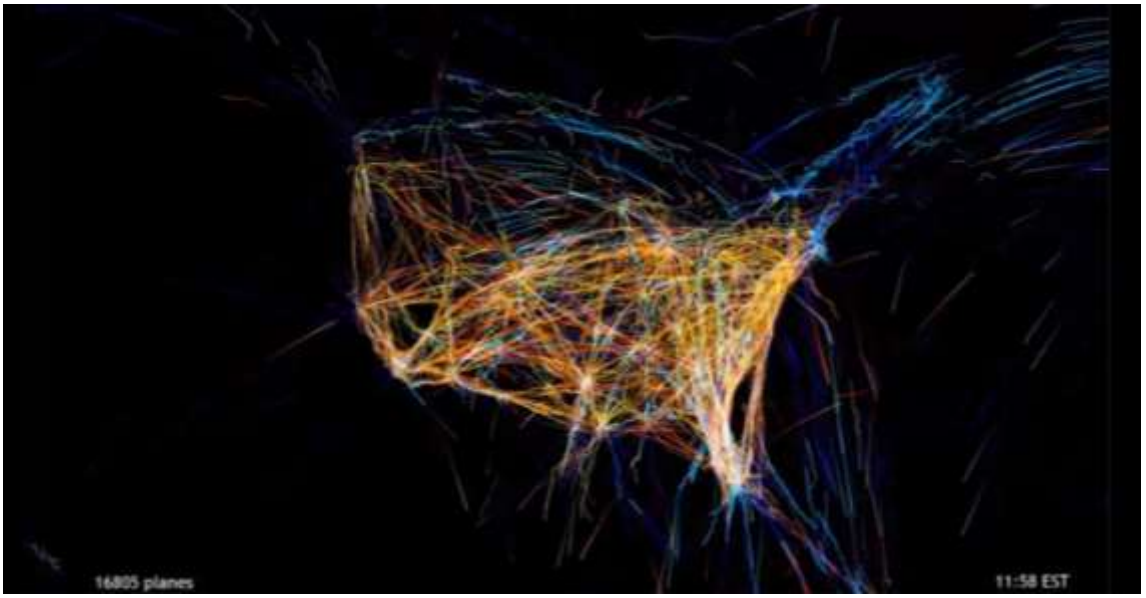

Medsker, B. & Smolan, S. (Producers), & Smolan, S. (Director). (2014)

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Range of Data

- Daily
- Weekly
- Monthly
- Quarterly
- Yearly
- Trending

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Software

- Microsoft Excel
  - Data analysis tool kit
  - Pivot tables
  - Pivot charts
- Tableau
  - Desktop
  - Reader
- SAS
- Google Analytic
- Board
- Clear Analytics
- Sisense
- Answer Rocket

Capterra
https://www.capterra.com/sem-compare/business-intelligence-software?gclid=EAIaIQobChMIrLfeq4rM3QIVkFqGCh1CJgTHEAAYAyAAEgLd1PD_BwE&gclsrc=aw.ds

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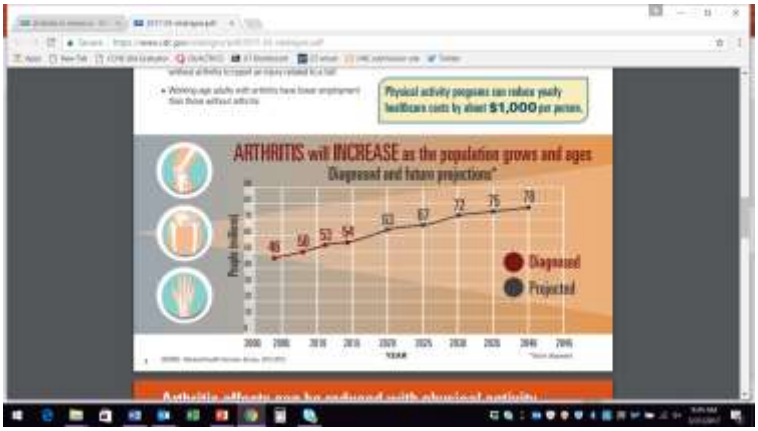
Sources of Big Data

Data Sources

- Health system
  - Individual hospital
  - Individual practices
  - Individual provider
- Insurance companies
  - Individual Health system
  - Individual hospitals
  - Individual practices
  - Individual providers
  - Geographical location
- HealthData.gov
- CDC
- World Health Organization
- NIOSH

Center for Disease Control (CDC)



https://www.cdc.gov/vitalsigns/pdf/2017-03-vitalsigns.pdf

World Health Organization

300 Million People

Increase of 18%

http://www.who.int/en/

Healthy People

DEVELOPING
HealthyPeople
2030

DATA2020 Search
This interactive data tool allows users to explore data and technical information related to the Healthy People 2020 objectives. **Search Healthy People data.**

https://www.healthypeople.gov/2020/data-search/

OSHA

- Data Statistics
- Commonly Used Statistics
- High Penalties by State
- Fatality Reports
- BLS Injury/Illness Statistics

https://www.osha.gov/

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Key Question for Nurses

How do we distinguish valuable data from data noise?

How do we analyze a wide variety of data and integrate in a meaningful way?

Where do we find the complex tools to conduct meaningful analytics?

How can we trust the accuracy and integrity of data?

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Guiding Principles

Privacy and security of health information

Data standards

Interoperability

Immutability

Recommendations for Nurses

Promote Standardization and Interoperability

Address documentation needs of the organization

Promote use of standardized and accepted terminologies

Implement an ANA-recognized nursing terminology that is mapped to national standards

- Joint pain vs. joint inflammation
- Knee pain vs. knee inflammation

→ Leads to confusion, inability to link data point, limits interoperability without extra coding, time, and expense

- WDL – within defined limits
- Normal findings

→ Represents discrete values. Nursing lacks a universal agreed upon definition

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Enhance knowledge

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Formalize clinical or health data relationships

Discover patterns between different types of data/information

Key factors:

- Authority- to grow and map content-specific terminology
- Universality- applicable across professions
- Usability- accessibility – adoptability- retrievability- automated inference
- Funding- resources and time allocations allotted out of routine role

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Advance Quality Measures

Align/Design quality Measures

- Identify data point
- Determine how data point collected
- Define and promote new quality measures
- Avoid narrative or text documentation
- Limit local customization of forms
- Convert regulatory and accreditation requirements into measures and reporting
- Collaborate with interprofessionals on data points reflecting impact of interdisciplinary work/care

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Leverage Electronic Reports

Work closely with IT system analyst

Identify data points – outcomes to be evaluated

Design spread sheets/reports that integrate analytic methods

Determine timeframes of automatic reporting

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Leverage Informatics Nurses/Consultants

Nursing process

Clinicians workflow needs

Interprofessional needs

Value of quality care

IT terminology

IT system integration

Clinical decision support/ Logic

Software compatibility

Interoperability

2015 Study

- 85% believe IN brings value to an organization
- 83% believe IN brings value to the optimization phase of system processes
- 60% believe IN had high impact on quality of care

HIMSS, 2015

What will you ask for?

Expand Current Curriculum

BIG DATA

- Accelerate growth/synthesis of new knowledge
- Influence quality
- Change care models
- Enhance evidence-based practice
- Improve employee, client, patient experience
- Encourage shared decision making

Nurses are Positioned

Define measures that align with true clinical practice

Meet with IT analyst to define electronic reports

Create efficient and effective processes for data collection **for analysis purposes**

Provide feedback to CMS and ONC – public commenting/industry workgroups

Engage in piloting new quality measures

You don't have to be a statistician

Technology Producing Data

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TECHNOLOGY

EHR/PHR

Smart Pumps

Medication scanning devices

Electronic vital machines

Monitoring devices

SOCIAL MEDIA

Telehealth

Telemedicine

Telenursing

Web sites

Blogs

Virtual prescience

Mobile Apps

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In Conclusion

Florence Nightingale

1820 – 1910

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Working the BIG DATA

-

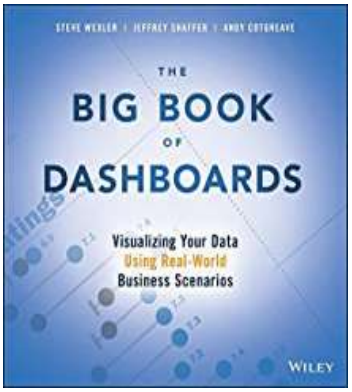
Tweeting

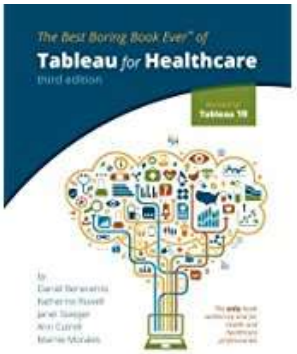
-

Blogging

With permission from Dr. Marian Ball

Resources





Microsoft Excel

Analysis Tool Kit – free download @

https://support.office.com/en-us/article/Load-the-Analysis-ToolPak-6a63e598-cd6d-42e3-9317-6b40ba1a66b4

YouTube videos - free viewing @

Beginners: https://www.youtube.com/watch?v=8L1OVkw2ZQ8

https://www.youtube.com/watch?v=J4zq3R8b5dQ

Advanced: https://www.youtube.com/watch?v=KyMj8HEBNAk

Thank you

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