

# How big data can improve health care

By Amy L. Garcia, MSN, RN

**HEATHER SEEMS AGITATED** as she describes the upcoming conference session to colleagues. “It’s about big data. You know—so much data that a regular computer can’t analyze it all.” Clearly, she feels intimidated by the topic. She observes, “I can’t even define big data. How am I going to lead my staff to use it? And how are we going to do research that contributes to big data when we’re busy taking care of patients?”



Broadly speaking, big data refers to a large, complex data set that can be analyzed to reveal patterns, trends, and associations related to human behavior and interactions. Some people use the term to describe massive research projects. The “big” in “big data” doesn’t refer to a specific size; it implies the use of massive or multiple computers and new statistical tools to make sense of the data. Be aware that what’s considered big data this year may be considered ordinary or small in the future.

Although the term “big data” is relatively new, the concept isn’t. Nurses have used big data to improve patient care since the dawn of our profession. Florence Nightingale applied analytics to data she collected on notecards about the care and outcomes of soldiers during the Crimean War. Her “Diagram of the

Learn how to use data in a way that enhances patient outcomes.

Causes of Mortality in the Army in the East” resembles a graphic we might use today. Her study using a big set of data collected in 1854 and 1855 changed our understanding of the impact of sanitation in hospitals. And she did it with note cards! Imagine what we can accomplish now using computers. (See *Big data: The Nightingale connection.*)

Connie Delaney, Dean of the School of Nursing at the University of Minnesota, has a vision for how nurses can use big data to improve patient outcomes. She sees a future when the data nurses enter into the electronic health record (EHR) is sharable and comparable. Nurse researchers who are prepared to work with big data will combine patient records with data from other sources, such as the human genome, the environment, surveys of risky behavior, education, or purchasing habits. They’ll look for insights and evidence to help nurses prevent, diagnose, intervene, and evaluate health conditions.

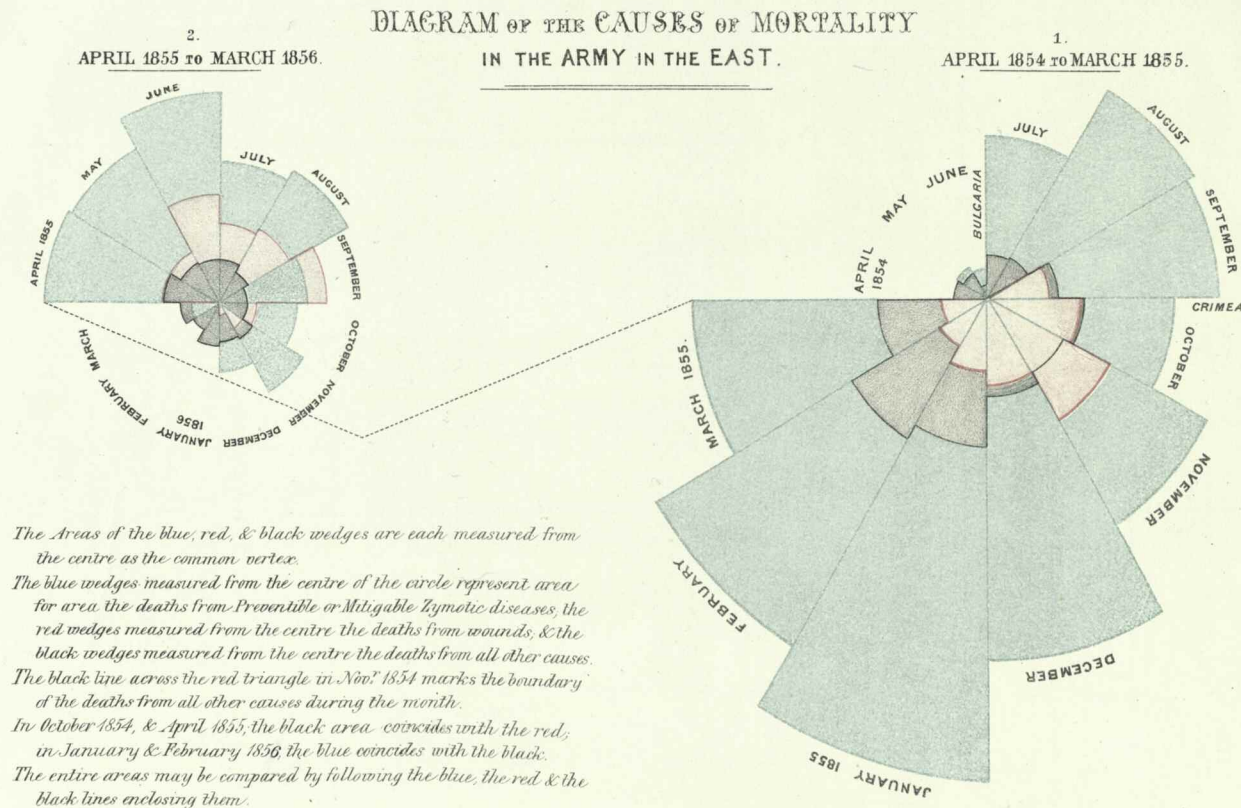
## Documentation guidelines that promote big data use

Nurses in every setting contribute to big data through their documentation in the EHR in a sharable and comparable way. Standardizing documentation enables researchers to retrieve the valuable assessments that nurses document. This list of six practices can help every nurse contribute to nursing’s ability to use big data to improve patient care.

- 1 Use, and document according to, evidence-based practice standards.** The EHR should reflect the standards of care for a given patient population. For example, if the Braden Scale is used to assess pressure-ulcer risk, components of that scale should be listed fully. Simply recording a score isn’t sharable or comparable, as it’s impossible to tell whether the issue was sensory perception, moisture, mobility, nutrition, or friction and shear.

## Big data: The Nightingale connection

Described by some as a “pioneer in the graphical representation of statistics,” Florence Nightingale created the “Diagram of the Causes of Mortality of Mortality in the Army in the East” (shown here) to illustrate that epidemic disease among British soldiers during the Crimean War caused more deaths than combat wounds and could be controlled with adequate nutrition, ventilation, shelter, and other factors.



Source: Nightingale F. *A Contribution to the Sanitary History of the British Army during the Late War with Russia*. London: J.W. Parker; 1859.

*Harrison & Sons, St. Martin's Lane.*

Early efforts to automate pressure-ulcer outcome measures have been complicated due to the wide variety of ways in which nurses document.

- 2 Document consistently, using a standard terminology.** Nurses have many different ways of saying the same thing, making it difficult to compare a patient's progress over time or to identify the effect of an intervention across many patients. Without clear standards, one nursing unit may document “hypoxia” while another documents “shortness of breath” and a third documents “SOB.” Nurses may document “movement” while physical and occupational therapists document “mobility.” Inconsistent documentation makes it hard to pull data from the EHR for performance-improvement or research projects.
- 3 Limit the use of free text.** Free text typically isn't sharable or comparable. Although so-called crawlers are available to collect words or themes, such data are difficult to share or compare. Work with your data governance committee to find discrete and consistent terms for information your

unit documents regularly.

- 4 Avoid using “within defined limits.”** If your organization has a checkbox for “within defined limits” (WDL), ask if checking this box populates the full scale or record with data. Ensure that the defined limits you're documenting to are visible to you and your documentation truly reflects the patient's condition. If not, retrieving the data can be hard to use for performance improvement or research. Also, it can cause problems proving what your documentation means, as defined limits can change.
- 5 Support research sponsored by your organization or association.** Clinical research improves our ability to care for patients. It doesn't happen unless front-line nurses learn about and document based on the questions being asked. Membership in professional nursing organizations helps us work together to make sure nursing-sensitive outcomes are used to measure the effectiveness of care.
- 6 Learn about nursing informatics.** This specialty integrates nursing science with multiple information management and analytical sciences to identify,

## Imagine a future where infectious diseases can be quickly linked to exposures or vaccination patterns, preventing the spread of illness.

define, manage, and communicate data, information, knowledge, and wisdom in nursing practice. *Nursing Informatics: Scope and Standards of Practice, Second Edition* (2014) is available

at [www.nursingworld.org](http://www.nursingworld.org). (The American Nursing Informatics Association is an organizational affiliate of the American Nurses Association.)

### The future is now

Imagine a future where infectious diseases can be quickly linked to exposures or vaccination patterns, preventing the spread of illness. Imagine a future where falls and healthcare-acquired infections are reduced by using evidence-based protocols based on big data research. Imagine a future where patient acuity is calculated automatically from nursing documentation and workloads are adjusted for patient needs and nursing skill sets. That future is now—but only if nurses document in a standard way that's sharable and comparable.

*As Heather learns more about big data, she recog-*

*nizes that nurses in every setting contribute to big data and can improve nursing care with patient, nurse, and financial outcomes. She recalls that her hospital uses an algorithm that monitors clinical*

*documentation to detect patterns indicating early sepsis, which has decreased mortality 24%. And she learns that her grandmother's nursing home decreased pressure-ulcer incidence by adopting evidence-based protocols developed by using big data. The ticket for the journey to quality, Heather realizes, is big data.* ★

### Selected references

American Nursing Informatics Association. About us. 2015. [www.ania.org/about-us](http://www.ania.org/about-us)

Nightingale F. *A Contribution to the Sanitary History of the British Army during the Late War with Russia*. London: J.W. Parker; 1859.

Schelle-Chapple H, Lee M. Reducing sepsis deaths: A systems approach to early detection and management. *Am Nurse Today*. 2014;9(7):26-31.

Amy L. Garcia is director and chief nursing officer of workforce and capacity management for Cerner Corporation in Kansas City, Missouri.

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