Complexity Science: Understanding the Implications for Critical Care Nursing

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Objectives

- Complexity Science
- Complex Adaptive Systems
- Complex Environment of Critical Care
- Nurse – Patient Feedback Loop
- Variables that enhance flow
- Barriers to information flow
How Wolves Change Rivers
Complexity Science

“Complexity science examines systems comprised of multiple and diverse interacting agents and seeks to uncover the principles and dynamics that affect how such systems evolve and maintain order”

(Lindberg & Lindberg, 2008, p.32)
Complexity Science

- Chaos theory
  - order emerges from disorder
- Complexity
  - interrelationships
  - organized into patterns
  - no rational predictable behaviour
  - new, more complex structures
  - spontaneous activity
  - holistic universe, complex, interdependent
Complexity Science

- Hysteresis
  - phenomena dependent on earlier historical past states
  - initial condition – unpredictable possible future

- Neo-Newtonian practices
  - standardization, routines
  - assume processes as predictable
  - traditional health care model
Complex Adaptive Systems

- Interconnected individual components
- React in an unpredictable fashion
- Influence other members of the group
- Each component is a CAS embedded within another CAS
- Changes in one system affect and shape all connected systems
Complex Adaptive Systems

community

hospital

nursing unit

nurse

healthcare system
Complex Adaptive Systems

- Dynamic, unstable
- Adaptation and evolution
- Small changes may have large effects
- Large changes may have small effects
- Self organizing
Complex Adaptive Systems
Delivery of Patient Care

- Phronesis
  - Expectations
  - Experience
  - Energy

- Hysteresis
  - Surveillance
  - Experience
  - Competencies

- Nurse
  - Treatment
  - Education
  - Standards
  - Communication
  - Technology and Tools
  - Policy and Procedure

- Patient

- MD
Pre-Arrest: Raw data & Standard deviation

Raw Data

Standard Deviation in 10 minute intervals

60 minutes pre-arrest
Questions?
References


