

## Component 2: The Culture of Health Care

### Unit 9: Sociotechnical Aspects: Clinicians and Technology Lecture 3

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## Sociotechnical Systems

- Sociotechnical system:
- Interaction between people and technology
- Organizational characteristics are modified by this interaction for better or for worse
- Optimization of one element without attention to the other may be detrimental to the organization

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## Clinicians And Technology

- Medicine is dependent on technology for progress
  - Microscope invented in 1590
  - In 1675 Anton van Leeuwenhoek uses a microscope to examine examines blood, cells, and bacteria
  - In 1938 Ernest Ruska develops electron microscopy
  - Researchers now have a detailed understanding of structure of organs in health and disease

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## Clinicians And Technology

- Clinicians integrate technology into their medical practice
  - Example: In 1816 Rene Laennec invents the stethoscope
  - Refined since then
  - Clinicians have adopted iterative modifications of technology into their practice

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## Technology In Medicine

- Technology is the primary driving force of medicine
- A vast array of technological resources are now available in clinical practice
- Availability of an electronic health record has changed the paradigm of information collection, storage, and recovery in medicine

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## Technology In Medicine

- Technology has assisted evolution of the scientific method
  - Example: complex statistical calculations in studies
- Technology helps advance reproducible scientific breakthrough
  - Example: Use and production of penicillin
- Technology essential to practice some forms of medicine
  - Example: in vitro fertilization

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## Technology In Medicine

- Clinicians need to constantly update their knowledge base
  - Example: In the past, reliance on textbooks and on other clinicians
  - Now, reliance on an online database of medical literature
- Advances in technology require clinicians to learn new skills
  - Example: changes in cardiac pacemaker technology
  - Invasive cardiologists need to update skills as technology advances

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## Technology In Medicine

- The primary focus of clinical medicine is the clinician-patient relationship
- Now there is a new focus in the exam room in addition to the clinician and the patient – the computer

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## Change

- Alteration in organizational structure and/or function
- Implementation of technology may be entirely transparent and may be welcomed by individuals and groups
  - Example: most physicians embraced pagers and cell phone technology because it allowed them to be reached (and respond) remotely
- However some technologies are intrusive and significantly change the workflow
  - Example: EHR implementation in the clinical setting

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## Intersection of social and technical changes

- Change occurs simultaneously and in parallel with the delivery of healthcare
- In the past the clinical workflow of physicians was independent of technology
- Now, with the advent of the EHR, there is an interdependence between social and technical aspects of patient care
- Changes in technology requires clinicians to make substantial changes to the way they deliver patient care

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## Resistance To Change

- Resistance to change is the action taken by individuals and groups when they perceive that the change is a threat to them
  - Three phases of change
  - Inertia
  - Transition
  - Achieving the new model
- Resistance to change is promoted by defenders of the status quo

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## Overcoming Resistance To Change

- Involve all stakeholders
- Create effective lines of communication
- Identify champions
- Alleviate fears
- Collaborate to solve problems
- Elicit feedback

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## Work Processes And Technology

- Clinicians have developed their own work processes
- Healthcare professionals use multiple tools and technologies to assist their work
- Technology has become an essential component of workflow
- Implementing new technology requires clinicians to adapt their work processes

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## Unintended Consequences of Technological Change

- Changes in workflow may not improve overall system efficiency
- Clinicians may be unable to adapt to the change
- Outcome measures may not be positive
- The implementation is just as important as the technology or the system

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## Managing Sociotechnical Change

- Organizations look for the right people for the right tasks at all levels to lead change
- Organizations make a fundamental choice -- either adapt work processes to new technology, or adapt technology to current workflow
- New technology can be designed to improve work processes
- Adapting work processes requires leadership to carefully manage change
- But adapting technology to current work processes is counterproductive in most cases
  - No significant long term improvements in care
  - Less agile
  - Less adaptable to future changes

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## The Impact Of Sociotechnical Change

- Improvement in quality and process improvement
- Improved process and outcome measures
- Improvement in efficiency
- Enhanced workflows
- Improved efficiencies of procedures dependent on technology
- Improvement in safety
- Reduction in errors

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## The Impact Of Sociotechnical Change

- Changes in job descriptions
- Role for new experts in healthcare IT
- Role for clinicians who are technologists, and technical specialists who have exposure to the clinical environment

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