DECEMBER 2017

# Perspectives on Biomedical & Clinical Engineering Trends

# ECRI Institute's Top 10 Health Technology Hazards for 2018

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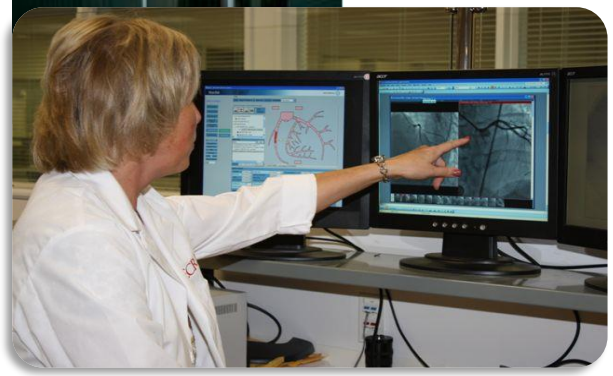
# Why People Call On ECRI Institute?



- Independent and research driven international nonprofit
- Strict conflict of interest rules
- World class experts improving patient care, mitigating decision risk on technology & providing cost avoidance solutions
  - Federally certified Patient Safety Organization and evidence based practice center - Agency for Healthcare Research and Quality (AHRQ)

PARTNERSHIP for HEALTH IT PATIENT SAFETY
*Making healthcare safer together*

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## Going by the Definition…

- Biomedical Engineering
- Clinical Engineering



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BEST JOBS 2012

# Fastest-growing jobs

CNNMoney

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## Medical Devices Clinical Engineer

2 of 10 BACK NEXT

10-year job growth: **61.7%**
Median pay: **$80,400**

**See complete data for Medical Devices Clinical Engineers**

PHOTO: THINKSTOCK

**NEXT: Meeting/Convention Planner**

http://money.cnn.com/gallery/pf/2012/11/01/fastest-growing-jobs/2.html



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# Best Jobs in America

0 Comments 2013

CNNMoney/PayScale's top 100 careers with big growth, great pay and satisfying work.

Recommend 9.1k

## 1. Biomedical Engineer

NEXT

**Median pay:** $87,000
**Top pay:** $134,000
**10-year job growth:** 61.7%
**Total jobs*:** 15,700

PHOTO: JOHN JERNIGAN

*"You can impact so many lives by creating technology that will repair a hip or help repair eyesight or allow somebody to breathe better," says Christine Schmidt, a professor of biomedical engineering at the University of Florida.*

**What they do all day?** The MRI, the pacemaker, artificial joints – biomedical engineers have helped make them the wonders they are today. BMEs, as they're called, work to design, create and improve medical devices such as prosthetics, artificial organs, and bioengineered skin.

**How to get the job?** BMEs typically have a bachelor's or master's in biomedical engineering, and may have an MBA, law degree, or M.D. as well. Employers value team players who can communicate complex ideas well; being research-oriented is another plus.

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http://money.cnn.com/pf/best-jobs/2013/snapshots/1.html

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# Perspectives

- Biomedical/clinical engineering professionals are typically responsible for maintenance and management of healthcare technology
- Unsung heroes in the hospital
- Play a vital role in hospital operations
- But don't get the recognition of physicians or nurses or C-suite executives
  - Healthcare organizations' "most valuable players"/leaders



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# HTM - Where do we start?

- A new mindset
- Moving from “unsung hero” to “most valuable player”

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# HTM Program Checklist

*What have we accomplished? Where are we headed?*

### HTM Program Level 1: Fundamental

- ☐ Maintains most general biomedical equipment in the organization
- ☐ Has a current, written medical equipment management plan (MEMP)
- ☐ Has a CMMS-based equipment control program
- ☐ Has written procedures for safety testing, functional testing, and preventive maintenance
- ☐ Has written schedules for inspecting and maintaining medical equipment
- ☐ Has a process for regular calibration of test equipment
- ☐ Has personnel with appropriate education, experience, credentials, and values
- ☐ Has job descriptions and job titles that conform to professional standards
- ☐ Is regularly included in the process for planning medical equipment
- ☐ Is part of the EOC Committee and participates in the MEMP annual evaluation

### HTM Program Level 2: Established

- ☐ Maintains or manages all medical technology for the organization
- ☐ Has access to engineering-level support from a qualified clinical engineer
- ☐ Is a distinct organizational entity with a dedicated manager and a separate budget
- ☐ Calculates the Cost of Service Ratio (COSR) performance metric
- ☐ Supports certification and at least one-third of its technical staff beyond entry-level are certified
- ☐ Has a budgeted continuing education program
- ☐ Supports participation in regional or national professional associations
- ☐ Is involved in capital equipment planning and equipment replacement planning
- ☐ Does internal benchmarking, monitoring multiple metrics over time
- ☐ Has collaborative relationships with Information Technology (IT)

### HTM Program Level 3: Advanced

- ☐ Manages all HTM-related costs for the organization
- ☐ Operates like a business and makes cost-effective long-term business decisions
- ☐ Has a CMMS with extensive analytical and technology management features
- ☐ Collaborates on the selection of all medical device-related technologies
- ☐ Integrates RM and QA methodologies into HTM
- ☐ Has a qualified clinical engineer on staff
- ☐ Provides leadership in CE-IT convergence issues for the organization
- ☐ Benchmarks externally, identifies best practices, and improves performance
- ☐ Is an active contributor to key technical and management groups in the organization
- ☐ Provides leadership in national and regional professional associations

*Note: These are select responsibilities from the HTM Level Guide. For the complete list, please refer to the guide.*

AAMI
Advancing Safety in Healthcare Technology

# Today's Health Technology Realities

- Technology is going through tremendous transition
- Computerization and HIT (in general) is driving much of that change
  - Integration is a big part of that
- Technology changes are bringing increasing complexities and growing risks
- More is expected from technology
  - Use of data for decision support is just one example
  - Impact of the press



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# What Hospitals Need

- Dedicated technology leaders
  - With a deep understanding of clinical, safety, technical, cost, and strategic concerns
- Leadership that sets the organization's technology direction
  - The one who everyone in the planning meetings turns to when it's time to discuss next steps



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# Future Operational Considerations

- Most therapeutic interventions are very intense and of the shortest possible duration
- All clinical activities are monitored in real time and feedback is provided to the clinician.
- Drug therapy is customized for the individual patient
- Increased use of simulators for all medical interventions
- Many patients come to the hospital with personal medical devices
  - Dialysis machines, insulin pumps

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# Changes to Traditional Technology Management Support

- Goodbye to traditional preventive maintenance
  - Increased reliance on remote diagnostics
    - By vendor
    - By clinical engineering
  - Less electromechanical measurement and more software testing and verification
- "Work order" requests coming from a central call desk
- Much more involvement with integration concerns and data management
- Dramatic shift to "systems" thinking – and operations



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# New and Evolving Roles

- Wireless Services Manager
- Clinical Systems Engineer
- Medical Device Data Security Professional
- Chief Clinical Technology Officer or Chief Technology Officer
- Interoperability Coordinator
- Stored/Saved Data Manager/Analyst



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# New Safety Perspectives

- Data availability (e.g., Wi-Fi network up-time)
- Privacy and security (i.e., cybersecurity)
- Accurate and timely transmission of data (e.g., with interoperability)
- Change management – related to software updates and corrections
- Automated monitoring for product recalls
  - With increasing emphasis on software problems and corrections



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# New Challenges to Address

- Conficker worm found on a patient monitoring server
- Connecting a phone to physiological monitor for charging causes a device shut down
- Open vulnerable communication ports identified with a dispensing cabinet
- Remote manufacturer access to spot check monitor server with a default password

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# Top 10 Health Technology Hazards for 2018

1. Ransomware and Other Cybersecurity Threats
2. Endoscope Reprocessing Failures
3. Contaminated Mattresses and Covers
4. Alarm Notification Failures
5. Equipment Failures from Improper Cleaning

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6. Patient Burns from Unholstered ESU Pencils
7. Radiation Exposure from Inadequate Use of Digital Imaging Tools
8. Bar-Coded Medication Administration System Workarounds
9. Care Delays from Flaws in Device Networking
10. Slow Adoption of Safer Enteral Feeding Connectors

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Download the Executive Brief for free at: https://www.ecri.org/Pages/2018-Hazards.aspx

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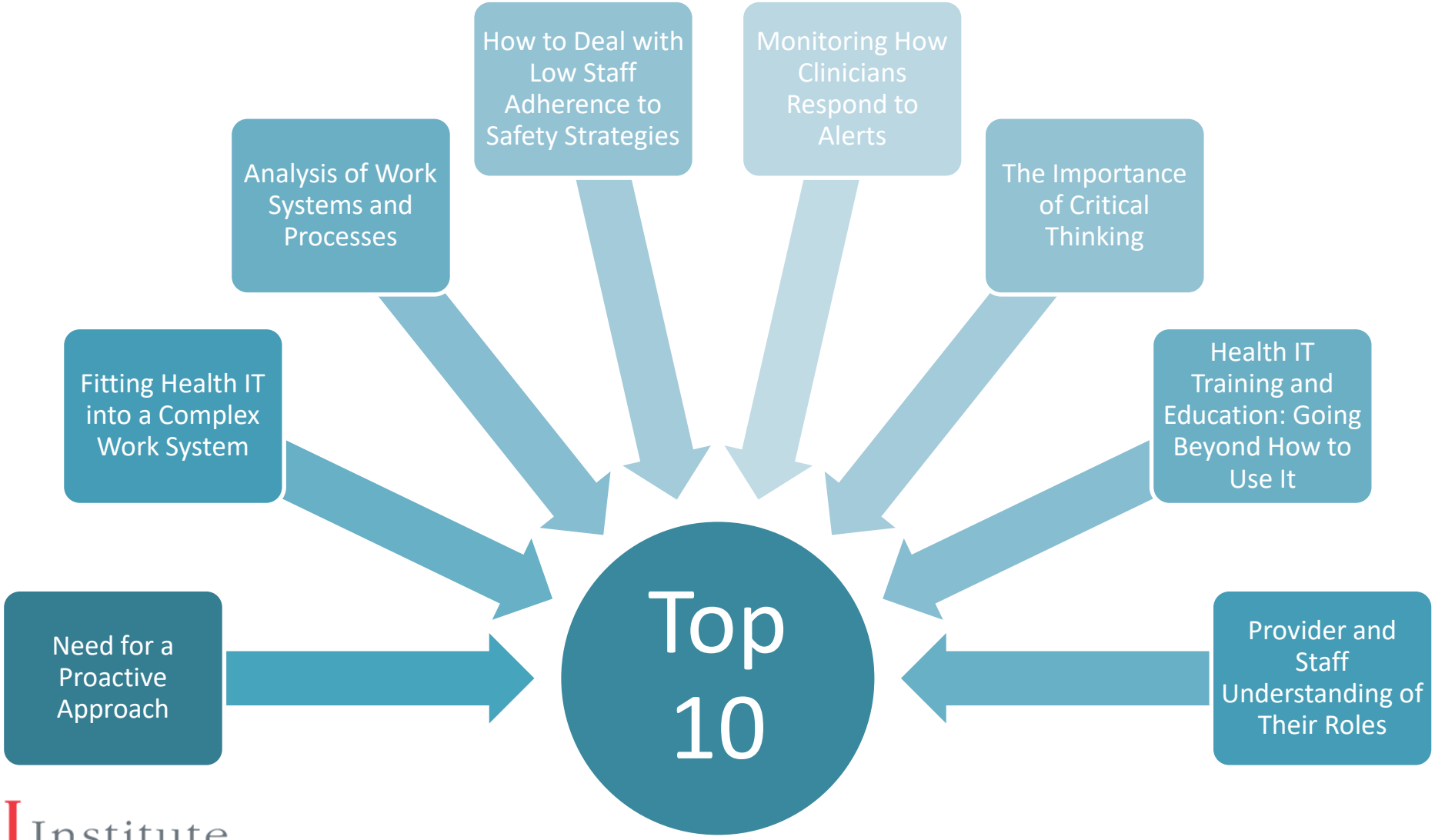
# Themes Running Through the Top 10

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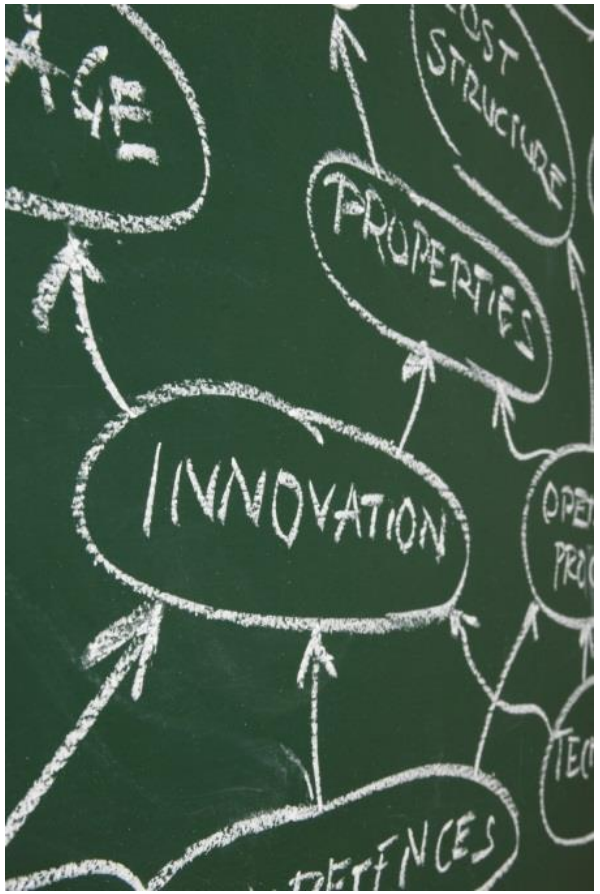
# Final Thoughts

- It's not technology just for technology's sake
- Technology will only be as effective as:
  - It's ability to meet clinical needs or organizational goals
  - It can show meaningful improvement proven against baseline measurements
  - It is supported by strong leadership that drives its direction and is not driven by it!
- Biomedical/Clinical engineering is the key to helping hospitals navigate emerging technology challenges!



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# Questions?

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# Thank You

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