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The Influence of Technology and Automation on the Pharmacy Job Market

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Disclosure

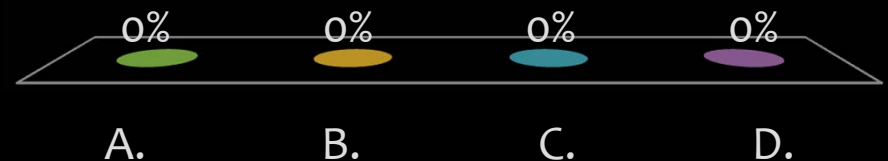
- I have no actual or potential conflict of interest in relation to this program/presentation.

Learning Objectives

- Define informatics and technology within a pharmacy context
- Describe the level of adoption around informatics and technology in pharmacy today and how pharmacists are utilized
- Describe educational pathways for Informatics Pharmacists as well as the current gaps and opportunities around education and training for Informatics Pharmacists

Pre-Test #1. According to ASHP, Pharmacy Informatics is defined as:

- A. The use of information in the Medication-Use Process to achieve positive health outcomes
- B. The use of information technology (IT) in the Medication-Use Process to achieve positive health outcomes
- C. The use of automation in the Medication-Use Process to achieve positive health outcomes
- D. All of the above



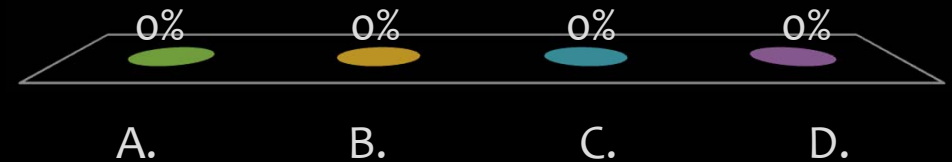
Pre-Test #2. True/False: According to survey results, 95% of U.S. Hospitals use Computerized Provider Order Entry (CPOE).

- A. True
- B. False



Pre-Test #3. The Core Competencies recommended by the Institute of Medicine (IOM) for Health Professions Education include:

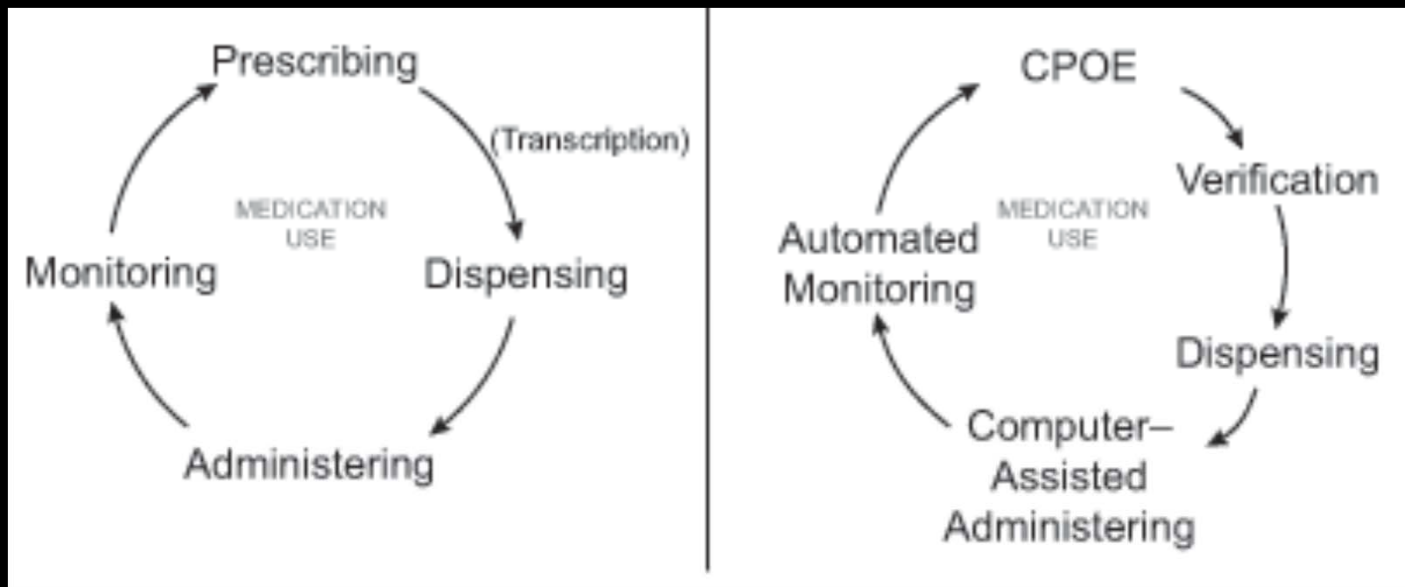
- A. Deliver Patient-Centered Care and Work in Interdisciplinary Teams
- B. Deliver Patient-Centered Care, Work in Interdisciplinary Teams, and Employ Evidence-Based Practice
- C. Focus on Quality Improvement and Utilize Informatics
- D. B and C



Pharmacy Informatics:

The use of information, information technology (IT), and automation in the Medication-Use Process to achieve positive health outcomes

Medication Use Cycles



My pathway to Informatics

- Pharmacy school at Midwestern University (1995-1999)
 - No informatics curriculum or classes
- Pharmacy Technician at Hinsdale Hospital (1995-1998)
 - Stocked Automated Dispensing Cabinets
 - Order entry in Pharmacy computer system
- Pharmacy Practice Residency at Advocate Lutheran General Hospital (1999-2000)
 - Paper charts
 - Pharmacy computer system with light pens
- IOM Report – To Err is Human (November 1999)
- Personal Digital Assistants for drug information (2000)
- Standardization of Pharmacy System across healthcare system (2001)

History of Pharmacy Informatics and Automation

History of Pharmacy Informatics and Automation

Pharmacy Technology	First Implemented
Pharmacy Information Management Systems	1960s
Computerized Physician Order Entry	1960s
Clinical Decision Support	1960s
Automated Dispensing Cabinets	1980s



IOM Report: To Err is Human

- Between 44,000 and 98,000 hospital deaths per year are caused by medical errors
- Preventable medical errors have been estimated to result in total costs of \$17 billion to \$29 billion per year
- Preventing errors and improving safety requires a systems approach
- Computerized Provider Order Entry (CPOE) is an important safety measure that should be implemented to mitigate errors



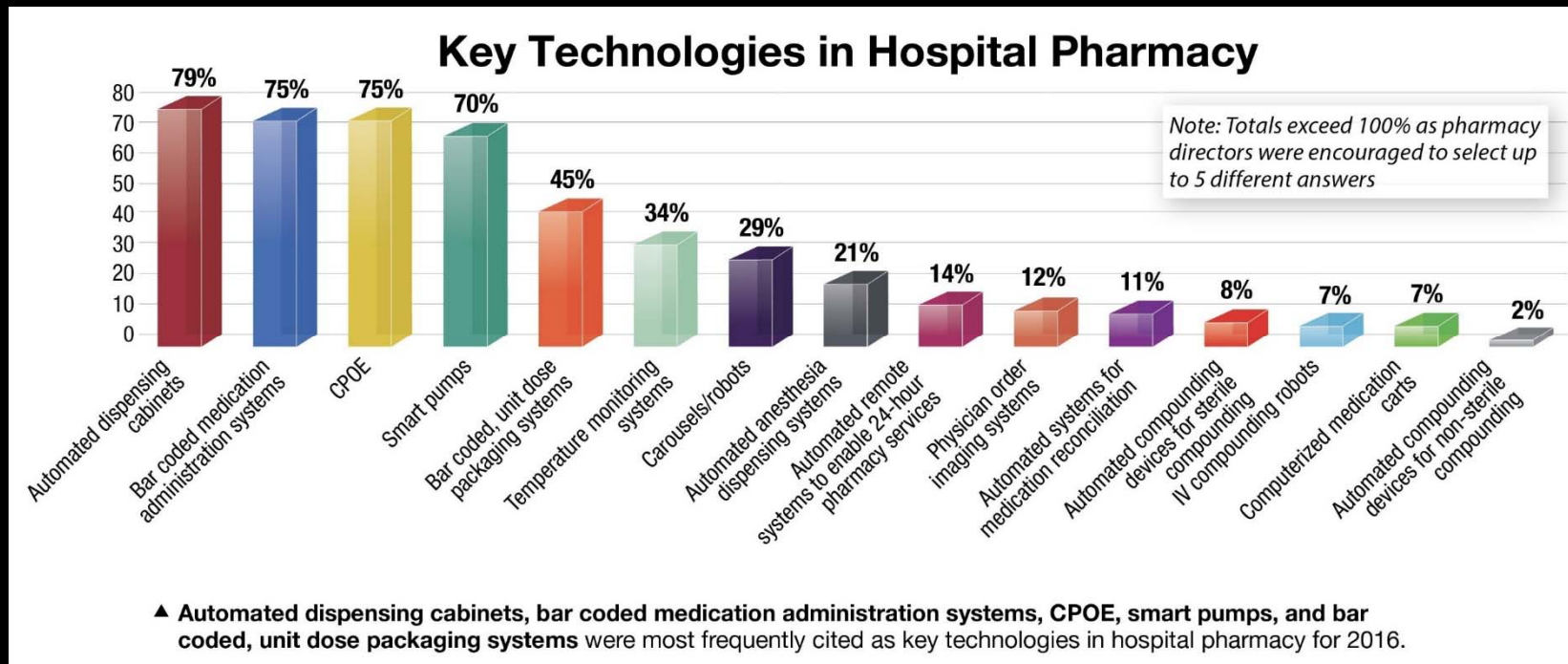
Institute of Medicine (IOM). 2000. *To Err Is Human: Building a Safer Health System*. L. T. Kohn, J. M. Corrigan, and M. S. Donaldson, eds. Washington, D.C: National Academy Press

Current state of Pharmacy Informatics

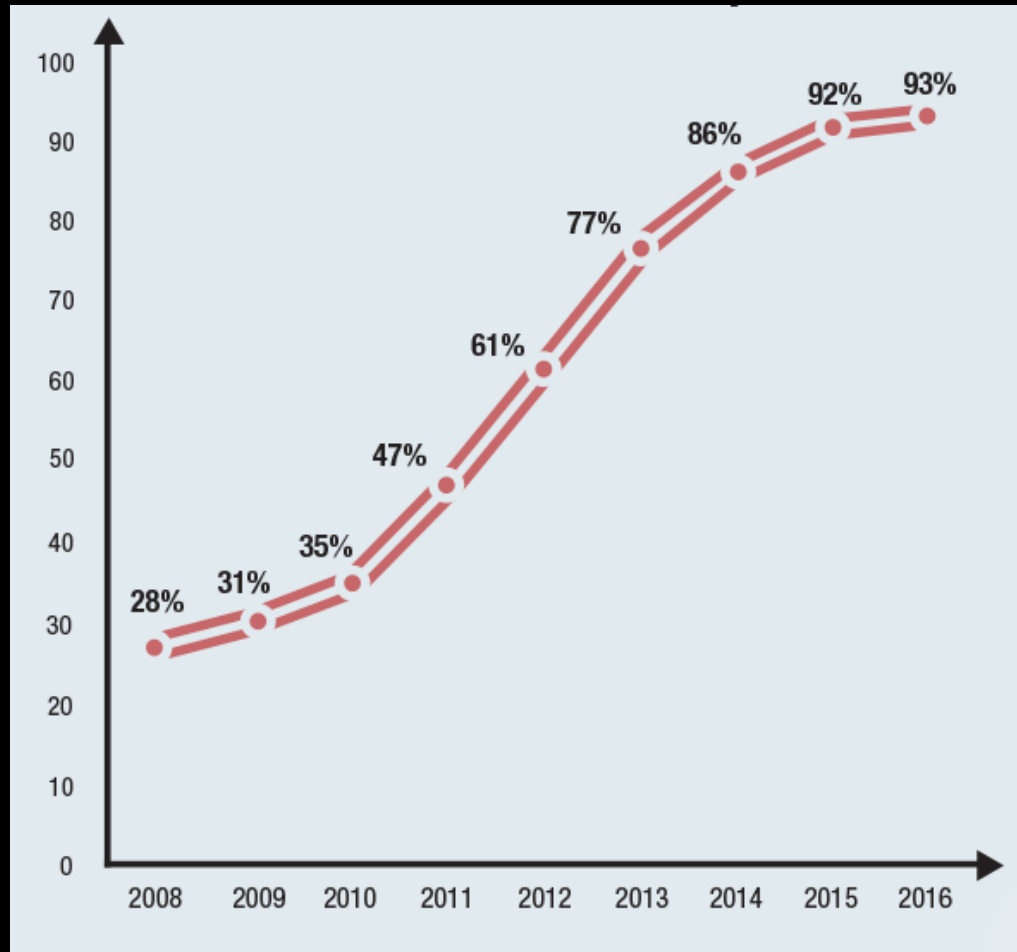
ASHP National Survey on Informatics

Characteristic	2013	2007
Complete EHR	30.2%	5.9%
CPOE system	76.4%	17.8%
Automated Dispensing Cabinet	79.2%	82.8%
Carousel	18.2%	12.7%
Barcode-Assisted Medication Administration	72.2%	24.1%
Smart Pumps	72.9%	44.0%
Automated Anesthesia Cart	30.2%	NA
IV Workflow Software	9.1%	NA
Real-time Medication Tracking Software	19.6%	NA

Automation in the Pharmacy

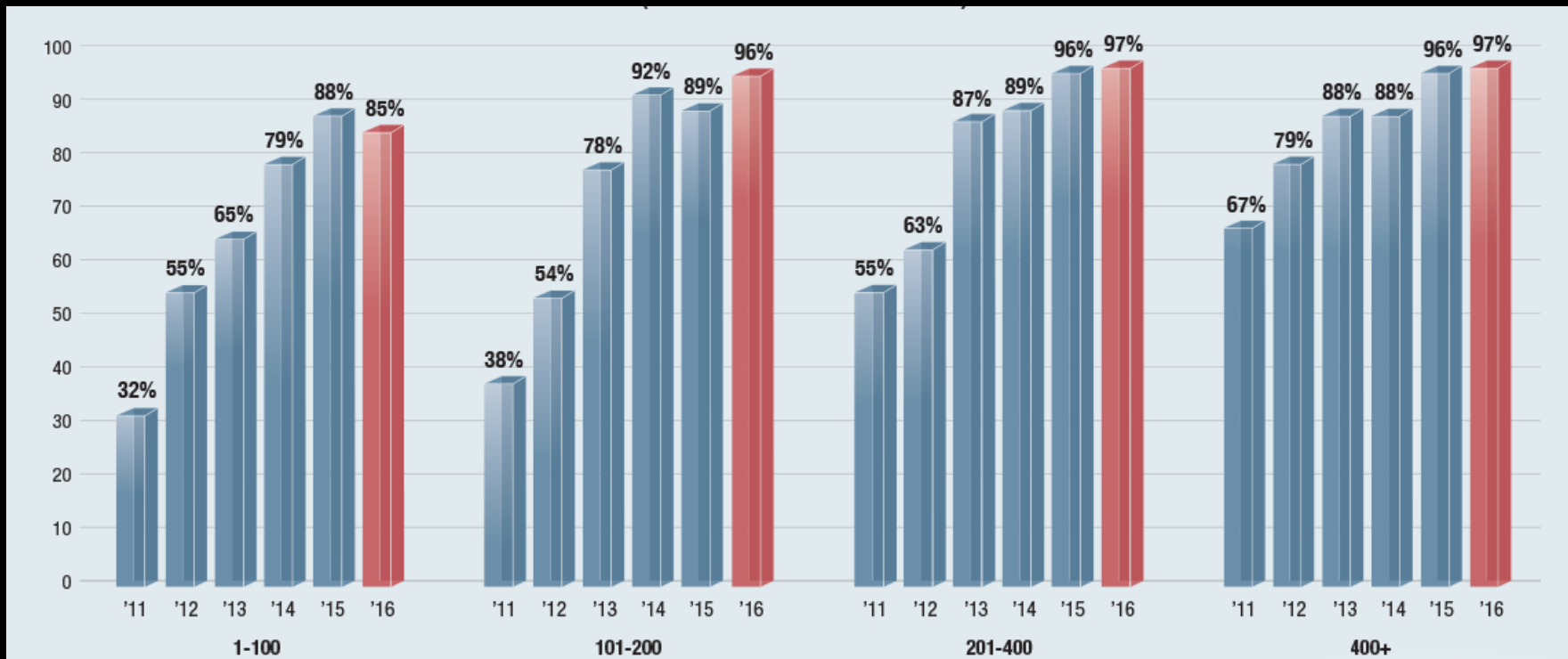


CPOE Adoption

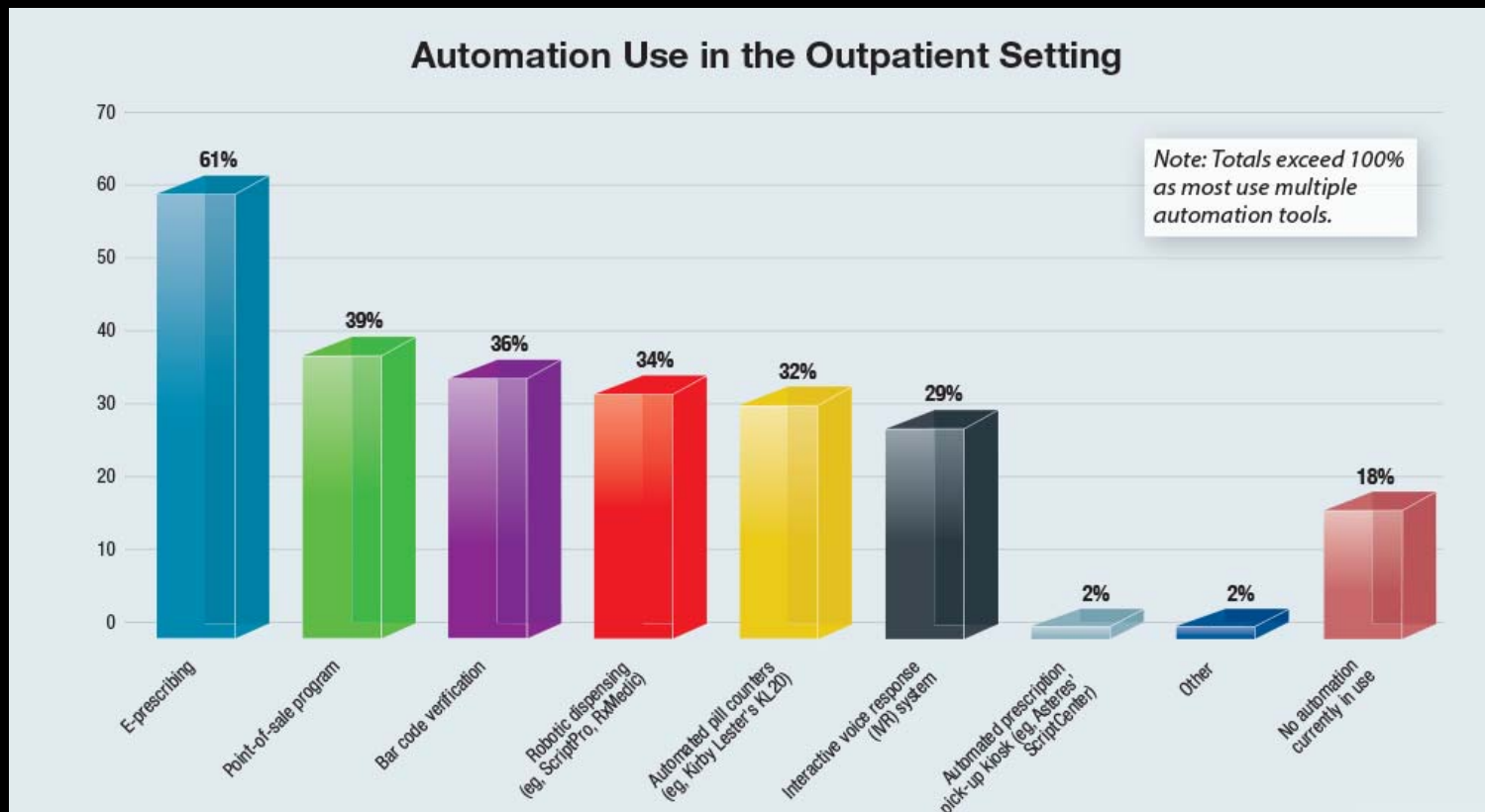


State of Pharmacy Automation. *Pharm Purch Prod.* 2016; 8: 1-84.

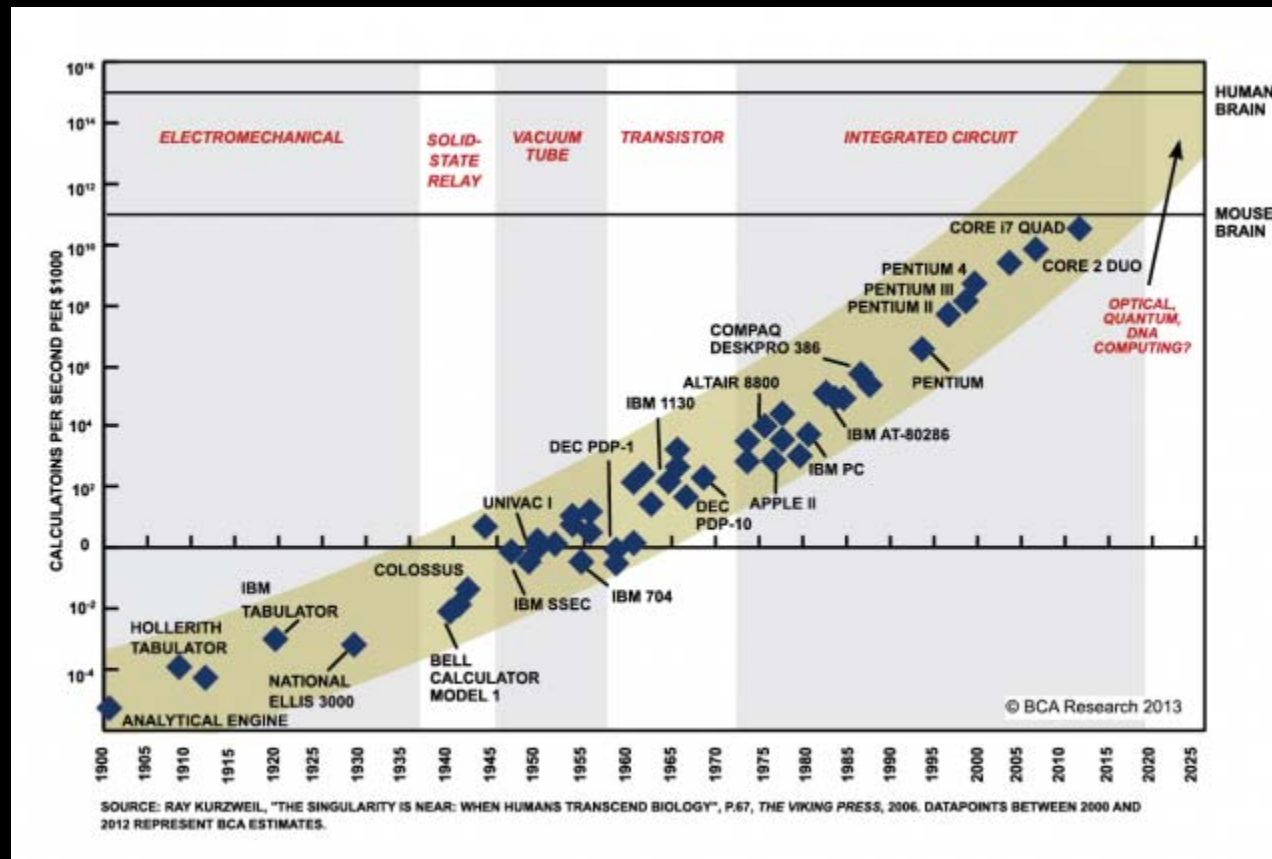
CPOE Adoption by Facility Size



Outpatient Pharmacy



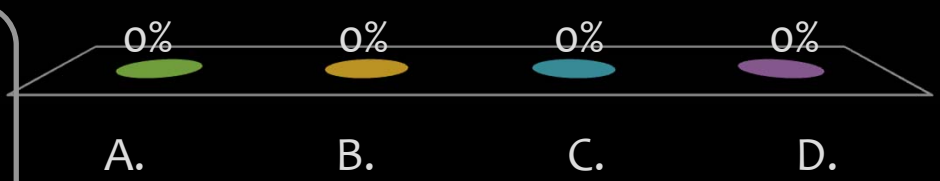
Moore's Law



<http://www.extremetech.com/extreme/210872-extremetech-explains-what-is-moores-law>

According to surveys conducted by ASHP and PPP, the top technologies in hospital pharmacy today are:

- A. CPOE, Smart Pumps, Automated Dispensing Cabinets, and Carousels
- B. CPOE, BCMA, Automated Dispensing Cabinets, Carousels
- C. CPOE, BCMA, Smart Pumps, Automated Dispensing Cabinets
- D. CPOE, BCMA, Smart Pumps, Carousels



Areas of Healthcare
Technology/Automation
that utilize
Pharmacists

Healthcare Technology and Automation Roles in Pharmacy

- Formulary Maintenance
- EMR/PIS Maintenance
- Device and System Maintenance
 - Automated Dispensing Cabinets
 - Bar Coded Medication Administration Systems
 - Smart Pumps
 - Carousels
 - Robots
 - IV Workflow Systems
- Academia
- Pharmacy Informaticist
 - ASHP Statement on the Pharmacist's Role in Informatics*

* American Society of Health-System Pharmacists. ASHP Statement on the Pharmacist's Role in Informatics. *Am J Health-Syst Pharm.* 20; 64:200-3.

Pharmacy Informaticists



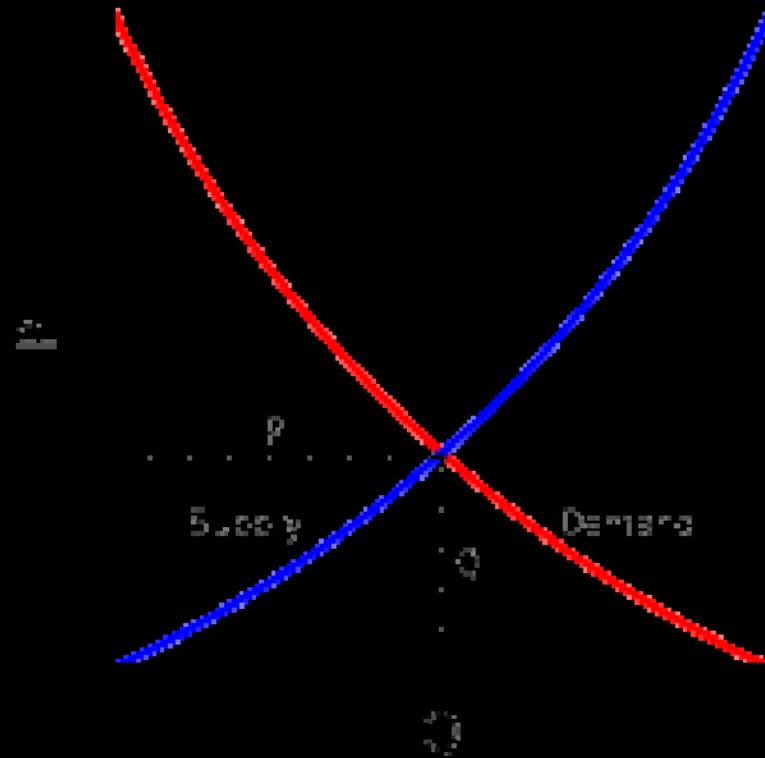
Additional Roles

- Retail
- Telepharmacy
- Industry
 - Sales
 - Consulting
 - Development
 - Strategy

Pharmacy Education in Informatics

Supply and Demand

- 105% increase in first-professional PharmD degree graduates from 2001 to 2016
- 15,000 pharmacist graduates per year anticipated by 2018
- 49% of hospitals had Pharmacy IT positions in 2013 (up from 35.8% in 2007)



Brown DL. A Looming Joblessness Crisis for New Pharmacy Graduates and the Implications It Holds for the Academy. *Am J Pharm Educ.* 2013; 77(5):Article 90.

Fox BI, Pedersen CA, Gumpper KF. ASHP national survey on informatics: Assessment of the adoption and use of pharmacy informatics in U.S. hospitals – 2013. *Am J Health-Syst Pharm.* 2015; 72:636-55.

Options for Practicing Pharmacists

- On the Job Training
- Certifications/Degree Programs
 - Various universities and colleges
 - Health Informatics Certification Program
 - MS in Healthcare Informatics
 - MBA with an emphasis in Health Informatics
 - American Medical Informatics Association (AMIA)
 - Advanced Health Informatics Certification (AHIC)
 - Health Information and Management Systems Society (HIMSS)
 - Certified Associate in Health Information & Management Systems (CAHIMS)
 - Certified Professional in Health Information & Management Systems (CPHIMS)
 - American Society of Health-System Pharmacists (ASHP)
 - Pharmacy Informatics Certificate

PGY-2 Pharmacy Informatics Residency Programs

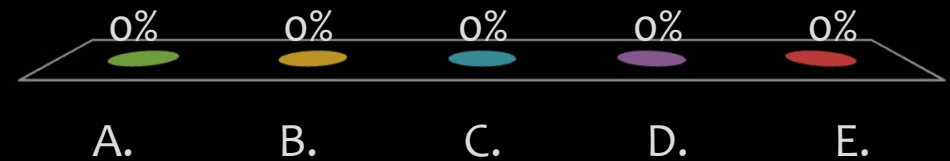
- Aurora Health Care (WI)
- Broward Health (FL)
- Cleveland Clinic Health System(OH)
- Froedtert (WI)
- HCA/University of Tennessee (TN)
- Indiana University Health (IN)
- Kaiser Permanente (CA)
- Lipscomb University (TN)
- Marshfield Clinic (WI)
- Mayo Clinic (MN)
- New York Methodist Hospital (NY)
- NorthShore Univ. HealthSystem (IL)
- Oregon Health and Science University Hospitals and Clinics (OR)
- Sentara Healthcare (VA)
- St. Elizabeth's Hospital – HSHS (IL)
- The Johns Hopkins Hospital (MD)*
- The Ohio State University (OH)
- University of Louisville Hospital (KY)
- University of Michigan Hospitals (MI)
- University of Utah Hospitals and Clinics (UT)
- University of Virginia Health System (VA)
- University of Wisconsin Hospital and Clinics (WI)
- VA San Diego Healthcare System (CA)
- Vanderbilt University Med Ctr (TN)
- William Jennings Bryan Dorn VA Med Ctr (SC)

* Combined PGY-1 Pharmacy and PGY2 Pharmacy Informatics program

<https://accred.ashp.org/aps/pages/directory/residencyprogramsearch.aspx>

Pharmacists can gain Informatics Education through:

- A. PGY-2 Pharmacy Informatics Residency
- B. MS in Informatics through ASHP
- C. Certification through HIMSS
- D. All of the above
- E. A and C only



Informatics in Pharmacy Curriculum

- Core Competencies recommended by the Institute of Medicine (IOM) for Health Professions Education:
 - Deliver Patient-Centered Care
 - Work in Interdisciplinary Teams
 - Employ Evidence-Based Practice
 - Focus on Quality Improvement
 - Utilize Informatics

Informatics in Pharmacy Curriculum

- Desire to Include Informatics: 82%
- Rate of Inclusion of Informatics: 36%
 - Offered as a Standalone Course: 18%
 - Offered as a Topic within a Course: 40%
 - Integrated throughout the curriculum: 37%
 - Not offered: 7%

Pharmacy Informatics Education

- Areas of focus in an informatics curriculum:
 - Prescribing
 - Pharmacist Prescription Review
 - Compounding and Dispensing
 - Medication Administration
 - Monitoring of Ongoing Medication Therapies

Emerging roles for Pharmacy Informatics Practice and Education

- Workflow Mobility
 - Mobile Devices
 - Telepharmacy
- Interoperability
 - Sharing usable health information electronically
- Patient-centered Technologies
 - Personal Health Records
 - Online Medical Information
 - Home Monitoring Devices

Emerging roles for Pharmacy Informatics Practice and Education

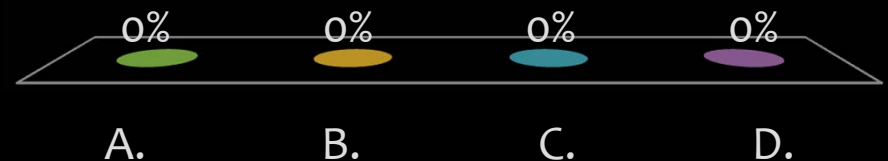
- Analytics
 - Electronic work queue systems
 - Clinical surveillance systems
 - Population Health
- Automation
 - Automated Workflow Systems
 - Robotics
 - Medication Tracking Systems
 - Barcode and Radio Frequency Identification (RFID) capabilities

Summary and Closing Thoughts

- Healthcare Technology will continue to evolve exponentially, requiring pharmacists who are both technologically and clinically savvy
- Although there will likely be an overabundance of pharmacists in the workforce, there is still a big need for pharmacy informaticists at many hospitals across the country
- Pharmacy school curriculums must include and expand Informatics as one of its core competencies

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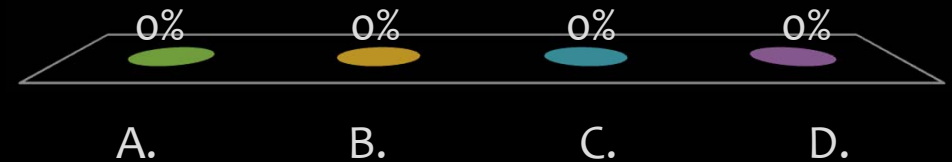
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Thank you!

Questions/Discussion

Supplemental Resources for Continuing Professional Development

- Flynn AJ. The current state of pharmacy informatics education in professional programs at US colleges of pharmacy. *Am J Pharm Educ.* 2005;69(4):Article 66
- Fox BI, Pedersen CA, Gumpfer KF. ASHP national survey on informatics: Assessment of the adoption and use of pharmacy informatics in U.S. hospitals – 2013. *Am J Health-Sys Pharm.* 2015;72(8):636-655.
- Fox BI, Flynn AJ, Fortier CR, Clauson KA. Knowledge, Skills, and Resources for Pharmacy Informatics Education. *Am J Pharm Educ.* 2011; 75(5):Article 93.