MedPro Group

Technology in Healthcare: A Mixed Blessing?

Objectives

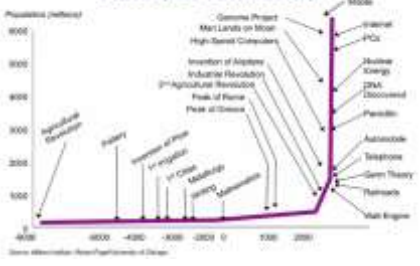
At the conclusion of this program, you should be able to:

- Explain why selection, training, and competency are top risk concerns for all new technologies.
- Understand risks associated with social media/ electronic communication and identify key areas for consideration in the development of social media policies.
- Cite barriers and risks associated with telehealth, and describe several strategies that can help address telehealth liability concerns.
- Identify emerging technology risks

2

The Speed of Technology

Growth of World Population and the History of Technology



3

Digital Healthcare

Drivers

- Consumerism
- Convenience is the new loyalty
- Cost transparency
- Private equity
- Consolidation on all fronts
- Emerging technologies
- Wearables
- AI and Big Data
- Amazon, JP Morgan Chase, Berkshire Hathaway

Source: Doctor News 2018

Barriers

- $$$$$$
- Privacy concerns
- User interface
- Patient safety
- Existing workflow
- Liability concerns
- Connection to EHR
- Reimbursement
- Digital divide

Source: 2016 Digital Health Study AMA

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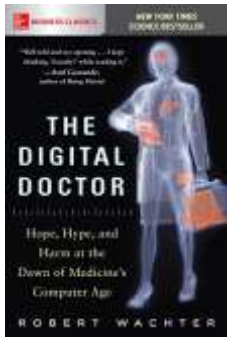
Physician's practice in the digital age

- Rapid access to data
- Improved outcomes
- Care coordination
- Improved efficiency
- Remote monitoring
- Patient engagement
- Clinical decision support



Source: 2016 AMA Digital Health Study

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2016 Digital Health Study AMA

Nearly half of all physicians are enthusiastic about new digital solutions

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Dependence on Technology

- **MRI For Traumatic Knee Injuries May Lead To Higher Healthcare Costs Without Improved Outcomes**
- Diagnostic Imaging (7/13) reported, "Magnetic resonance imaging for traumatic knee injuries, referred by general practitioners, leads to higher healthcare costs without improvement in outcomes."
- Is the physical exam dead?

Source: RadiologyVol. 288, No. 1 Apr 17 2018 https://doi.org/10.1148/radiol.2018171383

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What's the potential impact?

- Standard of care
- Do we have the expertise?
- Trust
- Ethics
- Monitoring
- Ability to adapt
- Ability to adopt
- What's actionable?
- Effect on liability

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Specific areas for review

Data security

Electronic communication

Electronic health records

Telemedicine

New technologies

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Handheld and mobile devices

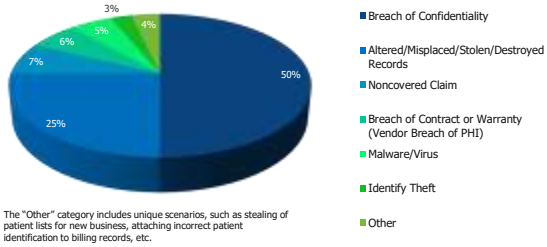
- One laptop is stolen every 53 seconds.
- 70 million smartphones are lost each year.
- 4.3% of smartphones issued to employees are lost.
- 52% of devices are stolen from the workplace.
- Types of threats include:
  - Data breach
  - Loss of intellectual property and trade secrets
  - Loss of personal information
  - Mobile malware
  - Web-based threats

Advisen Ltd. (August 2012). The liability of handheld and mobile devices.

10

Cyber/privacy cases: Volume by allegation type

Three-fourths of all cases related to cyber liability/privacy issues arise out of **breach of confidentiality** (disclosure of personal health information) or **theft of patient records** (either paper or electronic). Breach of contract/warranty cases involve failure of vendors to provide protection against "hacking" into system servers.



The "Other" category includes unique scenarios, such as stealing of patient lists for new business, attaching incorrect patient identification to billing records, etc.

Data source: MedPro Group claims data, 2011–2014.

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Case study: Postsurgical pictures on Instagram

Scenario	Successful augmentation procedure performed by plastic surgeon; patient consented via Facebook message to physician office posting "after" pictures on Instagram.
Case Overview	Within 2 hours of photo being placed on Instagram, claimant contacted physician office and asked that it be removed.
Outcome	Claim filed, even though photo was immediately removed; alleged violation of rights, negligence, breach of fiduciary duty, breach of contract, and infliction of emotional distress.
Key Issue	Consent did not include all required HIPAA elements.

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Ransomware and Breaches

- Employee education
- Patch operating system, software, and firmware on digital devices
- Ensure antivirus and anti-malware solutions are set to automatically update and conduct regular scans.
- Manage the use of privileged accounts.
- Configure access controls, including file, directory, and network share permissions appropriately.
- Implement software restriction policies
- Business Continuity Efforts
- Back up data regularly
- Secure your backups
- Test your system

http://www.healthcareitnews.com/news/tips-protecting-hospitals-ransomware-cyber-attacks-surge

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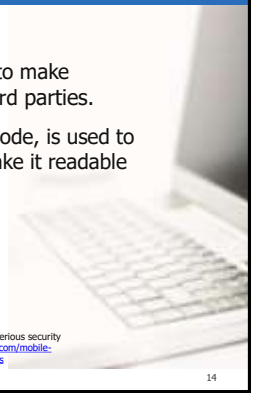
The importance of encryption

- Encryption is a method used to make information unreadable by third parties.
- A key, like a decoder ring or code, is used to decrypt the information to make it readable again.



Rashid, F. Y. (2013, December 7). Majority of mobile apps have serious security flaws. PC Magazine. Retrieved from http://securitywatch.pcmag.com/mobile-apps/318686-majority-of-mobile-apps-have-serious-security-flaws

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Being proactive — Security Risk Assessment Tool

http://www.healthit.gov/providers-professionals/security-risk-assessment-tool

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Technology, communication, and documentation

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Range of technologies and applications

- Email and texting
- Websites, blogs, and RSS feeds
- Social media
- Skype and FaceTime
- EHRs and patient portals
- An "app" for this and an "app" for that

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Physicians selectively use social media

- 25% use social media daily.
- 6.8% use Twitter.
- 52% use online physician-only communities such as Sermo, Ozmosis, medical society membership sites, and Medscape Physician Connect.

Mulcahy, N. (2012, December). Oncologists, primary care physicians don't Tweet. *Medscape Medical News*. Retrieved fromhttp://www.medscape.com/viewarticle/775926

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Risks of social media use in healthcare

- Lack of staff training
- Violations of HIPAA and breach of confidentiality
- Inaccurate and outdated website information
- Failure to comply with regulations on advertising
- Lack of adequate policies and procedures related to social media use
- Failure to assign a website administrator

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Social media presence: proactive risk interventions

- Limited number of website administrators
- Scheduled site review and monitoring
- Routinely update content
- Training (e.g., HIPAA, social media policies)
- Regulatory considerations
  - Information truthful and non-deceptive?
  - Evidence to back up claims?
  - Fair, non-biased content?

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Patient portals

- Secure online website giving patients 24-hour access to PHI, including:
  - Prescription requests
  - Discharge summaries
  - Diagnostic test results

- Terms of use should be clear
- Access should be via encrypted, password-protected login process
- EHR audit trail should be utilized — validate who accessed patients' records and when
- Goal should be to enhance provider–patient communication and to improve patient outcomes

http://healthit.gov/providers-professionals/faqs/what-patient-portal

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Managing online reviews

Options to consider

- Do nothing.
- Remove or ask the webmaster to remove the post.
- Do NOT engage in an online debate!
- Respond with script language to indicate you are committed to providing excellent patient care and encourage anyone with concerns to contact your office directly.

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Email checklist

Do you have a signed release and acknowledgement from the patient that includes:

- ❑ Requirement that for emergent or urgent concerns, communication will be via phone or in person?
- ❑ Notice of the provider's right to refuse to make decisions or conclusions based on information obtained online?
- ❑ Notice that email communication is retained in the patient's healthcare record?
- ❑ Notice that the patient has read and accepted the practice's "online patient policies," which include hold harmless language and terms of use?
- ❑ Email server encryption requirements, and a waiver if patients opt not to use an encrypted service?

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Case study — Texting

Scenario	Academic medical center used smartphones to enter orders.
Case Overview	Resident was in the process of discontinuing warfarin; at the same time, she received a party invitation via text message. The disruption caused her to forget to discontinue the medication.
Outcome	Three days later, the patient had a bleeding crisis that required surgery.
Key Issue	Did personal use of mobile technology cause the distraction, which resulted in the adverse outcome?

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Risk issues with text messages

- May reside on a mobile device and with a carrier indefinitely
- Potential for exposure to unauthorized third parties due to theft, loss, or recycling of the device
- May be accessed without any level of authentication
- Interception and decryption of text messages possible with inexpensive equipment
- Information outside the health record

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Risk mitigation for texting

- Establish a policy that prohibits or limits texting and establishes retention guidelines
- Train providers and staff on appropriate use
- Conduct inventory of all mobile devices, including personal
- Protect ePHI through passwords and encryption on all devices
- Delete data completely prior to retirement of any device
- Require health record annotation if texting is used for decision-making

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EHR goals

- Improve quality and convenience of patient care
- Increase patients' participation in their care
- Improve accuracy of diagnoses and health outcomes
- Improve care coordination
- Increase practice efficiencies and cost savings

Source: www.healthit.gov

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Documentation risks and strategies: red flags

- Additions/deletions
- Late entries
- Omissions/incomplete records
- Failure to document follow-up
- Identifying generation of occurrence/ incident report
- Inconsistent/contradictory entries
- Subjective remarks/finger-pointing

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Role of the EHR in patient safety events

- 3,099 reports related to EHR
- 10% classified as "unsafe" condition
- 15 reports in "temporary" harm
  - Entering wrong medication data
  - Administering the wrong medication
  - Ignoring a documented allergy
  - Failure to enter lab tests
  - Failure to document an allergy

Pennsylvania Patient Safety Authority. (2012, December). The Role of the electronic health record in patient safety events. *Pennsylvania Patient Safety Advisory, 9*(4), 113–121.

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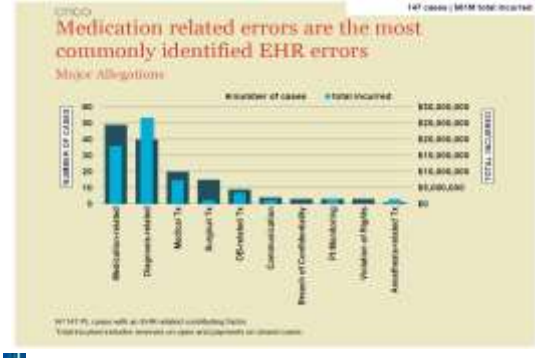
EHR errors as a risk factor — By case type



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EHR Liability: Is Metadata the Next Asbestosis?

- Time synchronization
- Audit trails/metadata
- Medical guidelines and best practices are not updated
- Alert fatigue/overload
- Too many "normal" indicators
- Abnormal areas are incorrectly documented
- Usable information is harder to find
- Document events before they actually occur
- Data entered for the wrong patient

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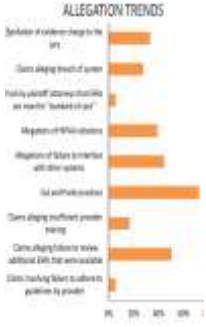
Source: PIAA – EHR Litigation Data

- 53% of the participants have already seen EHR-related claims.
- The top trends:
  - cut-and-paste practices
  - failure to review additional electronic records
  - failure to interface with other systems
  - allegations of HIPAA violations.



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EHR risk strategy

Identify functions within the EHR that create high risk for your practice, such as:

- Test tracking
- Drug interaction and allergy alerts
- Cancelled appointments and "no shows"
- Medication prescribing process

Consider developing a performance improvement plan to help mitigate these risks.

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Telemedicine

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Benefits of telemedicine

- Improved access
- Cost efficiency
- Improved quality
- Patient satisfaction
- Convenience
- Market share

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Types of technologies

Delivered through secure networks, email, landline, and wireless communication . . . telephone, satellite, Internet, and VPN:

- Videoconferencing
- Store-and-forward imaging
- Patient monitoring centers
- Mobile technologies (delivered via smartphone, tablets, etc.)
- Internet e-health patient services or professional education
- Robotic services (monitoring, surgery, etc.)

American Telemedicine Association. (2013, July). State Medicaid best practice: Store-and-forward telemedicine. Retrieved from http://www.americantelemed.org/docs/default-source/policy/state-medicaid-best-practice---store-and-forward-telemedicine.pdf?sfvrsn=6

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Informed consent

- Telemedicine-specific:
  - Names of all involved healthcare providers, as well as credentials and location
  - Plan for ongoing care (who is responsible)
  - Security/privacy measures
  - Risks associated with use of telehealth services (e.g., technical problems)
  - Alternative plan in case of emergency/malfunction

- Should be documented in the patient's medical record

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Online prescribing

- Provider–patient relationship
- Adequate physical exam
- Accuracy of patient history
- State licensing board requirements
- Federal regulations
- Majority of legal actions that have been brought against telehealth providers are related to online prescribing

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Telehealth: PIAA claims study

Of the 94,228 total claims in the data sharing project (DSP) during the period from 2004–2013, a total of only 196 claims were linked with telephone treatment.

Of those 196 reported claims, 56 resulted in some form of claim payment.

The total indemnity loss related to telephone treatment was $17 million compared with $8 billion for the total of all MPL losses in the DSP.

Telephone treatment claims thus represented only about 0.21% of all MPL losses.

The average indemnity loss was also lower for telephone treatment — $303,691 compared with $328,815 for all MPL claims within the DSP.

Source: Murphy, D. (2015, July). Telemedicine and MPL: The story so far. *Inside Medical Liability Online*. Retrieved from https://piaa.us/docs/IML/IML_Online_Telemedicine_July2015.pdf

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Risk strategies

- Ensure that technology used to facilitate telehealth interactions is functional and used appropriately by providers and patients.
- Follow available telehealth standards to reduce risks of error and lost data.
- Provide staff training on telehealth technologies, scope of service, maintenance, and policies/protocols.
- Understand the requirements related to the telehealth technology being used.
- Implement privacy and security safeguards for the transmission of patient health information.

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Emerging Risks

Communi-cation	Hand-offs	Documenta-tion EHR	Team training
Technology	Aging physicians	Consents	Infectious disease
Population health	Tele-medicine	Cyber liability	Medication shortages
Human factors	Big data	High risk medications	Test results follow-up
Disclosure	Burnout	Overlapping surgery	Genomics

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General risk management concerns

- Lack of awareness regarding learning curve, path to proficiency (volume)
- External pressures, i.e. patients, hospitals, etc.
- Patients unaware of risks, lack of informed consent
- Overestimation of benefits
- No universally accepted guidelines on how to train or length of training
- Because the technology is so new, standards of care have not yet been established

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Top 2019 Health Technology Hazards (ECRI)

- Hackers Can Exploit Remote Access to Systems, Disrupting Healthcare Operations
- "Clean" Mattresses Can Ooze Body Fluids onto Patients
- Retained Sponges Persist as a Surgical Complication Despite Manual Counts
- Improperly Set Ventilator Alarms Put Patients at Risk for Hypoxic Brain Injury or Death
- Mishandling Flexible Endoscopes after Disinfection Can Lead to Patient Infections
- Confusing Dose Rate with Flow Rate Can Lead to Infusion Pump Medication Errors
- Improper Customization of Physiologic Monitor Alarm Settings May Result in Missed Alarms
- Injury Risk from Overhead Patient Lift Systems
- Cleaning Fluid Seeping into Electrical Components Can Lead to Equipment Damage and Fires
- Flawed Battery Charging Systems and Practices Can Affect Device Operation

Source: www.ecri.org/2019hazards

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The System's Contribution to Error

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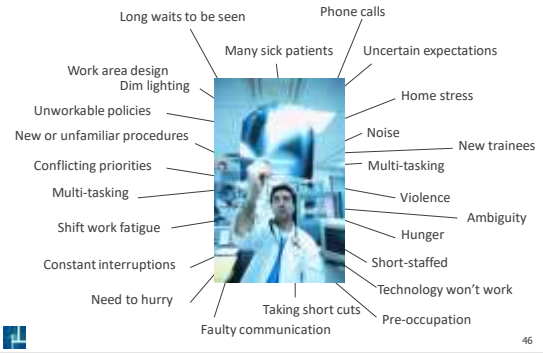
Complex Systems



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Defibrillator Case

- 32 year old healthy man w/wife, young kids
- Presents to ED with rapid heartbeat
  - Non-life threatening condition (SVT)
- Synchronized shock @50j → refractory
- Try again @ 100j → **VF Arrest**
- 45m resuscitation attempt → **patient dies**
- Investigation reveals that MD failed to put device in SYNC mode for second shock

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Defibrillator Usability Study

- Fourteen expert participants
- Four tasks: 2 routine, 2 emergent
- Two defibrillator models
- SimMan™ patient simulator
- ***50%*** *of participants inadvertently delivered an unsynchronized countershock for SVT*
  - **71% of participants never aware**

➢ *Fairbanks RJ, Caplan SH, et al. Usability Study of Two Common Defibrillators Reveals Hazards. Annals of Emergency Medicine Oct 2007; 50(4): 424-432. [See also associated editorial: Karsh and Scanlon, Oct 2007; 50(4): 433-435]*

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Vendor Response

- "Physician should have taken time to ask ED staff for an operator's manual for the defibrillator and read it after he arrived in the ED to perform a cardioversion"
- "the preventative or corrective action is provided in the device labeling"

Source: Fairbanks RJ and Wears RL. Hazards With Medical Devices: the Role of Design. Annals of Emergency Medicine Nov 2008; 52(5): 519-521.

49

Sources of Distractions in the OR

- Internal team members
- External team members
- Equipment-related issues
- Workspace design issues
- Ambient noise
- Teaching responsibilities
- Patient-related problems
- Pagers
- Mobile phones
- Shift change

Source: Pa Patient Saf Advis 2014 Jun;11(2):45-52

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The Impact of Artificial Intelligence on Healthcare

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Artificial Intelligence in Medicine

- Computer assisted diagnosis/devices
- Deep learning
- Machine learning
- Neural networks
- Predictive analytics
- Decision support tool
- Practice management guidelines

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IBM Healthcare Watson

Healthcare data will double every 73 days by 2020.

Source: IBM. (2015, April 13). Datagram: Medical data. Retrieved from www-03.ibm.com/press/us/en/photo/46588.wss

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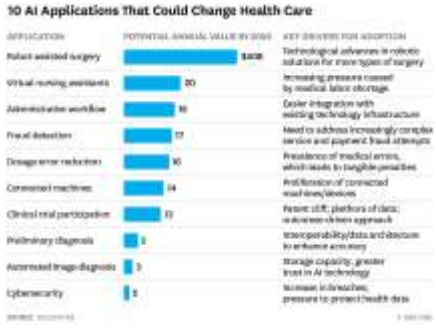
AI Impact on Healthcare



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"Will robots replace medical mentoring?"

Source: www.invivox.com

55

Healthcare AI Landscape

Source: https://techburst.io/ai-in-healthcare-industry-landscape-c433829b320c

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Diagnostic Error

- 49% Radiology (breast cancer, fracture, lung cancer)
- 20% Medicine (lung cancer, heart disease, fracture)
- 17% Pathology (benign neoplasm, uterine/cervical cancer, skin cancer)
- 8% Surgery (fracture)

Source: CRICO 2014

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Malpractice Suits in Chest Radiology

- 2680 (32.4%) of the group had at least 1 malpractice suit;
- 496 suits encompassing 48 difference causes, but diagnostic errors comprised 78% of them;
- Causes:
  - Failure to diagnose lung cancer: 211 cases or 42.5%; then failure to recognize an aortic dissection (7.1%), then failure to recognize a foreign body (6%), then missed pulmonary embolism (5%)
  - 417 cases admitted a court outcome with 73% settled in favor of the plaintiff with a mean payment of $277,230
  - 61% of lung cancer cases were won by plaintiffs with a mean payment of $313,550.

Source: "Malpractice Suits in Chest Radiology: An Evaluation of the Histories of 8265 Radiologists," Stephen Baker et al. Journal of Thoracic Imaging, 2013;28(6):388-391.

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Computer-aided diagnosis - CAD

- Computer-aided detection (CADe), also called computer-aided diagnosis (CADx), are imaging technologies used in X-ray, MRI and ultrasound diagnostics—possibly can also be used in digital pathology with the advent of whole-slide imaging;
- CAD applications include breast cancer, lung cancer, colon cancer, coronary artery disease, congenital heart defect, pathological brain detections, Alzheimer's nuclear medicine and diabetic retinopathy
- Typically CAD occurs as a second check of the radiologist's reading, marking any suspicious areas for reconsideration
- Based on clinical studies of the CAD technology, researchers estimate that for every 100,000 breast cancers currently detected with screening mammograms, the CAD technology could result in the detection of an additional 20,500 breast cancers.

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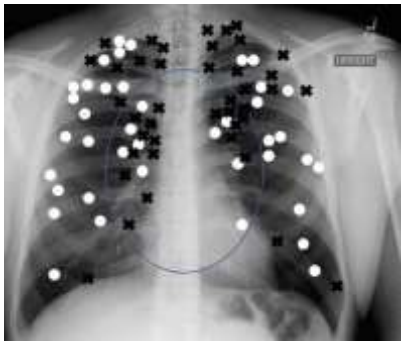
Computer-aided diagnosis - CAD



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Too much technology?

- Ct pulmonary angiography resulted in an 80% increase in pulmonary embolism from 1998 to 2006 with little reduction in mortality
- More patients receiving a diagnosis of thyroid cancer after incidental findings than after evaluation of a symptomatic or palpable nodule
- Twofold to threefold increase in prevalence of prediabetes
- 3-10 times increase in detection rate for carotid or vertebral arterial dissection
- For every 1000 US women aged 50, 490-670 will have at least 1 false alarm, and 3-14 will be over-diagnosed and treated needlessly while 0.3 to 3.2 will avoid a breast cancer death when screened annually from age 40.

Source: "Too much technology." Bjorn Hofmann, thebmj, Feb. 13, 2015.

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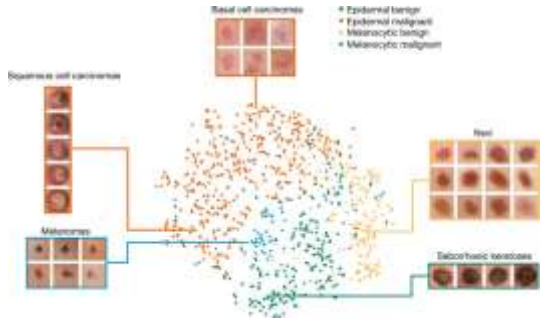
Skin Cancer



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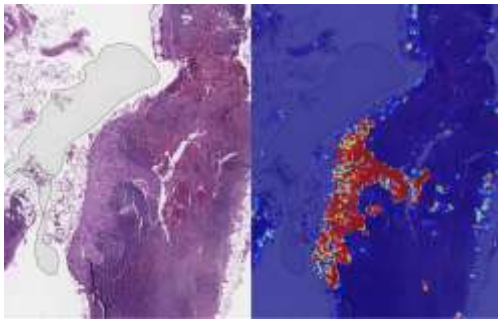
"Spell check" for doctors



Source:Google and https://www.businessinsider.com.au/google-ai-algorithm-metastatic-breast-cancer-diagnosis-2018-10

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Genomics Landscape

- Diagnostic testing
- Predictive genetic testing
- Carrier testing
- Prenatal testing
- Pre-implantation testing
- Newborn screening
- Pharmacogenetic testing
- Research genetic testing
- FDA clearance
- Genetic counseling
- Standard of care

Source: https://www.genome.gov

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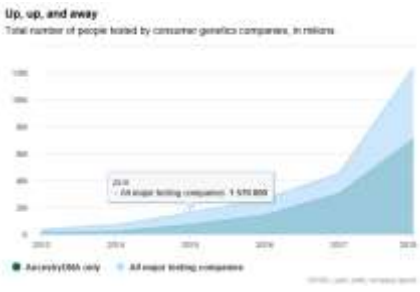
"2017 was the year consumer DNA testing blew up"



Source: by Antonio Regalado February 12, 2018 https://www.technologyreview.com/s/610233/2017-was-the-year-consumer-dna-testing-blew-up/

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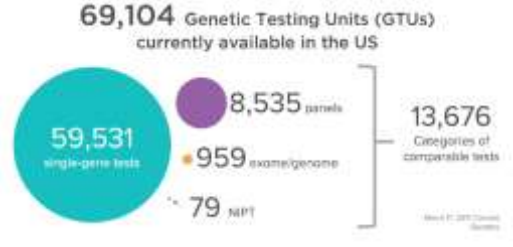
US genetic testing market size



Source: Concert Genetics

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Types of Genetic Testing

Types available

- Conformational diagnosis of a symptomatic individual
- Pre-symptomatic testing for estimating risk of developing disease
- Pre-symptomatic testing for diagnosing a disease that will manifest later
- Prenatal screening and diagnosis
- Newborn screening
- Preimplantation genetic diagnosis
- Carrier screening
- Forensic testing
- Paternal testing

How it's being used

- Diagnostic genetic testing
- Predictive genetic testing
- Screening genetic tests
- Pharmacogenomics
- Whole-genome and whole-exome sequencing
- Tumor analysis

Source: https://www.ama-assn.org/content/genetic-testing

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Black Box in the OR

Source: CNN St Michaels Hospital, Canada 2014

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"When artificial intelligence botches your medical diagnosis, who's to blame?"

Source: Reuters/Francois Lenoir and Robert Hart 2017

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Case Study

Dr Murphy (@DrMurphy11)

15/07/2018, 04:40
For the last 2 days, it has been painful to take a pee & I keeping having to run to the toilet...

I thought it might be a simple UTI.

But the @babylonhealth #AI #Chatbot has now got me a lot more worried...

#AI #eHealth #ClinicalValidation pic.twitter.com/hCQoHIS8I6

Source: #AI #eHealth #ClinicalValidation pic.twitter.com/hCQoHIS8I6

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3D printing




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Healthcare Drones

- First FAA approved in 2015
- Blood products
- Defibrillators
- Lab samples
- Medical supplies
- Contraceptives
- Vaccinations


72

"Blockchain the unifying glue that will hold together a highly fragmented healthcare record" - Forbes

Source: https://www.prnewswire.com/news-releases/convergence-of-blockchain-with-emerging-technologies-set-to-disrupt-the-healthcare-industry-by-2025-300482929.html
Source: https://www.healthit.gov/sites/default/files/11-74-ablockchainforhealthcare.pdf

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The cost of technology

- Depersonalization
- Retail medicine
- Young vs. old providers
- Too dependent ?
- Patient satisfaction
- Is the physical exam dead?
- Genetic testing — 23andMe
- Nanotechnology
- Concierge medicine
- Home monitoring
- Scribes — scope of practice?
- Google Glass privacy concerns
- Smart pills — transmitting data
- Product liability: stents, hips, mesh, robotics, morcellators

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Future Healthcare Technologies

- Virtual reality
- 3D printing
- Robotic care
- Digital surveillance
- Population analytics
- Regenerative medicine
- Digital avatars
- Precision medicine
- Quantum computing
- Wellness gamification
- Medical tricorder
- Brain –machine interface
- Nanorobotics
- Precision medicine

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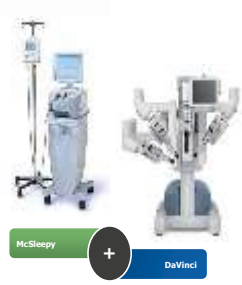
Training, competency, and credentialing

- Initial training for doctors and staff
- Proctoring/oversight
- Proficiency — How many is enough?
- Credentialing
- Ongoing training and competency testing
- Will new technologies effect the standard of care?



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Lessons Learned

- It is likely that you are being recorded
- Print a few high risk charts every qtr. and review
- Get an outside documentation audit once a year
- Get a security audit done on your practice
- Have a BYOD office policy
- Centralize office administrative permissions
- Develop a social media policy
- Practice disaster recovery
- Remember you are leaving a digital signature
- You will likely changes EHRs several times
- Remember the 'duty to preserve' documents
- Workarounds can be dangerous and are not in the EHR

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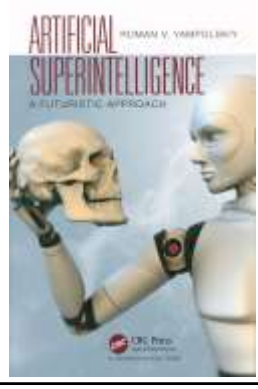
Thank you and Questions?



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