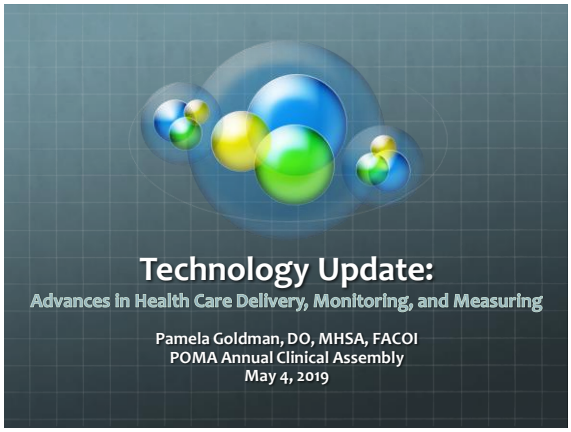
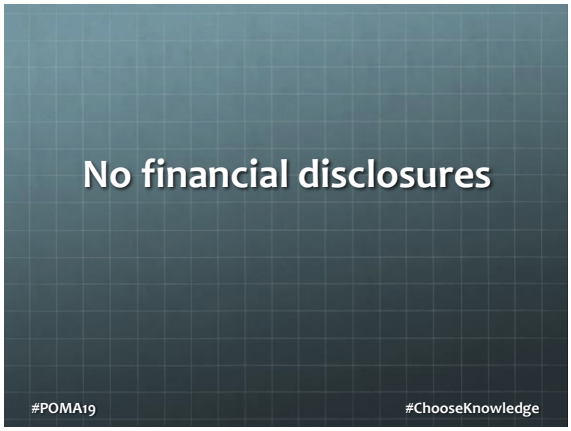

Technology Update:
Advances in Health Care Delivery, Monitoring, and Measuring
Pamela Goldman, DO, MHSA, FACOI
POMA Annual Clinical Assembly
May 4, 2019

1


No financial disclosures
#POMA19
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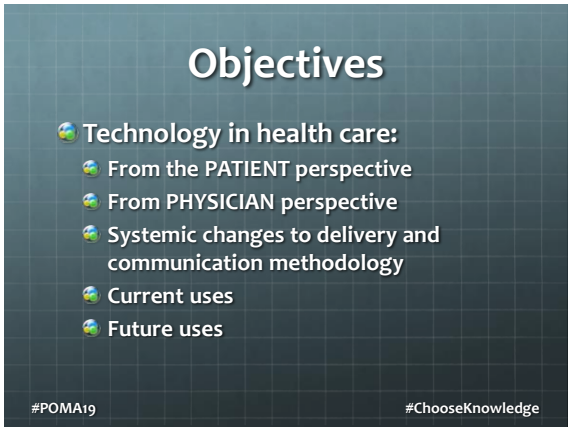
Objectives
Technology in health care:
From the PATIENT perspective
From PHYSICIAN perspective
Systemic changes to delivery and communication methodology
Current uses
Future uses
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3

Technology Defined

- Medical technology is any technology used to save lives and improve living through diagnosing, monitoring, and treating diseases/conditions
  - More than **500,000** medical technologies currently available
- Internet and web-based technology drives communication and access to health care

https://www.quora.com/What-is-medical-technology

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4

5

Vaginal Speculum

http://exhibits.hsl.virginia.edu/hist-images/romansurgical/vaginalSpeculum2_e.jpg

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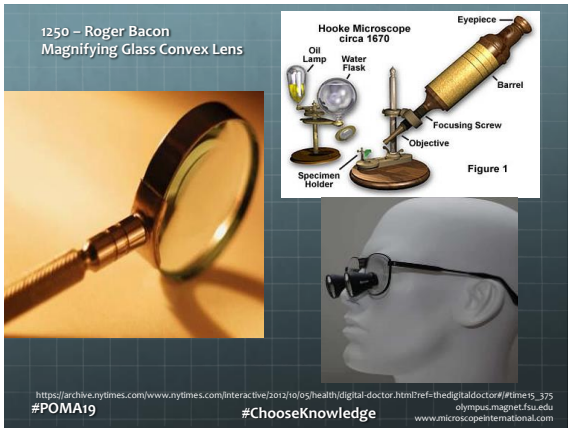
1250 – Roger Bacon
Magnifying Glass Convex Lens
Hooke Microscope
circa 1670
Eyepiece
Oil Lamp
Water Flask
Barrel
Focusing Screw
Objective
Specimen Holder
Figure 1
https://archive.nytimes.com/www.nytimes.com/interactive/2012/10/05/health/digital-doctor.html?ref=thedigitaldoctor#/#time15_375
olympus.magnet.fsu.edu
www.microscopeinternational.com
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7

1752 - Earliest eye glasses
Ben Franklin segmented urinary catheter
https://www.fi.edu/benjamin-franklin/inventions
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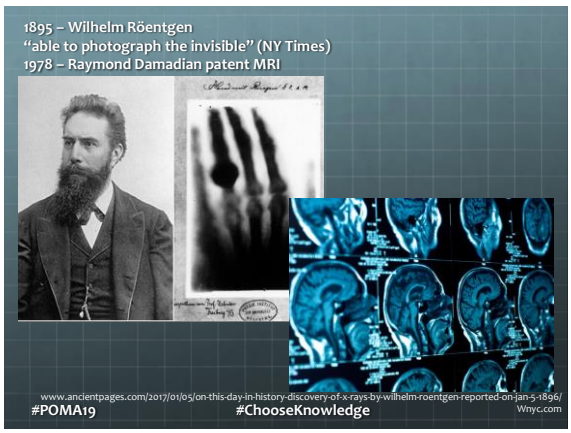
8


1895 – Wilhelm Röentgen
"able to photograph the invisible" (NY Times)
1978 – Raymond Damadian patent MRI
www.ancientpages.com/2017/01/05/on-this-day-in-history-discovery-of-x-rays-by-wilhelm-roentgen-reported-on-jan-5-1896/
Wnyc.com
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9

10

From the perspective of the patient….

What do they want from technology?
What do they expect from technology?

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11

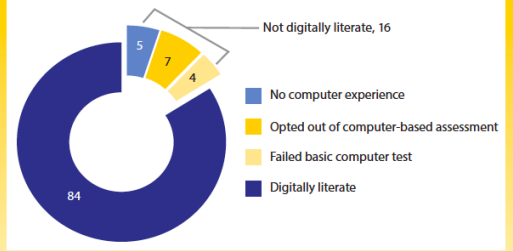
Digital Literacy

- Public is empowered with information, more digital-literate
- American users seeking health information:
  - 54 million in 1998
  - 62 million in 2001
  - 110 million in 2002
  - 117 million in 2005
- 2018 - 80% adult Internet users surfed online health topics

http://www.nbcnews.com/id/3077086/t/more-people-search-health-online/#.XI0LFKknbUo
Ball M. E-health: transforming the physician/patient relationship. International Journal of Medical Informatics. 2001
Anderson J. The Impact of CyberHealth on the Physician-Patient Relationship. Journal fo Medical Sciences. 2003

12

DIGITAL LITERACY RATES
Percentage distribution of digital literacy status among U.S. adults ages 16–65: 2012



SOURCE: U.S. Department of Education, National Center for Education Statistics, Organization for Economic Cooperation and Development (OECD), Program for the International Assessment of Adult Competencies (PIAAC), 2012.

https://nces.ed.gov/pubs2018/2018161.pdf
A Description of US Adults Who Are Not Digitally Literate

13

	Not Digitally Literate (%)				Digitally Literate (%)		
	Total	No Computer Experience	Failed Basic CBT	Opt Out of CBT	Total	Level 1 or below	Level 2 or 3
Educational attainment							
Less than HS	41.1	21.5	7.7	11.9	58.9	45.3	13.6
HS diploma	17.2	4.1	5	8.2	82.8	58	24.7
Associate's or higher degree	4.7	0.8	1.7	2.2	95.3	43.8	51.4
Gender							
Male	17.6	6.1	4.9	6.6	82.5	48	34.4
Female	15.2	4.9	3.7	6.6	84.8	54.1	30.8
Nativity Status							
Born in US	12.9	3.5	3.3	6.2	87.1	51.5	35.6
Born outside US	35.9	17.1	9.8	9.1	64.1	48.9	15.2

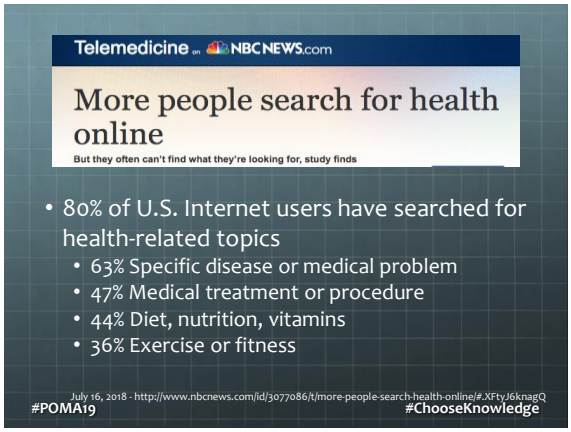
https://nces.ed.gov/pubs2018/2018161.pdf
A Description of US Adults Who Are Not Digitally Literate

14

	Not Digitally Literate (%)				Digitally Literate (%)		
	Total	No Computer Experience	Failed Basic CBT	Opt Out of CBT	Total	Level 1 or below	Level 2 or 3
Age							
16-24	7.7	0.91	3.7	3.1	92.3	52.4	39.9
25-34	10.7	2.01	3.8	4.9	89.3	48.9	40.4
35-44	13.8	5.1	3.5	5.2	86.2	50.1	36
45-54	20.5	7.8	5.4	7.3	79.5	53	26.6
55-65	28.4	11.2	4.7	12.5	71.7	51.1	20.5
Ethnicity							
White	11.5	2.8	2.6	6.1	88.6	48.4	40.1
Black	22.4	6.6	7.8	8	77.6	64.4	13.2
Hispanic	35	17.8	8.7	8.6	65	50.2	14.7
Other	13.2	3.7	4.5	5	86.8	54.2	32.6

https://nces.ed.gov/pubs2018/2018161.pdf
A Description of US Adults Who Are Not Digitally Literate

15


Telemedicine on NBCNEWS.com
More people search for health online
But they often can't find what they're looking for, study finds
• 80% of U.S. Internet users have searched for health-related topics
• 63% Specific disease or medical problem
• 47% Medical treatment or procedure
• 44% Diet, nutrition, vitamins
• 36% Exercise or fitness
July 16, 2018 - http://www.nbcnews.com/id/3077086/t/more-people-search-health-online/#.XFtyJ6knagQ
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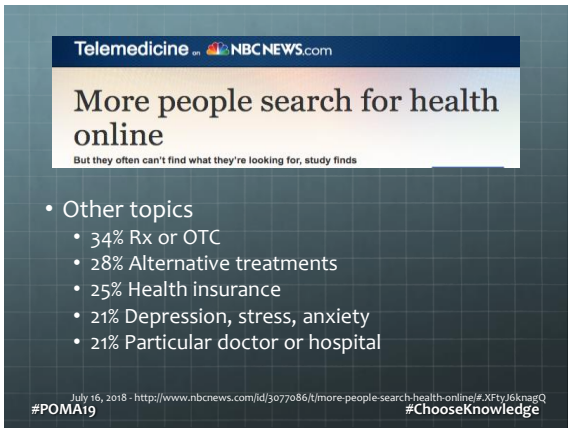
16


Telemedicine on NBCNEWS.com
More people search for health online
But they often can't find what they're looking for, study finds
• Other topics
• 34% Rx or OTC
• 28% Alternative treatments
• 25% Health insurance
• 21% Depression, stress, anxiety
• 21% Particular doctor or hospital
July 16, 2018 - http://www.nbcnews.com/id/3077086/t/more-people-search-health-online/#.XFtyJ6knagQ
#POMA19
#ChooseKnowledge

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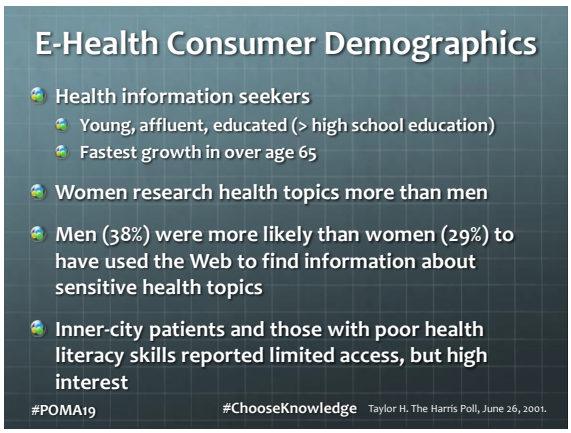
E-Health Consumer Demographics
Health information seekers
Young, affluent, educated (> high school education)
Fastest growth in over age 65
Women research health topics more than men
Men (38%) were more likely than women (29%) to have used the Web to find information about sensitive health topics
Inner-city patients and those with poor health literacy skills reported limited access, but high interest
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Taylor H. The Harris Poll, June 26, 2001.

18

What are they looking for?

- 2002 poll most sought-after topics:
  - information about disease
  - weight control
  - prescription drugs
  - mental health information
  - sensitive medical topics
  - alternative or experimental treatments or medicines

#POMA19 #ChooseKnowledge Taylor H. The Harris Poll, June 26, 2001.

19

Dear Dr. Google….

What is the top health-related Google search?

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20

Home » Harvard Health Blog » Dr. Google: The top 10 health searches in 2017 - Harvard Health Blog

Dr. Google: The top 10 health searches in 2017

POSTED FEBRUARY 21, 2018, 10:30 AM , UPDATED FEBRUARY 26, 2018, 10:35 AM

Robert H. Shmerling, MD
Faculty Editor, Harvard Health Publishing

1. What causes hiccup?
2. What can I do to stop snoring?
3. What causes kidney stones?
4. Why am I so tired?
5. How long does the flu last?
6. What is normal blood pressure?
7. How to lower cholesterol?
8. What causes high blood pressure?
9. What is ADHD?
10. What is lupus?

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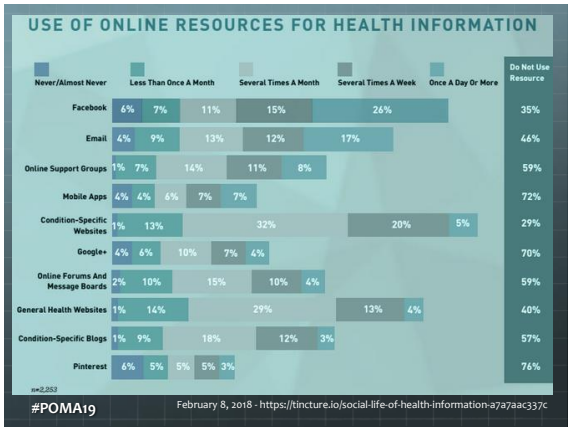
What else are they looking for?

- Web "health seekers" use information to:
  - change their decision about how to treat their illness (70%)
  - lead them to ask new questions or obtain a second opinion from another doctor (50%)
  - influence their decision whether or not to visit a doctor (28%)
  - improve the way they take care of themselves (48%)

#POMA19 #ChooseKnowledge Taylor H. The Harris Poll, June 26, 2001.

22



#POMA19 February 8, 2018 - https://tincture.io/social-life-of-health-information-a7a7aac337c

23

From the perspective of the Physician….

How do you use technology?
Do you know what your patients expect from technology?

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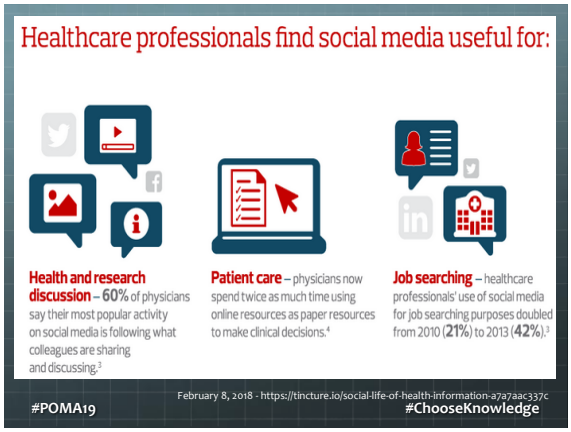
Healthcare professionals find social media useful for:
Health and research discussion – 60% of physicians say their most popular activity on social media is following what colleagues are sharing and discussing.[3]
Patient care – physicians now spend twice as much time using online resources as paper resources to make clinical decisions.[4]
Job searching – healthcare professionals' use of social media for job searching purposes doubled from 2010 (21%) to 2013 (42%).[3]
February 8, 2018 - https://tincture.io/social-life-of-health-information-a7a7aac337c
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Health Care Partnership
Allows patient to assume more responsibility for their health and actively participate in health care decisions
Improved clinical decision-making
Strengthened communication between physicians and patients
Ball M. E-health: transforming the physician/patient relationship. International Journal of Medical Informatics. 2001
#POMA19
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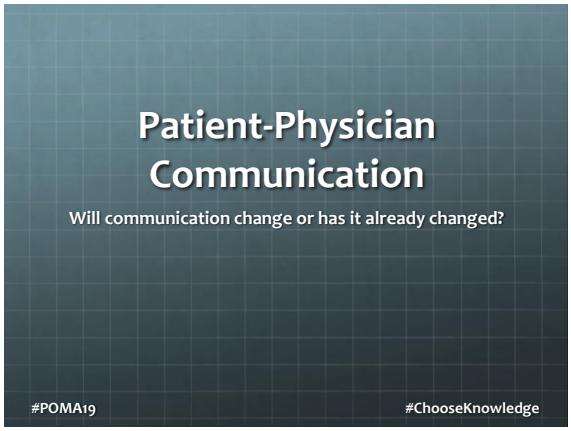
Patient-Physician Communication
Will communication change or has it already changed?
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Benefits of the Use of Internet-acquired Health Information

- Informed health care choices, shared decision making
- Earlier diagnosis and treatment
- Potentially decrease health care disparities
- More efficient use of clinical time
- Supplements physician information
- Patient portals to access to patients' own health information

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Disadvantages of Internet-acquired Information

- Misinformation and lack of quality information
- Socioeconomic health disparities
- Shifting of conventional notions of the physician–patient relationship
  - "Traditional" medical authority challenged
- Liability

Wald H. Untangling the Web—The impact of Internet use on health care and the physician–patient relationship. Patient Education and Counseling. 2007

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29

Patient Discussing Online Information with Physician

- Factors encouraging online info discussion:
  - Family member present
  - Doctor-initiated inquiry
  - Treatment-related advertisement suggesting to "ask your doctor if this is right for you"

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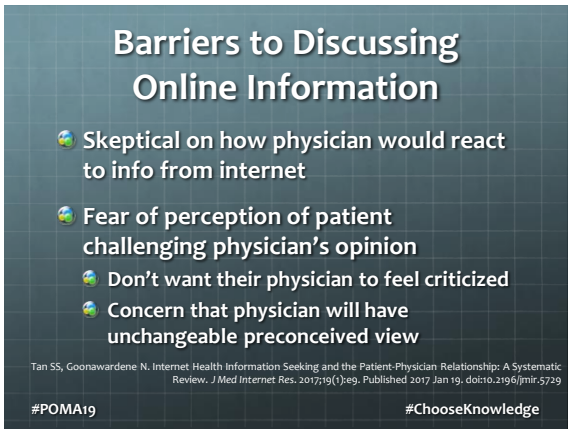
Barriers to Discussing Online Information
Skeptical on how physician would react to info from internet
Fear of perception of patient challenging physician's opinion
Don't want their physician to feel criticized
Concern that physician will have unchangeable preconceived view
Tan SS, Goonawardene N. Internet Health Information Seeking and the Patient-Physician Relationship: A Systematic Review. J Med Internet Res. 2017;19(1):e9. Published 2017 Jan 19. doi:10.2196/jmir.5729
#POMA19
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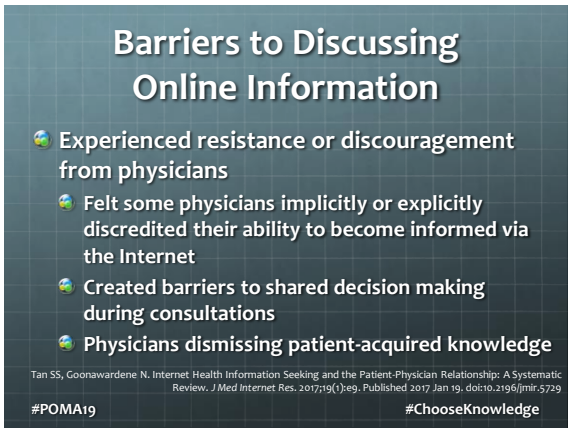
Barriers to Discussing Online Information
Experienced resistance or discouragement from physicians
Felt some physicians implicitly or explicitly discredited their ability to become informed via the Internet
Created barriers to shared decision making during consultations
Physicians dismissing patient-acquired knowledge
Tan SS, Goonawardene N. Internet Health Information Seeking and the Patient-Physician Relationship: A Systematic Review. J Med Internet Res. 2017;19(1):e9. Published 2017 Jan 19. doi:10.2196/jmir.5729
#POMA19
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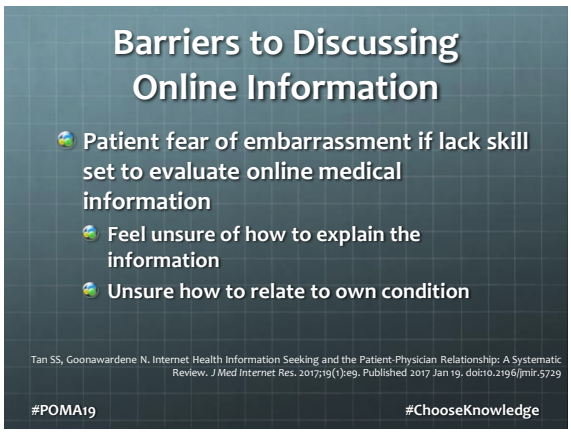
Barriers to Discussing Online Information
Patient fear of embarrassment if lack skill set to evaluate online medical information
Feel unsure of how to explain the information
Unsure how to relate to own condition
Tan SS, Goonawardene N. Internet Health Information Seeking and the Patient-Physician Relationship: A Systematic Review. J Med Internet Res. 2017;19(1):e9. Published 2017 Jan 19. doi:10.2196/jmir.5729
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Physician's Role

- Need to meet patients' new and evolving expectations
- Patients expect their physicians to interpret Internet-acquired information
- Internet-acquired information may alter medical decision-making process

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Systemic changes to health care delivery and communication methodology

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35

Telemedicine and Telehealth

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36

Telemedicine vs Telehealth

- Telehealth includes a broader, consumer-facing approach to improve health care delivery and education
- Remote non-clinical services included
  - Provider training
  - Administrative meetings
  - CME

https://en.wikipedia.org/wiki/Telemedicine
https://mhealthintelligence.com/features/is-there-a-difference-between-telemedicine-and-telehealth

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Telemedicine vs Telehealth

- "Telemedicine is the use of telecommunication and information technologies in order to provide clinical health care at a distance (2010 WHO)."
- "It helps eliminate distance barriers and can improve access to medical services that would often not be consistently available in distant rural communities."

https://en.wikipedia.org/wiki/Telemedicine
https://mhealthintelligence.com/features/is-there-a-difference-between-telemedicine-and-telehealth

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38

Forbes / Healthcare, Fiscal, And Tax

10 Stocks to

MAR 12, 2015 @ 12:36 PM 17,383 VIEWS

Telemedicine Is A Game-Changer For Patients, The System

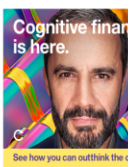
Bill Frist
CONTRIBUTOR

'cover global and domestic health care and health care reform.

FOLLOW ON FORBES

While 87% of Americans now have health insurance, overwhelming co-pays, high deductibles and a lack of primary care doctors still stand in the way of healthcare for many.

An average GOLD level plan—one of the more expensive, "better" insurance plans—still has a deductible of $2,000 for an individual, which approximately 40% of Americans cannot afford. Thirty-five percent of Americans already struggle with medical debt despite that 70% of those struggling have



physician shortage of[illegible] many as 52,000.

http://www.forbes.com/sites/billfrist/2015/03/12/telemedicine-is-a-game-changer-for-patients-the-system/

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What is Telemedicine Use For?

- Primary care and specialist referral services
- Consultation with patient or specialist assisting the primary care physician in diagnosis
  - Involves live interactive video
  - Transmission of diagnostic images, vital signs and/or video clips
  - Patient data for later review

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Newer Uses of Telemedicine

- Remote patient monitoring
- Home telehealth
  - Uses devices to remotely collect and send data to a home health agency or a remote diagnostic testing facility (RDTF) for interpretation
    - Specific vital sign, blood glucose, ECG
    - Supplement the use of visiting nurses

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Telemedicine Benefits

- Improved Access
  - Rural communities, local communities
- Cost Efficiencies
  - Management of chronic diseases, shared health professional staffing, reduced travel times, fewer or shorter hospital stays
  - Telehealth Home Monitoring (video)

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Example: Telehealth for Diabetes

- Upload food logs, medications, dosing and blood sugar levels
  - Reviewed by a nurse who responds electronically
- Watch video on carbohydrate counting by app
- App to estimate insulin need based on exercise/diet

https://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/telehealth/art-20044878

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Example: Telehealth for Diabetes

- Patient portal for test results, schedule appointments, request prescription refills or email your doctor
- Order testing supplies and medications online
- Mobile retinal photoscreening at your doctor's office rather than scheduling an appointment with a specialist
- Preventive care email, text or phone reminders (flu shot, foot exam or other preventive care)

https://www.mayoclinic.org/healthy-lifestyle/consumer-health/in-depth/telehealth/art-20044878

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Telemedicine Benefits

- Improved Quality
  - Studies show quality of health care services delivered via telemedicine are as good as traditional in-person consultations
  - Mental health and ICU care delivers superior product
  - Better outcomes, better patient satisfaction
- Patient Demand
  - Reduces travel time
  - Improved patient satisfaction

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KYLE VANHEMERT DESIGN 04.30.15 9:00 AM

WHY TELEMEDICINE NEEDS TO REDESIGN THE DOCTOR'S APPOINTMENT

- Why patients like it:
  - Text/Video appointment
  - Traditional Visit: 15 minutes only, one chance to ask questions
  - Remote Visit: Seek medical advice on your schedule, more free to ask those embarrassing/difficult questions

http://www.wired.com/2015/04/the-ux-of-telemedicine/

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46

Telemedicine Barriers

- Regulatory policies at the state level
- Many state laws severely limit or completely ban the practice of telemedicine
- Telemedicine is a tool used to practice medicine, not the practice of medicine itself

http://www.forbes.com/sites/billfrist/2015/03/12/telemedicine-is-a-game-changer-for-patients-the-system/

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fsmb
FEDERATION OF STATE MEDICAL BOARDS

Telemedicine Policies
Board by Board Overview

ocument Summary:

- Forty-nine (49) state boards, plus the medical boards of District of Columbia, Puerto Rico, and the Virgin Islands, require that physicians engaging in telemedicine are licensed in the state in which the patient is located.
- Fourteen (14) state boards issue a special purpose license, telemedicine license or certificate, or license to practice medicine across state lines to allow for the practice of telemedicine.
- Four (4) state boards require physicians to register if they wish to practice across state lines.
- Twenty-eight (28) states, plus the District of Columbia, require both private insurance companies and Medicaid to cover telemedicine services to the same extent as face-to-face consultations.
- Eighteen (18) states currently require only Medicaid to cover telemedicine services.
- One (1) state requires only private insurance companies to reimburse for services provided through telemedicine.

PA-M	√*	Medicaid Only.	Pa. Code § 17.4
PA-O	√*	Medicaid Only.	Pa. Code § 25.243

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What is Driving Telemedicine?

- Reimbursement trends
  - Incentive for Value over Volume
- Improves efficiency of health care delivery
  - Physician shortages
- Competitive advantage in saturated market
- Consumer technology getting better (mobile devices and applications)
  - Wearable devices collecting health-related data
  - Virtual distance between providers and patients is shrinking

https://home.svmic.com/resources/newsletters/157/telemedicine-update-consumer-technology-industry-trends-continue-to-drive-changes

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49

What is Driving Telemedicine?

- Technology as part of our lives
- Patients desire for telemedicine growing
  - Remote health care and consumer expectation
  - May choose another provider offering telemedicine
- 2016 Connected Patient Report by Salesforce Research (n>2000)
  - 52% of millennials (18-34) would choose a PCP offering virtual care options over one that does not
  - Almost 80% of respondents across generational segments desire their physicians to have access to health data from their wearable devices

https://home.svmic.com/resources/newsletters/157/telemedicine-update-consumer-technology-industry-trends-continue-to-drive-changes

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50

What is Driving Telemedicine?

- Employers realizing health care cost saving
  - National Business Group on Health's Large Employers' 2018 Health Care Strategy and Plan Design Survey
  - 148 large employers = 96% offered a telemedicine benefit
  - Per-employee health care cost of $14,000 per year in 2018
- 20% of large employers offering a telemedicine benefit reported an employee utilization rate of 8% or more
- Small and mid-sized employers may benefit
  - 2017 Society for Human Resource Management survey of over 3,000 employers (<500 employees) = 34% offered telemedicine employee benefit (up from 23% in 2016)

https://home.svmic.com/resources/newsletters/157/telemedicine-update-consumer-technology-industry-trends-continue-to-drive-changes

51

What are the biggest challenges for telemedicine programs?

Inadequate telemedicine parity laws, Medicare reimbursement and lack of EHR integration are among the top challenges faced by telehealth programs, reveals a new survey from Reach Health.

- Medicaid reimbursement
- Lack of EHR integration
- Physician compensation

https://medcitynews.com/2018/03/biggest-challenges-for-telemedicine-programs/

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52

What are the biggest challenges for telemedicine programs?

Inadequate telemedicine parity laws, Medicare reimbursement and lack of EHR integration are among the top challenges faced by telehealth programs, reveals a new survey from Reach Health.

- Areas of growth = Behavioral Health and Dermatology
- Return on Investment (ROI)
  - 49% Improved patient satisfaction
  - 41% Keep patients within their health care system
  - 40% Private payer reimbursement

https://medcitynews.com/2018/03/biggest-challenges-for-telemedicine-programs/

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Bedside and Office Visit Technology

What is available today?
What would be helpful if available for your practice?

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54

Bedside/Office Visit
Immediate Electronic Patient Information

- Ready access to patient data
  - I-pad, terminal
- Quality of care improves
  - Immediate documentation availability
  - Right patient/right order
- Immediate information about the patient while with patient
- Radiographs
- Resource guidance

Rantz MJ', et al. The use of bedside electronic medical record to improve quality of care in nursing facilities: a qualitative analysis. Comput Inform Nurs. 2011 Mar;29(3):149-56. doi: 10.1097/NCN.0b013e318f9db79.

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55

Teaching Residents and Students with Technology

- Rounding with technology
- How do your students/residents use technology to interact with you? With your patients?

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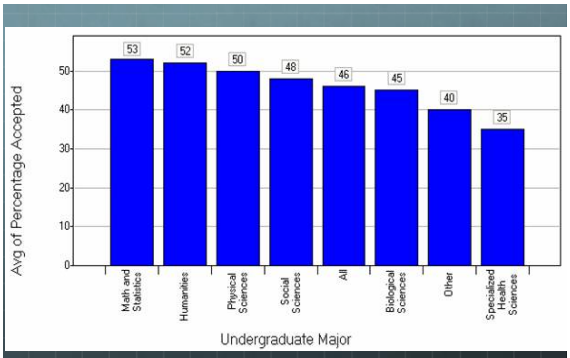
56



http://www.oswego.edu/academics/colleges_and_departments/departments/biology/faculty/mackenzie/homepage/advising/Pre-health_Careers/major_admission_data.html

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57

Technology in Academic Medicine: Video Games Take Increasing Role in Medical Education

AAMC Reporter: June 2014

—By Stephen G. Pelletier, special to the *Reporter*

A growing number of video games are gaining a foothold as tools in medical education. As reported last year by the AAMC Group on Information Technology Resources, medical schools increasingly are developing and using educational games as part of the learning process. In a brief, *Game-Based Learning in Medical Education*, the group observed that serious games can help users build expertise through practice in medical decision making and problem solving. They also suggested that "serious games offer the ability to extend learning outside the classroom." In that regard, some games are designed to reinforce what students learn in medical classrooms or help them recall knowledge they may have learned earlier.

https://www.aamc.org/newsroom/reporter/june2014/384790/technology-medical-education.html

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58

Current Electronic Health Monitoring and Data Collection

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59

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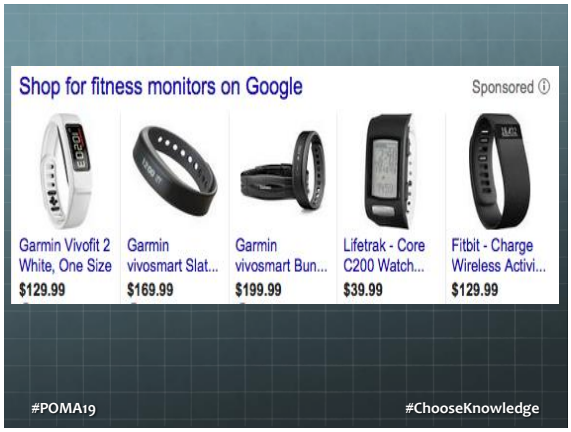
60


Shop for fitness monitors on Google
Sponsored
Garmin Vivofit 2 White, One Size
$129.99
Garmin vivosmart Slat...
$169.99
Garmin vivosmart Bun...
$199.99
Lifetrak - Core C200 Watch...
$39.99
Fitbit - Charge Wireless Activi...
$129.99
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HL7 STANDARDS
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Growth of the QS Movement, Part 3: Redesigning Wearable Tech
By HealthIsCool on September 12, 2013
Analysts vary greatly in their predictions for wearable technology. With the growth of the Quantified Self movement, fitness trackers, and the Internet of Things, the wearable tech revolution is poised for takeoff.
The early adopters may be interested in the latest smartwatch wars and Google Glass, but what are the opportunities and hurdles to mainstream appeal?
"Once you put a device on your body, it becomes an expression of who you are." – Christina Farr
The Nike Fuel Band is featured in the the popular "September Issue" of Vogue.

62

Tracking Our Lives
Activity Monitors
Sleep-specific Monitors
Women's Health
Diet/Weight
Mood
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63

Quantified Self (QS) or Personal Informatics (cheap and convenient data collection)

- Data collection from daily life
  - Inputs - food consumed, quality of surrounding air, sleep, number of cigarettes, step count
    - Medication compliance, glucose trends, BP trends
  - States - mood, arousal, fertility cycles, oxygen levels
  - Performance - mental/physical, movement at work, endurance training

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WIRED What We Can Learn From the Epic Failure of Google Flu Trends

SHARE

DAVID LAZER AND RYAN KENNEDY OPINION 10.01.15 07:00 AM

WHAT WE CAN LEARN FROM THE EPIC FAILURE OF GOOGLE FLU TRENDS

- Big Data
- Use in Epidemiology and Health Trends
  - Are Data Owners responsible to use it for public best interest?
- Google Flu Trends (GFT)
  - Google search data for influenza signs and symptoms could accurately estimate flu prevalence two weeks earlier than the CDC
  - Until…. 2013
    - Missed peak of flu season by 140%

https://www.wired.com/2015/10/can-learn-epic-failure-google-flu-trends/

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Future Electronic Health Monitoring and Data Collection

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66

abc 13
The Heart of Virginia
WSET-TV Lynchburg Danville Roanoke
HOME NEWS WEATHER SPORTS VIDEO FEATURES INTERACT
ADVERTISEMENT
BWXT
OUR NAME HAS CHANGED. OUR COMMITMENT HAS NOT.
www.bwxt.com
Recommend 0
Wearable Medical Devices Market to be Worth US$5.8 Billion by 2019, Expanding at CAGR of 16.4% From 2013 to 2019: Transparency Market Research
www.wset.com - July 8, 2015
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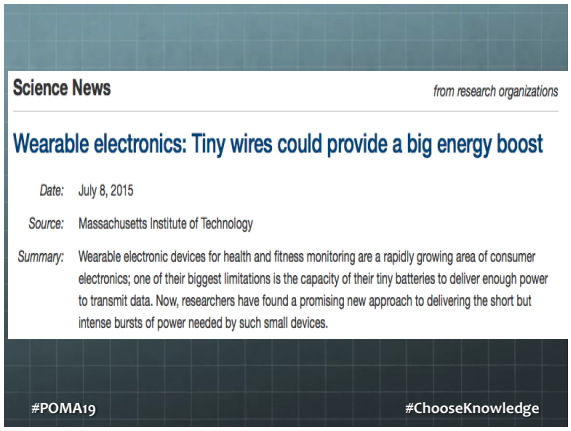
67


Science News
from research organizations
Wearable electronics: Tiny wires could provide a big energy boost
Date: July 8, 2015
Source: Massachusetts Institute of Technology
Summary: Wearable electronic devices for health and fitness monitoring are a rapidly growing area of consumer electronics; one of their biggest limitations is the capacity of their tiny batteries to deliver enough power to transmit data. Now, researchers have found a promising new approach to delivering the short but intense bursts of power needed by such small devices.
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68

Wearables 1.0
Wearables 2.0
IRONMAN
INVISIBLE MAN
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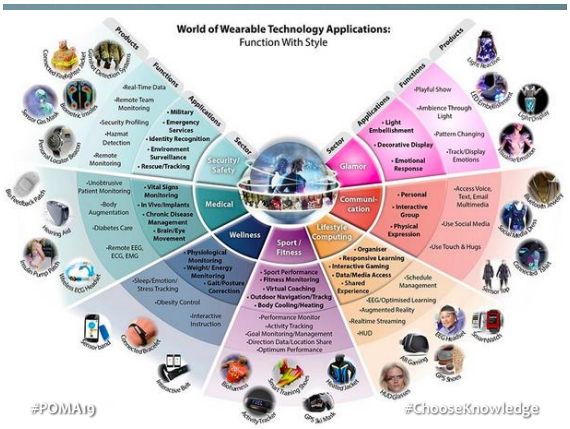
World of Wearable Technology Applications:
Function With Style
Products
Functions
Applications
Sector
Security / Safety
Medical
Wellness
Sport / Fitness
Lifestyle Computing
Communi-cation
Glamor
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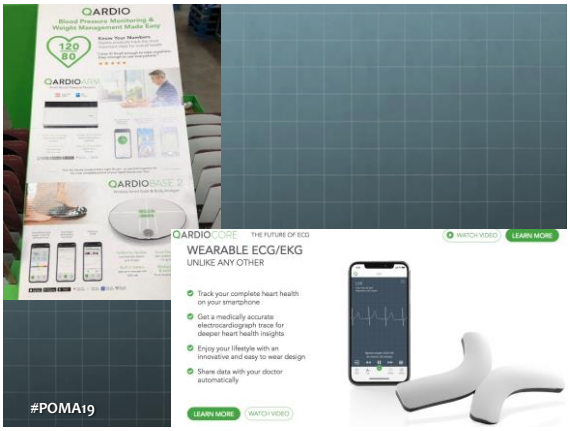
70


QARDIO
QARDIOBASE 2
QARDIOCORE
THE FUTURE OF ECG
WEARABLE ECG/EKG
UNLIKE ANY OTHER
Track your complete heart health on your smartphone
Get a medically accurate electrocardiograph trace for deeper heart health insights
Enjoy your lifestyle with an innovative and easy to wear design
Share data with your doctor automatically
LEARN MORE
WATCH VIDEO
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THE SATURDAY ESSAY
The Future of Medicine Is in Your Smartphone
New tools are tilting health-care control from doctors to patients
By Eric J. Topol
Jan. 9, 2015 1:37 p.m. ET
Over the past decade, smartphones have radically changed many aspects of our everyday lives, from banking to shopping to entertainment. Medicine is next. With innovative digital technologies, cloud computing and machine learning, the medicalized smartphone is going to upend every aspect of health care. And the end result will be that you, the patient, are about to take center stage for the first time.
https://www.wsj.com/articles/the-future-of-medicine-is-in-your-smartphone-1420828632
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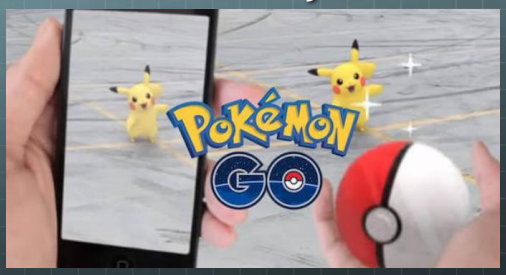
Smartphone Combats Obesity



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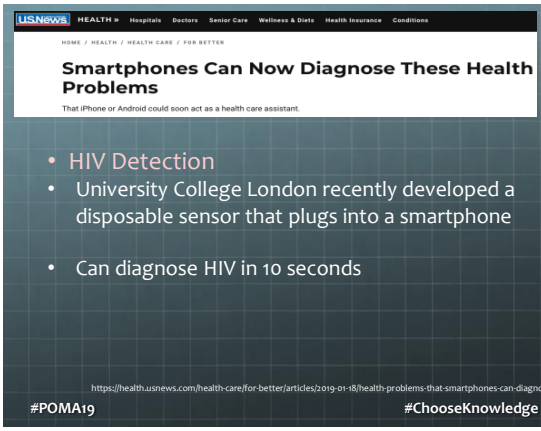
73



- HIV Detection
- University College London recently developed a disposable sensor that plugs into a smartphone
- Can diagnose HIV in 10 seconds

https://health.usnews.com/health-care/for-better/articles/2019-01-18/health-problems-that-smartphones-can-diagnose

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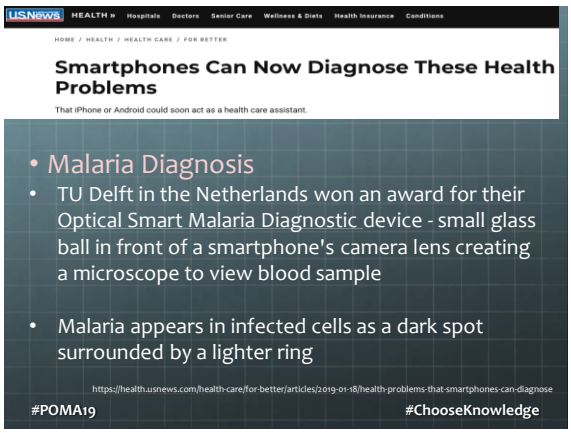

- Malaria Diagnosis
- TU Delft in the Netherlands won an award for their Optical Smart Malaria Diagnostic device - small glass ball in front of a smartphone's camera lens creating a microscope to view blood sample
- Malaria appears in infected cells as a dark spot surrounded by a lighter ring

https://health.usnews.com/health-care/for-better/articles/2019-01-18/health-problems-that-smartphones-can-diagnose

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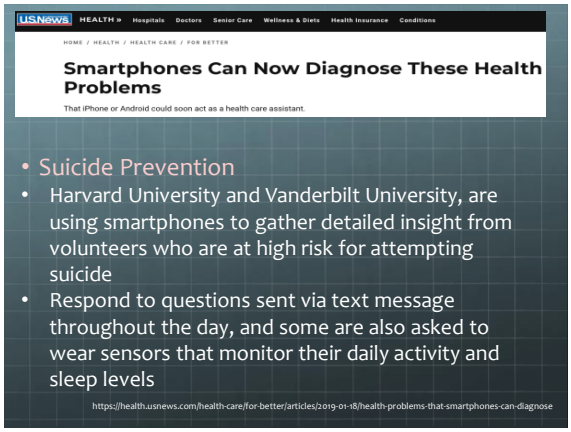
USNews HEALTH » Hospitals Doctors Senior Care Wellness & Diets Health Insurance Conditions
HOME / HEALTH / HEALTH CARE / FOR BETTER
Smartphones Can Now Diagnose These Health Problems
That iPhone or Android could soon act as a health care assistant.
• Suicide Prevention
• Harvard University and Vanderbilt University, are using smartphones to gather detailed insight from volunteers who are at high risk for attempting suicide
• Respond to questions sent via text message throughout the day, and some are also asked to wear sensors that monitor their daily activity and sleep levels
https://health.usnews.com/health-care/for-better/articles/2019-01-18/health-problems-that-smartphones-can-diagnose

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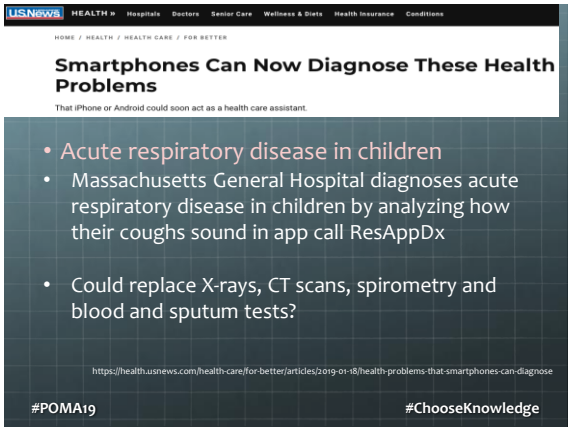
USNews HEALTH » Hospitals Doctors Senior Care Wellness & Diets Health Insurance Conditions
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Smartphones Can Now Diagnose These Health Problems
That iPhone or Android could soon act as a health care assistant.
• Acute respiratory disease in children
• Massachusetts General Hospital diagnoses acute respiratory disease in children by analyzing how their coughs sound in app call ResAppDx
• Could replace X-rays, CT scans, spirometry and blood and sputum tests?
https://health.usnews.com/health-care/for-better/articles/2019-01-18/health-problems-that-smartphones-can-diagnose
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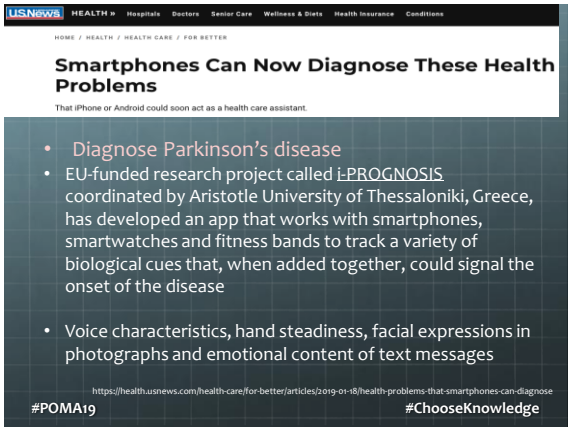
USNews HEALTH » Hospitals Doctors Senior Care Wellness & Diets Health Insurance Conditions
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Smartphones Can Now Diagnose These Health Problems
That iPhone or Android could soon act as a health care assistant.
• Diagnose Parkinson's disease
• EU-funded research project called i-PROGNOSIS coordinated by Aristotle University of Thessaloniki, Greece, has developed an app that works with smartphones, smartwatches and fitness bands to track a variety of biological cues that, when added together, could signal the onset of the disease
• Voice characteristics, hand steadiness, facial expressions in photographs and emotional content of text messages
https://health.usnews.com/health-care/for-better/articles/2019-01-18/health-problems-that-smartphones-can-diagnose
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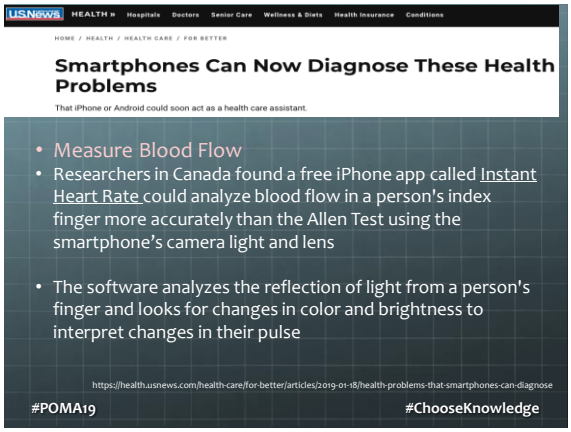
U.S.News HEALTH » Hospitals Doctors Senior Care Wellness & Diets Health Insurance Conditions
HOME / HEALTH / HEALTH CARE / FOR BETTER
Smartphones Can Now Diagnose These Health Problems
That iPhone or Android could soon act as a health care assistant.
• Measure Blood Flow
• Researchers in Canada found a free iPhone app called Instant Heart Rate could analyze blood flow in a person's index finger more accurately than the Allen Test using the smartphone's camera light and lens
• The software analyzes the reflection of light from a person's finger and looks for changes in color and brightness to interpret changes in their pulse
https://health.usnews.com/health-care/for-better/articles/2019-01-18/health-problems-that-smartphones-can-diagnose
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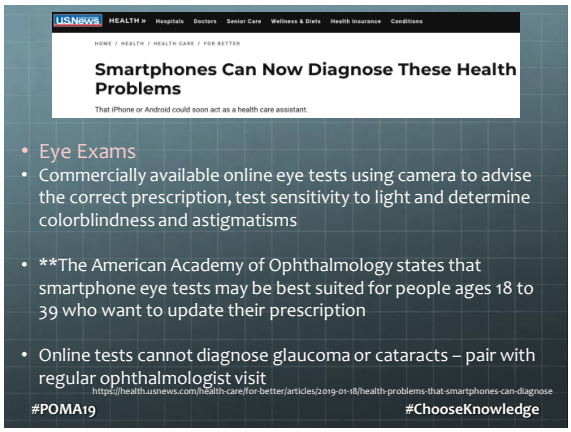
U.S.News HEALTH » Hospitals Doctors Senior Care Wellness & Diets Health Insurance Conditions
HOME / HEALTH / HEALTH CARE / FOR BETTER
Smartphones Can Now Diagnose These Health Problems
That iPhone or Android could soon act as a health care assistant.
• Eye Exams
• Commercially available online eye tests using camera to advise the correct prescription, test sensitivity to light and determine colorblindness and astigmatisms
• **The American Academy of Ophthalmology states that smartphone eye tests may be best suited for people ages 18 to 39 who want to update their prescription
• Online tests cannot diagnose glaucoma or cataracts – pair with regular ophthalmologist visit
https://health.usnews.com/health-care/for-better/articles/2019-01-18/health-problems-that-smartphones-can-diagnose
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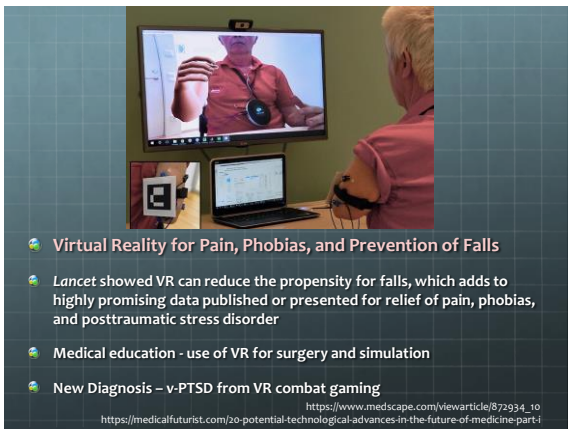
Virtual Reality for Pain, Phobias, and Prevention of Falls
Lancet showed VR can reduce the propensity for falls, which adds to highly promising data published or presented for relief of pain, phobias, and posttraumatic stress disorder
Medical education - use of VR for surgery and simulation
New Diagnosis – v-PTSD from VR combat gaming
https://www.medscape.com/viewarticle/872934_10
https://medicalfuturist.com/20-potential-technological-advances-in-the-future-of-medicine-part-i

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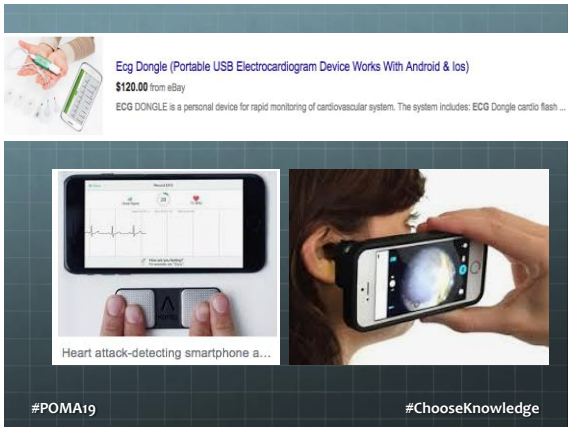
Ecg Dongle (Portable USB Electrocardiogram Device Works With Android & Ios)
$120.00 from eBay
ECG DONGLE is a personal device for rapid monitoring of cardiovascular system. The system includes: ECG Dongle cardio flash ...
Heart attack-detecting smartphone a...
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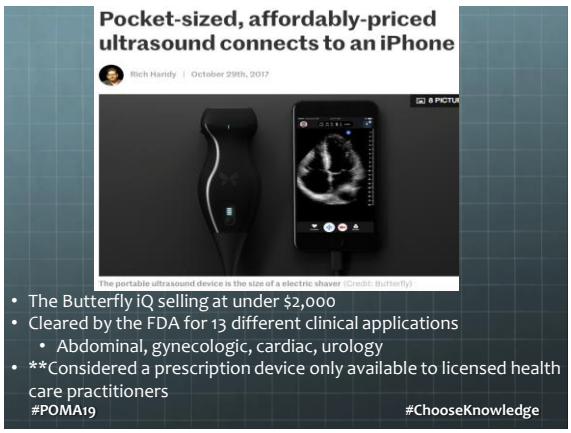
Pocket-sized, affordably-priced ultrasound connects to an iPhone
Rich Hardy | October 29th, 2017
The portable ultrasound device is the size of a electric shaver (Credit: Butterfly)
• The Butterfly iQ selling at under $2,000
• Cleared by the FDA for 13 different clinical applications
• Abdominal, gynecologic, cardiac, urology
• **Considered a prescription device only available to licensed health care practitioners
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Future?

- Google digital contact lens to measure glucose levels in tears
- Augmented Reality for surgeons – able to see through structures in the OR
- Cyborg-craze – implanting devices to enhance performance
- Medical 3-D printing – prosthesis today, living skin graphs and prescription meds tomorrow?

#POMA19 https://medicalfuturist.com/20-potential-technological-advances-in-the-future-of-medicine-part-i #ChooseKnowledge

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Future?

- Sensors in Rx – transmit digestion data
- Smart Pill Containers – turn Blue when time to take, turn Red when dose missed
- Intelligent surgical knife (iKnife) – mass spec evaluation of smoke detects chemicals and identify malignancy in real time
- Blood, sweat, and tears… and urine, feces, ear wax, saliva, mucous

#POMA19 https://medicalfuturist.com/20-potential-technological-advances-in-the-future-of-medicine-part-i #ChooseKnowledge

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Summary

- Internet health information
- Changing interaction between patients and physicians
- Cost-conscious medical care
- Improves access to health care services and health care data
- Future technology… no limits

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