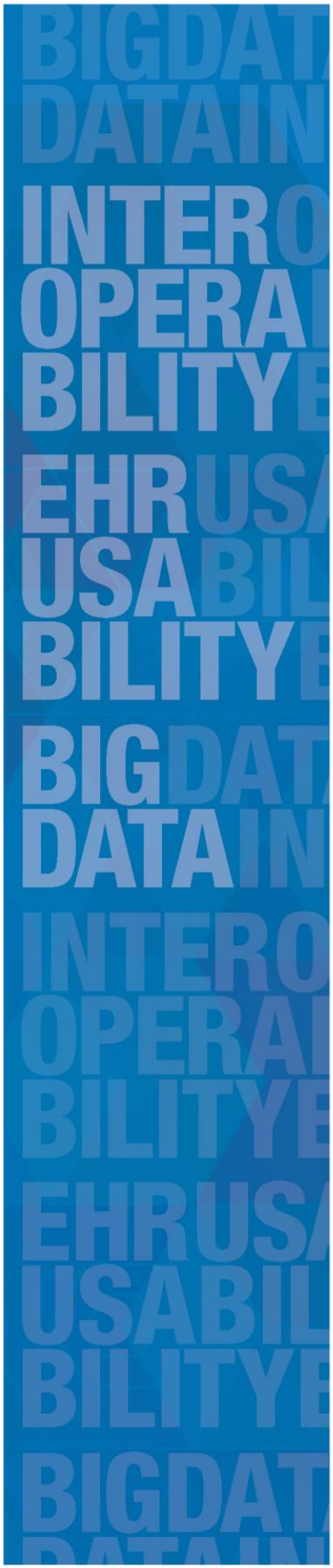

American College of Emergency Physicians®

ADVANCING EMERGENCY CARE

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HIT SUMMIT

evolving emergency care with technology

Vision Paper

Proceedings of the July 8, 2019 HIT Summit

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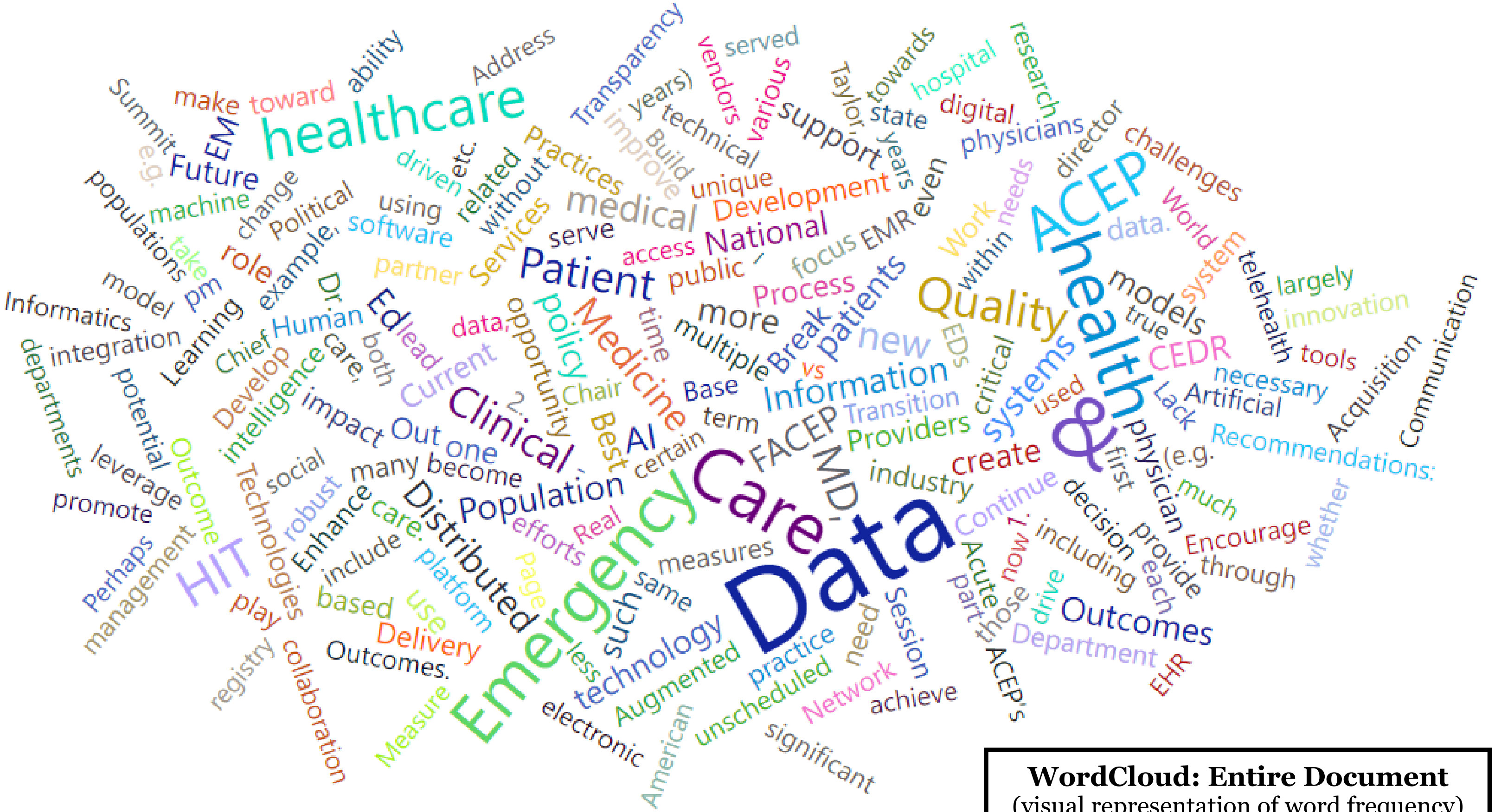
SEMI = ACEP Section for Emergency Medicine Informatics



WordCloud: Entire Document
(visual representation of word frequency)

American College of Emergency Physicians®
ADVANCING EMERGENCY CARE

ACEP Healthcare Information Technology Summit

Evolving Emergency Care with Technology

Vision Paper

Proceedings of the July 8, 2019 Summit

ACEP Headquarters, Irving, Texas

INTRODUCTION

ACEP convened an inaugural Healthcare Information Technology (HIT) Summit of ACEP members, industry luminaries, regulatory officials & ACEP staff (fig. 1) focusing on "Evolving Emergency Care with Technology".

This day-long event was structured using plenary keynotes, plenary group discussions and two breakout vision-sessions on HIT Policy, Artificial Intelligence, Distributed Healthcare, Data Integration\Management, Quality & Population Health (see appendix 1: Agenda). The first breakout focused on "Where do we want to be?" ("wish-list") and the second on "How do we get there?" (road map). Notes from each vision session were recorded & used to produce this comprehensive Vision Paper.

Several years ago, ACEP embarked upon a digital health strategy exemplified by the Clinical Emergency Data Registry (CEDR), created in part to assist members with the Centers for Medicare and Medicaid Services (CMS) new quality reporting requirements. In the process, ACEP collaborated with electronic health records (EHR) vendors for data extraction, which revealed additional challenges of data availability, capture & harmonization. Further, as is well-documented, EHRs create a significant burden for clinicians with respect to usability, portability, data blocking and cost.

It was within this context ACEP President Vidor Friedman proposed that ACEP hold an HIT Summit of industry stakeholders to explore the current HIT landscape and propose a new vision for ACEP's role in HIT.

In this Vision Paper, we detail these proceedings and present an emergency medicine vision for HIT, to include specific recommendations for Short, Intermediate & Long-Term goals to achieve this vision.

Figure 1

Attendee Demographics (Total 99)

60 = ACEP Member
24 = Non-Member
15 = ACEP Staff

Attendee Affiliation

14 = Academia
2 = Billing\Coding
7 = Consulting
2 = Data Analytics
6 = EHR
8 = Government
6 = Health Systems
9 = Integrator
14 = Non-Profit
11 = Physician Group
1 = Registry

ACEP HIT Summit

Objectives (47)

17 = Short Term
15 = Intermediate Term
15 = Long Term

Recommendations (130)

64 = Short Term
39 = Intermediate Term
27 = Long Term

EXECUTIVE SUMMARY

Keynote: Don Rucker, MD, FACEP

Director, Office of the National Coordinator (ONC) for Health Information Technology

Dr. Rucker is the newly appointed head of ONC & a friend of emergency medicine. In this opening Keynote Address, he outlined the vision for ONC as "Thinking ahead rather than being reactive" & getting creative about IT. After setting the stage with the current state, he outlined several changes that portend to change the way IT will impact healthcare:

- Congress has empowered consumers by putting them in charge of their data (Cures Act) with increased interoperability:
    - Information blocking (holders of data unwilling to release) is now illegal
    - Creates a trusted exchange framework
    - EHRs must have "application programming interfaces" (API) to make information exchange seamless (i.e. "without special effort"). For now outbound only.
- Big Data:
    - Will scale for healthcare allowing queries against EMR data
    - Performance measures will broaden
    - Will lead to a data driven world

Keynote: Michael Gillam, MD

CEO of HealthLab, a discovery automation company

Dr. Gillam is an ABEM-certified emergency physician, medical informaticist, researcher, software architect & health IT strategist. He gave one of those "you kinda had to be there" presentations bringing into focus healthcare in the modern IT era. Two of the many quotes were from Marc Andreessen (co-found of Netscape, later AOL), "Software is eating the world"[1] and Scott Farquhar (billionaire & CEO of Atlassian Corp) "You're either becoming a software company, or being disrupted by one." With these in context he said, "ACEP's existential challenge for the next decade is how to become a software platform company to serve its members, emergency medicine, and the public at large." Building on CEDR to create a data asset (called "base-layer") is one opportunity that can lead to "Augmented Intelligence" (Artificial Intelligence + Human Effort) which may be the future Holy Grail of emergency medicine.

Breakout: HIT Policy (Todd B. Taylor, MD, FACEP)

Few issues impact our lives more than healthcare. Yet, we struggle to garner consensus. HIT is no exception as funding, regulation & litigation is often what drives HIT & policy. We must have a robust understanding of the political environment (which is largely what limits HIT), in addition to actual technological factors.

We must also be careful not to think too small. Clinical data (where we tend to focus) is only a subset of the vast amount of useful data often hidden amongst reams of useless "chaff". Further, much of current HIT effort is being driven by regulatory mandates, which may not serve providers or patients well. So, for better or worse, ACEP's policy efforts are critical to altering the narrative & driving towards IT that can actually make a difference.

ACEP's policy efforts centered on HIT are critical to the survival of the organization & perhaps the specialty itself. Left to their own devices, the HIT industry may continue to do what suits them best vs everyone else. Yet they are also hampered by federal HIT policy that may force them to divert resource toward regulatory compliance vs efficiency. Collaboration towards meeting the need of all involved will pay huge dividends. ACEP also has an opportunity to drive solutions with industry partners & perhaps in-house development (e.g. CEDR). ACEP must drive toward becoming a software services company to compete in the new healthcare paradigm.

[1] "Why Software Is Eating the World" by Marc Andreessen. Wall Street Journal, Aug 20, 2011.

Breakout: Artificial (Augmented) Intelligence\Clinical Decision Support (Michael Gillam, MD)

Increasingly ubiquitous, albeit often poor understood, Artificial Intelligence (AI) is beginning to fundamentally alter human existence. When AI is partnered with human effort the result is "Augmented Intelligence" which far exceeds either one alone. Clinical Decision Support (CDS) is an example of AI that provides timely point of care information to inform decisions.

ACEP has the opportunity to define\shape how AI tools will be built and whether it will be ACEP, vendors or other organizations at the center of this revolution. In this sense, ACEP has the opportunity to control its fate and the fate of emergency medicine in this rising wave of disruptive technology.

Breakout: Distributed Healthcare (Edward N. Barthell, MD, MS, FACEP)

Distributed Healthcare takes many forms, one being "Health Care Without Walls", a systems approach to healthcare delivery that comes to the patient and simultaneously is coordinated across multiple facilities or providers. It is a system that anticipates healthcare needs across populations and works to keep them healthy. In other words, a healthcare system that is as convenient, accessible and coordinated.

Given this dynamic environment, ACEP would be well served to carefully plan for use of new technologies as new distributed care models are deployed, evaluate the impact of the new technologies and models, advocate for policies that support success among ACEP members, and educate the membership to encourage pursuit of best practices to deliver superior patient outcomes.

Breakout: Quality (Todd B. Taylor, MD, FACEP)

The role of HIT in all aspects of quality improvement is undeniable. How to acquire & leverage HIT toward this end is the challenge. ACEP has made significant strides toward achieving traditional types of quality measurements with CEDR. Yet, still today we create quality measures only once we have the necessary data readily available; then benchmark with standards; and reward those who achieve a defined threshold. In this sense, the data we have is driving what we measure, whether or not those measures have any true impact on care.

In a future "quality improvement world", robust data will tell us what we should focus on (based on outcomes) and even better, prompt to take actions in real time at the point of care and provide the most cost-effective treatment based on research.

To achieve these goals, ACEP must resolve data challenges by creating an EM data "base layer" to include a basic minimum healthcare data set.

The future for healthcare quality, outcome measures, data driven guidelines\best practices & learning networks is extraordinarily bright, albeit largely dependent on solving data challenges. Partnering with the HIT industry is critical to advancement of quality initiatives and transition to the next level of patient care improvement.

Breakout: Population Health (Michelle Lin, MD, MPH, MS, FACEP)

Population health seeks to impact the health of broad segments of a population either by specific disease management or stratification of populations for targeted intervention\treatments. While there are several arenas in which HIT can impact population health, significant challenges exist. EDs serve a critical role by providing "always open" resources for unscheduled acute care and a unique role with respect to disease surveillance and disaster preparedness. HIT can improve population health through care coordination, patient engagement and outcomes measurement by bridging resource constraints among diverse practice settings (ex. rural and urban) and alleviate challenges related to accessing care.

The question is, what role should ACEP play and how can ACEP leverage existing & future technologies toward these goals and revenue opportunity? Much of this may depend on public policy. EM may be forced into population health management and ACEP should be prepared to support the specialty should this become a reality.

Breakout: Data Acquisition & Integration

(Nicholas Genes, MD, PhD, FACEP & John T. Finnell, MD, FACEP, FACMI)

Data has been called "the oil of the 21st Century". HIT has the potential to improve medical care, but success depends in large part on availability of data. Even today, data are quite diverse and often " siloed" which stems from systems that cannot communicate effectively (not "interoperable") for a variety of technical reasons.

Data integration is the combination of technical & business processes used to combine data acquired from disparate sources into meaningful and valuable information.

Understanding these challenges is critical to resolution: 1) technical hurdles in labeling, transforming, & mapping data; 2) structural use of EHRs & variability of usage between EDs; and 3) contractual limitations, regulatory compliance & perceived administrative difficulties in sharing data.

There is no other aspect of HIT as fundamental to its success than data. ACEP has a huge opportunity to play a pivotal role in enhancing the acquisition & integration of emergency medicine data. And perhaps no bigger revenue opportunity in doing so.

ACEP HIT Summit Objectives & Recommendations

NOTE: The following are consolidated, abbreviated & reorganized objectives & recommendations from those found in individual sections. As such, there are minor differences. The statistics listed are from the original list.

WordCloud: Objectives\Recommendations
(visual representation of word frequency)

Short Term (1-2 years) Objectives w\Recommendations

ACEP must be at the apex of HIT policy development & management utilizing data driven advocacy.

- **Change the Public Political Emergency Care Narrative (i.e. ED expensive, unnecessary care, etc.)**
- **Assure that data drive Distributed Healthcare models, Quality Initiatives, Guidelines & Best Practices**
- **Lead Distributed Healthcare evolution, policy development & adoption as applied to unscheduled care evaluating impact.**

Advocacy:

1. **Establish HIT Advocacy Team**
2. **Create a list of "must-haves" for emergency care HIT**
3. **Ability to bill for telehealth emergency visits using the existing E/M codes and -95 modifier**
4. **Lead efforts to revolutionize care coordination & patient engagement**
5. **Lead efforts to reform E&M documentation for acute unscheduled care**
6. **Establish as best practice, inclusion of an emergency physician informaticist in EDs of a certain size and as a shared resource in EDs of less than that size.**
7. **Advocate for why ED data must be shared. This effort should address common legal or security considerations and refer to references from entities such as ONC, TJC, AHA.**

Develop short, intermediate & long term HIT plan (to include AI)

1. **ACEP needs to decide what 15 year inevitable future it intends to be a part. (see AI section)**
2. **ACEP needs to consider changing the cadence of future planning to "exponential thinking" models using sprints for technology planning that are revisited and re-planned every six months if they are to enable continuous pivots that take advantage of exponentially rising technologies to maximize future certainty.**
3. **Monetize HIT at ACEP**
   a. Move beyond CEDR, towards an EM Data Warehouse\Data Lake (many opportunities)
   b. Continue to partner with innovative HIT companies (EDie, Evidence Care, etc.)
4. **Better promote partner like EvidenceCare as an efficient method for guideline distribution & utilization**
5. **Take steps to standardize ED data and promote sharing\interoperability**
6. **ACEP is the "go to" partner for EM software development.**

Collaboration

1. **Contact AMA & AHA to assess their HIT initiatives & offer collaboration**
2. **Set up regular (monthly\quarterly) meetings between ACEP President (& relevant others) with ONC Director (Dr. Rucker)**
3. **Set up regular meetings with industry leaders**
4. **Annual or Biennial HIT Summit for HIT stakeholders**
5. **Create HIT Expert Panel (noting interests & expertise) in a Searchable Database**
6. **Create a network of individuals & "Pace Setter" Community EDs willing to deploy\trial\collaborate with developers that are creating new technologies.**
7. **Enhance collaboration with industry partners to encourage early innovation & long-term planning**

Establish an HIT Committee

1. **HIT policy management**
2. **Task Force\Subcommittee to develop solutions for ED EMR documentation issues**
3. **Subcommittees: Telehealth, EMR, etc.**
4. **Create a library of business case\ROI for various HIT solutions**
5. **Develop & manage guidelines, best practices, benchmarks, etc.**
   a. Draw upon examples by other specialties in utilization of data technologies for lessons learned, best practices & data products.
   b. Explore how certain aspects of the emergency care process can be performed by remote providers that serve multiple facilities simultaneously to improve productivity & patient outcomes.
   c. Create a feedback loop for improvements in guidelines
6. **Define a data dictionary for the emergency medicine and assist with ongoing federal efforts for data standardization.**
7. **Create a process measure for data sharing & transparency to incentivize EDs\health systems to solve challenges in data sharing.**
8. **Develop model contracting language to accelerate access to data and promote regulatory\compliance rather than performance\utilization.**
9. **Encourage the exploration of EHRs and practices where billing functions are separate from clinical documentation.**
10. **Address common EHR problems: e.g. charts with multiple conflicting problem lists, or obsolete allergies, can be subject to review – and incentivizing cleanup may improve data quality and reproducibility**

Education

1. **Continue to support 10X10 Informatics Course**
2. **Designate an HIT category for Scientific Assembly**
3. **Enhance HIT offerings at Scientific Assembly (e.g. CEDR 101)**
4. **Continue\enhance innovatED**
5. **Vendor-specific EMR enhancement conference or workshop (sponsored by EMR & adjunct technology vendors)**
6. **Increased focus on Distributed Healthcare topics such as new care models, optimizing EMRs, use of telehealth or other new communication technologies.**
7. **Sponsor conferences, webinars and documents to disseminate IT best practices with hospital leaders and auditors, with an eye toward ED workflows and specific needs**

Patient Education

1. **Encourage EHR vendors to create digital interactive, online personalized, discharge planning tools that include:**
   a. Facilitating follow-up & Identifying follow-up providers
   b. Video discharge education, e.g. wound care
2. **Enhance price transparency by allowing patients to calculate estimated out-of-pocket costs based on insurance, plan type and network**

Transitions of Care: Linking patients to community resources

1. **Identifying local primary & specialty care providers filterable by insurances accepted**
2. **Warm handoff from acute to longitudinal providers**
3. **Play a central role in platforms for ensuring follow-up care usable across EM which will likely be essential for success as healthcare moves into risk-sharing models such as CMS' Acute Unscheduled Care Model (AUCM)**
4. **Proactively identify populations who might benefit from targeted screening upstream in workflow**
    a. EM uniquely positioned with data that, in collaboration with law enforcement, could be used to train AI systems to identify at-risk patients, for a unique private-public collaborative role to make a public health impact.
    b. High risk population- ex.: sex trafficking, child\domestic partner abuse, chronic disease, high ED utilizers, etc.
    c. Screening & referral for social determinants of health (Population Health)

Enhance CEDR Investment

1. **Enhance CEDR to broaden its scope & serve multiple proposes**
    a. Plan for new functions & products with a scalable architecture to support retrospective & real time data analysis.
    b. Develop plans to enhance CEDR toward a true emergency medicine "data lake" (Repository) or broader data registry platform using data centric principles so it can serve multiple specialties.
    c. Further develop ACEP's quality measure process from conception to deployment in EQUAL and ultimately CEDR.
    d. Enhance efficiency & ability to utilize data and technology in practice
2. **Build a data registry platform, possibly with partner with other relevant medical specialties**
    a. Begins the process of building a "Base Layer of Patient Reported Outcomes"
    b. Consider Build\Buy\Partner decision for Patient Satisfaction Surveys to Enrich a Base Layer of Patient Reported Outcomes (RRO).
    c. Monetize Robotic Process Automation (RPA) system for generating Real World Evidence (RWE) from clinical registries
    d. Be the data provider for emergency medicine quality initiatives.
    e. ACEP demonstrate the first end-to-end Robotic Process Automation (RPA) system for generating Real World Evidence (RWE) from their clinical registries.

Intermediate Term (2-5 years) Objectives w\Recommendations

ACEP Supports: IT best practices, patient-reported outcomes (PROs), Distributed Health

1. **Advocacy:**
   a. Improve documentation with EMR vendors\regulatory agencies: less burdensome, more intuitive & helpful for delivering quality care vs focus on reimbursement
   b. Lead policy development and evaluation of new reimbursement and process of care models:
   c. Fund research, pilot projects & advancements in HIT to enable new care models & improved outcomes (esp for distributed care & leverage CEDR in new ways)
2. **Interoperability**
   a. Promote interoperability & frictionless communication across continuum of care
   b. Leveraging HIT interoperability to reduce avoidable utilization and costs:
   c. Aggregate data from different sources à validate & synthesize to make it usable
   d. EMR Standardization Accreditation: consider creating an IT accreditation process to showcase how doctors and departments are leveraging technologies like HIE and PDMPs to improve care while providing a roadmap for onboarding new practices.
   e. Digital Diagnostics and Therapeutics: Facilitate the adoption of PROs by developing and releasing apps for patients. An app that combines patient education, medication reminders, and prompts for surveys can help patients recover from their emergency while capturing PRO data.

Patient Healthcare Continuum: EM Integrated to include telehealth

1. **Telemedicine\Telehealth**
   a. Address national, cross state licensing
   b. Address economics of payment for Telemedicine\Telehealth
   c. Assess & remove policy barriers
   d. HIT subcommittee to focus on Telemedicine\Telehealth innovation
2. **Distributed Health**
   a. Change from provider-centric healthcare to in-home delivery (Amazon approach)
   b. Leverage currently available devices (smartphone) in healthcare delivery
   c. App driven healthcare with proper attribution for outcomes

Patient Engagement: Enabled & Incentivized to Mange Health

1. **Patient Questionnaire\Alerts\Patient-Reported Outcome Measure (PROM) (example: checking in\follow-up)**
   a. Digital Therapeutics through prescribe-able apps can play a role in daily “digital touchpoint” enabling data to be collected regularly from patients (e.g. the FDA approved app by BlueStar for Type II diabetes management)
2. **Improved patient engagement & empowerment through access to personal health profile: record plus plan (role in capturing and how to use if it is available)**
3. **Patient-Reported Outcomes (PROs): ACEP should advocate for more quality measures to rely on PROs. PROs are vital and foundational if ACEP is to buy\build\partner in areas related to machine intelligence "co-pilots" in healthcare.**

ACEP is an "APP" Company: Monetize HIT - CEDR a "must have" as a robust data repository

1. **Monetize HIT**
   a. Create consumer facing apps\services related to emergency care
   b. e.g. ED Follow-up management
   c. e.g. Searchable database of ACEP member\EMBC physicians by hospital (ACEP "Good Housekeeping Seal")
   d. EMR Consult Service
2. **Emerging Technologies**
   a. Video: Explore more routine use of ubiquitous video and how it might impact the specialty and provide recommendations to the emergency medicine community. Examples: Video of ED encounters becomes the new norm and perhaps replace the current documentation process; all consultations with specialists are routinely performed with video; parts of the care process such as discharge teaching are routinely provided by remote experts via video.
   b. Automated Acquisition of Data: e.g. automated patient tracking tools, machine learning methods for extracting data from existing systems & patient engagement in data collection.
3. **Work internally or with a partner to expand\enhance CEDR.**
   a. Develop a population risk adjustment tool in CEDR to account for various ED settings & populations
   b. Work with EMR vendors to automatically collect or enhance manual collection of meaningful quality data.
   c. Add operational & financial data to CEDR

Long Term (5-10 years) Objectives w\Recommendations

ACEP is a major player in HIT (including AI systems for EM) & monetized its value

1. **Build\buy\partner to transition CEDR to an AI\Learning Network**
2. **Align policy & financing to support IT-enabled services, including privacy, portability and HIPAA**
3. **Artificial & Augmented Intelligence:**
   a. ACEP deploy widespread Human-in-the-Loop Services with rapid migration and demonstration of AI+Human-in-the-Loop Services
   b. Plan for necessary policy & procedural realities.
   c. Lead efforts in emergency medicine toward development of useful tools (& dissuade those not).
   d. Provide necessary education & best practices for effective AI utilization.
   e. Use AI & biometrics to power predictive care models to improve diagnostics and treatment (fine tune to local demographics, social risk, and geography)
   f. Leverage CEDR to derive algorithms for training & best practices.

National Aggregated Unified Data Repository with AI (CEDR-AI+)

1. **Promote advantages of centralized healthcare data**
2. **Transition CEDR to a robust data platform ("Data Lake"):**
   a. Create new data tools based CEDR platform, e.g. standardized and ad hoc real time analytics and retrospective reports.
   b. Monetize CEDR products.
3. **Create a basic data set for patients that can be collected in the ED on every patient**
4. **Develop methods to collect\ascertain outcomes data**
   a. Marry with subsequent billing data
   b. Online\mobile APP for patient reported outcomes

EM integrated into the continuum of Distributed (tele) & Population health

1. **Monitor the development of healthcare delivery models how they will impact HIT & vice versa.**
2. **Leverage HIT to measure & improve quality, access, health outcomes & reduce cost**
3. **Maximize use of mobile device for connectivity & care coordination**
4. **Virtual & AI-enabled emergency care and primary care delivery before\after ED encounter to facilitate seamless transitions of care**

WordCloud: HIT Policy
(visual representation of word frequency)

ACEP HIT Summit Vision Paper

HIT Policy

Todd B. Taylor, MD, FACEP

Description\Definition

"Define how you fund, regulate & litigate healthcare . . . and eventually you define healthcare itself."
Todd B. Taylor, MD, FACEP

Few issues impact our lives more than healthcare. In fact, healthcare is the #1 priority (36%) in the current political environment.[i] Yet, like many other such issues, Congress struggles to garner consensus as to the direction America should take. As a subset, Healthcare Information Technology (HIT) is no exception. One might think that the one thing we could agree upon would be improving healthcare data systems. As discussed in this section, funding, regulation & litigation in healthcare is often what drives HIT & policy, despite otherwise noble efforts towards doing so.

HIT Policy Objectives\Recommendations

Short Term (1-2 years)

Objectives:

- **ACEP must be at the apex of HIT policy development & management.**
- **ACEP must change the Public Political Emergency Care Narrative**
- **Data must drive policy & policy must direct data utilization, i.e. data driven advocacy and healthcare**

Recommendations:

1. **Establish an HIT Committee**
   - HIT policy management
   - Standard, best practices, benchmarks, etc.
   - Task Force to create solutions to the ED EMR documentation problem
   - Subcommittees: Telehealth, EMR, etc.
   - Create a library of business case\ROI for various HIT solutions
2. **Advocacy:**
   - Create HIT Advocacy Team
   - Change the narrative to EM\ED as a solution vs always a problem
   - Create a list of "must-haves" for ED HIT
3. **Collaboration:**
   - Set up regular (monthly\quarterly) meetings between ACEP President (& relevant others) & ONC Director (Dr. Rucker)
   - Contact AMA & AHA to assess their HIT initiatives & offer collaboration
   - Set up regular meetings with industry leaders
   - Annual or Biennial HIT Summit for HIT stakeholders
   - Create HIT Expert Panel (noting interests & expertise) – Searchable Database
   - Create a network of individuals & "Pace Setter" Community EDs willing to deploy\trial\collaborate with developers that are creating new technologies.
4. **Education**
   - Continue to support 10X10 Informatics Course
   - Designate an HIT category for Scientific Assembly
   - Enhance HIT offerings at Scientific Assembly (e.g. CEDR 101)
   - Continue\enhance innovatED
   - Vendor-specific EMR enhancement conference or workshop (sponsored by EMR & adjunct technology vendors)
5. **Monetize HIT at ACEP**
   - Move beyond CEDR, towards an EM Data Warehouse (many opportunities)
   - Continue to partner with innovative HIT companies (EDie, Evidence Care, etc.)

Intermediate Term (2-5 years)

Objectives

- **Enable and incentivize personal (patient) responsibility for data transparency**
- **Emergency care must be integrated into the patient care continuum**
- **Integrate telemedicine\telehealth into health continuum to include acute emergency care**
- **Focus on distributed health**
- **Continue to monetize HIT at ACEP**

Recommendations:

1. **Telemedicine\Telehealth**
   - Address national, cross state licensing
   - Address economics of payment for Telemedicine\Telehealth
   - Assess & remove policy barriers
   - HIT subcommittee to focus on Telemedicine\Telehealth innovation
2. **Distributed Health**
   - Change from provider-centric healthcare to in-home delivery (Amazon approach)
   - Leverage currently available devices (smartphone) in healthcare delivery
   - App driven healthcare with proper attribution for outcomes (See Data Collection and Augmented Intelligence sections)
3. **Monetize HIT**
   - Create consumer facing apps\services related to emergency care
     - e.g. ED Follow-up management
     - e.g. Searchable database of ACEP member\EMBC physicians by hospital (ACEP "Good Housekeeping Seal")
   - EMR Consult Service

Long Term (5-10 years)

Objectives:

- **National Aggregated Unified Data Repository (Federal Infrastructure Project)**
- **Monitor Healthcare Administration & Delivery Development : Central vs Market vs Blended**

Recommendations:

1. **Promote advantages of centralized healthcare data**
2. **Monitor the development of healthcare delivery models how they will impact HIT & vice versa.**

Introduction

To address HIT policy we must have a robust understanding of the political environment (e.g. an appreciation for what can & cannot be accomplished) in addition to actual technological factors. The limiting factors for HIT are much less technical than they are "political". For example, data democratization[ii], a noble goal, continues to be hampered by a multitude of largely political & business factors. Here are a few examples:

- Health Insurance Portability and Accountability Act of 1996 (HIPAA): This law is noble in intent, but few other regulations have (unnecessarily) had more impact our ability to democratize data. Despite several HIPAA provisions to allow appropriate data sharing, (unreasonable) fears of violating the law even with allowed data sharing seems to be the unspoken HIPAA rule.
- Health Information Technology for Economics and Clinical Health (HITECH) Act (2009)[iii]: The HITECH Act created incentives related to HIT, including incentives for the use of electronic health record (EHR) systems among providers. But it also resulted in expansion & widening of the scope of HIPAA including increasing legal liability for non-compliance, more enforcement actions and constraints on exchange of electronic protected health information (ePHI).

  While HITECH was not directly focused on ED Information Systems (EDIS), it impacted nearly every ED in the United States. In an effort to comply with the HITECH Act, many hospitals were forced to update\replace their EHRs. Often the result was the loss of time-tested stand-alone "best-in-breed" EDIS as they were rapidly replaced by enterprise-EHR "ED modules"[iv] with much less ED functionality[v].

  Despite the great promise of HITECH (including a $35 billion allocation for HIT), interoperability efforts have largely failed despite the dramatic increase EHR system adoption[vi].

- Stark Law & Anti-Kickback Statute: Because healthcare data has "value", there are theoretical concerns with regard to provision of data as an incentive (kickback).[vii]
- A lack of a Unique (National) Patient Identifier: Although authorized in HIPAA (1996), citing privacy concerns, Congress prevented DHHS from implementing a unique identifier by refusing to provide funding.[viii] However, in June 2019, the House voted to lift this ban[ix] & the measure now resides with the Senate.
- Who actually owns healthcare data?: *"In the not-too-distant future, our lives will depend upon how our health information is accessed and used. This brave new digital world has one huge risk: You don't own your health information."*[x] David J. Brailer, MD, Former HHS HIT coordinator
- Data as an Asset: *"Data itself has become a currency and capital on par with financial and human capital. This data is driving valuations, which in-turn is driving protectionism."*[xi] The nefarious reality is that there are huge disincentives for businesses (e.g. hospitals) to readily share patient data.

  An analogy is when cell phone carriers used to "own" your phone number. Changing your number was so painful, you rarely would switch carriers, even for less cost. In 1996, the FCC mandated that cell carriers provide "Wireless Number Portability" & the floodgates for competition opened.[xii] From 1999-2001, cell service prices declined more than 10% annually & have sustained an average decline of about 2.5% annually since.[xiii] As a result, we pay about half of what we might have in 1996 & with substantially improved service.
- Information Blocking: Defined in the "21st Century Cures Act" (H.R. 34 – 1996) in Section 4004, paraphrased as "a practice by a health care provider, health IT developer, health information exchange, or health information network that, except as required by law or specified by the Secretary of Health and Human Services (HHS) as a reasonable and necessary activity, is likely to interfere with, prevent, or materially discourage access, exchange, or use of electronic health information (EHI)."[xiv]
- Lack of Data Transparency (knowledge about where data exist): Perhaps one of the few major technology hurdles, albeit certainly hampered by all of the above issues. Most patients falsely assume their physicians have their data and we certainly cannot assume they will (especially in an emergency).

Finally, we often focus on patient data related to HIT. But arguably, other types of data directly & indirectly related to care may have equal or more impact. For example, the inability to prospectively ascertain the cost of care by consumers is perhaps one of the biggest drivers in our inability to manage escalating healthcare costs.[xv]

Vision: Where do we want to be?

Outcome vs Treatment Quality Measures: Transition from pay for quality reporting towards actual clinical outcomes is a huge data challenge. NOTE: There is always a risk of misalignment of desired outcomes. From a purely economic perspective, enabling those with chronic conditions to live longer (& marginally healthier) actually costs more in the long run (cost of preventative care + ongoing medical services for a longer period of time), despite perhaps reducing complications. Nevertheless from a purely cost perspective, at least for high utilizers, preventative care and to some extent more effective outcomes largely benefit future payers, albeit certainly beneficial to patients. The point being, it is unknown if quality metrics will result in cost savings over & above improved health.

Risk Adjusted Healthcare Metrics: Current data is largely not risk-adjusted making analysis & use more limited. Augmented Intelligence (Artificial Intelligence) systems may improve this, but may also be a victim of it.

Augmented Intelligence: An alternative conceptualization of Artificial Intelligence that focuses on AI's assistive role, emphasizing the fact that cognitive technology is designed to enhance human intelligence rather than replace it. The choice of the word augmented, which means "to improve," reinforces the role human intelligence plays when using machine learning and deep learning algorithms to discover relationships and solve problems.[xvi] From a policy perspective, we should focus more on augmenting healthcare workers vs. aspiring to replace them with machines. Humans + machines are better than either of them alone.[xvii]

Unique (National) Patient Identifier (see above):

Current E/M Coding criteria not useful for health management: As always, a double-edge sword & slippery slope. But the fact remains, "Instead of reducing costs, many say, EHRs, which were originally optimized for billing rather than for patient care, have instead made it easier to engage in "upcoding" or bill inflation (though some say the systems also make such fraud easier to catch)".[xviii] Whether CMS current effort to update E/M coding will succeed in improving this conundrum remains to be seen, but ACEP must continue to be actively involved in the process.

State-by-State Healthcare Policy Incongruity: e.g. Medicaid differs dramatically state-to-state, as do privacy laws, insurance regulation, etc. How can we address national healthcare issues without congruity between states?

State Focused Physician Licensing: Telemedicine is beginning to democratize medical expertise by remote availability of subspecialists even in rural healthcare settings. Yet, provision of these services remains largely a state-by state endeavor due to archaic licensing models. The Interstate Physician Licensing Compact may be a pathway to a solution, although currently only 29 states plus DC have joined and about 80% of licensed physicians qualify[xix].

Lack of unified national healthcare policy and objectives: At least for emergency care (& some other aspects) EMTALA is the de facto general national healthcare policy. But with regard to HIT, certain accommodations need to be considered for EM. A good example is "Appropriate Use Criteria (AUC) via Clinical Decision Support (CDS) for Advanced Diagnostic Imaging Services" (PAMA). The emergency exclusion is not well defined in either the law or regulation. Despite an exemption based on EMTALA, it (apparently) has been so poorly understood many hospitals have decided to begin with implementation in the ED. Yet, the current systems (perhaps due to the exception) are poorly designed for ED use.

HIT Policy (in general): Will be challenging in light of all the other "noise" in the current healthcare debate.

Change the Public Political Narrative Regarding Emergency Care:

- "Primary care is great, emergency care is bad (unwritten bias in healthcare policy, unwritten policy)
- ACEP must change narrative from "ED bad" to "ED critically necessary"
- Integration of ED into healthcare ecosystem (normalize ED visits), i.e. ED is part of healthcare ecosystem, a completely valid part of patient care continuum (e.g. Kaiser maximizes primary care & uses ED as a "ballast", i.e. has higher ED visit rates by design)
- Need outcomes data to show that ED are cost effective & efficient

National Aggregated Unified Data Repository or (perhaps) a "Google-like" search of various connected data repositories

- Once you have unified data source, all software merely becomes an "appliance". Everyone can choose their own favorite way to access & manage data, as they do now with smartphones. The US telephone system: With a regulated infrastructure system, various vendors can innovate appliances (cell phones) to access this system.

Funding: Similar to other national infrastructure, HIT needs funding to build an infrastructure upon which innovation can flourish.

Actions: How do we get there?

ACEP Board Commitment to Drive Emergency Medicine HIT Conversation (highest priority)

- Make ACEP part of the process
- Change the narrative to EM\ED as a solution vs always a problem
    a. Integrate ED into health care ecosystem (normalize ED visits rather than vilifying)
    b. The "ED Problem" is a direct result of a lack of a unified national healthcare policy and objectives:
        i. Inability to follow patients longitudinally (e.g. failure to adopt unique national patient identifier)
        ii. Health insurance regulation disparity
        iii. Medicaid (significant differences state-to-state)
        iv. Local privacy regulation & HIPAA differs by state
        v. "Surprise Billing"
    c. Seek ways to leverage EMTALA towards other policy initiatives
    d. Create list of nonnegotiable items for legislation, regulation, etc.
- "Unified Voice"
    a. To vendors via ACEP policy
    b. Coordination (e.g. arbiter for EMR complaints & enhancements)
    c. Standards & regulations
- Enhance industry partner collaborations with EMR vendors, staffing companies, and data providers
- Enhance industry leader (AMA, AHA, HIMSS, etc.) collaborations
    a. Ex. solve state health care policy incongruity & state focused physician licensing
- Enhance political & regulatory collaborations
    a. Unique opportunity with ONC director Don Rucker, MD, FACEP

- Development of Interim Solutions & Best Practices
    a. for vendors related to efficiency & usability (e.g. fix the EMR documentation problem)
    b. for IT use by providers (not necessarily an IT solution, e.g. scribes)
    c. Create a library of business case\ROI for various HIT solutions

Need Data:

- CEDR is a good start, but not enough
    a. Outcomes data is critical
        i. e.g. Leverage claims (i.e. payers) for outcomes data and transparency
        ii. work with ONC to set standards allowing\mandating the flow of data relevant to outcomes
    b. Need evidence-based quality metrics & standards, i.e. stop wasting time, effort, and money on "meaningless uses"
        i. e.g. risk-adjusted healthcare metrics
    c. Inability to effectively combat adverse policy issues is largely a data challenge, e.g. "surprise billing"
- Benchmarks to address HIT issues (e.g. inefficiency related to E/M billing documentation)
- Data will drive & change the conversation

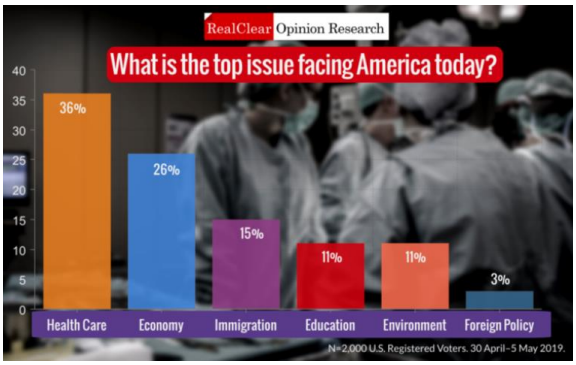
Innovation

- Reward innovation
- eBay, Uber, iPhone of emergency healthcare
- Create true market services approach
- Find ways to engage patients & enable\incentivize data transparency
- Explore opportunities related to:
    a. Telemedicine & telehealth
    b. Leverage currently available technology (ex. Smartphones, wearable tech)
    c. App-driven healthcare

Conclusion

ACEP's policy efforts centered on HIT are critical to the survival of the organization & perhaps the specialty itself. Left to their own devices, the HIT industry may continue to do what suits them best vs everyone else. Yet they are also hampered by federal HIT policy that may force them to divert resource toward regulatory compliance vs efficiency. Collaboration towards meeting the need of all involved will pay huge dividends. ACEP also has an opportunity to drive solutions with industry partners & perhaps in-house development (e.g. CEDR). ACEP must drive toward becoming a software services company to compete in the new healthcare paradigm.

[i] RealClear Opinion Research - May 15, 2019
https://www.realclearpolitics.com/real_clear_opinion_research/new_poll_shows_health_care_is_voters_top_concern.html



[ii] *Data democratization is the ability for information in a digital format to be accessible to the average end user. The goal of data democratization is to allow non-specialists to be able to gather and analyze data without requiring outside help.* WhatIs.com, Feb 7, 2017 https://whatis.techtarget.com/definition/data-democratization

[iii] HITECH Act was part of the American Recovery and Reinvestment Act (ARRA) of 2009.

[iv] KLAS: Emergency Department Information Systems Is Best of Breed Still the Best Approach? KLAS Research, Orem, UT. December 15, 2009

[v] KLAS Performance Report: EDIS 2013: Revealing the physicians' voice. KLAS Research, Orem, UT. January 2013

[vi] To Foster Information Exchange, Revise HIPAA and HITECH. Health Affairs. SEPT 19, 2017 https://www.healthaffairs.org/do/10.1377/hblog20170919.062032/full/

[vii] Do You Own Your Healthcare Data? Not According To Government or Healthcare Businesses. American Council on Science & Health. Nov 1, 2018 https://www.acsh.org/news/2018/11/01/do-you-own-your-healthcare-data-not-according-government-or-healthcare-businesses-13565

[viii] National Patient Identifiers: Why Healthcare Needs Them. CareCloud Corp https://www.carecloud.com/continuum/national-patient-identifiers-healthcare-needs-them/

[ix] Foster-Kelly amendment to H.R. 2740, the Depts. of Labor, Health and Human Services, and Education, and Related Agencies Appropriations Act of 2020

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[xi] The Importance of Transparency in Healthcare Data. Veta Health. Apr 17, 2019 https://myvetahealth.com/healthcare-data-transparency/

[xii] First Report and Order and Further Notice of Proposed Rulemaking in the Matter of Telephone Number Portability, FCC July 2, 1996, CC Docket No. 95-116 / RM 8535 (FCC 96-286)

[xiii] Historical Pricing for Cell Service: http://www.in2013dollars.com/Wireless-telephone-services/price-inflation

[xiv] HealthcareIT.gov: https://www.healthit.gov/topic/information-blocking

[xv] Promoting Transparency and Clear Choices In Health Care. Health Affairs. Jun 9, 2015 https://www.healthaffairs.org/do/10.1377/hblog20150609.048337/full/

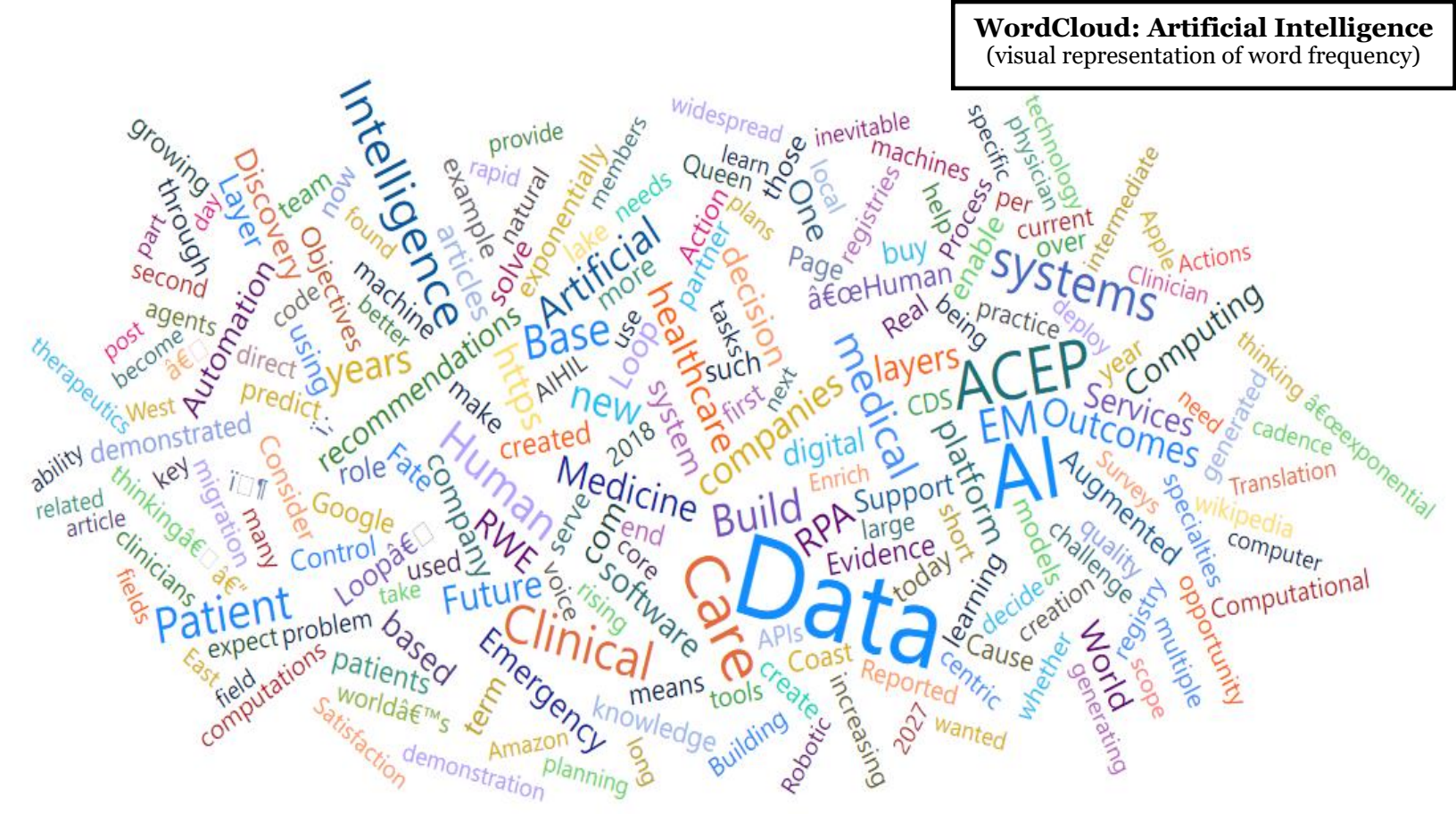
[xvi] WhatIs.com? https://whatis.techtarget.com/definition/augmented-intelligence

[xvii] Frank Chen: Humanity + AI: Better Together. Feb 22, 2019 https://a16z.com/2019/02/22/humanity-ai-better-together/

[xviii] Death By 1,000 Clicks: Where Electronic Health Records Went Wrong. Kaiser Health News. Mar 18, 2019 https://khn.org/news/death-by-a-thousand-clicks/

[xix] Interstate Physician Licensing Compact: https://imlcc.org/

WordCloud: Artificial Intelligence
(visual representation of word frequency)



ACEP HIT Summit Vision Paper

Artificial (Augmented) Intelligence\Clinical Decision Support

Michael Gillam, MD

Description\Definition

Artificial Intelligence (AI) is the ability of a computer program or machine to "think" and learn. It is also a field of study which tries to make computers "smart", working on their own without being encoded with specific commands. In more general use, the term "artificial intelligence" means a machine which mimics human cognition, such as learning and problem solving. AI is a system's ability to correctly interpret external data, to learn from such data, and to use those learnings to achieve specific goals and tasks through flexible adaptation.[i]

Augmented Intelligence is an alternative conceptualization of Artificial Intelligence that focuses on AI's assistive role, emphasizing the fact that cognitive technology is designed to enhance human intelligence rather than replace it. The choice of the word augmented, which means "to improve," reinforces the role human intelligence plays when using machine learning and deep learning algorithms to discover relationships and solve problems.[ii] The message is that we should focus more on augmenting healthcare workers vs. aspiring to replace them with machines. Humans + machines ("AI + "Human-in-the-Loop" Services) are better than either of them alone.

Clinical Decision Support (CDS) provides timely information, usually at the point of care, to help inform decisions about a patient's care. CDS tools and systems help clinical teams by taking over some routine tasks, warning of potential problems, or providing suggestions for the clinical team and patient to consider.[iii]

Artificial Intelligence\Clinical Decision Support Objectives\Recommendations

Short Term (1-2 years)

Objectives:

- **ACEP develops a short, intermediate & long term HIT plan involving AI.**
- **ACEP enhances CEDR to broaden its scope & serve multiple proposes**
- **ACEP partners with other relevant medical specialties to build a data registry platform**
- **ACEP begins the process of building a "Base Layer of Patient Reported Outcomes"**
- **ACEP monetize RPA system for generating RWE from their clinical registries**

Recommendations:

John Hagel of Deloitte studied East Coast "linear thinking" companies and West Coast "exponential thinking" companies (i.e. the FAANG companies – Facebook, Amazon, Apple, Netflix, Google and startups in Silicon Valley). He found the East Coast, linear thinking companies, had 3-5 year plans, whereas West Coast exponentially thinking companies, found 3-5 years ahead as too difficult to predict. Instead, they had 15 year "inevitable futures" that they wanted to be and six month plans for what they wanted to try.

1. **ACEP will need to decide what 15 year inevitable future it intends to be a part.**
2. **ACEP needs to consider changing the cadence of future planning to "exponential thinking" models using sprints for technology planning that are revisited and re-planned every six months if they are to enable continuous pivots that take advantage of exponentially rising technologies to maximize future certainty.**

Eisenhower is credited with the saying, "Whenever I run into a problem I can't solve, I always make it bigger. I can never solve it by trying to make it smaller, but if I make it big enough, I can begin to see the outlines of a solution." ACEP's data registry and base layer needs are likely too small to solve for only EM and may not achieve critical mass to be profitable. By increasing the scope of the problem addressed to all related specialties using data centric design, ACEP can solve the challenges for registries of all types in addition to EM creating a larger revenue base upon which to sustain the effort.

3. **ACEP build a data registry platform using data centric principles so it can serve multiple medical specialties.**

ACEP will need a way to gain base layers for patient outcomes to control its fate in AI. With data centric approaches, the platform created can serve multiple fields of healthcare. ACEP can consider patient survey companies as a buy\build\partner opportunity as obtaining patient outcomes could be an easy extension to these surveys.

4. **ACEP to Consider Build\Buy\Partner decision for Patient Satisfaction Surveys to Enrich a Base Layer of Patient Reported Outcomes.**

ACEP needs a platform to continue to create value from the data it is collecting.

5. **ACEP demonstrate the first end-to-end RPA system for generating RWE from their clinical registries.**

Intermediate Term (2-5 years)

Objectives

- **ACEP becomes a software platform & application (App) company.**

Recommendations:

1. **ACEP's existential challenge for the next decade is how to become a software platform company to serve its members, emergency medicine, and the public at large.**

One potential inevitable future of which ACEP can be a part is digital therapeutics (i.e. "digiceuticals"). BlueStar is the world's first FDA approved prescribe-able app for managing Type II diabetes. Many believe that this is just the first app of many and that we are headed towards a future where every discharge medication, post-procedure, or diagnosis is coupled to an app. The power of apps like BlueStar is that they have daily digital touchpoints with patients. Patients can be asked by the app every day to rate their pain or assess their symptoms. As a result, **new base layers can be collected and enriched around patient outcomes.**

2. **ACEP to decide whether to build\buy\partner in the digital therapeutics space to collect new patient outcome data.**

Long Term (5-10 years)

Objectives:

- **ACEP is a major player in AI systems for EM**

Recommendations:

If Moore's Law progress holds, within 10 years, every $1,000 a person spends buys them a device with the computational equivalence in calculations per second as the human brain. This means every clinician's care team could consist of dozen if not hundreds of additional AI minds available for assisting care. We can expect large swathes of clinical care will be automated and simply being supervised by human care.

1. **ACEP to decide its role in build\buy\partner AI systems in emergency medicine.**
2. **ACEP deploy widespread Human-in-the-Loop Services with rapid migration and demonstration of AI+Human-in-the-Loop Services**

Introduction:

Computational power to cost ratio has been increasing exponentially for over 120 years across five paradigms of computing[iv]. If the current trend continues, by 2030 it is estimated that $1,000 will buy computations per second equivalent to 1,000 human minds. For context, this means that, if current computational trends hold, the future iPhone XX in 2027 is expected to perform at least as many computations as the brain of the person using it. The implications for healthcare are obviously profound. Every member of a care team will be assisted by a variable number of artificially intelligent agent "co-pilots."

The actions of ACEP and its members over the next few short years will define and shape how these agents will be built, whether third party companies and organizations will be at the center of this revolution, and whether emergency medicine will control its fate in this rising wave of disruptive artificial intelligence.

Vision: Where do we want to be?

(1) Emergency Medicine (EM) Controls its Data Fate

EM owns and enriches data layers that are foundational to the future of Emergency Medicine

Marc Andreesen once said, "Software is eating the world." Now, Hod Lipson, Columbia University AI researcher, says, "AI is eating software." Software developers used to build the rules in AI systems, but today AI builds its own rules based on the data it ingests.

These data, in large amounts, are the key to AI system development. According to *The Economist* magazine, data is now more valuable than oil. Emergency medicine can influence the role of AI in its field if it curates and cultivates these new "oil fields" of data.

(2) EM Enables Frictionless Translation of Discovery to the Frontlines of Clinical Care

Over one million articles are catalogued in PubMed every year - any one of which could impact physician practice. Adding to this deluge, medical data is growing exponentially, doubling every 1.5 years. The Institute of Medicine (IOM) has estimated the gap from publication to a change in clinical practice can take 17 years. The implication is that medicine is a "Red Queen" race[v] to stay current and deliver evidence-based care. The result of this failing race is that patients receive less than the latest known best care.

One challenge of the data deluge is the shortage of resources to analyze it. Human labor is finite. McKinsey estimates in the U.S. alone there is a shortage of 1.5M people just to manage data projects. As John Naisbitt said, “We are drowning in information but starved for knowledge.”

One opportunity to meet this challenge is to leverage automation. New classes of data automation, specifically *Robotic Process Automation (RPA)* are maturing inside and outside of healthcare. UIPath[vi], a Romanian RPA company, in 2018 became the fastest growing software enterprise in history. Healthcare examples these new models of end-to-end automation of discovery have been demonstrated by Atul Butte at UCSF for drug discovery automation "machines" and MedStar Institute for Innovation's "data factories" for clinical discovery.

It is now possible to create “living” medical articles created by data factories that automatically generate knowledge directly from data lakes[vii]. Because these articles are automatically created, they can be regenerated at any cadence as the data lakes receive new data. Application Programming Interfaces (APIs) can be created to integrate that knowledge into live clinical workflow and drive care with Real World Evidence (RWE). For example, RPA generated medical articles can be created weekly that define the drug-of-choice for community acquired pneumonia based on a local hospital's bacterial culture results. APIs would enable those recommendations to be fed to an Electronic Medical Record (EMR) Clinical Decision Support (CDS) system.

RPA generated RWE can directly impact realt-time operations. For example, companies like PredictHQ[viii] predict aircraft demand for regions based on local events like concerts and conferences. This same type of approach could be used to predict real-world healthcare workforce demands based on local events or other real-time signals.

Automated generation of RWE through RPA will be a core key to shorten the translation gap down from IOM's 17 years.

(3) A Co-Pilot for every Condition, Clinician, & Patient

Harvard researchers recently reported that healthcare mistakes are now the 3rd leading cause of death in the U.S.[ix] "Human-in-the-Loop" oversight systems, such as eICUs have consistently demonstrated decreased medical error and improved quality.[x] As AI continues to expand in capabilities, the world can expect AI to play a greater role.

For example:

- Like autonomous vehicles that do not require riders to direct each action, clinical guidance AI won't require clinicians to direct each step of care
- Triage AI systems may be able to direct patients to an appropriate level of care or even have them wait until symptoms become more clear that care is needed..
- AI can assist with more than just patients. It can predict factors during a work shift related to physician fatigue, satisfaction or burnout.
- AI can provide evidence for its recommendations to help clinicians better understand when there may be a conflict in recommendation.
- Causal discovery from observational data is an increasing topic of AI research today as recently covered in The Book Of Why: The New Science Of Cause And Effect.[xi]

Summary: Today, the tools for building AI agents are highly democratized through open-source release of code. If the 2027 iPhone XX is roughly as fast in computations per second (CPS) as a human mind, we can expect that clinicians will have swarms of AI agents as additional "members" of the care team.

Actions: How do we get there?

(1) EM Will Control its Data Fate in an AI Future by Building a Base Layer of Patient Outcomes

Tim O'Reilly, CEO of the world's largest technical publishing company, has been quoted as saying that the smartest thing he sees company doing today is "enriching their base layers." Examples of base layers include Google's creation of Gmail so it had a treasure-trove of emails to develop natural language processing (NLP) systems and the creation of Google voice so they had voice data to develop interactive voice response (IVR) systems. The creation and use of those *digital base layers* was the key foundation that enabled Google to create an Amazon Alexa competitive product, Google Home.

At the core of training AI systems are the digital base layers used to build those systems. If EM is to control its fate in the rising world of AI assisted care, EM must build and enrich the base layers necessary to enable that future.

One critical core base layer missing in emergency medicine are patient outcomes. Outcomes are necessary to enable causal discovery derived from observational data. Outcomes are also needed to enable EM to embrace emerging risk-sharing models such as the Center for Medicare & Medicaid Services (CMS) Acute Unscheduled Care Model (AUCM).

Action: EM is to build a base layer of 30 day post-care patient outcomes

(2) Automate Real World Evidence (RWE) with Robotic Process Automation (RPA)

The International Committee of Medical Journal Editors (ICMJE) consisting of the world's top medical publishers previously called for commentary on requiring that all authors publish both the data and code for their methods. As described above, models have been demonstrated that show how to create "living" medical articles with all the code attached to a data lake that when refreshed with new data – a new article is generated. APIs can link the knowledge from these articles to EMRs to close the loop on RWE in an evidence-based care practice guided world.

Action: EM is to build the first RPA based medical article that generates RWE for clinical care

(3) Build "Human-in-the-Loop" and AI + "Human-in-the-Loop" Services

Supervisory care systems, as discussed above, have been shown to increase the quality of delivered care. eICUs and companies like EmOpti[xii] represent "human-in-the-loop" (HIL) supervisory systems. AI + Human-in-the-Loop systems (AIHIL) have been around for decades with MUSE[xiii] EKG systems – where clinician decision-making is augmented by AI assistance "computer EKG readout". Enlitic[xiv] has demonstrated AIHIL systems for CT scan triage with, for example, AI moving computer suspected subarachnoid hemorrhages to the top of the radiologist reading queue.

The opportunity of HIL systems is they provide a platform for natural migration to AIHIL.

Action: EM is to deploy widespread Human-in-the-Loop Services with rapid migration and demonstration of AI+Human-in-the-Loop Services

SUMMARY: A growing chorus of leaders have sided with Atlassian's Scott Farquhar's warning "you're either becoming a software company, or being disrupted by one." Microsoft CEO, Satya Nadella said, "Every business should be looking at how it can be transformed through data."

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[i] Wikipedia: https://simple.m.wikipedia.org/wiki/Artificial_intelligence

[ii] WhatIs.Com? https://whatis.techtarget.com/definition/augmented-intelligence

[iii] Agency for Healthcare Research & Quality: https://www.ahrq.gov/cpi/about/otherwebsites/clinical-decision-support/index.html

[iv] Computing Paradigms in the Modern Age: 1) Main Frame Computing 2) PC Computing 3) Network Computing 4)Internet Computing 5) Grid Computing 6) Cloud Computing

[v] Red Queen's race from Lewis Carroll's "Through the Looking-Glass" and involves a representation of a Queen in chess and Alice constantly running but remaining in the same spot.

[vi] http://superfounders.com/2018/09/romanian-uipath-raises-225-million-setting-record-as-the-fastest-growing-software-enterprise-in-history/

[vii] A data lake is a system or repository of data in its natural\raw format usually as object blobs or files. Typically it is a single store of all enterprise data including raw copies of source system data and transformed data used for tasks such as reporting, visualization, advanced analytics and machine learning. A data lake can include structured data from relational databases (rows and columns), semi-structured data (CSV, logs, XML, JSON), unstructured data (emails, documents, PDFs) and binary data (images, audio, video). https://en.wikipedia.org/wiki/Data_lake

[viii] https://apple.news/AAOQChz-cRNqgwXVhE_a07g

[ix] Makary M. Medical Error-the Third Leading Cause of Death in the US. BMJ 353:i2139. May 2016

[x] https://www.enzymehealth.com/blog/telehealth-and-digital-health-tools-saving-lives-with-e-icus/

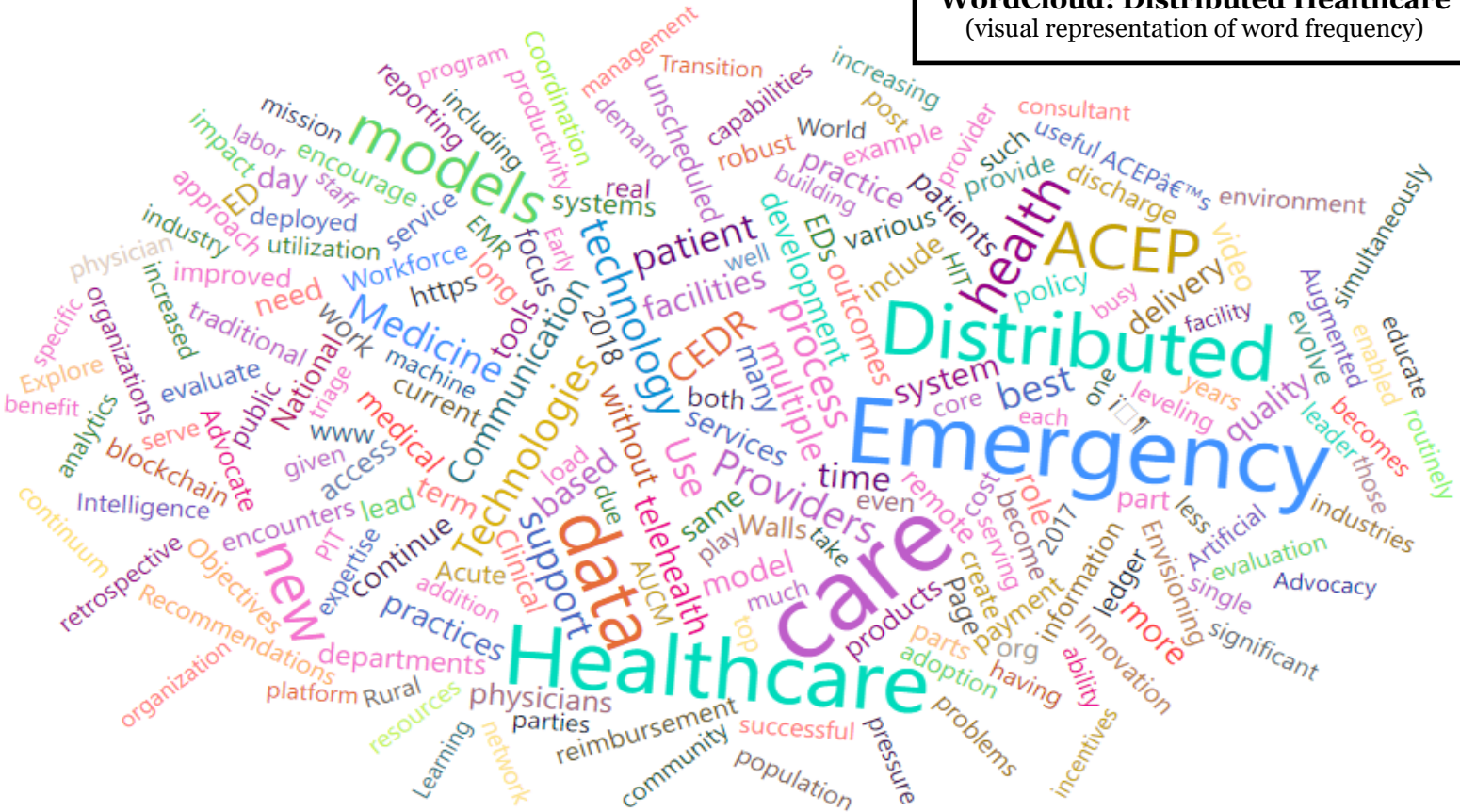
[xi] Judea Pearl & Dana Mackenzie. The Book Of Why: The New Science Of Cause And Effect. New York: Basic Books, May 15, 2018

[xii] https://www.emopti.com/

[xiii] GE Healthcare https://www.gehealthcare.com/products/diagnostic-ecg/cardio-data-management/muse-v9

[xiv] https://www.enlitic.com/

WordCloud: Distributed Healthcare
(visual representation of word frequency)



ACEP HIT Summit Vision Paper

Distributed Healthcare: Telehealth, Distributed Delivery Models, Care Coordination

Edward N. Barthell, MD, MS, FACEP

Description\Definition

Distributed Healthcare can take many forms and have various definitions. But perhaps a meaningful one is "Health Care Without Walls".[i] It is a systems approach to healthcare delivery that comes to the patient, in the home, workplace, or community, and care that is coordinated across multiple facilities or providers simultaneously. It is a system that anticipates healthcare needs across populations and works to keep us healthy. In other words, a healthcare system that is as convenient, accessible and coordinated as services offered in other industries, including things that we now take for granted such as Amazon same-day delivery.

Distributed Healthcare Objectives\Recommendations

Short Term (1-2 years)

Objectives:

- **ACEP must be a leader of Distributed Healthcare evolution & policy development as applied to unscheduled care.**
- **ACEP must encourage adoption of Distributed Healthcare models and lead the evaluation of their impact.**
- **ACEP must help assure the technology & data that drive Distributed Healthcare models are robust & reliable.**

Recommendations:

1. **Education:** Increased focus on Distributed Healthcare topics such as new care models, optimizing EMRs, use of telehealth or other new communication technologies.
2. **Advocacy:** Advocate for enhanced efficiency & ability to utilize data and technology in practice. e.g. Ability to bill for telehealth emergency visits using the existing E/M codes and -95 modifier.
3. **Partnerships:** Enhanced collaboration with industry partners to encourage both early innovation and long-term planning, particularly with regard to distributed care models and care coordination.
4. **CEDR:** Enhance this investment with plans for use in new functions and data products with a scalable architecture to support both retrospective and real time data analysis.
5. **Best Practices:**
    - Draw upon work done by other medical specialties in utilization of data technologies for lessons learned, best practices & data products.
    - Establish as a best practice, inclusion of an emergency physician informaticist in EDs of a certain size, and as a shared resource in EDs of less than that size.
    - Explore how some parts of the emergency care process can be performed by remote providers that service multiple facilities simultaneously to improve productivity and patient outcomes.

Intermediate Term (2-5 years)

Objectives

- **Distributed health is a major ACEP initiative**
- **The inefficiencies and productivity barriers commonly associated with EMR use are significantly reduced**
- **Emergency Medicine is considered a leader and central player within the continuum of Distributed Healthcare**

Recommendations:

1. **Advocacy:**
   - Change the documentation process with EMR vendors and regulatory agencies to make it less burdensome, more intuitive and helpful for delivering quality care vs its current focus primarily on reimbursement.
   - Funding for research, pilot projects and advancements in the use of technology to enable new care models and improved outcomes, especially those that focus on distributed care and leverage CEDR in new ways.
   - Promote interoperability & frictionless communication technologies across the continuum of care.
   - Lead policy development and evaluation of new reimbursement and process of care models:
     - Expect increasing downward pressure on reimbursement as value-based models become the norm.
     - Encourage models that include 30-day post-ED discharge responsibility.
     - Explore models that take advantage of load leveling resources across multiple departments
2. **Emerging Technologies**
   - **Video:** Explore more routine use of ubiquitous video and how it might impact the specialty and provide recommendations to the emergency medicine community. Examples: Video of ED encounters becomes the new norm and perhaps replace the current documentation process; all consultations with specialists are routinely performed with video; parts of the care process such as discharge teaching are routinely provided by remote experts via video.
   - **Automated Acquisition of Data:** e.g. automated patient tracking tools, machine learning methods for extracting data from existing systems & patient engagement in data collection.

Long Term (5-10 years)

Objectives:

- **CEDR is a major contributor to a National Aggregated Unified Data Repository (Federal Infrastructure Project)**
- **Telemedicine\telehealth are routinely integrated into the health continuum including acute emergency care**
- **HIT tools that support decision making in Distributed Healthcare models are monetized by ACEP**
- **An Emergency Medicine Subspecialty emerges with a focus on Distributed Healthcare (Tel*ER*doc)**
- **Distributed Healthcare is part of the emergency medicine core curriculum.**
- **Use of artificial & augmented Intelligence are common place in emergency medicine practice**

Recommendations:

1. **Transition CEDR to a robust data platform ("Data Lake"):**
   - Create new data tools based CEDR platform, e.g. standardized and ad hoc real time analytics and retrospective reports.
   - Monetize CEDR products.
2. **Artificial & Augmented Intelligence:**
   - Plan for necessary policy & procedural realities.
   - Lead efforts in emergency medicine toward development of useful tools (& dissuade those not).
   - Provide necessary education & best practices for effective AI utilization.
3. **Communication & Learning Modalities:**
   - Lead in new ways to educate\train emergency medicine workforce, e.g. virtual simulation environments.
   - Leverage CEDR to derive algorithms for training & best practices.
4. **Emergency Medicine Workforce:**
   - Use data to guide changes in workforce & staffing of EDs, e.g. how best to utilize staff of various types.
   - Work with ABEM to develop a Distributed Healthcare subspecialty.

Introduction

While this section will focus on the U.S., we should acknowledge that at least half the world's population still lacks access to essential health services.[ii] Even in the U.S., 12.4% of the population lack a usual source of healthcare & 4.8% fail to obtain needed medical care due to cost.[iii] These disparities are particularly true in rural America where higher rates of mortality[iv] result in part due to long distances to access a health care and (much) longer waits for emergency medical services (EMS). Lack of access can also cause a negative impact on patient outcomes in many busy urban environments.

With the aging of the U.S. population, the demand for emergency care and other unscheduled acute health care services continues to increase. Traditional resources struggle to keep up with this demand, and at the same time the health industry is faced with downward revenue pressures.

Care models and technology continue to evolve. Payment models continue a gradual evolution from traditional fee for service to mixed models to value based care. The proliferation of urgent care and free-standing emergency department (FSED) facilities may reduce the pressure on hospital-based emergency departments (ED) for low acuity conditions, but does little for often complex, often geriatric, seriously ill patients.

ACEP has recently advocated for the Acute Unscheduled Care Model (AUCM), an effort to create a new bundled payment model for emergency care. This model would shift incentives for emergency care providers, from a single ED encounter, to include the thirty-day post-discharge period.

At the same time, technology development continues to advance at a rapid pace. Powerful, albeit frustrating, electronic medical record (EMR) systems have been deployed in most EDs, in part due to federal incentives. In addition, the HIT industry is seeing increased utilization of advanced analytics and progress in adoption of telehealth and other remote communication strategies.

From a technology perspective, Distributed Healthcare is enabled by well-established approaches: building on scalable cloud-based software, mobile wireless platforms and universal network coverage. The available devices and solutions support a distributed care model similar to what we have experienced in other industries taking advantage of mobile telephony, office automation, and video\data transmission. Layered on top are rapidly evolving capabilities in artificial and augmented intelligence.

One enabling technology worth mentioning is "Blockchain", which enabled the much-hyped Bitcoin phenomenon. Blockchain is a transactional ledger that records movement of anything of value—currency, records, contracts, supplies—between parties. Its distributed ledger is unique, which means multiple parties can hold copies of the ledger that are continuously synched, removing inefficiencies in the transaction process. Most importantly, it is highly secure and generally cannot be changed without the agreement of all parties to the ledger. The Economist Magazine has called blockchain "a machine for creating trust," allowing "people who have no particular confidence in each other [to] collaborate without having to go through a neutral central authority."[v]

The world is changing. Given this environment, current centralized systems are now diverging into subfunctions of information collection, data interpretation, workflow support and communications that allow us to unlock the current 1:1:1 caregiver\patient\facility relationship in time and space. Data can be collected remotely, analyzed centrally, and then AI informed interventions can be delivered in a distributed fashion.[vi]

To truly accomplish Distributed Healthcare, we need to pursue discrete tasks in five areas:[vii]

1. Apply technology that has already been successfully used in other industries to solve problems in healthcare. Investigate how to best deploy telehealth, remote monitoring, self-administered lab tests, and a variety of other information technologies and workflow enhancements in the delivery of healthcare.
2. Payment\Reimbursement Challenges: Develop new payment models that support delivery of technology-enabled distributed care.

3. Examine well-intentioned regulations from an earlier era that now stand as a barrier to more modern modes of care delivery and lead efforts to reform and modernize them. e.g. State-based health professions licensure; healthcare information privacy & security; etc.
4. Re-evaluate the healthcare workforce and how to educate\train providers to be successful working in a very different distributed healthcare system.
5. Finally, examine human factors pertaining to the adoption of technology, and how to best accommodate for the various capabilities and limitations that surface across a vast range of patients, healthcare workers and others who will use these technologies.

Vision: Where do we want to be?

The mission of the ACEP is to promote the highest quality of emergency care and advocate for emergency physicians, emergency patients and the public. ACEP has always supported access to high quality EM care, even in the face of severe problems with ED crowding that remains pervasive across the country.

Emergency physicians work as part of a care team and this will become even more important should the AUCM model become a national standard. In many departments Advanced Practice Providers (APPs) play an increasing critical role. APPs work in the same technology environment as physicians, and as their numbers grow this involvement should be recognized by including them in ACEPs HIT initiatives.

With regard to telehealth, distributed delivery models, and care coordination, ACEP is ideally suited to play a significant role. Emergency physicians have a broad-based view of acute unscheduled care and are aware of the many strengths and weaknesses of the current health care system's ability to respond to patient demands.

A core challenge with traditional emergency medicine practice is the variable demand that inevitably occurs with unscheduled care. Providers and administrators tend to "manage to the mean", building facilities and assigning staff based on the mean number of encounters expected on any given day. However, patient census can vary as much as +/- 50% on any single day, resulting in understaffing impacting quality care or overstaffing wasting labor cost.

The consolidation of hospitals into larger systems, larger emergency physician groups serving multiple hospitals, and the parallel maturity of telehealth, analytics and communication technologies, creates an opportunity to pursue new care models to address these core challenges. ACEP must play a significant role in stimulating innovation around new models and spreading information about best practices.

Specifically, new care models may evolve that break the emergency care process into its various parts, and then assign the work of some of those parts to virtual resources that can simultaneously service multiple facilities. This approach can provide load leveling across a group of facilities yielding significant efficiencies of scale amongst those having a "slow day" and others having a "busy day". The result is both improved clinical metrics and patient experience while at the same time lowering labor costs.

A specific example is the emergency intake process. Use of a provider-in-triage (PIT) model has been shown to speed patient flow in busy emergency departments, but the addition of an extra provider for this part of the care process for each individual facility can be cost prohibitive. Early adopters of a remote PIT process, with a provider serving multiple facilities, have seen double productivity compared to an on-site PIT program. With the added benefit of load leveling across multiple facilities, the new approach results in a markedly improved cost-benefit ratio.

The pressure to create new care models means emergency physicians will need to think outside of the four walls of traditional EDs. Emergency medicine must be viewed as a community or regional practice and not merely a single departmental venue. Also, the opportunity to assist patients post-discharge so they transition successfully to other providers and\or long-term care will require a new set of technology tools to enhance that process.

As new care models evolve, it is critically important to collect data that enables robust evaluation of these models. ACEP is uniquely positioned to serve as a custodian of the definitive database of the nation's emergency encounters and outcomes. ACEP may be able to provide an increasing role as a consultant and data analyst providing services to other organizations as the ACEP Clinical Emergency Data Registry (CEDR) becomes more mature.

Actions: How do we get there?

With ubiquitous access to high-quality emergency care as its mission, ACEP should continue to evolve along several different dimensions. This may involve ACEP becoming less physician-centric and shifting focus to how emergency physicians can effectively serve as leader of a team of various providers that work together to optimize emergency care. As medical providers deal with increased volumes of data, emergency teams will in many cases be composed of personnel with clinical expertise and personnel with technical data management expertise, that may or may not be one and the same.

ACEP itself may find the need to increasingly serve as a data management organization and consultant to emergency providers to be successful in the long term. As the Clinical Emergency Data Registry (CEDR) grows and matures in its role as the definitive database of emergency encounters and outcomes, it may be utilized by the College for multiple functions.

For example, ACEP may become a partner to researchers seeking to solve problems and answer questions across broad populations and large datasets that were previously unavailable. To this end it would be useful to expand the CEDR to include even more data from EDs, Urgent Cares, FSEDs, Prehospital and 30-day follow-up and outcome data.

Additional data products that could emerge include quality reporting and benchmarking tools, licensing data to pharmaceutical companies, payor organizations or government policy organizations, and public health reporting. As the ACEP data system capabilities advance beyond retrospective reporting to support real time data analysis, other possibilities include public health surveillance, operations reporting and predictions, and real time clinical decision support.

As ACEP's CEDR data becomes more robust, it may support the development of other data products, either created internally or, more likely, in collaboration with development partners. An example might be a Pre-ED Triage Tool for Consumers that are trying to determine the most appropriate way to address a medical problem.

ACEP's standing as a neutral body possessing unique expertise can be leveraged to create other related services. For example, the creation of an accreditation or certification approach to evaluate technologies proposed for emergency departments could be very useful to clinicians that are trying to sort through the many options for improving the care process. If and when the AUCM model is deployed, new technologies will be needed to support successful programs. Who better than ACEP to evaluate the effectiveness of these technologies? If the development of a formal ACEP consulting service is problematic for regulatory reasons, at a minimum the publishing of white papers around best practices should be encouraged.

It seems that communication among stakeholders can always be improved in almost any business, and emergency medicine is no exception. ACEP should continue and expand its role communicating policy, influencing behaviors among patients, providers and regulators to continue to support the ACEP mission. ACEP will need to evolve its communication strategy to adapt to new communication mediums as they emerge. ACEP's role as an advocate for quality emergency care, serving the interests of both providers and patients, and ranging from specific issues to national priorities, will continue to be paramount.

SUMMARY: Given this dynamic environment and the growing need to deliver care where and when people need it, ACEP would be well served to carefully plan for the use of new technologies by its members as new distributed care models are deployed, evaluate the impact of the new technologies and models, advocate for policies that support success among ACEP members, and educate the membership to encourage pursuit of best practices to deliver superior patient outcomes.

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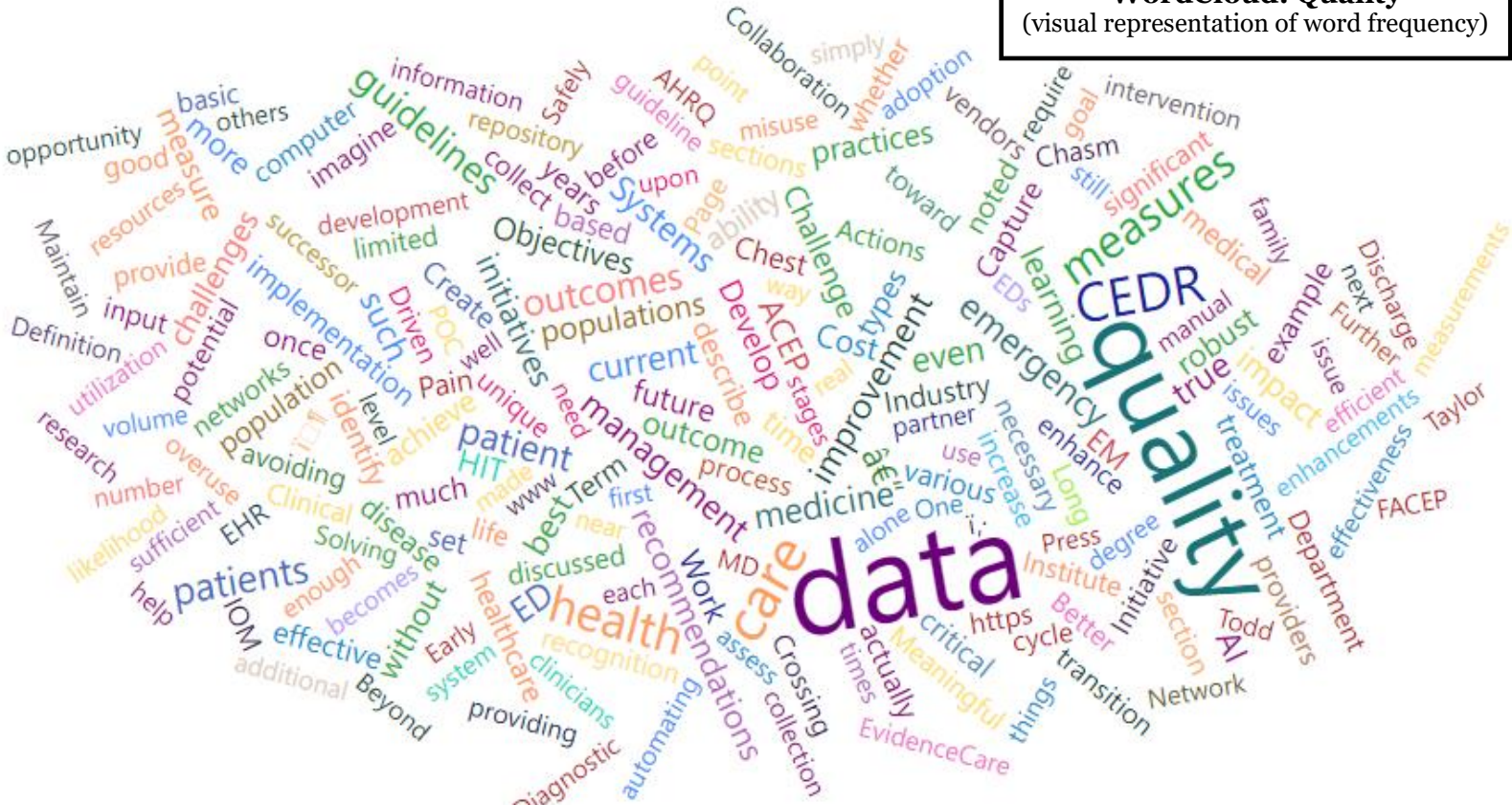
WordCloud: Quality
(visual representation of word frequency)



ACEP HIT Summit Vision Paper

Quality Initiatives, Outcome Measures, Data Driven Guidelines\Best Practices, Learning Networks

Todd B. Taylor, MD, FACEP

Description\Definition

The degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.[i] [IOM Quality Definition]

Quality Objectives\Recommendations

Short Term (1-2 years)

Objectives:

- **ACEP is the data provider for emergency medicine quality initiatives.**
- **ACEP is the "go to" partner for EM software development.**
- **Data drives Quality Initiatives, Guidelines & Best Practices**

Recommendations:

1. **Maintain current CEDR objectives & functionality**
2. **Develop plans to enhance CEDR toward a true emergency medicine "data lake" (Repository)**
3. **Better promote EvidenceCare as an efficient method for guideline distribution & utilization**
4. **Create a feedback loop for improvements in guidelines**
5. **Further develop ACEP's quality measure process from conception to deployment in EQUAL & ultimately CEDR.**

Intermediate Term (2-5 years)

Objectives:

- **CEDR successor becomes full & robust data repository**
- **Add enhancements to CEDR to increase its value**
- **CEDR becomes a "must have" for most EDs**

Recommendations:

1. **Work internally or with a partner to expand\enhance CEDR.**
   - Develop a population risk adjustment tool in CEDR to account for various ED settings & populations
   - Work with EMR vendors to automatically collect or enhance manual collection of meaningful quality data.
2. **Add operational & financial data to CEDR**

Long Term (5-10 years)

Objectives:

- **CEDR is an AI\Learning Network**

Recommendations:

1. **Work with industry partners to transition CEDR to an AI\Learning Network**
2. **Create a basic data set for patients that can be collected in the ED on every patient**
3. **Develop methods to collect\ascertain outcomes data**
   - Marry with subsequent billing data
   - Online\mobile APP for patient reported outcomes

Introduction

As with quality in other fields, healthcare quality is an assessment of whether something is good enough and whether it is suitable for its purpose. The goal is to provide medical resources to ensure good quality of life, cure illnesses when possible, to extend life expectancy, etc. Healthcare researchers measure quality to identify issues caused by overuse, underuse, or misuse of health resources. In 1999, the Institute of Medicine released six domains to measure and describe quality of care in health:[ii]

- Safe – avoiding injuries to patients from care that is intended to help them
- Effective – avoiding overuse and misuse of care
- Patient-Centered – providing care that is unique to a patient's needs
- Timely – reducing wait times and harmful delays for patients and providers
- Efficient – avoiding waste of equipment, supplies, ideas and energy
- Equitable – providing care that does not vary across intrinsic personal characteristics

Measuring quality of care poses significant challenges due to the limited number of outcomes that are measurable[iii]:

- Structural Measures describe providers' ability to provide high quality care;
- Process Measures describe actions taken to maintain or improve health
- Outcome Measures describe the impact of a health care intervention.

The role of HIT in all aspects of quality improvement, e.g. Plan→Do→Check→Act (Deming Cycle)[iv] is undeniable. How to leverage HIT toward this end is the challenge. In this section, we discuss those challenges and offer recommendations for improvement.

Vision: Where do we want to be?

Meaningful "Real-Time" Data: As discussed in other sections, acquisition, integration, harmonization, and organization of health data remains a huge challenge and is a prerequisite for true quality management. ACEP has made significant strides toward achieving traditional types of Emergency Medicine (EM) quality measurements with its Clinical Emergency Data Registry (CEDR). The future state, beyond this typical retrospective\historical quality measurement and analysis, is to achieve near real-time quality systems that impact patients at the point of care (POC). Isolated examples are beginning to emerge such as predictive modeling to assess likelihood of hospital readmission for patients discharged from inpatient or the Emergency Department (ED). Nevertheless, these systems have a long way to go before we can achieve true POC quality management.

Population Management: As discussed in the Population Health Section recognition of unique factors in various populations is a way to impact the health of broad segments of the population either by specific disease management or stratification of populations for targeted intervention or treatments. An example is in the treatment of breast cancer with identification of gene markers that indicate which type of chemotherapy will be most effective. In EM however, it may be a long time before we have the ability to utilize gene markers to direct care. But a combination of patient medical, social & family history, combined with certain diagnostic tests or procedures may yield sufficient sensitivity to, for example, safely discharge patients who have been evaluated for chest pain. Current ED chest pain pathways achieve as low as a ½% serious cardiac event within 30 days[v]. But such studies are conducted with a relatively small number subjects under ideal conditions not prevalent in most EDs. The ability to have outcomes data on millions of such cases, with robust clinical data elements may eventually allow machine learning to achieve near zero failure rates. Or even better, predict potential cardiac events in any patient, even without chest pain.

Too much data . . . Not enough of the "right" data: The "dirty little secret" of the Electronic Health Record (EHR) implementation initiative is that we now have more & more data that no one has time to look at. "Golden nuggets" of pertinent information is buried in mounds of useless computer generated chaff. Further, with the burden of so much data input, little time is left to actually "mine that data". The EHR "solution" has become a distraction. Only once Artificial Intelligence (AI) systems are applied to all of this data will we actually see the benefit of the EHR investment. And, once this is achieved, quality improvement initiatives will be transformed.

Data Capture: As noted, much of current data capture requires manual input by highly skilled clinicians who should actually be delivering care instead. Yet without a basic data set on each patient, the goal of true quality management cannot be realized. Data capture must be automated and patients\family leveraged for data input. Patients are a captive audience in the ED and having them complete various information surveys would not only help with the current medical issue but future visits as well. This is the concept of **basic minimum healthcare data set**. If we are able to collect this on virtually every resident in the US, imagine the research, disease discovery\management, and AI potential. For example, an ED encounter for a simple laceration leading to completion of this data, might uncover the potential for diabetes, years before it actually occurs. Then, once married with ongoing collection of outcomes data, imagine the endless possibilities.

Cost: One cannot consider "quality" without also considering cost. How do we really know the most cost-effective treatment for various diseases? In fact, we struggle to even assess treatment effectiveness, let alone cost effectiveness. These are the types of things that only a computer can do.

Data Driven Guidelines: There are (at least) 3 stages in guideline development & utilization. 1) Identify the need 2) Develop the best practice 3) Implementation & adoption. Each of these has unique challenges and all stages relay upon data.

The "need" may be obvious (stroke, MI, seizure), but may be more subtle. For example, the recognition of HIV\AIDS in the early-1980s was only after significant clusters of symptoms gain critical mass. If data systems had been available that grouped these symptoms across large populations, the recognition would have been made much sooner.

Best practices also rely on data, but rarely have sufficient amount to draw definitive conclusions. The result is often that recommendations based on weak or empiric data. How many times has medicine reversed course on the use of steroids in spinal trauma?

As challenging as the first two may be, implementation & adoption of guidelines are even more so. The sheer volume of guidelines makes it difficult even to read them let alone keep current. Systems such as EvidenceCare[vi] have begun to address volume & concurrent issues by curating guidelines and automating the algorithms to some degree. But still, clinicians must identify the underlying disease & think to use the system. Fully automating this could be the EM "Holy Grail" of HIT.

Conclusion

Today we create quality measures only once we have the necessary data readily available; then benchmark with standards; and reward those who achieve a defined threshold. In this sense, the data we have is driving what we measure, whether or not those measures have any true impact on care. In a future "quality improvement world", robust data will tell us what we *should* focus on (based on outcomes) and even better, prompt us to take actions in real time at the point of care and provide the most cost-effective treatment based on research.

Actions: How do we get there?

The Data Challenge: "*In today's world, our biggest challenge is not disease, but data.*"[vii] As noted, without robust, integrated, harmonized and organized data, we are limited as to what we can even attempt to do with regard to quality initiatives, outcome measures, guidelines\best practices & learning networks. Solving this data challenge is discussed in other sections, so here we have simply reiterated how the lack of such is severely impacting our ability to deliver belter care.

CEDR: CEDR is a good start and additional enhancements will continue to pay dividends. However, as noted in the AI section, until CEDR (or its successor) achieves critical data mass, we may be limited to quality measurements based on the data we have. Accessing additional data is both a policy and a technical issue. From the technical side, current EHRs do not conform to a standard data set. As mentioned in other sections, work by the ONC and others are gradually creating that dataset that may make it easier for CEDR and other data warehouses to capture more robust and accurate clinical data. From the policy side, questions of data ownership and privacy still remain to be worked out, particularly in the emergency department where most providers do not own the computer systems they work with. ACEP will need explore avenues to increase the ability of data to flow to data warehouses such as CEDR. In the short-term, the ONC seems particularly interested in the free flow of data and is headed by an emergency physician. This may represent an opportunity for ACEP to influence the data flows necessary for implementation of meaningful quality metrics.

Outcome Data Measures appear to be a critical missing piece necessary for true quality improvement. Without this, we are simply guessing at which measures will have any impact on care outcomes.

Quality Measure Version Management: Like all such things, quality measures have a life cycle & require updating with version control. As noted, true AI systems could automate this process as well as identify new measures that might impact quality.

Industry Collaboration: Beyond resolving data challenges, future efforts to enable transition to the next level of quality improvement will require active collaboration with the HIT industry. ACEP has the opportunity to create the EM data "base layer" upon which others can build tools we have yet to imagine.

Conclusion

The future for healthcare quality, outcome measures, data driven guidelines\best practices & learning networks is extraordinarily bright, albeit largely dependent on solving data challenges. Partnering with the HIT industry, to include EMR vendors and segment specific vendors (e.g. EvidenceCare & Collective Medical Technologies[viii]) is critical to advancement of quality initiatives and transition to the next level of patient care improvement.

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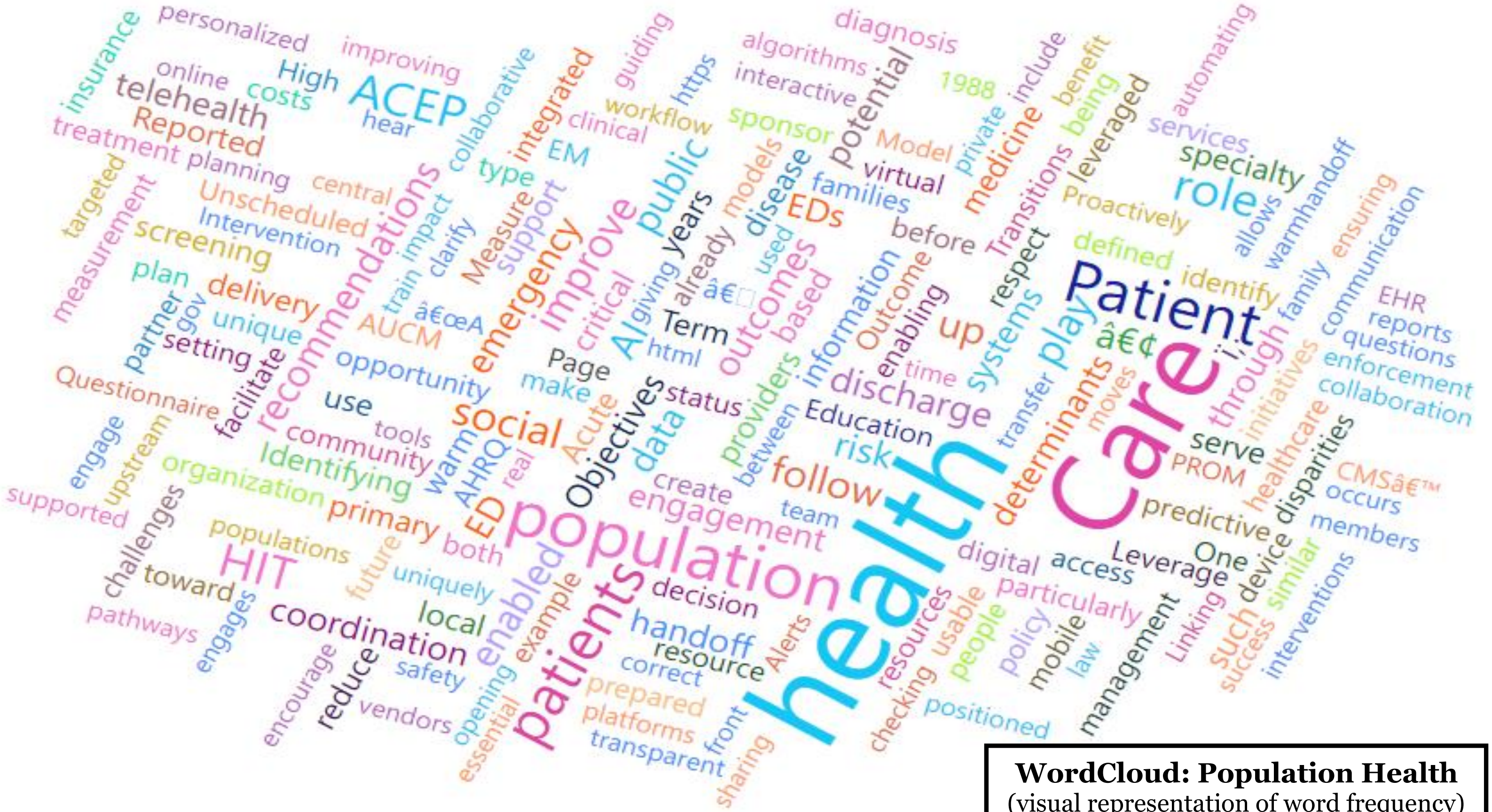

WordCloud: Population Health
(visual representation of word frequency)

ACEP HIT Summit Vision Paper

Population Health

Michelle Lin, MD, MPH, MS, FACEP

Description\Definition

Population health is defined as when a sponsor organization takes responsibility for delivering care to maintain the health of a group of people in a way that is accessible, affordable, and equitable. Population health is similar to public health in the focus on overall well-being, not simply absence of disease; however, population health involves a sponsor organization overseeing health care delivery, while public health is broadly defined by what "we as a society do collectively to assure the conditions in which people can be healthy" (Institute of Medicine, 1988).

Population Health Objectives\Recommendations

Short Term (1-2 years)

Objectives:

- **ACEP will lead efforts to revolutionize care coordination & patient engagement**

Recommendations:

1. **Patient Education**
   - ACEP will encourage EHR vendors to create digital interactive, online personalized, discharge planning tools that include:
     - Facilitating follow-up & Identifying follow-up providers
     - Video discharge education, e.g. wound care
   - Enhance price transparency by allowing patients to calculate estimated out-of-pocket costs based on insurance, plan type and network
2. **Transitions of Care: Linking patients to community resources**
   - Identifying local primary & specialty care providers filterable by insurances accepted
   - Warm handoff[i] from acute to longitudinal providers
   - ACEP can play a central role in platforms for ensuring follow-up care usable across EM which will likely be essential for success as healthcare moves into risk-sharing models such as CMS' Acute Unscheduled Care Model (AUCM)
3. **Proactively identify populations who might benefit from targeted screening upstream in workflow**
   - High risk population- ex.: sex trafficking, child\domestic partner abuse, chronic disease, etc.
     - EM is uniquely positioned with patient data that, in collaboration with law enforcement, could be used to train AI systems to identify at-risk patients, opening a unique private-public collaborative role that ACEP can play to make a public health impact.
   - High utilizers
   - Screening & referral for social determinants of health

Intermediate Term (2-5 years)

Objectives:

- **Patients are engaged & enabled in managing their health**

Recommendations:

1. **Patient Questionnaire\Alerts\Patient-Reported Outcome Measure (PROM) (example: checking in\follow-up)**
   - Digital Therapeutics through prescribe-able apps can play a role in daily "digital touchpoint" enabling data to be collected regularly from patients (e.g. the FDA approved app by BlueStar for Type II diabetes management)
2. **Improved patient engagement & empowerment through access to personal health profile: record plus plan (role in capturing and how to use if it is available)**
3. **Leveraging HIT interoperability to reduce avoidable utilization and costs:**
   - Aggregate data from different sources → validate & synthesize to make it usable

Long Term (5-10 years)

Objectives:

- **Emergency Medicine integrated into the continuum of care**
- **Data leveraged toward predictive modeling**

Recommendations:

1. **Virtual & AI-enabled emergency care & primary care delivery before\after ED encounter to facilitate seamless transitions of care**
2. **Use AI & biometrics to power predictive care models to improve diagnostics and treatment (fine tune to local demographics, social risk, and geography)**
3. **Maximize use of mobile device for connectivity & care coordination**
4. **Leverage HIT to measure & improve quality, access, health outcomes & reduce cost**
5. **Align policy and financing to support IT-enabled services, including privacy, portability and HIPAA**

Introduction

One goal of population health is to reduce health disparities stemming from social determinants, such as cultural, economic, environmental, etc. Emergency Departments (EDs) have traditionally been (and will likely continue to be) the local health and social "safety net." As such, in the U.S., EDs serve a critical role in both population and public health by providing a 24/7/365 resource for unscheduled acute care. EDs also serve a unique role with respect to disease surveillance and disaster preparedness.

There is substantial potential for healthcare IT (HIT) to improve population health through care coordination, patient engagement, and outcome measurement: HIT has the potential to bridge resource constraints among diverse practice settings (ex. rural and urban) and alleviate challenges related to accessing care. For example, mobile phone or AI-enabled telehealth systems can provide a first tier of decision-making for patients before they require care in the ED. While patient-initiated telehealth has already been adopted, there is potential for passive device diagnosis using sensors (ex. heart rate monitoring or arrhythmia) to initiate a telehealth session. While HIT and telehealth are already being leveraged, they have tremendous potential to grow, in the alleviation of shortages and disparities with respect to behavioral health and other forms of specialty\subspecialty care (ex. neurology, critical care).

HIT can be further employed to facilitate care coordination by enabling the scheduling of in-person or virtual follow-up care after ED discharge, and optimize the setting of care by integrating information about individual patients' health status, insurance status, and geographic location. Technology-enabled follow-up systems could help monitor patient symptoms after discharge and AI-enabled decision support could assist patients in deciding whether to return to the ED or seek care in a clinic setting.

HIT also can create actionable insights to improve risk adjustment by aggregating data about social determinants of health, social services, primary care, and emergency medicine. EDs could partner not only with integrated health care delivery systems, but also with federally qualified health centers and other community-based resources, particularly when social determinants of health are identified during ED screening. HIT could also play a role in health promotion and preventive care, by identifying individuals who are in need of health maintenance.

AI-supported algorithms can improve population health by improving diagnosis & guiding treatment through real-time clinical pathways and automating post-discharge care (e.g. repeat lab testing or imaging, with recommendations pushed to patients based on results). This information can be shared with patients to promote patient engagement and activation, which has been shown to improve self-efficacy and health outcomes. Finally, HIT can play a critical role in the measurement, collection, and feedback—to both patients and clinicians—of health outcomes, particularly those reported by patients (patient-reported outcomes and patient-important outcomes).

Conclusion

While there are several arenas in which health IT can improve population health, significant challenges exist. The question is, what role should ACEP play in population health and how can ACEP leverage existing & future technologies toward the express goals of population health. Much of this may depend on public policy, specifically reimbursement schemes such as AUCM. Emergency physicians may be forced into population health management by this or other similar initiatives. ACEP should be prepared to support the specialty should this become a reality, and it may also serve as one more revenue opportunity for ACEP. The recommendations made here are a bare minimum of what ACEP should now consider and be prepared to broaden the scope as future initiatives come into play.

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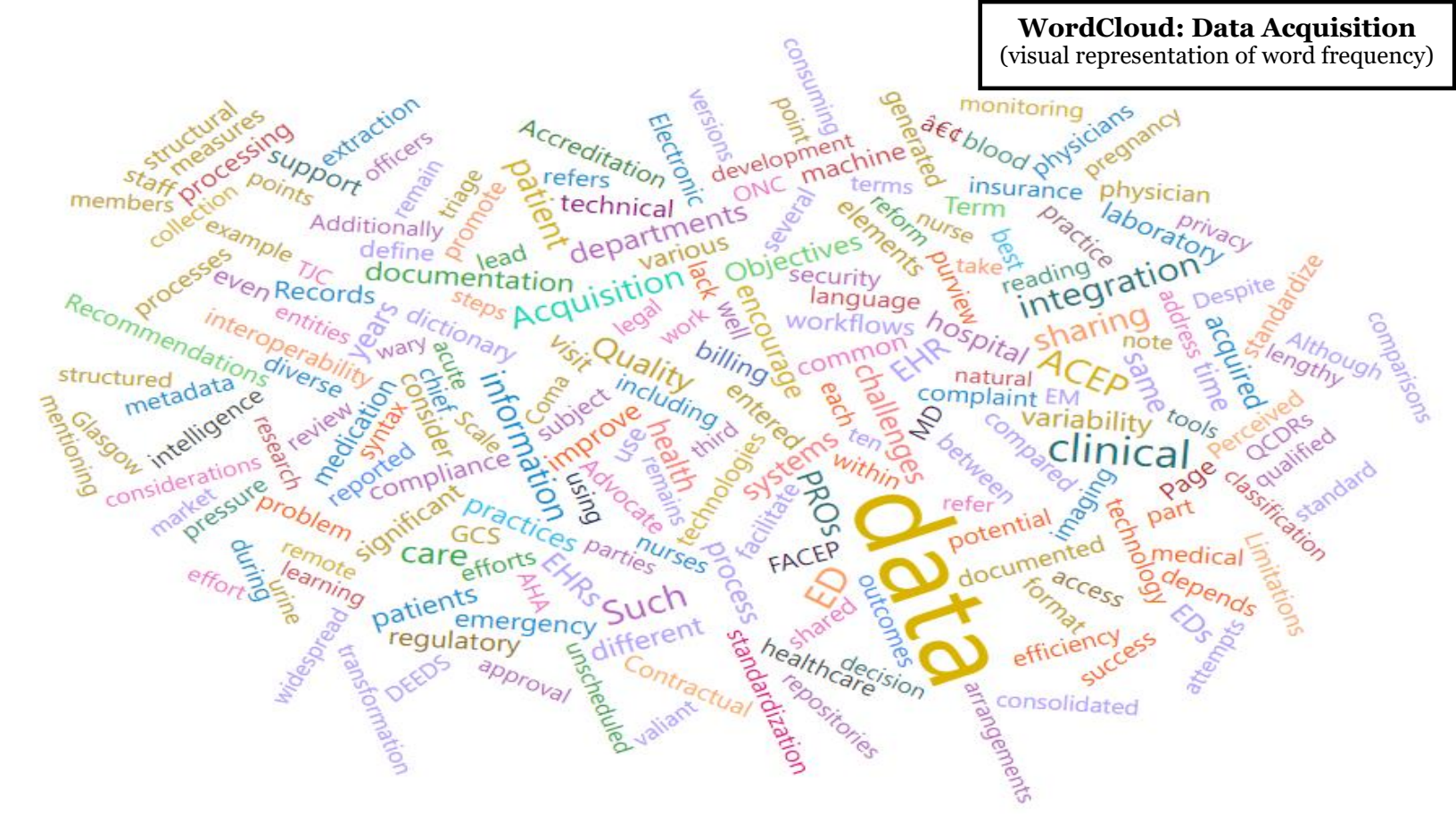
[i] "A warm handoff is a transfer of care between two members of the health care team, where the handoff occurs in front of the patient and family. This transparent handoff of care allows patients and families to hear what is said and engages patients and families in communication, giving them the opportunity to clarify or correct information or ask questions about their care." Warm Handoff: Intervention. AHRQ: https://www.ahrq.gov/patient-safety/reports/engage/interventions/warmhandoff.html

WordCloud: Data Acquisition
(visual representation of word frequency)



ACEP HIT Summit Vision Paper

Data Acquisition & Integration

Nicholas Genes, MD, PhD, FACEP
John T. Finnell, MD, FACEP, FACMI

Description\Definition

Data acquisition refers to the extraction and processing of clinical data and metadata from Electronic Health Records (EHRs). These data are diverse, including data received directly from patients (such as demographics, insurance information, and chief complaint) as well as acquired data entered by nurses and physicians during the emergency departments (ED) visit, such as clinical documentation, laboratory, imaging, and medication records.

While health information technology has the potential to improve the quality and efficiency of medical care, the success of these systems depends in part on the clinical data within their purview. Too often, clinical information is siloed and the lack of a common syntax precludes significant interoperability.

Data Acquisition and Integration Objectives\Recommendations

Short Term (1-2 years)

Objectives:

- **ACEP will take steps to standardize ED data and promote sharing\interoperability**
- **ACEP will lead efforts to reform E&M documentation for acute unscheduled care**

Recommendations:

1. **Define a data dictionary for the specialty** (and assist with ongoing federal efforts for data standardization).
2. **Advocate for why ED data should and can be shared.** This effort should address common legal or security considerations, and refer to work from other entities such as ONC, TJC, AHA.
3. **Create a process measure for data sharing and transparency** to incentivize departments and health systems to overcome challenges in data sharing.
4. **Sponsor conferences, webinars and documents to disseminate IT best practices** with hospital leaders and auditors, with an eye toward ED workflows and specific needs
5. **Develop model contracting language** to accelerate access to data and promote regulatory\compliance rather than performance\utilization.
6. **Encourage the exploration of EHRs and practices** where billing functions are separate from clinical documentation. Common EHR problems, such as charts with multiple conflicting problem lists, or obsolete allergies, can be subject to review – and incentivizing cleanup may improve data quality and reproducibility

Intermediate Term (2-5 years)

Objectives

- **ACEP will support IT best practices**
- **ACEP will support patient-reported outcomes (PROs)**

Recommendations:

1. **EMR Standardization Accreditation**: consider creating an IT accreditation process to showcase how doctors and departments are leveraging technologies like HIE and PDMPs to improve care while providing a roadmap for onboarding new practices.
2. **Patient-Reported Outcomes (PROs)**: ACEP should advocate for more quality measures to rely on PROs. PROs are vital and foundational if ACEP is to buy\build\partner in areas related to machine intelligence "co-pilots" in healthcare. (See section on Augmented Intelligence.)
3. **Digital Diagnostics and Therapeutics**: Facilitate the adoption of PROs by developing and releasing apps for patients. An app that combines patient education, medication reminders, and prompts for surveys can help patients recover from their emergency while capturing PRO data.

Long Term (5-10 years)

Objectives:

- **ACEP will encourage research and development into machine learning classification of natural language processing.**
- **ACEP will encourage remote patient monitoring and data collection technologies**
- **ACEP will encourage the integration of PROs into clinical decision support tools.**

Introduction

Data has been called the oil of the 21st Century. Health information technology has the potential to improve the quality and efficiency of medical care, but the success of these systems depends in part on the clinical data within their purview. Too often, clinical information systems function like "islands" or "silos" and cannot get the data when and where it is needed. A significant reason for this problem is that many systems cannot communicate effectively (i.e., they are not "interoperable") with each other because they lack shared conventions for the syntax (structure) and semantics (meaning) of clinical data. Each one stores patient data elements in a different format and with various codes and names for the same concepts.

Data acquisition refers to the extraction and processing of clinical data and metadata from Electronic Health Records (EHRs). This data is quite diverse, including data from patients, such as demographic data, insurance information, and their declared chief complaint. Acquired data also includes data entered by nurses and physicians during the Emergency Departments (ED) visit, such as clinical documentation for care and billing, clinical impression, and a record of orders placed for laboratory testing, imaging, and medication administration. Acquired data also may include diagnostic results, such as laboratory, radiology reports, and timestamps for events such as arrival, disposition time, the turnaround time for various studies, and total time in the ED.

There are several distinct challenges to the process of acquiring data from EDs across the US in a consistent, comparable manner. The challenges fall into categories of 1) technical hurdles in labeling, transforming, and mapping data, 2) structural use of EHRs and variability of usage and practice between EDs, and 3) contractual limitations, regulatory compliance and perceived administrative difficulties in sharing data.

Data integration is the combination of technical and business processes used to combine the data acquired from disparate sources into meaningful and valuable information.

Data integration requires access to the data, understanding the data context, (e.g., is this the first blood pressure reading, or the blood pressure reading after treatment); and then integration of this data with similar metrics into a data schema (the organization of data as a blueprint of how the database is constructed).

Technical challenges

Although the EHR market has consolidated compared to ten years ago, several different EHRs, and different versions of the same EHR, remain in widespread use. Despite valiant attempts (e.g., EM-DEEDS) to standardize and define a data dictionary for standard ED terms and workflows, data transformation to facilitate comparisons between EDs remains a time-consuming process.

Variability in ED Practice

Even among EDs using the same EHR software, considerable variability in workflows means the same data elements may be generated at different points in the patient's visit, by various staff members or processes.

For example, consider a Glasgow Coma Scale (GCS) documented by a nurse in a structured format at triage, compared to a physician mentioning GCS in a note. Or consider a point-of-care urine pregnancy test, documented manually by a technician vs. automatically entered as a lab result from a machine connected to the EHR. Quality measures that make use of these data elements will exhibit significant structural variability that may not reflect differences in quality of care, but rather, an artifact from how and when the data is generated.

Perceived Contractual & Regulatory Limitations

The question of ownership of ED data may lead to delays and blocking in the acquisition and sharing of data. ED physician staff may have complicated relationships with the hospital and healthcare system; even though they are using the same facility and EHR, details of the contract may appear to preclude sharing data for purposes other than billing.

Additionally, hospital IT departments are wary of sharing patient data with third parties, even qualified clinical data repositories (QCDRs). Such arrangements are subject to lengthy security review, as well as approval from hospital privacy and compliance officers.

These challenges can be addressed, through a variety of strategies, over the coming months and years.

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HIT SUMMIT

evolving emergency care with technology

July 8, 2019 • 7 am – 5 pm CST

ACEP Headquarters • Irving, Texas

American College of Emergency Physicians®

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ACEP's Healthcare Information Technology (HIT) Summit:

Where are we? Where do we want to be? How do we get there?

Time	Topic	Presenter(s)
7:00 am - 7:15 am	Welcome, Introductions & Summit Objectives	Vidor E. Friedman, MD, FACEP Dean Wilkerson, JD, MBA, CAE
7:15 am - 8:00 am	Keynote Address: National Coordinator for HIT (ONC)	Donald Rucker, MD, FACEP
8:00 am - 8:30 am	Current State of Emergency Department HIT	Todd Taylor, MD, FACEP
8:30 am - 9:00 am	Quality Collaborative, CEDR & EMF/Data Summit Recap	John T. Finnell, MD, FACEP, FACMI Jay Schuur, MD, MHS, FACEP
9:00 am - 9:15 am	Break	
9:15 am - 10:00 am	HIT Vision for Emergency Medicine	Michael Gillam, MD, FACEP
10:00 am - 10:05 am	Transition to Break Out Sessions	
10:05 am - 11:00 am	**Break Out Session #1: Where Do We Want To Be?** 1. Data Acquisition, Management, Utilization, Augmented Intelligence, Information to Knowledge 2. Data Integration/Aggregation, Clinical Analysis, Automation, Data Transparency, HIE 3. HIT Policy, Advocacy, Funding, Administration, Data-Driven Healthcare, Political Realities 4. Distributed Healthcare: Telehealth, Distributed Delivery Models, Care Coordination 5. Population Health 6. Quality Initiatives, Outcome Measures, Data-Driven Guidelines/ Best Practices, Learning Networks 7. AI, CDS, Predictive Modeling 8. Data Aggregation, "Big Data" Analytics, Surveillance, HIE	Moderators: Nicholas Genes, MD, PhD, FACEP John T. Finnell, MD, FACEP, FACMI Todd Taylor, MD, FACEP Ed Barthell, MD, FACEP Bharat Saturiya, MD, FACEP David Nilasena, MD, MSPH, MS Brian Fengler, MD, FACEP James J Augustine, MD, FACEP
11:00 am - 11:15 am	Break, Transition from Breakout Sessions, Get Food	
11:15 am - 12:15 pm	Working Lunch Reports from Break Out Sessions	Break Out Session Moderators
12:15 pm - 1:15 pm	**Panel Discussion #1: Where Do We Want To Be?**	Stephen Epstein, MD, MPP, FACEP James J Augustine, MD, FACEP Bharat Saturiya, MD, FACEP Denys Lau, PhD Kenneth Rubin
1:15 pm - 1:30 pm	Break & Transition to Break Out Sessions	
1:30 pm - 2:30 pm	**Break Out Session #2: How Do We Get There?** *Categories & Topics will mirror Session #1*	Session #1 Moderators
2:30 pm - 2:45 pm	Break & Transition from Break Out Sessions	
2:45 pm - 3:30 pm	Reports from Break Out Sessions	Break Out Session Moderators
3:30 pm - 4:30 pm	**Panel Discussion #2: How Do We Get There?**	Todd Taylor, MD, FACEP Don Rucker, MD, FACEP Christopher Alban, MD, MBA David Nilasena, MD, MSPH, MS Tom Sugarman, MD, FACEP, FAAEM
4:30 pm - 5:00 pm	Q&A, Next Steps, Thanks	James J Augustine, MD, FACEP

HIT Summit

- The overall objective of this Summit is to bring stakeholders & industry experts together to better understand the future state of Healthcare IT (HIT) & explore tactics, actions & strategies to achieve common goals.
- After setting the stage with a limited number of short presentations, the majority of the Summit will be an interactive discussion format.
- The work product of the Summit will be summarized & serve as a guidebook for ACEP's future planning & policy/advocacy.

Break Out Sessions

There will be two, 1-hour break out sessions with a moderator, a scribe to record findings, & 8-10 attendees in each topic group. The work product for each group will be presented to all attendees, with additional discussion, as time allows. Following each report, a panel discussion with various stakeholders will respond to the findings. The topics will be the same for both break out sessions, but the objective for each session differs.

Break Out Session #1: Where Do We Want To Be?

This break out session will focus on an ideal future state of HIT with each individual group discussing each topic. This break out session is intended to be brainstorming, where there are no bad or crazy ideas. These ideas should be stratified into short/mid/long-term goals, where certain aspects may be necessary to precede others. While groups are not necessarily limited to the respective topics, the assigned topics should be the primary focus.

Break Out Session #2: How Do We Get There?

This break out session will focus on tactics, actions & strategies to achieve the ideal state proposed in the earlier session. This break out session is intended to be practical, realistic, reasonable & not so much idealistic. These ideas should be stratified into short/mid/long-term goals, where certain aspects may be necessary to precede others. While groups are not necessarily limited to the respective topics, the assigned topics should be primary focus.

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Break Out Session Category: CARE DELIVERY

1. Data Acquisition, Management, Utilization, Augmented Intelligence, Information to Knowledge

Recent HIT efforts have been largely focused on EMR/EHR implementation, which focuses on data input/acquisition, data management/presentation, & less so for data utilization, augmented intelligence & transformation of information into knowledge.

2. Data Integration/Aggregation, Clinical Analysis, Automation, Data Transparency, HIE

Data silos (even within the same institution) have been the bane of healthcare for years. The typical response is to tout "standards," which have had some impact, but have largely fallen short. Is there a future state (for example, cloud-base data repository)? What opportunities would such a repository enable? Clinical analysis may never reach its potential without broad-based data aggregation. Automation refers to the ability to use technology to do menial tasks, such as tracking location. Data transparency refers to prevention of intentional data sequestration to gain an advantage. HIE is perhaps obvious, but to date has been limited to local or regional data sets.

3. HIT: Policy, Advocacy, Funding, Administration, Data-Driven Healthcare, Political Realities

HIT, in certain respects, mirrors healthcare policy in general – a mixture of public and private, including funding, competing priorities, distributed delivery, multiple standards and processes, a lack of coordination, a lack of transparency, & more. An additional challenge is a lack of insight as to the future of healthcare, but regardless of which system prevails, HIT will continue to be a necessity. Further, certain political realities have hampered HIT advancement (such as the prohibition of a Universal National Patient Identifier, sequestration of certain data types, consent issues, and more).

4. Distributed Healthcare: Telehealth, Distributed Delivery Models, Care Coordination

Advancements in diagnostic & treatment modalities have moved rapidly, with the potential to cure or significantly alter the course of many diseases (for example, immune therapy). Yet, healthcare delivery models have changed more slowly, despite advancements in communications technology. For example, the delivery model for emergency medicine has changed little in the last 30 years – hub & spoke centralized care to which patients are transported. Further, decreasing availability (actually a distribution issue) of specialty care forces frequent transfers. Are there more efficient and/or cost effective alternatives?

Break Out Session Category: DATA SCIENCES

5. Population Health

Population health is health outcomes of a group of individuals, including the distribution of such outcomes within the group, which are often based on geographic populations (communities, corporation employees, etc.) or disease-oriented (such as diabetes). How should HIT support the management & advancement of this burgeoning healthcare area?

6. Quality Initiatives, Outcome Measures, Data-Driven Guidelines/Best Practices, Learning Networks

Few areas of healthcare are as data driven as these. Building on current efforts, where should HIT take these important sectors?

7. AI, CDS, Predictive Modeling

Often considered to be the "Holy Grail" of healthcare, these data science areas are barely nascent. What aspects of HIT are required to advance these fields? For example, even simple CDS such as drug-drug interaction & allergy checking fail due to a delay in input or lack of transparency for these data elements. For these to be effective in the emergency department, more data acquisition needs to occur earlier in the visit.

8. Data Aggregation, "Big Data" Analytics, Surveillance, HIE

What is the future of large data sets? What is necessary to achieve these aspirations?

Break Out Session Category: WILD CARD

9. Define Your Own

An open, no-holds-barred discussion of the ideal emergency department healthcare HIT environment.

American College of Emergency Physicians®

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1669_0619

Presenters:

Vidor E. Friedman, MD, FACEP

Dr. Friedman was elected President of the American College of Emergency Physicians in October of 2018. He was elected to the Board of Directors in 2012, and again in 2015. He has served as Chair of the Emergency Medicine Foundation and is a Past-President of the Florida College of Emergency physicians.

He was the Director of Emergency Services for Florida Hospital Celebration Health, in Orlando Florida, 1998-2009. In addition, he was one of the first Emergency Medicine physicians to serve as Chief of Staff within the Florida Hospital system.

He is a past Chair of the Federal Governmental Affairs committee of American College of Emergency Physicians, as well as FCEP's Governmental Affairs committee, and has served as a trustee of the National Emergency Medicine Political Action committee for over 5 years.

Dean Wilkerson, JD, MBA, CAE

Dean Wilkerson joined the American College of Emergency Physicians as Executive Director in April 2004.

Before joining ACEP, he was National Executive Director and CEO of Mothers Against Drunk Driving (MADD) for 11 years and General Counsel for three years. Prior to joining MADD, Dean was a corporate attorney for Gardere & Wynne for six years.

Don Rucker, MD FACEP

Dr. Don Rucker, the National Coordinator for Health Information Technology, comes to the Office of the National Coordinator for Health IT (ONC) from the Ohio State University where he was Clinical Professor of Emergency Medicine and Biomedical Informatics and Premise Health, a worksite clinic provider, where he served as Chief Medical Officer. Dr. Rucker started his informatics career at Datamedic Corporation, where he co-developed the world's first Microsoft Windows based electronic medical record. Dr. Rucker has served terms on the Board of Commissioners of the Certification Commission for Healthcare Information Technology and Medicare's Evidence Development and Coverage Advisory Committee (MEDCAC) and has extensive policy experience representing healthcare innovations before Congress, MedPAC and HHS.

Todd Taylor, MD, FACEP

Emergency Physician\Clinical Informaticist (ABEM & ABPM Board Certified)
ACEP Section for Emergency Medicine Informatics, Founding Member & Past Chair
ACEP Council (House of Delegates), Past Speaker
Microsoft Health Solutions Group, Former Physician Executive

Presenters:

John T. Finnell, MD, FACEP, FACMI

Dr. Finnell is an associate professor of clinical emergency medicine at Indiana University and a Research Scientist at the Regenstrief Institute. He is the fellowship program director for Clinical Informatics and is board certified in Emergency Medicine and Clinical Informatics. Dr. Finnell's work has primarily centered upon operational research within the emergency department where he was the chief architect of two ED information systems. Dr. Finnell is currently Director of Regenstrief's Clinical Informatics Fellowship Program. This two-year Accreditation Council for Graduate Medical Education program trains clinicians from all specialties in applied informatics, preparing them to become chief medical informatics officers or assume other leadership roles.

Jay Schuur MD, MHS, FACEP

Jeremiah D. Schuur, MD, is physician-in-chief of emergency medicine at Lifespan and chair of the department of emergency medicine at The Warren Alpert Medical School of Brown University. Dr. Schuur's research focuses on quality of care and patient safety in emergency medicine and the intersection of emergency care and health policy. He has been funded by the governmental agencies and foundations including the Agency for Healthcare Research and Quality, the Patient Centered Outcomes Research Institute, the Robert Wood Johnson Foundation, and the Centers for Medicare and Medicaid Services. He is currently co-leading ACEP's 4-year $4 million E-QUAL network, a national quality network funded by the Centers for Medicare and Medicaid Innovation. He has published over 100 peer-reviewed manuscripts.

Michael Gillam, MD, FACEP

Michael Gillam, MD, FACEP, FAAEM, is a medical informaticist, researcher, software architect, health IT strategist and board certified in emergency medicine. Most recently, he was a partner level physician executive and Director of the Microsoft Healthcare Innovation Lab which served as an incubation, technology transfer, and prototyping lab for next generation health informatics technologies. He was one of four physician directors of the team that built and sold the software which became one of Microsoft's flagship products in healthcare, Microsoft Amalga™. He has served as Chair of Informatics for both the Society for Academic Emergency Medicine (SAEM) and the American College of Emergency Physicians (ACEP).

Break Out Session Moderators:

Nicolas Gene, MD, PhD, FACEP

Dr. Genes is the Chair of the ACEP Section for EM Informatics, Associate Professor in the Department of Emergency Medicine at the Icahn School of Medicine at Mount Sinai in New York City, and serves as the lead informaticist for the six EDs of the Mount Sinai Hospital System. He is also Medical Director for the Mount Sinai's on-demand telehealth services. He has published research and spoken to national and international audiences on the topics of usability and clinical decision support, peer comparison feedback, technology for ED transitions of care, and the promise and risks of digital health and social media.

John T. Finnell, MD, FACEP, FACMI

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Todd Taylor, MD, FACEP

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Ed Barthell, MD, FACEP

Dr. Edward Barthell, EMI Section Founder, was the First Chair and Councilor for EMI. He is a board-certified emergency physician with over 20 years of clinical experience and a Masters in Medical Informatics. He founded a regional HIE in Wisconsin, worked at Microsoft as National Director of Connected Health and is currently the CEO of EmOpti and active member of Golden Angels Investors. preparing them to become chief medical informatics officers or assume other leadership roles.

Bharat Sutariya, MD, FACEP

Dr. Bharat Sutariya is the vice president and chief medical officer, population health, and is responsible for leading population health innovation strategy, and solution design for Cerner. In this capacity, he collaborates with leaders across the company and industry to enhance Cerner's industry leading Population Health Platform and solutions. He is an experienced executive and population health expert with a demonstrated history of disruptive innovation within population health and care delivery optimization.

David Nilasena, MD, MSPH, MS

Dr. Nilasena is the Chief Medical Officer for the U.S. Centers for Medicare & Medicaid Services' Dallas Regional Office. He has been with the agency since 1995. He is the regional lead for the agency's Value-Based Purchasing initiatives, including quality reporting and pay for performance programs in hospitals, ambulatory surgical centers and ambulatory care settings. He is also a lead contact for the Promoting Interoperability Programs and the Quality Payment Program (QPP).

Break Out Session Moderators:

Brian Fengler, MD, FACEP

As founder and Chief Executive Officer, Dr. Brian Fengler sets the vision and overall strategic direction for the company, while ensuring the Provider is kept at the forefront. As an Emergency Room Physician himself, Dr. Fengler founded EvidenceCare to fill a recognized need among Providers and in the healthcare community.

In addition to his role as CEO, Brian serves the company well as Chief Medical Officer, working with every Physician-author to ensure our medical content stays top-notch. He also oversees our technology team, championing the development of the most user-friendly platform that's ever reached a Provider's pocket.

James J. Augustine, MD, FACEP

Dr. James J Augustine, M.D., FACEP is an emergency physician, and a proud member of the Board of Directors of the American College of Emergency Physicians. He serves as a Clinical Professor in the Department of Emergency Medicine at Wright State University in Dayton, Ohio. Jim is the Chair of the National Clinical Governance Board for U.S. Acute Care Solutions, in Canton, Ohio. Dr Augustine served as Chair for The Joint Commission Hospital Professional Technical Advisory Committee, and on the Board of Commissioners. He is the Vice President of the Emergency Department Benchmarking Alliance (EDBA), and a national consultant, author, and speaker on emergency department operations and design.

Pannelists:

Steve Epstein, MD, FACEP

Dr. Steve Epstein is an emergency physician in practice for more than 20 years. As part of his training, he earned a Master's in Public Policy from the Harvard Kennedy School with a concentration in health policy. He has been involved in quality registry development since 2010. More recently, he has served as the founding chair of the American College of Emergency Physicians' Clinical Emergency Data Registry (CEDR), a CMS-approved qualified clinical data registry.

James J. Augustine, MD, FACEP

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Bharat Sutariya, MD, FACEP

See Page 7

Denys Lau, PhD

Denys T. Lau, Ph.D., is the Director of the Division of Health Care Statistics at the CDC National Center for Health Statistics, the Nation's principal health statistics agency. He oversees the Division that administers the National Health Care Surveys, which provide statistical information on the provision and use of ambulatory, inpatient, outpatient, long-term care, and end-of-life care services. The Division is currently transitioning some of its data collection efforts from manual abstraction of patient medical records to data extraction from electronic health record systems. Dr. Lau holds adjunct faculty appointments at the Johns Hopkins University, George Washington University, and University of Illinois at Chicago. He is a current associate editor of the American Journal of Public Health and former associate editor of Clinical Therapeutics. Dr. Lau earned his Ph.D. in health services research from Johns Hopkins University and B.A. with distinction from Cornell University. He completed a Pfizer post-doctoral research fellowship at the University of Michigan and a certificate program in management at the Kellogg School of Management at Northwestern University.

Kenneth Rubin

Ken Rubin is the Director of Standards for the VA Office of Knowledge Based Systems, with responsibility for health industry standards involvement for the Veterans Health Administration. In this capacity, Mr. Rubin oversees VHA involvement within the standards community, advocating for standards required to meet Veteran and VA needs, and promulgating the adoption and use of standards within VA efforts. Mr. Rubin is the principal author and key contributor to VHA's interoperability Roadmap, which includes both business and technical standards. Mr. Rubin is leading an industry effort to create Business Process Models for Healthcare, an open effort.

Pannelists:

Todd Taylor, MD, FACEP

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Don Rucker, MD FACEP

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Christopher Alban, MD, MBA

Dr. Christopher J. Alban, MD, MBA is a physician on the Clinical Informatics team at Epic Systems Corp. In his 17 years at Epic, he has been involved with sales, customer implementation and optimization, and software development for Epic's clinical applications. He has presented nationally and internationally on interoperability, terminologies, and EHR usage.

David Nilasena, MD, MSPH, MS

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Thomas Sugarman, MD, FACEP, FAAEM

Thomas Sugarman, MD, FACEP, FAAEM, has been practicing emergency medicine since 1992. He has been a partner with Vituity since 2001 and is currently the Senior Director of Government Affairs for Vituity. He is Chair of Emergency Services at Sutter Delta Medical Center where he was named emergency department physician of the year in 2005. He is immediate Past-President of the Alameda Contra Costa Medical Association, Co-Chair of the East Bay Safe Prescribing Coalition and a Past-President of the California Chapter of the American College of Emergency Physicians. California ACEP awarded him the Walter T. Edwards Meritorious Service Award.