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## Policy Measures and Reimbursement for Emergency Medical Imaging in the Era of Payment Reform: Proceedings From a Panel Discussion of the 2015 *AEM* Consensus Conference

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### Abstract

The Affordable Care Act (ACA) of 2010 is expanding the use of quality measurement and promulgating new payment models that place downward pressure on health care utilization and costs. As emergency department (ED) computed tomography utilization has tripled in the past decade, stakeholders have identified advanced imaging as an area where quality and efficiency measures should expand. On May 12, 2015, *Academic Emergency Medicine* convened a consensus conference titled “Diagnostic Imaging in the Emergency Department: A Research Agenda to Optimize Utilization.” As part of the conference, a panel of health care policy leaders and emergency physicians discussed the effect of the ACA and other quality programs on ED diagnostic imaging, specifically the way that quality metrics may affect ED care and how ED diagnostic imaging fits in the broader strategy of the U.S. government. This article discusses the content of the panel's presentations.

### INTRODUCTION

The Affordable Care Act (ACA) of 2010 has a variety of provisions that affect the delivery of emergency department (ED) care, specifically delivery system reform, payment reform, and insurance reform,<sup>1</sup> which will likely increase ED visit rates.<sup>2</sup> The ACA's overall goals are to expand and strengthen insurance coverage while implementing payment and delivery changes that will improve the value of medical care. Delivery system reform and the expansion of quality measurement programs are likely to affect the use of diagnostic imaging in the ED, as it is an area of high cost and rapid growth. For example, the use of

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computed tomography (CT) imaging in the ED increased by nearly three-fold over the decade of 2000–2010.<sup>3,4</sup> While there are studies describing improvements in patient outcomes,<sup>5</sup> other investigations find no measurable change,<sup>6,7</sup> leading to scrutiny on efficiency from government and private payers.<sup>8,9</sup>

On May 12, 2015, *Academic Emergency Medicine* convened a consensus conference titled “Diagnostic Imaging in the Emergency Department: A Research Agenda to Optimize Utilization” to explore issues in ED diagnostic testing and create a series of research agendas aimed at improving its use. One panel at the conference was devoted to discussing issues related to quality and reimbursement in ED diagnostic imaging, and included health policy leaders and emergency physician (EP) leaders. These speakers were selected because of their leadership positions in the federal government, the National Quality Forum (NQF), and the emergency medicine (EM) research community. The panel described how physician professional societies are attempting to measure quality of ED imaging, how the Centers for Medicare and Medicaid Services (CMS) is attempting to measure and reimburse for quality, and lessons learned from past efforts to implement quality metrics inside and outside of the ED community.

## INTRODUCTORY REMARKS

Dr. Jesse Pines, Director of the Office for Clinical Practice Innovation and Professor of Emergency Medicine and Health Policy at The George Washington University School of Medicine, moderated the panel and gave opening remarks. He described how the narrative of medical care has changed over the last decade: initially, care practices were hailed as advanced and lifesaving, while they are now often seen as wasteful and even harmful due to intensive, expensive services rendered. As the truth is likely somewhere in the middle, he cautioned that policies aiming to reduce utilization must be thoughtfully constructed and implemented. This is especially true regarding quality measures in ED care, as the evidence to support such measures is at an early phase in development.<sup>10</sup> In order to safely reduce diagnostic imaging utilization, there needs to be a robust measurement system in place to accurately differentiate utilization rates or appropriateness in reliable, valid ways within physician groups and across hospitals. Once a robust system is developed, physicians need the tools to be able to safely reduce imaging. While some tools exist in the form of validated clinical decision rules, the most efficient, cost-effective, and safe methods by which to deploy these rules in electronic health records (EHR) to reduce imaging rates is not a developed science. A premature policy push to reduce imaging without validated tools theoretically has the potential to harm patients through delayed or missed diagnosis if providers experience pressure to reduce imaging indiscriminately. This article will explore past imaging measures and critique their flaws, which will lead readers to understand how measures can lead to unintended consequences.

## PHYSICIAN PROFESSIONAL SOCIETY EFFORTS TO MEASURE IMAGING QUALITY IN EMERGENCY CARE

Dr. Jeremiah Schuur, Chief of the Division of Health Policy Translation and the Vice Chair of Patient Safety and Quality for the Department of Emergency Medicine of the Brigham

and Women's Hospital, and an Assistant Professor of Emergency Medicine at Harvard Medical School, reviewed efforts by professional societies to measure quality related to ED diagnostic imaging. He started by describing two mechanisms by which efficiency in imaging can be measured: utilization and appropriateness.

In utilization metrics, the goal is a lower score, the construct being that physicians are overusing imaging. This measure is calculated by dividing the specific number of tests by the number of patients at risk; for example, the number of head CTs in patients presenting to the ED with head trauma or headache. Imaging utilization metrics face several challenges when applied to the ED. First, most ED imaging is done in the context of a patient's chief complaint (e.g. blunt head trauma and headache), rather than a definitive diagnosis (e.g. intracranial hemorrhage), which is usually unknown when imaging decisions are made. Imaging metrics should group ED patients with similar complaints together, such as abdominal pain; however, there is no common system for comparing patients with a chief complaint of abdominal pain because no universal categorization system exists for chief complaints, and it is not routinely collected in administrative databases.<sup>11</sup> Most metrics have been developed using diagnosis codes rather than chief complaint as the denominator for quality measures, which limits their utility.

An alternative approach to measuring imaging is the appropriateness measure, where the goal is a higher score. In this case, the denominator is the number of patients who received the test (e.g. CT brain) and the numerator is the number of patients with appropriate indications for a test (e.g. Glasgow Coma Scale [GCS] score < 14). Appropriateness measures appeal to clinicians as they can directly align with the clinical evidence, guidelines, and decision tools that support evidence-based imaging.<sup>12</sup> However, appropriateness measures are more technically complex as they require data on the indication for an imaging test, which are not a part of standard administrative data sets or current EHR data. As clinical decision support expands, these data will become more available, but will likely be specified differently in each EHR until national standards are developed. The Protecting Access to Medicare Act (PAMA) of 2014 will accelerate this process, as it requires hospital-performed imaging to include a consultation of applicable evidence-based appropriate use criteria by 2017.<sup>13,14</sup> While this law exempts emergency imaging, it may expand to include ED imaging because hospitals often have integrated EHRs that include the ED.

When considering new quality measures, it is important to keep in mind clinical relevance, the feasibility of collecting necessary data, and the ultimate reliability and validity of the measure.<sup>11,12</sup> The validity of a performance measure refers to the extent to which it truly measures that which it is intended and designed to measure. Reliability refers to "the stability of a set of observations generated by an indicator under a fixed set of conditions, regardless of who collects the observations or of when or where they are collected,"<sup>15</sup> and is a scientific attribute of measurement instruments.

Dr. Schuur went on to describe the CMS OP-15, "Use of Brain Computed Tomography (CT) in the Emergency Department for Atraumatic Headache,"<sup>16</sup> as an example of an ED imaging measure that proved neither reliable nor valid. OP-15 was developed by a

contractor for CMS, based on expert opinion and utilization data from Medicare claims. It uses ICD-9 diagnosis codes to calculate the percentage of all ED visits for headache with coincident brain CT studies. As an appropriateness measure, OP-15 defines the measure population using ICD-9 codes for atraumatic headache, and defines measure exclusions, such as subarachnoid hemorrhage, pregnancy, HIV, focal neurological deficit, tumor/mass, and patients who underwent lumbar puncture.

While the use of ICD-9 codes to identify patients with a headache diagnosis is feasible, EPs were concerned that coding did not reliably exclude patients as designed. Dr. Schuur and colleagues published a study demonstrating that 65% of cases flagged by the measure as inappropriate actually met exclusion criteria when the medical record was reviewed. The validity of the measure was only 17%: on chart review, 83% of cases included had either an OP-15 exclusion or a consensus indication for imaging. Among cases assessed as inappropriate, chart review showed that 22% had thunderclap or sudden onset headache; 14% were for trauma; 14% had a prior history of neurosurgical intervention; 11% had tumor, other mass, or cancer; 11% had LP performed; 11% had focal neurological deficit; and 10% were taking warfarin.<sup>17</sup> This measure was not endorsed by the NQF given concerns about reliability and validity. Furthermore, this measure is currently being proposed for removal from the Hospital Outpatient Quality Reporting (OQR) Program.

Dr. Schuur proposed that three elements should be targeted as stakeholders, including payers, regulatory bodies, and provider organizations, and that they develop quality measures of *provider* performance for emergency imaging:

1. The *provider* must be able to influence the process being measured. For instance, a poor measure of emergency *provider* quality would be to track average radiation dose for CT scans done for renal colic because the EP does not control dose. A better measure would calculate how frequently an EP orders CT for patients with flank pain.
2. Sample size needs to be sufficient, usually greater than 20 patients or cases. Measuring frequency of magnetic resonance imaging (MRI) for dizziness might produce too low of a sample size, while frequency of radiography for low back pain could yield a much larger sample.
3. Data collection by the hospital or provider group also must be feasible. Currently this means data from administrative sources including EHRs, but not manual chart review, may be included.

Dr. Schuur then focused his discussion on the Physician Quality Reporting System (PQRS),<sup>18</sup> which is maintained by CMS. Prior to 2015, PQRS offered bonus payments to physicians and groups who reported quality performance using claims submissions. This allowed CMS to track performance and provide individuals or practices with feedback compared to national benchmarks. Starting in 2015, physicians and groups are instead penalized financially for *not* participating in PQRS.<sup>19</sup> While PQRS is an innovation and engages many providers in quality measurement for the first time, it has several limitations: 1) it primarily tracks data for Medicare patients, 2) it includes a limited number of quality measures given the range of specialties practiced by eligible professionals required to report

under the program, and 3) it requires CMS to do significant administrative work for the nearly one million U.S. Medicare eligible providers. Currently and going forward, provider quality reporting can be performed through a qualified clinical data registry (QCDR).

In order to meet CMS requirements for QCDRs, the American College of Emergency Physicians is currently developing the Clinical Emergency Data Registry (CEDR)<sup>20</sup> for EPs, which will be the first specialty-wide registry at the national level. CEDR will allow EM providers to submit quality and performance data on all patients (not just Medicare patients) and satisfy CMS reporting requirements for quality metrics. It is being designed to measure and report health care quality and outcomes for individual clinicians. It will also provide data to identify practice patterns, trends, and outcomes in emergency care that will lead to improvements in quality of care.

Dr. Schuur reviewed four measures of ED imaging that have been developed and approved through ACEP's Quality Measure Technical Expert Panel, which may prove to be useful metrics of emergency care.

- 1      Ultrasound determination of pregnancy location for pregnant patients with abdominal pain: the percentage of pregnant female patients aged 14 to 50 years who present to the ED with a chief complaint of abdominal pain or vaginal bleeding who receive a trans-abdominal or trans-vaginal ultrasound to determine pregnancy location.
- 2      ED utilization of CT for minor blunt head trauma for patients aged 18 years and older: the percentage of ED visits for patients aged 18 years and older who presented within 24 hours of minor blunt head trauma with a GCS score of 15, and who had a head CT for trauma ordered by an emergency care provider and an indication for a head CT.
- 3      ED utilization of CT for minor blunt head trauma for patients aged 2 through 17 years: the percentage of ED visits for patients aged 2 through 17 years who presented within 24 hours of minor blunt head trauma with a GCS score of 15 and who had a head CT for trauma ordered by an emergency care provider, who are classified as low-risk according to the Pediatric Emergency Care Applied Research Network prediction rules for traumatic brain injury.<sup>21</sup>
- 4      Appropriate ED utilization of CT for pulmonary embolism: percentage of ED visits during which patients aged 18 years and older had a CT pulmonary angiogram ordered by an emergency care provider, regardless of discharge disposition, with either moderate or high pre-test clinical probability for pulmonary embolism OR positive result or elevated D-dimer level.

In addition, he described two further measures that were in development:

- 5      Avoiding imaging for adult ED patients with atraumatic back pain without red flags: the percentage of patients aged 18 to 50 years with an ED discharge diagnosis of atraumatic low back pain of onset less than 28 days prior to ED presentation for whom a lumbar imaging study (i.e., plain film radiography, MRI, or CT) is ordered during the ED stay.

- 6 Inappropriate imaging for recurrent renal colic: the percentage of ED visits for patients aged 18 to 50 years with recurrent renal colic during which no imaging is ordered, OR plain film radiography, ultrasound, or low-dose CT is ordered.

The CEDR is including these measures of imaging efficiency among a suite of emergency care quality and safety measures because the EM experts on the Technical Expert Panel believe that imaging efficiency can be improved in the ED. While imaging is an integral part of high-quality emergency care, evidence demonstrates wide institution- and provider-level variation in utilization of certain studies without measurable differences in patient-centered outcomes.<sup>22,23</sup> The aim of CEDR is to measure imaging use to develop standard benchmark utilization rates and then compare practice among different institutions and providers, thereby allowing EDs to better identify particular studies that may be targets for decreasing utilization. At this time, safe utilization reduction practice using benchmarked imaging rates is primarily theoretical. However, given the potential for decreasing high-cost imaging envisioned by payers, it is likely that public and private payers alike will soon attempt to initiate utilization-reduction policies that target ED imaging such as the above measures.

## THE ROLE OF CMS IN HEALTH SYSTEM TRANSFORMATION

The next talk was by Dr. Nancy L. Fisher, CMS Chief Medical Officer, Region 10. Dr. Fisher commenced her presentation describing how quality measures and methods of reimbursement are undergoing a renaissance in the era of the ACA. In order to understand how imaging in the ED will be affected, it is first necessary to review how quality measures and reimbursement strategies will be changing. While the ACA mandates quality measures and changes in reimbursement for delivery of care to primarily Medicare and Medicaid patients, establishment of high-quality practices for this large subset of patients should ultimately lead to widespread adoption for all patients in the United States.

The philosophy for implementation of the ACA is: “Better. Smarter. Healthier.” A large amount of variation exists in the intensity of health services<sup>24,25</sup> and the quality of care delivered.<sup>10,26</sup> Comprehensive quality care can only be delivered with increased evidenced-based standards for health care, more intelligent medical spending, and increased communication with improved coordination among health care providers.<sup>27</sup> Six National Quality Strategy priorities have been identified as the most critical to quality improvement: 1) care safety, 2) care coordination and effective communication, 3) prevention, 4) patient engagement, 5) population and community health, and 6) efficiency and cost reduction through new health care models.<sup>28</sup>

Within each priority, quality measures are being evaluated, developed, and changed, with a priority being placed on patient-centered outcomes. The traditional fee-for-service model rewarded intensity and volume of services. Since 2011, there has been increasing linkage of payment to quality measures and value. While this linkage encourages and incentivizes the move from volume to value, it encourages providers to consider efficiency in daily practice. With EHR systems, there are new ways to not only track and report quality, but also provide easier access to assess successes and needs for improvement. Moving forward, a greater portion of payment will be based on new alternative payment models where providers will be accountable for both quality and cost. The goal is to achieve 50% of Medicare payments

based on new alternative payment models by 2018.<sup>29</sup> Examples of alternative payment models include next-generation accountable care organizations, bundled payments, integrated advanced primary care practices, and the Maryland All-Payer Hospital Payments.<sup>30</sup>

When it comes to achieving better care, smarter spending, and healthier people, medical imaging in the ED, like most areas of medicine, has room for improvement. While utilization in the ED for non-emergent health issues is decreasing in some sectors,<sup>31,32</sup> many individuals still receive primary care in the ED. This can significantly increase the scope of practice of the ED practitioner. Given that new evidence is often generated rapidly, it is challenging for clinicians to have up-to-date knowledge regarding the diagnosis and management of every emergency and primary care disorder. A clinical decision support mechanism may be warranted to increase clinicians' reliability in ordering the correct study every time. Additionally, quality improvement measures should not only ensure that the right procedure is done for the right patient each time, but also that it is done the appropriate number of times. Last, care coordination within and without the facility is imperative. All pieces of the imaging puzzle need to align to ensure the best outcomes for individual patients and the population at large.

## THE INTENDED AND UNINTENDED CONSEQUENCES OF QUALITY MEASURES

The final talk was by Dr. Helen Burstin, Chief Scientific Officer at NQF. She started her comments by talking about the struggles of generating meaningful quality information, and specifically, the issue of determining whether quality measures are having intended or positive results. After having worked with many of the most prominent quality measures, she has seen some fail and some succeed. Despite good intentions, not all measures prove to be valuable after implementation.

She described a variety of different measures that had created unintended consequences, including the Brain CT OP-15 measure<sup>16</sup> that was described earlier by Dr. Schuur. In addition, she described a retired measure, Pneumonia PN-5b, which is known as "Initial Antibiotic Received Within 4 Hours of Hospital Arrival," where the goal was to ensure prompt treatment for admitted patients diagnosed with pneumonia.<sup>33</sup> PN-5b had been developed after retrospective studies demonstrated lower mortality when antibiotics were delivered in a timely manner.<sup>34,35</sup> The implementation of PN-5b led to a number of unintended consequences, including "overtriage" for potential pneumonia patients, and administration of antibiotics to patients who did not ultimately have pneumonia.<sup>36</sup> Because of these concerns, and because of a growing consensus that the new measure was not proving to be cost-effective or to improve mortality, the measure was first modified and then ultimately discontinued. She thought that if PN-5b had undergone extensive pilot testing, it might have been implemented better—or perhaps it would not have been implemented at all. The lesson to be learned from this measure is pilot testing should be done when feasible, and when not feasible, stakeholders including physicians should be involved to the fullest extent possible prior to implementation of similar measures.

Dr. Burstin also discussed a central line-associated blood stream infections (CLABSI) measure, which is an example of how quality measurement had clearly improved the quality of patient care. In the early 2000s, medical research began to focus on nosocomial infections as one cause of prolonged inpatient stays and increased mortality. Specifically, CLABSIs were occurring, and studies were beginning to reveal that simple precautions such as sterile technique and removal of unnecessary central lines could prevent infection.<sup>37</sup> Measure EP-10 requires use of "a catheter checklist and a standardized protocol for central venous catheter insertion."<sup>38</sup> CLABSIs are tracked at the hospital level, and reimbursement is contingent on measure performance. This measure has been hailed as one of the most effective patient safety measures to date, as the prevalence of CLABSIs has decreased dramatically: 59% between 2001 and 2009.<sup>39</sup>

In developing the next generation of ED imaging quality measures, it is clear that future measures will require careful review by a diverse set of stakeholders, including practicing physicians, prior to implementation. For each measure it will be necessary to ask: what is the intended use of the measure, and do available data accurately describe the clinical encounters of interest? Relevant stakeholders should be present during the development of the measures, including government personnel, hospital administrators, care providers, and patients. Utilization measures used to identify outliers may be helpful. Appropriateness measures are even more important to develop, but care must be taken that the intended numerators and denominators are measurable and meaningful. Future improvements to obtaining data on quality measures should include integration of data registries with EHRs, because this process is rarely straightforward in the current climate.

Important larger questions to answer in the future include: 1) how can cost measures be integrated with quality, and should cost measures be integrated with quality measures or instead sought in isolation; 2) should measures be developed if providers cannot directly affect the outcome of interest; and 3) how do we obtain accurate information from "the field" when measures are producing unintended consequences? The last question is perhaps the most important, given that any measure implemented is likely to affect the practice of medicine on the front end if care providers fear their reimbursement could be affected.

## CONCLUSIONS

Patients, emergency physicians, and government stakeholders all have an interest in improving health care, with more intelligent use of resources being necessary to produce better value. In the words of the 2010 *AEM* consensus conference authors, "The ideal emergency care system delivers the right care to the right patient at the right time, and yields appropriate patient outcomes at a sustainable overall cost."<sup>40</sup> The Centers for Medicare and Medicaid Services is nudging health care providers and networks toward novel payment models, and these models will be dependent on using more and better measures of quality, cost, and outcomes. There is much work to be done to produce effective quality measures that will guide the practice of emergency medicine. However, with the combination of professional organization efforts in this arena along with those of the government, the development of meaningful quality measures and fair reimbursement protocols is within reach. (CMS notes that since this panel discussion, it has proposed to remove the OP-15



measure from the Hospital Outpatient Quality Reporting Program. Readers should refer to the CY 2016 Hospital Outpatient Prospective Payment System, and Ambulatory Surgical Center Payment System Proposed Rule (CMS-1633-P) for details.<sup>41)</sup>

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