Research Report

Implementation of Changes to Medical Student Documentation at Duke University Health System: Balancing Education With Service

Jane P. Gagliardi, MD, MHS, Brian Bonanno, CPC, Eugenia R. McPeek Hinz, MD, MS, R. Clayton Musser, MD, MS, Nancy W. Knudsen, MD, Michael Palko, Felice McNair, MBA, CPC, CPMA, CEMC, Hui-Jie Lee, PhD, and Alison S. Clay, MD

Abstract

Purpose

When the Centers for Medicare and Medicaid Services (CMS) changed policies about medical student documentation, students with proper supervision may now document their history, physical exam, and medical decision making in the electronic health record (EHR) for billable encounters. Since documentation is a core entrustable professional activity for medical students, the authors sought to evaluate student opportunities for documentation and feedback across and between clerkships.

Method

In February 2018, a multidisciplinary workgroup was formed to implement student documentation at Duke University Health System, including educating trainees and supervisors, tracking EHR usage, and enforcing CMS compliance. From August 2018 to August 2019, locations and types of student-involved services (student–faculty or student–resident–faculty) were tracked using billing data from attestation statements. Student end-of-clerkship evaluations included opportunity for documentation and receipt of feedback. Since documentation was not allowed before August 2018, it was not possible to compare with prior student experiences.

Results

In the first half of the academic year, 6,972 patient encounters were billed as student-involved services, 52% (n = 3,612) in the inpatient setting and 47% (n = 3,257) in the outpatient setting. Most (74%) of the inpatient encounters also involved residents, and most (92%) of outpatient encounters were student–teaching physician only. Approximately 90% of students indicated having had opportunity to document in the EHR across clerkships, except for procedure-based clerkships such as surgery and obstetrics. Receipt of feedback was present along with opportunity for documentation more than 85% of the time on services using evaluation and management coding. Most students (> 90%) viewed their documentation as having a moderate or high impact on patient care.

Conclusions

Changes to student documentation were successfully implemented and adopted; changes met both compliance and education needs within the health system without resulting in potential abuses of student work for service.

Inclusion of medical student documentation in the medical record has fluctuated over many years, from students writing physical notes in the chart with co-signature by attending physicians to near exclusion of students from the electronic health record (EHR). For 16 years, medical student documentation was relegated progressively as supplemental or “for educational purposes only” and limited only to review of systems and social history.[1] Widespread implementation of the EHR, including security limitations for medical student access and billing guidelines, significantly affected medical students’ roles in clinical care and medical decision making. Medical students unable to participate in EHR documentation have reported feeling insufficiently engaged in patient care.[2] Precepting physicians busy with patient care have felt additionally burdened by teaching when students were artificially separated from patient care activities, resulting in difficulty recruiting and retaining community-based preceptors.[3] Indeed, the Society for Teaching in Family Medicine issued position statements asking the Centers for Medicare and Medicaid Services (CMS) to change guidelines based on both a lack of student exposure to documentation and the burdens placed on preceptors to teach and then separately document encounters.[4,5]

In 2018, the CMS changed billing guidelines[6] specific to the use of documentation by medical students (defined as students enrolled in a degree program to earn an MD degree). Some experts advise caution regarding reintroducing medical student documentation to patient care activities. One concern is that “education” will suffer at the hands of “service,” with students being asked to act as scribes.[7] Another concern is the possibility that students, when documenting in the EHR, will somehow learn more about billing than about clinical reasoning.[8] Some authors raise the possibility that, since every preceptor uses the EHR in their own individualized manner, it will not be possible for students to learn anything about meaningful use.[9] In addition to effects on education itself, concerns exist about the impact of changing workflows and processes. Perhaps student participation in documentation will provide no benefit to or, worse, even exacerbate preceptor burnout.[10]

Please see the end of this article for information about the authors.

Correspondence should be addressed to Alison S. Clay, Department of Medicine, Duke University School of Medicine, 8 Searle Center Dr., TSCHE 1074, Durham, NC 27710; telephone: (919) 812-3024; email: alison.clay@duke.edu; Twitter: @AS_Clay.

Acad Med. 2021;96:900–905.
First published online September 8, 2020
doi: 10.1097/ACM.0000000000003729
Copyright © 2020 by the Association of American Medical Colleges

Supplemental digital content for this article is available at http://links.lww.com/ACADMED/B23.

Copyright © by the Association of American Medical Colleges. Unauthorized reproduction of this article is prohibited.

While there may be costs to including medical students in EHR documentation, there may also be important opportunities for education. Students may improve their ability to document a medical encounter properly, a skill essential for internship.[11] Students involved in meaningful work may also find themselves more engaged with the team during the course of an encounter.[12] Improved engagement and meaning could improve medical student education rather than compromising it.[11] This effect may extend to their supervising physicians, who have reported greater satisfaction when they are able to delegate elements of documentation.[13] Supervisors who spend less time on the intricacies of documentation may have more time to give to patients as well as learners.[14] Finally, in the longer term, giving students more responsibility may add value to health systems by facilitating the transition from observer to accountable health care professional.[15]

With an overall goal of improving medical student education and patient care at our own institution, we looked to other groups' experiences to inform our process.[11,16] We worked to implement clear recommendations and parameters for medical student documentation, physician review and oversight, and criteria for assessment, all toward the goal of promoting a new model of medical student documentation with the class starting clerkships at Duke University in August 2018. We hypothesized that student documentation would increase after implementation and that students would report feedback on their notes since supervisors were using new attestations statements that included any edits or changes. We planned to proactively review the number of notes written each 4 weeks in each clinical department and to question students on required clerkships about opportunities for documentation and receipt of feedback on the end-of-course evaluations. We also hypothesized that the 2 specialties with more procedures (obstetrics–gynecology, surgery) might have lower rates of implementation of student documentation since much of their billing is bundled care and the billing requirements differ from typical fee-for-service charges.

Background

Changes to policy, creation of a work group, and development of attestation statements

After publication of the new CMS requirements for medical student documentation, a multidisciplinary workgroup formed, including representatives from undergraduate and graduate medical education (GME), health system and physician practice group compliance offices, and health system information technology. The group convened in January 2018 and met biweekly through implementation and the study period.

The group discussed the new requirements, defining existing workflows for patient encounters that involved students, residents, and faculty members in both inpatient and outpatient environments. The group reviewed workflows with the compliance officers to determine if each workflow met each component of the new CMS guidelines:

- A teaching physician who has completed residency and practices medicine in a clinic or hospital or is a resident physician must be physically present in the patient's room when the evaluation and management service is performed.
- Medical students may document their findings in the medical record. However, the teaching physician must verify in the legal medical record all student documentation/findings.
- The teaching physician must personally perform (or re-perform) the physical exam and medical decision-making activities of the evaluation and management service being billed.
- The teaching physician must attest to the note written by the medical student.

The workgroup also considered the educational opportunities afforded by the CMS changes and committed to developing a new policy that not only was compliant but also increased opportunities for feedback to the students.

The workgroup developed an ideal 2-column student note template within Epic, the EHR used by Duke University Health System, that allowed students to document the history, physical exam, testing, and medical decision making in the left-hand column. The student identified who observed their history-taking/patient encounter. The right-hand column was for the attending physician and included any changes or corrections that the attending wished to make as well as specific attestations for each aspect of the note (history, physical exam, and medical decision making). The goal of this template was to allow the student to easily see changes made by the attending physician and to reinforce the specific components of the 2018 CMS billing guidelines that differed from attestations used in GME.

However, recognizing that providers often have their own templates and are accustomed to seeing their notes a given way, attestations were also created that could be added to the end of notes based on other templates. At our institution, attestation statements create claims logic that drives billing. These attestation statements assure that services (including resident-involved services) are captured and appropriately billed. We created attestation statements for both student–teaching physician and student–resident–teaching physician encounters based on those used in current GME workflows involving residents. Attestations were developed into "dot phrases" for quick insertion by the user into any patient care note within the EHR:

- .attSTTP—Student-involved services with teaching physician only: I was present with the medical student and patient during performance of obtaining the history, physical examination, and medical decision making (assessment and plan) by (student name***) and I verify the findings documented. I personally re-performed a physical examination (including ***/excluding ***) and below is additional information pertaining to the patient's encounter.
- .attSTFR—Student-involved services with resident and teaching provider: The resident was present with the medical student and patient during the performance of obtaining the history, physical examination, and medical decision making (assessment and plan) by (student name***) and I verify the findings documented. I personally re-performed a physical examination (including***/excluding***) and below is additional information pertaining to the patient's encounter.

Copyright © by the Association of American Medical Colleges. Unauthorized reproduction of this article is prohibited.

Student, resident, and faculty development: Learning management system

The workgroup created a short learning management system module to teach students, residents, and faculty about these new CMS and health system requirements (see Supplemental Digital Appendix 1, available at http://links.lww.com/ACADMED/B23). This interactive tutorial displayed existing patient workflows across departments. Participants were asked which specific components of the CMS guidelines were met for each workflow and whether the encounter was a billable encounter. The module provided specific feedback for each user's answers. Although billing is not a student or resident responsibility, their decisions about how to provide and document patient care ultimately affect if an encounter is billable, so a decision was made that all users see each participant's responsibilities.

All medical students and residents were required to complete the module. The training was also mandatory for attending physicians who wished to bill student encounters. Supplemental materials, including tip sheets and video tutorials, were provided. Completion of the module was tracked. Participants were asked to evaluate the module and commit to making at least one change in their practice to improve education.

Method

Study population

We included all clinical documentation with attestation statements in the EHR indicating student-involved services in this study. End-of-clerkship evaluations completed by second-year medical students from August 2017–March 2018 and from August 2018–March 2019 were included.

Assessment and analysis

To assess compliance and use of documentation, the compliance office pulled encounters with attestation statements for student-involved services, including those with the 2-column note, before billing. All charges were held in work queues that allowed compliance officers (including B.B. and F.M.) to assess appropriateness of the documentation and use of attestations, as well as to provide feedback to our workgroup, departments, and high utilizers. This occurred weekly in the first month, biweekly the month after, and then monthly. Using attestation statements, the group assessed the number of notes in specific billing areas (departments, inpatient vs. outpatient) and whether the notes documented student–teaching physician encounters or student–resident–teaching physician encounters. To encourage adoption, Duke University Health System, School of Medicine, and Private Diagnostic Clinic (the faculty practice) sent out updates to students and faculty about specific departments and individuals who were high utilizers. The compliance officers were able to accomplish this work by shifting priorities without requiring additional FTEs.

To assess opportunities for students to document within the required clerkships (medicine, surgery, obstetrics–gynecology, pediatrics, neurology, psychiatry, family medicine and community health, and radiology), the School of Medicine added standard questions to the end-of-clerkship evaluation (which includes questions about clinical and educational opportunities as well as perceived mistreatment), asking:

- Did you have an opportunity to write a patient note in the EHR? (Yes/No)
- If yes, please rate this opportunity's impact on patient care. (High impact/Moderate impact/No impact)
- Did you receive faculty feedback on your EHR note? (Yes/No)

We summarized students' responses for each required clerkship with frequencies and percentages to reflect the opportunity to write patients' notes in EHR after the change in CMS policy. To examine whether students had equal opportunity to document between clerkships, we compared students' responses between required clerkships using Fisher's exact tests.

To examine the effect of CMS policy change on education outcomes, we summarized the levels of confidence in different skill areas, including documentation, with frequencies and percentages and compared between students before and after the CMS policy change using Fisher's exact tests. A 2-sided significance level of 0.05 was used for all statistical tests without multiple comparison adjustment. We conducted all statistical analyses using SAS statistical software, version 9.4 (SAS Institute, Cary, North Carolina).

We also collected unsolicited feedback and provided it via email to workgroup members. The Duke University Health System institutional review board reviewed this study and considered it exempt from further review.

The School of Medicine has a robust reporting system for mistreatment of medical students, both on end-of-course evaluations and through an adverse event reporting system. Due to concerns about potential mistreatment of students as scribes, we monitored this system for any reports specific to documentation.

Results

Training and student documentation in the EHR

During the first academic year (August 2018–August 2019), 1,323 individuals completed the training course. From August 2018–February 2019 (first half of the academic year), a total of 6,972 student-involved services were documented. Rates of student-involved services remained consistent across 4-week blocks, except for time periods when students were on break (Thanksgiving and Christmas, blocks 4 and 5). Use of student documentation occurred across a wide variety of clinical billing locations (Figure 1).

Student-involved services were documented in both inpatient (51.8%, n = 3,612) and outpatient (46.7%, n = 3,257) locations. In the inpatient setting, 73.9% (n = 2,670) of notes included the resident and an attending physician, while in the outpatient setting, 92.4% (n = 3,009) of encounters involved the student working directly with the teaching physician. When specific departments or individuals were contacted by the workgroup to thank them for being early adopters, several unsolicited comments were returned indicating favorable impacts from these policy changes. A student wrote:

> The new notes system is great. It was nice to feel like even more of a part of the team (and help take some of the note burden off the fellow). Thanks for all of your efforts in getting this off the ground.

Copyright © by the Association of American Medical Colleges. Unauthorized reproduction of this article is prohibited.

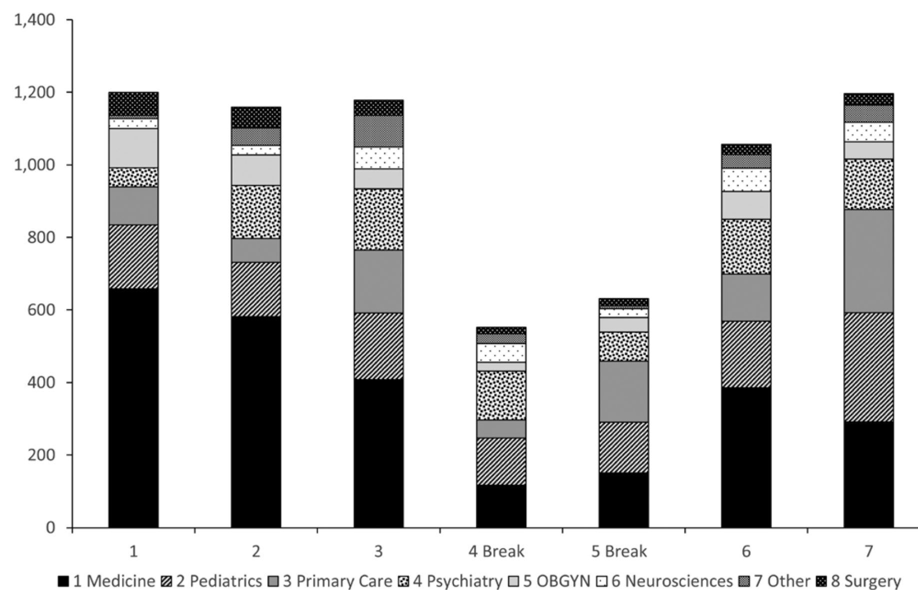

Figure 1 Number of notes and clinical services documenting student-involved services in 4-week blocks from the time of initial implementation, from a study of implementing changes to student documentation, Duke University Health System, 2018–2019.

A faculty member commented:

> Thanks! This has been *great* for students. They work hard and this really validates their role as team members. It's also been great for the house staff; it's allowed them to mentor students rather than duplicating student work. Definitely a huge win all around!

Student evaluations

During the first half of the academic year (August 2018–March 2019), 389 student evaluations were collected for the required clerkships. Overall, 326 (83.8%) evaluations indicated students had had the opportunity to document patient encounters in the EHR (see Figure 2). There were some statistically significant differences in the opportunity to write student notes in the EHR between clerkships in year 1 (2018–2019) ($P < .0001$). The departments with greater than 90% of students reporting the opportunity to write notes were psychiatry, medicine, pediatrics, and obstetrics–gynecology. More than 90% of students also reported receiving feedback on their notes in the departments of family medicine and community health, medicine, psychiatry, and radiology, which was statistically different from other clerkships ($P < .0001$).

On the 326 surveys indicating opportunity to write student notes in the EHR, 296 (90.8%) provided input that the notes had a moderate or significant impact on patient care. Over 95% of surveys from family medicine and community health, medicine, pediatrics, and psychiatry reported this opportunity as having a moderate or high impact on patient care.

When comparing student reports of confidence with individual clinical skills from August 2018–March 2019 (n = 389) to the prior year (August 2017–March 2018) (n = 399), there were no differences in confidence with documentation ($P = .3$).

Compliance

All records using attestations were manually retrieved and reviewed by compliance officers. During the first month of implementation, 100% of records were reviewed weekly. Initially, 30% of the notes were not properly recorded. Based on review of these cases, individual corrections were made to these accounts, workflow enhancements were identified, and education of documentation requirements was provided to individuals who had used attestations improperly. Over the next few months, the accuracy level rose to normal levels (approximately 5% error rate) due to these efforts. Encounters continue to be monitored to provide ongoing feedback and support compliant billing.

Cost

All individuals who worked on this study did so as part of their existing responsibilities to their reporting entities (School of Medicine, Duke University Health System, Private Diagnostic Clinic) so this work did not result in additional monetary cost. The group met for 1 hour biweekly for 3 months preceding implementation and during implementation. Outside of this meeting, individuals spent approximately 1 hour per week working on this project, with the exception of those working on training. The training module took approximately 6 weeks, including a pilot testing period for its construction.

Discussion

We successfully implemented changes to student documentation across our health system and have seen sustained use of student documentation. This growth occurred despite faculty concerns that observing students, editing their notes, and providing feedback would take too much time. Rates of feedback to students on their notes were high across disciplines.

We found that documentation of student-involved services occurs not only in medicine, psychiatry, and pediatrics clerkships but also on clerkships that are traditionally procedural (obstetrics–gynecology and surgery). However, students do receive less feedback on their notes on these services. Understanding why this happens would require further review; our group hypothesizes that students

Copyright © by the Association of American Medical Colleges. Unauthorized reproduction of this article is prohibited.

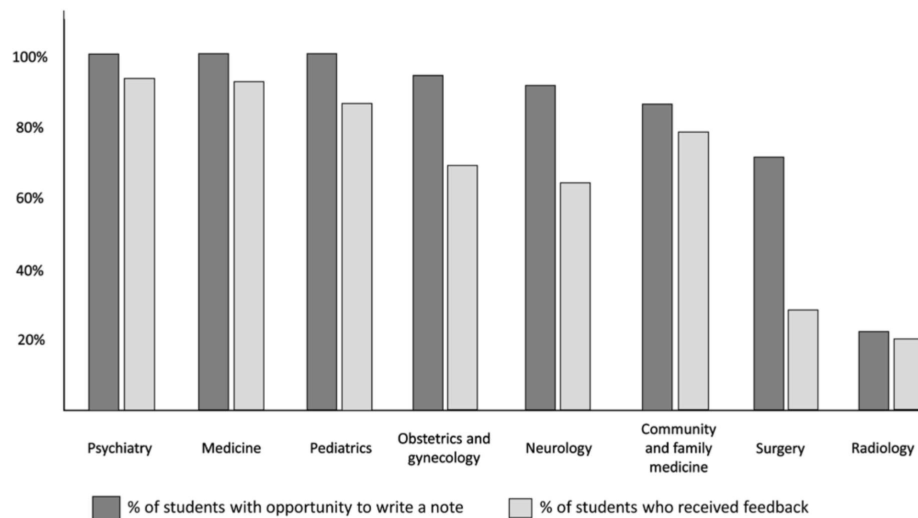

Figure 2 Student-reported opportunities for documentation and receipt of feedback on documentation across clerkships, from a study of implementing changes to student documentation, Duke University Health System, 2018–2019.

receive less feedback on these services given differences in the mechanism of reimbursement (global surgery package billing versus encounter-based fee-for-service), since the departments/clinical sites billing fee-for-service for individual encounters must use our new attestations that allow for edits/changes. Students see changes to their notes even if they are not directly discussed. There may be a relationship between inclusion of student documentation and/or edits to student documentation and students' perception that their notes had a greater impact on patient care for nonprocedural clerkships (psychiatry, pediatrics, family medicine and community health, medicine); however, a causal relationship must be confirmed with additional study. We studied students' perceptions about impact on care (not actual patient care outcomes) because we were interested in understanding student perceptions about the value of their work; in other words, trying to determine if students felt engaged and to assure that the balance between service and education was not tipped toward service.

Based on qualitative feedback, the opportunities provided to students for documentation, and their reports of receiving feedback on their documentation, we do not believe that involving students in documentation had a negative effect on teams or students. Rather, we believe there was a positive effect on student education. No reports of student mistreatment were received regarding documentation.

There are several contributors to the success of this change within our health system. The first was the creation of a multidisciplinary team that included members from undergraduate medical education, GME, health system compliance, and EHR experts. The group met bimonthly, allowing an opportunity for continuous improvement. When hurdles were discovered (such as issues regarding authorship of notes in the outpatient context), we were able to quickly develop and distribute solutions. The workgroup also made a commitment to improving medical student education with this policy change. We highlighted this opportunity in the learning management system, used by students, residents, and faculty, who evaluated the impact of this effort on student education. Flexibility was also key to the success of this effort. While the group spent considerable time developing the student 2-column note to highlight aspects of attestation that are distinctly different from supervision requirements for residents, we recognized this would not work for groups that already had group-specific templates. Therefore, additional attestation statements were developed.

In the academic year following the study, the workgroup identified several areas for further exploration. Updates to the required documentation module will highlight additional use of templates and provide a list of current student templates. Within the module, students will learn how to use the "hover" option to highlight sections of their notes edited by subsequent authors, which will provide an additional mechanism for feedback. New smart data elements are being created to allow us to track student documentation by student authorship instead of through billing data. By using smart data elements in the EHR, we may be able to better define the frequency of diagnoses, encounter types, and locations seen by our students throughout medical school. This would eliminate the need for our students to separately log patient encounters. Finally, we are interested in learning more about the impact of this effort on teamwork. For example, we could evaluate resident satisfaction with precepting students, look for reduced documentation by residents, and study burnout. It is possible that, over time, redundant services provided by both residents and students could be reduced, enabling more direct contact between teaching physicians and students as well as reducing the number of notes residents write so that they can instead focus on teaching.

Finally, our work in student documentation has increased our interest in more formally teaching students about use of the EHR from the start of medical school. We envision creating cases that students navigate within a simulated EHR and providing feedback about where and how students found information, accuracy of orders placed, time spent, use of tools such as trending values, discovery of patient safety issues, and efficiency (by tracking clicks and eye movements).

Copyright © by the Association of American Medical Colleges. Unauthorized reproduction of this article is prohibited.

Since EHR use represents such a large proportion of time spent by interns and residents,[17] teaching effective use of the EHR may help interns be more efficient, accurate, and satisfied with patient care.

There are limitations to this study. This is a single-site study that only includes data from within our health system using Epic, our EHR. Student notes written at outside locations, such as the Veterans Administration or outlying clinics, are not reflected in our data. Based on our EHR, we were unable to pull data directly from student notes; instead, we needed to pull data from billing attestations. This prevented us from differentiating notes written by second-year students (on required clerkships) from those on rotations in the fourth year. Thus, we were not able to study the actual impact on patient care. A final limitation of Epic is that ambulatory processes are different from inpatient processes. Initially, attending physicians sought workarounds for outpatient encounters (providers needed to use the Make Me the Author functionality to edit student notes); changes to our health system policy were required to allow providers to use this functionality, which may have affected the number of opportunities for our students in the outpatient setting and family medicine early in the observation period.

Conclusions

After changes to CMS requirements for billing, we successfully implemented student documentation across our health system. Students received feedback on their documentation, and services included students working alone with teaching physicians as well as student–resident–teaching physician services.

Acknowledgments: The authors wish to thank the involvement of all the clerkship directors at the time (Dr. Nancy Weigle, Dr. Aditee Narayan, Dr. Shelley Holmer, Dr. John Haney, Dr. Saumil Chudgar, Dr. Elizabeth Livingston, Dr. Caroline Carrico, Dr. Vern Juel, Dr. Myles Nicklovich, Dr. Barb Sheline, and Dr. Bruce Peyser), who embraced proposed changes to documentation, supported their residents and faculty, and collaborated with our workgroup to quickly identify problems and distribute solutions. Dr. Daniel Ostrovsky was critical in adapting new templates for pediatrics.

Funding/Support: None reported.

Other disclosures: None reported.

Ethical approval: The Duke University Health System institutional review board reviewed this study and considered it exempt from further review.

Previous presentations: Presented in part only, as “Utilizing Medical Student Documentation to Enhance Care Team Integration and Education,” at Epic XGM, May 7, 2019, Verona, Wisconsin. Presented at AAMC Learn, Serve, Lead, November 10, 2019, Phoenix, Arizona.

J.P. Gagliardi is associate professor, Department of Medicine and Department of Psychiatry and Behavioral Sciences, Duke University School of Medicine, Durham, North Carolina.

B. Bonanno is associate vice president for compliance, privacy, security, and integrity, Private Diagnostic Clinic, Durham, North Carolina.

E.R. McPeek Hinz is associate chief medical information officer, Duke University Health System, Durham, North Carolina.

R.C. Musser is assistant professor, Department of Medicine, Duke University School of Medicine, Durham, North Carolina.

N.W. Knudsen is professor, Department of Anesthesiology, and assistant dean for the learning environment, Duke University School of Medicine, Durham, North Carolina.

M. Palko is instructional designer and informatics educator, Duke University Health System, Durham, North Carolina.

F. McNair is compliance auditor, Duke University Health System, Durham, North Carolina.

H.-J. Lee is senior biostatistician, Department of Biostatistics and Bioinformatics, Duke University School of Medicine, Durham, North Carolina.

A.S. Clay is assistant professor, Department of Surgery and Department of Medicine, and assistant dean for clinical education, Duke University School of Medicine, Durham, North Carolina; ORCID: http://orcid.org/0000-0003-3191-5345.

References

1 Centers for Medicare and Medicaid Services. Medicare Carriers Manual Part 3—Claims Process. https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/downloads/R1780B3.pdf. Published 2002. Accessed August 14, 2020.
2 Leep Hunderfund AN, Starr SR, Dyrbye LN, et al. Value-added activities in medical education: A multisite survey of first- and second-year medical students’ perceptions and factors influencing their potential engagement. Acad Med. 2018;93:1560–1568.
3 Christner JG, Dallaghan GB, Briscoe G, et al. The community preceptor crisis: Recruiting and retaining community-based faculty to teach medical students—A shared perspective from the alliance for clinical education. Teach Learn Med. 2016;28:329–336.
4 Steiner B, Cochella S, Jortberg B, et al. STFM develops preceptor guidelines and a position statement on student use of electronic health records. Ann Fam Med. 2014;12:179–180.
5 Wilson SA. Preceptor expansion action plan—Description and progress update. Fam Med. 2018;50:318–320.
6 Centers for Medicare and Medicaid Services. CMS Manual System. Pub 100-04 Medicare Claims Processing. https://www.cms.gov/Regulations-and-Guidance/Guidance/Transmittals/2018Downloads/R4068CP.pdf. Accessed August 14, 2020.
7 Cassese T, Sharkey MS, Pincavage AT, Schwanz K, Farnan JM. Avoiding pitfalls while implementing new guidelines on student documentation. Ann Intern Med. 2019;170:193–194.
8 Howard R, Reddy RM. Coding discrepancies between medical student and physician documentation. J Surg Educ. 2018;75:1230–1235.
9 White J, Anthony D, WinklerPrins V, Roskos S. Electronic medical records, medical students, and ambulatory family physicians: A multi-institution study. Acad Med. 2017;92:1485–1490.
10 Kumar A, Chi J. CMS billing guidelines and student documentation: A new era or new burden? J Gen Intern Med. 2019;34:634–635.
11 Power DV, Byerley JS, Steiner B. Policy change from the Centers for Medicare and Medicaid Services provides an opportunity to improve medical student education and recruit community preceptors. Acad Med. 2018;93:1448–1449.
12 Hoonpongsimanont W, Velarde I, Gilani C, Louthan M, Lotfipour S. Assessing medical student documentation using simulated charts in emergency medicine. BMC Med Educ. 2018;18:203.
13 Gidwani R, Nguyen C, Kofoed A, et al. Impact of scribes on physician satisfaction, patient satisfaction, and charting efficiency: A randomized controlled trial. Ann Fam Med. 2017;15:427–433.
14 Welcher CM, Hersh W, Takesue B, Stagg Elliott V, Hawkins RE. Barriers to medical students’ electronic health record access can impede their preparedness for practice. Acad Med. 2018;93:48–53.
15 Gonzalo JD, Lucey C, Wolpaw T, Chang A. Value-added clinical systems learning roles for medical students that transform education and health: A guide for building partnerships between medical schools and health systems. Acad Med. 2017;92:602–607.
16 Theobald M, Ruttter A, Steiner B, Morley CP. Preceptor expansion initiative takes multitactic approach to addressing shortage of clinical training sites. Fam Med. 2019;51:159–165.
17 Chaiyachati KH, Shea JA, Asch DA, et al. Assessment of inpatient time allocation among first-year internal medicine residents using time-motion observations. JAMA Intern Med. 2019;179:760–767.

Copyright © by the Association of American Medical Colleges. Unauthorized reproduction of this article is prohibited.