




SPECIAL CONTRIBUTION

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Addressing Note Bloat: Solutions for Effective Clinical Documentation

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Abstract

Clinical documentation in the United States has grown longer and more difficult to read, a phenomenon described as “note bloat.” This issue is especially pronounced in emergency medicine, where high diagnostic uncertainty and brief evaluations demand focused, efficient chart review to inform decision-making.

Note bloat arises from multiple factors: efforts to enhance billing, mitigate malpractice risk, and leverage electronic health record tools that improve speed and completeness. We discuss best practices based on available evidence and expert opinion to improve note clarity and concision. Recent E/M coding reforms aim to streamline documentation by prioritizing medical decision-making over details of historical and physical examination, though implementation varies. New technologies such as generative artificial intelligence present opportunities and challenges for documentation practices. Addressing note bloat will require ongoing effort from clinical leadership, electronic health record vendors, and professional organizations.

Keywords: *clinical informatics, documentation, electronic medical records, reimbursement*

1 INTRODUCTION

1.1 Etiology of Note Bloat

The “note bloat” phenomenon describes clinical notes that contain unnecessary information, which can obscure critical or time-sensitive information in the patient’s record.^{1,2} A longitudinal cross-sectional analysis of provider electronic health record (EHR) documentation showed 60% growth in note length

and 11% growth in note redundancy from 2009 to 2018.³ An analysis of more than 23,000 provider notes found only 18% of available text was entered manually, with 46% copied from another note and 36% imported from another source (eg, medication list).⁴ Similar research on 2,000 progress notes found ≥20% copied information in 82% of residents’ and 74% of attendings’ notes.⁵ Among users of the same EHR across different countries, US clinical notes were an average of 4 times

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longer than those of international users, suggesting note bloat is a product of US health care practices and requirements.⁶

The causes of clinician note bloat are multifactorial and involve billing, regulatory, and liability incentives to document increasing amounts of detail from an encounter, an aging, increasingly complex patient population,⁷ as well as EHR “content-importing technology” that make it easy for clinicians to generate long, detailed notes (see Table 1). The original CMS’ E&M guidelines for reimbursement assigned higher billing codes to clinical encounters based largely on elements of history-taking and examination,⁸ leading to increased administrative burden, reduced note clarity, and degradation of the patient-physician relationship.⁹ Liability concerns have also promoted thorough documentation; a general decline in malpractice rates across the US in recent years¹⁰ may be correlated. In 2021 and 2023, the E/M guidelines for ambulatory practices and emergency medicine were changed to focus on medical decision-making. In response to this change, some clinical notes appear to have become shorter, though reports vary.^{11,12} Removing note bloat will require a sustained, multi-pronged approach from clinicians and clinical leadership, EHR vendors, and professional societies.

1.2 The Role of Content-Importing Technology in Clinician Note Bloat

Content-Importing Technology (CIT) is a computerized function that enables automatic or semiautomatic data or text

entry in the EHR. CIT can be helpful when used appropriately but can cause note bloat, obscuring key clinical information, and increase medical errors when used indiscriminately.^{13–15} CIT use has become widespread, with 60% to 90% of clinicians using some form of CIT, such as duplication (copy-paste), macros, templates, autotext, autofill, and autocomplete. Certain forms of CIT, such as macros and “dotphrases” (time-saving shortcut keystrokes to generate preset expanded text), are perceived favorably by physicians and are recommended as productivity-enhancing documentation tools. To address note bloat and CIT-related issues, various professional groups have issued documentation guidelines that focus on regulating specific CIT functions, such as copy-paste, which have been shown to increase documentation errors.^{14–16} Efforts to limit documentation aids must balance the desire to improve accuracy and reduce redundancy against their perceived ease-of-use.

2 IMPACT OF NOTE BLOAT

2.1 Impact of Note Bloat on Clinical Considerations

Note bloat can negatively impact patient care in several ways (see Table 2). First, the redundancy caused by indiscriminate CIT and the completionism approach to perceived reimbursement requirements decreases readability, making it more difficult to find information relevant to the patient’s current encounter.¹⁷ This impairs the primary function of the note to

TABLE 1. Etiology of note bloat.

Factors	Citations
Regulatory requirements and billing incentives US clinical notes are comparatively long due to regulatory and billing demands, including the original CMS E&M guidelines (blamed for increasing administrative burden, reducing note clarity, and straining patient-physician rapport). Recent guideline updates (2021 for ambulatory; 2023 for emergency departments) aim to reduce this load by prioritizing medical decision-making, but impacts vary.	1, 2, 3, 6, 7, 8, 10, 11
Liability concerns Thorough documentation is driven in part by fear of legal repercussions, leading to detailed note-taking to protect against potential malpractice claims.	9
Aging population with increasing medical complexity Over one-third of individuals over age 65 use 5 or more medications. 88% of older adults have at least one chronic condition; 60% have at least 2. Chronic conditions and complex medication regimens require coordinated care, and detailed documentation.	7
CIT CIT includes tools like copy-paste, templates, macros, autotext, autofill, and autocomplete speed up documentation, but add redundant and unnecessary information, obscuring important details. Widespread CIT use (60-90% of clinicians use it) increases note bloat and invites medical error.	4, 5, 18, 20
EHR usability Poor EHR interfaces and hidden patient data prompt heavy reliance on CIT for documentation, exacerbating note bloat and impairing readability. Increased time in the EHR in turn detracts from patient care, and has been linked to increased rates of burnout.	6, 27, 28, 29, 30

CIT, content-importing technology; CMS, Center for Medicare & Medicaid Services; E&M, evaluation and management; EHR, electronic health record.

TABLE 2. Adverse impacts of note bloat.

	Relevant Citations
A. Clinical considerations	
• Decreases readability and makes it difficult to find relevant patient information	12
• Impairs the primary function of notes to convey accurate and timely clinical information	12-17
• Creates monotonous or duplicative documentation by auto-importation of clinically irrelevant information	12, 14-17
• Propagates documentation errors, leading to real medical errors and negative patient outcomes	18
B. Impact on liability, operations, and wellness	
• Raises medico-legal concerns with template-guided documentation (macros, dotphrases, and other CIT)	22-24
• Machine-documented “normal” notations can misrepresent patient conditions	25
• Extended documentation has diminishing returns on charge capture	26
• Electronic documentation prioritizes non-clinical communication over patient care	6
• Increases medico-legal risk by importing unverified information or documenting duplicated assessments	19
• High prevalence of redundancy degrades EHR data quality for biosurveillance, epidemiology, quality improvement, registry functions, and research	21
• Poor EHR usability and excessive computer-facing tasks burden physicians, leaving less time for patient interaction, disrupted workflows, hindered communication, and increased rates of burnout, particularly in Emergency Medicine	27, 28, 29, 30

CIT, content-importing technology; EHR, electronic health record.

convey accurate and timely clinical information for patient care.¹⁸ Auto-importation often creates monotonous or duplicative documentation by pulling clinically irrelevant information into the chart, placing the burden on the reader to search for and identify salient data. Copy-forward has also been shown to diminish the timeliness of documentation by propagating outdated content.^{16,17,19–21}

Unverified copy-paste and copy-forward can propagate documentation errors that contribute to real medical errors and patient harm.¹³ Importing unverified information that fails to accurately describe the patient’s condition or documenting duplicated assessments that never occurred exposes the chart to medico-legal risk.¹⁵ A 2003 study of 2,645 notes with duplicated text in the Veterans Administration system found that 338 notes (1.2%) were high risk from a patient safety perspective due to “misleading” information or documentation with “major potential risk of patient harm, fraud or tort claim exposure” on expert review.¹⁴

The high prevalence of redundancy in patient notes degrades the quality of EHR data used for biosurveillance and epidemiology, quality improvement, registry functions, and research. Note clutter, copy/paste-related errors, data entry inaccuracies, and duplications render the existing health data difficult to use,²² and present a unique challenge for text-mining and artificial intelligence tools designed to extrapolate clinical concepts and phenotypes from EHR data.¹⁶

2.2 Impact of Note Bloat on Liability, Operations, and Wellness

The transition from paper to EHR systems has generally been thought to improve documentation quality and reduce medico-legal risk^{23–25}; however, the nature of focused EHR-enabled documentation (macros, dotphrases, and other CIT) raises several medico-legal concerns. Clinicians should watch for machine-documented “normal” notations when clearly pathological findings exist (such as “regular rate and rhythm” in a patient presenting with atrial fibrillation). A database of EHR-related claims acknowledges several related to CIT, such as “History copied from a previous note which did not document patient’s amiodarone medication [led to] delayed recognition of amiodarone toxicity” and “Incorrect conclusion that patient was on indomethacin when it was automatically pulled [into a note] forward from an outdated medication list.”²⁶

Although extended documentation is generally appreciated to improve charge capture, research suggests an inflection point at which more documentation focused on relative value units did not appear to generate significantly higher collections.²⁷

Note bloat has negative impacts on the emergency medicine (EM) clinician workforce, as well. United States physicians spend roughly 44% to 49% of their professional time computer-facing and only 24% of their professional time patient-facing.^{28,29} A recent study summarizing feedback from clinicians found that poorly structured notes in “EHRs

impede clinician workflow, inhibit communication, and adversely affect decision-making ... [as] clinical notes were bloated and hard to read.”³⁰ This poor EHR usability, related significantly to note bloat, has been linked to increased rates of burnout among physicians, particularly in EM.³¹

3 FACTORS EXACERBATING OR MITIGATING NOTE BLOAT IN EMERGENCY MEDICINE

3.1 Summary of 2023 E/M Coding Guidelines Changes

On January 1, 2023, CMS implemented new documentation requirements recommended by the Current Procedural Terminology Editorial Panel,³² intended to reduce the administrative burden of documentation. The primary determinants of the E/M level in the emergency department emphasize medical decision-making (MDM). Clinical complexity, the manner and amount of data reviewed, and potential risk to the patient have replaced quantifiable elements of history, review of systems, and physical examination. Value is placed on risk stratification through reviewing medical records, obtaining history through independent sources, use of clinical decision tools, shared decision-making, medication management, consideration of social determinants of health, and collaboration with consultants. Testing, when earnestly considered, counts toward the complexity of the encounter even if the clinician decides against pursuing them.

When studied in the emergency departments of a large health system,¹⁰ the effects of these new documentation guidelines resulted in decreased note length, but clinicians’ time spent on documentation was unchanged. This suggests the prior documentation length had a large CIT component. The same documentation guidelines were implemented for ambulatory practices 2 years earlier; in this setting, there were statistically significant but not meaningful differences in the amount of time in documentation (-0.06 minutes) and length of notes (+24 characters).¹¹ The more impactful change was a 22.6% relative increase in level 5 coding. The effects of the new guidelines may have greater influence on coding and reimbursement despite its intent to reduce documentation burden.

There remain unstudied potential benefits to E/M coding’s effect on note bloat. Note length and documentation time are imperfect proxies of cognitive burden; more manual involvement in note composition may provide a clearer narrative of a patient encounter and make better use of its author’s attention. Increased focus on the MDM may incentivize more clinically valuable documentation, evidence of reflective thinking, and a more patient-centric narrative of the encounter. Documentation guidelines that reflect a clinician’s thought process through emphasis on data, complexity, and risk are a step in the direction of acknowledging the negative burden contributing to burnout and job dissatisfaction documentation bears on clinicians. The note and the act of its creation might

become better if not necessarily shorter or with less time required.³³

With the adoption of new E/M coding changes and the integration of generative artificial intelligence (AI) by EHR vendors, there is a temptation to automate and simplify the MDM section to enhance charge capture, similar to how EHR macros and CIT improved level-of-service calculations previously. Best practices for accurate documentation include minimizing CIT and maintaining organized, clear clinical notes.^{34,35}

Many EM clinicians were trained under documentation requirements predating widespread EHR use. The 2023 E/M coding changes offer EHR vendors an opportunity to move beyond template- and checkbox-based charting.³⁶

3.2 Common EHR Tools to Streamline Documentation

One technical solution to streamline documentation involves the implementation of templates with collapsible headers or dividers, which can provide clearer structure and organization to notes. Such templates may provide a meaningful opportunity for vendors to enhance the EHR experience for clinical end users.³⁷ Hospital information technology (IT) departments may adopt the “base template” produced by vendors and develop a “best practice” template so that it may be utilized for the specific needs of their institution.³⁸

Collapsible headers may also provide clinicians with the opportunity to review the information that is only most relevant to their clinical question at hand without fully removing such data from the chart and risking that such data may be ignored altogether,³⁹ though collapsible headers do limit one’s ability to scan notes and may give the impression of missing data unless explicitly indicated.

Utilizing an “APSO” format (Assessment and Plan before Subjective-Objective, as opposed to the more traditional S-O-A-P format) may streamline the ability of a physician to find and review their colleagues’ clinical recommendations. Assessment, Plan, Subjective, Objective “provide[s] a complete, clear, and concise representation of diagnostic and therapeutic thoughts” at the beginning of a note— in a more easily found and recognized location - without eliminating the importance or relevance of the Subjective and Objective sections.¹⁷ Regardless of using SOAP or APSO, clinicians themselves should respect the organization of a note and avoid copying elements from one section to another (eg, copying details of history or results into Assessment & Plan).

Hyperlinks to chart elements, such as vital signs and radiology reports, may allow clinicians to view critical patient data dynamically on their screen to ensure they are viewing the most relevant and updated patient data while simultaneously reducing screen clutter.⁴⁰ Templates may be structured with “disappearing tips” that provide physicians with inline documentation suggestions and recommend patient-specific plans before a note is finalized. Such tips can then disappear from the note (either to be found as a hyperlink in

TABLE 3. Recommended practices to reduce note bloat, for front-line emergency department clinicians.

Recommended practices	Details
Make sparing use of CIT	Use CIT tools (eg, copy-paste, macros, dotphrases) judiciously. Include only pertinent findings, avoid redundancy and do not propagate outdated info.
Respect the defined sections of a note	Keep content within appropriate sections (eg, avoid pasting history or results in Assessment & Plan), to maintain clarity.
Utilize dividers or collapsible headers	When creating note templates using EHR tools, incorporate dividers or collapsible headers to improve note structure, making key information easier to find. Appreciate the risk in hiding important details.
Adopt the APSO format	Use APSO over SOAP to place clinical recommendations at the top of the note, ensuring their visibility.
Provide feedback on EHR usability	Regularly report documentation challenges to leadership, IT staff, and EHR developers to help improve EHR usability and reduce note bloat.
Avoid over-documentation for billing purposes	Accurate, relevant documentation is what's needed for both clinical communication and billing; avoid unnecessary details for reimbursement as coding now emphasizes MDM.
Stay current with EHR training	Participate in ongoing EHR training to stay informed about new features and updates, as well as new techniques for documentation.
Personalize EHR templates	Customize note templates to fit your style and needs, reducing unnecessary content while meeting regulatory standards.

APSO, Assessment, Plan, Subjective, Objective; CIT, content-importing technology; EHR, electronic health record; MDM, medical decision-making; SOAP, Subjective, Objective, Assessment, Plan.

the note or as a task on a separate worklist) to improve readability and ensure clearer and more concise patient planning on signing.^{41,42}

3.3 Managing CIT

When properly implemented, CIT and other automated tools can enhance clinical documentation and decision-making by providing relevant patient data and information at appropriate points during patient encounters.^{43,44} CIT, including templates and dotphrases, helps standardize complex data and meet regulatory or billing needs. Judicious use of macros and copy-paste and copy-forward functions can improve documentation efficiency, reduce errors of omission, and maintain continuity in medical decisions.⁴⁵ However, each CIT function has unique advantages and disadvantages, varying by clinical context; reducing note bloat and errors relies on providers' appropriate use of CIT, guided by best practices in hospital and emergency department settings.

Individual providers may follow the best practices outlined in Table 3. Recommendations for clinical and IT leadership, informaticists, and EHR vendors to preserve the benefits of CIT (which enables automatic or semiautomatic data or text entry in EHR) while minimizing the risks and drawbacks of note bloat are found in Table 4.⁴⁶

3.4 The Emerging Challenge Posed by Generative AI in Clinical Documentation

Generative AI such as ChatGPT have shown significant advancements recently, with freely-accessible software able to

generate verbose, appropriate, grammatically correct text with minimal prompting.⁴⁷ Researchers have begun to study the accuracy and utility of generative AI in various health care-related tasks, including drafting discharge summaries and summarizing medical notes.⁴⁸ However, generative AI technologies bring significant risks, including the subtle introduction of bias from training texts and the tendency to hallucinate and generate authoritative-sounding false information,⁴⁷ as well as risks to patient privacy. A related risk involves a loss of specificity in the patient narratives that degrades trust in medical documentation. Reliance on generative AI to compose notes can bypass the clinical reasoning process, risking the loss of personalized and nuanced patient care—which can lead to generic treatment plans and a diminished doctor-patient relationship.⁴⁹

3.4 Personalizing Documentation to Different EHR Audiences

Describing general best practices for EHR documentation is difficult because of the variety of stakeholders who consume EHR data for different purposes. Rather than taking a “one size fits all” approach by designing one optimal clinical note accessed by all users, another approach is to create different versions of the clinical note that emphasize or de-emphasize specific content to match the needs of different users.

Originally, Davidson⁵⁰ suggested 4 primary audiences for EHR notes: clinicians, billers/coders, lawyers/regulators, and researchers (“secondary use”). It seems reasonable to also

TABLE 4. Recommendations for emergency department leaders, informaticists and hospital IT to preserve the benefits of content-importing technology while minimizing note bloat.

<i>Make CIT easily identifiable.</i>	Ensure copied/imported data are clearly marked in the user interface (not simply in metadata), with clear provenance (original author, date, source) to aid review. ¹⁴
<i>Require validation or attestation of data and text generated using CIT.</i>	Implement strategies to prompt authors to validate CIT data; mitigate risk with "copy, validate, and paste" instead of "copy and paste." Limit automatic transfer or generation of data without an author review. ⁴⁶ Add confirmation steps for importing data that outdated or otherwise questionable.
<i>Restrict CIT use and provide quality control.</i>	Establish processes to validate and restrict CIT, and oversee CIT usage. Although personalized dotphrases offer advantages, standardized CIT can better meet quality and regulatory standards. Balance personalized CIT use with the need for consistency.
<i>Regularly monitor and assess CIT usage and documentation practices that rely on CIT.</i>	Use clinician efficiency profiles to identify documentation outliers. Audit CIT usage to detect trends, risky practices, and opportunities for improved documentation. ¹⁴
<i>Ensure adequate staff training and education around CIT tools.</i>	Include CIT training with EHR onboarding, focusing on the appropriate, safe use of valid CIT. Educate users on template & macro design, and designate CIT champions to disseminate CIT best practices. ¹⁴

CIT, content-importing technology; EHR, electronic health record.

include patients as a fifth audience, given the recent evidence for empowering patients with shared notes.^{51,52} EHR documentation could be parsed into different automated summaries based on these different target audiences.⁵³ Given increasing availability and interoperability of EHR data (including efforts from the 21st Century Cures Act Final Rule on Information Blocking), efforts such as these may be worth re-exploring both inside available EHR vendors and via interoperability standards and APIs^{54,55} especially as generative AI technology demonstrates capabilities in processing the same text for specific audiences.⁴⁷

4 RECOMMENDATIONS AND FUTURE DIRECTIONS

To develop the best possible strategies and tools to accommodate new documentation guidelines without perpetuating note bloat, the proactive engagement of 3 key stakeholders is critical: clinicians (who document the note), coders (who determine the charge based on the note), and EHR vendors (who develop the documentation tools). In addition, emergency department clinical and administrative leaders should be engaged to ensure that operational, quality, and research standards and goals for documentation are met. Clinical informaticians can be vital assets to help manage this complex stakeholder group to develop a coherent documentation strategy.

The engagement of clinician end users is particularly notable within well-described methodologies of user-centered design.^{23,36,56–58} Clinicians should provide feedback to leadership, IT staff, and/or developers when EHR documentation and workflow are inadequate. Balancing personalization and standardization of EHR tools is essential for supporting

cognitive workflow while maintaining usability and patient safety.⁵⁹ Regular user-centered design evaluations should occur before and after implementation to ensure effective and efficient workflows.⁶⁰

Whereas change management for new documentation practices can be challenging, several educational strategies have been shown to successfully improve EM physician documentation. A systematic review of 19 EM studies revealed more than half with positive results, with mixed results in 9 studies.⁶¹ Studies show chart audits and feedback to staff prompted more complex charting and a significant increase in RVUs, whereas another study of audits and feedback showed an improvement in scores for note content and legibility.^{62,63} Two studies of reminders and 7 studies of templated notes were also generally found to improve elements of documentation. As part of a bundled intervention on note length and quality to inpatient interns, an educational session paired with a new EHR progress note template was found to decrease note length and improve all domains of the Physician Documentation Quality Instrument-9 (PDQ-9) across 4 academic medical centers.⁶⁴ Multiple interventions, such as the combination of templates and an educational lecture or the distribution of pocket cards and reminders, were found to improve documentation quality.

Continuous optimization of documentation practices should be based on stakeholder feedback and regular, ideally automated, documentation audits. Automated EHR-based audit logs can supplement traditional manual reviews by leveraging user metadata to identify data sources, and machine learning algorithms can score notes on clarity and other factors,⁶⁵ helping to quantify provider responses to changing incentives. Enhanced transparency, granularity, and standardization of vendor-derived EHR data definitions are crucial for measuring EHR use and addressing note bloat effectively.^{46,66}

4.1 The Role of Physician Organizations

Medical specialty colleges and other societies that represent patients, clinicians, and health care organizations have played and should continue to play a significant role in clinical documentation standards and expectations. These societies help craft standards, such as the American Medical Association's original development of Current Procedural Terminology codes in 1966 and the Relative Value Scale Update Committee in 1989 for use by CMS.⁶⁷ Societies can review evidence, set a research agenda and issue recommendations for EHR vendors and individual members, such as with the American College of Physicians' 2015 position paper on the use of EHR for clinical documentation.⁶⁸ Societies can issue statements on the use of specific EHR documentation tools, such as the American Health Information Management Association recommendations on clinician use of copy/paste functionality.⁶⁹

These professional associations can also advocate for policy change; recent examples of this include efforts to simplify the licensure and delivery of telemedicine care and the recommendations from the American Medical Association and other organizations that led to E/M coding reforms.^{33,70} An important and potentially effective role for medical colleges is to guide and educate their members, as has been the case with clinical policies and consensus recommendations, continuing medical education, college-sponsored publications, conferences, and webinars. This effort will help EM clinicians share the patient's story, clinical findings, and EM decision-making processes in a manner that prioritizes clear clinical communication while acknowledging reimbursement and liability considerations. The American College of Emergency Physicians and other organizations have an opportunity to guide emergency physicians and NP/PAs in explaining the new documentation requirements and leveraging EHR tools for efficient note composition.

AUTHOR CONTRIBUTIONS

Each author has made substantial contributions to the concept and design of the article, has drafted the article and revised it critically for important intellectual content, and has approved the version to be published. N.G. agrees to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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CONFLICT OF INTEREST

All authors have affirmed they have no conflicts of interest to declare.

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