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SPECIAL REPORT

Copy/Paste: Prevalence, Problems, and Best Practices

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Background

The copy/paste function in electronic health records (EHRs) allows users to easily duplicate information such as text, images, and other data within or between documents. Many EHRs also support copy-forward functionality, which allows authors to begin a new progress note by populating the text with the contents of a prior note, presumably to reflect the details of the new encounter. The increased use of EHRs, fueled in part by legislation such as the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009, has highlighted both the unique strengths and challenges posed by electronic documentation of patient care, including the proper use of copy/paste and copy-forward functionality.

Healthcare providers under time constraints use copy/paste to improve documentation efficiency and reproduce prior test results or medication lists (which might remain stable from visit to visit, but are germane to the patient's care) instead of laboriously retyping them. However, use of copy/paste may also contribute to lengthy and less-organized progress notes and propagation of outdated or inaccurate information in the patient chart, with potential risks to patient safety. Increasingly, EHRs also allow measurement and longitudinal tracking of clinical outcomes that can inform quality improvement initiatives—functions that are compromised by inaccurate documentation. Recently, the U.S. Office of the Inspector General raised concerns that inappropriate use of copy/paste could be contributing to reimbursement fraud. In response to these concerns, in 2014, the American Health Information Management Association released a position statement, titled *Appropriate Use of the Copy and Paste Functionality in Electronic Health Records*.¹ Several other organizations, including the Federation of State Medical Boards, have also formally addressed this issue.

Despite the importance of this topic, no published articles to date have systematically reviewed the evidence regarding prevalence of and patient safety risks associated with copy/paste or copy-forward. In this review, we address the following four key questions:

- 1) What is the prevalence of copy/paste and copy-forward use in the EHR?
- 2) What evidence exists that copy/paste or copy-forward use is associated with adverse patient events?
- 3) What characteristic problems are associated with copy/paste and copy-forward?
- 4) What best practices or recommendations have been made to address proper use of copy/paste and copy-forward? Although irresponsible use of copy/paste and cloned statements associated with reimbursement fraud are serious concerns, we considered this outside the scope of this project.

Methods

We conducted a systematic literature search of PubMed, MEDLINE, EMBASE, CINAHL, Journals@OVID, ScienceDirect, Scopus, PS Net, and the Agency for Healthcare Research and Quality Web Morbidity and Mortality using a search strategy developed by a medical librarian. The search strategy (available upon request) included studies published from January 2010 to January 2015 and used a combination of medical subject headings and keywords. Bibliographies of identified studies were also reviewed for relevant citations and additional articles. Gray literature was retrieved by searching the publications and websites of relevant vendors, professional organizations, private agencies, and government agencies. A doctoral-level analyst reviewed abstracts to determine relevance. Specifically, studies were included if they addressed frequency of copy/paste or copy-forward use, perception or attitudes among healthcare staff regarding these functions, copy/paste-associated patient safety or clinical outcomes, copy/paste-associated problems, lessons learned, or interventions aimed at decreasing inappropriate use. Studies were excluded if they primarily

addressed use of copy/paste to address reimbursement fraud. We included 51 articles and tabulated reported data regarding prevalence, patient safety outcomes, and recommendations and perceptions regarding copy/paste or copy-forward.

Results

In the first half of this paper, we summarize the evidence addressing key questions 1 and 2. We also summarize existing categories of risk severity used in the literature as well as healthcare provider perceptions of associated risks.

In the second half of the paper, we address key questions 3 and 4 by offering a narrative summary of potentially problematic consequences to medical documentation, contextual factors likely contributing to an environment that promotes inappropriate copy/paste use, and recommendations/best practices gleaned from the literature. Specifically, we discuss recommendations from the literature addressed to individual authors, professional organizations, and healthcare institutions. We also summarize suggestions from the literature regarding potential EHR adaptations to address problematic copy/paste use. For simplicity, throughout the rest of the paper, we will use copy/paste to refer to copy/paste and copy-forward functionality.

What Is the Prevalence of Copy/Paste Use?

Table 1 below provides an overall summary of prevalence estimates from included studies. We identified 13 studies²⁻¹⁴ and 2 conference abstracts^{15,16} that evaluated the frequency of copy/paste use in 3 ways: by self-report (survey studies of healthcare providers), retrospective review of patient charts, and direct observation of the note-writing process. Appendix A, Table 1 describes these studies in further detail. Overall, authors reported high rates of copy/paste use, while frequency of copied material identified by chart reviews varied widely, perhaps due to differing clinical contexts and varied definitions of copying (see Table 2). Notably, not all studies specified how copy/paste was defined.

Self-reported Use

We identified three research studies published as full articles²⁻⁴ and one survey published only as a conference abstract.¹⁵ These studies surveyed healthcare providers' use of copy/paste (see Table 1 for results). Three large studies surveying medical students, residents, and attending physicians reported high rates of use across all training levels. O'Donnell⁴ surveyed 315 physicians and found that 90% of physicians using an EHR for inpatient documentation used copy/paste to write daily progress notes, and 78% identified themselves as high-frequency users (using copy/paste almost always or most of the time). Eighty-one percent of copy/paste users frequently copied notes authored by other physicians, and 72% copied notes from prior admissions. Heiman and colleagues similarly found high rates of use among Northwestern University (Chicago, IL, USA) medical students, with 66% reporting that they copied their own notes "frequently or nearly always."² Students were also asked how often they observed authors copying from a *different* provider's note: 86% of students had witnessed this type of copying by residents, and 60% had observed it in an attending physician. Swary et al. surveyed 143 dermatology residents and found that 83% admitted to copy/pasting a prior author's past medical history, social history, or family history without confirming the information's accuracy with the patient.³ Finally, in a smaller survey reported only in a conference abstract, 39 residents and 14 faculty at the University of Pittsburgh (PA, USA) were asked how often they copy/pasted from a prior note in the outpatient clinic setting. Significantly lower rates of copy/paste use were reported (13% for residents, 7% for faculty).¹⁵

Chart-based Studies

Outpatient

We identified nine studies published as full articles^{5,6,8-13,17} and one published only as a conference abstract.¹⁶ These studies assessed the frequency of copy/paste by performing retrospective chart reviews. Edwards et al. (2014) reviewed a random sample of 239 EHR notes from outpatient visits to an endocrinologist, cardiologist, or primary care physician for diabetes, coronary artery disease, or both.⁵ Overall, 10.8% of notes contained copy/pasted material; frequency of copying varied significantly by specialty: 19.5% of endocrinology notes contained copy/pasted material compared to 8.2% of primary care notes and 1.9% of cardiology notes ($p < 0.01$). No study definition of copying was provided.

Two studies (Turchin et al. 2011 and Zhang et al. 2013) evaluated how often authors documented lifestyle counseling for patients with diabetes by copying from their own prior notes. Specifically, Turchin et al. explored how often attestations of lifestyle counseling addressing diet, exercise, and weight loss for adult patients with diabetes (followed on average over 3.7 years) were copied.¹⁰ Copying was defined as use of a sentence identical to a sentence in the previous note from the same provider for the same patient. Using software, 62,934 notes for 5,914 patients with diabetes followed for at least 2 years within a roughly 4.5-year period were examined. Approximately 5% of lifestyle counseling statements were found to be duplicate statements. To further assess whether this duplicate wording was the result of copying a prior note versus inserting a template statement, study authors compared how often a provider wrote duplicate statements for the same patient compared to other patients. Duplicate statements occurred significantly more often for the same patient than for multiple patients (3.0 versus 0.09, $p < 0.001$), suggesting that providers were copying from a patient's prior note instead of inserting a template with standardized wording. A second study by Zhang et al. assessed copying of lifestyle counseling statements in a similar group of patients with diabetes over a nine-year period; although this study primarily focused on evaluating whether evaluation and management (E&M) codes were appropriately assigned, the study reported about 12% of lifestyle counseling statements from primary care physicians appeared to be copied from a prior note.⁷

Inpatient

In a 2013 study, Thornton et al. retrospectively reviewed charts from 135 patients hospitalized at 1 institution's intensive care unit (ICU) for more than 72 hours to identify how often copying occurred in the assessment and plan (A/P) section of the chart.⁶ Using a program called CopyFind, the A/P section of each note was analyzed to identify matching phrases >4 words and 20 total characters. Notes were considered to contain copying if the copied text composed $\geq 20\%$ of the note's text.

Using these criteria, the study found that 82% of residents and 74% of attending physicians' notes contained copying. While resident A/Ps contained more copied material, the amount of copied material in each note was slightly less for resident physicians than for attending physicians (55% versus 61%, $p < 0.01$). The degree of copying was not associated with patient or provider characteristics such as age, race, length of ICU stay, insurance, or diagnosis.

In a conference abstract, Chang et al. (2012) reported on a review of all inpatient documentation for 12 general medicine patients and found that 229 of 299 progress notes contained "copy/paste events." More than 60% of these events resulted from providers copying their own notes, while 32% occurred between different providers on the same service.¹⁶

Veterans Affairs Studies

Three studies (Hammond,¹² Thielke,¹¹ and Weir¹³) described the prevalence of copy/paste in Veterans Affairs (VA) hospital systems. Although these studies were published before our search dates, we included them because they were frequently cited in peer-reviewed research and gray literature.

Hammond et al. (2003) performed a study within the VA health system to examine copying in all medical progress notes for 1,479 randomly selected patients over a 12-year period (1990–2002). A computerized algorithm identified all instances of ≥ 40 consecutive identical words occurring in 2 documents and found that 9% of all notes contained copied text, with 63% of these “copy events” due to human copying (as opposed to machine artifact).¹²

Thielke et al. (2006)¹¹ built on this work, focusing specifically on identifying copied physical examinations. The authors created and validated software to recognize the language describing examinations in the chart and identified 1,112 copied exams that occurred outside the context of a discharge summary. Roughly half of these copied exams were physical exams ($n = 595$), followed by podiatry exams ($n = 484$) and mental status exams ($n = 33$). Overall, 25% of patient charts contained at least one copied exam; 11% of charts contained more than one exam copied from another author. Notably, more than 80% of copying was performed by only a small fraction of authors (4.2%). Interestingly, podiatry exams were copied far more often (78.2%) than other commonly documented exams (9.7% mental status exam, 11.5% physical exam). On average, exams were copied 128 days after the original note (overall median 56 days, 2 days—inpatient, 98 days—outpatient).

A third VA study, by Weir et al. (2003), studied charts from 60 randomly selected patients admitted to a VA hospital for more than half a day. Nearly 20% of all inpatient notes (372 of 1,891) contained copied material, and physicians were responsible for 50% of copied notes.¹³ Nearly 90% of copying resulted from authors copying forward another note on which they made substantial edits reflecting the current encounter. When authors chose to begin a note by copying forward, they often chose to copy from their own prior note (nearly 60% of cases). However, in 29% of cases, authors chose to copy-forward *another* provider’s note. Only 1.6% (6 of 372) of notes were copied forward without any changes, and only 1 note (0.3%) was apparently copied from another provider without modifications.

Other

Finally, two smaller studies evaluated copy/pasting in particular contexts. Reinke et al. (2014) assessed a random sample of 195 electronic surgical discharge summaries and found that 8% contained copy/pasted material.⁹ The study noted that summaries containing copy/pasted material were significantly harder to read but did not lower the note’s overall quality.⁹ Shah et al. (2013) investigated a sample of 388 radiology requests to assess how often clinical histories appearing within requests were “cloned” (copied from prior radiology requests instead of updated for each request).⁸ A clinical history was considered “cloned” or copied if the identical history had appeared on radiology requisition forms for three consecutive days. Only 7% of requests contained “cloned” histories, primarily originating from the neonatal ICU. Of the 27 cloned clinical histories, 11 (40%) were considered clinically inappropriate after review of the patient’s chart.

Direct Observation

In a small study, Mamykina et al. (2012) observed 11 residents writing 96 daily progress notes for a general medicine inpatient service.¹⁴ The study found that, on average, residents used the copy/paste function 0.8 times per note. The SmartPaste function, which allows automatic insertion of specific current data from elsewhere in the patient chart (such as labs and vital signs), was used 0.2 times per note on average.

Table 1. Prevalence of Copy/Paste

Reference	Prevalence, Context
Self-reported Use of Copy/Paste	
O'Donnell et al. (2008) ⁴	90% of physicians (residents and attendings) using electronic notes reported using copy/paste to write daily inpatient progress notes. 78% used copy/paste almost always or most of the time. 81% of copy/paste users frequently copied notes from other physicians or prior admissions.
Heiman et al. (2014) ²	66% of Northwestern medical students reported copying their own notes frequently or nearly always.
Swary et al. (2014) ³	83% of dermatology residents reported using copy/paste to insert a prior author's past medical history, family, or social history.
Tilstra et al. (2014) ¹⁵	13% of residents and 7% of University of Pittsburgh Medical Center faculty copied from their own prior notes to document outpatient clinic visits at a large academic center
Chart-based Studies	
Edwards et al. (2014) ⁵	10.8% of outpatient primary care, cardiology, and endocrinology notes contained copy/pasted material.
Turchin et al. (2011) ¹⁰	5% of diet counseling, 5.1% of exercise counseling, and 5.2% of weight-loss counseling documentation by primary care physicians for adult patients with diabetes were copied.
Zhang et al. (2013) ⁷	12.3% of primary care notes documenting lifestyle counseling were considered copied from prior notes (by the same author).
Thornton et al. (2013) ⁶	82% of resident and 74% of attending notes in the intensive care unit contained copied text ($\geq 20\%$ copied text from another document).
Chang et al. (2012) ¹⁶	77% (229 of 299) inpatient medicine progress notes contained copied material.
Hammond et al. (2003) ¹²	9% of all notes (Veterans Affairs [VA] Health System) contained copied text, and 63% of these "copy events" were due to human copying.
Thielke et al. (2006) ¹¹	25% of patient charts in a Veterans Affairs (VA) health system contained at least 1 copied exam, with the majority of copying performed by a relatively small fraction of authors. For 11% of patients, charts contained an exam copied from another author.
Weir et al. (2003) ¹³	Nearly 20% of inpatient notes for 60 randomly selected patients (at a VA hospital) were found to contain copied material and 43 out of 60 patient charts contained at least 1 copied note.
Reinke et al. (2012) ⁹	8% of electronic surgical discharge summaries were found contain copy/pasted material.
Shah et al. (2013) ⁸	7% of all radiology referrals over 3 days at a tertiary care children's hospital contained copied ("cloned") clinical histories.
Observational	
Mamykina et al. (2012) ¹⁴	On average, residents were observed to use copy/paste 0.8 times per note when writing inpatient progress notes.

Table 2. Study Definitions of Copy/Paste

Reference	Definition
O'Donnell et al. (2008) ⁴	Copy-forward functionality was considered copying. However, automatic insertion of vital signs and results was not classified as copying.
Turchin et al. (2011) ¹⁰	A duplicated or copied documentation of lifestyle counseling was defined as "using a sentence identical to the sentence used to document the same type of counseling in the previous note by the same health care provider."
Zhang et al. (2013) ⁷	2 notes from the same author containing identical sentences to describe lifestyle counseling.

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Thornton et al. (2013) ⁶	Copying was defined as: matching phrases >4 words and 20 total characters. A progress note was considered to contain copying if it contained ≥20% copied text from another document.
Thielke et al. (2006) ¹¹ Hammond et al. (2003) ¹²	A copy-event was defined as ≥40 identical consecutive words between 2 documents.
Weir et al. (2003) ¹³	Phrasing, content, or form >50% identical; assessors then categorized degree of copying subjectively.

What Components Are Frequently Copied?

While studies reported copy/paste use for nearly all aspects of the medical note (e.g., history of present illness, physical exam, assessment, plan), only three studies with small sample sizes offered details regarding how often particular sections of the note were copied. Wrenn et al. (2013) subjectively examined a small subset of 10 document pairs within a larger study and concluded that sections chosen for copying appeared to vary based on type of note being written.¹⁸ For instance, the A/P was often copied from admission note to progress note. However, when writing a discharge summary, the history of present illness and medication lists from admission were more likely to be copied.

Chang et al. (2012) reported in a conference abstract the frequency of copy/paste in progress notes for 12 patients hospitalized on a general medicine service.¹⁶ When providers from *another* medical service copied material from the daily progress note, the most copied elements included labs/studies (39.4%), insignificant portions of the plan (28.3%), past medical history (8.7%), and medications (6.3%). Also, Hammond et al. (2003) evaluated charts from the VA health system and reported that for a subset of 164 visits, the following elements of the note were copied (in order of decreasing frequency): physical examination, history of present illness, past medical history, assessment, problem list, review of systems, and chief complaint.¹²

Problematic Consequences for Patients

Risks to Patient Safety

Overall, we identified no research studies assessing the prevalence of adverse patient outcomes resulting from copy/paste. However, we identified three case reports¹⁹⁻²¹ of adverse patient outcomes attributed to copy/paste and two studies^{10,22} that captured the frequency of potential or perceived risks to patients. Hersh²³ described a chemotherapy patient with a history of pulmonary embolus who was admitted for diarrhea and dehydration. While the admission note A/P specified the patient should receive heparin for venous thromboembolism prophylaxis, the medication was never ordered. After the patient was transferred to a different service, the A/P was copy/pasted for five days and approved by the attending physician, but no heparin was ever ordered. Shortly after discharge, the patient developed a pulmonary embolus and required readmission.^{20,23}

In another case, a middle-aged man found to have atrial fibrillation and potential heart disease during an emergency room visit was discharged to follow-up with his primary care physician for a stress test. However, the primary care physician failed to diagnose cardiac disease and copy/pasted the A/P over 12 office visits during the next 2 years. The patient died from a heart attack, and the physician was successfully sued.¹⁹ Finally, a third case involved an infant with fever, rash, and fussiness. The initial EHR note documented no history of tuberculosis (TB) exposure, despite the infant's recent travel to a TB endemic country. Successive office visits copy/pasted this negative exposure to TB for two weeks until the child received a diagnosis of TB meningitis in the emergency room and left with significant residual deficits.²¹

A large analysis of VA medical records by Singh et al. (2013) found that copy/paste contributed to clinical diagnostic errors, some of which may have adversely affected patients.²² Singh et al. identified 2 “triggers” potentially suggesting diagnostic error: Trigger 1 was a primary care visit followed by an unplanned hospitalization within 14 days; trigger 2 was a primary care visit followed by at least 1 primary, emergency room, or urgent care visit within 14 days. A physician reviewed all “triggered” records to determine whether diagnostic error was present, based on information easily available to the practitioner at the time of the visit. If diagnostic error was considered to be present, a second, independent reviewer was asked to corroborate the error. Of 212,165 visits over a 1-year span at 2 large urban medical centers, 190 diagnostic errors were detected, corresponding to 20.9% of trigger 1 records and 5.4% of trigger 2 records. Failure to review previous documentation contributed to 15.3% of errors. In 7.4% of cases, a practitioner had copy/pasted prior notes into the progress note; of these cases, copy/pasting mistakes contributed to 35.7% of errors. Unfortunately, the study provided no details regarding the nature of these copy/paste mistakes. Also, while an overall summary of severity of risks associated with all diagnostic errors was provided, the study did not describe whether these specific copy/paste mistakes resulted in adverse patient outcomes.

Association with Clinical Outcomes

Although we identified no evidence that copy/pasting was associated with adverse clinical events, one study found that copy/pasted statements of lifestyle counseling were associated with less effective glucose control for patients with diabetes. Compared to copied statements of lifestyle counseling for diet, exercise, and weight loss, Turchin et al. found that noncopied or “distinct” statements were associated with a significant improvement in HgbA1c among patients with diabetes: an increase of 1 monthly counseling episode was associated with a hazard ratio of 4.35 ($p < 0.001$) for reaching HgbA1c target. In contrast, copied/duplicate counseling or absent statements had no effect on glucose control.¹⁰

Other Consequences

Other reports of chart inaccuracies propagated by copy/paste were also detected.^{17,23-25} One physician reported beginning a conversation with the family of a comatose patient by mistakenly stating that the patient had only recently undergone surgery; a description of the patient as postoperative day two had been copied daily in the progress notes for 5.5 weeks.¹⁸ In this case, this misinformation created mistrust between the family and physician, which could not be repaired.

Inaccuracies propagated by copy/paste extended beyond the clinical realm. In one case, a patient reported a *family* history of cancer. However, this was mistakenly listed under the *patient’s* past medical history and copy/pasted into numerous notes by authors who failed to confirm the accuracy of this diagnosis with the patient. Her insurance company subsequently accused her of withholding information about a preexisting condition.²⁶ In another case of misattribution, a medical student incorrectly documented a history of mental disability; this error was not detected and copied for several days and led to a delay in the patient’s transfer to a rehabilitation facility.²⁷

How Did Studies Categorize Risks Associated with Copying?

Only the three studies performed within the VA health system offered some categorization of the potential risks to patients posed by copied text within notes (see Table 3). Hammond et al. rated all copied text on a scale of 1 (lowest risk) to 6 (highest risk). A level 6 rating involved copying by human author (versus machine-generated artifact such as standard template headings), which resulted in clinically misleading documentation posing a major risk to the patient.¹² A level 1 rating merely represented artifact, was not misleading, and posed no risk. Roughly 2.4% of all copy “events” were level 5 or 6.

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Thielke et al. modified this scale, creating three categories: “highest” risk was defined as copying from another author or from a note ≥ 6 months prior.¹¹ “Moderate” risk copying was defined as copying from oneself one to six months prior, and “lesser” risk events were defined as copying from oneself < 1 month prior.¹¹ Of the 1,112 copied exams the authors identified, 55% were highest risk, 18% were moderate, and 27% were lesser risk.¹¹ However, these copied exams represented a very small percentage of overall documented exams: the authors estimated the total number of physical exams to be 37,000; using this total number of exams as the denominator, 1.6% of exams were highest risk, 0.6% were moderate risk, and 0.8% were lesser risk.¹¹

Finally, in a study of inpatient progress notes, Weir and colleagues categorized notes according to the degree of change (ranging from substantial to none) made to a copied note.¹³

Table 3. Study Categorization of Risk Associated with Copy/Pasted Material

Reference	Study Classification	Rates
Thielke et al. (2006) ¹¹	Risk severity ratings <ul style="list-style-type: none">■ Highest risk: Copying from another author or from a note ≥ 6 months in the past■ Moderate risk: Copying from oneself 1 to 6 months prior■ Lesser risk: Copying from oneself from < 1 month prior	1,112 copied exams were identified (out of an estimated 37,000 exams total). Of these copied exams: <ul style="list-style-type: none">■ 55% were highest risk (n = 607)■ 18% were moderate risk (n = 204)■ 27% were lesser risk (n = 301)
Hammond et al. (2003) ¹²	The severity of each of these “copy events” was rated on a 6-point scale (1 = lowest risk, 6 = highest risk) Severity rating <ul style="list-style-type: none">■ 1 Artifact, not misleading, no risk■ 2 Artifact, minimally misleading, minimal risk■ 3 Human, not misleading, no risk■ 4 Human, minimally misleading, minimal risk■ 5 Human, misleading, some risk■ 6 Human, clinically misleading, major risk	■ 2.4% considered level 5 or 6 events
Weir et al. (2003) ¹³	1. Copied note in full 2. Copied note with small changes or 3. Copied note with substantial changes Copying from oneself vs. another author was noted.	■ 89% copied note with substantial changes ■ 59% copied from themselves ■ 29% copied from others ■ Only a single note (0.3%) copied from a different author without changes.

Attitudes and Perceptions of Healthcare Workers

O'Donnell et al. surveyed 315 physicians and found that 25% agreed that copy/paste makes progress notes more likely to lead to a mistake in patient care. However, only 3% reported committing an error related to confusion caused by a note with copy/pasted text.⁴ Healthcare providers also agreed that frequent copy/pasting can result in notes that are less accurate, lengthier, and less organized. Specifically, physicians felt copy/paste facilitated generation of progress notes that were more likely to contain outdated (71%) or inconsistent information (71%).⁴

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Notably, providers also recognized important benefits: 11% of physicians reported that copy/paste resulted in a “more trustworthy” medical note, and many agreed copy/paste had improved documentation of the patient’s hospital course (79%), documentation for legal purposes (40%), and documentation for billing (46%).

One survey of 123 medical students found that attitudes varied regarding which elements are most acceptable to copy. Medical students reported that the most acceptable portion of the note to copy was laboratory results, while the least acceptable was the physical exam.² Over half (55%) considered copying from another provider acceptable as long as the text was in quotes.

Problematic Consequences for the Medical Chart

Within gray literature, in addition to position statements from several professional organizations (summarized in the Appendix B), many editorials and letters to the editor addressed the problematic aspects of copy/paste from multiple perspectives. Drawing on this literature base, we identified four major ways in which poor use of copy/paste poses challenges to good clinical care by decreasing the quality of documentation: 1) facilitating introduction of new inaccuracies, 2) accelerating the propagation of inaccurate information, 3) promoting creation of internally inconsistent notes, and 4) generating lengthy notes that may obscure important clinical information.

Although mistaking one patient’s results for another has always been possible, frequent use of copy/paste, particularly between notes for different patients, significantly increases the risk of copy/pasting text into the wrong patient’s chart. When clinicians begin a new note by using copy/paste or copy-forward to pull the entire note from a different patient or author, thoroughly editing and adapting the note to accurately reflect the current patient encounter may be challenging. Thus, routinely documenting in this way substantively increases the risk of introducing inaccuracies into the chart. Also, many clinicians routinely use several applications to access laboratory results, imaging reports, or other studies, transferring results into the EHR using copy/paste. However, with several windows open, information can easily be copied into the wrong location.

Secondly, copy/paste **accelerates propagation of inaccurate information**. The ubiquitous use of copy/paste means that, once created, an error can rapidly spread. If a diagnosis is mistakenly added to the patient’s list of medical problems (appearing under past medical history), a busy practitioner might assume others have verified the diagnosis and simply copied the list into their own note. Again, while repetition of inaccuracies is not novel, the ability to copy/paste a large amount of material can enable propagation of errors across charts at a significantly higher magnitude compared to paper documentation. In one case, an emergency room physician found a patient was listed as having a history of “PE” or pulmonary embolism, although the patient denied this was true. After reviewing the chart, the physician found “PE” had originally been used for “physical exam,” but someone had mistakenly listed this under medical history; this error had been copy/pasted throughout the chart for years.²⁵

Third, when authors fail to carefully delete old information, notes may become internally inconsistent, creating further confusion.²⁸⁻³⁰ For instance, a note might report that a patient spiked a fever, but if copied text from the previous day’s note stating “afebrile, vital signs stable” had not been removed, the note would state both and create confusion. Use of copy/paste to document review of systems (ROS) or history of present illness may result in contradictory statements in which ROS is documented as normal, while the history of present illness explicitly details that it is not.³¹ When a physical examination is copied verbatim from an earlier exam, the reader may see that the exam fails to note a recent change. Such inconsistencies create dilemmas for subsequent readers who may not know whether to discount the recorded physical

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exam.³¹ Seventy-one percent of physicians agreed that copy/paste promoted more inconsistencies within progress notes, and 27% agreed copy/paste functionality led to more confusion over the patient's status or course.⁴

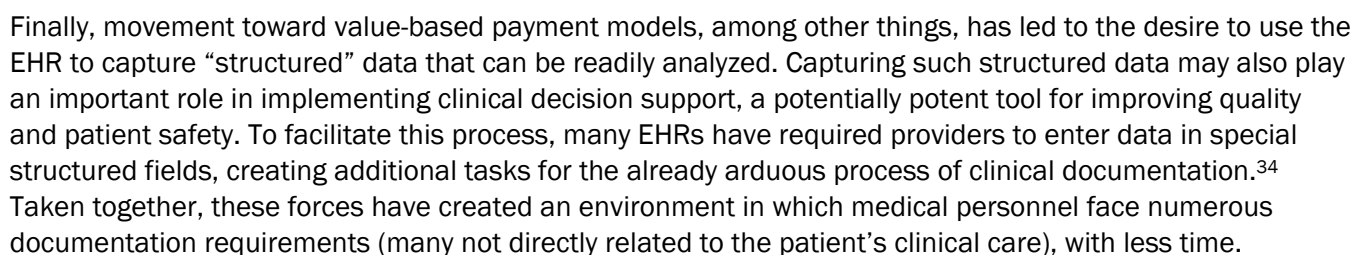
Fourth, copy/paste facilitates creation of increasingly long and uncured notes, dubbed “note bloat.” Inclusion of redundant, clinically irrelevant, or outdated information at successive encounters can result in a note so long that it obscures new or clinically important information.^{4,28,32,33} “Note bloat” may be caused by time constraints for busy clinicians who feel they lack the time to meticulously edit extraneous information. However, wading through long notes in search of relevant information likely requires more time. One physician performing disability evaluations reported that patient charts ranged from 30 to 5,000 pages long and noted that the volume of material in charts significantly slowed the disability evaluation process.³¹

In addition to these considerations raised by the literature, we believe some uses of copy/paste may also create privacy concerns. While EHRs are secured by logon and passwords, using copy/paste stores data directly in the local computer's clipboard before pasting to a final destination within the EHR. Unless this information is cleared, patient information would remain on the local workstation's clipboard, no longer protected within the EHR, and available to subsequent workstation users until the computer is shut down. This could be particularly concerning if users are copying sensitive health information, which may even be specially protected within the EHR (e.g., psychological evaluations).

Factors Contributing to a Challenging Environment for Medical Documentation

Medical documentation is also driven by other important factors. Four factors have particularly contributed to creation of an environment in which copy/paste is so widely (and often inappropriately) used (see Figure 1). First, healthcare providers face increasing time constraints when providing care. Primary care providers may be allotted only 10 to 15 minutes per visit; this time frame may make it difficult to obtain all the relevant clinical information, let alone review interval notes since the patient's last visit and adequately document the encounter.

Second, documentation requirements for healthcare providers have grown progressively complex. The rise of defensive medicine (driven by concerns regarding potential litigation) has resulted in a drive for more thorough documentation: healthcare personnel now record information that previously would not have merited documentation. Also, under the current reimbursement paradigm, medical charts serve not only as a repository of clinical information and decision making, but also as a billing document. As Kuhn et al. argue, E&M guidelines that outlined documentation requirements for reimbursement “largely redefined cognitive services as not what was done, but rather what was documented.”³⁴ Many statements inserted for billing purposes may render notes less clinically oriented and informative. For example, instead of “thoughtfully written review of systems that listed pertinent positive or negative findings, clinically meaningless terms, such as ‘ten point review of systems was negative’ were inserted into the record to satisfy E&M guidelines.” In reflecting on copy/paste use in A/P sections of ICU charts, Thornton et al. suggested that intensivists may have come to primarily regard the daily progress note as a means to satisfy billing requirements instead of a clinically useful document.⁶ Finally, proliferation of available medical tests means that clinicians must sift through and summarize an increasingly high volume of results in their notes.



Nearly all articles we identified acknowledged the usefulness of copy/paste when properly used.^{28,29,36} Nearly 80% of physicians agreed that copy/paste has improved documentation of the entire hospital course, and 82% agreed that copy/paste use should continue.⁴ While acknowledging the potentially problematic aspects of copy/paste, several authors suggested that characterization of copy/paste has been overly negative. For one, forcing providers to retype information may in fact lead to *more* errors.³⁶ Although copy/paste may promote note bloat, these lengthier notes may promote timelier documentation. As previously noted, Hirschtick found residents kept these irrelevant test results to facilitate easy conversion into a discharge summary.³⁵ In fact, Reinke et al. found that compared to dictated surgical discharge summaries, electronic summaries were completed significantly faster and were shorter in length.⁹ Other

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potential benefits include continuity of medical decision making, more complete documentation of clinical encounters, and systematized tracking of a patient's problem list.²⁸

Some have described notes using copy/pasted or boilerplate text as engaging in “medical plagiarism.” However, in a blog post, Northwestern's Chief Medical Information Officer argued that describing this as plagiarism is fundamentally unjustified since medical progress notes are not intended to be an exercise in “creative writing.”³⁷ As he notes, for several sections of the progress note, repetitive and standardized text is entirely appropriate. For instance, the language used to describe physical exams can often be highly standardized (for example, “heart rate was regular rate and rhythm” or “pupils equally round and reactive to light”).³⁴ Sheehy et al. echoed this argument, noting that the mere presence of repeated material from note to note is insufficient to conclude that a practitioner simply copy/pasted text without performing an exam or reviewing information.³⁸

Recommendations

Author Responsibilities

Several articles discussed aspects of copying from oneself, with a general consensus that this practice was more acceptable than copying from another provider.^{37,39} Generally, articles either urged caution or argued that copying from another author should be considered unacceptable. Guidance from professional organizations can be found in Appendix B.

Overall, four common themes regarding an author's responsibilities emerged (see Table 4). First, authors should verify the accuracy of all copied content *regardless of the source*. Whether copying a past medical history from their own prior note or another provider's summary, physicians should be able to vouch for the information's accuracy.^{28,40} Second, the *original source* of the copied text should always be acknowledged, particularly when copying from another provider.^{25,28,32} If the EHR lacks this functionality, the author should nevertheless ensure appropriate attribution for the copied text. Third, authors should strive for *brevity*, regularly editing notes to avoid irrelevant or redundant text that might obscure new or important information.^{28,37} Instead of copying pertinent text from another note into the chart, authors could simply reference the relevant information. For example, pertinent findings from a consultant could simply be alluded to instead of copy/pasted in their entirety into the patient's note.

Finally, agreement prevailed that copy/paste should be acceptable for certain portions of the note, but perhaps forbidden for others. For instance, copying from medical student notes should be avoided, and copying a medical student's exam or decision-making sections should be absolutely prohibited.⁴¹ In general, agreement was widespread that copy/pasting the history of present illness should not be allowed.^{42,43} Several articles suggested that for sections such as past medical history, family history, and social history, a copy-forward approach with modifications after the author confirmed the accuracy with the patient could be acceptable. Writing on behalf of the Association of Medical Directors of Information Systems, Shoolin et al. argued that for inpatient documentation, the parts of a note that should *never* be copied from another provider's notes are history of present illness, review of systems, physical examination, assessment, and plan.⁴²

Table 4. Common Themes Regarding Author Responsibilities

Responsibilities for Authors	References
Accuracy: The note's author should be responsible for verifying the accuracy of all copied information regardless of the source.	28,40
Source attribution: The author should always acknowledge the original source of copied material.	25,28,32

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Responsibilities for Authors	References
Brevity: Authors should edit extraneous or redundant information to prevent “note bloat,” which may obscure important clinical information.	28
Appropriateness of copy/paste differs for different sections of the note: Copy/paste is suitable for certain portions of the note but should be strongly discouraged (if not forbidden) for others, such as the history of present illness (HPI)	25
■ HPI: Copying should be discouraged if not prohibited	42-44
■ Past medical history (also family history, surgical history): Copy-forward with verification acceptable	42
■ Test results: Copy-forward with auto-population of latest results acceptable	37
■ Review of systems: Avoid copy-forward from another provider’s note	42
■ Physical exam: Avoid copy-forward from another provider’s note	42
■ Assessment and plan: Avoid copy-forward from another provider’s note	42
Other	
Always inappropriate: ■ Copying the exam or assessment portions of a medical student note	41
Avoid: ■ Copying from a medical student note ■ Copying another provider’s note ■ Copying from one patient’s chart to another	28,30,40,41

Implications for EHR Design

To address problematic use of copy/paste, we identified a variety of proposed suggestions for EHR design in the literature, many of which are summarized, along with their proposed potential benefits, in Table 5. In the right column, we offer our thoughts regarding implementation considerations.

Given the consensus that certain portions of the medical student note should rarely (if ever) be copied, Kirch et al., writing for the Association of American Medical Colleges, recommends disabling certain EHR features to prevent 1) copying a medical student note in full, 2) automatically pulling information into another note, 3) removing evidence of medical student authorship, or 4) copying a medical student’s exam or decision-making section.⁴¹ These recommendations are aimed at concerns that attending physicians could copy elements of the medical student note to justify reimbursement, although that practice is strictly forbidden. Similarly, the *Emergency Department Legal Letter* suggested institutions consider disabling copy/paste for particular fields.²⁵ Citing concerns that copy/paste and auto-fill functions diminish the education of residents by allowing them to bypass the cognitive process of generating content for themselves, Schenart et al. suggested disabling copy/paste functionality and prepopulated templates for residents.⁴⁵

Consensus was widespread that EHRs should work toward improved functionality to allow easy identification of copied material. For instance, the Federation of State Medical Boards supports efforts to “promote functionalities that enable an indication that copy/pasting and other edits have occurred.”²⁹ Some suggested displaying copied text with a different font or color of text to allow subsequent readers to easily track where copied material had been inserted, a practice that anecdotally several institutions have already implemented.^{7,25}

Other suggestions attempted to address the consequences of “note bloat” due to irresponsible copy/pasting. Shoolin et al. suggested that providers wishing to copy/paste another provider’s findings or

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test results should consider acknowledging the findings by reference instead of reentering them.⁴² To facilitate this alternative “referencing” method, EHRs should allow for easy linking between the reference in one note and the text being alluded to in the source note. The American Health Information Management Association also recommended development of this functionality in its recent position statement.¹

Several suggestions were aimed at improving display of data. Shoolin et al. suggested that allowing sections of the note to be hidden with a toggle function could significantly promote succinct display of data and counteract the issues associated with lengthy notes.⁴² Based on a small focus group, Senathirajah et al. speculated that sections of the note likely to remain stable over time (i.e., past medical history) could be visually separated from other sections typically requiring frequent updates over time (i.e., HPI).⁴⁶ Hahn et al. reported using an “inverted” note structure in which the A/P section, which captures the synthesis of information and medical decision making, is moved from the end to the front of the note. As many users depend on this “bottom line” summary, this reorganization could allow readers to avoid scrolling through other lengthy sections of the note to locate this information.⁴⁷ Shoolin et al. also suggested this alteration in note structure as a potential solution.⁴² More radically, Berkowitz argued for a fundamental reexamination of the chart’s current organizational paradigm: instead of conceiving of documentation as a series of individual notes written by separate authors, he advocated a “Wiki” type design in which multiple authors could contribute, in keeping with the drive for increasing integration of care. Berkowitz summarized this approach as “The Note Is the Chart.”³⁷ Others have also echoed the need for a collaborative team note.⁴⁸

Finally, several authors suggested standard incorporation of audit or tracking capability into EHR design; with this capability, administrators could accurately capture the frequency of copy/paste and provide feedback regarding proper and improper use.^{25,49} This capability would allow high-frequency users to be identified and provided with ongoing training.

Table 5. Selected Proposed EHR Modifications to Address Problematic Aspects of Copy/Paste from the Literature and Implementation Considerations

Features of EHR (References)	Benefits	Implementation Considerations
To allow easy identification, display of copied material should be altered (i.e., different font, different color text) (Zhang et al.; ⁷ ED legal letter et al. ²⁵)	Copied text easily identified Potentially facilitates authorial attribution Potentially deters copying text	Altered text (i.e., multiple fonts, conflicting colors) could be more difficult to read (similar to tracked changes in Word formats) Potentially challenging to differentiate between text copied once from text copied over and over again Compatibility issues, as not all systems use the same fonts If alteration of copied text was automatic, this would require a system to perform this automation; however, if the “copier” was responsible for alterations, this could slow down documentation and user error could lead to false conclusions/attribution Issues with color display, color-blindness affecting note read

Features of EHR (References)	Benefits	Implementation Considerations
<p>To promote acknowledging outside information by reference instead of reentering information in the body of a note, EHRs should create links between the referenced text and the referring note (American Health Information Management Association et al.,⁴¹ Shoolin et al.⁴² Association of Medical Directors of information Systems)</p>	<p>Avoid “note bloat”</p> <p>Decrease the need to copy by providing an alternative method for maintaining timeliness of information</p> <p>Automatic attribution of authorship</p> <p>Allows users quick access to original report/note without searching through other records or accessing through separate menu</p> <p>Potentially allows clinicians to review original information and form impressions for themselves</p>	<p>Information at the link target could change, which could affect how people reviewing a note interpreted the reasons behind care provided. For instance, if a test result or impression was subsequently altered or added, the link could misrepresent the original author’s intent. This could pose medico-legal problems as well.</p> <p>Links typically degrade over time. This could affect the permanence of the document artifact; future users reviewing a record with broken links could lack access to complete record.</p> <p>Inserting links instead of complete information could make it more challenging to quickly provide patients with copies of their note.</p> <p>This functionality does not exist within many EHR systems; implementation would require creation of de novo functionality for many systems.</p>
<p>To facilitate succinct display of data, allow parts of the note to be hidden with a toggle function (Shoolin et al.⁴² Association of Medical Directors of information Systems)</p>	<p>Decreased information overload</p> <p>Allows users to “customize” display of information for their own clinical context</p> <p>Intuitive data display already widely used; likely easy for users to learn</p> <p>Each note would still contain a “complete” record of data (even if hidden). This could address concerns regarding what information was available to author during documentation and medico-legal concerns as well.</p>	<p>If clinically important information is hidden by default, this could allow critical information for patient care to be missed.</p> <p>Would require additional clicks to access certain information; this could be inconvenient and lead to dissatisfaction with the system.</p> <p>Would likely require consensus regarding what should be hidden on a system level—likely too much variability if users described what should be hidden on an individual basis. However, preferences could be tailored for groups of users (i.e., surgeons, nurses, pediatricians).</p> <p>This functionality does not exist within many EHR systems; implementation would require creation of de novo functionality for many systems.</p>
<p>To increase efficiency of workflow and decrease copy/pasting of redundant information—sections likely to remain stable over time (i.e., past medical history) should be displayed separately from sections that should require frequent update (i.e., History of Present Illness) (Senathirajah et al.⁴⁶)</p>	<p>Decreased information overload</p> <p>Avoidance of “note bloat”</p> <p>Attribution of authorship</p> <p>Supports a shared patient record</p>	<p>Separating sections likely to be stable such as past medical history could allow users to overlook its clinical importance.</p> <p>Information in separated sections could change. However, if no version at the time of documentation was inserted into the note, subsequent readers could misinterpret reasons behind care from original authors. For example, if a patient received a new diagnosis that replaced a prior diagnosis, a subsequent reader could find it challenging to determine which diagnosis a clinician was working with when a note was written.</p> <p>If patients requested copies of their note, it could be difficult to present an accurate representation for older notes.</p> <p>Additional clicks would be required to access/edit separated information.</p> <p>This functionality does not exist within many EHR systems; implementation would require creation of de novo functionality for many systems.</p>

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Features of EHR (References)	Benefits	Implementation Considerations
To promote succinct presentation of information and decrease copy/pasting between provider notes, the chart should be redesigned to allow for editing by multiple authors (Berkowitz ³⁷)	<p>Attribution of authorship</p> <p>Supports a shared patient record</p> <p>Potential to eliminate redundancy: would not require multiple authors to repeatedly edit past medical history changes; 1 author could make the change, and future authors could simply confirm</p> <p>Potential for increased accuracy; topic “experts” assume responsibility for documenting topic specific sections (neurologists describe location and cause of stroke; surgeons describe particular procedure)</p>	<p>This would only affect copy forward or copy/paste activities in areas of the chart that are amenable to multiple provider inputs.</p> <p>Authors may inadvertently remove important material entered by other authors; could create medico-legal concerns.</p> <p>Authors may overwrite each other to describe the truth from their point of view, which could create medico-legal concerns.</p> <p>Would require accounting for simultaneous data entry or for users being “locked out” of portions of the note; could create inefficiencies.</p> <p>This functionality does not exist within many EHR systems; implementation would require creation of de novo functionality for many systems.</p>
To allow tracking of copy/paste use over time and identify “high utilizers,” EHR should include functionality to allow regular audits (Koppel ⁴⁹)	Supports organization oversight of copy/paste and copy-forward activities	<p>Conveys a negative connotation about copy/paste and copy forward that may not align with organizational opinion.</p> <p>Certain specialties may be more likely to appear as “high utilizers” due to patient stability.</p>

Organizational Responsibilities

The importance of organizational initiatives was also a recurrent theme in the literature. Adoption of EHRs across both inpatient and outpatient contexts has dramatically increased: as of 2013, 59% of hospitals now use EHRs, a four-fold increase from 2010,⁵⁰ and EHR use among office-based physicians has also dramatically risen from 25% in 2010 to 78% in 2013.⁵¹ However, a recent Office of the Inspector General survey found that only 24% of hospitals had a copy/paste policy.³⁸ Professional organizations and healthcare institutions were urged to develop policies addressing professional standards for the proper use of copy/paste. Several articles called for organizations to provide clarity for documentation standards and specify consequences for violations.^{1,43}

Concerns about inappropriate use of copy/paste were often expressed as part of larger concerns about maintaining the integrity of information captured in the EHR. Writing for the American College of Physicians, Kuhn et al. urged, “Physicians working with their care delivery organizations, medical societies, and others should define professional standards regarding clinical documentation practices throughout their organizations.”³⁴ Similarly, Bowman argued that organizational policies specifically addressing copy/paste should specify what type of information is permissible to copy, reiterate the provider’s responsibilities for copied material, and specify disciplinary consequences for problematic behavior.³² Such policies were also advocated at the department level (e.g., emergency department).²⁵ Finally, healthcare organizations need to provide ongoing education and feedback to medical personnel once these standards have been established.^{1,25,28,34}

Commentary/Conclusion

Studies empirically investigating copy/paste use, frequency, and impact on patient care remain sparse. However, the limited available evidence from three larger surveys suggests a majority of medical students, residents, and physicians routinely use copy/paste while charting (66% to 90%). Given general familiarity with copy/paste as a widely available core functionality of word processing for some time, as well as time constraints and increased documentation requirements, this high rate of use is not surprising.

Drawing conclusions regarding the frequency of copy/paste and the risk of adverse events to patients from the current evidence base is more challenging for several reasons. At a basic level, some studies did not describe how copying was defined, and others used varying definitions. Future studies will need to address this problem. To facilitate interpretation of results, at a minimum, researchers should be transparent about the definitions they employ. Ideally, researchers could work toward a standard definition and provide their rationale. Given variability in clinical contexts, multiple definitions might be warranted depending on the context of the copying. Furthermore, as Weis and Levy note, in addition to copy/paste and copy-forward functionality, current EHRs commonly provide prepopulated templates and macros that essentially automate the process of information copying.²⁸ Researchers will need to consider how these functions should be incorporated into definitions of copying as well.

Stakeholders, including clinicians, quality improvement administrators, payers, EHR designers, and patients, share the goal of detecting inappropriate use of copy/paste and creating policies to promote good practice. However, at a minimum, developing thoughtful and feasible copy/paste policies will require stakeholders to acknowledge the many appropriate uses of copy/paste along with inappropriate ones. This will be key to helping solve the problems generated by copy/paste without creating burdensome restrictions for authors already under significant time constraints. We provide a list of potential alterations to EHR function that have been suggested to address the problem along with our assessment of implementation considerations (Table 5). Ideally, practicing clinicians should pilot test such alterations before implementation at organizational levels.

The responsibilities previously outlined for authors (Table 4) and organizations offer a helpful starting point for addressing the problem. Authors should work to ensure the veracity of material they copy, offer attribution when copying is performed, strive for brevity, and avoid copying from certain sections of the note if possible. Professional and institutional organizations should consider these guiding principles as they develop standards and educational venues to help authors put them into practice.

However, it is also important to acknowledge the factors that have contributed to an environment that potentially promotes inappropriate use of copy/paste: time constraints, complex and onerous documentation requirements, limited functionality in current EHR platforms, and decreases in efficiency related to efforts to capture more data from the chart. In addition to promoting uptake of recommendations for authors and organizations, successful efforts to combat inappropriate copying in the long term will also need to address these underlying factors.

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Appendix A

Table A 1. Studies Describing the Prevalence of Copy/Paste

Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
<i>Self-report</i>					
Tilstra et al. (2014) ¹⁵ Conference abstract	Not reported (NR)	To evaluate perceived efficiency and accuracy of outpatient clinical documentation	Survey of faculty and residents at outpatient clinics at a large academic medical center	<p>39 residents and 14 faculty at University of Pittsburgh Medical Center completed the survey (54% and 74% response rates, respectively).</p> <p>39% of residents were satisfied with training in outpatient documentation and chart management. 57% of faculty reported receiving training during their career.</p> <p>62% of residents spent >20 minutes documenting per patient encounter (vs. 7% of faculty)</p> <p>Compared to faculty, residents were more likely to:</p> <ul style="list-style-type: none"> ■ Cut and paste from their last note (13% vs. 7%) ■ Struggle to complete outpatient notes within 24 hours (100% vs. 87%) ■ Be uncomfortable with appropriate billing for patient encounter (100% vs. 44%) ■ Be unaware of required documentation elements for clinical encounter (86% vs. 56%) <p>Compared to faculty, residents were less likely to:</p> <ul style="list-style-type: none"> ■ Use a template for documentation (54% vs. 67%) ■ Have received feedback regarding quality of their documentation (54% vs. 86%) <p>Nearly 50% of residents identified further training in the electronic chart with “frequent refreshers” as a mandatory step for moving forward.</p> <p>Some residents asked for more user-friendly templates.</p> <p>Both faculty and residents reported that timely charting was the major challenge.</p>	Residents are not well trained in outpatient documentation and electronic chart management and struggle with efficiency, navigating/updating the electronic portal, identifying needed components for documentation and billing, and do not receive adequate feedback.

Copy/Paste: Prevalence, Problems, and Best Practices

Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
Heiman et al. (2014) ²	NR	To understand medical student perspectives and observations of healthcare documentation	Survey of 3rd-year medical students at a large academic medical center	<p>123 medical students at Northwestern University School of Medicine participated (75% response rate).</p> <p>97% frequently or always use EHR to document patient encounters</p> <p>Only 16% received specific feedback about the use of cut and paste</p> <p>Many medical students reported observing use of cut and paste from another provider's note by:</p> <ul style="list-style-type: none"> ■ Residents (86%) ■ Attendings (60%) ■ Other medical students (59%) <p>Scribing:</p> <p>43% of medical students reported scribing for an attending</p> <p>23% of medical students had scribed for a resident</p> <p>Self-reported use of copy/paste by medical students:</p> <p>95% copied their own notes at least "sometimes"</p> <p>66% copied their own notes frequently or nearly always</p> <p>22% copied resident notes at least sometimes</p> <p>13% copied notes from their attending sometimes or frequently</p> <p>Medical student attitudes toward copy and paste:</p> <p>83% felt it is generally acceptable to copy/paste from their own prior notes.</p> <p>The most acceptable part of the note to copy from day to day was laboratory results (87%).</p> <p>The least acceptable part to copy was the physical exam (37%).</p> <p>Only 10% felt it was acceptable to copy from another provider.</p> <p>55% felt copying from another provider was acceptable if the text was in quotes.</p> <p>Medical students intending to choose a procedure-focused field (i.e., anesthesia, obstetrics, gynecology or surgery) were significantly more likely to report using copy/paste compared to their peers in nonprocedurally based fields.</p> <p>Only 42% of students were aware of a medical school policy on copy/paste.</p>	<p>Despite the medical school policy, many medical students report the use of copy/paste by attending physicians.</p> <p>In general, medical students are aware of the complexity of issues surrounding medical documentation and wish to use the EHR responsibly.</p> <p>As there was significantly more use of copy/paste among students intending to specialize in procedurally based field initiatives to promote responsible use of copy/paste should cross multiple disciplines.</p>

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
Swary et al. (2014) ³	NR	To identify the frequency of practice gaps in dermatology training programs	Survey of dermatology residents at national meeting	<p>142 dermatology residents attending a national conference voluntarily participated in survey.</p> <p>Several concerning practice gaps were identified:</p> <p>82.8% (n = 77) reported using cut/paste from a previous author's past medical history, social history, or family history without confirming the information's accuracy with the patient.</p> <p>45.2% (n = 28) reported failing to report a needlestick injury.</p> <p>96.7% (n = 118) had experienced a right/left labelling mistake.</p> <p>Several other safety issues were identified, including failure to routinely perform "time-out" before starting a procedure and intimidation from an attending, causing the resident to feel uncomfortable challenging a questionable clinical decision.</p>	A variety of safety issues were identified in dermatology programs. 82.8% of dermatology residents reported using cut/paste from a different author's prior note without confirming the information.
O'Donnell et al. (2008) ⁴	NR	To determine use of copy/paste among physicians and their perceptions of impact on use and patient care	Survey of physicians at 2 academic hospitals (2 pediatrics departments and 1 medicine department) with ≥2 weeks of inpatient service time	<p>For this study, copy/paste was defined to include the copy-forward function, but exclude automatic insertion of vital signs and results.</p> <p>315 physicians participated in the survey (response rate 70%) over a 2-month period in 2007.</p> <p>80% wrote inpatient notes electronically (97% of residents, 61% of faculty). Residents and younger physicians were much more likely to write electronic notes.</p> <p><u>Use of Copy/Paste:</u></p> <p>Of physicians who wrote electronic notes (n = 253), 90% (n = 226) reported using copy/paste to write daily progress notes.</p> <p>Of the 226 using copy/paste, 78% (n = 177) were "high-frequency" users (copy/paste used almost always or most of the time).</p> <p>Residents were nearly 3 times more likely to be high-frequency copy/paste users as faculty (odds ratio = 2.9, 95% confidence interval [CI]: 1.5–5.7).</p> <p>81% of copy/paste users frequently copied notes written by other physicians or notes from prior admissions (72%).</p> <p>The copy forward function was used to copy either part or all of a prior note by 47% of copy/paste users at 1 hospital and 69% of copy/paste users at the second hospital.</p> <p><u>Perceptions of Copy/Paste:</u></p>	<p>Although many physicians acknowledge flaws that copy/paste introduces into the record, many physicians in this study did not have a negative perception of copy/paste.</p> <p>Residents composed the majority of electronic note writers and copy/paste users.</p> <p>The authors speculate that physician reluctance to report errors may lead to under-reporting of copy/paste errors, particularly since copy/paste is so vital to meeting increasing time constraints.</p>

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
				<p>Compared to notes written without copy paste, the following percentages of physicians agreed that copy/paste makes progress notes:</p> <ul style="list-style-type: none"> ■ More trustworthy (11%) ■ More difficult to detect new information within (61%) ■ Contain more outdated information (71%) ■ Contain more inconsistent information (71%) ■ Lead to more confusion in patient status or course (27%) ■ More likely to lead to a mistake in patient care (25%) <p>Physicians felt that copy/paste has improved:</p> <ul style="list-style-type: none"> ■ Communication of the patient's daily course (55%) ■ Documentation of the entire hospital course (79%) ■ Documentation for legal purposes (40%) ■ Documentation for billing (46%) ■ Physician documentation overall (56%) <p>With regard to future copy/paste use, physicians felt:</p> <ul style="list-style-type: none"> ■ Copy/paste use should continue (82%) ■ Copy/paste education was needed (91%) ■ Copy/pasted text should be identifiable (44%) ■ Alerts should indicate when notes are too similar (38%) ■ Copying of all types of notes should not be allowed (46%) ■ Copying from another author should not be allowed (23%) ■ Copying of certain types of notes should not be allowed (17%) <p>Compared to non-users, copy/paste users were less likely to believe copy/pasted notes were more difficult to find information within (52% vs. 83%, $p < 0.001$), contained more outdated information (66% vs. 85%, $p = 0.001$), and were more likely to lead to a mistake in patient care (21% vs. 33%, $p = 0.03$).</p> <p>Only 8 physicians (3%) reported making a mistake in patient care due to confusion from a note that contained copy/pasted text. 56 physicians reported being unsure.</p> <p>"Many" residents reported using other methods (resident's sheets) with trustworthy clinical documentation.</p>	

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
Chart-based Studies					
Edwards et al. (2014) ⁵	NR	To evaluate quality of outpatient notes for patients with diabetes and coronary artery disease (CAD) and determine whether note quality was associated with high-quality care	Retrospective chart review at urban academic medical center	<p>All patients with a “moderately complex” office visit to an endocrinologist, cardiologist, or primary care physician for diabetes, CAD, or both documented in the EHR during 2010 were identified. A random sample of 239 notes (authored by 111 physicians) from these visits was selected for analysis.</p> <p>Notes were reviewed using a data-collection instrument created for this study along with a single-item general impression score (“Please rate the overall quality of this note”) and the physician documentation quality instrument (PDQI-9).</p> <p>10.8% of notes overall contained copy/pasted material.</p> <ul style="list-style-type: none"> ■ 19.5% of endocrinology notes ■ 1.9% of cardiology notes ■ 8.2% of primary care notes <p>There was no significant association between general impression scores and composite quality scores for diabetes ($p = 0.065$) or CAD ($p = 0.06$).</p> <p>The PDQI-subscale “accurate” decreased with increasing clinical quality ($p = 0.01$).</p> <p>However, the PDQI subscales that best correlated with the general impression score were “useful,” “synthesized,” and “organized.”</p>	10.8% of notes overall contained copy/pasted material.
Thornton et al. (2013) ⁶	Notes were considered to contain copying if copied text between 2 documents was $\geq 20\%$.	To describe the prevalence of copy/paste among medical intensive care unit (ICU) physicians	Retrospective review of the assessment and plan (A/P) sections of ICU charts at urban academic medical center	<p>Charts from all patients ($n = 135$) with an ICU stay lasting >72 hours over a 5-month period were reviewed.</p> <p>The A/P section of each note was analyzed using the CopyFind program for matching phrases of >4 words and 20 total characters.</p> <p>73 physicians (62 residents, 11 attendings) provided the care. 2,068 total notes were written (1,047 [51%] by residents, and 1,021 [49%] by attendings).</p> <p>Copying ($\geq 20\%$) was identified in 82% of resident notes and 74% of attending notes.</p> <p>Residents wrote significantly longer A/P sections than attendings (208 ± 99 words vs. 116 ± 61, $p < 0.001$) and copied less information ($55\% \pm 23\%$ vs. $61\% \pm 21\%$, $p < 0.001$).</p> <p>Between attendings, there was significant variation in the amount of copying (range 41% to 82%). No clinical or demographic</p>	<p>Residents copied more often than attending physicians, but attending physicians copied more information between notes.</p> <p>Intensity of medical care does not necessarily alter the prevalence of copy/paste. “Some authors have suggested that the primary of purpose of writing progress notes has shifted from the transfer of knowledge to documentation for billing. As a result, physicians may be less invested in spending the time and effort necessarily to convey new information and may prefer copying of existing</p>

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
				patient/provider variables (including age, race, length of ICU stay, insurance, or diagnosis) was associated with mean copying.	information as a means to quickly complete an onerous task.” “Despite the need for intensive monitoring and therapies, physicians may not feel obligated to convey new or changing information from day to day. Alternatively, the ICU environment may make physicians feel more compelled to reduce their workload.”
Zhang et al. (2013) ⁷	Lifestyle counseling was considered copied if the note contained a sentence <i>identical</i> to the sentence documenting lifestyle counseling in the patient’s prior note (and authored by the same provider).	“To determine whether copied lifestyle counseling is being used to justify higher evaluation and management (E&M) charges”	Retrospective chart review of 16,000 records from patients with diabetes at urban academic medical center	Records from all adult patients with diabetes followed by primary care physicians (associated with Brigham and Women’s Hospital and Massachusetts General Hospital) for at least 2 years (between 2000 and 2009) with ≥ 1 hemoglobin A1c $\geq 7\%$ were studied (n = 16,164). Patients were excluded (n = 7,933) if they saw an endocrinologist during the study period (to ensure only a single source of care). Study was conducted using local internally developed EHR, the Longitudinal Medical Record. A “copy” function automatically copies the entire note to a new note for a patient with the current date. No decision support, drop-down menus, or check boxes exist for lifestyle counseling. Lifestyle counseling was considered copied if the note contained a sentence <i>identical</i> to the sentence documenting lifestyle counseling in the patient’s prior note (and authored by the same provider). 65.4% of primary care encounters documented lifestyle counseling. 87.7% of these documentations were considered “distinct” (i.e., not copied) from prior notes. No evidence existed that copied lifestyle counseling led to increased E&M charges. 9.6% of encounters with “distinct” counseling recorded at Level 5 E&M compared to 7.2% of encounters with “copied” counseling.	No evidence existed that copy/paste documentation of lifestyle counseling was used to justify to raise the level of E&M charged. Higher charges were associated with complexity of patients and encounters. The incidence of copied lifestyle counseling may have been underestimated because they required wording to be exactly identical between notes.
Shah et al. (2013) ⁸	“Cloning was defined as identical clinical histories appearing on the radiology	To determine frequency of “cloned” clinical history in	Chart review	388 radiology requests on 3 randomly selected days during a single month (2 weekdays, 1 weekend day) were reviewed. ■ 315 (81%) weekday requests	Cloned clinical histories occurred in 7% of all radiology requests; 40% of these cloned histories were considered inappropriate.

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
	request on 3 consecutive days (study date and preceding 2 days)."	radiology requests		<ul style="list-style-type: none"> 73 (19%) weekend day) requests <p>Most outpatient requests came from the emergency room and orthopedic clinic, while inpatient requests predominantly came from ICUs.</p> <ul style="list-style-type: none"> Cloning of clinical history was identified only in inpatient requests (n = 27). Cloning composed 7% of all overall requests and 15% of inpatient requests (27/182). Of the 27 cloned clinical histories, 11 (40%) were considered inappropriate. Cloning did not occur more frequently on weekdays vs. the weekend day. Most cloned clinical histories occurred on radiology requests from the neonatal intensive care unit (NICU). Also, 22% of all radiology requests from the NICU had cloned histories. The most common cloned histories included "hypoplastic left heart syndrome (n = 4), "endotracheal tube placement" (n = 3), and "evaluate lung fields and bowel" (n = 3). There was no association between cloning of the clinical history and inappropriate clinical history (p = 0.17) <p>Standing orders for morning chest x-ray in the NICU likely contributed to the volume of cloned clinical histories.</p> <p>A follow-up letter by Greenberg et al. (2013)⁵² disclosed that after routine ordering of daily films from the NICU was discontinued and staff watched a short educational video, only 17% of ordered studies were inappropriate and cloning of requests was completely absent.</p>	Cloning occurred only in inpatient (compared to outpatient) requests.
Reinke et al. (2012) ⁹	NR	To assess the timeliness and quality of surgical discharge summaries after implementation of electronic format	Retrospective review of surgical discharge summaries at an academic medical center	<p>A random sample of 195 discharge summaries from October 1 to December 31, 2008, and October 1 to December 31, 2009 (before and after introduction of the Electronic Discharge Summary Program.</p> <p>All summaries were evaluated for quality and readability using a modified version of other summary quality tools.</p> <p>Electronic discharge summaries were significantly shorter (124 vs. 216 words, p <0.01) and completed faster (median 0 vs. 6 days, p <0.01).</p> <ul style="list-style-type: none"> Overall summary quality score did not differ between electronic vs. dictated summaries. 	8% of electronic surgical summaries were found to have copy/paste, which was associated with decreased readability, but no difference in note quality.

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
				8% of electronic summaries were found to have “obvious use” of copy/paste; this did not affect the overall quality score, but did significantly decrease their readability score compared to other electronic summaries ($p = 0.02$); no description of what was copy/pasted was provided, but the authors mention readability suffered “presumably” because of the “distracting and illogical nature “of the documentation.”	
Chang et al. (2012) ¹⁶ Conference abstract	NR	To determine the prevalence of copy/paste	Retrospective chart review, inpatient general medicine service	<p>Of all the patients hospitalized on a general medicine service over 1 year, study authors randomly selected 12 patients. Investigators identified 299 progress notes associated with these patients. After eliminating instances of “false” copy/paste events (i.e., signatures, template-associated text), 229 documents remained containing 10,310 instances of “copy-paste events.”</p> <ul style="list-style-type: none"> ■ 60.5% ($n = 1,062$) of these events occurred by the same provider on the same service. ■ 32% ($n = 562$) occurred between different providers on the same service. ■ 7.2% ($n = 127$) were copied by a provider from a different service from the primary service. <p>When providers from other services copied, the most commonly copied elements of the progress note were labs/studies (39.4%), insignificant portions of the plan (28.3%), past medical history (8.7%), and medications (6.3%). This pattern was significantly different from instances in which providers from within the same service copied elements.</p>	229 of 299 progress notes contained copied material. Utilization of copy/paste varies by user. Providers from the same service copy different elements than providers from another service.
Turchin et al. (2011) ¹⁰	Copying was defined as “using a sentence identical to the sentence used to document the same type of counseling in the previous note by the same health care provider; otherwise counseling was deemed to be ‘distinct.’”	To evaluate copy/paste of lifestyle counseling and evaluate outcomes	Retrospective chart review at an urban academic medical center	<p>Used software to detect copying in records of adult patients with diabetes followed for at least 2 years by a primary care physician affiliated with 2 academic hospitals between January 1, 2000, and August 31, 2005.</p> <p>Software was validated against 600 randomly selected notes that 2 reviewers manually reviewed.</p> <p>Categorized into lifestyle counseling addressing weight loss, exercise, and diet.</p> <p>Software processed 62,934 notes from 5,914 patients, followed for a mean 3.7 years during the study period.</p> <p>The following percentages of lifestyle counseling were found to be duplicate:</p> <ul style="list-style-type: none"> ■ Diet counseling: 5% 	Duplicated lifestyle counseling for diet, weight loss, and exercise were not associated with any improvement in HgA1c, while non-copy/pasted, “distinct” counseling had a significant effect. The authors suggest their results raise the question of whether duplicated lifestyle documentation could represent “an honest mistake or deliberate falsification.”

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
				<ul style="list-style-type: none"> ■ Exercise counseling: 5.1% ■ Weight loss counseling: 5.2% <p>Duplication was attributed to copy/paste instead of template use because duplicate counseling from the same provider for the same patient occurred on average 3.07 times per patient. In contrast, duplicate wording from 1 provider used for different patients occurred only 0.099 times on average ($p < 0.001$).</p> <p>Distinct counseling for diet, exercise, and weight loss was associated with significant improvement in HgbA1c: an increase of 1 monthly episode was associated with a hazard ratio of 4.35 ($p < 0.001$) for reaching HgbA1c target.</p> <p>In contrast, duplicate or absent counseling had no effect.</p>	Authors suggest training for providers as well as software to monitor notes that are too similar.
Thielke et al. (2006) ¹¹	A “copy-event” was defined as ≥ 40 identical consecutive words between 2 documents.	To further characterize episodes of copy/paste of physical examinations within the medical record	Chart review using a validated automatic tool for identifying copy events.	<p>Within 1,364 notes, 1,366 instances of copying of an exam were identified. Examinations were classified as physical exams, mental status exams, and podiatry exams.</p> <p>After excluding 254 discharge summaries, 1,112 instances of copying of an exam remained.</p> <p>Risk severity ratings</p> <ul style="list-style-type: none"> ■ Highest risk: copying from another author or from a note ≥ 6 months in the past ■ Moderate risk: Copying from oneself 1 to 6 months prior ■ Lesser risk: Copying from oneself from < 1 month prior <p>Using these ratings:</p> <ul style="list-style-type: none"> ■ 1.6% of exams were highest risk ■ 0.6% were moderate risk ■ 0.8% were lesser risk <p>Of all exam authors, 6.2% copied an exam creating a “highest” risk copy event, 2.8% created a moderate risk event, and 7% copied creating a lesser risk event.</p> <p>By patient chart:</p> <ul style="list-style-type: none"> ■ 25% of patients had ≥ 1 copied exam in their chart ■ 11% of patients had ≥ 1 exam copied from another author in their chart ■ 19% of patients had ≥ 1 copied physical exam ■ 5% of patients had ≥ 1 copied mental status exam ■ 37% had a copied podiatry exam 	<p>A significant proportion (1 in 4) of patient charts were found to include a copied exam with 1 in 60 exams judged to be a copy event of the highest risk (copied from another author or from at least 6 months prior).</p> <p>A majority of the copying was performed by a relatively small fraction of authors. 4.2% of all authors produced $> 80\%$ of copying.</p> <p>Notably, frequency of copying differed by examination. Authors copied podiatry exams (78.2%) more often compared to mental status (9.7%) or physical exams (11.5%).</p>

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
				<p>Patients with ≥ 1 exam copied from another author</p> <ul style="list-style-type: none"> ■ 5% physical exam ■ 0.5% mental status exam ■ 32% podiatry exam <p>Relatively few authors produced most of the copied exams.</p> <ul style="list-style-type: none"> ■ 86 authors (4.2% of all authors) produced >80% of all copying. ■ 32 authors (1.6% of all authors) produced >80% of highest risk copying. <p>Of all authors writing an exam, 13% had copied at least 1 exam and 3% had copied another author's exam.</p> <p>Authors copied podiatry exams far more often than mental status and physical exams (78.2% for podiatry vs. 9.7% for mental status and 11.5% for physical exam).</p> <p>Authors of podiatry exams were also more likely to copy from others (65.5% podiatry vs. 1.1% mental status and 4% physical exam).</p> <p>On average, the time between the original note and the copy was 128 days (median 56 days).</p> <p>99 out of 1,112 copied exams were from a source ≥ 1 year prior.</p> <p><u>Inpatient vs. Outpatient</u></p> <p>Average time between original and copy</p> <ul style="list-style-type: none"> ■ Inpatient: 36 days (median 2 days) ■ Outpatient: 167 days (median 98 days) <p>Approximately 31% of all exams occurred in the inpatient (vs. outpatient) setting.</p> <ul style="list-style-type: none"> ■ 84% of all copied exams occurred in outpatient notes. ■ However, 61% of copying from another author occurred in the inpatient setting. <p>To address whether copying was simply the result of a normal exam (i.e., potentially reflecting appropriate copying), investigators manually reviewed all copied exams and found that 82% of exams contained ≥ 1 abnormality. The authors felt this suggested that only 18% of copying could be attributed to an apparently normal exam.</p>	

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Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
Hammond et al. (2003) ¹²	A “copy-event” was defined as ≥40 identical consecutive words between 2 documents.	To identify the prevalence of copy/paste within the VA’s EHR, the Computerized Patient Record System	Chart review using software to detect copying, followed by manual rating of copy-events.	<p>CopyFind, a general public use license program (Bloomfield), which detects copying was modified to communicate with a database of patient documents and renamed “CopyFind-VA.” A random sample of patients at VA Puget Sound with at least 1 progress note over a 1-month period in 2002 was selected. The data set consisted of 167,076 progress notes for 1,479 patients. Analysis with Copy-Find VA detected 90,702 instances of copying.</p> <p>Notes believed to commonly contain boilerplate text were excluded, along with discharge summaries (since copying was deemed appropriate in this context) and several other types of notes; investigators then performed manual review to further describe these copy events (n = 6,322 events for 243 patients, representing 29,386 notes between 1993 to 2002, and representing 1.6% of the overall cohort).</p> <p>The severity of each “copy event” was rated on a 6-point scale (1 – lowest risk, 6 – highest risk)</p> <p>Severity rating</p> <ul style="list-style-type: none"> ■ 1 Artifact, not misleading, no risk ■ 2 Artifact, minimally misleading, minimal risk ■ 3 Human, not misleading, no risk ■ 4 Human, minimally misleading, minimal risk ■ 5 Human, misleading, some risk ■ 6 Human, clinically misleading, major risk <p>9% (n = 2,645) of all notes contained copied text and, 63% of the copy-events were due to human copying.</p> <p>Risk severity:</p> <ul style="list-style-type: none"> ■ Level 6 : 44 events (0.15% of all notes) ■ Level 5 or 6: 338 events (1.2% of all notes) ■ Level 5: 294 (1% of all notes) <p>When records for 243 patients were analyzed, the distribution of copying increased significantly over time with the notes containing copied text rising from 2 out of 20 (1995) to 867 out of 10,989 (in 2001).</p> <p>Authors performed a separate subanalysis of 164 visits in which a 3rd party had been billed was also performed.</p>	<p>Copy-Find VA allowed a first pass at identifying and characterizing the extent of copying in VA records. The authors suggest disabling copy/paste functionality is not feasible; instead, more education with modification of templates to prevent unnecessary duplication and efficient insertion of data objects into the text.</p> <p>Also, source attribution when copying does occur is recommended.</p>

Copy/Paste: Prevalence, Problems, and Best Practices

Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
				<p>Of the highest risk copy-events for this subset, the type of information copied was as follows:</p> <ul style="list-style-type: none"> ■ Examination (n = 31) ■ History of present illness (n = 9) ■ Past Medical history (n = 8) ■ Assessment (n = 5) ■ System error (n = 4) ■ Problem list (n = 3) ■ Review of systems (n = 2) ■ Multiple type (n = 2) ■ Chief complaint (n = 1) ■ Other (n = 1) <p>“The highest-risk note consisted of 80% copied text.”</p>	
Weir et al. (2003) ¹³	Phrasing, content, or form >50% identical; assessors then categorized degree of copying subjectively.	To characterize extent and type of copying and errors in patient charts	Chart review (nonautomated) of charts for randomly selected 60 patients with <half day hospitalizations over a 4-month period in 2002. Addendums were excluded from the review.	<p>Overall, the randomly selected 60 patients had 1,891 regular notes and an average length of stay of 8.6 days.</p> <p>2 investigators reviewed chart inaccuracies (with high interrater reliability) and classified them as follows:</p> <ul style="list-style-type: none"> ■ Copying: If any copying from a prior note was detected, the copying was further classified as either 1) copied note in full, 2) copied note with small changes, or 3) copied note with substantial changes. ■ Copying from oneself vs. another author was noted. ■ Copying error: Error clearly resulting from copying such as a reference to a time-sensitive event (i.e. “today the patient walked for the first time” copied for 3 consecutive days or inconsistency such as reporting the patient to be afebrile, when the vital signs showed a fever.) ■ Wrong patient: name of the patient in the text did not match the name in the heading ■ Patient name: patient’s name was not documented directly in the text ■ Patient age: incorrect documentation of patient’s age ■ Inconsistent text: text within a note that clearly contradicts another part of the note ■ Outdated vital signs: capture of vital signs >24 hours old ■ Authorship problems: person who signed the note either copied another signature or was not the author of the note 	<p>A high proportion of patient charts were found to contain copied material and documentation errors.</p> <p>Nearly 20% of all notes were found to contain copied material, and 43 out of 60 patient charts contained at least 1 copied note.</p> <p>Furthermore, 84% of all notes had at least 1 documentation error (with an average of 7.8 errors/patient chart).</p>

Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
				<p>84% of all notes had at least 1 documentation error.</p> <p>Each patient chart had an average of 7.8 documentation problems (not including signature errors).</p> <p>19.7% (372 out of 1891) of notes were found to possess copied material. 43 out of 60 patients had at least 1 copied note.</p> <p>Of notes found to contain copying:</p> <ul style="list-style-type: none"> ■ 58.9% (n = 219) were copied from the same author's prior note with substantial changes. ■ 8.6% (n = 32) were copied from the same author's prior note with small changes. ■ 1.6% (n = 6) were copied from the same author's prior note without changes. ■ 28.8% (n = 107) were copied from another author's note with substantial changes. ■ 1.9% (n = 7) were copied from another author's note with small changes. ■ 0.3% (n = 1) were copied from another author's note with no change. <p>When copying from one's own prior note, making fewer changes resulted in more errors ("copying errors"). Notes copied and then substantially changed had an average of only 0.19 errors per note compared to 3.17 errors/note without any changes.</p> <p>Authors:</p> <ul style="list-style-type: none"> ■ Physicians wrote 36% of all notes, but accounted for 50% of all copied notes. ■ Physicians were responsible for 89% of all copying errors (131 out of 148) compared with nurses (responsible for <1%). ■ Nurses wrote 27% of all notes, but only accounted for 21% of copied notes. ■ Medical students wrote 5% of notes and were responsible for 11% of all copied notes. 	
Mamykina et al. (2012) ¹⁴	Direct observation	To understand documentation workflow to help improve EHR design	Observation by trained observer of residents documenting notes on the general medicine inpatient service	<p>96 note-writing sessions by 11 residents (5 first year, 6 second and third year residents) over 11 days.</p> <p>Documentation was performed in Allscripts Sunrise, Allscripts Corp., Chicago, IL. The software allows users to document in either a "structured template" form or as free-text narrative.</p>	The process of EHR documentation is highly fragmented, requiring transitions between different tasks and documentation activities. The authors speculate this "may lead to an increased load of working

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				When documenting within the EHR, on average, residents used copy/paste 0.8 times per note. “Smart Paste,” in which specific current data from elsewhere in the chart including notes, common labs, templates, and vital signs, were automatically inserted 0.2 times per note on average.	memory, increased probabilities errors and as a result, a number of workaround to compensate for limitations of computerized systems.”

Table A-2. Additional Studies Describing which Sections of the Charts Are Frequently Copied

Author (Year)	Study Definition of Copying	Study Goals	Design and Context	Results	Conclusions
Wrenn et al. (2010) ¹⁸	“The amount of unique or new information in a document was calculated as the number of words that did not align with previous documents divided by the length, in words, of the document.”	To quantify the degree of redundancy in clinical documentation. This study did not distinguish between copy-paste and iterative changes the author made.	Retrospective chart review	<p>All documentation took place in WebCIS (Web-based Clinical Information System).</p> <p>Researchers randomly selected 100 patients among all admissions lasting >72 hours during a 169-day period. All materials including resident sign-out, and discharge summary notes were gathered.</p> <p>Documents from these patients included 100 admission notes, 1,167 resident sign-out notes, 303 progress notes, and 100 discharge summaries.</p> <p>Progress notes contained an average of 46% (standard deviation 18%) unique information (interquartile range 30% to 53%).</p> <p>Researchers chose a subset of 10 pairs of documents to subjectively review and concluded the following:</p> <ul style="list-style-type: none"> ■ Material copied from admission notes to sign-out notes was likely to be medication lists and history of present illness. ■ Material copied from admission notes to progress notes was more likely to be the assessment and plan. ■ Material copied from admission notes to discharge summaries was likely to be history of present illness and medication lists. ■ Material copied from last sign-out note to discharge summary often included the medication list and, occasionally, the hospital course. ■ Material copied from the final progress note to the discharge summary included the physician exam, medication list, and elements describing the hospital course. 	Copying particular sections appeared to vary based on type of note being written. For instance, the assessment and plan was often copied from admission note to progress note. However, for a discharge summary, the history of present illness and medication lists from admission were more likely to be copied.

Table A-3. Studies Reporting Risks to Patient Safety Arising from Use of Copy/Paste

Reference	Context	Objective	Design	Description	Conclusions
Singh et al. (2014) ²²	2 large urban medical centers	To evaluate contributory factors to diagnostic error	Retrospective chart review	<p>Identified charts with potential diagnostic errors. “Triggers” for possible error included:</p> <ul style="list-style-type: none"> ■ Trigger 1. Primary care provider (PCP) visit followed by unplanned hospitalization within 14 days ■ Trigger 2. PCP visit followed by ≥ 1 PCP or emergency room or urgent care visit within 14 days. <p>All identified records were evaluated by trained physicians; based on information already available or readily available to documenting PCP, reviewers judged whether diagnostic error was present.</p> <p>“An error was judged to have occurred if adequate data to suggest the final, correct diagnosis were already present at the index visit, or if documented abnormal findings at the index visit should have prompted additional evaluation that would have revealed the correct, ultimate diagnosis. Thus errors only occurred when <i>missed opportunities</i> to make an earlier diagnosis occurred based on retrospective review.”</p> <p>A random sample of “control” visits was also reviewed for errors. An independent second reviewer confirmed all error cases.</p> <p>Of 212,165 visits, 190 diagnostic errors were identified.</p> <ul style="list-style-type: none"> ■ 20.9% (141 of 674) Trigger 1 records ■ 5.4% (36 of 669) Trigger 2 records ■ 2.1% (13 of 614) control records <p>Using a 5-dimension model of ambulatory care diagnostic processes, the point at which an error occurred was classified.</p> <ul style="list-style-type: none"> ■ Patient-practitioner clinical encounter ■ Performance and/or interpretation of diagnostic tests ■ Follow-up and tracking of diagnostic information ■ Subspecialty and referral related ■ Patient specific process 	In 7.4% of cases of diagnostic error identified, practitioners copy/pasted from a prior note. Of these cases, copy/paste errors contributed to 35.7% of errors.

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Reference	Context	Objective	Design	Description	Conclusions
				<p>Breakdowns occurred in all 5 dimensions of the diagnostic process and involved more than 1 dimension in 43.7% of cases.</p> <p>Breakdowns in the patient-practitioner clinical encounter were due to data gathering and synthesis process related to:</p> <ul style="list-style-type: none"> ■ Medical history (56.3%) ■ Physical examination (47.4%) ■ Ordering further diagnostic tests for workup (57.4%) ■ Failure to review prior documentation (15.3%) <p>2 additional documentation problems noted were:</p> <ul style="list-style-type: none"> ■ No documentation of differential diagnosis at index visit. ■ Documenting practitioner copy/pasted prior notes into the index visit note in 7.4% of cases: of these cases, copy and pasting mistakes contributed to 35.7% of errors. <p>Potential severity of injury for overall 190 diagnoses (ranging from 1 no harm to 8 immediate or inevitable death) was rated.</p> <p>19% were rated 7 (serious permanent damage), and 14% were rated 8 (immediate or inevitable death).</p>	

Appendix B

Table B-1. Position Statements from Professional Organizations

Author (If provided), Organization	Area of Electronic Health Record (EHR) Focus	Description
American Health Information Management Association (AHIMA) et al. (2014) ¹	Not specified	<p>Copy/paste functionality in EHRs should be permitted only when strong technical and administrative controls were in place, including:</p> <ul style="list-style-type: none"> ■ Organizational policies and procedures ■ Requirements for participation in user training and education ■ Ongoing monitoring <p>Recommendations include:</p> <ul style="list-style-type: none"> ■ Industry stakeholders should collaborate on best practice standards for monitoring compliance with government, regulatory and industry standards, and organizational policies for clinical documentation; industry stakeholders should share responsibility for ensuring that EHR systems support compliant documentation and billing/coding practices. ■ Industry stakeholders should collaborate to develop functionality that can increase efficiency of documentation. ■ EHR systems should be designed to allow customization of copy/paste functionality by healthcare provider organizations. ■ Agencies such as the Office of the National Coordinator (ONC) for Health Information Technology and the National Institute of Standards and Technology should continue to address EHR usability; ONC should include appropriate copy/paste functionality within EHR certification criteria. ■ To maximize opportunity for appropriate and successful functionalities such as copy/paste, the Centers for Medicare & Medicaid Services should confirm copy/paste functionality is allowed under the Medicare Conditions of Participation and augment existing training to provide examples of appropriate use. ■ Healthcare provider organizations should develop policies for proper copy/paste use, train for staff, and monitor and enforce these policies.
Arrowood et al. (2013) ⁴³ AHIMA	Not specified	<p>Cloning and copy/paste are noted to contribute to legal issues surrounding EHRs.</p> <ul style="list-style-type: none"> ■ “Organizations must develop policies designed to address inappropriate use of these tools to minimize non-compliance.” ■ “Providers must recognize that every patient is unique and must ensure that they health service provided is documented distinctly from all others.” <p>Examples of common documentation problems noted:</p> <ul style="list-style-type: none"> ■ Vital signs that never change from visit to visit ■ Copy/pasted data from another patient’s chart ■ Copying documentation from another provider, including their attestation statement <p>Identical verbiage used repeatedly for all patients seen by a provider for a specific time frame (with minimal modification regardless of the nature of the problem)</p>

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Author (if provided), Organization	Area of Electronic Health Record (EHR) Focus	Description
Kirch et al. (2014) ⁴¹ Association of American Medical Colleges	Medical student documentation	<p>Potential risks that need mitigation were identified as:</p> <ul style="list-style-type: none"> ■ Copying disallowed sections of medical student's note in support of a bill ■ Inadvertent use of inappropriate sections of a medical student's note by a teaching physician or resident ■ In appropriate use of access controls—requesting the medical student to enter data using passwords of others <p>In response, various strategies are suggested to promote evaluation of “documentation integrity”:</p> <ul style="list-style-type: none"> ■ Distinctive and separate security class for medical students to render their entries permanently identifiable ■ Blocking copying of exam/medical decision portions of medical student's note for evaluation and management services ■ Blocking EHR functionality for copy/paste of medical student's entire note or removing evidence of their authorship ■ Prohibiting automatic pulling of information from a medical student's note into a different note ■ Automatic indication within a note that has been copied and if possible description of the source ■ Limit viewing of medical student note once review for educational purposes has been complete (but allowing viewing for medico-legal purposes) ■ Blocking ability for attending to simply append a statement to medical student note for which only the teaching physician is identified as author
Association of Clinical Documentation Improvement Specialists (ACIDS) et al. (2013) ⁴¹	Not specified	<p>Clinical Documentation Improvement (CDI) specialist should NOT get involved in policing use of copy/paste unless</p> <ul style="list-style-type: none"> ■ Diagnosis inadvertently enters the record that is not clinically supported and then becomes propagated ■ Conflicting documentation between an attending and consultant physician
Federation of State Medical Boards (FSMB) Committee on Ethics and Professionalism in the Adoption and Use of Electronic Health Records, (2014) ²⁹	Not specified	<p>Risks associated with copy/paste:</p> <ul style="list-style-type: none"> ■ Copying information into the wrong patient record ■ Noting inaccurate or outdated information ■ Including redundant information that hinders current and future providers' ability to determine current information ■ Inability to identify the author or intent of documentation ■ Inability to identify when the documentation was first created ■ Inability to accurately support or defend E/M codes for professional or technical billing notes ■ Propagation of false information ■ Internally inconsistent progress notes <p>FSMB recommends “caution in the use of copy/paste functionality.”</p> <p>The author committee does not believe it should be prohibited altogether, as information that is stable over time is appropriate for copy/paste. However, “it is unethical and inappropriate to ‘copy/paste’ or otherwise document an entry that is not derived from a patient encounter at the time of the visit without indicating that the information is</p>

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Author (If provided), Organization	Area of Electronic Health Record (EHR) Focus	Description
		copied and pasted from another record. The committee supports efforts to promote functionalities that enable an indication that copying, pasting and other edits have occurred."
Silverstone et al. (2010) ³⁰ American Academy of Ophthalmology, Medical Information Committee	Not described	<p>Copy/paste and copy forward noted as potentially propagating errors</p> <p>Types of possible errors created</p> <ul style="list-style-type: none"> ■ Temporal errors (misrepresenting when something happened). ■ Contradictory: Information in one part of chart, contradicts info found elsewhere. ■ Authorship confusion: unclear who the patient note was written by. ■ Authors provide "General Principles for Achieving information integrity in the EHR." ■ Shortcuts, including copy/paste, copy forward, and prepopulated templates, are important tools, but patient notes must be edited carefully. ■ "Never copy information from one patient's chart into another patient's chart."
Shoolin et al. (2013) ⁴² Association of Medical Directors of Information Systems	Inpatient progress notes	<p>Guiding principles for effective/efficient note documentation:</p> <ul style="list-style-type: none"> ■ Document encounters with minimum data necessary to meet a list of goals (13 provided). ■ Collect data and display in a way that meets varied needs of the following audiences (providers, team members, patient and family, regulators, legal counsel, researcher and payer/auditor). ■ Support data integrity and quality. <ul style="list-style-type: none"> — When specific elements of a patient's note do not change from one encounter to the next, "those elements may be copied forward or preferably acknowledged by reference rather than re-entered." — "When copying elements of the subjective information or history, the user acknowledges the source and modifies the information to reflect differences from prior notes. When copying into one's own note, the author marks those sections as having been reviewed by the author." — Information that is "less controversially" copied or carried forward "when truly needed to communicate decision-making for the active encounter- include elements of the previously recorded: Past Medical/Surgical/Obstetric/Psychiatric history Family history, social history, past relevant reports (labs, imaging, pathology) with dates, unique circumstances in which the patient is unable to provide this information and the original source (i.e., a family member) is no longer available." — Parts of a note that should not be carried forward for other provider's notes: history of present illness, review of systems, physical examination, assessment, plan. ■ Ensuring privacy and security <p>Authors suggest, instead of the traditional SOAP (subjective, objective, assessment, and plan) note, a shift to APSO (assessment, plan, subjective, objective) (moving the assessment to the front of the note) to deal with "note bloat" and allow providers to bypass scrolling through information. However, this could potentially increase incentives for providers to be more succinct in the other portions of the note.</p> <p>Effective copy/paste should be limited to certain circumstances; it should be performed by reference as much as possible instead of creating a separate copy in the record.</p> <ul style="list-style-type: none"> ■ If referring to a consultant's note, EHR should allow that section to be displayed differently (i.e., varied font/color)

Author (If provided), Organization	Area of Electronic Health Record (EHR) Focus	Description
		<ul style="list-style-type: none"> ■ Suggest allowing parts of the note to be hidden with a toggle function (to allow succinct display of data)
American College of Obstetricians and Gynecologists Committee on Patient Safety and Quality Improvement; Committee on Practice Management (2015) ⁵³	Not specified	<p>Discusses various consideration with the widespread adoption of health information technology, Specifically with regard to copy/paste:</p> <ul style="list-style-type: none"> ■ Although automated/self-populating templates can save time, they can also inadvertently create inaccuracies. Healthcare providers “must review and edit these templates to ensure they accurately reflect the encounter.” ■ Copy/paste from prior visits can also compromise accuracy if not reviewed and edited.
Kuhn et al. (2015) ³⁴ American College of Physicians	Not specified	<p>Defensive medicine has resulted in longer notes, and the EHR has facilitated the ability to document <i>more</i>, although it is unclear whether this has improved patient care. “It is conventional wisdom that a well organized record and note make continuing care with the same and subsequent providers easier and quicker.”</p> <p>However, evaluation and management guidelines in 1995 and 1997 shifted the focus of documentation to reimbursement. Although designed to respond to the “lack of an externally verifiable measure of cognitive services....these guidelines largely redefined cognitive services as not what was <i>done</i>, but rather what was <i>documented</i>.”</p> <p>Policy recommendations for clinical documentation</p> <ul style="list-style-type: none"> ■ Primary purpose of clinical documentation should be to support patient care and improve clinical outcomes through enhanced communication. ■ Physicians working with care delivery organizations, medical societies, and others should define professional standards for clinical documentation. <ul style="list-style-type: none"> — Clinical record should include the patient’s story in as much detail as is required to retell the story. — Appropriately used, macros and templates “may be valuable” for completeness and efficiency of documentation, especially if documentation consists of standardized terminology (such as review of systems and physical examination findings). — The EHR should facilitate thoughtful review of previously documented clinical information (particularly, review of longitudinal history and prior physical exams can provide helpful context). — “Where previously documented clinical information is still accurate and adds to the value of current documentation, this process of ‘review/edit and/or attest, and then copy-forward’... of specific prior history or findings may improve the accuracy, completeness and efficiency of documentation. However, these documentation techniques can also be misused, to the detriment of accuracy, high-quality care and patient safety.” — “Effective and ongoing EHR documentation training of clinical personnel should be an ongoing process.” ■ An EHR’s primary purpose should remain the facilitation of seamless patient care to improve outcomes, while contributing to data collection that supports necessary analyses. <ul style="list-style-type: none"> — Structured data should be captured only where they are useful in care delivery essential for quality assessment or reporting.

Author (if provided), Organization	Area of Electronic Health Record (EHR) Focus	Description
		<ul style="list-style-type: none"> — Prior authorization as well as other documentation required by other entities must no longer be unique in their data content and format requirements. — Patient access to progress notes as well as the rest of their medical records may improve both patient engagement and quality of care. ■ More research is needed on the following: best practices for systems and clinicians to improve the accuracy of recorded information and value of information presented to other users, the authoring process and automated tools that improve quality without facilitating improper behaviors, the best way to educate clinicians for use of health information technology and documenting concisely, and disseminating standards of clinical documentation <p>Authors close by offering policy recommendation for EHR design: “EHR systems must facilitate the integration of patient-generated data and must maintain the identity of the source.”</p>

Policy Statement

This Special Report presents a literature review and is designed to provide a snapshot of the status of this issue at the time literature searches and literature review were conducted. The information contained herein is derived primarily from the available, published, peer-reviewed scientific literature and searches of the World Wide Web. Publications referenced are limited to the English language. The conclusions and recommendations must be interpreted cautiously and judiciously. ECRI Institute implies no warranty and assumes no liability for the information, conclusions, and recommendations contained in this Special Report.

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