

Physicians' Attitudes Towards Copy and Pasting in Electronic Note Writing

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BACKGROUND: The ability to copy and paste text within computerized physician documentation facilitates electronic note writing, but may affect the quality of physician notes and patient care. Little is known about physicians' collective experience with the copy and paste function (CPF).

OBJECTIVES: To determine physicians' CPF use, perceptions of its impact on notes and patient care, and opinions regarding its future use.

DESIGN: Cross-sectional survey.

PARTICIPANTS: Resident and faculty physicians within two affiliated academic medical centers currently using a computerized documentation system.

MEASUREMENTS: Responses on a self-administered survey.

RESULTS: A total of 315 (70%) of 451 eligible physicians responded to the survey. Of the 253 (80%) physicians who wrote inpatient notes electronically, 226 (90%) used CPF, and 177 (70%) used it almost always or most of the time when writing daily progress notes. While noting that inconsistencies (71%) and outdated information (71%) were more common in notes containing copy and pasted text, few physicians felt that CPF had a negative impact on patient documentation (19%) or led to mistakes in patient care (24%). The majority of physicians (80%) wanted to continue to use CPF.

CONCLUSIONS: Although recognizing deficits in notes written using CPF, the majority of physicians used CPF to write notes and did not perceive an overall negative

impact on physician documentation or patient care. Further studies of the effects of electronic note writing on the quality and safety of patient care are required.

KEY WORDS: medical records system, computerized; documentation/mt [methods]; attitude of health personnel; medical staff, hospital; user-computer interface.

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BACKGROUND

The Institute of Medicine has identified health information technology (IT) as having enormous potential to improve the quality and safety of US health care^{1,2}. Electronic medical records (EMR), in particular, may enhance care by increasing the accessibility of patient information. With this in mind, the National Health Information Coordinator has set a goal that every American should have an electronic medical record within the next 10 years.

Computerized physician documentation, the direct entry of physician notes into electronic health records via computer keyboard and mouse, offers several additional advantages: improved legibility, real time accessibility and decreased costs³. Although potentially cumbersome and time-consuming for physicians, electronic note writing also enables the use of time-saving, computer editing functions, including the copy and paste function (CPF). CPF allows physicians to copy a patient note from a previous time, insert it under a new date and time and alter it, rather than writing an entirely new note each day³. Although physicians have always been able to hand-copy previous patient notes, CPF facilitates this process. Examination of VA electronic medical records from 1990–2002 found evidence of copying in 9–20% of patient notes and 3% of recorded physical exams^{4–6}.

Similar to findings with other health IT applications^{7–11}, however, computerized physician documentation can lead to new types of problems (i.e., unintended consequences), which might mitigate the benefits associated with its use. The VA medical center studies reported that copy and pasted notes could be misleading and present a risk in terms of patient harm, fraud or malpractice claim exposure^{4–6}. In particular, VA investigators found that the copying of the physical exam, especially if copied from a different author or from a prior time

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period, was "high risk": more likely to be misleading and have a higher potential for patient harm^{4,5}. Other recent articles also suggest that CPF may have altered the content of patient notes and their use^{3,12,13}. It is unclear, however, whether physicians who use computerized documentation systems share these perceptions of CPF's impact.

We undertook this study to determine the frequency and pattern of CPF use by resident and faculty physicians in two affiliated academic hospitals, their perceptions of the CPF's impact on patient notes and patient care and their opinions about the use of CPF in the future.

METHODS

Physicians within three departments (two pediatric, one medicine) of two large, affiliated, academic hospitals were given a self-administered survey over an 8-week study period between June and August 2007.

Survey Sites and Documentation System. The three departments of the two academic medical centers included in this study were the pediatric and medicine departments of Hospital A, a 798-bed hospital with 27,500 discharges annually, and the pediatric department of Hospital B, a free-standing children's hospital with 283 beds and 12,300 discharges annually. The medicine department of Hospital B was not using a computerized documentation system at the time of the survey. The three study departments had inpatient electronic note writing capabilities as part of a commercial electronic medical record system for at least 3 years. The CCHIT (Certification Commission for Health Information Technology) certified vendor system offered preconfigured templates for inpatient note documentation, including admission, progress, procedure and discharge notes. Most information was entered as free text by physicians. Certain vital signs and laboratory values could be imported directly into notes from flow sheets. Each hospital used a different version of the system.

In Hospital A's older version, each templated note was a single free text document. Physicians could copy all or parts of a previous note. Hospital B had switched from this version to a newer version of the documentation system a year prior to survey. In this new version, templated notes were separated into different text boxes or fields (including subjective, past medical history, assessment and plan). The physical exam field could be completed using a checklist or free text. Physicians could use a 'copy forward' function in which separate note fields could be individually forwarded into fields of a new note. Physicians could still copy and paste in this system by writing notes as free text documents instead of templated documents, or by copy and pasting each field of the note separately into a new note. Both pediatric departments required all resident and general pediatrician notes to be electronic, while consult service and specialist participation were varied. In the medicine department, writing notes electronically was not mandatory.

Survey Population. All resident physicians in the three departments were included in this study. Five faculty divisions of each department were selected for inclusion: the four divisions with the largest inpatient services (general

pediatrics or internal medicine, critical care, cardiology and oncology) and one division with primarily inpatient consulting responsibility (infectious disease). The division faculty lists were reviewed by department leaders and division chairs to identify physicians who completed at least 2 weeks of clinical inpatient service in the last academic year.

Survey Instrument. We identified important considerations regarding CPF by literature review and key informant interviews. Relevant articles found in Ovid Medline using the key word searches: 'copy and paste' and 'computerized physician documentation' as well as the subject headings: 'copying processes,' 'user computer interface,' 'documentation,' 'medical records systems, computerized,' 'attitudes to computers' and 'attitudes of health personnel' were reviewed. In addition, 15 semi-structured interviews were conducted with residents, faculty physicians and leaders within the hospital areas of patient safety, legal affairs, billing compliance and clinical informatics. All interviewees reported the ability to distinguish between progress notes written with and without CPF by comparing them to the previous patient notes. Ideas and concepts from these two sources were translated into survey questions and pilot tested for clarity and content validity by an additional 15 residents and faculty.

The 22-question survey incorporated a definition of CPF that included the copy-forward function and excluded the automatic insertion of vital signs and results. Respondents were asked whether they wrote inpatient notes electronically on the hospital documentation system, on paper or a combination of both. Physicians who wrote at least some notes electronically were asked about their comfort level writing notes electronically and the frequency and pattern of their CPF use. All opinions were assessed using five-point Likert scales. Physicians who acknowledged reading electronic notes were asked how frequently they noted flaws in progress notes written using CPF compared to other electronic notes, how CPF affected physician documentation overall and CPF's effect on the ability of progress notes to serve several purposes (e.g., to communicate a patient's daily course, to document a patient's entire course or to document for billing or legal purposes). They were also asked if they have ever made a mistake in patient care that they felt was a result of being confused by a note containing copy and pasted text (yes, no or unsure) and asked their opinion of several proposed changes to CPF use. Demographic information collected included gender, training level, year of birth and year of medical school graduation. A copy of the survey is available online as an appendix.

Data Collection. The study protocol and survey were approved by the Institutional Review Boards of the two hospitals before the confidential, self-administered survey was sent to all eligible physicians via e-mail using an online survey tool. Non-respondents were sent two additional e-mail surveys at 2-week intervals and were contacted by phone or page a maximum of two times. In addition, paper copies were brought to resident conferences, and a paper copy was mailed to the offices of all faculty non-respondents. No financial incentives were given for the completion of the survey.

Statistical Analysis. Comparisons between (1) survey respondents and non-respondents, (2) electronic note writers (physicians who

wrote their inpatient notes electronically on the hospital system) and non-electronic note writers (physicians who wrote paper notes) and (3) CPF users and non-CPF users (including electronic note writers who never used CPF and non-electronic note writers) were performed using chi-square or Fisher exact tests for categorical variables, and t-tests, or ANOVA for continuous variables. Multivariate logistic regression models were used to determine independent predictors associated with (1) electronic note writers versus non-electronic note writers and (2) high (used CPF almost always or most of the time when writing progress notes) versus low CPF use (used CPF sometimes or rarely). All analyses were performed using SAS for PC version 9.1.

RESULTS

A total of 451 physicians were eligible to participate in this study, including all 250 resident physicians (120 pediatric, 130 medicine). Of 438 faculty physicians in the three departments, 297 were within the five selected divisions and 201 had at least 2 weeks inpatient clinical time. The eligible faculty population varied among departments depending on the department size and use of hospitalists. Three hundred fifteen physicians responded to the survey, yielding a response rate of 70%. Three physicians (<1%) began but did not complete the survey. The only significant difference between respondents and non-respondents was that residents earlier in their training were more likely than senior residents to be respondents (p=0.02, Table 1).

Table 1. Study Population and Comparisons Between Respondents and Non-respondents

Characteristic [‡]	Study population	All respondents	Non-respondents	p-value
All physicians	N=451	N=315	N=136	
Female gender	270 (60)	187 (59)	83 (61)	0.74
Hospital A	287 (64)	196 (62)	91 (67)	0.34
Pediatricians	256 (57)	186 (59)	70(51)	0.14
Residents	250 (55)	167 (53)	83 (61)	0.12
Residents only	N=250	N=167	N=83	
Residency year [†]				
First	83 (33)	63 (38)	20 (24)	0.02
Second	77 (31)	54 (32)	23 (28)	
Third	89 (36)	50 (30)	39 (48)	
Faculty only	N=201	N=148	N=53	
Years since graduation (mean, SD) [‡]	20 (9.5)	19.8 (9.7)	20.5 (8.7)	0.67
Primary care	50 (25)	40 (27)	10 (19)	0.24
Subspecialists only	N=151	N=108	N=43	
Subspecialty				
Cardiology	42 (28)	23 (21)	19 (44)	0.07
Critical care	27 (18)	23 (21)	4 (9)	
Oncology	38 (25)	28 (26)	10 (23)	
Infectious disease	21 (14)	16 (15)	5 (12)	
Neonatology	23 (15)	18 (17)	5 (12)	

*N (%) unless otherwise indicated

†One observation missing for residency year

‡Two observations missing for years since graduation

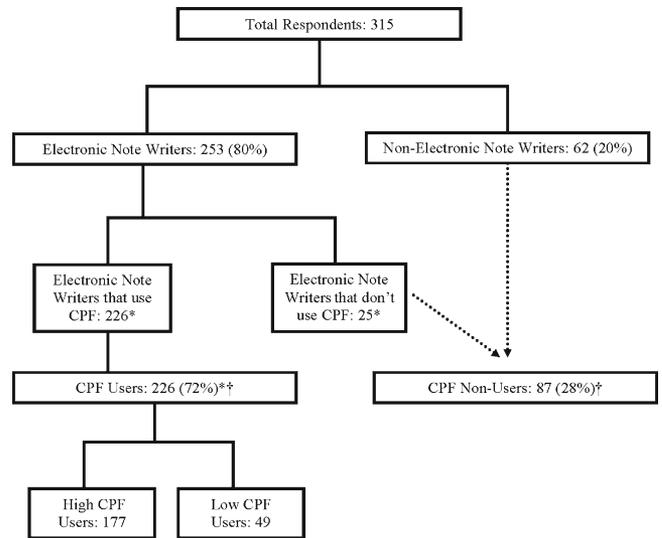


Figure 1. Flow diagram of respondents. *Two electronic note writers did not indicate whether they use CPF, total respondents = 313. †Of the 313 respondents, 304 (97%) reported reading electronic patient notes (223 CPF users and 81 CPF non-users).

Use of Computerized Documentation System. As shown in Figure 1, 253 (80%) of the 315 respondents wrote their inpatient notes electronically, including 193 who wrote all of their notes electronically and 60 who used a combination of electronic and paper notes. Ninety-seven percent of residents were electronic note writers compared to 61% of faculty. Resident physicians, physicians at hospital A with the older documentation system and younger physicians were independently more likely to be electronic note writers (Table 2). Among faculty, primary care physicians and physicians working at hospital A were independently more likely to be electronic note writers.

Use of the Copy and Paste Function. Ninety percent of the 253 electronic note writers reported they used CPF when writing daily progress notes (Fig. 1). Among these 226 CPF users, 177 (78%) were high CPF users (used CPF almost always or most of the time when writing progress notes). Residents were almost three times more likely to be high rather than low CPF users compared with faculty physicians (OR=2.9, 95% CI= 1.5, 5.7), while age, gender, hospital, specialty and comfort writing notes electronically were not independently related to frequency of use.

CPF users frequently copied notes written by other physicians (81%) and notes written during past visits or admissions (72%). Forty-seven percent of CPF users at Hospital B with the copy forward function and 69% at Hospital A (p=0.002) copied either the entire note or part of the note, including the physical exam.

Impact of CPF Use. Three hundred and four of the 315 respondents reported reading electronic patient notes, including 223 CPF users and 81 non-users. Although CPF non-users were more likely to recognize flaws in notes created with CPF compared to electronic notes written without CPF, the majority of both users and non-users agreed CPF notes contained more outdated and inconsistent information and were more difficult to find new

Table 2. Univariate and Multivariate Associations of Writing Notes Electronically

Characteristic	All respondents (n=315)		Faculty respondents only (n=148)	
	Univariate odds ratio (95% CI)	Multivariate odds ratio (95% CI)	Univariate odds ratio (95% CI)	Multivariate odds ratio (95% CI)
Female gender	1.7 (1.0, 3.0) *	1.2 (0.6, 2.4)	1.3 (0.7, 2.5)	—
Age (per 1-year increase)	0.9 (0.9, 0.9)*	1.1 (1.0, 1.1) †	1.0 (0.9, 1.0)*	1.0 (0.9, 1.0)
Hospital A	3.7 (2.1, 6.5)*	2.6 (1.3, 4.9) †	3.6 (1.8, 7.3)*	4.3 (2.0, 9.4) †
Pediatricians	0.8 (0.5, 1.5)	—	0.8 (0.4, 1.6)	—
Residents	20.3 (7.9, 52.5)*	7.6 (2.3, 24.7) †	—	—
Primary care physician	—	—	8.7 (2.9, 26.0)*	9.9 (3.2, 31.6) †
Inpatient service time			Reference	
<3 months/year			0.9 (0.4, 1.9)	
3 to 6 months/year			0.7 (0.3, 1.7)	

*Variables in which $p \leq 0.1$ were included in the multivariate model

† $p < 0.05$ in multivariate model

information within (Table 3). CPF non-users were also more likely than users to agree CPF notes led to confusion or mistakes in patient care (Table 3), but only a quarter of all electronic note readers agreed and only eight physicians (3%) reported they made a mistake in patient care resulting from being confused by a note that contained copy and pasted text. Fifty-six (19%) were unsure. Many resident respondents explained they used other methods to keep track of patient data: "No (I have not made a mistake) - only because we carry around handwritten notes (residents' sheets) at all times and those are usually trustworthy." Most CPF users felt that CPF had improved physician documentation overall and the ability of progress notes to communicate a patient's daily course and document for legal purposes, while most non-users disagreed (Table 3). The majority of both users and non-users, however, thought CPF improved the documentation of a patient's entire

hospital course, and approximately half of both users and non-users thought that CPF improved billing documentation.

Future CPF Use. Most physicians agreed that the CPF should be continued in future documentation systems, and more than 90% believed education on using CPF responsibly should be provided to physicians (Table 3). CPF users were significantly less supportive than non-users of changes in CPF use, including having copy and pasted text be readily identifiable (highlighted or italics), alerts that notify writers when their note does not differ significantly from prior notes, and restrictions on parts of notes from being copied (i.e., physical exam). CPF users seemed particularly resistant to limitations on copying from other authors or from certain types of notes (i.e., admission notes).

Table 3. Attitudes Towards CPF Use Among CPF Users and CPF Non-users (Non-users Include 25 Electronic Note Writers Who Do Not Use CPF and 62 Non-Electronic Note Writers)

Characteristic	All respondents N=302†	CPF users N=226	CPF non-users N=87	p-value
CPF impact on notes: Physicians who agree that electronic notes written using CPF compared to other electronic notes (are):				
More trustworthy	32 (11)	27 (12)	5 (6)	0.13
More difficult to find new information within	183 (61)	116 (52)	67 (83)	<0.001
Contain more outdated information	215 (71)	146 (66)	69 (85)	0.001
Contain more inconsistent information	214 (71)	152 (69)	62 (77)	0.18
Lack documented justification for clinical decisions	74 (23)	35 (16)	35 (43)	<0.001
Lead to more confusion in patient status or course	83 (27)	40 (18)	43 (53)	<0.001
More likely to lead to a mistake in patient care	74 (25)	47 (21)	27 (33)	0.03
CPF impact on note use: Physicians who feel CPF has improved:				
Communication of patient's daily course	165 (55)	146 (66)	19 (24)	<0.001
Documentation of entire hospital course	238 (79)	193 (87)	45 (56)	<0.001
Documentation for legal purposes	120 (40)	105 (48)	15 (19)	<0.001
Documentation for billing	138 (46)	100 (46)	38 (49)	0.64
Physician documentation overall	168 (56)	153 (69)	15 (19)	<0.001
Future CPF use: Physicians who agree:				
CPF use should be continued	246 (82)	199 (91)	47 (58)	<0.001
CPF Education needed	272 (91)	198 (90)	74 (91)	0.80
CPF text should be identifiable	133 (44)	80 (37)	53 (65)	<0.001
Alerts should indicate notes too similar	113 (38)	70 (32)	43 (53)	<0.001
Should not allow copying all types of notes	139 (46)	91 (42)	48 (59)	0.006
Should not allow copying from another author	70 (23)	35 (16)	35 (44)	<0.001
Should not allow copying certain types of notes	51 (17)	18 (8)	33 (41)	<0.001

*N (%) unless otherwise indicated

†Three missing

DISCUSSION

The use of the copy and paste function appears to have become an integral part of electronic note writing among physicians using a hospital computerized documentation system and the copying of physical exams and notes from other authors and from past visits, deemed "high risk" in previous studies^{4,5}, is common. While articles in the medical literature suggest CPF use in electronic note writing may threaten the usefulness of physician documentation⁵ and the safety of patient care^{4-6,14}, physicians in our study did not largely report the same beliefs. Although it is currently unknown whether CPF use or the introduction of electronic note writing has enhanced or jeopardized physician documentation and patient care, most physician respondents did acknowledge that CPF-created notes contained content flaws previously described in the literature^{3,13}. It is unclear why these flaws have not translated into negative perceptions of CPF on the part of more physicians.

Physician reluctance to report negative outcomes is well known¹⁵, and in our study, CPF users may be especially unwilling or unable to recognize pitfalls in a function that allows them to cope with increasing demands on their time. Resident and faculty physicians currently carry a heavier patient workload daily due to the reduction in residency work hours^{16,17}, the shift of inpatient care from primary physicians to hospitalists¹⁸, and reductions in the average patient length of stay^{19,20}. Health IT implementations, themselves, may have introduced additional time burdens as note writing and ordering have moved away from patients' bedsides³.

Resident physicians, who represent the preponderance of electronic note writers and CPF users, may be more susceptible to these time constraints. Alternatively, the differences in the attitudes of CPF users and non-users may reflect a different understanding of the purpose of patient notes among resident and faculty physicians. In our study, residents report maintaining other methods including handwritten or typed sheets to keep track of patient information for daily clinical decision-making and communication. This parallel record implies that electronic notes are not meeting all their documentation needs, whether due to content, structure or an inherent property of computerized documentation systems, such as their reduced portability. Maintaining two records, however, would seem to add work, reduce efficiency and introduce potential for error²¹.

If not to document daily changes, physicians may value electronic notes for other reasons. Physicians in our study reported CPF most improved documentation of patients' entire hospital course. Running summaries have likely become valuable tools, as the inpatient population comorbidity has increased over time²², and patients are cared for by more physicians during a hospital stay²³. Approximately half of all respondents also believed that the use of CPF improved documentation for billing irrespective of their note-writing preferences, and half of all CPF users believed it improved documentation for legal purposes. Our key informants from the offices of billing compliance and legal affairs, however, disagreed, stating that the ability to assess daily changes in patient condition and care is most important in billing and legal documentation. This disparity between what physicians and billing and legal advisers value in patient notes may increase the risk of billing fraud and legal liability.

Although CPF users report that CPF has improved physician documentation overall, they likely recognize the existence of irresponsible CPF use as evidenced by their identification of flaws in the content of CPF notes and their unified support of physician education in the responsible use of CPF. In addition, their resistance to making copy and pasted text identifiable may reflect an inadvertent acknowledgement of irresponsible use. The best way to improve the content of electronic physician notes, however, is not clear. Limitations or restrictions to CPF use were rejected by physicians in our survey, and the danger of not incorporating their opinions in designing health IT systems is widespread refusal to use the systems^{24,25}. Physician educational interventions, although supported by our respondents, have had mixed results in other areas^{26,27}. Changing the computerized documentation system to better meet both resident and faculty physicians' needs might prove more effective in modifying physician behavior. A system that is portable and can integrate daily and long-term patient information concurrently might provide adequate incentive for physicians to keep entered information accurate and up to date.

As this study was designed to ascertain physician perceptions of CPF use and not objective data, it was limited by the recall and social desirability biases of the respondents. In addition, although we included a definition of CPF in our survey, copy and pasted material is not readily identifiable within the EMR. We relied on the respondents' ability to differentiate between CPF and non-CPF notes to answer questions about the structure and content of these notes. This survey involved physicians from two affiliated academic institutions with similar documentation systems and may not be generalizable to other health-care staff and physicians at different hospitals with other documentation systems. However, the CPFs at the two hospitals were significantly different, as were the patterns of CPF use, making the results more robust than a single site survey would provide.

CONCLUSION

Both CPF use and the changes in the practice of hospital medicine have contributed to shifts in the structure, content and use of inpatient notes. CPF use has become an integral part of patient note writing and simple restrictions or changes to its use will likely decrease acceptance by physicians. Defining and streamlining purposes of patient notes could add much valued efficiency and accuracy to physician documentation.

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