The Physical Attractiveness of Electronic Physician Notes

Thomas H. Payne MD
Rupa Patel MSI
Sally Beahan, RHIA
Jacquie Zehner RHIT

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Outline of today's talk

- Why study note attractiveness?
- Setting
- Methods
- Results
- Discussion
  - What can be learned?
  - What if anything should be done?
- Limitations
- Summary

Electronic physician notes

Advantages

- Multiple simultaneous access, locally and distantly
- Potential to influence content and to save time
- Information within notes potentially useful for other purposes

Disadvantages

- Time required to enter notes
- Clarity to clinicians—what is new and important?
- Unprofessional and unattractive physical appearance

Physical attractiveness of notes

The problem, and purpose of our study

- The decline in the attractiveness of notes is in our experience a common complaint surrounding electronic medical records.
- Perceived unprofessional appearance is felt to reflect poorly on the physician and the institution.
- To our knowledge, there are no prior studies of this topic.
- The purpose of this study is to identify notes physicians consider to be physically attractive and unattractive and the characteristics of both, so that we can improve the appearance of notes in our EMRs and when viewed by users of our EMRs and by physicians outside our institution.

UW Medicine, Seattle

- Hospitals

  Harborview Medical Center
  UW Medical Center
  Seattle Cancer Care Alliance
  949 beds, 51,000 admissions
  Northwest Hospital
  281 beds

- Clinics

  1.4 million outpatient and ER visits

- Staff

  1,800 attending physicians
  1,100 residents
  800 medical students
  1,200 nurses

EMRs in use in UW Medicine

And tools used to create physician notes

- Cerner Powerchart: Powernote, Clinical Note Editor, Dragon, dictation
- Epic Systems EpicCare: SmartText, Dragon, dictation
- Ambulatory and inpatient notes largely electronic since 2005.
- Each day, roughly 1,500 inpatient electronic notes and 2,000 outpatient notes are created by resident and attending physicians.

Case report

Transition from paper to electronic inpatient physician notes

Thomas H Payne, Aharon E tenBroek, Grant S Fletcher, Mardi C Labuguen

University of Washington, Seattle, Washington, USA

Correspondence to
Dr T H Payne, UW Medicine Information Technology Services, Box 358988, 325 Ninth Ave, Seattle, WA 98104-2499, USA; tpayne@u.washington.edu

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ABSTRACT

UW Medicine teaching hospitals have seen a move from paper to electronic physician inpatient notes, after improving the availability of workstations, and wireless laptops and the technical infrastructure supporting the electronic medical record (EMR). The primary driver for the transition was to unify the medical record for all disciplines in one location. The main barrier faced was the time required to enter notes, which was addressed with data-rich templates tailored to rounding workflow, simplified login and other measures. After a 2-year transition, nearly all physician notes for hospitalized patients are now entered electronically, approximately 1500 physician notes per day. Remaining challenges include time for note entry, and the perception that notes may be more difficult to understand and to find within the EMR. In general, the transition from paper to electronic notes has been regarded as valuable to patient care and hospital operations.

Implementing an EMR system in a medical center often includes the intention to move from paper to electronic documentation of admission notes, progress notes, discharge summaries and other notes. In our hospitals, despite using computing systems to review results and imaging for 15 years, physicians only recently made the transition from writing notes in a paper chart to using the EMR to do so. Some hospitals in our city have made this transition, including the Veterans Administration hospital which did so a decade ago, but most have not. Because many hospitals in the USA are still using paper but may be considering electronic note entry, a description of our experience may be helpful. The purpose of this report is to describe what we believe to be the single most important step we took leading to physician adoption of electronic notes: our efforts to speed note entry.

CASE DESCRIPTION

This paper describes work conducted at the University of Washington Medical Center (UWMC), Harborview Medical Center (HMC) and the Seattle Cancer Care Alliance (SCCA). In 2007, UWMC had 390 beds, 72 ICU beds, and 18 120 admissions; HMC had 369 beds, 73 ICU beds, and 18 777 admissions. The SCCA has one hospital for adult patients, consisting of 18 beds. All three hospitals serve as teaching hospitals for the University of Washington. There are 792 active hospital medical staff at UWMC, 492 at HMC and 297 at SCCA. Across all hospitals, there are approximately 1000 residents and fellows, 826 medical students, 1610 full-time, and 1182 part-time nurses.

Our medical centers' leadership favored the transition to electronic physician notes because our medical record was fragmented among several computer systems and the paper chart. Notes by nurses, social workers, and other ancillary services were in one computing system, outpatient notes in another, and physician notes in the paper chart. From surveys, we learned that some physicians did not know how to access each of these systems, and so sometimes made decisions without important information that would have been available if notes by all disciplines were in a single location. There were other reasons also: improving the professional fee billing process, making notes available for quality of care review, and others.

BACKGROUND

Our project was undertaken by the Medical Staff Documentation subgroup of the UW Medicine ORCA (EMR) project. It was overseen by a steering group consisting of hospital Medical Directors, the professional fee organization Chief Compliance Officer, and Patient Data Services (medical records) directors using weekly conference calls. The team comprised two nurse analysts, the CMIO, a programmer and a project manager. The project was formally chartered in July 2006 and completed in February 2007. Our goal was to move inpatient documentation from paper to electronic form, beginning at Harborview Medical Center and then UW Medical Center and Seattle Cancer Care Alliance. (Some notes such as detailed records of cardiac arrest management and records from other hospitals were entered on paper and scanned.)

Before undertaking the project, the main barrier voiced by physicians was concern that writing notes electronically would require more time than using paper templates.

METHODS

Between February and August of 2005, we began our transition by piloting directly entered notes on the inpatient Medicine teams at HMC, using PowerNote, a semiencoded note-entry application provided by our vendor (Cerner) in which both narrative text and encoded "clickable" elements are used to create the note. We delayed implementing other services until hardware and software limitations were addressed, including upgrading host hardware to improve performance and development of the 'one button templates' described below. Surgical services were the next to adopt electronic notes. They used the narrative text Clinical Note Editor templates (figure 1) for nearly all progress notes. Clinical Note Editor, another note-entry

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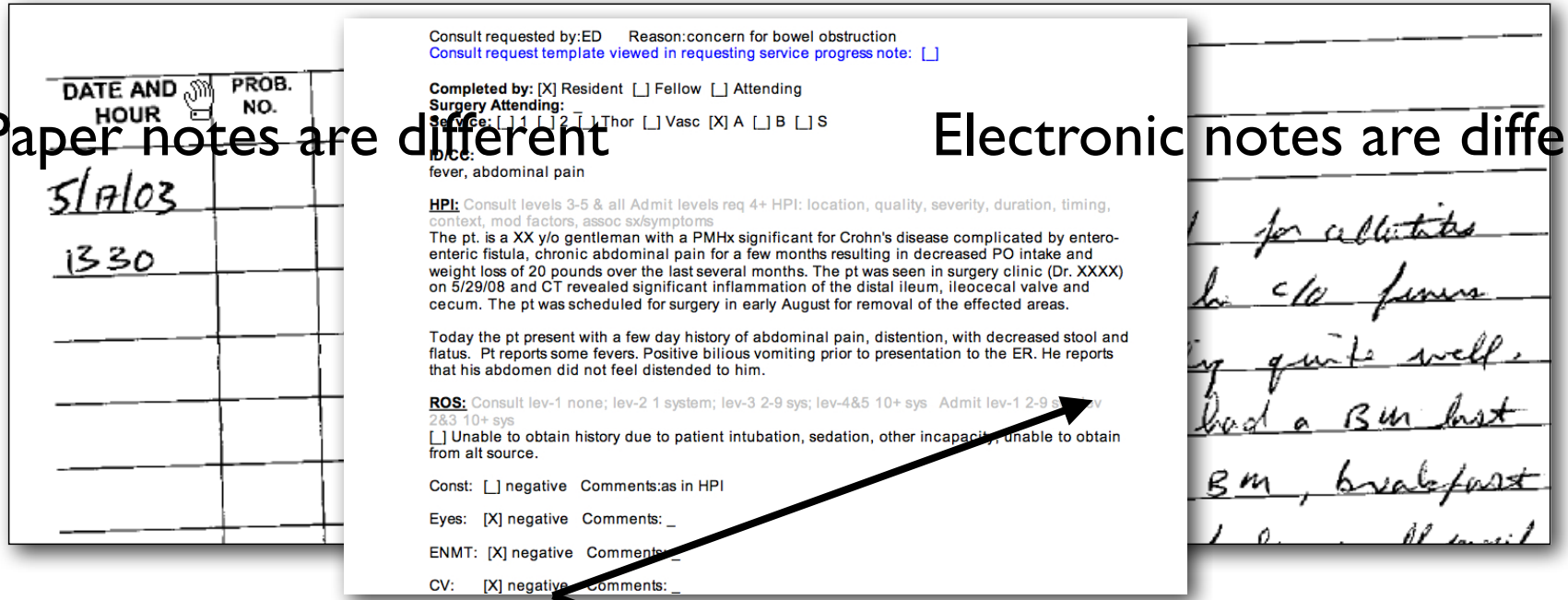
Paper notes are different

Electronic notes are different



Consult requested by:ED Reason:concern for bowel obstruction
Consult request template viewed in requesting service progress note: [_]

Completed by: [X] Resident [_] Fellow [_] Attending
Surgery Attending: _
Service: [_] 1 [_] 2 [_] Thor [_] Vasc [X] A [_] B [_] S
ID/CC:
fever, abdominal pain

HPI: Consult levels 3-5 & all Admit levels req 4+ HPI: location, quality, severity, duration, timing, context, mod factors, assoc sx/symptoms
The pt. is a XX y/o gentleman with a PMHx significant for Crohn's disease complicated by entero-enteric fistula, chronic abdominal pain for a few months resulting in decreased PO intake and weight loss of 20 pounds over the last several months. The pt was seen in surgery clinic (Dr. XXXX) on 5/29/08 and CT revealed significant inflammation of the distal ileum, ileocecal valve and cecum. The pt was scheduled for surgery in early August for removal of the effected areas.

Today the pt present with a few day history of abdominal pain, distention, with decreased stool and flatus. Pt reports some fevers. Positive bilious vomiting prior to presentation to the ER. He reports that his abdomen did not feel distended to him.

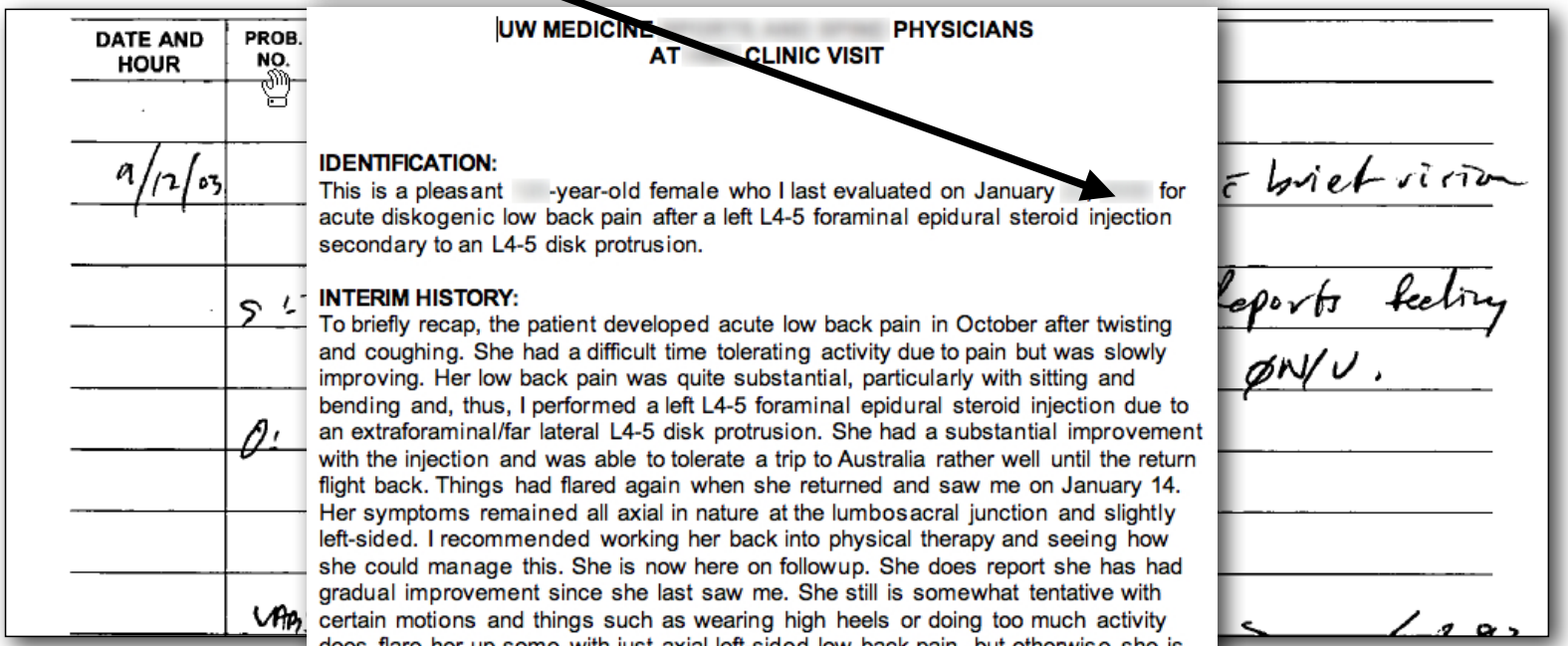
ROS: Consult lev-1 none; lev-2 1 system; lev-3 2-9 sys; lev-4&5 10+ sys Admit lev-1 2-9 sys; lev-2&3 10+ sys
[_] Unable to obtain history due to patient intubation, sedation, other incapacity, unable to obtain from alt source.

Const: [_] negative Comments:as in HPI

Eyes: [X] negative Comments: _

ENMT: [X] negative Comments: _

CV: [X] negative Comments: _



UW MEDICINE PHYSICIANS
AT CLINIC VISIT

IDENTIFICATION:
This is a pleasant -year-old female who I last evaluated on January for acute diskogenic low back pain after a left L4-5 foraminal epidural steroid injection secondary to an L4-5 disk protrusion.

INTERIM HISTORY:
To briefly recap, the patient developed acute low back pain in October after twisting and coughing. She had a difficult time tolerating activity due to pain but was slowly improving. Her low back pain was quite substantial, particularly with sitting and bending and, thus, I performed a left L4-5 foraminal epidural steroid injection due to an extraforaminal/far lateral L4-5 disk protrusion. She had a substantial improvement with the injection and was able to tolerate a trip to Australia rather well until the return flight back. Things had flared again when she returned and saw me on January 14. Her symptoms remained all axial in nature at the lumbosacral junction and slightly left-sided. I recommended working her back into physical therapy and seeing how she could manage this. She is now here on followup. She does report she has had gradual improvement since she last saw me. She still is somewhat tentative with certain motions and things such as wearing high heels or doing too much activity does flare her up some with just axial left-sided low back pain, but otherwise she is managing quite a bit better. She has been quite busy at work and has not been able to get into physical therapy and she feels somewhat guilty about this as she feels she wants to learn an appropriate exercise program to help manage things better. She is having a better time sleeping but still has some difficulty where she wakes up about

Methods

Selection of physicians and notes

70 physicians

- 40 clinical and administrative leaders
- 30 randomly selected from those who recently wrote notes
- Represent users of our 2 major EMRs, and those who enter notes in a variety of ways

10 notes

- Selected by authors because in our opinion they reflect a spectrum of physical attractiveness when viewed in printed form
- Clinic notes, inpatient progress notes, and consult notes
- Created using different EMR systems, and within each EMR system using a variety of techniques
- Both author patient patient identifiers removed or blocked

The study was reviewed by the UW Human Subjects Division and deemed exempt from full review.

Methods

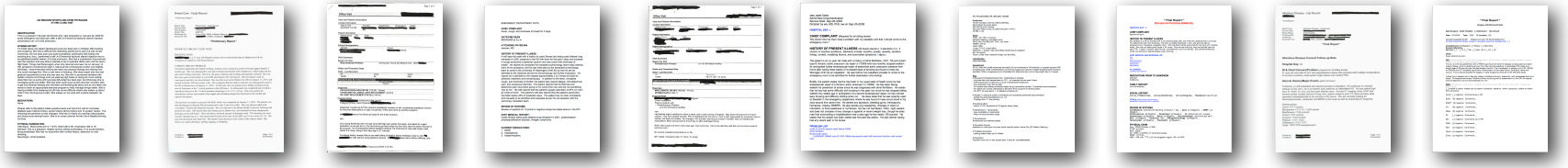
Instructions to physician reviewers

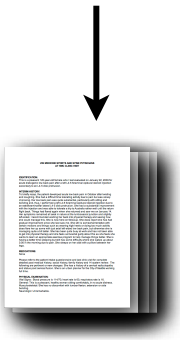
In the envelope with this letter you will find ten notes.

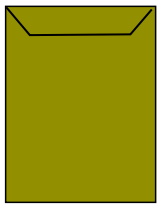
1. *Lay these on your desk, and sort them.*
2. *Put the note you find to be the most attractive in appearance on the top, the note that is least attractive on the bottom, and with the other 8 notes sorted from most attractive to least attractive in between.*
3. *Do not consider the content of the note, but rather how attractive it appears.*
4. *When you are done, put the sorted stack in the enclosed envelope and mail it back to me via interdepartmental mail.*

Methods

Ranking of attractiveness





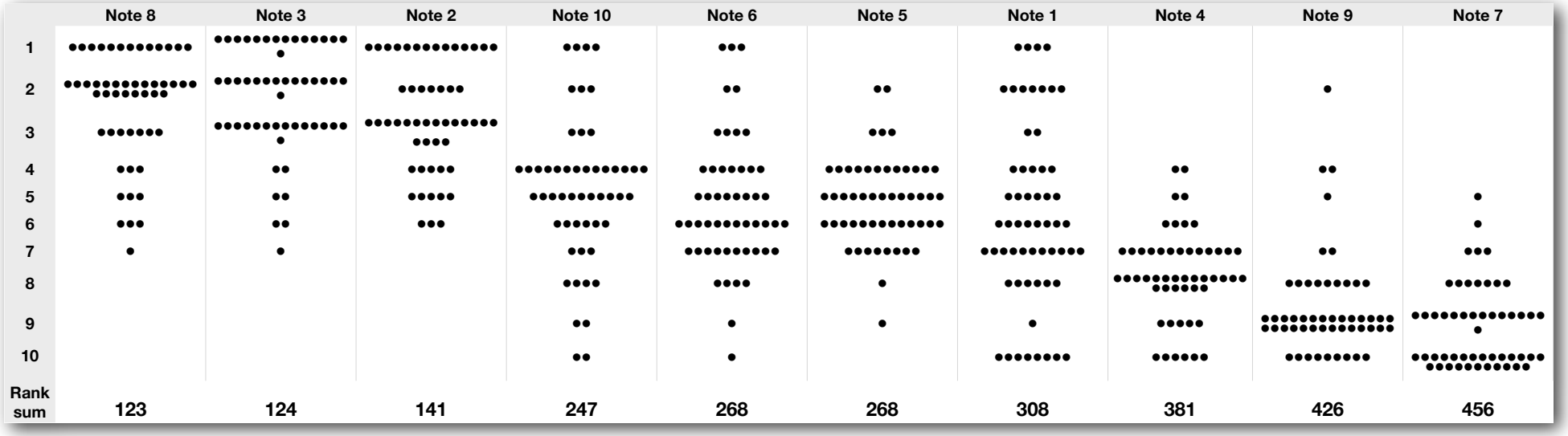


Results

- 70 physicians invited to participate
- 4 were unable because of leave or had left UW Medicine
- 66 sets of ranked notes returned—76% response rate

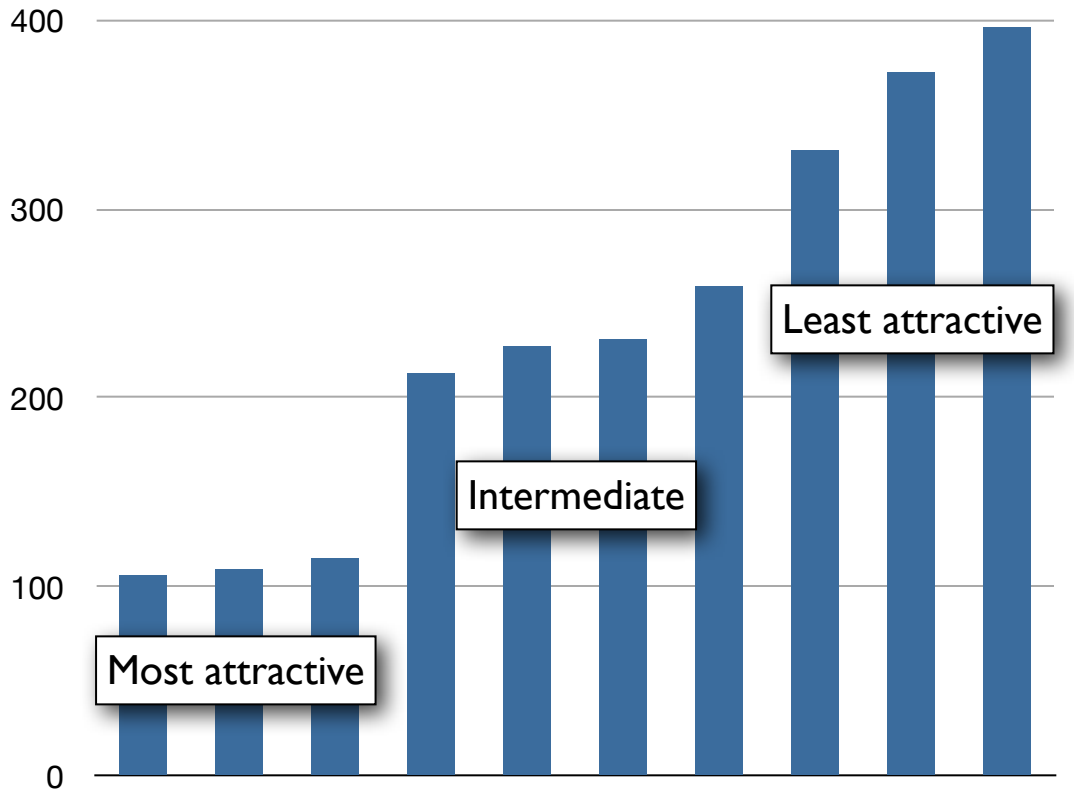
Ranks assigned to each note by physicans.

Ranks of 1-10 are on left, note number is on top. Each dot indicates the rank assigned to the note by one physician. Dot plots are sorted by rank sum shown on bottom.



Attractiveness scores

Rank sums for 10 notes



Using Kruskal-Wallis test we rejected the null hypothesis that physician ranking can be explained by chance alone, $p<0.0001$.

Characteristics of notes ranked most and least attractive

Notes ranked as most attractive had simpler formatting and more narrative text.

Note characteristics
Font types
Paragraphs/page
Heading types
Lines in note
Lines that are checklists
Professionally transcribed
Lines containing narrative text

UW MEDICINE SPORTS AND SPINE PHYSICIANS
AT HMC CLINIC VISIT

IDENTIFICATION:
This is a pleasant 120-year-old female who I last evaluated on January 22, 2009 for acute diskogenic low back pain after a left L4-5 foraminal epidural steroid injection secondary to an L4-5 disk protrusion.

INTERIM HISTORY:
To briefly recap, the patient developed acute low back pain in October after twisting and coughing. She had a difficult time tolerating activity due to pain but was slowly improving. Her low back pain was quite substantial, particularly with sitting and bending and, thus, I performed a left L4-5 foraminal epidural steroid injection due to an extraforaminal/far lateral L4-5 disk protrusion. She had a substantial improvement with the injection and was able to tolerate a trip to Australia rather well until the return flight back. Things had flared again when she returned and saw me on January 14. Her symptoms remained all axial in nature at the lumbosacral junction and slightly left-sided. I recommended working her back into physical therapy and seeing how she could manage this. She is now here on followup. She does report she has had gradual improvement since she last saw me. She still is somewhat tentative with certain motions and things such as wearing high heels or doing too much activity does flare her up some with just axial left-sided low back pain, but otherwise she is managing quite a bit better. She has been quite busy at work and has not been able to get into physical therapy and she feels somewhat guilty about this as she feels she wants to learn an appropriate exercise program to help manage things better. She is having a better time sleeping but still has some difficulty where she wakes up about 3:00 in the morning due to pain. She sleeps on her side with a pillow between her legs.

MEDICATIONS:
None

Please refer to the patient intake questionnaire and last clinic visit for complete detailed past medical history, social history, family history and 14 system review. The following are pertinent or new changes: She has a history of a cervical radiculopathy and status post cervical fusion. She is an urban planner for the City of Seattle working full time.

PHYSICAL EXAMINATION:
Vital Signs: Blood pressure is 114/70, heart rate is 60, respiratory rate is 16.
General: This is a pleasant, healthy woman sitting comfortably, in no acute distress.
Musculoskeletal: She has no discomfort with lumbar flexion, extension or side bending.
Neurologic: Unremarkable.

More attractive

UW MEDICINE SPORTS AND SPINE PHYSICIANS
AT HMC CLINIC VISIT

IDENTIFICATION:
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MEDICATIONS:
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General: This is a pleasant, healthy woman sitting comfortably, in no acute distress.
Musculoskeletal: She has no discomfort with lumbar flexion, extension or side bending.
Neurologic: Unremarkable.

Less attractive

*** Final Report ***

Surgery Admit/Consult Note

Dept Surgery: Initial Hospital [_] Admission [X] Consult

Date: 07/04/08 **Time:** 1500 **Pt Location:** ED

Consult requested by:ED Reason:concern for bowel obstruction
Consult request template viewed in requesting service progress note: [_]

Completed by: [X] Resident [_] Fellow [_] Attending
Surgery Attending: _
Service: [_] 1 [_] 2 [_] Thor [_] Vasc [X] A [_] B [_] S

ID/CC:
fever, abdominal pain

HPI: Consult levels 3-5 & all Admit levels req 4+ HPI: location, quality, severity, duration, timing, context, mod factors, assoc sx/symptoms
The pt. is a XX y/o gentleman with a PMHx significant for Crohn's disease complicated by entero-enteric fistula, chronic abdominal pain for a few months resulting in decreased PO intake and weight loss of 20 pounds over the last several months. The pt was seen in surgery clinic (Dr. XXXX) on 5/29/08 and CT revealed significant inflammation of the distal ileum, ileocecal valve and cecum. The pt was scheduled for surgery in early August for removal of the effected areas.

Today the pt present with a few day history of abdominal pain, distention, with decreased stool and flatus. Pt reports some fevers. Positive bilious vomiting prior to presentation to the ER. He reports that his abdomen did not feel distended to him.

ROS: Consult lev-1 none; lev-2 1 system; lev-3 2-9 sys; lev-4&5 10+ sys Admit lev-1 2-9 sys, lev 2&3 10+ sys
[_] Unable to obtain history due to patient intubation, sedation, other incapacity, unable to obtain from alt source.

Const: [_] negative Comments:as in HPI

Eyes: [X] negative Comments: _

ENMT: [X] negative Comments: _

CV: [X] negative Comments: _

Resp: [X] negative Comments: _

GI: [_] negative Comments: _

GU: [_] negative Comments: as in HPI

MSK: [x] negative Comments: _

Skin: [x] negative Comments: _

Psych: [x] negative Comments: _

Endo: [x] negative Comments: _

Why is this important?

- Note appearance is important to physicians.
  - "Thanks for doing this!"
  - "Our notes have become complete garbage."
- There is evidence that there is a close relationship between users' initial perceptions of interface aesthetics and their perceptions of the system's usability and value.
- If true in the domain of physician notes, when faced with a large collection of notes to read, the attractiveness of notes might influence the choice to read a note.
- It may also affect the perception of professionalism of the note author and institution.

What can we do with the results?

- Focusing attention on improving note quality, and improving appearance is part of this effort.
- Configure software so that notes are more attractive yet also achieve objectives sought when using EMRs, permit direct entry, lower cost, higher compliance.
- Lobby EMR vendors to help improve appearance of notes created with their products.
- Specifically, simplify note formatting and increase narrative text.

Limitations

- It is confined to a small sample of physicians in a single institution, using a small number of notes.
- The attributes we identified to distinguish highly ranked from lower ranked notes may not be the most important ones in the minds of physicians or in other institutions.
- We did not seek to balance the need for other note characteristics, such as compliance or inclusion of quality indicators in measurable form, with note attractiveness though this could be accomplished in further work.

Summary

- In our experience, the physical appearance of notes is important to physicians, and is a frequently-voiced complaint about EMRs.
- Physicians generally agreed when ranking notes based on their physical attractiveness.
- The notes ranked most attractive used fewer fonts, simpler headings, more narrative text, and fewer sections, and were professionally transcribed. Notes ranked as intermediate and least attractive were generated with locally-developed templates, included a greater number of fonts, more paragraph headings, a lower proportion of narrative text, and were likely to contain a mixture of typed text and system generated material.
- By changing note configuration and working with our EMR vendors, we hope to improve note attractiveness while achieving other goals of electronic notes.

Thanks...

...to the study participants and to the and health information professionals who work on UW Medicine electronic medical record system.

tpayne@u.washington.edu