important when considering how to structure and staff an outpatient practice. Notably, nearly one-half of the funding for these comparison practices was provided by the institution with which they were affiliated.

Despite its limitations, we believe the survey to be the first of its kind, offering developing palliative care programs a glimpse of existing outpatient practice structures, operations, and finances. This may be especially useful for oncology programs and cancer centers, as palliative care is increasingly recognized as vital to comprehensive cancer care. Additional research is needed that expands on this work to measure the clinical impact of outpatient palliative care programs, financial viability, and health system outcomes, including hospital and hospital admission rates.

Michael W. Rabow, MD  
Alexander K. Smith, MD, MS, MPH  
Janet L. Braun, RN, MSPH  
David E. Weissman, MD

Author Affiliations: Department of Medicine, University of California, San Francisco (Dr Rabow); Department of Medicine, University of California, San Francisco and Veterans Affairs Medical Center, San Francisco (Dr Smith); Palliative Care Center of the Bluegrass, Hospice of the Bluegrass, Lexington, Kentucky (Ms Braun); and Department of Medicine, Medical College of Wisconsin, Froedtert Hospital, Milwaukee (Dr Weissman).

Correspondence: Dr Rabow, Department of Medicine, UCSF Medical Center at Mount Zion, 1701 Divisadero St, Ste 500, San Francisco, CA 94143-1732 (mrabow@medicine.ucsf.edu).

Author Contributions: Dr Rabow had full access to all of the data in the study and takes responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Rabow, Braun, and Weissman. Acquisition of data: Rabow, Smith, Braun, and Weissman. Analysis and interpretation of data: Rabow, Smith, and Weissman. Drafting of the manuscript: Rabow and Smith. Critical revision of the manuscript for important intellectual content: Rabow, Braun, and Weissman. Statistical analysis: Rabow, Smith, Braun, and Weissman. Administrative, technical, and material support: Rabow, Braun, and Weissman. Study supervision: Rabow and Weissman.

Financial Disclosure: None reported.

Funding/Support: Drs Rabow and Weissman and Ms Braun have received support from the Center to Advance Palliative Care. No funding was sought or received for this research.

Results. Moderate or severe reported UEMSs attributed to computer use were common: 48% (29 of 59) reported VAS scores of 25 or higher. Mean (SD) VAS was 29 (25) (range, 0-100). The correlation of VAS to Quick-DASH measure of UEMSs, not specific to computer use. Demographic variables reported to predict UEMSs (age, sex, and body mass index [BMI] components [weight and height]) and computer use (EMR-using clinical sessions per week and hours per week of computer use) were elicited, as were institution, years of computer use, and years of EMR use. Bivariable relations of dichotomized VAS scores to categorical variables were assessed by x2 analysis. Multivariable regression evaluated prediction of UEMSs (continuous VAS) by computer variables, adjusted for UEM predictors of age, sex, and BMI. A 2-sided α level of .05 was used to indicate statistical significance. This project was approved by the UCSD Human Research Protection Program & San Diego VA Research Compliance office.

Methods. A cross-sectional survey assessed work-related computer use and symptoms in primary care clinics at 2 academically affiliated centers in San Diego, California, with distinct EMRs. The US Department of Veterans Affairs (VA) San Diego Healthcare System group converted to the VA CPRS/VISTA EMR 8 years prior to the survey, and the University of California, San Diego (UCSD) Medical group practice adopted the EpicCare EMR 1 year prior to the survey. Both systems require extensive physician keyboarding and/or mouse clicks. Fifty-nine physicians (87% of those targeted) completed the 20-minute survey. A visual analog scale (VAS) assessed UEMSs attributed to computer use (scale, 0-100), validated against the QuickDash measure of UEMSs, not specific to computer use. Demographic variables reported to predict UEMSs (age, sex, and body mass index [BMI] components [weight and height]) and computer use (EMR-using clinical sessions per week and hours per week of computer use) were elicited, as were institution, years of computer use, and years of EMR use. Bivariable relations of dichotomized VAS scores to categorical variables were assessed by x2 analysis. Multivariable regression evaluated prediction of UEMSs (continuous VAS) by computer variables, adjusted for UEM predictors of age, sex, and BMI. A 2-sided α level of .05 was used to indicate statistical significance. This project was approved by the UCSD Human Research Protection Program & San Diego VA Research Compliance office.

Results. Moderate or severe reported UEMSs attributed to computer use were common: 48% (29 of 59) reported VAS scores of 25 or higher. Mean (SD) VAS was 29 (25) (range, 0-100). The correlation of VAS to Quick-DASH was 0.61 (P < .001), supporting convergent and construct validity for VAS.

Electronic medical record use in primary care clinics is common, and UEMSs lead workplace injuries nationwide, incur the longest absence among service sector workplace injuries (28 days median, exceeding fractures and amputations), and can foster multiple spells of lost work time, so that work loss per episode underestimates the impact of UEMSs (by approximately 32% at 5 years). Numerous studies link computer use to UEMSs. However, to our knowledge, whether such symptoms affect physicians practicing at facilities using integrated electronic medical records (EMRs) has not been assessed. We evaluated the prevalence of UEMSs attributed to computer workstation use in 2 medical facilities with different EMR systems.
On bivariable analyses, higher VAS scores related to more EMR-using clinic sessions per week ($P = .02$) and more computer hours per week ($P = .04$). Other variables individually, including sex, age, and BMI, as well as institution and years of EMR use and employment, bore no significant relation to dichotomized VAS in this sample, suggesting a more powerful relationship of EMR-using clinic sessions or computer hours than other potential UEMS predictors.

The prediction of UEMSs by computer hours per week and particularly by EMR-using clinic sessions per week was preserved or strengthened in analysis adjusted for age, sex, and BMI (computer hours per week: $\beta = 13.9$, SE = 6.48 [$P = .04$]; EMR-using clinic sessions per week: $\beta = 4.30$, SE = 1.56 [$P = .008$]) (Figure). 

Comment. High prevalence of UEMSs attributed to EMR use was reported among physicians at 2 facilities with integrated EMRs. Economic and personal losses arise irrespective of employment type, but “costs” from UEMS disability are arguably amplified for physicians by the investment years of education required to practice medicine. Our findings parallel those for nonphysician computer users; indeed, UEMSs are an emerging concern in professional occupations. More than half of computer users reported musculoskeletal symptoms during the first year after starting a job. One review found that the most consistent predictor was hours keying. However, mouse use may more strongly predict UEMS development. The apparently stronger association to UEMSs of EMR-using clinic sessions per week might be speculated to reflect relatively high mousing requirements of EMR systems during patient-relevant activities and/or reduced discretionary (non-clinic) computer use among those with UEMSs. Future studies may evaluate whether modifications of EMR systems to minimize mouse use reduce the risk of clinic session–associated UEMSs.

The generalizability of findings must await replication in other settings; however, findings were consistent across 2 physician groups with distinct EMRs. Our findings may underreflect the true impact, since prior injury and work modification were not captured and reduced clinic sessions engendered by UEMSs may produce strong bias to the null. (We are aware that at least 4 physicians received surgery, had clinic reductions, and/or used specialized voice/foot pedal–operated workstations because of UEMSs.)

Ergonomics have received little attention in discussions of EMR implementation. (“Transitioning to an EMR System Without Pain” refers to protection against figurative rather than literal discomfort.) This is perhaps ironic because health care institutions are in the business of understanding risk factors for, and promoting prophylaxis against, illness and injury.

To our knowledge, ours is the first assessment of this issue for physicians. If high rates of UEMSs among physicians using EMRs are replicated and extend to other settings, the impact of physician symptoms and disability on health-related quality of life, work time lost, patient care continuity, and costs for health care institutions warrant assessment. Proactive attention to ergonomics may be merited, as integrated EMRs are increasingly adopted at health care institutions.

These findings are timely, given the current efforts, extending to the presidential level, to hasten nationalized implementation of EMRs.

**Beatrice A. Golomb, MD, PhD**
Reza Yaghmai, MD, PhD
Marian J. Renvall, MS
Joe W. Ramsdell, MD

**Author Affiliations:** Departments of Medicine (Drs Golomb, Yaghmai, and Ramsdell and Ms Renvall) and Family and Preventive Medicine (Dr Golomb), University of California, San Diego, School of Medicine, San Diego.

**Correspondence:** Dr Golomb, Department of Medicine, University of California, San Diego, 9500 Gilman Dr, MC 0995, La Jolla, CA 92039-0995 (bgolomb@ucsd.edu).

**Author Contributions:** Study concept and design: Yaghmai and Ramsdell. Acquisition of data: Yaghmai and Ramsdell.
In their recent commentary, Largent et al propose guidance to help clinicians distinguish between well-supported and unsupported off-label prescribing. In 2008, we published a related analysis using nationally representative data from a survey of office-based physicians to identify the frequency of unsupported off-label use of specific therapies. We identified medications for which research on off-label use is most urgently needed based on recency of market entry, known adverse effects, high medication cost, high levels of promotional expenditures, and high volume of uses with insufficient evidence. Largent et al discussed these same features with the exception of promotional efforts, a factor we consider crucial, given the potential impact of marketing on prescribing. Among the top 25 prioritized medications, antidepresants (escitalopram, trazodone, sertraline, buspirone, amitriptyline, and venlafaxine), antipsychotics (quetiapine and risperidone), and anxiolytics/sedatives (zolpidem, lorazepam, and clonazepam) were prominent. Given the complexities that clinicians face in assessing the evidence base supporting different therapies, particular vigilance may be appropriate when using these treatments.

An additional issue for consideration in off-label use is the apparent tendency for clinicians to mistakenly apply evidence regarding one medication to others in the same therapeutic class. Such inference is often not supported by good evidence. Off-label drug use occurs in diverse clinical situations, and many off-label uses are valid and well supported. We support L argent and colleagues in their classification of off-label uses as supported, supposition al, and unsupported. Recognizing these distinctions will improve efforts toward better collection and use of evidence in prescribing. Given the volume of unsupported off-label prescribing in the United States and the associated concern for lack of efficacy and potential harm, further work is urgently needed to promote evidence-based prescribing.

### Author Affiliations:

Departments of Pharmacy Administration (Dr Walton) and Pharmacy Practice (Dr Schumock), College of Pharmacy, and Center for Pharmacoeconomic Research (Drs Walton and Schumock), University of Illinois at Chicago; Section of General Internal Medicine, Department of Medicine, and Center for Health and Social Sciences (Drs Alexander and Meltzer), MacLean Center for Clinical Medical Ethics (Dr Alexander), and Department of Economics (Dr Meltzer), University of Chicago, Chicago, Illinois; and Stanford Prevention Research Center, Stanford University, Palo Alto, California (Dr Stafford).

### Correspondence:

Dr Walton, Department of Pharmacy Administration (MC 871), College of Pharmacy, University of Illinois at Chicago, 833 S Wood St, Room 241, Chicago, IL 60612-7231 (walton@uic.edu).

ing clinical decision making regarding treatment alternatives. We fully agree with the value of using decision analysis to prioritize clinical scenarios most in need of further data and on the importance of basing decisions on patient-centered outcomes. Moreover, we support the authors’ assertions regarding the need to elicit patient preferences. Numerous studies have demonstrated that the preferred option will vary among well-informed patients, even when one strategy is recommended by experts or shown to be superior in analytic decision models. Therefore, high-quality decision making requires not only the availability of appropriately tailored outcome data but also an explicit assessment of how individual patients value the outcomes associated with different treatment alternatives.

Liana Fraenkel, MD, MPH
Terri Fried, MD

**Author Affiliations:** Department of Medicine, Yale University School of Medicine, New Haven, Connecticut; and Clinical Epidemiology Research Center, VA Connecticut Healthcare System, West Haven.

**Correspondence:** Dr Fraenkel, Yale University/VA Connecticut Healthcare System, 300 Cedar St, TAC 525, PO Box 208031, New Haven, CT 06520 (liana.fraenkel@yale.edu).

---

**Time Spent on Clinical Documentation: Is Technology a Help or a Hindrance?**

We commend Oxentenko and colleagues on their study demonstrating the excessive burden of clerical work reported by internal medicine residents. The recognition of this important topic and the effort to assess the educational value of these tasks is critical to ensuring that future residency reforms focus not just on hours worked but also on the type of work residents do. The authors identify faculty feedback as one factor that may add value to clerical work. There may be other factors that could make house staff activities more or less useful. In fact, Dresselhaus and colleagues demonstrated that while house staff perceived direct patient care activities to be more educational than indirect care, the differences were smaller than one would anticipate (ie, a score of 66 for “performing initial history and physical” vs as score of 39 for “documentation” on a scale of 0 to 100).

Given the increasing use of electronic health records (EHRs) in teaching hospitals, we also wondered how the time and value of certain clerical work related to documentation has changed with health information technology. Certainly, the advantages of such systems include more efficient and safer order entry, easily accessible clinical information, and the ability to facilitate documentation through decision support or documentation templates. As a result, one could theorize that EHRs could streamline or eliminate many of the low-value tasks that compose clerical work. Unfortunately, it is also possible that these technology solutions could have the opposite effect of increasing the time spent in clerical work and lowering the value of that work. In our experience at the University of Chicago, after implementing an EHR, residents often research a new patient extensively on the EHR prior to the history taking and physical examination, preferring to obtain information via clerical work rather than direct patient assessment. In addition, the well-described habits of “cutting and pasting” notes or copying forward previous notes with minor daily updates are work-arounds that may save time but provide little opportunity for education and reflection about a patient’s course. While it is hard to imagine that clerical work will not be a significant part of residents’ duties in the future, it is important to recognize that the method and content of this clerical work is changing rapidly with the adoption of EHRs. We hope future studies will examine the influence of EHRs on clerical work and propose strategies for using health information technology to maximize the educational value of necessary clerical tasks performed by internal medicine residents.

Jacob A. Doll, MD
Vineet Arora, MD, MAPP

**Author Affiliations:** Internal Medicine Residency, Department of Medicine, University of Chicago, Chicago, Illinois.

**Correspondence:** Dr Arora, Department of Medicine, University of Chicago, 5841 S Maryland Ave, MC 2007, AMB W216, Chicago, IL 60637 (varora@medicine.bsd.uchicago.edu).


---

**In reply**

We appreciate the insightful comments by Doll and Arora relating to our article on how internal medicine residents spend their time on inpatient services, in which we found that 67.9% of residents reported spending in excess of 4 hours daily on documentation, while only 38.9% reported spending this amount of time in direct patient contact. Although feedback on documentation may increase the educational value of this indirect patient care activity, it is infrequently provided.

Measuring the educational value of trainee activities can provide insight into where curricula can be enhanced. Doll and Arora point out that the difference in educational value between direct and indirect patient care was not as great as one might expect in the study by Dresselhaus and colleagues, but we note that activities deemed “indirect patient care” (eg, documentation, order/obtain tests, discharge planning, initiating consultations) received the lowest

scores compared with any direct patient care or educational activity, with the exception of reading literature regarding patients and discussion of patient issues, which clearly have differing educational merit.

Doll and Arora raise the additional question of how the time demands and merits of clinical documentation have changed in the era of modern technology. Data on EHRs were not part of the Internal Medicine In-Training Examination Survey, but our experience has also been that electronic systems can both promote and impede efficiency and may create new medical errors that such systems were intended to reduce. Doll and Arora suggest that the improved efficiency of the copy and paste function needs to be balanced against the potential decrease in reflection on a patient’s clinical course. This also has implications for quality of care, given a recent report that the copy and paste function leads to mistakes in patient care.3

It is concerning that time spent on clerical documentation continues to consume more time for trainees than activities with higher educational value. Limiting tasks of low educational value in medicine will have to be part of the solution; however, optimizing the educational merit of remaining tasks may better reflect the reality that clerical tasks are unlikely to disappear altogether. We agree that consideration of the role of EHRs in striking the balance between clerical necessity and optimal medical education will be of critical importance.

Amy S. Oxentenko, MD
Colin P. West, MD, PhD
Joseph C. Kolars, MD

Author Affiliations: Divisions of Gastroenterology and Hepatology (Dr Oxentenko) and General Internal Medicine (Dr West), Department of Internal Medicine, and Division of Biomedical Statistics and Informatics, Department of Health Sciences Research (Dr West), Mayo Clinic, Rochester, Minnesota; and Division of Gastroenterology, Department of Internal Medicine, University of Michigan Medical School, Ann Arbor (Dr Kolars).

Correspondence: Dr Oxentenko, Department of Internal Medicine, Mayo Clinic, 200 First St Sw, Rochester, MN 55905 (Oxentenko.amy@mayo.edu).


Correction

Error in Text. In the Research Letter titled “Electronic Medical Records and Upper Extremity Symptoms: Pain With the Gain?” by Golomb et al, published in the April 12, 2010, issue of the Archives (2010;170[7]:653-657), an error occurred in the final sentence of the “Results” section on page 656. The sentence should read as follows: “The prediction of UEMSs by computer hours per week and particularly by EMR-using clinic sessions per week was preserved or strengthened in analysis adjusted for age, sex, and BMI (computer hours per week: β=0.601, SE=0.194 [P=.003]; EMR-using clinic sessions per week: β=4.30, SE=1.56 [P=.008]) (Figure)."