

Nephrologist Burton Rose's encounter with a Macintosh program called HyperCard would result in the creation of a digital reference tool that saw the greatest use in myriad clinical contexts: UpToDate. Working nights and weekends, Rose, his wife Gloria, and a small team of nephrologists created a computer program of searchable and interlinking "topic cards," which they released as an eight-floppy-diskette set in 1992. For \$495, physicians could buy an annual subscription that included the basic program and quarterly updates. The program was initially focused on nephrology; Rose and his colleagues soon expanded its scope by recruiting physicians representing the full range of clinical medicine.

Early subscribers welcomed the program as an alternative to textbooks that rapidly became outdated, endlessly proliferating journals, and time-consuming library searches. As some observers saw it, the miniaturization

and digitization of reference tools facilitated a shift from a "just-in-case" to a "just-in-time" model of learning and practicing: from memory-intensive practices of preparing for as many clinical circumstances as possible to more process-oriented learning. Others, echoing earlier concerns, insisted that the digitization of medical information corrupted the traditions and cognitive practices enabled by tangible, paper-based tools. Excursions to the medical library, into a medical textbook, or through the *Index Medicus* could permit reflection and serendipitous stumbling.

The medical reference landscape will continue to change as reference tools are integrated with clinical trials, machine-learning algorithms, and electronic medical records. Choices regarding reference tools are deeply intertwined with clinical and even sartorial norms (what pocket guide could fit into today's favored clinical uniform, the embroidered fleece?). The demands

and constraints associated with search algorithms and "prompt engineering" may engender new ways of approaching, framing, and engaging with medical data. The history of reference tools demonstrates the ways in which the physician's proverbial "peripheral" brain is anything but.

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How Does Health Care Burden Patients? Let Me Count the Days

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Think of it like a new job, I offered my 81-year-old retired-engineer father: radiation treatments for a prostate cancer that should not have been found in the first place, Monday through Friday, for 8 weeks. On day 1, the

traffic overwhelmed him and my highway-shy mother. On day 2, he forgot to drink water to fill his bladder before treatment, and the scheduled 15 minutes dragged into 3 hours. On day 3, postradiation, the chest pain that was

once provoked only by vigorous walks emerged minutes into a Costco trip. So on day 4, his treatment turned into an overnight emergency department stay and an ambulance ride to Philadelphia for cardiac catheterization.

Baba spent days 5 through 8 in the hospital awaiting coronary-artery bypass surgery on day 9, and by day 13, remarkably, he was discharged home. Soon afterward, my brother and I retired our bedside posts to return to our jobs and families in Virginia and Massachusetts. And it was my mother who took Baba to the office visits, stress tests, and blood draws that followed — aiding his halting passage down three back stairs, folding and unfolding his walker, easing him into the passenger seat. All of it consumed time and effort that my parents might rather have spent on other things, such as, for my mother, seeing friends and gardening and, for my father, reading trade magazines and making his signature Bengali dessert.

Health care contact days — defined as days spent getting health care outside the home¹ — can represent access to needed, even lifesaving care, like the operation that supplied Baba's heart with vital workarounds. But these days can also present substantial burdens, especially for older adults and their care partners. On top of the well-documented challenges associated with time spent in a hospital or nursing facility, ambulatory services such as office visits, procedures, treatments, imaging, and tests require time and result in transportation expenses, missed work, and other opportunity costs, not to mention the environmental impacts.²⁻⁴ By one estimate, U.S. adults spend an average of 2 hours per office visit, and only 20 minutes is with the doctor.²

I've witnessed and lived these trade-offs as a daughter (mother,

wife, patient) and as a general internist. As a health services researcher, I've wanted to understand them. To this end, research that my colleagues and I have conducted found that older adults on traditional Medicare, like my parents, spend an average of 3 weeks of each year on health care contact days, most of which are for ambulatory care.¹ Eleven percent of these older adults have 50 or more contact days per year.

We and others have also found that the frequency and burdens of contact days are inequitably distributed. Contact-day counts vary widely among older adults on Medicare, not only by medical need, but also by factors such as race, income, and geography¹ — reflecting both socioeconomic inequities in access to care and known variation in care utilization across clinicians and health systems. Nearly one in five older adults on Medicare report having trouble getting places like the doctor's office, and the rates are even higher among those with lower incomes or with conditions such as dementia or mental illness.³ Studies comparing patients in minoritized racial or ethnic groups with their non-Hispanic White counterparts found that each of their visits takes more travel time despite similar or less time spent with the doctor.⁴

Although there is no "right" number of health care contact days, this intuitive, claims-based outcome measure has the potential to be widely used in efforts to make our health care system more person-centered. The contact-days measure, which was first proposed in a 2016 report⁵ and updated in our recent work,¹

adds ambulatory care (and granularity) to measures such as "days at home," which have strong face validity but are limited by the fact that hospital and skilled nursing facility days are relatively rare for most older adults. For patients with advanced cancers, oncologists have compellingly defined a similar idea of "time toxicity" — the extent to which days spent in a hospital or clinic offset the added days or weeks of life that a cancer treatment under evaluation may provide.

Clinicians and health care systems should count, and talk about, health care contact days because there is both a need and an opportunity to be more thoughtful about how we use them. In a way, contact days are analogous to health care spending: underuse of contact days, like underspending, is also problematic, since many contact days are (just as much spending is) beneficial. Contact days carry varying levels of burden (though even going in for a blood test can take hours), and they may also carry social benefits (an outing that is the highlight of an otherwise lonely week). But if we can achieve equal or better outcomes with fewer days (or lower spending), as some studies hint, these excess days (or spending) may be worthy targets for reduction.

Specifically, contact days could be optimized by reducing unnecessary care, coordinating care, and shifting care to the home when possible (see table). Clinicians could talk with their patients about contact days, along with other meaningful measures of health and well-being, as they make shared decisions about pursuing prostate cancer screening

Contexts, Uses, and Optimization of Health Care Contact Days.*

Context	Sample Uses of a Contact-Days Metric	Sample Approaches to Optimizing Contact Days		
		Reduce Unnecessary Care	Coordinate Care	Shift Care to the Home
Individual patient care	Consider when choosing treatment plans, alongside factors such as efficacy and affordability	With shared decision making or clinical judgment, forgo marginally beneficial services (e.g., don't repeat laboratory tests to confirm normalization of slightly abnormal results)	Maximize needed care provided in a given office visit (e.g., offer a pending vitamin B ₁₂ injection at a visit for knee pain)	Manage conditions remotely when possible (e.g., prescribe a home blood-pressure cuff and schedule a virtual visit to follow up on hypertension)
Clinic or health system	Track at physician, clinic, and health system levels using dashboards to inform quality improvement	Change health system workflows to reduce use of low-value services (e.g., eliminate low-value preoperative testing before cataract surgery and resulting care cascades)	Set up clinical decision support in electronic health records to prompt any member of a patient's care team to provide needed services when the patient presents for care Use scheduling technology and service colocation to facilitate same-day scheduling across service categories for a specific diagnosis (e.g., dementia or cancer)	Provide technology and workflows for virtual visits and remote patient monitoring Offer home services such as hospital at home, visiting nurse, and home visits in primary care
Policy	Measure and report contact days in evaluation of new care delivery and payment models Consider contact days as a trade-off when developing clinical guidelines	Consider use of low-value care as a performance measure for accountable care organizations	Use comprehensive payments for episodes of care (e.g., knee replacements) as incentives for colocating or coordinating services, as in the CMS Bundled Payments for Care Improvement initiative Provide incentives for prioritizing multimodal, efficient care over volume of care (e.g., avoiding extra office visits to discuss laboratory results), as in the CMS Making Care Primary model	Reimburse for audio and video virtual visits and remote patient monitoring

* CMS denotes Centers for Medicare and Medicaid Services.

or starting treatment for Alzheimer's disease. Clinic and health system leaders could track numbers of contact days and work to optimize them by means of hiring decisions, technology infrastructure, policies, and workflows — half of ambulatory tests and imaging studies were not performed on the same day as an office visit, which suggests missed opportunities to coordinate services.¹ Policymak-

ers could design payment models and regulations to help clinicians prioritize the quality of health care contacts over their quantity, support virtual and home care, and otherwise make better use of patients' time. In all of these areas, researchers could include contact days as a person-centered outcome when evaluating treatments and delivery approaches.

Soon after his surgery, Baba's

new day job was cardiac rehab, 3 days a week, for 8 weeks. My parents liked these days slightly better. The drive was now familiar, and my mother, a world traveler, rated the cafeteria pizza the best she'd had. Then, once Baba had regained his strength, radiation treatment was back on the table, and we talked with his doctors about the trade-offs. Five days of intensive radiation or 30 to 40 days with gentler doses?

There was no right answer, but at least we were having the conversation.

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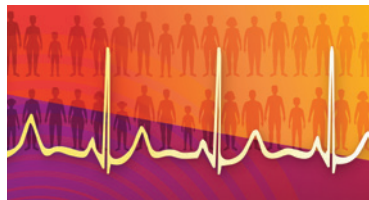
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