Toward a Medical "Ecology of Attention"

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In the clinical environment, the most important — and most limited — resource is attention. Attention is a key factor in the mastery of complex, skilled practices; it enables both good work and satisfying work. But too often in clinics and hospitals, attention is a casualty of well-meaning efforts to maximize productivity. Clinical and administrative leaders should consider optimizing attention as a component of efforts to advance quality, safety, and patient and provider satisfaction.

Evidence from cognitive science is clear: fractured attention leads to increased processing time spent on complex tasks, impaired working memory, and bias. In medicine, distraction contributes to lapses in judgment, insensitivity to changing clinical conditions, and medication errors. In his 2016 book *Deep Work*, computer scientist Cal Newport made a strong case for prioritizing attention in highly dynamic work environments. In a wide range of industries, he found that efforts to reduce interruptions, multitasking, and task switching resulted in increased work enjoyment, higher-quality communication, and often better overall outcomes for specialized tasks.[1] Cultural commentator Matthew Crawford used the term "ecology of attention" to describe the way in which an environment might be designed to better serve attentive practice.[2] The table describes suggestions for prioritizing attention in the clinical environment.

One of the most important factors at play in the clinical environment is the apparent tension between availability and attention. Clinicians rightly value availability to our colleagues, our multidisciplinary teams, and especially our patients. But we propose that shallow availability — or "reachability" — can often be a barrier to the type of deep, interpersonal availability that is most essential. Reachability is attractive in the short term: it allows clinicians to provide and receive instant feedback, and it appears, on a small scale, to improve efficiency by reducing barriers to communication. But frequency of communication is a questionable surrogate for quality of communication. Every time task switching or multitasking occurs, a portion of a person's attention remains on tasks other than the one at

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hand (a phenomenon described in the literature as "attention residue"). Real inter personal availability depends on people's capacity to make themselves fully present with another person. Nonessential interruptions take the place of relationships and disrupt fUll, focused presence.

Opportunities for Developing an Ecology of Attention in Clinical Settings.	
Opportunity	**Examples**
Prioritize quality of communication over frequency of communication	Incorporate categories of importance and urgency into systems and communication methods. Encourage prioritization of attention (such as by triaging pages with levels of acuteness or batching messages to a designated part of the day). Incorporate hard stops or receiver-centered functionality (such as a pager setting that allows the user to batch low-acuity pages and receive them at a single time, or an improved ability to capture and retain low-acuity tasks as they arise in workflows).
Design physical spaces to foster attention in the clinical environment	Develop spaces that provide an ability to separate from noise and that contain necessary tools for clinical practice. Consider attention optimization as one of the primary design principles guiding the creation and maintenance of shared and individual work spaces.
Evaluate the effects of proposed changes on work-force roles and duties	Avoid unnecessary task switching. Consider the number and types of tasks performed in a given workday, the maximum number of patient encounters per day, and the ability for clinicians to structure their workflows. Define roles within teams to allow for periods of deeper focus during the workday.
Optimize electronic health records	Develop awareness of the cognitive burden associated with prompts (such as best-practice advisories), data-entry tasks, and switching between screens and views. Develop and disseminate customizable flow sheets with data that are frequently retrieved together. Minimize attention spent maintaining the record outside vital patient care activities.
Develop measurement tools that are sensitive to attention-mediated outcomes	Develop descriptive measures to define the type, frequency, and intensity of common distracters. Develop quantitative and qualitative measures, including measures for patient and provider satisfaction, fatigue, and burnout. Measure the downstream effects of productivity goals on the ability for deep, focused work and on quality- and safety-related outcomes.
Integrate attention into organizational culture	Consider the downstream effects of resource allocation. Evaluate scheduling of shifts and tasks. Provide clinicians with tools and language to prioritize attention in their daily practice.

Another important consideration is the design of physical spaces. Various industries prioritize attention in environmental design. The Federal Aviation Administration's long-standing "sterile cockpit" rule, which prohibits nonessential activities during key moments in flight, was instituted after the agency recognized the role that distraction had played in a series of airline accidents. Similarly, open office plans are falling out of favor in the tech industry after it was repeatedly shown that, because of increased distraction, such designs actually undermine the goals of creativity, productivity, and interpersonal connection that their implementation aimed to achieve. Clinical spaces affect the depth and quality of work that can happen within them — and counterintuitive solutions, such as those that enhance people's ability to isolate themselves from noise and other interruptions, may have beneficial effects.

Establishing clinical roles and staffing structures creates additional opportunities for thoughtful design. Allocating tasks to maximize clinician attention could help reduce the amount of multitasking and cognitive retriaging that occurs during a given workday. This strategy could include protecting time for focused work and splitting cognitively distinct tasks among various clinicians (admitting and cross-covering, for instance, or seeing patients

for office visits and addressing nonurgent lab results). It could also involve redefining a clinician's optimal number of patient contacts per day and leveraging teams to consciously distribute "shallower" tasks.

Changes to electronic health records (EHRs) could also be helpful. The EHR is the source of many cognitive burdens for clinicians, including best-practice advisories, data-entry tasks, alerts, and multiple open windows that shift attention from the patient to the screen. Independent projects aimed at improving quality can, in aggregate, contribute to alarm fatigue and distraction. But there may be ways of improving workflows to minimize distraction. Similarly, if carefully designed and implemented, EHR tools such as electronic-chat functions and in-boxes could enhance targeted communication among care teams. Data from EHRs could be used to develop metrics that could then be paired with qualitative measures to help identify key areas in which changes can be made to improve attention.

The metric-heavy drive toward productivity might be one of the biggest barriers to a shift to attentive work. If not thoughtfully crafted and deployed, attempts to increase productivity can negatively affect patient-centered outcomes, quality of care, and patient flow. In inpatient settings, patients' length of stay and the cost of care increase with hospitalists' increasing workload.[3] Primary care clinicians often face the brunt of the push to increase productivity. A 2018 article suggested that clinicians recoup time spent on shared decision making by "skip[ping] time with older children who don't like them much anyway" — a quip that was grounded in real-world sentiment and supported research into the ongoing pressures on outpatient clinicians' time.[4] Moving discussions from a focus on workload, time, or resources to the broader issue of attention — a factor that can be influenced by many elements of environmental and system design — may contribute to improved value, safety, and satisfaction.

An emphasis on attention can be integrated into organizational culture. Throughout disciplines, focus has been shown to improve job satisfaction. This phenomenon is probably attributable to improved quality of work, combined with the intrinsic satisfaction that comes from being in a state of focus. Heightened attention is pleasurable in itself and facilitates meaningful, unimpeded action.[2] Attention supports the development of excellence by fostering innovation, dedicated practice, and continual improvement, because spending less time on shallow tasks reserves more cognitive bandwidth for complex and creative thinking.

Optimized attention may also address one of the perennial causes of dissatisfaction in clinical medicine: the disenchantment that comes from being increasingly separated from the core work of healing. Bodies and persons aren't the same as machines, and health and well-being aren't industrial outputs but delicate states of being. And yet clinicians often attend to our systems and record keeping at least as much as to the patients in front of us, and we use metaphors and practices that belie the less tangible yet still crucial dimensions of interpersonal care. Rita Charon, an internist and the founder of the narrative medicine movement, wrote that attention "seems [to be] the most pivotal skill with which to endow a health professional who wants to be a healer."[5] There is a rich and varied literature on the human capacity for attentive care that spans eras, regions, and philosophies. We admire the

computer scientist who said unironically that such work expresses "appreciation for something elusive and valuable in modernity: a glimpse of the sacred."[1]

As we continually try to optimize the systems in which we work, we should think ambitiously about clinical environments that optimize attention. Such thinking can improve quality, efficiency, and patient and provider satisfaction and reduce costs of care. Perhaps most important, it takes seriously the human elements that are necessary to produce high-quality and meaningful work — a worthwhile goal for any care environment.

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