



University of Rochester Medicine Rochester, N.Y.

The AHA Physician Alliance provides resources to connect hospitals with work being done across the field to address the individual, environmental, and systemic factors that contribute to burnout and to foster resilience and well-being. You may find more case studies at our [knowledge hub](#).

Overview

University of Rochester Medicine (URM) is one of the largest facilities for medical treatment and research in upstate New York. URM had deployed a strategy for the Triple Aim goal of providing high-value patient experience but found that programs designed to foster a change in physician behavior were progressing slowly. The focus then shifted to examining root causes. With rising rates of clinician burnout, the patient experience team partnered with clinicians to make clinician well-being a priority.

Despite these efforts, there was a significant challenge in convincing administrative leaders — who were focused on the Triple Aim, particularly pa-

Human factors and ergonomics is a field that uses knowledge of human abilities and limitations to design systems, organizations, jobs, machines, tools and consumer products for safe, efficient and comfortable human use. Three types of ergonomics are physical, cognitive and organizational.

tient satisfaction— to also prioritize clinician well-being. It became clear that the fourth dimension needed to be added, resulting in the Quadruple Aim framework for health care delivery— improving the experience of providing care. Furthermore, this new dimension needed to be broken down into its components and mechanisms of impact

Impact

All efforts to improve patient experience and clinician well-being are now collaborative and enhanced by the new well-being infrastructure. URM publicly committed to the Quadruple Aim across the organization through the National Academy of Medicine Action Collaborative on Clinician Well-being and Resilience. Leaders are looking beyond traditional models of understanding health care errors and integrate other concepts—like factors that drain neural resources and extraneous cognitive load— when considering workflow changes and other administrative decisions. This model helps explain how systemic/organizational latent conditions contribute to downstream errors and how these latent conditions can be avoided. URM developed and implemented an Integrated Model of Patient Safety and Staff Well-being in use today.

to more clearly demonstrate its importance to patient care. Academic clinicians began studying human factors and ergonomics, the impact of the workplace on a clinicians' executive brain function (needed for delivering quality care) and development of burnout. The purpose of human factors and ergonomics is to optimize overall system performance and human well-being. Patient safety is one component of system performance. Based

on research into biologic consequences of burnout on the human brain in the last six years, the team wondered if workplace–brain interactions could be the key to improving patient satisfaction, net revenue, patient safety and clinician well-being.

The patient experience team collaborated with the academic clinicians to utilize human factors and ergonomics concepts to show how a health system’s design can affect a physician’s cognitive capacity, quality of medical decision-making and quality of interaction with patients and families. Examples include:

- Multiple unharmonized quality metrics, mandatory requirements, laws, regulations and workflow expectations, which were intended to improve patient safety, have caused a high rate of interruptions, task-switching, sorting, sifting, classifying and frequent decision-making. All this drains brain power (neural resource) in a way that reduces the quality of complex clinical decisions. As chronic high stress mounts from such ongoing operational challenges, burnout sets in. In such conditions, the brain develops anatomic changes that reduce cognitive performance in the short-term and later in long-term memory, and also increase

How do human factors and ergonomics apply to the health system?

HFE includes considering and budgeting an individual’s “neural resources.” With high neural resources, clinicians are emotionally available for patients. They can add new clinical information into better decision-making to decrease errors. Workplace features that result in distraction, high stress, chaos and confusion lower a clinician’s neural resources. This biological reduction of cognitive function increases the risk of clinician burnout, medical errors and malpractice, and results in poor patient experience.

emotional reactivity. Neurotransmitter changes that occur from this same process decrease a clinician’s fine motor skills.



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- Neural resources can be depleted by a poorly designed electronic health record because of the sheer number of small decisions a clinician must make. Each mouse click is a decision and leaves less brain reserve for achieving accurate differential diagnosis, quality-of-care planning or other important clinical care decisions. Clicks matter.

Applying the science of human factors and ergonomics helped URM teams make the case for clinician well-being by directly identifying the causal link between clinician well-being and patient well-being.

URM deployed a wellness survey to physicians and nurse practitioners to understand the incidence of burnout—both emotional exhaustion and depersonalization. URM tried to determine leading workplace factors that drive burnout and estimate the cost of burnout to the health system.

The wellness survey helped identify and prioritize four rounds of feasible, high-impact system changes that URM could make to improve clinician well-being. The business case for well-being was identified: the survey revealed that lowering the clinician burnout rate would result in a savings of \$243,000 for every \$1 million currently spent by URM for employee medical insurance claims, and in additional revenues of \$169,000 for every \$1 million currently received for patient satisfaction

performance. Now focused on the Quadruple Aim, URM hired a well-being director who worked with others to develop leadership training on human factors science for the health system's division directors and administrators.

Lessons Learned

Since internal wellness efforts required changing from the Triple Aim to Quadruple Aim framework, building buy-in with hospital leadership involved the strategic use of credible, outside speakers. Their expertise encouraged and supported internal efforts to link clinician well-being to patient satisfaction, safety, quality and cost. Human factors and ergonomics principles are scientific and evidence based; that helped secure buy-in and collaboration of multiple hospital sectors and processes.

Human factors and ergonomics principles integrate well with Lean efforts, as they relate to mechanisms and explanations of how improvement occurs with Lean process. Once human factors and ergonomics principles are taught and applied in key areas like electronic health record optimization, workflow and process improvement committees, they easily spread within organizations.

Future Goals

URM plans to deploy recently developed educational modules on human factors-based leadership to division chiefs and administrative leaders to strengthen new managerial skills across the system. Longer term plans include measuring the impact of the modules and other well-being initiatives on hard outcomes such as malpractice claims, quality measures and patient experience. URM will continue to use human factors and ergonomics to redesign its system, improve the experience of providing care, foster behaviors and processes that improve patient satisfaction and safety, and reduce costs while providing top-notch care.

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